

City of Lincoln – Sewer Master Plan Update

Final Report

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Prepared by:
Stantec Consulting Services, Inc.

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184032446



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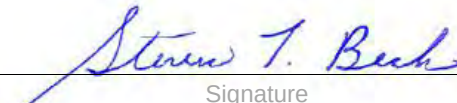
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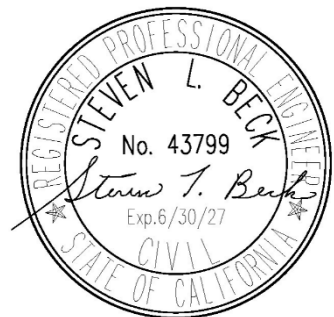
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Steve Beck, P.E.

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Appendix A Post 2018 Master Plan Collection System Planning Details

Appendix B Technical Memorandums

TECHNICAL MEMORANDUM NO. 1 – FLOW MONITORING PLAN

TECHNICAL MEMORANDUM NO. 2 – COLLECTION SYSTEM MODEL UPDATE AND CALIBRATION

The City of Lincoln Sanitary Sewer Flow Monitoring Study (V&A Consulting Engineers)

TECHNICAL MEMORANDUM NO. 3 – FUTURE LAND USE AND ASSUMPTIONS

TECHNICAL MEMORANDUM NO. 4 – CONDITION ASSESSMENT OF LIFT STATIONS

TECHNICAL MEMORANDUM NO. 5 – CONDITION ASSESSMENT OF DOWNTOWN SEWER
PIPELINES

Appendix C Placer County SMD1 Flow Projections

Appendix D CIP Opinion of Probable Cost Details



Executive Summary

ES-1. Introduction

This Sewer Master Plan Update and Capital Improvement Recommendations report presents a comprehensive, updated evaluation of the City of Lincoln's wastewater collection system to ensure reliable service for existing customers and accommodate planned future growth. Building upon the City's 2018 Wastewater Collection System Master Plan, this update reflects significant changes in service area boundaries, asset ownership, development planning, and newly available system condition and flow data.

The study area encompasses the existing sewer service area, undeveloped lands within the city limits, and the City's General Plan 2050 Sphere of Influence (SOI), including designated Villages and Special Use Districts (SUDs). The updated hydraulic modeling framework, originally developed in PCSWMM, incorporates updated calibration parameters and reflects post-2018 system modifications.

Since completion of the 2018 Master Plan, the City has experienced continued annexations and growth, and in November 2022 entered into a Joint Powers Agreement with Placer County establishing the Lincoln – Sewer Maintenance District 1 Wastewater Authority (LiSWA). As a result, ownership and operational responsibilities for the Regional Trunk Sewer, the Wastewater Treatment and Reclamation Facility (WWTRF), and related facilities were transferred to LiSWA. This Master Plan Update focuses exclusively on wastewater collection facilities that remain solely owned and operated by the City of Lincoln and excludes infrastructure now under LiSWA jurisdiction.

The primary purpose of this update is to re-evaluate the capacity and level of service of the City's remaining wastewater collection system under current conditions and projected growth scenarios. Key objectives include reviewing prior studies, confirming system data through as-built information and targeted field surveys, updating and recalibrating the hydraulic model using recent flow monitoring and WWTRF data, identifying existing and future hydraulic deficiencies, and developing conceptual upgrade strategies with associated order-of-magnitude cost estimates. The results are intended to support a defensible, prioritized Capital Improvement Program (CIP) that will guide future infrastructure investments and inform sewer rate and development fee planning.

Overall, this Master Plan Update provides the City with an updated, technically sound roadmap for maintaining acceptable levels of service, strategically extending wastewater infrastructure to support planned development, and coordinating future capital investments in a manner consistent with current ownership responsibilities and long-term sustainability goals.

ES-2. Existing Collection System

This chapter provides an overview and assessment of the City of Lincoln's existing wastewater collection system, focusing on regulatory compliance, system characteristics, recent flow monitoring, inflow and infiltration (I/I) conditions, and updates to the City's hydraulic model. The information presented establishes a technical foundation for identifying system vulnerabilities and informing future capital improvement planning.

Collection System Overview

The City's wastewater collection system operates under the State Water Resources Control Board's General Order for Sanitary Sewer Systems (WQ 2022-0103-DWQ). The City's Sewer System Management Plan (SSMP), updated most recently in August 2025, governs operation, maintenance, and management practices and supports regulatory



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compliance. The results of this Master Plan Update provide information required for Element 8 of the SSMP and should be incorporated into the next update. The SSMP is required to be updated every 6 years, at a minimum.

The existing collection system serves approximately 11,200 acres and more than 24,000 connections through an extensive network of gravity sewers, force mains, and pump stations. The system includes roughly 233 miles of City-owned sewers, the majority of which are 6- and 8-inch vitrified clay pipe installed during a period of rapid growth between 1998 and 2010. While much of the system is relatively modern, older pipe segments and the predominance of vitrified clay pipe increase vulnerability to cracking, joint failure, and infiltration. The City owns and operates multiple lift stations of varying ages and capacities, several of which are critical to system performance.

Flow Monitoring Study

A comprehensive flow monitoring study conducted from February through April 2025 provided new data for evaluating dry- and wet-weather system performance. Twelve flow monitoring sites, supplemented by influent data from the Wastewater Treatment and Reclamation Facility and the SMD1 Regional Pump Station, were used to assess Average Dry Weather Flow (ADWF), Peak Wet Weather Flow (PWWF), and flow variability across the system. Although none of the monitored storm events reached the design 10-year, 24-hour threshold, observed rainfall events produced sufficient response to support wet-weather model calibration.

Analysis of flow components confirmed that the collection system generally has adequate dry-weather capacity. However, elevated groundwater infiltration and rainfall-derived inflow and infiltration were observed throughout much of the system. Several sewer-sheds—particularly recorded at Site 3 (E Street Sewer south of Auburn Ravine), Site 4 (Regional Trunk Sewer along Ferrari Ranch Road, east of Hwy 65), and Site 5 (Old Town Sewer, along 5th Street upstream of Chamber Drive)—ranked highest for normalized I/I contributions, and most monitored locations exhibited groundwater infiltration rates exceeding typical standards. These findings indicate that while capacity issues are limited under dry-weather conditions, I/I significantly affects system performance during wet weather in certain areas of the system.

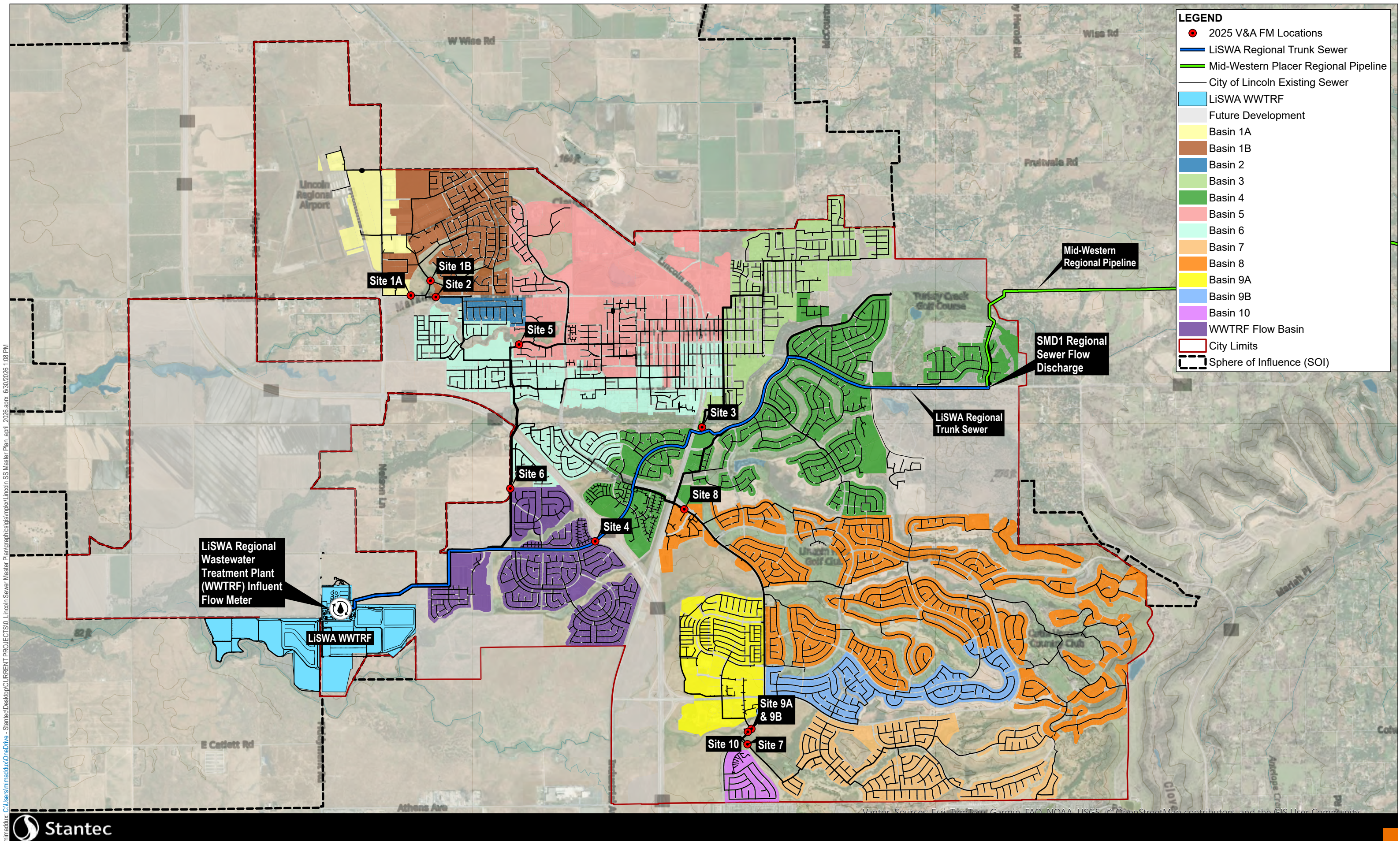
An overview of the flow monitoring locations and sewer sheds is shown on **Figure ES-1**.

Pump Station I/I Assessment

Focused I/I assessments were performed for the City's two largest pump stations: the Nicolaus Road Pump Station (NRPS) and the East Lincoln Parkway Pump Station (ELPPS). At the NRPS, substantial I/I was identified in sewers and manholes downstream of manhole monitored in the flow monitoring study, with more than 6.5 million gallons (MG) of I/I entering the system during the monitoring period. Proximity to Markham Ravine, floodplain conditions, and aging vitrified clay pipes contribute to these impacts. At the ELPPS, I/I is influenced by Orchard Creek, multiple creek crossings, and older residential areas. Specific basins within each pump station service area were identified as priority targets for investigation, rehabilitation, and I/I reduction.

The pump station I/I assessment identified specific sewer segments and facilities that contribute disproportionately high inflow and infiltration to the lift stations. Priority actions include rehabilitating or lining sewers and manholes upstream of the Nicolaus Road Pump Station, diverting or eliminating stormwater inflows at industrial areas and the airport, and conducting targeted smoke testing and inspections—particularly in the collection system upstream of Twelve Bridges Drive and at key sewer crossings. Given the prevalence of vitrified clay pipe, focused rehabilitation of aging VCP segments and drainage crossings, especially in the collection system upstream of Twelve Bridges Drive and upstream of Wilson Park, is recommended. These targeted measures will reduce I/I and improve system performance and reliability. Additional details are provided in the recommended Capital Improvement Program described in **Chapter 7**.





Hydraulic Model Update

The City's hydraulic model, originally developed for the 2018 Master Plan, was upgraded to the current PCSWMM platform and recalibrated using the 2025 flow monitoring data. Calibration followed industry best practices and accounted for both dry- and wet-weather conditions. The updated model provides a reliable, current representation of system performance and serves as a key tool for evaluating capacity, prioritizing rehabilitation, and supporting long-term growth planning. Detailed documentation of the process can be found in Technical Memorandum No. 2 – Collection System Model Update and Calibration (TM 2) in **Appendix B**.

ES-3. Wastewater Flow Projections

This chapter presents the methodology, data sources, and assumptions used to project future wastewater flows for the City of Lincoln over the planning horizon defined by the General Plan. These projections provide the analytical foundation for updating the hydraulic model, evaluating the performance of the existing collection system, and identifying infrastructure improvements needed to accommodate anticipated growth within the city and its SOI.

Historical Wastewater Flow

Historical influent flow data from the WWTRF spanning 2005 through 2024 indicates a strong correlation between rainfall and peak wastewater flows, highlighting the system's sensitivity to inflow and infiltration (I/I). Since 2016, flows include contributions from SMD1, which has increased both average and peak flows due to higher elevations and higher rainfall in that service area. Analysis of historical ADWF normalized by equivalent dwelling units (EDUs) shows a long-term decline in per-unit wastewater generation driven by water conservation and efficiency, followed by a partial rebound after 2020. Despite these trends, conservative design assumptions are retained for planning purposes to ensure long-term system reliability.

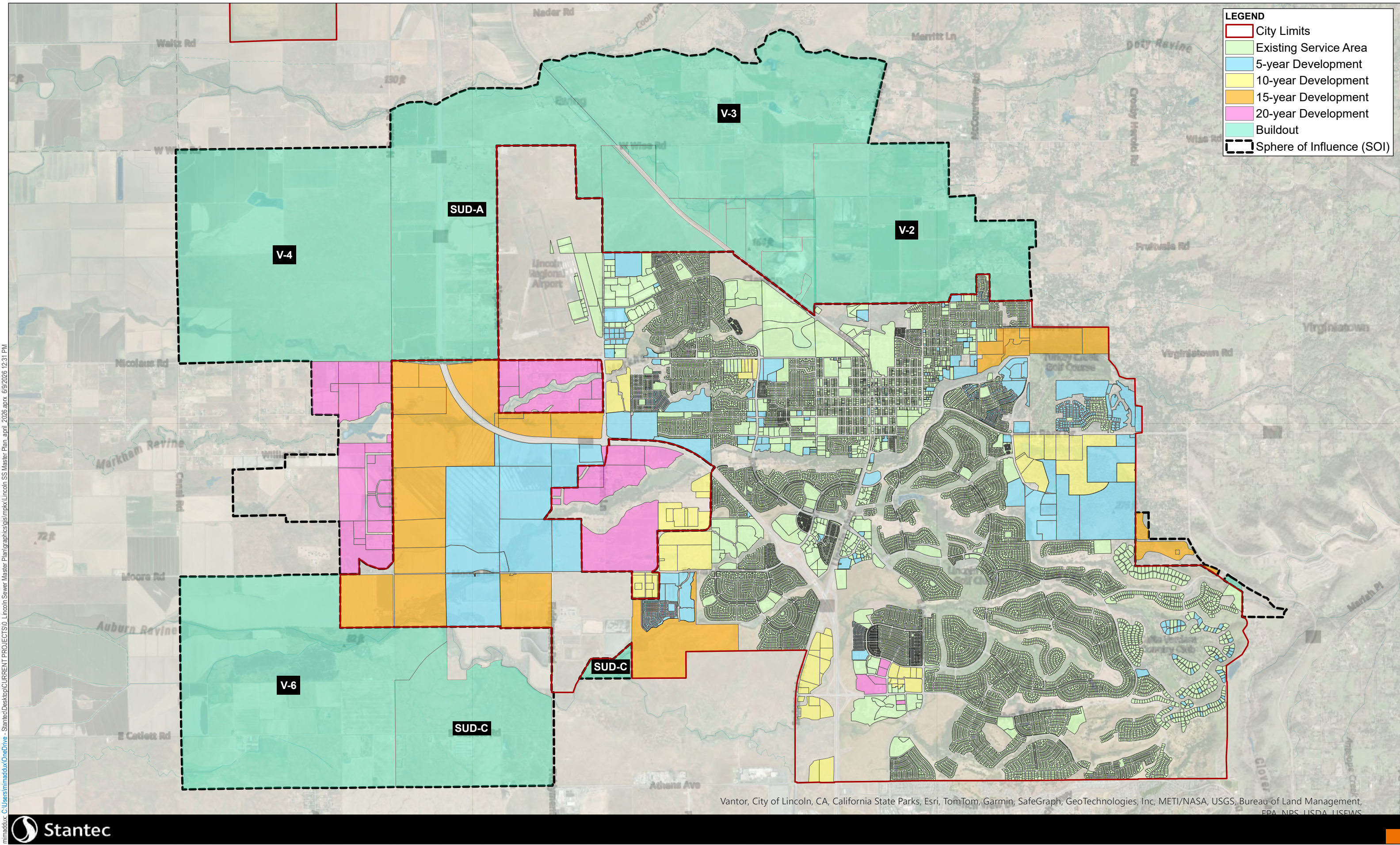
Future ADWFs are projected using the City's established design standard of 250 gallons per day per EDU, consistent with the City of Lincoln Department of Public Works Design Criteria and Procedures Manual. This approach intentionally exceeds recent average generation rates to account for variability, aging infrastructure, and the limited flexibility of collection system facilities. PWWFs are estimated using a combination of calibrated rainfall dependent I/I model parameters for existing service areas and peaking factor methods for future developments and new infrastructure.

Land Use and Future Growth Assumptions

Land use and growth assumptions are based on the City's General Plan 2050, detailed GIS data, specific plans, and coordination with City staff. Development is phased in five-year increments over a 20-year planning horizon, with remaining growth assumed at ultimate buildout. Growth is categorized into three primary areas: infill and annexed development within current city limits, unannexed lands within the SOI, and longer-term SOI developments including Villages and SUDs. Stantec reviewed the future growth areas and development assumptions with the City and documented the details in Technical Memorandum No. 3 – Future Land Use and Assumptions (TM 3). Detailed effort went into identifying each development area, the associated land use assumptions, and the projected development timeline, for full details please refer to TM 3 in **Appendix B**.

Future development area phasing is shown on **Figure ES-2**.





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Wastewater Flow Estimates

At buildout, the City is projected to serve an additional 39,580 EDUs of new residential development and 3,710 acres of new non-residential development, corresponding to an estimated total ADWF of 20.7 MGD from the City service area. Regional wastewater contributions from SMD1 are also incorporated into the analysis to account for backwater effects and shared infrastructure constraints. At full buildout, combined flows from the City of Lincoln and SMD1 are projected to reach approximately 26.0 MGD of ADWF. The total ADWF projected at each level of development is summarized in **Table ES-1**.

Table ES-1. Total ADWF at Each Development Phase

Development	City of Lincoln Service Area		Total ADWF (MGD)		
Phase	Area (Acres)	EDU	Lincoln	SMD1	Total
Existing	5,567		4.59	1.41	6.00
5-year	7,930	10,250	7.16	2.02	9.18
10-year	8,679	14,978	8.34	2.34	10.68
15-year	10,727	20,887	9.82	2.54	12.36
20-year	12,059	24,790	10.79	2.68	13.47
Buildout	24,098	64,389	20.69	5.31	26.00

Overall, this chapter establishes a conservative yet data-driven framework for wastewater flow projection. By integrating historical trend reviews, standardized design criteria, detailed land use planning, and calibrated hydraulic modeling, the flow projections provide a robust basis for assessing system capacity, prioritizing capital improvements, and supporting sustainable growth consistent with regulatory requirements and the City's long-term planning goals.

ES-4. Servicing Strategy and Assessment Criteria

This chapter defines the servicing strategy, capacity assessment criteria, and design standards used to evaluate wastewater collection system performance under existing and future development conditions. Together, these elements provide a consistent and defensible framework for interpreting hydraulic model results and identifying improvement needs across the planning horizon scenarios.

Servicing Strategy

The servicing strategy builds upon, but revises, the approach established in the 2018 Master Plan. While the earlier plan emphasized large regional gravity trunk sewers to bypass the existing system and minimize long-term operating costs, it created phasing challenges that were not well aligned with actual development timing. This Master Plan Update shifts toward a more flexible strategy that better utilizes residual capacity in the existing system and supports incremental growth. The revised approach updates the future collection system layout presented in the 2018 Master Plan considering the utilization of residual capacity, removing the primary focus from new large gravity sewers. This presents a more feasible approach for serving future development recognizing the need for near- and mid-term feasibility as development occurs in stages.

Level of Service (LOS) Criteria

Level of service (LOS) criteria are established to evaluate collection system performance under peak wet weather conditions using a 10-year, 24-hour design storm. System capacity is assessed using multiple complementary metrics, including allowable surcharge, hydraulic loading ratio (HLR), residual capacity, depth-to-diameter (d/D) ratio,



flow velocity, and reliable pump station capacity. For existing infrastructure, limited surcharge is permitted provided minimum freeboard requirements are maintained, while no surcharge is allowed for new facilities. HLR thresholds differentiate acceptable performance in dry weather versus wet weather and guide the identification of deficient pipes and the sizing of future infrastructure. Additional performance indicators, such as velocity ranges and pump station reliable capacity, are used to ensure operational reliability and maintenance efficiency.

Future Infrastructure Design Criteria

Design criteria for future infrastructure establish uniform assumptions for modeling and layout of new facilities, including manhole spacing, allowable drops, pipe roughness, velocity limits, and pipe sizing based on full-capacity flow. These criteria ensure consistency between hydraulic modeling and future detailed design while supporting conservative planning assumptions. A summary of the criteria used to layout the future system can be found in **Table 4-3**.

Overall, this chapter establishes a balanced, practical framework for evaluating system performance and planning future wastewater infrastructure. The servicing strategy and criteria support phased development, regulatory compliance, and cost-effective long-term operation while maintaining acceptable levels of service as the City continues to grow.

ES-5. Capacity Evaluation Results

This chapter presents the results of the wastewater collection system capacity evaluation conducted as part of the Master Plan Update. Hydraulic modeling was used to assess system performance under existing conditions and a range of future growth scenarios. Model results were evaluated against established Level of Service (LOS) criteria to identify capacity constraints, assess risks under peak wet weather conditions, and define capital improvement needs.

Six planning scenarios were evaluated, representing the existing level of development, intermediate growth horizons (5-, 10-, 15-, and 20-year scenarios), and ultimate General Plan buildout. Each scenario builds upon the previous one and simulates peak wet weather flow (PWWF) conditions using a 10-year, 24-hour design storm to evaluate system resiliency. The analysis considered projected increases in average dry weather flow (ADWF), peak flows, and pump station demands as future development is added incrementally across the City.

Existing System Performance

Under existing dry weather conditions, the collection system performs adequately. Modeled flows indicate no significant capacity constraints, no surcharging, and full compliance with LOS criteria. Most sewers operate well below recommended hydraulic thresholds, indicating sufficient capacity under normal operating conditions.

Under existing wet weather conditions, however, the 10-year design storm reveals capacity limitations in select portions of the system. Four distinct areas experience surcharging or inadequate freeboard that fail LOS criteria:

- 1. Upstream of the East Lincoln Pump Station (ELPPS):**

Insufficient gravity sewer capacity along portions of Joiner Parkway and Twelve Bridges Drive results in significant surcharging. Upsizing of undersized sewer segments is recommended.

- 2. Old Town North Trunk Sewer:**

Portions of the trunk sewer along 5th Street exhibit shallow surcharge depths that nonetheless fail freeboard requirements due to limited burial depth. Targeted capacity improvements are recommended.



3. Upstream of the Nicolaus Road Pump Station (NRPS):

Surcharging is driven by a combination of upstream pipe capacity limitations, lift station operations, and excessive inflow and infiltration (I/I). Addressing I/I is expected to improve system performance at this level of development.

4. Chambers Drive Sewer Confluence:

Multiple legacy trunk sewers converge at a deep trunk sewer where downstream capacity is constrained. While localized surcharge is predicted, sufficient freeboard remains, and due to the depth and complexity of this infrastructure, the City may elect to allow this condition under existing LOS standards.

Based on the modeling results, two primary gravity sewer capacity projects are recommended to address existing wet weather deficiencies: upsizing sections of the Joiner Parkway/Twelve Bridges Drive sewer and the Old Town North Trunk sewer along 5th Street. In addition, targeted I/I reduction improvements upstream of the NRPS and ELPPS are recommended to mitigate excessive wet weather flows and improve system performance without solely relying on pipe upsizing. Ongoing inflow and infiltration reduction efforts and repair and rehabilitation (R&R) programs are also identified as essential complementary strategies for maintaining system capacity and reducing long-term risks.

Overall, the capacity evaluation confirms that the City of Lincoln's wastewater collection system performs well under dry weather conditions but experiences localized deficiencies during peak wet weather events. The recommended capital improvements and targeted I/I mitigation measures address these deficiencies and provide a framework for maintaining acceptable levels of service as development continues. These findings form the basis for the capacity-related projects included in the Capital Improvement Plan presented in **Chapter 7**.

Future Development Results

Future development scenarios indicate that, with strategic investments, the collection system can support projected growth while maintaining acceptable levels of service.

5-year Development Scenario:

Near-term growth increases peak wet weather flows significantly and exacerbates existing constraints, particularly at the Chambers Drive sewer confluence, segments of the Old Town South Trunk, and upstream of the NRPS and Independence Pump Stations. While severe SSOs are not predicted, several facilities approach or exceed reliable capacities. Recommended improvements focus on selective sewer diversions, trunk sewer upsizing in constrained downtown areas, and aggressive I/I reduction—particularly upstream of the NRPS. Recently constructed facilities, such as the Independence Pump Station, are recommended to be monitored rather than expanded in the near term.

10-year Development Scenario:

Additional development further increases flows into the Chambers Drive trunk sewer and upstream of the NRPS. Although surcharging becomes more pronounced, available freeboard remains sufficient to limit SSO risk. Improvements in this phase are generally deferred or made contingent upon development timing, with I/I mitigation continuing to be a preferred early action to reduce peak flows.

15-year Development Scenario:

Mid-term growth introduces new capacity limitations in previously unconstrained areas, most notably along Virginiatown Road associated with northern Village 1 development. Strategic bypass sewers and selective upsizing are recommended to relieve these constraints while preserving system redundancy. This scenario also enables implementation of major regional infrastructure—including the Nelson Lane trunk sewer—



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which allows key pump stations (NRPS and Lincoln Square) to be taken offline, eliminating constraints at the Chambers Drive sewer confluence and improving long-term system resilience.

20-year Development Scenario:

Under 20-year conditions, the modeled system performs adequately with no new capacity deficiencies identified, assuming earlier improvements are implemented. The analysis also confirms that substantial residual capacity remains in the Regional Trunk Sewer, Moore Road, E Street, and Ferrari Ranch trunk sewers. This residual capacity provides multiple viable pathways for serving ultimate buildout within the City's Sphere of Influence without triggering widespread reinvestment in the existing core system.

The capacity evaluation supports a phased capital improvement program that aligns infrastructure investments with development timing. Early-phase projects prioritize risk reduction in the existing system through targeted sewer upsizing, diversions, and I/I mitigation. Mid- and long-term projects focus on expanding regional conveyance capacity to support future villages. New trunk sewers and pump stations identified in the CIP are sized to accommodate upstream buildout, reducing the need for repeated upgrades.

The capacity evaluation demonstrates that the City of Lincoln's wastewater collection system can accommodate projected growth through the 20-year development window with timely implementation of recommended capital improvements. The phased approach provides a cost-effective, resilient framework for maintaining system performance, minimizing wet weather risks, and supporting sustainable community growth.

Buildout Development Results

The buildout scenario evaluates ultimate development of the City's full General Plan area, including Villages 2, 3, 4, and 6, and SUD-A and SUD-C. At buildout, average dry weather flow is projected to increase to approximately 26.0 MGD, with peak wet-weather flow reaching approximately 79 MGD at the WWTRF. Modeling confirms that, with implementation of previously identified trunk sewer and pump station improvements, the system can convey buildout flows while maintaining acceptable LOS.

To support ultimate development, servicing strategies were developed for three regional areas—northeast, northwest, and southwest—reflecting topography, environmental constraints, floodplains, and residual capacity in the existing system. These strategies establish a “backbone” framework of trunk sewers and pump stations for each area, with infrastructure sized to accommodate future upstream development and to be refined as specific plans advance.

- **Northeast (Villages 2 and 3):** Development is served by new regional pump stations and force mains directed toward existing trunk sewers with available residual capacity. A phased approach allows temporary facilities in early development stages, transitioning to permanent regional infrastructure as buildout occurs.
- **Northwest (SUD-A and Village 4):** Service relies on the Nelson Lane trunk sewer and a regional pump station serving northern Village 5 and SUD-A. The strategy divides the area into multiple pump station service sheds to support phased development and reduce reliance on a single large facility.
- **Southwest (SUD-C and Village 6):** The servicing approach accounts for extensive floodplains and environmental preserves by concentrating development south of Auburn Ravine and using a combination of regional and localized pump stations. Trunk sewer improvements along Moore Road and new influent sewers provide long-term conveyance capacity to the treatment facility.

Overall, the buildout analysis demonstrates that the City can accommodate full General Plan development through a coordinated, phased investment in regional conveyance infrastructure. The recommended strategies reduce long-term reliance on temporary pump stations, improve system resiliency, and preserve flexibility to adjust infrastructure as development timing and land use intensities evolve.



The capacity evaluation supports a phased Capital Improvement Program that prioritizes near-term risk reduction in the existing system, followed by strategic expansion of regional trunk sewers and pump stations to support growth. Early investments focus on targeted upsizing and I/I mitigation, while mid- and long-term projects establish a robust backbone system capable of serving buildout development.

Overall, the analysis confirms that the City of Lincoln's wastewater collection system can reliably support projected growth through full buildout, provided recommended capital improvements are implemented in coordination with development. This approach promotes cost-effective infrastructure planning, maintains regulatory compliance, and ensures long-term system resilience.

ES-6. Condition Evaluation

This chapter presents the results of the condition evaluations performed for the City of Lincoln's wastewater system, including sewer lift stations and select downtown sewer pipelines. The purpose of these evaluations was to assess the current condition, reliability, and risks associated with critical system components and to support development of priority projects for inclusion in the City's Capital Improvement Program (CIP) as part of the Sewer Master Plan Update. Detailed findings are documented in Technical Memorandum No. 4 – Condition Assessment of Lift Stations and Technical Memorandum No. 5 – Condition Assessment of Downtown Sewer Pipelines, provided in **Appendix B**.

Lift Station Condition Assessment

A comprehensive condition assessment of the City's sewer lift stations was conducted through site inspections performed on August 7, 2025. The assessments focused on evaluating the structural, mechanical, electrical, and operational condition of each lift station to identify deficiencies, risks, and opportunities for proactive investment. Inspections were conducted by discipline-specific experts, with City operations and maintenance staff present to incorporate institutional knowledge and operational history.

Each lift station was evaluated using a standardized "Lincoln Lift Station Condition Field Assessment Form," which addressed key asset categories, including pumps and piping, wet well structures, electrical and instrumentation systems, site security, and civil features. Based on the findings, each lift station was assigned Probability of Failure and Consequence of Failure ratings, which were used to help prioritize recommended improvements.

Key issues identified across the lift station inventory include lack of fall protection at wet wells, aging or corroded piping, electrical panels nearing or exceeding their expected service life, communication and alarm system deficiencies, limited or absent backup power, and site safety concerns. At select stations—most notably the Flightline and Q Street lift stations—multiple deficiencies were identified that warrant capital-level rehabilitation projects.

Recommendations were developed for each lift station and categorized as either operations and maintenance (O&M) actions or capital improvement projects, with CIP projects generally defined as having estimated costs exceeding \$75,000. Recommended actions range from minor safety improvements and equipment repairs to full replacement of pumps, control panels, and electrical systems. The results support the inclusion of targeted lift station rehabilitation projects in the City's CIP to improve reliability, safety, and regulatory compliance. It is also recommended that the City continue an ongoing, five-year condition assessment cycle to reassess asset condition and refine CIP priorities.

Downtown Sewer Pipeline Condition Assessment

A condition assessment of select sewer pipelines in the Downtown Area was completed using closed-circuit television (CCTV) inspection. The assessment focused on pipelines within defined downtown boundaries and included approximately 25,184 linear feet of sewer pipe prioritized by the City. Inspections were performed by a NASSCO-certified contractor in accordance with the Pipeline Assessment Certification Program (PACP) standards.



Structural, operations and maintenance (O&M), and overall condition ratings were assigned to each inspected pipeline based on PACP scoring criteria. These ratings provide a consistent and objective basis for identifying deficient pipelines, prioritizing rehabilitation needs, and supporting future capital planning decisions. The results of this assessment establish a baseline condition for the downtown sewer system and inform the development of repair, rehabilitation, and replacement strategies within the Sewer Master Plan.

Overall, the combined lift station and pipeline condition evaluations provide a critical foundation for strategic asset management, enabling the City of Lincoln to prioritize investments, reduce system risk, and maintain reliable wastewater service over the long term.

ES-7. Capital Improvement Program (CIP)

This chapter presents the Wastewater Collection System Capital Improvement Program (CIP) developed for the City of Lincoln as part of the Sewer Master Plan Update. The CIP translates the findings of the hydraulic capacity modeling, pump station inflow and infiltration (I/I) assessments, and system condition evaluations into a structured, prioritized set of capital projects and ongoing programs. The objective of the CIP is to maintain regulatory compliance, protect public health, support planned growth, and manage infrastructure investment over time in a fiscally responsible manner.

The CIP represents a snapshot of known system conditions as of April 2026 and is intended to serve as a planning-level framework. Project priorities, scopes, costs, and schedules should be revisited regularly to reflect changing system conditions, development timing, and available funding. All project costs are expressed in 2026 dollars and should be escalated annually using a recognized construction cost index.

Recommended projects are organized into three categories reflecting the primary drivers for infrastructure investment:

- **Condition Improvement Projects** address known deficiencies identified through system condition assessments, pump station evaluations, and ongoing repair and rehabilitation needs. These projects focus on reducing risk, improving reliability, and extending asset life.
- **Capacity Improvement Projects** address hydraulic deficiencies identified through modeling under existing and future development conditions through the 20-year planning horizon.
- **Buildout Improvement Projects** represent major infrastructure investments needed to extend sewer service to the City's Sphere of Influence (SOI) at full General Plan buildout.

Projects are presented chronologically to distribute costs over time while prioritizing those that mitigate the highest risk to the community.

Project Prioritization Approach

Projects were prioritized based on their ability to address the most critical risks to the wastewater system. Highest priority was assigned to projects that resolve existing system surcharging, condition-related failures, or public health and safety concerns. Secondary priority was given to projects needed to maintain LOS as new development occurs, followed by long-term infrastructure required to serve future growth areas. This framework provides flexibility to adjust implementation timing as development or operating conditions change.

Cost Estimating Methodology

The CIP cost estimates represent engineering opinions of probable cost consistent with early-stage planning (AACE Class 5). Estimates include construction costs, contingency allowances, and soft costs for engineering, construction management, inspection, and City administration. Unit costs were developed using recent City bid data, manufacturer



pricing, and comparable California infrastructure projects. Land acquisition, financing costs, and long-term operations and maintenance costs are not included. As projects advance toward design, costs should be refined accordingly.

Condition Improvement Projects

Condition-based investments focus on proactive asset management and risk reduction. These include the Infrastructure Repair and Replacement (R&R) Program, which provides a continuous mechanism to address aging infrastructure and excessive wet-weather flows. The following items are recommended for inclusion in the City's on-going R&R program:

- A.1: The Lift Station O&M Improvements identified in **Table 6-2** and Technical Memorandum No. 4 – Condition Assessment of Lift Stations Technical Memorandum (TM 4) in **Appendix B**. Improvements are identified for seven of the City's lift stations and are less than \$75,000 each.
- A.2: Rehabilitation of the Downtown Sewer Pipelines as described in **Section 6.2** and Technical Memorandum No. 5 – Condition Assessment of Downtown Sewer Pipelines (TM 5) in **Appendix B**. The TM identifies priority pipelines and budgets to improve inspected pipelines. The cost to address pipes needing near-term rehabilitation is estimated as \$767,000.
- A.3: The I/I Reduction Program described in **Section 7.4.1**.

In addition, targeted capital projects address concentrated I/I impacts at the Nicolaus Road and East Lincoln Parkway Pump Stations, as well as rehabilitation of the Flightline Drive Lift Station. Together, these projects reduce operational risk, improve resilience, and defer the need for more extensive capacity upgrades. A breakdown of each project's opinion of probable cost is presented in **Appendix D**. A summary of the opinion of probable costs for the condition improvement projects is presented in **Table ES-2**.

Table ES-2. Condition Improvement Projects Opinions of Probable Costs

CIP Project	Name	Total Project Cost
A	Infrastructure Repair and Replacement (R&R) Program	\$3,000,000/year
B	Flightline Drive Lift Station Rehabilitation	\$615,000
C	Nicolaus Road Pump Station (NRPS) I/I Improvements	\$2,517,000
D	East Lincoln Parkway Pump Station (ELPPS) I/I Improvements	\$1,609,000
Total:		\$4,741,000

Capacity Improvement Projects

Capacity improvement projects address deficiencies identified through hydraulic modeling under existing and future conditions through the 20-year planning horizon. These projects include sewer upsizing in constrained areas of the downtown system, construction of major trunk sewers along Moore Road and Nelson Lane, bypass sewers to relieve localized bottlenecks, and pump station bypass projects that improve long-term system efficiency. Collectively, these projects form the backbone of the collection system needed to reliably convey future flows while maintaining acceptable LOS standards. A breakdown of each Project's opinion of probable cost is presented in **Appendix D**. A summary of the opinion of probable costs for the capacity improvement projects is presented in **Table ES-3**.



Sewer Master Plan Update

Executive Summary

Table ES-3. Capacity Improvement Projects Opinions of Probable Costs

CIP Project	Name	Description	Model Scenario	Total Project Cost
1	Joiner/Twelve Bridges Dr.	Upsize 4,485 LF of 12-inch sewer to 15-inch sewer.	1 (Existing)	\$3,283,000
2	Old Town North Trunk, 5th Street - Joiner Pkwy to R St.	Upsize 1,552 LF of 15-inch sewer to 18-inch sewer.	1 (Existing)	\$1,113,000
3	Chambers Drive Sewer Diversion	62 LF of new 18-inch sewer diverting flow to the 30-inch sewer in Chamber Drive.	2 (5-year)	\$64,000
4	Old Town South Trunk, Alley - Joiner Pkwy to R St.	Upsize 1,627 LF of 15-inch sewer to 18-inch sewer.	2 (5-year)	\$1,139,000
5	Influent Trunk Sewer from Moore and Fiddymment Road	3,284 LF of new 54-inch sewer.	2 (5-year)	\$11,609,000
6	Moore Road Trunk Sewer - Phase I	5,379 LF of new 42-inch sewer.	2 (5-year)	\$14,339,000
7	Virginiatown Road Bypass - Epick Upsizing	663 LF of 8-inch through Epick upsized to 10-inch 902 LF of 10-inch in Virginiatown upsized to 12-inch 1,923 LF of 10-inch bypass sewer in Liberty Lane	4 (15-year)	\$3,164,000
8	Nelson Lane Trunk Sewer	12,871 LF of new 36-inch sewer	4 (15-year)	\$34,187,000
9	Lincoln Square LS Bypass to Nelson Lane	1,651 LF of new 15-inch sewer	4 (15-year)	\$1,879,000
10	NRPS Bypass to Nelson Lane	75 LF of 10-inch sewer 895 LF of 15-inch sewer 1,840 LF of 18-inch sewer	4 (15-year)	\$3,717,000
11	Moore Road Trunk Sewer - Phase II	2,581 LF of new 36-inch sewer	4 (15-year)	\$3,827,000
12	N. Village 5/SUD-A PS and Dual Force Main	7.2 MGD pump station and 9,045 LF of dual 18-inch force main	4 (15-year)	\$35,100,000
Total:				\$113,421,000

Buildout Improvement Projects

Buildout projects support ultimate development of the City's SOI and are organized by geographic service regions—northeast, northwest, and southwest. These improvements include new regional pump stations, force mains, and trunk sewers sized to accommodate ultimate buildout flows. The proposed servicing strategies provide a scalable framework that allows phased development while minimizing reliance on temporary facilities and reducing long-term operational complexity. A breakdown of each Project's opinion of probable cost is presented in **Appendix D**. A summary of the opinion of probable costs for the Buildout Improvement Projects is presented in **Table ES-4**.



Sewer Master Plan Update

Executive Summary

Table ES-4. Buildout Improvement Projects Opinions of Probable Costs

Buildout Region	Service Areas	Total Project Cost
Northeast	Village 2 and Village 3	\$112,860,000
Northwest	SUD-A and Village 4	\$73,833,000
Southwest	SUD-C and Village 6	\$56,535,000
Total:		\$243,228,000

CIP Overview and Conclusions

The Collection System CIP represents a comprehensive, phased investment strategy that balances immediate system needs with long-term growth planning. Near-term investments prioritize condition improvements and I/I reduction to mitigate risk and optimize existing capacity. Mid- and long-term investments expand regional conveyance infrastructure to support growth and eliminate systemic capacity constraints.

Overall, the CIP establishes a clear, defensible roadmap for maintaining a safe, reliable, and resilient wastewater collection system. With periodic updates and adaptive implementation, the program provides the City of Lincoln with a strategic framework to support community growth while managing infrastructure costs over time.

An overview of the Collection System CIP projects is shown on **Figure ES-3**.



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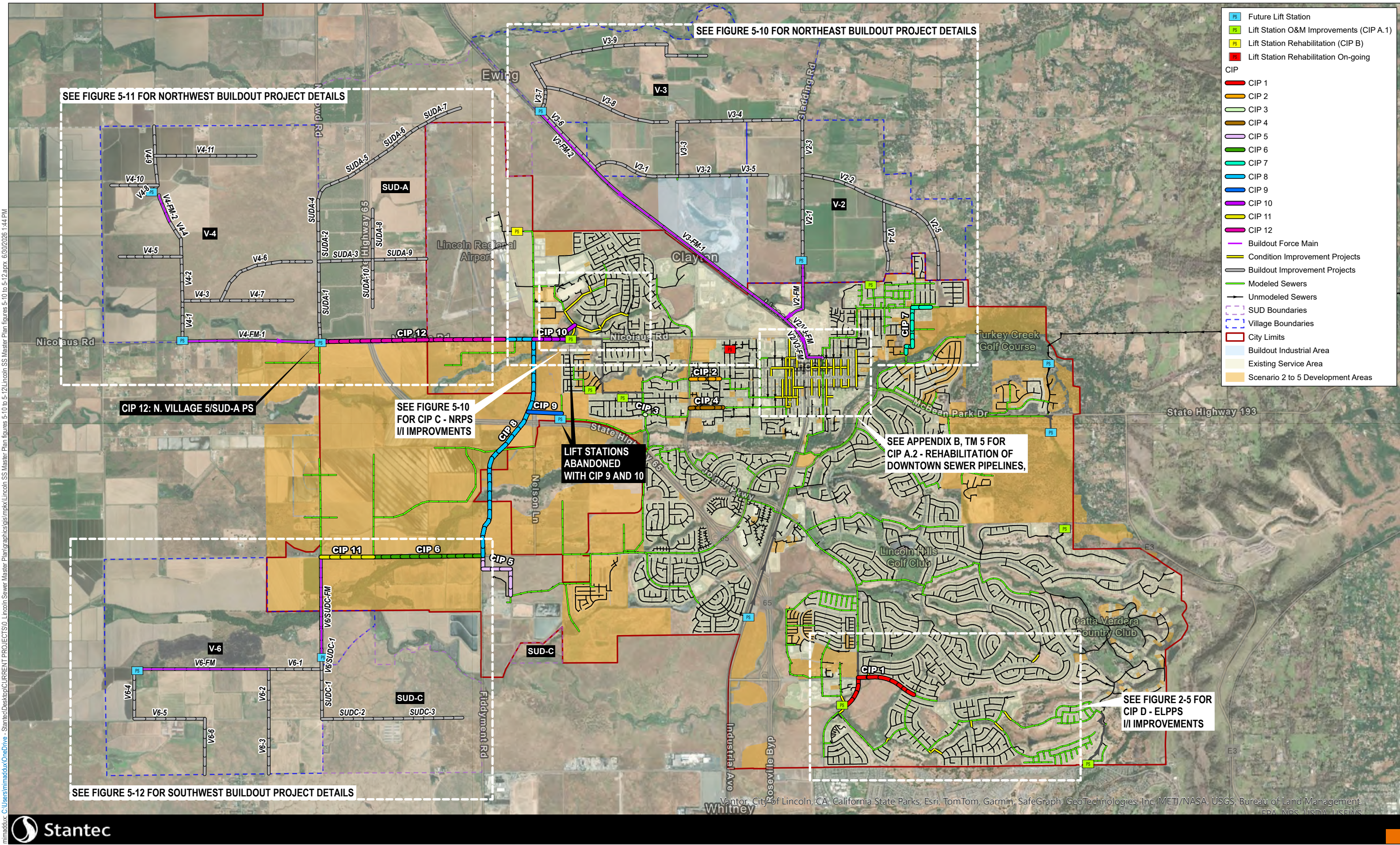


FIGURE ES-3
CAPITAL IMPROVEMENT PROGRAM (CIP) OVERVIEW
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
ADWF	Average Dry Weather Flow
ALT	Alternative (alignment or design option)
CCTV	Closed-Circuit Television (pipeline inspection)
CIP	Capital Improvement Program
CIP #	Capital Improvement Project identifier
CIPP	Cured-In-Place Pipe
CIWEM	Chartered Institution of Water and Environmental Management
COJA	Construction, Operations and Joint Exercise of Powers Agreement
d/D	Depth-to-Diameter Ratio
EDU	Equivalent Dwelling Unit
ELPPS	East Lincoln Parkway Pump Station
ENRCCI	Engineering News Record Construction Cost Index
FM	Force Main
FM-1, FM-2	Force Main segment identifiers
GIS	Geographic Information System
GW	Groundwater Infiltration
HGL	Hydraulic Grade Line
HLR	Hydraulic Loading Ratio
HP	Horsepower
I/I	Inflow and Infiltration
in	inches
JPA	Joint Powers Agreement
LF	Linear Feet
LiSWA	Lincoln – Sewer Maintenance District 1 Wastewater Authority
LOS	Level of Service
LS	Lift Station
MCC	motor control center
MG	Million Gallons
MGD	Million Gallons per Day
n	Manning's Roughness Coefficient
NASSCO	National Association of Sewer Service Companies
NorCal	NorCal Pipeline Services
NRPS	Nicolaus Road Pump Station
O&M	Operations and Maintenance
PACP	Pipeline Assessment Certification Program
PCSWMM	Personal Computer Storm Water Management Model
PG&E	Pacific Gas and Electric
PS	Pump Station
PVC	Polyvinyl Chloride
PWWF	Peak Wet Weather Flow
R&R	Repair and Replacement



Sewer Master Plan Update

Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
RCP	Reinforced Concrete Pipe
RDII	Rainfall Dependent Inflow and Infiltration
ROW	Right-of-Way
SMD1	Sewer Maintenance District No. 1
SOI	Sphere of Influence
SSMP	Sewer System Management Plan
SSO	Sanitary Sewer Overflow
SUD	Special Use District
SUDA-#	Special Use District Area project identifier
TM	Technical Memorandum
V&A	V&A Consulting Engineers
V2-PS, V3-FM	Village-specific infrastructure IDs
VCP	Vitrified Clay Pipe
WWTP	Wastewater Treatment Plant
WWTRF	Wastewater Treatment and Reclamation Facility



1 Introduction and Background

This Sewer Master Plan Update and Capital Improvement Recommendations report (Master Plan Update) summarizes the comprehensive evaluation of the capacity and condition of the wastewater collection system in the City of Lincoln (City) to safely convey current and projected future wastewater flows. It presents a sustainable and defensible plan to address existing level of service deficiencies and future development needs through a prioritized Capital Improvement Program (CIP).

The current Wastewater Collection System Master Plan (2018 Master Plan) was developed by Stantec in 2018 to provide an evaluation of collection system capacity needs within the existing and planned future boundaries of the City as they existed at that time. It provided sewer servicing options considering the then commitments to regional customers outside of city limits and established a CIP to address existing and future needs of the wastewater collection system.

Since the development of the 2018 Master Plan, there have been several changes to the City's service area, responsible assets, and development planning. An important part of this Master Plan Update is to address changes in ownership of the City's wastewater treatment and collection assets. The Lincoln – Sewer Maintenance District 1 Wastewater Authority (LiSWA) was established on November 30, 2022, by the execution of a Joint Powers Agreement (JPA) between the City of Lincoln and Placer County (County).

This Master Plan Update revises the City's 2018 Master Plan to consider these changes and provide updated recommendations based on current flow conditions and new condition assessment data of select assets. The purpose of this chapter is to present the Master Plan Update scope of work, study area, and background information.

This chapter is divided into the following sections:

- Scope and Objectives
- Study Area
- Background Information

1.1 Scope and Objectives

The overall goals of this Sewer Master Plan Update are to evaluate the existing collection system capacity and identify any new capacity deficiencies in the collection system since the 2018 Master Plan.

The City has established the following objectives for this Master Plan Update:

- Collect, review, and summarize previous studies and reports.
- Collect as-built drawings for existing trunk sewers, as well as conduct surveys to confirm manhole inverts and rim elevations where confirmation is needed.



- Update and calibrate the existing hydraulic model of the wastewater collection system to simulate existing diurnal patterns and wet weather response using Wastewater Treatment and Reclamation Facility (WWTRF) data and new collection system flow monitoring data.
- Evaluate the level of service of the existing sewer system using the updated model.
- Identify hydraulic deficiencies (if any) within the existing sewer system.

Extend the hydraulic model by adding annexation areas to predict dry and wet weather deficiencies that would incur due to the growth scenarios.

- Develop a conceptual sewer service upgrade strategy of the existing network services to annexed lands and prepare concept level of opinion of probable cost for budgeting purposes.
- Model the conceptual upgraded networks.
- Interpret the results of the analysis and master planning effort to identify necessary capital improvements and associated costs. This effort will serve as a basis for recommendations (by others) for adjustments in sewer enterprise fund revenues, including ongoing sewer charges (e.g. monthly rates) and one time development impact fees.

1.2 Study Area

The City of Lincoln (City) is located within the Sacramento metropolitan area in Placer County, California. The existing city limits boundary encompasses an area of 18,457 acres or approximately 28.8 square miles, much of which has recently been annexed and is yet to be developed. Currently, the City provides wastewater collection service to about 11,200 acres within its boundaries, supporting a population of over 50,000 residents, along with various industrial and commercial users.

This Master Plan Update focuses on the area outlined in the City of Lincoln General Plan 2050, addressing both existing and future wastewater collection system infrastructure needs. The study area includes the existing sewer service area, undeveloped areas within city limits, and the extent of the City's current General Plan Sphere of Influence (SOI), including the new Villages, and Special Use Districts (SUDs) identified in the General Plan Land Use and Circulation Diagram.

Figure 1-1 illustrates the study area, including the current sewer service area and areas of future development.



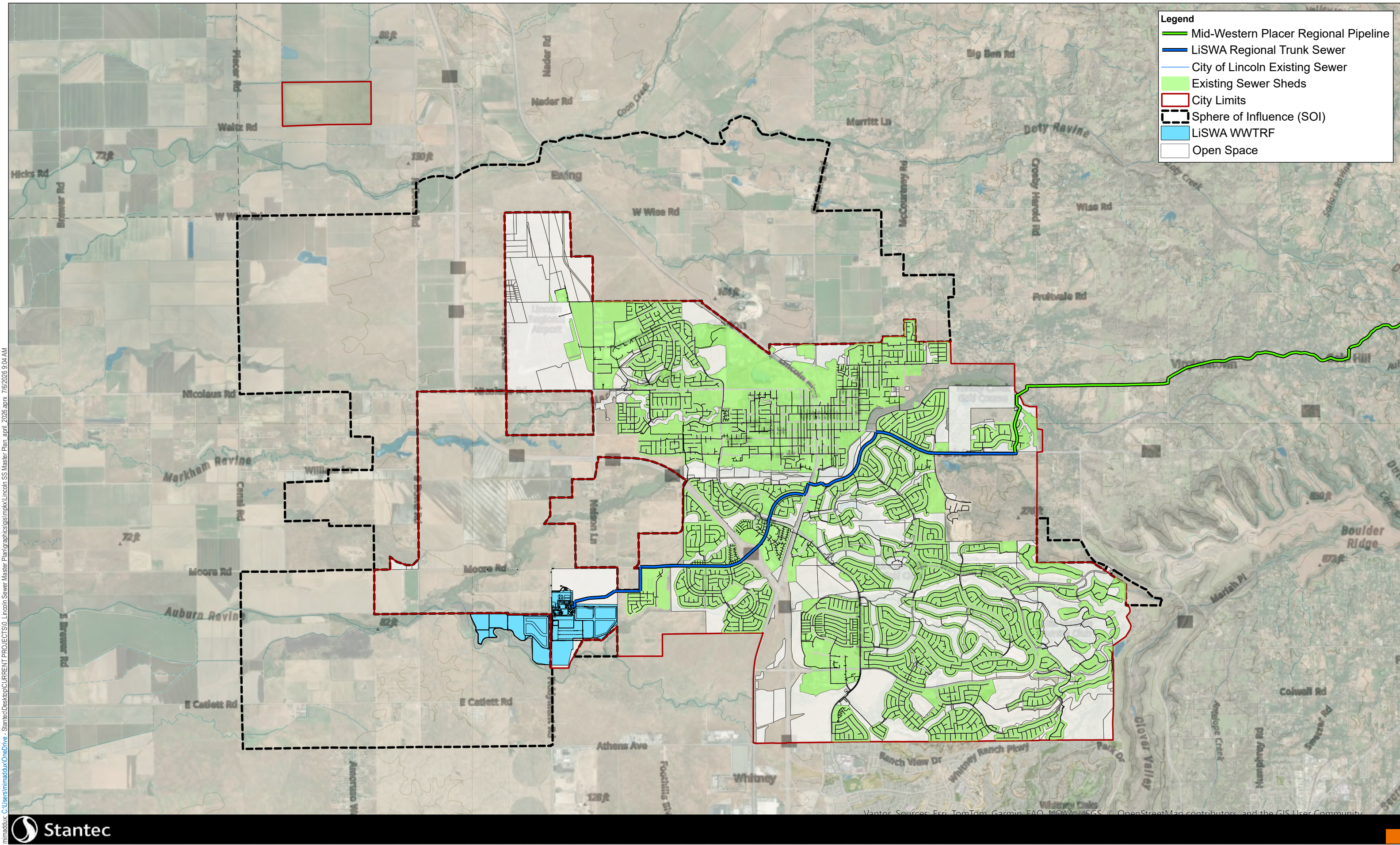


FIGURE 1-1
SEWER MASTER PLAN UPDATE STUDY AREA
 CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

1.3 Background Information

This section describes the key background information relevant to the need and development of this Master Plan Update.

1.3.1 Lincoln – Sewer Maintenance District 1 Wastewater Authority (LiSWA)

The Lincoln – Sewer Maintenance District 1 Wastewater Authority (LiSWA) was established on November 30, 2022, by the execution of a Joint Powers Agreement (JPA) between the City of Lincoln and Placer County (County). The JPA is an agreement that authorizes members to create a separate entity for the joint exercise of any power common to them (ownership, operation, maintenance, etc.) for regional governmental cooperation in providing wastewater services. The JPA established a new public agency, LiSWA, that is separate and apart from each of the members that will jointly and continuously provide the essential public service of wastewater conveyance, treatment, and disposal for properties located within the City and Sewer Maintenance District No. 1 (SMD1). The 2018 Master Plan reflected ownership and operational responsibilities prior to the establishment of the JPA, as described below.

Ownership and Operation Pre-JPA (LiSWA)

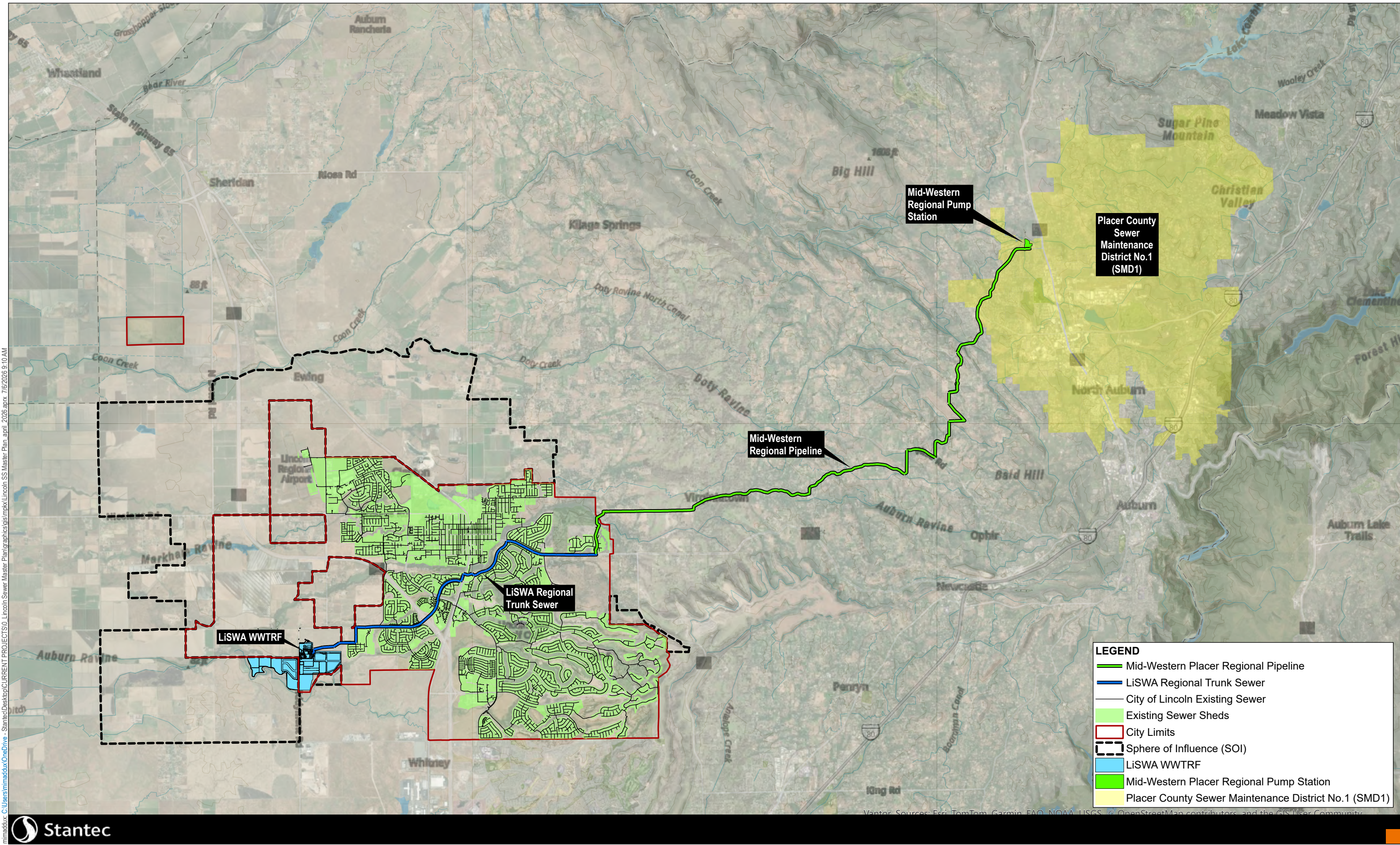
City of Lincoln: The City owns and operates the Lincoln Wastewater Treatment and Reclamation Facility (WWTRF), as well as the tributary wastewater collection and conveyance systems that serve properties within the City of Lincoln.

Placer County: The County, through its Sewer Maintenance District No. 1 (SMD1) owns and operates wastewater collection and conveyance systems that serve properties within the service area boundaries of SMD1. The wastewater collected within SMD1 is conveyed from the Mid-Western Placer Regional Pump Station and Pipeline to a confluence structure, where it combines with the City's wastewater and flows through a joint regional trunk sewer to the WWTRF for joint treatment and disposal with the City's collected wastewater. The joint conveyance, treatment, and disposal of this wastewater was initially provided for under the Construction, Operations and Joint Exercise of Powers Agreement (COJA) between the City and the County dated October 16, 2013.

This Master Plan Update only considers facilities solely owned and operated by the City and excludes evaluation of the facilities for which LiSWA is now responsible for operating and maintaining. The facilities now owned and operated by LiSWA are described below.

The infrastructure now considered the responsibility of LiSWA are excluded from evaluation in this Master Plan and shown on **Figure 1-2**.





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LiSWA Ownership and Operation Post-JPA (*excluded from Master Plan Update*)

- Regional Trunk Sewer: from the WWTRF to the confluence structure at the intersection of McBean Park Drive and Green Hollow Drive.
- WWTRF Facility: land parcels, treatment plant, outfall, sampling structure, ponds, and all other structures necessary for the operation of the WWTRF.

It should also be noted that as part of the JPA the City transferred to County all rights to the Mid-Western Placer Regional Pump Station and Pipeline which were established in the 2013 COJA.

1.3.2 Summary of 2018 Master Plan

The infrastructure considered in the 2018 Master Plan was limited to those related to the wastewater collection system itself (piping, manholes, pump stations, etc.). Infrastructure improvements related to wastewater treatment, disposal, and reuse facilities were not considered. The land uses, outlined in the City's General Plan, were used in conjunction with the City's wastewater generation rates to develop future average dry weather flow (ADWF) estimates. Existing contractual agreements, and flow monitoring data were used to develop regional and existing wastewater flows. Peak Wet Weather Flows (PWWF) within the collection system were used to size new infrastructure and evaluate the capacity of the existing system.

The hydraulic model of the City's wastewater collection system was developed using PCSWMM software by Computational Hydraulics Inc. The City's existing collection system, Geographic Information System (GIS) database was updated and input into the model. Flow monitoring was conducted during the early months of 2017 and was used to calibrate a model of the existing collection system. To evaluate the needs of the collection system under PWWF conditions, a 10-year, 24-hour storm event was simulated within the model. The existing system model was then expanded to incorporate additional flow at varying levels of City development. The following scenarios were evaluated as part of the 2018 Master Plan.

<u>Scenario 1 – Existing Dry Weather Flow Model:</u>	Existing ADWF (Winter 2017)
<u>Scenario 2 – Existing Wet Weather Flow Model:</u>	Existing PWWF (10-year, 24-hour Design Storm)
<u>Scenario 3 – Buildout of the Existing Sewer-sheds:</u>	Scenario 2 + Infill of Vacant Parcels
<u>Scenario 4 – Buildout of City Limits:</u>	Scenario 3 + Village 1 & Village 7
<u>Scenario 5 – Buildout of the SOI:</u>	Scenario 4 + Remaining SOI
<u>Scenario 6 – Buildout of the SOI, plus, Regional Flow:</u>	Scenario 5 + Regional Flows



2018 Master Plan – Existing System CIP Projects

Level of service (LOS) criteria was used to assess model results and identify the capacity limitations of the existing system under existing and future development conditions. Based on the results of the evaluation, seven capital improvement projects were recommended within the existing collection system and included in the Capital Improvement Program (CIP).

- CIP 1: Sewer System Overflows (SSOs) were predicted to occur in Scenario 2 along the 15-inch sewer trunk that follows 5th Street, Q Street, 4th Street, O Street, and 3rd Street. Two alternative improvement projects were presented to address this capacity constraint. The sewer could be upsized in place, or alternatively, the drop connection at the intersection of Joiner Parkway and 5th Street could be eliminated, and the sewer could be reconstructed at a more suitable pipe slope and size. This alternative may be more attractive to the City because it may allow for Q Street Pump Station to be taken offline.
- CIP 2: The 15-inch sewer trunk in 2nd Street (Old Town South Trunk, just south of CIP 1) was predicted to incur 3 feet of surcharge under existing PWWF conditions. Like CIP 1, two alternative solutions were presented to address this capacity deficiency. Upsizing the sewer in place or eliminating the drop connection at the intersection of Joiner Parkway and 2nd Street and reconstructing the sewer at an appropriate slope.
- CIP 3: The East Lincoln Parkway Pump Station (ELPPS) is in South Lincoln, along Joiner Parkway. The ELPPS is equipped with an emergency storage basin, dual 12-inch forcemains, two 60 horsepower (HP) pumps, and one 45 HP pump. The PWWF simulated under existing conditions exceeded the reliable capacity (2.7 MGD) of the pump station. Although, this PWWF is less than the maximum capacity of the pump station (4.0 MGD), the addition of flow from infill development caused the PWWF to exceed the maximum capacity. Since the development of the 2018 Master Plan the City recently constructed improvements at this pump station 2025.
- CIP 4: The sewer trunk following 9th Street, East Avenue, and 12th Street, upstream of the E. Street sewer, was predicted to become surcharged under existing conditions. Surcharging was further exacerbated with the addition of infill flow from upstream developments. This CIP recommended that this sewer trunk be upsized to provide adequate capacity for existing and infill development.
- CIP 5: Unlike capacity issues at the ELPPS, both pipelines and reliable pump station capacity failed to meet LOS criteria under infill development conditions at the Nicolaus Road Pump Station (NRPS). Under existing conditions, the NRPS was found to have sufficient reliable pumping capacity to convey flow entering the pump station. Capacity issues were predicted within the 10-inch sewer in Aviation Boulevard and Nicolaus Road, surcharging was predicted to occur under existing conditions. The addition of wastewater flow from development of vacant areas near the airport exacerbated these pipeline capacity issues and caused the reliable capacity of the NRPS to be exceeded. This improvement project recommended the diversion of this pump station to the proposed future trunk sewer in Nelson Lane. Flow from the pump station could be diverted by



gravity, by intercepting the existing influent sewers and redirecting flow west on Nicolaus Road to the proposed Nelson Lane Trunk.

The implementation of this CIP was dependent on the phasing and construction of other collection system improvements. Interim solutions for the existing pipeline capacity issues included on-going inflow and infiltration (I/I) reduction efforts, limiting development in the area, upsizing the 10-inch portion of sewer in Aviation and Nicolaus Road, and/or increasing reliable capacity of the NRPS.

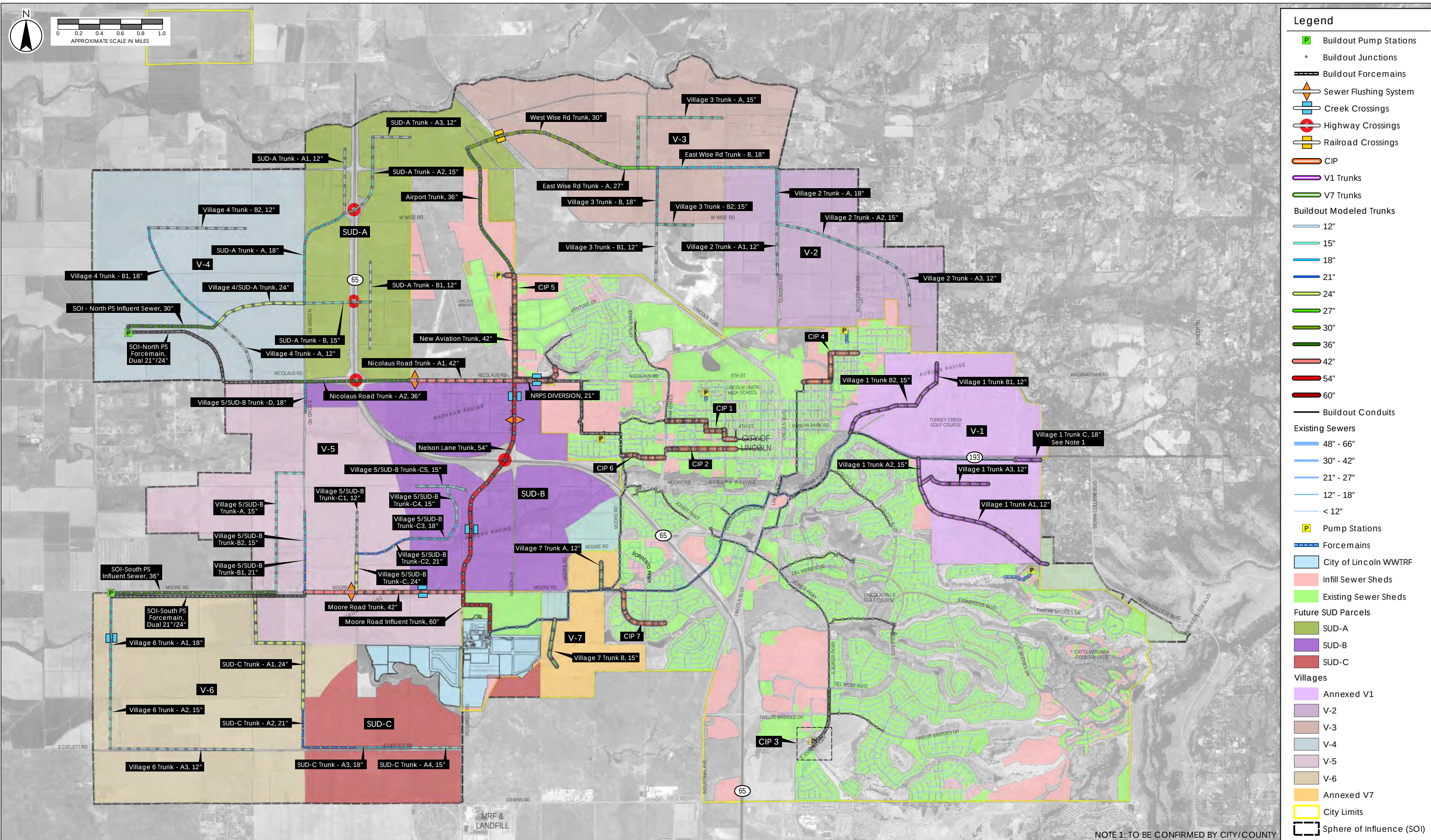
- CIP 6: Surcharging was predicted to occur with the addition of flow from infill development in the 18-inch sewer in 1st Street and Chambers Drive, and the downstream 30-inch sewer in Chambers Drive. To reduce surcharge to an acceptable level in these sewers, this improvement project recommended re-routing and upsizing the 18-inch sewer in 1st Street. The Chambers Drive sewer was originally constructed to re-route the collection system from the old Wastewater Treatment Plant (WWTP) location to the new WWTRF on Moore Road. The 30-inch sewer runs parallel to the upstream 18-inch in Chambers Drive. Flow from 1st Street is first routed north in the 18-inch sewer, then loops south in the 30-inch sewer. It was proposed that this “loop” be eliminated by diverting the 18-inch sewer in 1st Street to the Chambers Drive sewer, near the intersection of Douglas Drive and 1st Street. Sewers upstream of this new tie in location were recommended to be upsized to 21-inches to provide capacity for flow from infill developments.
- CIP 7: The Lincoln 270 Area lies between Highway 65 and Industrial Avenue. Alternative solutions to provide wastewater collection services to this area have been previously considered. It was assumed that the City of Lincoln will provide service to this area, through the Lincoln Crossings development. This improvement project recommended that sewers between the point of connection of the 270 Area development and the intersection of Caledon Circle and Ferrari Ranch Road, are upsized to meet LOS requirements. These sewers were found to have adequate capacity to serve their existing service area under existing and infill development conditions, without the addition of flow from Lincoln 270.

The existing system projects identified in the 2018 Master Plan are shown on **Figure 1-3**.

2018 Master Plan – Future System CIP Projects

The existing collection system models were expanded to include flow and infrastructure from the Villages and Special Use Districts (SUDs) within the City’s General Plan area. The 2018 Master Plan identified locations for future trunk sewers (pipelines 15-inches or larger) consistent with the City’s General Plan Circulation Diagram. Future trunks sewers were generally planned within future arterial roadways. The strategy was to route the majority of future flow from areas outside city limits around the existing collection system through new future trunk sewers directly to the WWTRF. These portions of the City’s SOI included Villages 2, 3, 4, 5, and 6 and SUD-A, SUD-B, and SUD-C. This included a new 60-inch influent sewer extending from WWTRF to the intersection of Moore Road and Fiddymont Road. A total of 50 new trunk sewers and two large lift stations were proposed with the 2018 Master Plan to serve the City’s Villages and SUD areas. These trunk sewers are shown on **Figure 1-3**. Overall recommendations for collection system planning are summarized within **Table 1-1**.





Sewer Master Plan Update

Introduction and Background

Table 1-1. 2018 Master Plan Recommendations Summary

Item	Recommendations
Hydraulic Modeling	Continuously update the model with physical system improvements and recalibrate to additional flow monitoring, to serve as a “living tool” for City use.
Maintenance	- Ongoing I/I Reduction Program - Regular Repair and Replacement program
Additional Flow Monitoring	- To further isolate areas of the system with high localized I/I contributions - To further plan for CIPs 1 through 3, specifically upstream of Flow Monitor 3. - To provide updates to the hydraulic model - Evaluate GWI in each sewer-shed by monitoring flow during times of ADWF
Existing System CIPs	- CIP 1 – Currently at risk of SSO - CIP 2 – Combine with CIP 1 - CIP 3 – Increase reliable pumping capacity of the ELPPS and raise upstream manhole lids to an elevation higher than the emergency overflow elevation - CIP 4 – Warrants additional flow study/ monitoring within area of recommended improvements - CIP 5 – Dependent on construction of the Nelson Lane Trunk and those downstream <u>Interim Improvements:</u> - upsizing the 10-inch sewer in Aviation Blvd. - Increasing NRPS pumping capacity. - Limiting development - Reduce I/I, inspect for direct stormwater inflow paths (Airport Area) - CIP 6 – City may elect to accept a lower LOS for this sewer, freeboard remains 10-feet below the ground surface. Surcharging further reduced after implementing CIP 5. - CIP 7 – Improvements are not needed unless wastewater service is provided to the Lincoln 270 Area.
Future System CIPs	- Prioritize new trunk sewers by vicinity to the WWTRF, and near-term developments. - Ensure that large shallow sloped sewers (<0.0008 ft/ft) are designed with consideration of solids deposition and associated maintenance activities. Requiring flushing systems, odor control facilities, low flow channel/ovoid pipe shapes, and pipe materials with low roughness coefficients are used (T-lock, lined concrete, PVC, etc.).
Planning Principals & System Design	<u>Minimize Pump Stations</u> – permit temporary pump stations contingent on the collection system being compatible with being converted to gravity in the future (once more development occurs, and new trunks/ large pump stations have been constructed). <u>Maximize Gravity Flow Sewers</u> – consider alternative gravity servicing strategies in areas currently planned to flow to large pump stations (SUD-A and SUD-C). Extend the trunk sewers in Nicolaus Road and Moore Rd as far west as minimum slope and cover will permit. <u>Solids Deposition</u> – require flushing systems, pipe materials with low manning's n coefficients (roughness), and pipes with low flow channels or ovoid shapes where specified. To be approved by the City Engineer. <u>Odor Control</u> – should be included on shallow sloped sewers, flushing systems, and pump stations <u>Force mains</u> – dual force mains are recommended to accommodate varying levels of flow. <u>Aging Infrastructure</u> – The City's design guidelines were used to estimate PWWF from SOI areas, using a peaking factor of 2.3. Smaller areas of development warrant the use of a larger peaking factor. Assessing new sewers using RDII parameters developed for the existing system warrants larger pipe sizes for those upstream sewers currently sized between 12 and 24 inches in diameter. Upsizing these sewers by one pipe size would allow capacity for increasing levels of I/I as the system ages.



1.3.3 Post 2018 Master Plan Collection System Planning

The studies listed below were completed after the 2018 Master Plan to evaluate capacity in specific portions of the collection system utilizing the hydraulic model. Model updates and resulting improvement projects implemented by the City have been incorporated into this Master Plan Update. Additional details regarding each study can be found in **Appendix A**.

- Sewerage of the Silver Spur Service Area Preliminary Engineering (11/27/2018)
- Prunella Court Sewer Capacity Evaluation (12/18/2018)
- Lincoln Parkway Sewer Lift Station Expansion – Pump Evaluation Preliminary Design (2/19/2019)
- Lincoln Meadows – Wastewater Collection System Capacity Assessment (6/20/2019) & Lincoln Meadows/ Virginiatown Road Flow Monitoring Study (5/12/2020)
- North Village 1 Sewer Service Analysis & E Street Trunk Capacity Assessment (11/21/2020)
- Evaluation of the Independence Pump Station Capacity (11/24/2021)



2 Existing Collection System

The purpose of this chapter is to present an overview of the City's existing wastewater collection system.

This chapter is divided into the following sections:

- Regulatory Framework
- Collection System Overview
- Flow Monitoring Study
- Pump Station Inflow and Infiltration (I/I) Assessment

2.1 Regulatory Framework

The City's wastewater collection system operates under the regulatory framework of the State Water Resources Control Board's Water Quality Order WQ 2022-0103-DWQ, titled "Statewide Waste Discharge Requirements General Order for Sanitary Sewer Systems" (General Order). Under the General Order, the City must develop and implement a Sewer System Management Plan (SSMP), detailing protocols for the operation, maintenance, and management of the collection system. The goals of the SSMP are to provide a plan and schedule to 1). properly manage, operate and maintain all parts of the sewer collection system, 2). reduce and prevent spills, and 3). contain and mitigate sewer system overflows if they do occur.

The SSMP is required to be updated every 6 years, at a minimum. The City last revised its Sewer System Management Plan (SSMP) in August 2025, the current SSMP is publicly accessible on the City's website. The results of this Master Plan Update provide information to be incorporated in the subsequent SSMP update. Specifically, this information is required for Element 8 of SSMP titled *System Evaluation, Capacity Assurance and Capital Improvements*.

2.2 Collection System Overview

The City's existing collection system covers an area of approximately 11,200 acres and provides service to over 24,000 residential, commercial, public, and industrial connections. Wastewater generated by these users is conveyed to the WWTRF by a network of sewer pipes, force mains, and pump stations for treatment. The WWTRF was built in 2004 to comply with new water quality regulations promulgated by the State of California and to provide capacity for growth and regional wastewater treatment. The facility is now owned and operated by LiSWA, as discussed in **Section 1.3** of this report.

The City's original wastewater treatment plant was located south of Nicolaus Road between Nelson Lane and Waverly Drive. To support the WWTRF's relocation near Fiddymont and Moore Roads, portions of the collection system were rerouted, requiring construction of the trunk sewers in Douglas Road, Chambers Drive, Moore Road, and E Street. All these trunks drain to the main branch of the collection system referred to as the Regional Trunk sewer in Ferrari Ranch Road, which is also now owned and operated by LiSWA. The 42- to 66-inch Regional Trunk sewer runs from the WWTRF to the confluence structure at the



intersection of McBean Park Drive and Green Hollow Drive. Placer County's Sewer Maintenance District No. 1 (SMD1) discharges into the same trunk sewer via a 13.5-mile force main from the Mid-Western Placer Regional Pump Station in North Auburn.

The City's existing wastewater collection system comprises approximately 233 miles of gravity sewers and force mains ranging from 4-inch diameter to 36-inch diameter. The 6.3-mile Regional Trunk Sewer runs through the city and is owned by LiSWA. There is an additional 7.4 miles of private and HOA owned sewers in the system based on the GIS database provided by the City. Private sewers are primarily in industrial and commercial areas. LiSWA's 13-mile Midwestern Regional Pipeline conveying flow from the Regional Pump Station in SMD1 to the Regional Trunk Sewer is also included in the database. **Table 2-1** provides a summary of sewers by diameter, excluding the private/HOA owned sewers and the Midwestern Regional Pipeline. As shown in **Table 2-1**, the majority of the existing sewer system is comprised of 6-inch and 8-inch sewers (80%).

Table 2-1. Sewer Mains by Diameter ⁽¹⁾ ⁽²⁾

Diameter (in)	Total Length (Miles)	Portion of Total Length (%)
4	1.9	0.8
6	89.5	37.4
8	101.5	42.4
10	13.5	5.6
12	10.4	4.3
15	5.4	2.3
16 to 24	5.7	2.4
27 to 36	4.6	1.9
42 to 66	6.3 ⁽³⁾	2.7
Unknown	0.5	0.2
Total:	239.2	100.0

1. Data summarized from the City of Lincoln's GIS sanitary sewer line shapefile (Sewerpipe.shp), February 2025.
2. Excludes sewer laterals and pipes designated as privately or HOA owned.
3. The LiSWA Regional Trunk Sewer comprises this 6.3 miles of sewer.

The most common sewer pipe material is vitrified clay pipe (VCP), which accounts for approximately 91% of the system by pipe length. Roughly 6% of the system consists of polyvinyl chloride (PVC), less than 2% is reinforced concrete pipe (RCP), and the remaining 1% is of various other pipe materials. The installation years of gravity mains are summarized in **Table 2-2**. According to the GIS database, approximately 14% of the system was constructed prior to 1998, 66% were constructed between 1998 to 2010, and 13% of the system was constructed after the year 2010 or within the last 15 years. Data on installation year is limited for sewers constructed prior to 1970, the earliest installation year listed as 1915. Approximately 5% of the system is identified as being constructed between 1915 and 1970 and less than 6% of the system has an unknown installation year. City of Lincoln's population grew 282% from 11,205 in 2000, to 42,819 in 2010, making it the fastest growing place in the United States during this time. To keep up with this period of rapid growth and development, the City constructed 147 miles of sewers between 1998 and 2005, laying at least



Sewer Master Plan Update

Existing Collection System

10 miles of sewer each year with 32 miles built in 2004 alone. More than 60% of the existing sewer system was constructed during this 7-year period.

Table 2-2. Sewer Mains by Installation Year ⁽¹⁾ ⁽²⁾

Installation Year	Total Length (Miles)	Portion of Total Length (%)
1915 to 1970	12.2	5.1
1971 to 1997	22.1	9.2
1998 to 2010	159.0	66.4
2010 to present	31.8	13.3
Unknown	14.2	5.9
Total:	239.2	100.0

1. Data summarized from the City of Lincoln's GIS sanitary sewer line shapefile (Sewerpipe.shp), February 2025.
2. Excludes sewer laterals and pipes designated as privately or HOA owned.

The City's GIS database includes five private, and ten city owned lift stations. One of the lift stations, Turkey Creek, is currently in construction but will be operated by the City upon completion. Planning documents provided by the City show two additional future lift stations. A condition assessment of the nine existing City owned lift stations is provided in **Chapter 5.5** of this report. The GIS data provided for the lift stations included limited information. Key pump station information was assembled where available from record drawings, discussions with City staff, and other available resources. A summary of the City owned lift stations is shown as **Table 2-3**. The existing wastewater collection system and lift stations are shown in **Figure 2-1**.

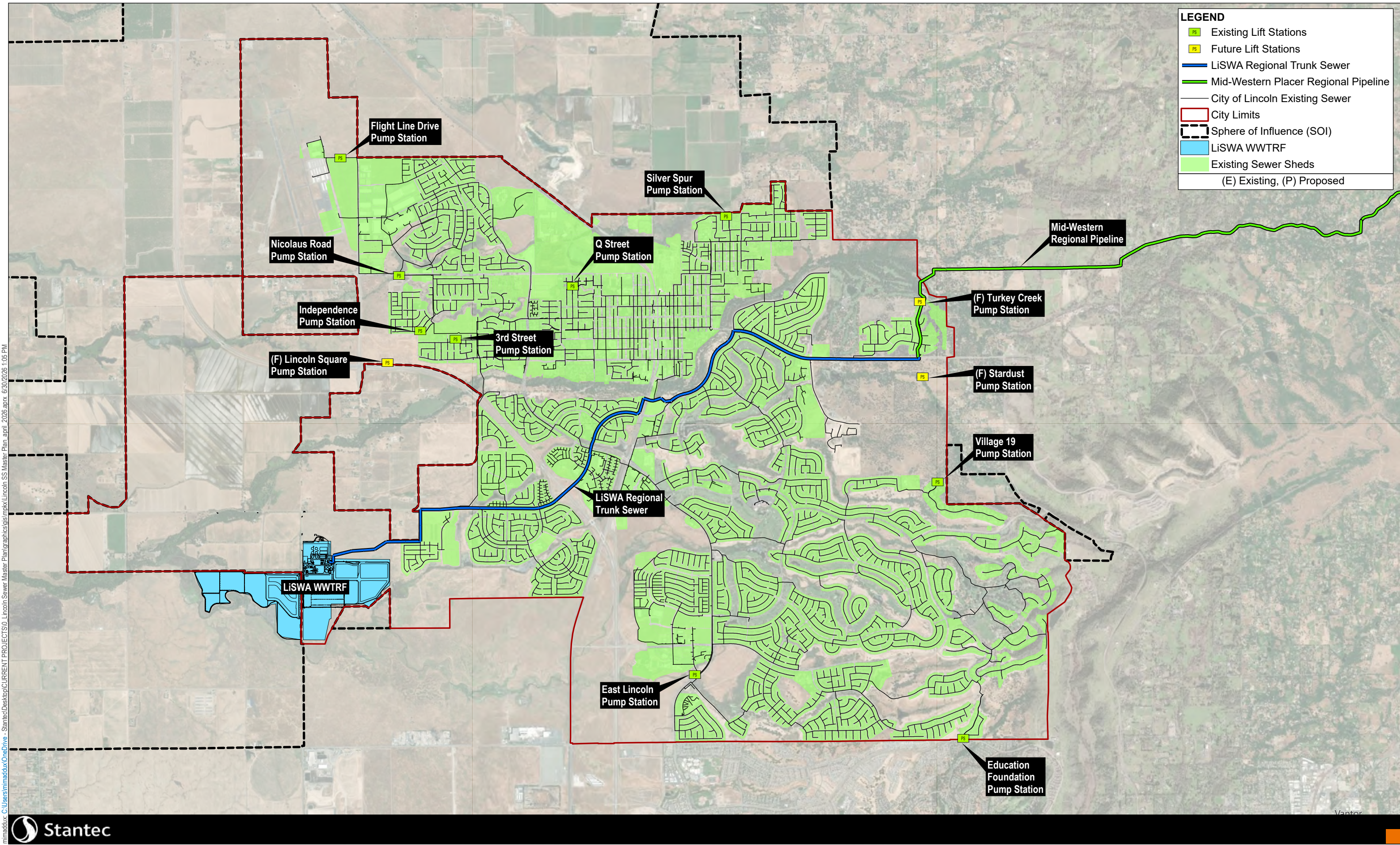
Table 2-3. Wastewater Lift Stations

Lift Station	Number of Pumps	Horsepower (HP)	Reliable Capacity ⁽¹⁾ (MGD)	Install Year ⁽²⁾
Village 19	2	4	unknown	2005
3rd Street	2	5	unknown	2001
East Lincoln Parkway	3	85	5.67	2001
Flight Line	2	60	unknown	1985
Nicolaus Road	3	60/20	3.40	1985
Q Street	2	5	0.36	1989
Silver Spur	2	4	0.19	1989
Education Foundation	2	23	0.15	2020
Independence	2	15	0.66	2023
Turkey Creek Estates	2	4	0.20	Future
Stardust	2	5	0.36	Future
Lincoln Square (Wildwood/Peery)	2	20	1.29 (0.95) ⁽³⁾	Future

1. Reliable capacity is defined as the maximum pumping capacity of the lift or pump station with the largest pump out of service.
2. New pumps have been installed periodically since original build date.
3. Lift Station Design report has not been approved, capacity might be adjusted.



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2.3 Flow Monitoring Study

As part of this Master Plan Update, a flow monitoring study was conducted within the collection system from February 10 to April 9, 2025. The study provided critical data for assessing both dry- and wet-weather flow conditions across the City's collection system. Flow measurements were recorded using open-channel flow monitors installed at 12 strategic locations. Additionally, influent flow data from the WWTRF and flow data from the Regional Pump Station serving SMD1 were incorporated into the analysis.

2.3.1 Wastewater Flow Components

Dry-weather flow conditions represent the typical operating state of the collection system and are defined by the Average Dry Weather Flow (ADWF). ADWF is calculated as the average of total flows measured during the typically dry months of July through September each year. This metric is essential for base capacity planning and load calculations. Wastewater collection systems, however, must be designed to convey Peak Wet Weather Flows (PWWFs) resulting from rainfall events. PWWFs generally consist of the following components: base sanitary wastewater flow, groundwater infiltration (GWI), and rainfall-dependent inflow and infiltration (RDII). A diurnal flow pattern describes the variation in wastewater flow occurring over the course of a full ADWF day. Each of these elements is described in detail below.

Base Sanitary Flow Sanitary flow or base flow is the component of wastewater generated directly by public, residential, commercial, and industrial users.

Groundwater Infiltration (GWI) Groundwater Infiltration (GWI) is groundwater that enters the collection system through cracks in sewer pipes and manholes, leaky joints, and damaged sewer lateral connections. GWI tends to vary seasonally depending on groundwater depth in relation to the depth of sewer pipelines. GWI is more significant during the wet season when groundwater elevations are higher. GWI is also more significant in sewers built in low-lying areas near creeks and drainage courses where groundwater elevations may be high due to surface water conditions.

Rainfall Dependent Inflow and Infiltration (RDII) Rainfall Dependent Inflow and Infiltration (RDII) is flow that enters the collection system due to precipitation events. Inflow is stormwater discharged into the sewer system through direct connections, often through leaky manhole covers, improperly connected roof leaders, and clean-outs. Infiltration is an indirect introduction of rainfall into the collection system through cracked sewer pipes, leaky joints, and manhole walls.

Diurnal Patterns In a 24-hour period, wastewater flow varies significantly with maximum flow typically occurring in the morning and early evening. During the flow monitoring study conducted by the City flow was recorded every 15 minutes. This monitoring provided detailed data allowing the City to evaluate these daily patterns throughout its service area. Each area of the City has its own unique pattern, which also varies between weekdays and weekends.



2.3.2 Study Overview

Open channel flow monitoring was conducted at twelve locations within the collection system from February 10, 2025, to April 9, 2025. This work was performed by V&A Consulting Engineers (V&A) and summarized in a technical report dated June 2025. The City of Lincoln Sanitary Sewer Flow Monitoring Study report provided by V&A is included in **Appendix B**. The goals of the flow monitoring study included:

- To collect flow monitoring data sufficient to recalibrate the collection system model.
- Perform an inflow and infiltration (I/I) assessment at the two major pump stations in the system.

Based on these goals, a flow monitoring plan was developed. The flow monitoring plan can be found in Technical Memorandum No. 1 – Flow Monitoring Plan (TM 1) included in **Appendix B. Table 2-4** summarizes the characteristics of the flow monitoring locations and sewer-sheds. The locations of these flow monitors and the associated monitoring basins or sewer-sheds are shown on **Figure 2-2**.

Table 2-4. 2025 Flow Monitoring Locations

Flow Monitor	Manhole ID ⁽¹⁾	Pipe Size (in)	Monitored Pipe	Sewer-shed Area ⁽²⁾ (Acres)	Description ⁽³⁾
Site 1A	I08022	10	West Inlet	160	Aviation/Lincoln Regional Airport (NRPS)
Site 1B	I08002	15	Southeast Outlet	349	Markham Ravine Drainage (NRPS)
Site 2	I08020	18	East Inlet	51	Abbyhill Road Subdivision (NRPS)
Site 3	L12057	30	North Inlet	394	E Street and 12 th Street
Site 4	N11077	48	Northeast Inlet	743	Sun City & North Regional Sewer Subdivisions (North of Joiner Parkway)
Site 5	J10114	24	Northeast Inlet	793	5th Street and Joiner Parkway
Site 6	M09003	36	North Inlet	512	1st Street and Moore Road
Site 7	R13060	15	Southeast Inlet	420	South Twelve Bridges (ELPPS)
Site 8	M12050	24	Southeast Inlet	1,164	Stoneridge Golf Club/Country Club
Site 9A	R13056	15	Northwest Inlet	232	Bella Breeze Developments (ELPPS)
Site 9B	R13056	12	Northeast Inlet	255	Spring Valley and Parkside (ELPPS)
Site 10	R13050	15	Southwest Inlet	71	Southwest Twelve Bridges (ELPPS)
WWTRF	Influent PS	Influent Flow Meter	NA	420	South Regional Sewer Subdivisions (South of Joiner Parkway)
SMD1	Regional PS	Discharge Flow Meter	NA	NA	SMD1 Service Area Flow

1. Manhole ID is the structure name provided in City GIS files; modeling retains the 2018 naming convention.
2. Existing sewer-shed areas exclude vacant lots, rights-of-way, parks, and open space.
3. Nicolaus Road Pump Station (NRPS) and the East Lincoln Parkway Pump Station (ELPPS).



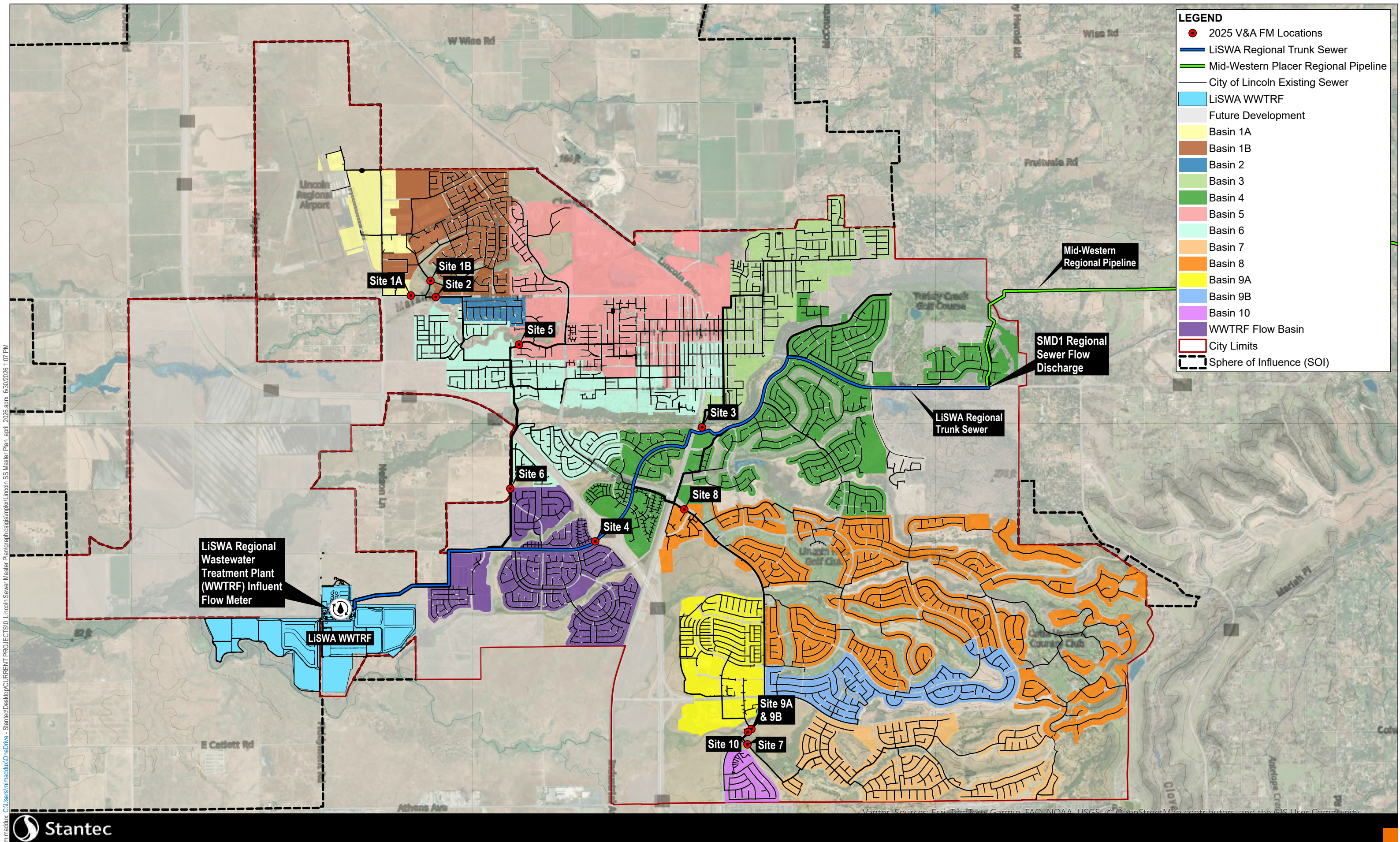


FIGURE 2-2

2025 FLOW MONITORING LOCATIONS AND SEWER-SHEDS
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

2.3.3 Flow Isolation

Data collected at the twelve flow monitoring sites, influent flow data from the WWTRF, and SMD1 flow data from the Regional Pump Station were used for model development and calibration. Many of the flow monitors were aligned in series, such that a downstream monitor receives flow from one or more upstream monitors. To distribute flow within the hydraulic model, flows from flow monitoring sheds in series are estimated by subtracting flow from upstream flow monitoring basins. There are inherent errors introduced when subtracting flow monitors in series due to variations in data quality, and travel time between monitors. Despite the induction of error, the use of unique parameters for each area between successive monitors provides increased resolution on both dry weather diurnal patterns and wet weather flow responses. The sewer-shed isolation equations used to isolate flow are summarized in **Table 2-5**.

Table 2-5. Sewer-shed Flow Isolation Equations

Flow Monitor	Sewer-shed Flow Isolation Equation
Site 1A	$= Q_{1A}$
Site 1B	$= Q_{1B}$
Site 2	$= Q_2$
Site 3	$= Q_3$
Site 4	$= Q_4 - Q_8 - Q_3 - Q_{SMD1}$
Site 5	$= Q_5$
Site 6	$= Q_6 - Q_5 - Q_{1A} - Q_{1B} - Q_2$
Site 7	$= Q_7$
Site 8	$= Q_8 - Q_{10} - Q_{9A} - Q_{9B}$
Site 9A	$= Q_{9A}$
Site 9B	$= Q_{9B}$
Site 10	$= Q_{10} - Q_7$
WWTRF	$= Q_{WWTRF} - Q_4 - Q_6$
Regional PS	$= Q_{SMD1}$

2.3.4 Rainfall Data

V&A analyzed rainfall data from five publicly available weather stations from Weather Underground. These stations are all centrally located within the City, and their locations are shown on a map in Figure 3-1 of the V&A Flow Monitoring Report in **Appendix B**. Rainfall within the City was also assessed for the purpose of model calibration using precipitation data available through the California Department of Water Resources California Data Exchange Center (CDEC) website. The CDEC Lincoln (LNC) weather station provided insights into rainfall conditions in the eastern portion of the City. Rainfall data recorded in the SMD1 service area was obtained from the California Irrigation Management Information System (CIMIS) website using Station 195 for North Auburn.

Table 2-6 lists the recorded rainfall over the monitoring period at each rain gauge.



Table 2-6. Flow Monitoring Study Rainfall Data

Rain Gauge	Source	Total Rainfall (in)
V&A Flow Monitoring: - Southwest - West - South - North - Northwest	Weather Underground ⁽²⁾ - WU (KCALINCO239) - WU (KCALINCO126) - WU (KCALINCO223) - WU (KCALINCO167) - WU (KCALINCO253)	4.62 4.77 5.30 4.78 5.46
CDEC Station: LCN– Lincoln	California Department of Water Resources California Data Exchange Center (CDEC) website	4.20
CIMIS Station: 195 – North Auburn	California Irrigation Management Information System (CIMIS) website	6.49

1. Total rainfall recorded over the study period: February 10, to April 9, 2025.
2. Weather Underground (wunderground.com) collects data from 180,000+ weather stations across the country, including Automated Surface Observation System (ASOS) at airports, personal weather stations (PWS), and Meteorological Assimilation Data Ingest System (MADIS) managed by the National Oceanic and Atmospheric Administration (NOAA).

V&A provided basin specific rainfall data for modeling purposes based on their proximity to the rain gauge locations. The mean precipitation for each site's upstream basin was calculated by taking data from the rain gauges and using the inverse distance weighting (IDW) method. IDW is an interpolation method that assumes the influence of each rain gauge location diminishes with distance. The center of an upstream basin is identified, and a weighted triangulated average of the precipitation data from nearby rain gauge locations is taken.

During the monitoring period, a total of 4.96 inches of rainfall was recorded, and three significant storm events were analyzed: February 12–14 with 1.52 inches (approximately a 1.5-year, 6-hour event), March 11–15 with 1.19 inches (approximately a 1-year, 2-hour event), and March 16–18 with 1.15 inches (approximately a 3-year, 1-hour event). For modeling purposes, a 10-year, 24-hour event is simulated to generate peak wet weather flow (PWWF) and assess system capacity. Although none of the observed storms met the 10-year return period threshold, their impact on the system was significant enough to support wet weather model calibration.

2.3.5 V&A Flow Data and I/I Analysis Summary

V&A provided an analysis of inflow and infiltration (I/I) within the collection system. V&A differentiated I/I flow from ADWFs to determine which components of I/I were more prevalent in each shed. After separating flow components, the I/I analysis metrics were normalized for an “apples-to-apples” comparison of each flow monitoring shed. All monitored sites demonstrated adequate dry weather flow capacity, with depth over diameter (d/D) ratios ranging from 0.09 to 0.39, and no site exceeded a d/D ratio of 0.75.

Site 1A exhibited the highest peaking factor at 14.6 during the monitoring period. Analysis of inflow and infiltration (I/I) indicated that Basins 4, 5, and 6 ranked highest for normalized peak I/I rates, while Basins 3,



4, and 5 ranked highest for overall rainfall-derived infiltration (RDI) and combined I/I. Furthermore, all sites except Site 10 exhibited groundwater infiltration (GWI) rates exceeding typical standards, suggesting elevated groundwater infiltration throughout much of the system. The findings confirm that while the system generally maintains adequate dry weather capacity, significant infiltration and inflow issues persist, particularly in Basins 03, 04, and 05, and elevated groundwater infiltration is evident across most sites. These conditions warrant further investigation and targeted rehabilitation measures to mitigate I/I impacts and reduce GWI contributions. Additional information is provided in V&A's City of Lincoln Sanitary Sewer Flow Monitoring Study report included in **Appendix B**.

A summary of the data and results of the V&A flow monitoring study are provided in **Table 2-7**.

Table 2-7. V&A Flow Monitoring and I/I Analysis Summary

Flow Monitoring Site	ADWF ⁽¹⁾ (MGD)	Peak Measured Flow (MGD)	Peaking Factor	Max d/D Ratio	High GWI	I/I Ranking ⁽²⁾
Site 1A	0.010	0.147	14.6	0.33	Yes	7
Site 1B	0.247	0.728	2.9	0.58	Yes	5
Site 2	0.056	0.114	2.0	0.13	Yes	10
Site 3	0.366	1.307	3.6	0.23	Yes	2
Site 4	4.667	11.642	2.5	0.34	Yes	1
Site 5	0.405	1.806	4.5	0.47	Yes	3
Site 6	1.208	5.795	4.8	0.32	Yes	4
Site 7	0.361	0.799	2.2	0.43	Yes	9
Site 8	1.468	3.101	2.1	0.28	Yes	12
Site 9A	0.244	0.522	2.1	0.42	Yes	8
Site 9B	0.261	0.981	3.8	0.36	Yes	6
Site 10	0.471	1.044	2.2	0.37	No	11

1. ADWF values are those observed at each location during the flow monitoring period (February 10, to April 9, 2025), these values are not representative of flows that would occur during dry weather months (July – September).
2. The final combined I/I rank from the V&A report. A ranking of “1” represents the most observed I/I after normalization.
3. Flows presented in the table represent the total flow recorded at the flow monitoring location, flow from upstream monitors is not removed to isolate flow.

2.4 Pump Station Inflow and Infiltration (I/I) Assessment

The second goal of the flow monitoring study was to perform an I/I evaluation at the two largest pump stations in the City's collection system. Seven of the twelve flow monitors were placed upstream of the stations to delineate flows and isolate areas with high I/I contributions within each service area. Sites 1A, 1B, and 2 delineate flow upstream of the Nicolaus Road Pump Station (NRPS) and Sites 7, 9A, 9B, and 10 delineate flow upstream of the East Lincoln Parkway Pump Station (ELPPS). The evaluation for each pump station is presented below.



2.4.1 Nicolaus Road Pump Station (NRPS)

The Nicolaus Road Pump Station (NRPS) is located on the south side of Nicolaus Road, approximately half a mile east of Aviation Boulevard in the City of Lincoln. Its service area covers roughly 650 acres, including the airport as well as residential and industrial developments. The NRPS was originally constructed in 1985, and pumping capacity was most recently expanded in 2017. The station includes two submersible 60 hp pumps installed in a 29-foot deep, 5-foot diameter manhole. It also includes a 20 hp pump installed in an upstream 26.5-foot deep, 4-foot diameter manhole. The two 8-inch force mains from each manhole combine into a single 12-inch force main that discharges to a sewer manhole at Chambers Drive and Thomsen Way. The pump station has a reliable capacity of 3.4 MGD and a total pumping capacity of 3.7 MGD. The reliable capacity is defined as the pumping capacity of the station with one of the larger (60 hp) pumps out of service.

Historically, the station has experienced high inflow and infiltration (I/I), prompting the City to conduct flow studies and implement reduction measures. In 2016, a study titled City of Lincoln – Nicolaus Road Pump Station Collection Shed Flow Monitoring (Stantec, 2016) was prepared to evaluate total flow entering the station and identify areas with the highest apparent I/I within its collection shed.

The elevated I/I at the NRPS is influenced by its proximity to Markham Ravine, a narrow watercourse originating in the rolling hills east of the City. The ravine meanders through the service area and exhibits significantly increased flows during winter months. It also conveys irrigation water at certain times of the year, further elevating flow levels. South of Nicolaus Road, drainage modifications have created the City's most extensive freshwater marsh within Markham Ravine. This habitat, characterized by perennial slow-moving or standing water, may affect groundwater levels and contribute to sewer infiltration both within and upstream of the marsh areas.

Three flow monitors were used to isolate flow within the service area during the 2025 flow monitoring study. The NRPS, flow monitoring locations, and contributing sewer basins are shown on **Figure 2-3**. Each basin is described below.

- **Site 1A:** Includes an industrial area around the airport on Aviation Boulevard. The trunk sewer was constructed in 1983 and crosses Markham Ravine. There is a pump station in this basin, the Flight Line Drive Pump Station.
- **Site 1B:** Includes the residential area north of Nicolaus Road. The main sewer branch was constructed in 1985 and passes through Markham Ravine. It appears that most of the residential development occurred in this area from the early 1990's to the mid 2000's. This sewer-shed also includes an industrial area adjacent to the airport. The residential area south of venture drive was built in the late 1990's and the area north of Venture drive was installed in 2006.
- **Site 2:** Includes a small residential area south of Nicolaus Road. The Glenmoor subdivision was constructed in 1999 and Fullerton Ranch which was constructed in 2020.



The goal was to measure the total flow entering the NRPS. However, the final placement of flow meters left a section between basins unmonitored. This unmonitored areas is shown as the priority I/I rehabilitation area in **Figure 2-3**. This gap resulted from the collection system layout, pump station operations, and the flow conditions required for open-channel monitoring. This same challenge was noted during the 2016 flow monitoring effort. Although this unmonitored portion of the system does not have any sewer laterals or contribute sanitary flow, it lies within the 100-year floodplain of Markham Ravine and likely experiences higher inflow and infiltration (I/I) than sewers on higher ground. To address this data gap, the City provided total daily flow data recorded at the NRPS.

The flow meter data from the pump station provided insights into the amount of I/I entering the station downstream of the V&A flow monitors. The V&A flow meters upstream of the NRPS were summed and compared to the lift station data provided by the City. The graphed results of the assessment are shown in **Figure 2-4**.

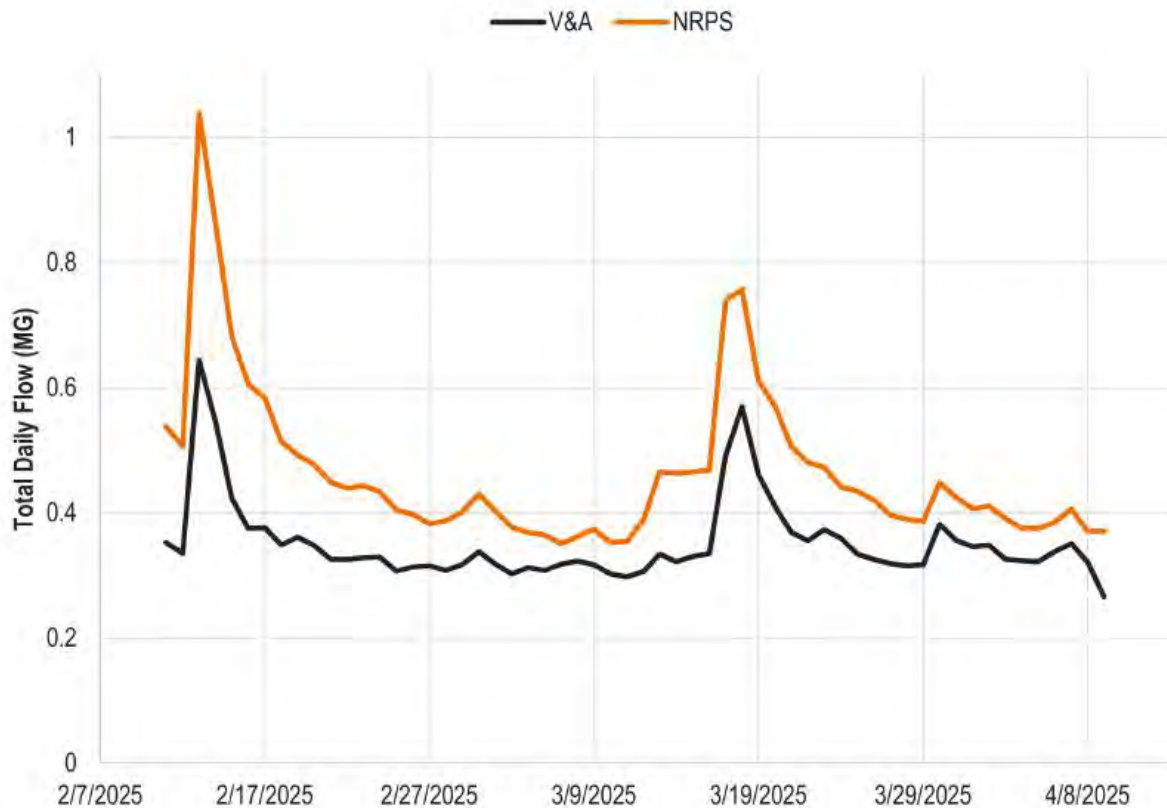


Figure 2-4. NRPS Flow Meter Data vs. Upstream Flow Monitoring Study Total Flow

Based on the difference between the flow recorded at the pump station and the total flow measured by V&A, a significant amount of I/I enters the system through manholes and sewers located between the flow monitoring points and the pump station. During the monitoring period, this section of the system contributed an average of more than 70,000 gallons per day (gpd) of I/I under dry weather conditions. The peak daily I/I



from this area reached approximately 400,000 gallons on February 13, 2025, and over the entire monitoring period, the total contribution exceeded 6.5 million gallons (MG). It should be noted that because this information was provided after completion of the V&A report, this I/I contribution was attributed to Site 6 impacting the I/I analysis presented in their report. I/I mitigation efforts should target the primary sewer segments upstream of the Nicolaus Road Pump Station (NRPS), as highlighted in **Figure 2-3**.

Based on upstream flow data, Site 1A exhibited the highest peaking factor. The City noted that surface drains at the Corporation Yard may not always be properly closed or diverted during storm events, which could also occur at the airport and adjacent industrial facilities. Site 1B recorded the second-highest peaking factor and ranked high for overall inflow and infiltration (I/I) in the V&A monitoring report. This sewer-shed includes the main upstream branches of Markham Ravine and multiple sewer crossings over drainage areas. In contrast, Site 2 showed the lowest I/I contribution. Therefore, mitigation efforts within the NRPS service area should prioritize eliminating I/I from open areas upstream of Site 1A and drainage crossings upstream of Site 1B.

The majority of the collection system is made of VCP pipe material, which is prone to cracking and joint separation, making it a major source of I/I. Older VCP pipes are more susceptible to the joint failures and cracks that allow I/I to enter. It's recommended that VCP pipes in close proximity to drainage areas be repaired or replaced to seal cracks and improve joints. Priority pipelines identified in this assessment are identified by their unique GIS ID in **Table 2-8** and shown in **Figure 2-3**.

The capacity assessment and hydraulic modeling analysis identifies potential capacity constraints at the NRPS under future levels of development and recommends capital improvement program (CIP) project 10 which diverts flow from the NRPS to a new 36-inch gravity sewer in Nelson Lane. CIP 10 allows the lift station to be taken offline and recommends that some pipelines identified in this assessment be abandoned and rerouted out of the ravine area. Sewers to be abandoned as part of CIP 10 are identified in **Table 2-8**. I/I improvements are still recommended for these sewers in the near-term as CIP 10 cannot be constructed prior to the completion of the Nelson Lane Trunk Sewer (CIP 8).

Additional details are provided in the recommended CIP described in **Section 7.4**.



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Existing Collection System

Table 2-8. NRPS I/I Assessment Priority Pipelines

GIS ID	Pipe Segment Reference	Diameter (in)	Pipe Length (LF)	Pipe Material	Install Year	Notes
1243	I08021-I08023	10	222.8	VCP	1983	Abandoned with CIP 10
2295	I08020-I08029	12	399.9	VCP	1999	
2296	I08029-I08050	12	41.8	VCP	1999	
2402	I08023-I08045	10	97.7	VCP	1983	Abandoned with CIP 10
286	I08022-I08021	10	396.7	VCP	1983	Abandoned with CIP 10
390	I08002-I08003	15	347.6	VCP	1985	Abandoned with CIP 10
391	I08003-I08023	15	306.6	VCP	1985	Abandoned with CIP 10
1959	H09084-H09039	10	115.1	VCP	1985	
226	H08039-H08037	12	367.2	VCP	1985	
227	H09104-H08039	12	454.6	VCP	1985	
249	H09044-I09027	10	435.9	VCP	1985	
250	I09027-I09083	10	122.3	VCP	1985	
284	H09038-H09084	10	125.7	VCP	1985	
287	H08036-H08038	12	418.5	VCP	1985	
288	H08037-H08036	12	409.6	VCP	1985	
295	I09083-I09084	12	361.1	VCP	1985	
385	I09084-I08001	12	381.1	VCP	1985	
389	I08001-I08002	12	487.1	VCP	1985	
393	I09040-I09083	6	129.4	VCP	1985	
399	I09055-I09027	8	163.0	VCP	1985	
560	H09043-H09044	10	414.5	VCP	1985	
567	H09039-H09043	10	457.6	VCP	1985	
568	H09040-H09038	10	123.4	VCP	1985	
569	H08005-I08002	15	421.9	VCP	1985	
570	H08038-H08005	15	416.9	VCP	1985	
2166	H09064-H09023	8	145.4	VCP	1987	
222	H09023-H09104	8	151.0	VCP	1987	
241	G09021-H09095	10	353.6	VCP	1999	



2.4.2 East Lincoln Parkway Pump Station (ELPPS)

The East Lincoln Parkway Pump Station (ELPPS) is located on the west side of East Joiner Parkway, south of Fieldstone Drive. Its service area covers roughly 1,100 acres and consists primarily of residential development, schools, and some commercial areas. The ELPPS was originally constructed in 2000, and pumping capacity was recently expanded in 2025. The existing facilities consist of a triplex pump station with three 85 hp pumps, a 21-inch diameter influent sewer, 6-foot diameter influent manhole with a trash basket, 10-foot diameter wet well, back-up generator, odor control facilities, emergency storage basin, and dual 12-inch diameter sewer force mains. The dual force main conveys wastewater from the ELPPS to a sewer manhole located near the intersection of East Joiner Parkway, Bella Breeze Drive, and Del Webb Boulevard. The pump station has a reliable capacity of 5.7 MGD and a total pumping capacity of 7.4 MGD. The reliable capacity is defined as the pumping capacity of the station with one of the pumps out of service.

The amount of I/I entering the ELPPS is likely influenced by its proximity to Orchard Creek, which meanders through the service area. The presence of perched groundwater and multiple sewer crossings over the creek further contributes to these conditions. Four flow monitors were used to isolate flow within the service area during the 2025 flow monitoring study. The ELPPS, flow monitoring locations, and contributing basins are shown on **Figure 2-5**. Each basin is described below.

- **Site 7:** Includes approximately 420 acres of primarily residential development south of Twelve Bridges Drive. It also includes Twelve Bridges Elementary School and Coyote Pond Park. The Education Foundation pump station is at the upstream end of the collection area. This basin includes the upstream reaches of Orchard Creek and its tributaries and four Orchard Creek sewer crossings.
- **Site 9A:** Includes approximately 350 acres of commercial and residential development west of Joiner Parkway. It also includes the Twelve Bridges High School, a TK-12 public charter school, the Lincoln Public Library, and medical facilities. The basin has expanded north since the previous Master Plan was developed, and much of the area is currently in planning and development phases.
- **Site 9B:** Includes approximately 250 acres of residential development north of Twelve Bridges Drive. This area was constructed between 2000 and 2004 and is considered one of the relatively older portions of the ELPPS service area.
- **Site 10:** Includes approximately 70 acres of residential development and one middle school along E Joiner Parkway, south of Wilson Park. This flow monitor was positioned such that it captures the I/I flow from the E. Joiner Parkway and Orchard Creek sewer crossing immediately upstream of the ELPPS.

Unlike the NRPS, flow monitoring at the ELPPS allowed full measurement of total flow. Analysis of recorded data indicates that Site 9B exhibited the highest peaking factor among the monitored locations. Elevated I/I was also observed at Site 10. However, flow recorded at Site 10 required adjustment during the flow balance process because total inflow at the ELPPS exceeded the downstream measurement at Site 8. A review of flow depths and invert elevations confirmed that this discrepancy caused flow data error at Site 10. There is a major sewer creek crossing immediately upstream of Site 10 that should be evaluated for



improvement needs by CCTV. The sewer stub at this location could be a major source of I/I if there are cracks or openings allowing creek flow to enter.

Site 9B contributes the highest volume of I/I of the ELPPS monitoring basins. There are fewer drainage crossings in this area, but several storm drains that may directly or indirectly divert stormwater into the collection system. There also appears to be an abandoned 4-inch sewer stub in close proximity to a drainage course that could be a significant source of I/I. Smoke testing in Basin 9B is recommended to further identify potential cross connections and locations where I/I could be entering the collection system.

Site 9A was ranked as the next most significant source of I/I in the ELPPS service area although this may be impacted by open construction in the sewer-shed. The sewer immediately upstream of the flow monitoring site is a drainage crossing which should be reviewed as potential source of I/I.

Data from Site 7 did not show excessive I/I but is the largest area and contributes the second largest I/I volume to the ELPPS. As previously noted, there are four sewer crossings in this sewer-shed which are identified as priority pipelines in **Figure 2-5**.

Like the NRPS collection area much of the ELPPS service area consists of VCP sewers. Creek crossings are typically DIP, but surrounding VCP sewers should be evaluated for potential improvements. Priority pipelines identified in this assessment are identified by their unique GIS ID in **Table 2-9** and shown in **Figure 2-5**.

The existing system model and capacity assessment recommend upsizing the 12-inch sewer in Joiner Parkway between Twelve Bridges Drive and Field Stone Drive as CIP 1. A portion of this stretch of sewer is included in the priority pipelines identified in this assessment and are noted in **Table 2-9**. I/I investigation of these pipelines is still recommended if CIP 1 is not implemented.

Additional details are provided in the recommended CIP described in **Section 7.4**.

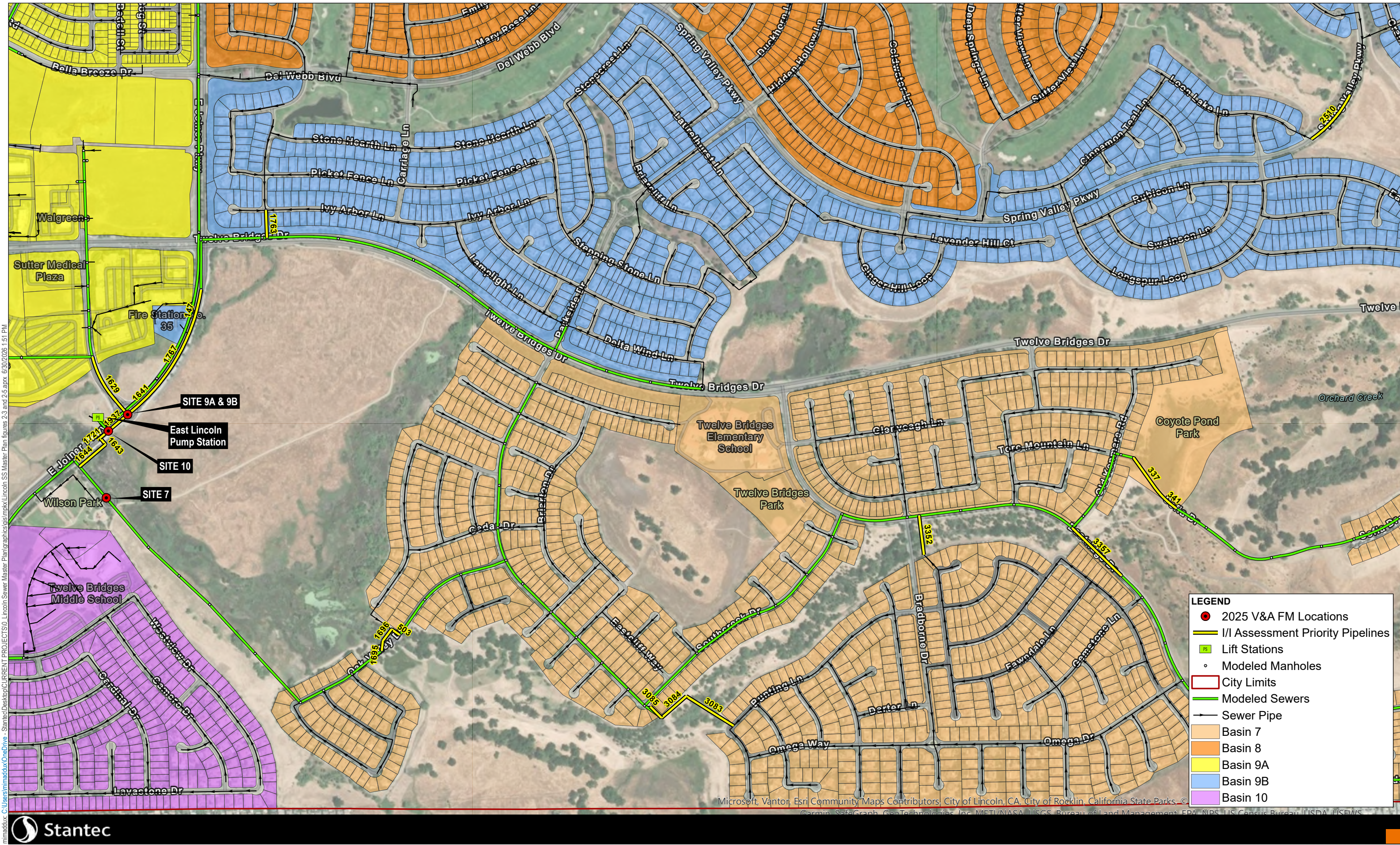


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Existing Collection System

Table 2-9. ELPPS I/I Assessment Investigation Pipelines

GIS ID	Pipe Segment Reference	Diameter (in)	Pipe Length (LF)	Pipe Material	Install Year	Notes
1644	R13055-R13054	16	262.0	DIP	2001	
1696	S13076-S13075	15	111.9	DIP	2001	
2510	Q16047-Q16046	8	457.8	DIP	2003	
3083	S14021-S14017	12	430.8	DIP	2005	
147	Q13053-R13052	12	360.3	VCP	2002	Upsized with CIP 1
148	R13005-R13053	15	25.0	VCP	2000	
1629	R13058-R13056	15	526.9	VCP	2001	
1641	R13051-R13056	12	377.4	VCP	2000	Upsized with CIP 1
1643	R13054-R13053	15	66.0	VCP	2001	
1721	R13053-R13050	15	83.5	VCP	2000	
1763	Q13057-Q13050	12	211.0	VCP	2000	
1767	R13052-R13051	12	403.7	VCP	2000	Upsized with CIP 1
1937	R13056-R13050	18	194.9	VCP	2000	
1695	S13075-S13074	15	75.5	VCP	2001	
503	S13073-S13076	15	75.9	VCP	2001	
3084	S14017-S14016	12	254.0	VCP	2002	
3085	S14016-S14015	12	122.4	VCP	2002	
3352	R15048-R15064	8	301.9	VCP	2002	
3357	R15063-R15062	8	526.9	VCP	2004	
337	R15053-R15051	8	387.3	VCP	2004	
341	R15052-R15053	8	125.0	VCP	2004	





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FIGURE 2-5
ELPPS INFLOW AND INFILTRATION ANALYSIS AND FLOW MONITORING
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

2.4.3 Pump Station Inflow and Infiltration (I/I) Assessment Summary

Based on the results of the pump station I/I assessment, specific portions of the pump station collection areas were identified as contributing high amounts of I/I to lift stations. These areas should be targeted for rehabilitation or replacement and I/I reduction measures. The following is recommended as a result of the assessment:

- Sewers and manholes downstream of flow monitors (Sites 1A, 1B, and 2) and upstream of the NRPS should be replaced or lined. This assessment isolated this portion of the system as the priority I/I rehabilitation area, water tightness should be the goal of these improvements.
- Surface drains should be closed or diverted to the stormwater system during rain events at the City Corp Yard, airport and other industrial facilities in Basin 1A. Direct inflow of stormwater to the Flightline Drive Lift Station should also be evaluated.
- Smoke testing is recommended to identify the specific sources of I/I in Basin 9B. The sewer stubs in Basin 9B should be inspected to ensure they are watertight.
- The sewer crossing between flow monitoring Sites 7 and 10 should be prioritized for evaluation and rehabilitation.
- Much of the City service area consists of vitrified clay pipe (VCP), which is prone to joint failure and cracking; therefore, targeted rehabilitation of VCP segments and drainage crossings should be prioritized. These areas are primarily in Basin 1B and Basin 7. These areas of the system are highlighted in **Figure 2-3** and **Figure 2-5**.

Additional details are provided in the recommended CIP described in **Section 7.4**.

2.5 Hydraulic Model Update

The City's hydraulic model, originally developed in PCSWMM during the 2018 Wastewater Collection System Master Plan (2018 Master Plan), has been a critical tool for evaluating system performance and planning infrastructure investments. For this update, the model was modernized to the latest PCSWMM platform, integrated with recent system improvements, and re-calibrated using the flow monitoring data described in this section. This ensures that planning decisions are based on accurate, current conditions.

Calibration was completed for both dry and wet weather scenarios, following Chartered Institution of Water and Environmental Management (CIWEM) standards to maintain industry best practices. The updated model provides a reliable foundation for prioritizing capital improvements, mitigating risk, and supporting growth strategies outlined in the City's General Plan. Detailed documentation of the process can be found in the Technical Memorandum No. 2 – Collection System Model Update and Calibration (TM 2) in **Appendix B**.



3 Wastewater Flow Projections

The purpose of this chapter is to outline the data and assumptions used to estimate future wastewater flows and their distribution within the planning horizon defined by the City's General Plan. These projections form the foundation for developing hydraulic models of both the existing and anticipated collection system. The models are utilized to assess current infrastructure performance and to identify improvements required to accommodate future growth areas.

This chapter is divided into the following sections:

- Historical Wastewater Flows
- Land Use and Future Growth Assumptions
- Wastewater Flow Estimates

3.1 Historical Wastewater Flow

The past 20 years of average daily influent flow data recorded at the WWTRF is summarized in **Table 3-1**.

Table 3-1. Historical LiSWA WWTRF Influent Flow Data

Year	Average Annual Flow, AAF (MGD)	Average Dry Weather Flow, ADWF (MGD)	Peak Day Flow (MGD)	Total Annual Rainfall, Lincoln (in)
2005	2.47	2.27	8.66	21.78
2006	2.94	2.50	7.00	24.60
2007	2.85	2.73	5.81	14.52
2008	2.97	2.72	6.13	9.10
2009	2.98	2.76	6.57	14.12
2010	3.21	2.79	8.79	25.62
2011	3.27	2.87	7.95	19.24
2012	3.28	2.83	10.04	28.48
2013	2.96	2.84	4.83	7.46
2014	3.01	2.62	9.33	23.62
2015	2.85	2.65	5.28	11.28
2016	3.99	3.70	11.97	24.63
2017	5.24	4.03	19.90	31.90
2018	4.73	3.95	14.58	22.50
2019	5.22	4.11	18.37	30.21
2020	4.41	3.98	12.79	11.45
2021	4.97	4.41	21.73	21.75
2022	4.79	4.19	20.78	16.61
2023	5.57	4.51	16.95	23.01
2024	5.64	4.63	15.17	26.49



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Wastewater Flow Projections

The table presents the average annual flow (AAF), average dry weather flow (ADWF), peak day flow, and total annual rainfall from 2005 through 2024. It should be noted that the SMD1 service area began contributing flow to the facility on May 23, 2016; influent flow after this date reflects consolidation of flow conditions from both communities. Rainfall presented in the table is from the Lincoln (LCN) weather station available on the California Department of Water Resources California Data Exchange Center (CDEC) website.

Higher total annual rainfall volumes correlate with higher peak day flow peaking factors (peak day flow/ADWF). Peaking factors range from less than 2 in dry years (2013) to nearly 5 in wet years (2017) indicating a high I/I response. The introduction of flow from SMD1 has also increased these peaking factors. SMD1 is at a higher elevation and typically experiences a higher average annual rainfall than Lincoln which is likely a contributing factor. Average daily influent flow recorded at the LiSWA WWTRF from May 2005 through May 2025 is graphed along with total daily rainfall in **Figure 3-1**.

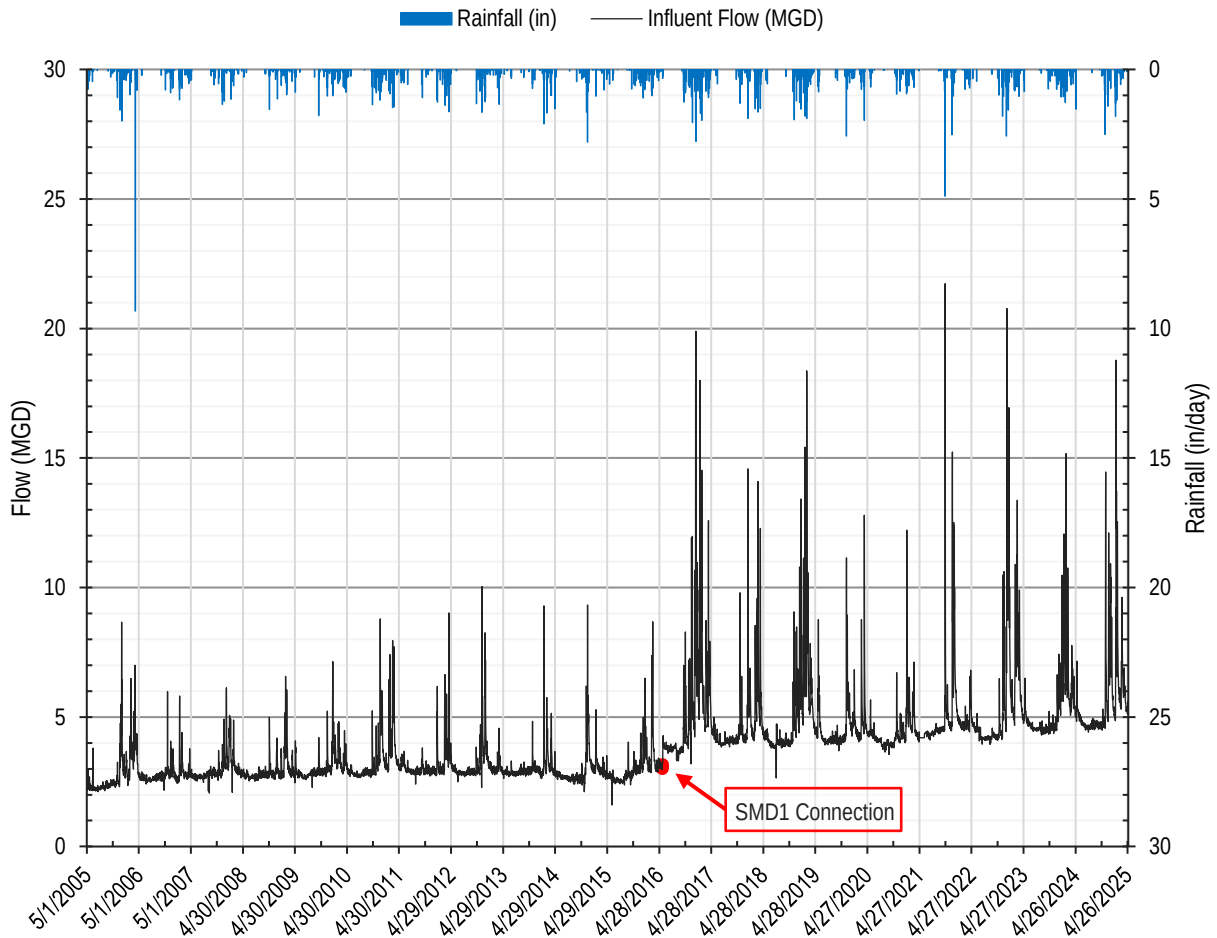


Figure 3-1. Historical WWTRF Daily Influent Flow and Total Rainfall



3.1.1 Wastewater Flow Per Equivalent Dwelling Unit (EDU)

The average wastewater generation rate per equivalent dwelling unit (EDU) was calculated using historical flow data and EDU counts provided by the City. Average Dry Weather Flow (ADWF) data from 2016 to 2024 were obtained for Service Maintenance District 1 (SMD1) and the Wastewater Treatment and Reclamation Facility (WWTRF). The City of Lincoln's contribution to ADWF was estimated by subtracting the SMD1 value from the total recorded at the WWTRF. The ADWF data is summarized in **Table 3-2**.

Table 3-2. Historical ADWF Contributions

ADWF		WWTRF	SMD1	Lincoln
Year	3-month dry period	(MGD)	(MGD)	(MGD)
2016	June-Aug	3.77	1.21	2.56
2017	July- Sept	4.03	1.25	2.78
2018	July- Sept	3.95	1.24	2.71
2019	July- Sept	4.11	1.32	2.79
2020	July- Sept	3.98	1.07 ⁽¹⁾	2.91
2021	July- Sept	4.41	1.18	3.24
2022	July- Sept	4.19	1.17	3.02
2023	July- Sept	4.51	1.16	3.35
2024	July- Sept	4.63	1.16	3.47

1. SMD1 diverting flow for construction during this period.

Table 3-3 summarizes historical wastewater generation rates per EDU from 2005 through 2024, with an average ADWF rate of approximately 150 gallons per day per EDU (gpd/EDU). The corresponding ADWF per capita is also shown in **Table 3-3**. A notable decline occurred between 2012 and 2016, primarily due to drought conditions and water-use restrictions, reducing the rate from 172 gpd/EDU in 2011 to 130 gpd/EDU in 2016. This trend is mirrored in per capita flows, which dropped from about 68 gpd/person to 54 gpd/person during the same period.

Following 2016, generation rates stabilized at roughly 130 gpd/EDU, even as the total number of EDUs continued to increase. Significant rainfall and elevated ADWF in 2017 temporarily raised rates for that year. Overall, this reflects improved water efficiency and conservation practices across the community. However, both flow per EDU and per capita began trending upward again around 2020, likely influenced by stay-at-home orders and lifestyle changes resulting from the COVID-19 pandemic, as more residents worked from home. Flows and EDU counts recorded for 2022 may have been affected by the formation of the Lincoln–Sewer Maintenance District 1 Wastewater Authority (LiSWA) and by relatively dry conditions that year, resulting in lower ADWF and unit flows. Excluding 2022 as an outlier, per capita flows appear to have rebounded to pre-drought levels post-2020.

Although generation rates per EDU have declined since 2005, the rebound observed in recent data shows that conditions are variable. Unlike treatment facilities, which can be expanded or supplemented with flow equalization, collection systems are far more difficult to modify, warranting a higher level of conservatism in



Sewer Master Plan Update

Wastewater Flow Projections

planning. This Master Plan Update applies the City's Engineering Design Standard of 250 gpd/EDU to estimate flows for new developments. Section 9 of the City of Lincoln Department of Public Works Design Criteria and Procedures Manual (June 2004) outlines the criteria to be used in the engineering design of sewers in the City of Lincoln. Use of this standard was confirmed through discussions with City staff and is intentionally conservative to ensure adequate system capacity. While the value may appear high compared to recent trends, the Master Plan also incorporates Peak Wet Weather Flow (PWWF) factors from the City's Design Standards. These factors are generally lower than observed peaks, particularly as facilities age, and provide realistic estimates based on flow monitoring data. Together, these design assumptions balance conservatism with observed performance, ensuring the collection system is properly sized.

Table 3-3. Historical Wastewater Generation per EDU

Year	Total EDUs ⁽¹⁾	Lincoln ADWF (MGD)	Generation Rate (gpd/EDU)	Population ⁽²⁾	Per Capita Flow (gpd/person)
2005	12,986	2.28	175	28,083	81.2
2006	15,505	2.58	166	34,342	75.1
2007	16,368	2.69	164	38,360	70.1
2008	16,633	2.70	162	40,726	66.3
2009	16,795	2.73	163	41,787	65.3
2010	16,968	2.78	164	42,589	65.3
2011	17,068	2.94	172	43,563	67.5
2012	17,275	2.83	164	44,286	63.9
2013	17,701	2.83	160	44,954	63.0
2014	18,006	2.65	147	45,899	57.7
2015	18,243	2.53	138	46,627	54.3
2016	19,687	2.56	130	47,427	54.0
2017	20,032	2.78	139	48,268	57.5
2018	20,796	2.71	131	48,860	55.5
2019	21,519	2.79	130	49,348	56.6
2020	21,041	2.91	138	49,573	58.7
2021	22,569	3.24	143	50,343	64.3
2022	24,973 ⁽³⁾	3.02	121	51,255	58.9
2023	23,454	3.35	143	52,329	63.9
2024	24,025	3.47	144	54,316	63.9
Average:			150		63.2

1. Service connection EDUs provided by City of Lincoln Utility Billing Records.
2. Population estimates from State of California Department of Finance Tables E-4 Historical Population Estimates for Cities, Counties, and the State, May 2026.
3. Total EDUs for 2022 may have been impacted by the formation of the Lincoln – Sewer Maintenance District 1 Wastewater Authority (LiSWA). Established on November 30, 2022, by the execution of a Joint Powers Agreement (JPA) between the City of Lincoln and Placer County (County).



3.2 Land Use and Future Growth Assumptions

Stantec reviewed the future growth areas and development assumptions with the City and documented the details in a Technical Memorandum No. 3 – Future Land Use and Assumptions (TM 3). TM 3 breaks down the flow projection parameters and assumptions for each future development area. Detailed effort went into identifying each development area, the associated land use assumptions, and the projected development timeline using City provided shapefiles, maps, and feedback by the City Planning Department. The following outlines the existing and future land use, growth assumptions, and development timelines, for full details please refer to TM 3, which can be found in **Appendix B**.

Development data, land use classifications, and wastewater generation unit rates are used to estimate the average dry weather flow (ADWF) expected from future growth areas. The City's General Plan 2050 serves as a long-term policy guide for the City's growth and is the basis for future growth projections used for sewer service planning in addition to input from City Staff. The development of the future growth areas is classified in 5-year increments through a 20-year period with any remaining area assumed to be developed at buildout.

3.2.1 Existing Land Use

The City of Lincoln's prevailing land use pattern is characterized primarily by low-density, single-family residential development, complemented by commercial, office, industrial, recreational, and institutional uses. Residential areas are distributed throughout the service area, with the eastern portion featuring established single-family neighborhoods along Twelve Bridges Drive and Del Webb Boulevard. The far eastern edge of the city is distinguished by country estate-style properties, consisting of large homes situated on expansive lots.

Commercial and mixed-use developments are interspersed across the city, with a prominent concentration along the historic downtown corridor. Industrial land uses are most prevalent in the northern and northwestern sectors of the city, where major industrial connections such as Sierra Pacific Industries, Gladding McBean, and the Lincoln Regional Airport are located. Additional industrial and commercial uses are proposed along the western Highway 65 corridor.

For purposes of this Master Plan, it is assumed that existing developments will not be rezoned or intensified, and existing wastewater flows are representative of ultimate land uses. Any such rezoning or redevelopment should be subject to review, requiring specific evaluation of its impact on the collection system prior to approval by the City.

3.2.2 Future Land Use

Future growth and land uses are established by the City's General Plan and serve as the basis for estimating wastewater flow from future development. Infill is expected to occur on vacant parcels within city limits. The sphere of influence (SOI) defines the ultimate planning boundary for the City. To provide flexibility while ensuring new developments meet the quality and mix of land uses desired by the City, the



General Plan applies two land use designations, Village and Special Use District (SUD) for larger undeveloped portions of the General Plan Sphere of Influence (SOI). Future development areas are divided into city limits, unannexed lands, and SOI development, each of which is described below.

City Limits

City limits development includes vacant parcels and those with a specific development title that exist within the current city limits boundary. The vacant parcels without a specific development title were classified as “infill” and zoning-based land use designations were used to estimate the total number of EDUs associated with each parcel. This includes approximately 172 acres of non-residential developments and 993 EDUs of residential development. These areas are assumed to develop within the next 5 years to reserve capacity in existing sewers.

Since the development of the 2018 Master Plan, the City has annexed the following areas into city limits: SUD-B, the majority of Villages 1 and 7, as well as a portion of Village 5 (referred to as Village 5A). These areas as well as a number of on-going developments within city limits were identified in City GIS files and discussions with City Staff. Land uses, EDU counts, and time of development were specified for each area. These areas include a total of 720 acres of non-residential development and 14,216 EDUs which will be developed over the next 5 to 20 years. A breakdown of the assumptions for each development area within city limits is provided in TM 3 included in **Appendix B**.

Unannexed Lands

Unannexed lands are areas of the SOI surrounding the city limits boundary consisting of unannexed portions of partially annexed villages and an industrial area south of Village 3 referred to as “other”. Land uses for these areas were provided in the shapefile *Unannexed_Land_Use.shp*. These areas include 684 acres of non-residential development and 3,190 EDUs. Development of these areas is assumed to occur between 10 years and buildout.

SOI Development

The SOI development areas consist of the remaining SUDs and Villages, SUD-A and -C, and Villages 2, 3, 4, and 6. Assumptions from the 2018 Master Plan were carried through for these areas in this Master Plan Update based on discussions with City Staff. These areas include 2,135 nonresidential acres and 21,179 EDUs and are assumed to develop at buildout.

Future development areas and their projected time of development are shown **Figure 3-2**.



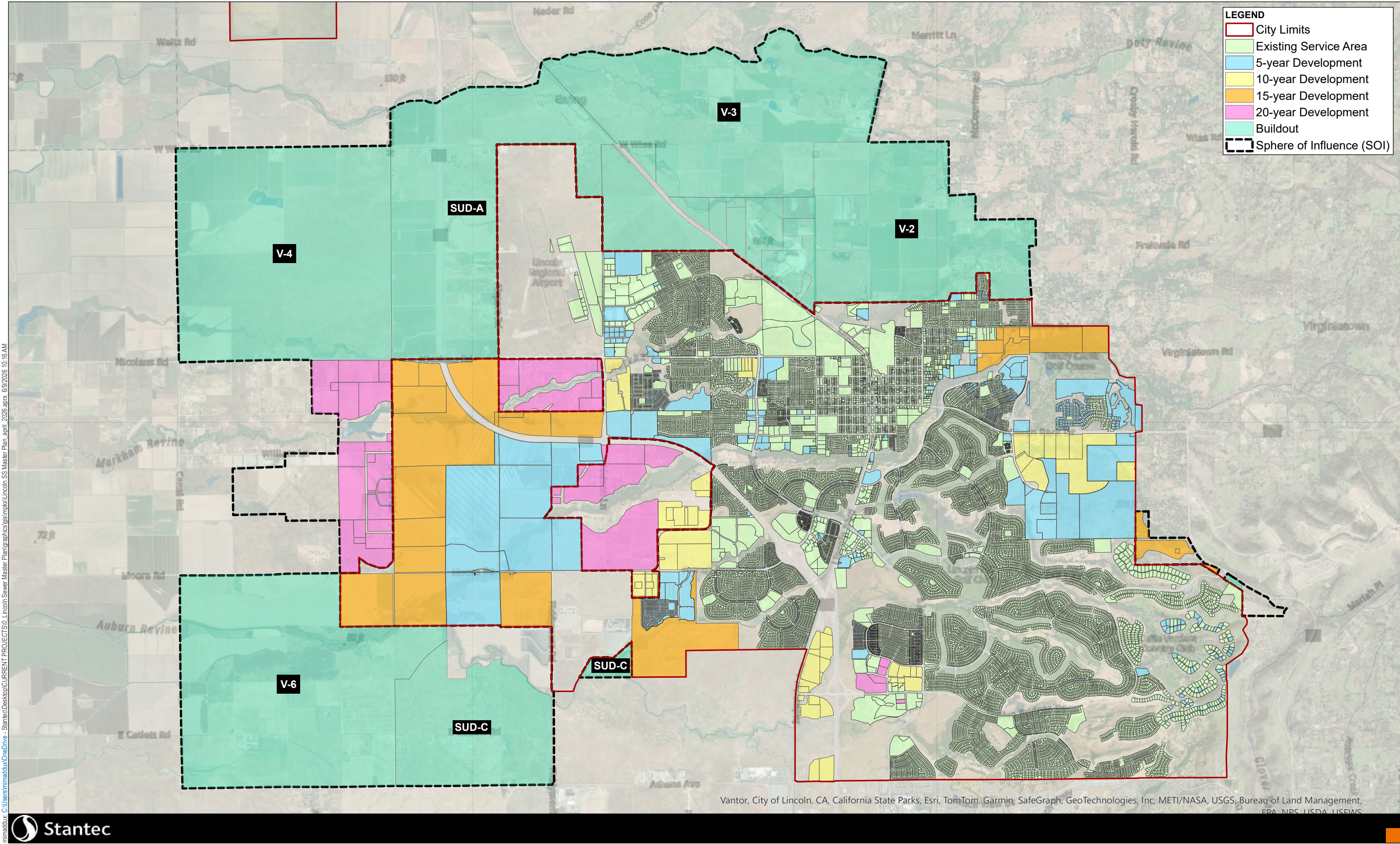


FIGURE 3-2
FUTURE DEVELOPMENT AREA PHASING
 CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

3.2.3 Assumptions Summary

The primary assumptions used to estimate development in this Master Plan are summarized below, for full details please refer to TM 3, which can be found in **Appendix B**:

- Infill is assumed to be parcels within existing city limits boundaries with a land use activity code of Vacant in the GIS files provided by the City.
- Infill is assumed to be completed within 5 years to reserve any available capacity in existing sewers.
- Village 1 has active construction and is anticipated to be substantially completed within 10 years.
- SUD-B is anticipated to begin development within the next 5 years and be substantially completed within 10 years.
- Villages 5 and 7 are anticipated to begin development in the next 5 to 10 years and be substantially completed within 15 to 20 years.
- Villages 2, 3, 4 and 6 and SUD-A and -C are assumed to develop at buildout (beyond 20 years).
- Available Specific Plans and/or General Development Plans were referenced to capture the most recent land use assumptions.
- No development occurs outside of the SOI (Additional flow is contributed by regional entities).
- The wastewater unit rate for a single-family household established by Section 9 of the City of Lincoln Department of Public Works Design Criteria and Procedures Manual (June 2004) is used to estimate flows for new developments: 250 gallons per day (gpd) per EDU.
- Residential unit densities are assumed to be the midpoint of the dwelling unit densities provided in the General Plan unless other specific densities are provided. See **Table 3-4** below.
- Non-residential wastewater generation rates (gpd/acre) from the 2018 Master Plan are carried through but converted to unit densities (EDU/acre) using the City's unit rate. For example, an industrial rate of 2,500 gpd per acre divided by 250 gpd/EDU equates to 10 EDU/acre.
- Open Space and Agricultural land uses will not contribute flow to the collection system or will contribute only negligible flow not material to sizing sewers.
- Land use data is correlated with EDU densities to project the total EDUs for future developments where specific estimates were not provided.

Table 3-4. General Plan Land Use Unit Density and Wastewater Generation Rates

Land Use Designation			EDU Density (EDU/Acre)	Wastewater Generation Rate (gpd/Acre)
Residential	Rural Residential	RR	0.50	125
	Country Estates	CE	2.00	500
	Low Density Residential	LDR	4.45	1,113
	Medium Density Residential	MDR	9.45	2,363
	High Density Residential	HDR	16.50	4,125
Non-residential	Commercial	C	6.40	1,600
	Industrial	I	10.00	2,500
	Public	P	4.00	1,000
	Park	Park	0.08	20



3.3 Wastewater Flow Estimates

For this Master Plan Update, future wastewater generation is expressed in terms of equivalent dwelling units (EDUs) assigned to each parcel or development area. An EDU standardizes demand across all land use designations—residential, commercial, industrial—based on the flow produced by a typical single-family home. In other words, one EDU represents the average wastewater discharge from a single-family detached household. The average dry weather flow (ADWF) is then calculated by applying the City’s standard wastewater unit rate of 250 gpd/EDU.

3.3.1 Future Development Areas

A total of 39,578 residential EDUs and 3,710 acres of non-residential area are projected at buildout. This equates to a total EDU projection of 64,389 EDUs at buildout. Non-residential area excludes open spaces and right-of-way, as well as any SOI development area park sites. **Table 3-5** summarizes the area, EDUs, and projected wastewater flows for future planned development by development area and phase.

Table 3-5. Summary of Future Development ADWF Projections

Area of Development	Parameter	5-year	10-year	15-year	20-year	Buildout	Total
City Limits	Area (Acres)	2,364	616	1,982	40.5		5,003
	EDU	10,250	4,132	5,780	259		20,422
	ADWF (MGD)	2.56	1.03	1.45	0.06		5.11
Unannexed Lands	Area (Acres)		133	65	1,292	422	1,912
	EDU		595	129	3,644	4,168	8,536
	ADWF (MGD)		0.15	0.03	0.91	1.04	2.13
SOI Development	Area (Acres)					11,617	11,617
	EDU					35,431	35,431
	ADWF (MGD)					8.86	8.86
Total	Area (Acres)	2,364	749	2,047	1,332	12,039	18,531
	EDU	10,250	4,728	5,909	3,903	39,599	64,389
	ADWF (MGD)	2.56	1.18	1.48	0.98	9.90	16.10

The flows presented in **Table 3-5** represent ADWF and not the peak wet-weather flow (PWWF) simulated in the hydraulic model, which is used to evaluate the level of service (LOS) of the collection system and provide recommendations for future servicing and improvement strategies.

3.3.2 Regional Flow Contributors

Although the LiSWA facilities are not the topic of this Master Plan the flows carried through the Regional Trunk Sewer are relevant to evaluating the upstream City of Lincoln collection system. Water level and the capacity of these sewers may cause backwater effects upstream.

Placer County provided a spreadsheet outlining the annual EDU and wastewater flow projection to contribute to LiSWA facilities. The projection includes future development from the SMD1 service area,



including Bickford Ranch. The spreadsheet provided by the County is presented in **Appendix C**. Flows at each level of development are summarized below.

Table 3-6. SMD1 Wastewater Flow Projections

Development Phase	Total ADWF (MGD)
Current (2025) ⁽¹⁾	1.41
5-year	2.02
10-year	2.34
15-year	2.54
20-year	2.68
Buildout	5.31

1. Total ADWF simulated in the hydraulic model, determined from flow data provided by the County recorded at the SMD1 Regional Pump Station. Remaining flows are projections provided by the County.

The total ADWF at each phase of development is summarized in **Table 3-7**.

Table 3-7. Total ADWF at Each Development Phase

Development	City of Lincoln Service Area		Total ADWF (MGD)		
Phase	Area (Acres)	EDU	Lincoln	SMD1	Total
Existing	5,567		4.59	1.41	6.00
5-year	7,930	10,250	7.16	2.02	9.18
10-year	8,679	14,978	8.34	2.34	10.68
15-year	10,727	20,887	9.82	2.54	12.36
20-year	12,059	24,790	10.79	2.68	13.47
Buildout	24,098	64,389	20.69	5.31	26.00

3.3.3 Flow Distribution and Peak Flow Methodology

The existing collection system was delineated as part of the flow monitoring study and wastewater flow contributions were distributed to manholes within the existing sewer-sheds based on the flow monitoring data and the proportion of the sewer-shed area contributing to each manhole during the model calibration process. Following calibration of existing collection system model, projected flows from future development areas are incorporated into the model for each future development phase.

Flow estimates from future development areas were distributed in a similar manner, aligning with provided planning data where available. Each of the projected Village and SUD flow estimates were assigned to upstream manholes proportionally by the approximate manhole tributary area within each Village and SUD. Tributary areas consist of large swaths of land and were delineated considering topography, floodplains, environmental reserves, and their proximity to the collection system.



PWWFs simulated in the hydraulic model are used to evaluate the LOS of the collection system and provide recommendations for future servicing and improvement strategies.

Two methods were used to determine peak flows within the hydraulic model:

1. Flows Contributed to the Existing System: Use the simulated design storm and calibrated RDII parameters to predict PWWFs entering the existing system.
2. Flows Contributed to the Future System (New Infrastructure): Use City design criteria and PF method, to predict PWWFs that may result from future development.

PWWFs are determined by computational models by simulating design rainfall events representing a reasonable worst-case condition. The design storm selected for many Central Valley collection systems has a statistical 10-year return frequency and a 24-hour duration. PWWFs in the collection system, originating from the existing sewer-sheds, are simulated using a 10-year, 24-hour design storm with a Huff Distribution (distributing rainfall by the hour). The 10-year, 24-hour design storm in the City of Lincoln has a total rainfall depth of 3.32 inches.

PWWF from future development outside of the existing service area is estimated using the peaking factor method outlined in the City's Design Criteria. A peaking factor of 2.3 was applied to flows that contribute to new infrastructure to estimate a PWWF under future conditions. The approach of establishing design storm conditions to distribute flow within the existing collection system, and application of a peaking factor of 2.3 to estimate future flows from future development (to size future infrastructure) is considered by the City to be an acceptable and conservative approach to meeting State Water Board requirements.

Peak wastewater flow estimates from regional entities are projected using calibrated model parameters and the design storm. The service area is assumed to expand by 50 percent at buildout. It assumed that the capacity of the SMD1 Regional Lift Station will eventually be expanded to accommodate increased flows, its current capacity is 14.7 MGD.

Table 3-8 presents a summary of the PWWF estimating methods used in this Master Plan Update.

Table 3-8. Peak Wet Weather Flow Methodology

Contributing Area	PWWF Simulation Method	Description
Existing Sewer-sheds	RTK Unit Hydrograph and 10-year, 24-hour Design Storm	Calibrated based on flow monitoring data
Future Development within the Existing Service Area	RTK Unit Hydrograph and 10-year, 24-hour Design Storm	Contributes to existing infrastructure. Sewer-shed RTK parameters assigned based on the location of development.
Future Development outside the Existing Service Area	Fixed Flow, Peaking Factor	Contributes to future infrastructure. Design criteria prescribed.
Regional Flows	RTK Unit Hydrograph and 10-year, 24-hour Design Storm	RTK parameters calibrated to existing SMD1 flow data. The service area is assumed to expand by 50 percent at buildout and adds 5 percent of the current service area at every 5-year level of development scenario.



4 Servicing Strategy and Assessment Criteria

The purpose of this chapter is to present capacity evaluation criteria used to assess collection system model simulation results and to provide a description of each of the simulated scenarios.

This chapter is divided into the following sections:

- Servicing Strategy
- Level of Service Criteria
- Design Criteria

4.1 Servicing Strategy

The 2018 Master Plan presented a servicing strategy for the future collection system that focused on routing flow from future SOI development areas around the existing collection system through new large trunk sewers. Phasing strategies and overall planning of the future collection system focused on the minimization of pump stations, and the maximization of gravity flow sewers. This approach would reduce the overall buildout operating cost of the system but has led to phasing challenges not well aligned with the actual timing of future developments. This Master Plan Update revises the future collection system layout presented in the 2018 Master Plan considering the utilization of residual capacity in the existing system and removes the focus from large gravity sewers to present a more feasible approach for future development.

4.2 Level of Service (LOS) Criteria

The purpose of this section is to present the capacity evaluation criteria used to assess the collection system hydraulic model simulation results. The 10-year, 24-hour design storm was applied to the model to simulate PWWF and evaluate the systems level of service (LOS) performance in meeting the following criteria. The collection system is assessed based upon the following wastewater flow metrics. Improvements are generally recommended based on the allowable surcharge and hydraulic loading ratio (HLR) criteria described below.

4.2.1 Allowable Surcharge Criteria

Surcharging occurs when flow exceeds the open channel flow capacity of a gravity flow pipeline, which causes the water level in manholes to begin rising above the adjacent pipe crown elevation. Under surcharged conditions, the pipe flows under pressure and can carry additional flow. However, once a manhole surcharges it takes very little additional flow for an overflow to occur. Gravity sewers are generally designed to flow partially or full without surcharging. Wastewater collection systems can generally accommodate some degree of surcharge during peak flow conditions. Short periods of surcharge can be accommodated within certain limits without justifying the cost of upsizing an existing pipeline.



Freeboard in a manhole is defined as the distance between the rim elevation and the hydraulic grade line (HGL). Surcharging occurs when the HGL exceeds the pipe crown elevation. The maximum allowable surcharge in the gravity portion of the existing collection system is 1-foot. Manholes in the existing system must also maintain at least 8 feet of freeboard during a design storm event. No surcharging will be allowed for new manholes proposed under future development scenarios. Criteria for allowable surcharge and freeboard is presented in **Table 4-1**.

Table 4-1. Allowable Surcharge Criteria

Scenario	LOS Criteria
Existing Manholes	- When the rim elevation is less than or equal to 8 feet above the pipe crown: No Surcharging Allowed - When the rim elevation is more than 8-feet above the pipe crown: A pipeline is hydraulic deficient if there is less than 8-feet of freeboard or the surcharging is greater than or equal to 1-foot above the pipe crown.
Future Manholes	No Surcharging Allowed

4.2.2 Hydraulic Loading Ratio (HLR)

Collection system performance is assessed based upon the hydraulic loading ratio (HLR) within each sewer under dry weather and peak wet weather conditions. HLR is commonly used as a metric to evaluate the capacity and performance of a collection system. The HLR of a pipeline is mathematically defined as the peak modeled flow divided by the full pipe capacity derived from Manning's equation.

The existing level of development scenario is evaluated under dry weather conditions and wet weather conditions. Under dry weather conditions, sewers with HLRs of 50 percent or less are considered to meet LOS criteria. Sewers having HLRs greater than 50 percent indicate that there may not be capacity for flow under peak conditions. Improvements identified under PWWF conditions are proposed based on a HLR exceeding 100 percent in existing sewers and the level of surcharge criteria. New infrastructure proposed in future level of development scenarios are sized for HLRs up to 100 percent for sewer greater than 12-inches in diameter.

Table 4-2. Allowable Hydraulic Loading Ratio (HLR) Criteria

Scenario	Flow Conditions	Acceptable HLR (Max Flow/Full Flow)
Existing Level of Development Scenario	Dry Weather	Less than 50%
Existing Level of Development Scenario	Wet Weather	See Allowable Surcharge Criteria (Table 4-1)
Future Level of Development Scenarios	Wet Weather	Less than 100%



4.2.3 Residual Capacity

The residual capacity is the remaining capacity within a sewer when subjected to PWWF conditions. The residual capacity is mathematically defined as Manning's full pipe flow capacity minus the peak modeled flow. This performance indicator is useful for illustrating the relative remaining capacity throughout the collection system for use in evaluating future servicing strategies.

4.2.4 Depth to Diameter (d/D) Ratio

The peak sewer depth under PWWF conditions is an important factor in understanding capacity limitations of a collection system. The d/D ratio is the peak modeled depth of flow (d) divided by the pipe diameter (D). Typical LOS criteria allow a maximum d/D ratio of 0.70-0.85.

4.2.5 Velocity

Typical LOS criteria define an acceptable velocity range of 2 – 7 fps for gravity sewers and a maximum of 8 fps for sewer force mains.

4.2.6 Pump Station Capacity

In addition to the surcharge criteria described above, wastewater lift stations are evaluated based on their reliable pumping capacity and their ability to convey the projected peak wet weather inflows. The reliable pumping capacity is defined as the total pumping capacity with the largest pump out of service.

4.3 Future Infrastructure Design Criteria

Trunk sewer alignments follow the roadway circulation framework presented in the 2050 General Plan, where applicable. The design criteria presented below establish the guidelines used to layout future infrastructure and extend the existing collection system to serve future development.

Pipelines within gravity service areas are sized using standard design slopes that produce full-pipe flow velocities between 2.0 and 2.5 fps ($n = 0.013$). In areas with significant topographic variance, drop manholes are incorporated into the model to manage elevation changes and avoid excessive sewer depth. This provides a conservative approach to sizing buildout sewers to meet depth requirements, opposed to planning for steeper pipe slopes and smaller diameters when slopes may not be achievable in design based on field surveys. It is noted in the buildout CIP project tables where manhole drops are included and smaller diameter pipelines with steeper slopes may be applicable.

Force mains are sized for velocities between 3 and 5 fps. Single force main sizing is noted, but dual force main systems are ultimately recommended in the CIP to allow operational flexibility. Alignments, pump station capacities, and pipe sizes should be refined with specific plan development.

The design criteria used to simulate future infrastructure in the hydraulic model is presented in **Table 4-3**.



Sewer Master Plan Update
Servicing Strategy and Assessment Criteria

Table 4-3. Future Infrastructure Design Criteria

Design Criteria	Value
Manhole Spacing	~ 500 feet
Manhole Drops	Sewers < 36-inches in diameter: 0.1 feet Sewers >= 36-inches in diameter: 0.1 feet at bends > 15-degrees 0.0 feet (through manholes) on straightaways
Manhole Depth	8 – 30 feet
Manning's "n"	Manning's formula shall be used to determine the relation of slope, design flow, velocity, and diameter. The "n" value shall not be less than 0.013 for all new pipes.
Velocity	2 – 7 fps
Pipe Size	Hydraulic Loading Ratio (HLR) < 100%
Rim Elevation/ Grade	LiDAR Surface Elevation Data
Lift Stations	For purposes of this Master Plan Update future pump station capacity equates to the peak modeled inflow to the station. However, lift station design typically uses higher peaking factors (generally 3.0 or greater) or calibrated modeling to account for short-duration peak inflows and operational considerations as is applied for the existing service area.



5 Capacity Evaluation

The purpose of this chapter is to present the results of each model simulation scenario. The results of each scenario are evaluated based on LOS performance criteria described in **Chapter 4**.

This chapter is divided into the following sections:

- Modeled Scenarios
- Existing Development Results
- Future Development Results
- Buildout Development Results
- Pump Station Capacity Evaluation

5.1 Modeled Scenarios

This Master Plan Update assessed system performance for the existing level of development scenario and projected growth scenarios for the City of Lincoln's wastewater collection system. The modeled scenarios align with the projected development phasing described in **Section 3.2**. Each scenario is built from the previous scenario, including all flows and improvements considered in prior scenarios. All future level of development scenarios simulate peak wet weather flow (PWWF) by applying the 10-year, 24-hour design storm. Modeled scenarios are summarized in **Table 5-1**.



Sewer Master Plan Update
Capacity Evaluation

Table 5-1. Modeled Scenario Summary

Model Scenario/ Level of Development	Description	Total ADWF (MGD)			Total Peak Flow (MGD)	SMD1 Peak Flow (MGD)
		Lincoln	SMD1	Total		
Scenario 1: Existing (2025)	This modeled scenario simulates flow in the existing collection system under current conditions and includes three sub-scenarios: A: This model represents the existing ADWF condition. B: This model was constructed using the calibrated wet weather flow model and applying a 10-year, 24-hour design storm.	4.59	1.41	6.00	A: 8.57 B: 32.52	A: 1.88 B: 12.80
Scenario 2: 5-year	This scenario simulates PWWF in the future collection system upon development of vacant parcels within the existing city limits boundary and specific developments identified within the 5-year growth horizon. Notable large developments include the first phase of Village 5A and the southern portion of Village 1.	7.16	2.02	9.18	39.65	14.09
Scenario 3: 10-year	This scenario simulates PWWF in the future collection system upon development of the following areas: <u>Specific Developments:</u> Bella Breeze commercial development, Lincoln 14, Lincoln 270, Lincoln Place, The Waterfront, and Gill commercial and residential areas. <u>Village Areas:</u> The portion of Village 1, that exists south of McBean Park Drive and east of Oak Tree Lane within the current city limits boundary. The northern portion of Village 7, including the area north of Ferrari Ranch Road within city limits, and the unannexed areas along Moore Road.	8.34	2.34	10.68	43.62	14.92
Scenario 4: 15-year	This scenario simulates PWWF in the future collection system upon development of the remaining undeveloped Village areas including Village 1, Village 5A, and Village 7.	9.82	2.54	12.36	48.55	15.70
Scenario 5: 20-year	This scenario simulates PWWF in the future collection system upon development of the unannexed portions of Village 5 and the Bella Breeze commercial area upstream of the ELPPS.	10.79	2.68	13.47	50.22	16.41
Scenario 6: Buildout	This scenario simulates PWWF in the future collection system upon development of the City's full General Plan area. This scenario extends sewer service to the areas within the SOI boundary, adding flow from Villages 2, 3, 4, and 6, and SUD-A and SUD-C.	20.69	5.31	26.00	79.23	22.74



5.2 Existing Development Results

This section discusses the results of the model simulations and the collection system capacity assessment results.

5.2.1 Scenario 1: Existing Level of Development

The existing system model simulates flow in the collection system during a 10-year, 24-hour design storm event. The results of this simulation evaluate the existing collection system under ADWF and peak wet weather (PWWF) conditions.

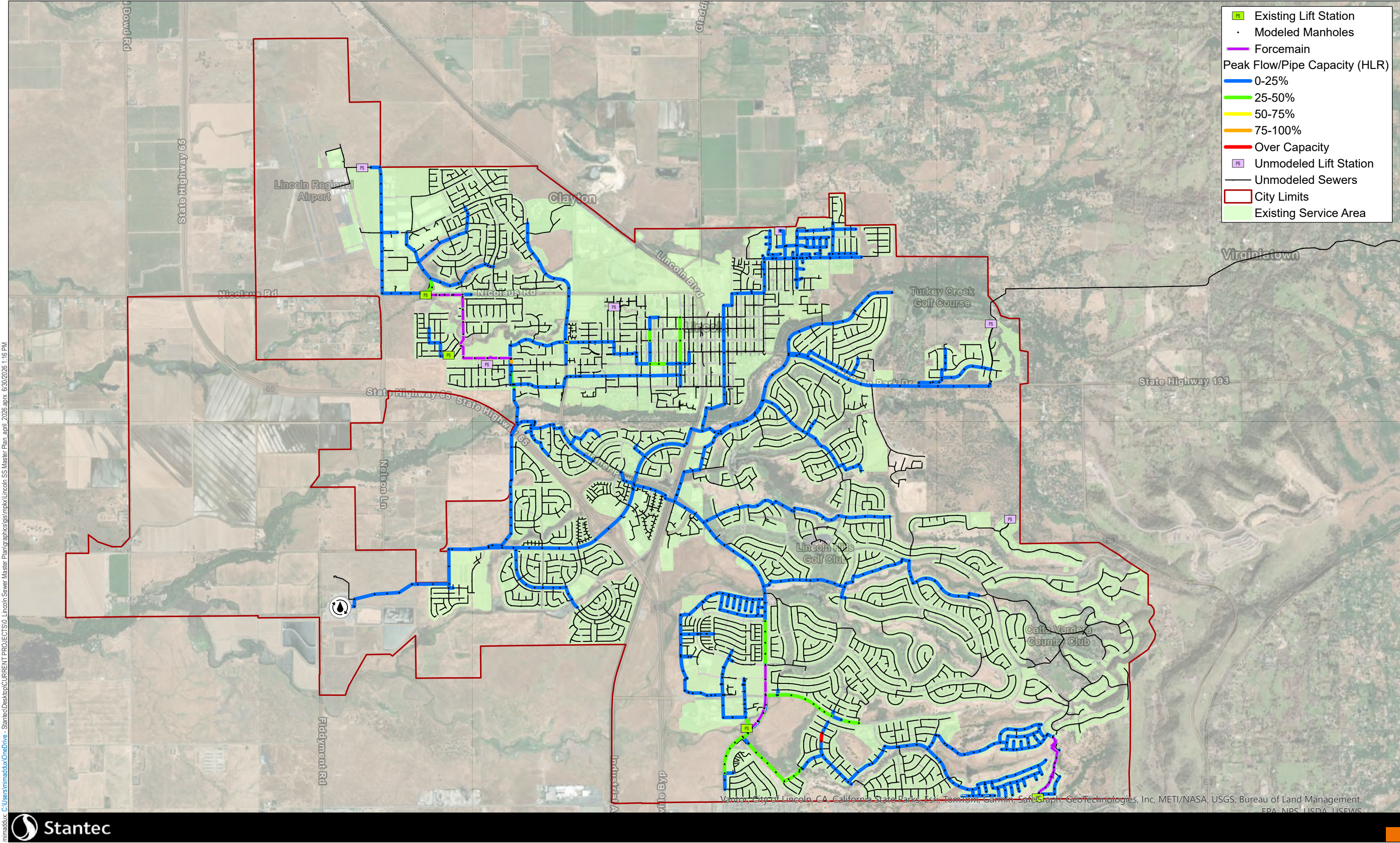
Scenario 1A: Dry Weather Flow

The dry weather flow model simulates an ADWF of approximately 4.59 MGD from the City of Lincoln service area and 1.41 MGD contributed by SMD1 for a total ADWF of 6.0 MGD. A peak flow of 8.57 MGD is predicted to occur at the WWTRF with a peak flow of 1.88 MGD from SMD1.

No significant capacity constraints exist in the existing system under dry weather conditions. The majority of the collection system is predicted to have d/D and HLR of less than 50 percent, which is recommended under dry weather conditions. There are a few areas of the system that exceed these parameters but are generally associated with individual sewer segments with shallow slopes within the model, or those upstream of pump stations due to operating levels and major sewer confluences. No surcharging is predicted to occur in the collection system in this scenario. There are no LOS failures predicted under these conditions.

The existing system dry weather flow model results are presented in **Figure 5-1**, which shows the HLR of sewers included in the collection system model.





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FIGURE 5-1
SCENARIO 1A: EXISTING SYSTEM DRY WEATHER FLOW MODEL RESULTS
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

Scenario 1B: Wet-Weather Flow

Under existing conditions, the 10-year, 24-hour design storm is predicted to generate a peak flow of 32.5 MGD at the WWTRF with a peak flow of 12.8 MGD sent to the Regional Trunk Sewer from the SMD1 service area. The evaluation indicates that the design storm has the potential to cause surcharging to occur in four areas of the collection system.

Scenario 1: Capacity Constraints

Upstream of the ELPPS

Surcharging is predicted to occur in the 12-inch sewer in Twelve Bridges Drive and continues downstream along East Joiner Parkway to Fieldstone Drive. The surcharge is due to insufficient sewer capacity and is not a result of pump station capacity or operating levels. Surcharge depth is predicted to peak at the intersection of Parkside Drive and Twelve Bridges Drive reaching 4.4 feet above the pipe crown. Surcharging in this part of the system fails LOS criteria and improvements are recommended. The 4,485 LF of 12-inch sewer from Parkside Drive to Fieldstone Drive should be upsized to 15-inches. The upstream system is not included in the model and also should be studied for potential capacity improvements. The ELPPS I/I improvements identified in the Lift Station I/I Assessment presented in **Section 2.4** may help address these issues.

Old Town Trunk Sewers

Surcharging is predicted to occur in the trunk sewer referred to as the Old Town North Trunk in 2018 Master Plan. The surcharge is generally less than 1-foot above the pipe crown but shallow sewer depth results in less than 8-feet of freeboard and therefore failing to meet LOS criteria. These conditions are predicted to occur in the 15- to 18-inch sewer in 5th Street between Joiner Parkway and Zoe Ann Drive. There is an 18-inch sewer upstream of this section of 15-inch sewer. The parallel portion of the 15-inch Old Town South Trunk is at its flow capacity but is not predicted to surcharge above the pipe crown. Improvements are recommended for the portion of the Old Town North Trunk failing to meet LOS criteria.

Additional surcharging is predicted upstream but there are several unknowns in this very old part of the collection system that warrant additional study before improvements are recommended. Specifically, the interconnectedness of the network and its ability to spill over into the E Street Trunk sewer, which are not represented in the model. Areas for further investigation include the 10-inch sewer in J Street between 3rd Street and 7th Street and the parallel 12-inch to 10-inch sewer that runs in the alley way between N Street and M Street. The section of sewer connecting these two branches in 3rd Street should also be considered. Several of these upstream sewers are included in the CCTV condition evaluation described in the TM in **Appendix B**.

Upstream of the NRPS

Surcharging upstream of the NRPS is due in part to lift station operations, as was observed during the flow monitoring period, and in part due to limited upstream sewer capacity as result of



excessive I/I identified in the Lift Station I/I Assessment presented in **Section 2.4**. Surge depth exceeds 2 feet above the pipe crown in this reach of the system, failing to meet LOS criteria and warranting improvements. Addressing the excessive I/I in these sewers could address this capacity issue at this level of development. Sewer segments predicted to exceed their flow capacity include the 15-inch and 10-inch sewers that converge north of the lift station in Markham Ravine.

Chambers Drive Sewer Confluence

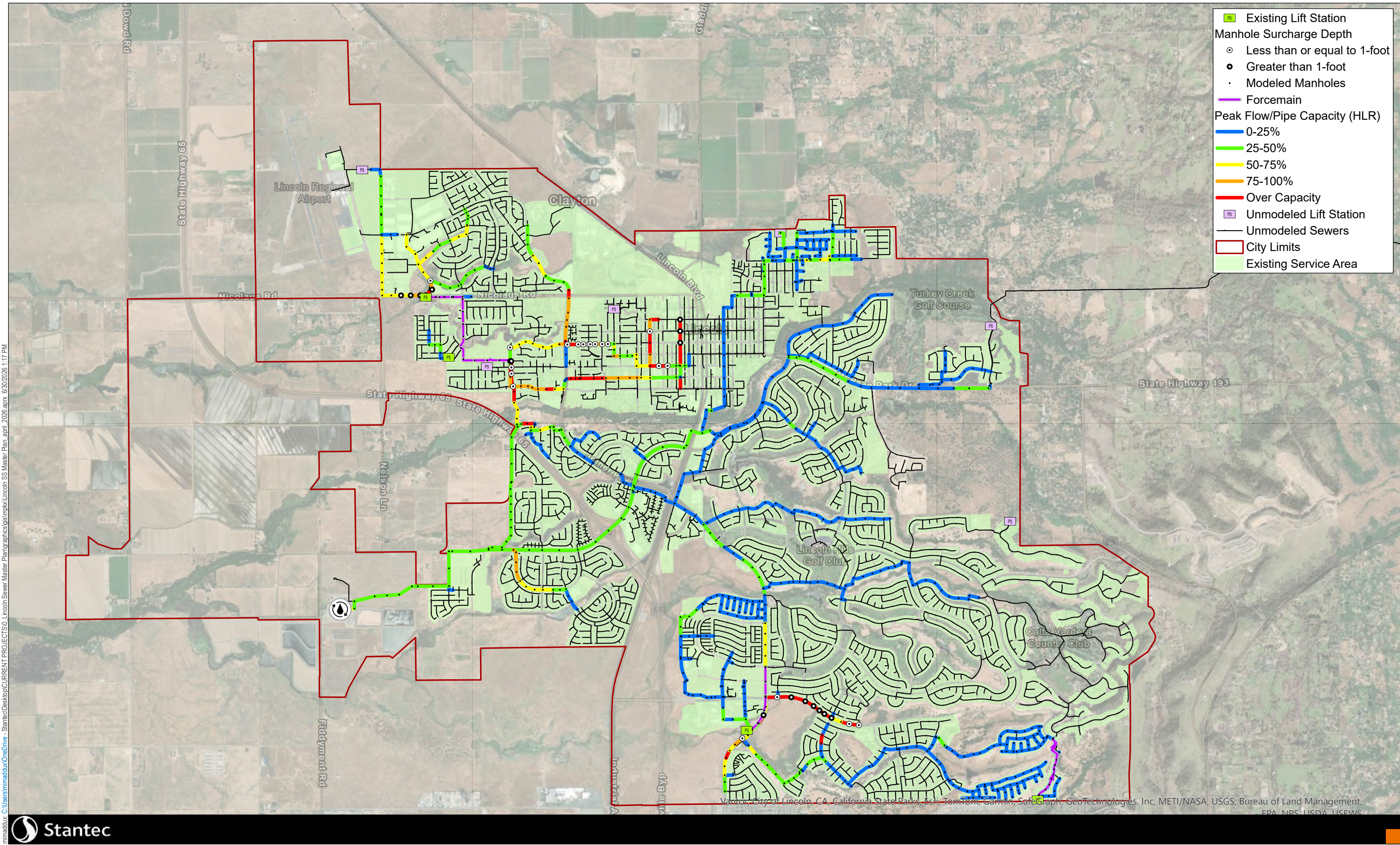
The construction of the WWTRF and Regional Trunk Sewer required that the City's existing collection system be re-routed from the City's old WWTP site to direct flow to the new facilities. This was accomplished through the construction of the Chambers Drive trunk sewer. The oldest reaches of the City's collection system all converge at the intersection of Thomsen Way and Chambers Drive. The confluence includes flow from the following areas:

- Old Town North: The trunk sewer traversing the City from east to west following 3rd Street, O Street, 4th Street, Q Street, 5th Street, and the 30-inch sewer north of the confluence in Chambers Drive. This sewer was referred to as the Old Town North Trunk sewer in the 2018 Master Plan. Sewer ranges in size from 12- to 18-inch before it crosses Joiner Parkway, where it picks up additional flow from the 18-inch sewer from the north in Joiner Parkway. The sewer increases to 24-inches in diameter in 5th Street after crossing Joiner Parkway. Flow monitoring Site 5 was installed at the downstream end of the 24-inch section of this trunk sewer.
- Old Town South: The Old Town South Trunk sewer parallels the Old Town North trunk to the south. It runs from the intersection of J Street and 2nd Street through Glen Edwards Elementary School continuing through backyards to meet Joiner Parkway where it turns south and continues in 1st Street to meet Chambers Drive. The sewer continues northward in Chambers Drive until it reaches the confluence at Thomsen Way. The sewer ranges in size from 15- to 18-inches, upsizing where it crosses Joiner Parkway.
- NRPS Force Main: The NRPS force main discharges at the confluence manhole. Flow from the Independence pump station also connects to this force main.

The cumulative flow from upstream sewers exceeds the flow capacity of the downstream 30-inch sewer in Chambers and Douglas Drive. Capacity is limited until the sewer increases to 36-inches in diameter at the end of Douglas Court before crossing Auburn Ravine and meeting Moore Road. Surge depth peaks at the confluence manhole reaching 1.2 feet above the pipe crown with 18.9 feet of freeboard. Due to the location and extreme depth of this sewer, it's recommended that the City elect to allow this level of service under these conditions.

The existing system wet weather flow model results are presented in **Figure 5-2**, which shows surcharged manhole locations and the HLR of sewers included in the collection system model.





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FIGURE 5-2
SCENARIO 1B: EXISTING SYSTEM WET WEATHER FLOW (10-YEAR, 24-HOUR DESIGN STORM) MODEL RESULTS
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

5.2.2 Scenario 1: Improvement Recommendations Summary

The existing system model identified four areas of surcharge and capacity deficiencies under existing PWWF conditions. Each of the four areas failed the allowable level of surcharge and pumping capacity criteria outlined in **Chapter 4**, triggering the need for system improvements. Expanding pipe capacity is recommended for the 12-inch gravity sewer upstream of the ELPPS along Joiner Parkway and Twelve Bridges Drive (CIP 1), and the 15-inch sewer in 5th Street between Joiner Parkway and R Street (CIP 2). Evaluating the capacity of upstream sewers for potential improvements is also recommended as part of these projects. These improvements provide sufficient capacity through buildout, due to limited future development upstream.

In addition to the recommended gravity sewer improvements, it is recommended that the City implement the I/I improvements identified from the Lift Station I/I Assessment presented in **Section 2.4** to address remaining capacity issues under existing system conditions. Specific condition assessment projects and the ongoing collection system repair and rehabilitation (R&R) program are also recommended as part of the overall CIP in **Chapter 7**.

The recommended improvements are summarized in **Table 5-2** and shown in **Figure 5-3**.

Table 5-2. Scenario 1: Existing Collection System CIP Project Summary

CIP ID	Description	Length (LF)	Current Pipe Size (in)	Proposed Pipe Size (in)
1	Joiner/Twelve Bridges Dr. (Upstream sewer capacity study also recommended)	4,485	12	15
2	Old Town North Trunk, 5 th Street - Joiner Pkwy to R St. (Upstream sewer capacity study also recommended)	1,552	15	18
C	Nicolaus Road Pump Station (NRPS) I/I Improvements	8,268	Length of sewer pipe recommended for inspection and lining or replacement. Projects also include smoke testing, cross connection review, etc. See Section 2.4 and Chapter 7 for additional details.	
D	East Lincoln Parkway Pump Station (ELPPS) I/I Improvements	5,380		



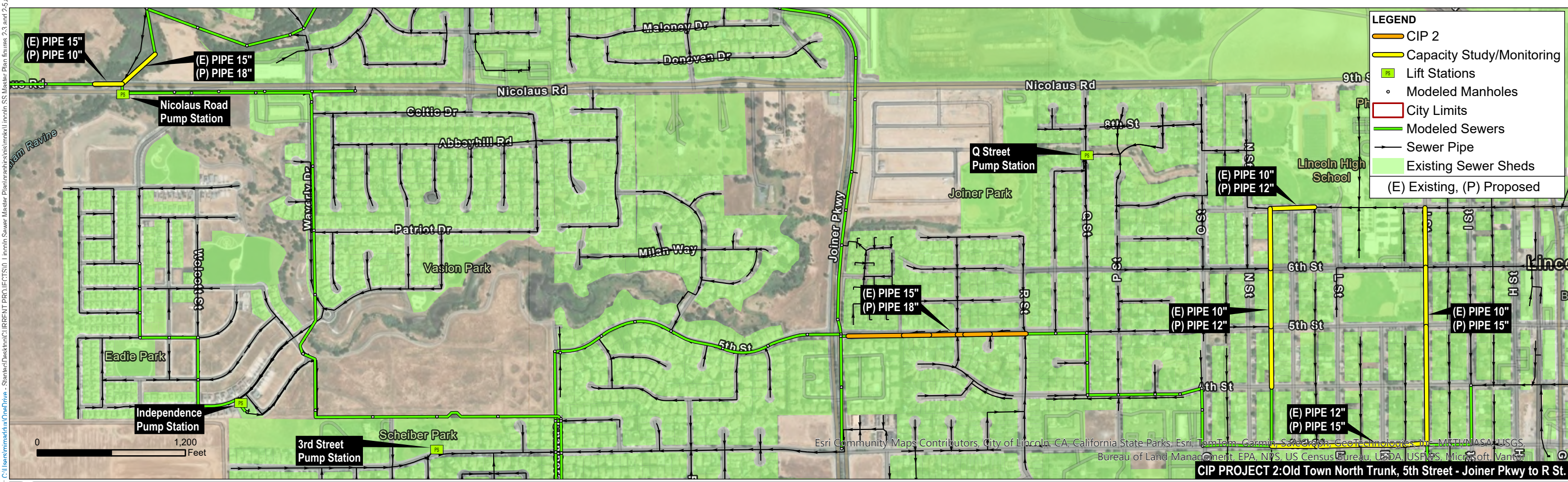
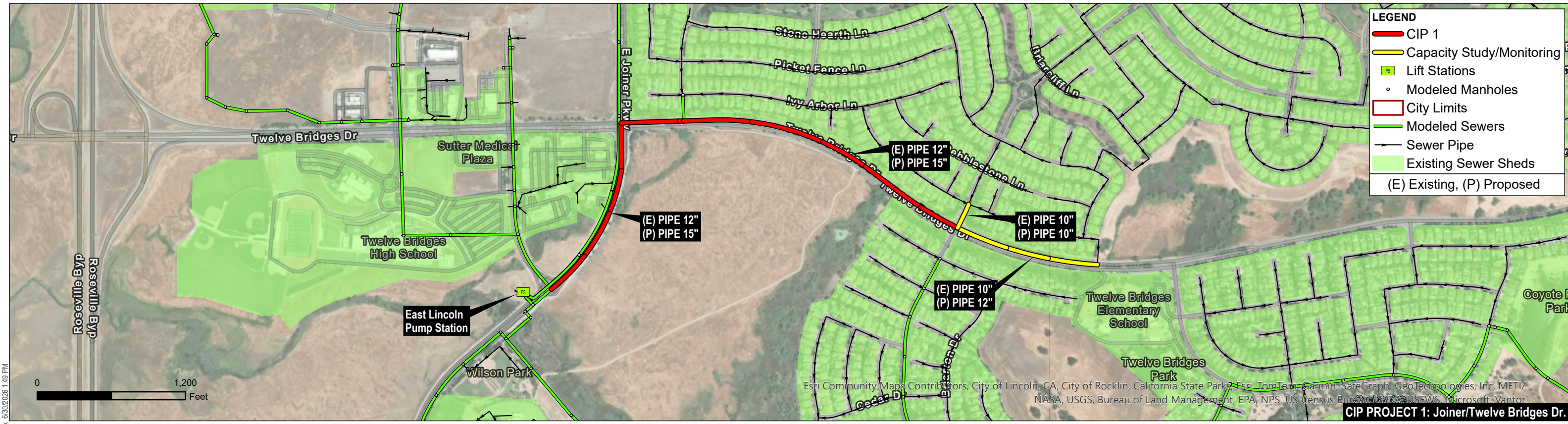


FIGURE 5-3
SCENARIO 1: EXISTING SYSTEM CIP RECOMMENDATIONS
 CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

5.3 Future Development Results

Future levels of development were evaluated in 5-year increments, the results of each scenario are described below.

5.3.1 Scenario 2: 5-year Level of Development

The 5-year level of development scenario adds flow from vacant parcels within city limits and planned developments identified to be within the 5-year growth horizon. This scenario adds 2.56 MGD of ADWF from the City of Lincoln and 0.61 MGD of ADWF from the SMD1 service area, simulating a total ADWF of 9.18 MGD. The peak flow predicted to occur at the WWTRF increases to 39.7 MGD with 14.1 MGD contributed from SMD1. The recommended improvements under Scenario 1 are included in this scenario, the additional flow exacerbates surcharge in areas where improvements were not recommended under existing conditions.

Scenario 2: Future Infrastructure

Available infrastructure plans were provided for planned developments and incorporated into the model including the new trunk sewer in Oak Tree Lane, Stardust Lift Station, Epick sewer siphon, Lincoln Square (Wildwood/Peery) Lift Station and the associated downstream 15-inch sewer. These sewers are already planned and funded and are not included in the CIP.

The first development phase of Village 5A is also included in this scenario, which will require constructing a new 54-inch influent trunk sewer from the intersection of Moore Road and Fiddymment Road to the existing 54-inch sewer stub along the Regional Trunk Sewer upstream of the WWTRF headworks. This had been proposed in the 2018 Master Plan as a new 60-inch influent sewer but is reduced in size due to re-routing upstream flow in this Master Plan Update. The new 54-inch influent sewer will ultimately serve Villages 4, 5, and 6 as well as SUD-A and SUD-C at buildout.

The 42-inch gravity sewer along Moore Road from the 2018 Master Plan is necessary from S. Dowd Road to Fiddymment Road. A 42-inch sewer is still needed to serve Village 5 and accommodate upstream flow from Village 6 and SUD-C. The Moore Road Trunk will cross Auburn Ravine upstream of Fiddymment Road, requiring a 42-inch crossing. Topographical information and survey data collected for this Master Plan indicates that elevation clearance exists between creek inverts and planned sewer profiles to provide gravity sewer service through these locations. However, detailed surveys and engineering will be required to confirm the creek crossing details and construction techniques.

The main branches of the Village 5 collection system upstream of the 54- and 42-inch main trunks are included in the model for flow routing but excluded from the overall CIP. These sewers generally match those identified in the 2018 Master Plan.



Scenario 2: Capacity Constraints

The evaluation indicates that the design storm limits capacity in the following areas of the collection system under the 5-year level of development scenario.

Chambers Drive Sewer Confluence

The addition of flow from infill development increases the predicted level of surcharge at the Chambers Drive Sewer Confluence from that identified in Scenario 1. Surcharge depth reaches 2.4 feet above the pipe crown at the confluence. The hydraulic loading ratio (HLR) of the downstream 30-inch sewer in Chambers and Douglas Drive reaches 165% causing the sewer to surcharge between the confluence and the end of Douglas Court (where it increases to 36-inches in diameter).

Surcharge depth is roughly 1.5 feet above the pipe crown at the manholes in 3rd Street and Boyden Drive. The minimum freeboard along this reach of sewer remains greater than 12 feet below the ground surface. The 36-inch downstream sewer crossing the ravine has sufficient capacity to accept the flow, including the addition of flow from the new 15-inch sewer serving the Peery Residential and Commercial developments. Surcharging propagates upstream in the Old Town North Trunk due to backwater effects, exceeding 1-foot above the pipe crown at the intersection of Chambers Drive and 5th Street.

This scenario of the model assumes that the full flow into the NRPS and the Independence Pump Station is pumped to the confluence although these flows may exceed the pump station capacities. This is done to fully unattenuate flow through the lift stations to assess their peak flow, reliable capacities, and the resulting downstream impacts. Therefore, it is likely that flow is further attenuated through these lift stations, reducing the peak that may be observed at the confluence.

Improvements were not recommended under existing conditions (Scenario 1B) due to the limited amount of predicted surcharge and the significant amount of freeboard available, which minimizes the risk of a potential SSO. Upsizing the 30-inch sewer would be challenging considering the area is already fully developed with a crowded utility corridor, significant sewer size and depth, and the extent of bypass pumping that would be required.

This capacity limitation was also identified in the 2018 Master Plan which recommended two strategies to reduce flow in the 30-inch Chambers Drive sewer 1) diverting the 18-inch Old Town South Trunk directly to the 30-inch sewer in Chambers Drive at the intersection of 1st Street and Chambers/Douglas Drive, and 2) diverting the NRPS to a future trunk sewer in Nelson Lane. These options are still viable, although as previously mentioned diverting flow from the NRPS depends on the timing of future development and the new trunk sewer in Nelson Lane.

The 18-inch Old Town South Trunk crosses over the 30-inch Chambers Drive sewer. The difference in invert elevation is approximately 8.4 feet. It is recommended that the 18-inch sewer in 1st Street be diverted directly to the 30-inch Chambers Drive sewer where the two sewers cross at Douglas Drive to reduce flow through the confluence and the predicted level of surcharge. The 18-



inch sewer in 1st Street does not require upsizing as was recommended in the 2018 Master Plan based on the updated model results. Approximately 50 to 60 linear feet (LF) of 18-inch sewer should be installed to re-route flow from manhole K09042 to manhole K09040.

Old Town Trunk Sewers

The 15-inch portion of the Old Town South Trunk between R Street and Joiner Parkway exceeds its available flow capacity and is predicted to surcharge above the pipe crown in this scenario. Surcharge depth remains less than 1-foot above the pipe crown, reaching 0.5 feet above the pipe crown at the manhole in R Street. Surcharge propagates upstream to O Street due to backwater effects. The minimum freeboard ranges from 6.2 to 12.7 feet along the surcharged sewer. The 18-inch portion of the Old Town South Trunk west of Joiner Parkway is at its available flow capacity but is not predicted to surcharge above the pipe crown.

Improvements are recommended for the 15-inch sewer between R Street and Joiner Parkway because it fails to meet the LOS criteria for minimum freeboard to allow any level of surcharge. Further investigation of the upstream sewers is still recommended as discussed for Scenario 1. The Old Town North trunk does not experience any new capacity constraints in this scenario but does surcharge due to the downstream capacity limitation in the Chambers Drive sewer.

The NRPS Pumping Capacity

The additional flow from primarily vacant industrial parcels upstream of the NRPS causes the predicted peak flow into the lift station to exceed the reliable pumping capacity (3.4 MGD). Without sufficient pumping capacity, surcharge is predicted in the upstream collection system. The peak flow reaches 3.6 MGD, only exceeding the reliable pumping capacity by 0.2 MGD for a brief period during the storm event. Therefore, the predicted HGL of the sewer remains below grade and SSOs are not predicted as a result. Although the model simulates reliable capacity, the predicted peak flow into the station is within the maximum pumping capacity (3.7 MGD).

The most recent capacity improvement project (2017) at the NRPS was challenging due to limited space and depth available onsite, but a cost-effective option was ultimately identified. Based on prior lift station capacity evaluations, expanding the NRPS capacity further would require significant structural and electrical improvements. Capacity limitations at the NRPS were also identified in the 2018 Master Plan, which proposed taking the lift station offline by diverting flow to a new large trunk sewer in Nelson Lane. This option is also considered in this Master Plan Update but is dependent on the timing of future development and the construction of the required downstream infrastructure.

Due to the constraints associated with expanding the pumping capacity at the NRPS and the predicted flow being within the maximum pumping capacity at this level of development, it is recommended that the City focuses on reducing I/I within the NRPS service area in order to reduce peak flows into the station. The NRPS I/I improvements were noted for the existing system scenario and further described in the Lift Station I/I Assessment presented in **Section 2.4**.



It is advised that the City limit development upstream of the pump station to industries with low water consumption. Industrial wastewater production is largely dependent on the type of industry, for example a vegetable processing facility or a bottling company would produce a larger volume of wastewater than a storage facility or warehouse.

Independence Pump Station Pumping Capacity

The addition of flow from the remaining portion of the Independence development causes the predicted inflow into the lift station to exceed the reliable pumping capacity (0.66 MGD). The predicted inflow is approximately double the reliable capacity, 1.2 MGD. This flow exceeds the capacity of the 10-inch sewer that enters the lift station and causes the upstream manhole to surcharge 1.5 feet above the pipe crown.

This may be a result of the model calibration, sewer-shed 6 includes a portion of the old part of town and the new Independence Pump Station. Higher I/I in the older sewers could be overestimating the amount of predicted I/I at the station, these calibrated parameters are applied to future development within the existing sewer-shed. This value aligns with the potential peak flow at the lift station calculated by applying the per-acre flow observed at the NRPS, this was presented in the 2021 Technical Memorandum Titled *Evaluation of the Independence Pump Station Capacity* (Stantec, 2021) described in **Appendix A**.

Improvements to the lift station are not recommended due to its recent construction (2023). It is recommended that the City monitors its ability to keep up with flow as more homes are occupied within the service area. The maximum pumping capacity of the lift station should be evaluated considering the overall force main system and NRPS. Expanding the lift station or operating both pumps could negatively impact the capacity of the NRPS.

The 5-year level of development model results are presented in **Figure 5-4**, which shows surcharged manhole locations and the HLR of sewers included in the collection system model.



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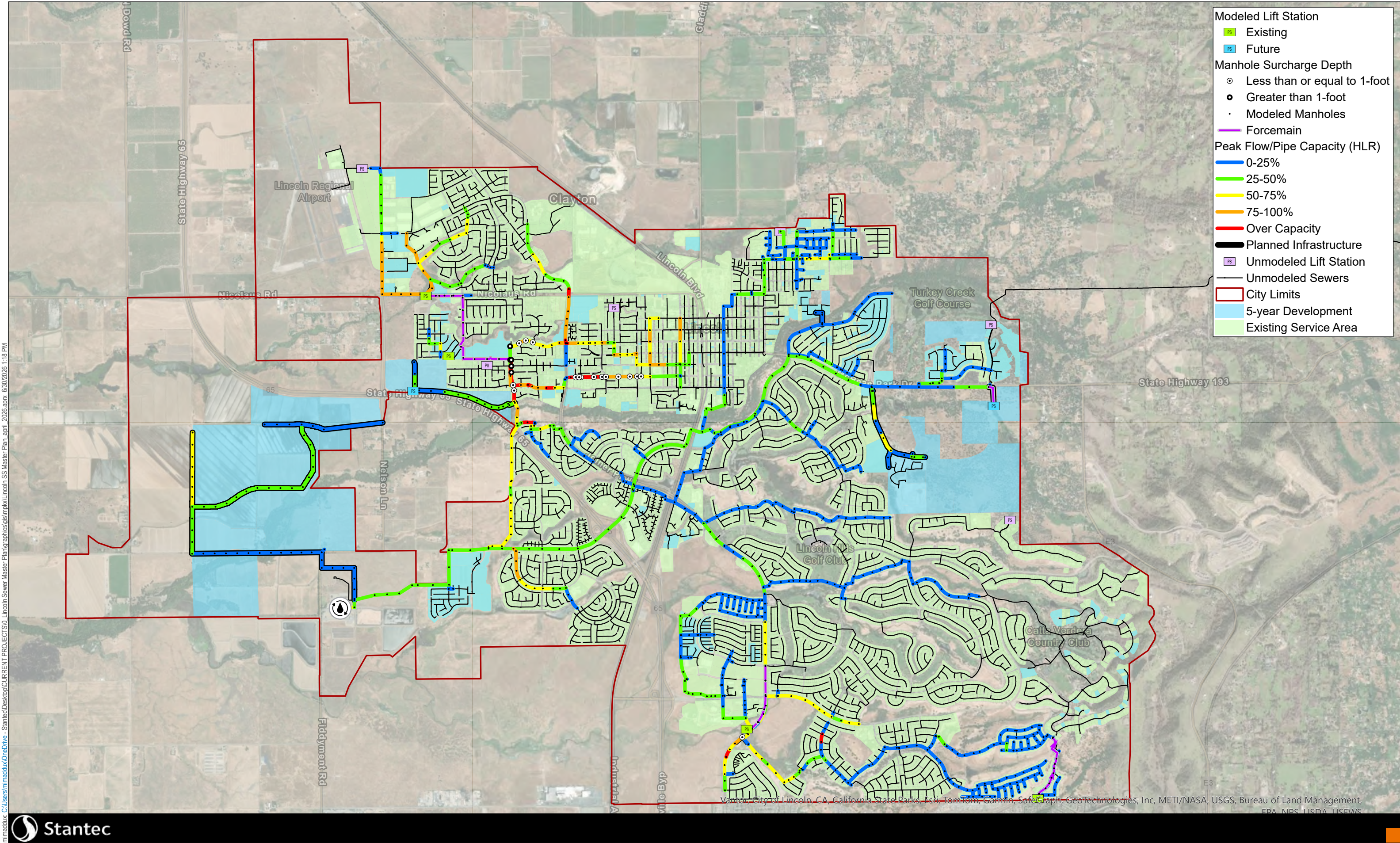


FIGURE 5-4
SCENARIO 2: 5-YEAR LEVEL OF DEVELOPMENT MODEL RESULTS
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

5.3.2 Scenario 3: 10-year Level of Development

The 10-year level of development scenario extends sewer service to the following areas:

Specific Developments: Bella Breeze commercial development, Lincoln 14, Lincoln 270, Lincoln Place, The Waterfront, and Gill commercial and residential areas.

Village Areas: The southern portion of Village 1, that exists south of McBean Park Drive and east of Oak Tree Lane within the current city limits boundary. The remaining area which was not included in Scenario 1 (5-year). The northern portion of Village 7, including the area north of Ferrari Ranch Road within city limits, and the unannexed areas along Moore Road.

This scenario adds 1.18 MGD of ADWF from the City of Lincoln and 0.32 MGD of ADWF from the SMD1 service area, simulating a total ADWF of 10.68 MGD. The peak flow predicted to occur at the WWTRF increases to 43.6 MGD with 14.9 MGD contributed from SMD1. The recommended improvements from prior scenarios are included in this scenario.

Scenario 3: Future Infrastructure

Future flow routing plans for the Lincoln 270 development were added to the model which include a new lift station and force main discharging to the manhole at the southeast corner of the intersection of E. Joiner Parkway and Lincoln Boulevard (M12051). A new trunk sewer to serve the northern Village 7 area is also added to the model in this scenario. The extension of the sewer in Oak Tree Lane and construction of the Leavell Ranch sewer system is also assumed. The remaining developments are served by the existing system or infrastructure added to the model as part of Scenario 2.

Scenario 3: Capacity Constraints

The evaluation indicates that the design storm limits capacity in the following areas of the collection system under the 10-year level of development scenario.

Upstream of the NRPS

Flow from the Gill commercial development is assumed to be routed to the 10-inch sewer in Nicolaus Road east of the pump station. The added flow causes the sewer to exceed its flow capacity and surcharging is predicted along Nicolaus Road and Aviation Boulevard. SurchARGE depth reaches approximately 1.0 foot above the pipe crown at the intersection of Aviation Boulevard and Nicolaus Road. The available freeboard ranges between 11.7 and 15.5 feet in manholes predicted to experience surcharge.

Upsizing the 10-inch sewer Nicolaus Road to 12-inches would eliminate the predicted surcharging, but seeing as this level of surcharging is right at the threshold of the LOS criteria the City may choose to focus on the I/I improvements or make this improvement contingent on future development.



Chambers Drive Sewer Confluence

Despite bypassing flow from the Old Town South Trunk downstream of the confluence, capacity is still limited in the 30-inch Chambers Drive sewer. The added flow from Lincoln Place, Lincoln 14, and the Gill commercial area exacerbate the predicted level of surcharge at the confluence.

Surcharge depth reaches approximately 1.4 feet above the pipe crown at the confluence in the 10-year level of development scenario. Improvements are not recommended at this location due to the constraints identified in previous scenarios. The minimum freeboard remains greater than 11 feet at surcharged manholes, therefore the risk of an SSO is limited.

The 10-year level of development model results are presented in **Figure 5-5**, which shows surcharged manhole locations and the HLR of sewers included in the collection system model.



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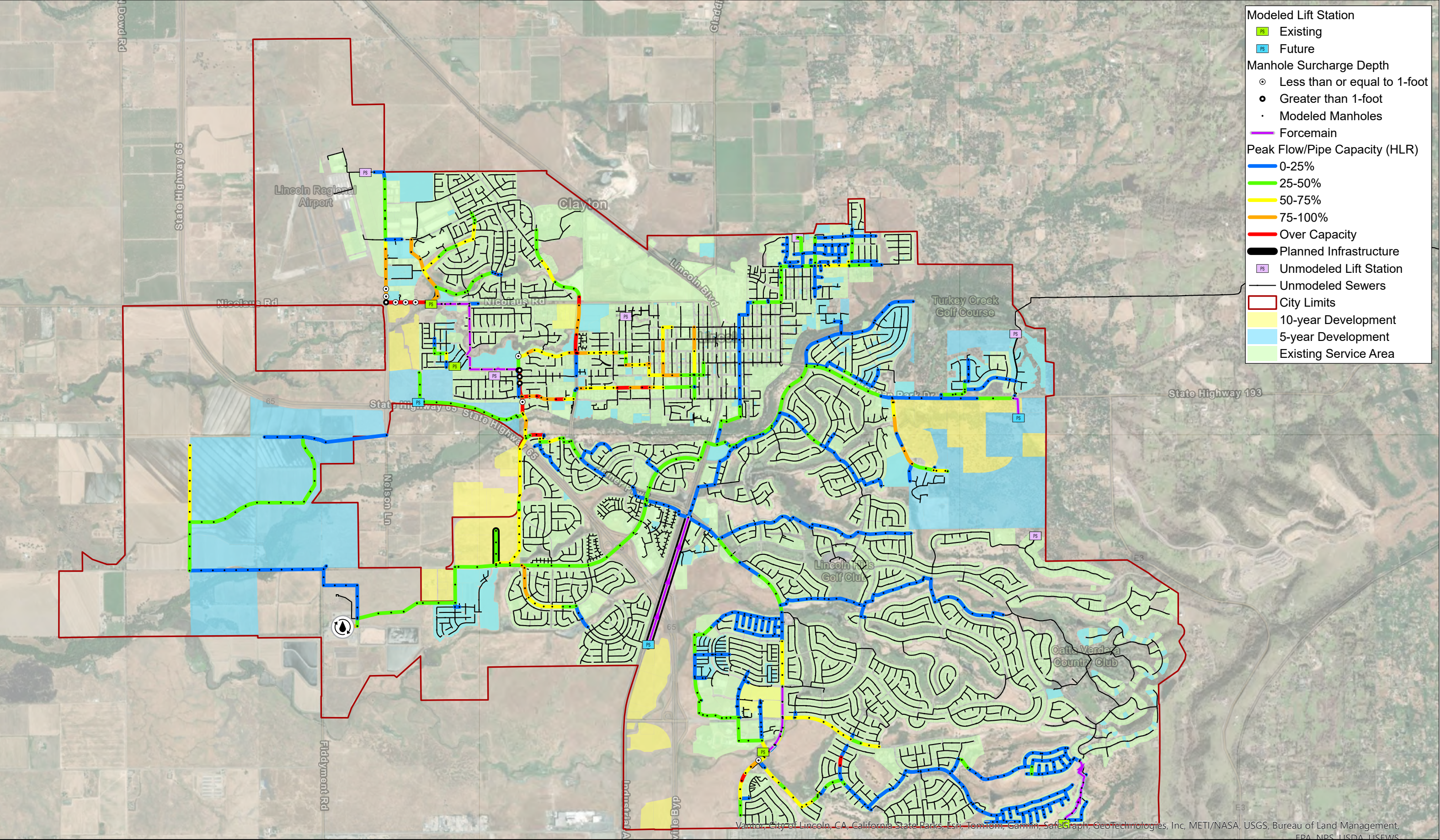


FIGURE 5-5
SCENARIO 3: 10-YEAR LEVEL OF DEVELOPMENT MODEL RESULTS
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

5.3.3 Scenario 4: 15-year Level of Development

The 15-year level of development scenario extends sewer service to the remaining undeveloped Village areas including Village 1, Village 5A, and Village 7. This scenario adds 1.48 MGD of ADWF from the City of Lincoln and 0.20 MGD of ADWF from the SMD1 service area, simulating a total ADWF of 12.36 MGD. The peak flow predicted to occur at the WWTRF increases to 48.6 MGD with 15.7 MGD contributed from SMD1. The recommended improvements under prior scenarios are included in this scenario.

Scenario 4: Future Infrastructure

Two remaining areas of Village 1 are assumed to develop under the 15-year planning scenario: the northern portion of Village 1 and the area located outside the current city limits boundary. The undeveloped northern portion encompasses approximately 200 acres situated south of Virginiatown Road and north of Auburn Ravine. The model assumes approximately 120-acres will ultimately be served by the existing 10-inch sewer along Virginiatown Road, with approximately 80 acres east of Hungry Hollow Road contributing to the dual 8-inch sewer siphon associated with the Epick development.

The second Village 1 area, comprising approximately 65 acres, is located east of the current city limits boundary and west of Sierra College Boulevard. This area is assumed to ultimately discharge through the Levell Ranch sewer system, which is tributary to the Oak Tree Lane trunk sewer.

The collection system is extended to serve the remaining Village 5A area within the current city limits boundary. A new 36-inch sewer in Nelson Lane is needed to serve the northern area of Village 5 and future SOI developments. Two new 36-inch crossings will be needed for the Nelson Lane sewer to cross Auburn and Markham Ravines.

A new regional lift station is included to serve northern Village 5 and SUD-A at buildout. The force main is proposed to cross under Highway 65 along Nicolaus Road and discharge to the 36-inch new trunk sewer in Nelson Lane. It's proposed that the 36-inch sewer extend approximately 1,500 LF west in Nicolaus Road to collect flow from Neighbor Lane.

The Nelson Lane trunk sewer must maintain a slope of less than 0.001 ft/ft to take the lift stations offline in the proposed alignment. Approximately 125 acres of Village 5 east of Highway 65 and North of Markham Ravine may require a small local lift station, the model assumes this flow will contribute to the sewer in Neighbor Lane.

The last area to develop within the Village 7 specific plan includes approximately 270 acres south of Liberty at Lincoln near Ingram Slough. It's assumed that this area will be served by a new 15-inch sewer connecting directly to the Regional Trunk Sewer and require a new creek crossing at Ingram Slough.



Scenario 4: Capacity Constraints

The model evaluation indicates that extending service to northern Village 1 results in capacity limitations within the existing collection system. The sewer in Oak Tree Lane is expected to flow near its full flow capacity with addition of flow from the Village 1 area outside of the current city limits boundary. Flow from Village 7 is conveyed by a proposed gravity sewer to the Regional Trunk Sewer, which has sufficient available capacity, and Village 5A will be served by future infrastructure conveying flow directly to the WWTRF. As a result, extending service to Village 7 and Village 5A is expected to have minimal impact on the existing collection system.

Virginiatown Road

With the addition of flow from the northern Village 1 area, surcharging is predicted along the 10-inch sewer in Virginiatown Road, extending to the upstream end of the line from the manhole located east of McCourtney Road. Surge depth is predicted to reach 3.4 feet above the pipe crown along the 10-inch sewer east of Liberty Lane. The minimum freeboard remains greater than or equal to 10 feet below the ground surface along the surcharged stretch of sewer. Backwater effects cause surcharging to propagate upstream on Liberty Lane, Heartwood Street, and Havenwood Drive.

The model assumes that the area east of Hungry Hollow Road and north of the Turkey Creek Golf Course tributarly contributes to manhole H14023, where the Lincoln Meadowlands sewer system connects at the edge of the development. The remaining portion of northern Village 1, located east of Liberty Lane and west of Hungry Hollow Road, is assumed to be routed through the Epick collection system and conveyed across Auburn Ravine via the dual 8-inch sewer crossing.

Surcharging can be reduced by constructing a bypass sewer which connects the 10-inch sewer in Virginiatown Road with the collection system serving the Epick development. Approximately 1,925 LF of 10-inch sewer routed south in Liberty Lane from manhole H14026 to the 10-inch sewer at the eastern edge of the Epick development is predicted to reduce surcharging in Virginiatown Road. Elevations from the Epick development plans and the City GIS files suggest that a minimum slope of 0.002 ft/ft can be achieved on the 10-inch bypass sewer in Liberty Lane.

The additional flow from the 10-inch bypass sewer requires installation of a 10-inch sewer in lieu of the originally planned 8-inch sewer upstream of the siphon in the Epick development. The costs associated with constructing these two 10-inch sewer segments are included in this CIP to capture the full capital investment required to implement this servicing strategy.

Despite these recommended improvements, the 10-inch sewer east of Liberty Lane in Virginiatown Road exceeds its flow capacity but does not fail LOS criteria and improvements are not recommended. To avoid these capacity concerns, these sewers could be upsized to 12-inches in diameter or flow from the northern Village 1 area could be routed directly to the sewer siphon through the service area. Alternatives for routing flow from the far reaches of northern Village 1 were considered in the TM titled *North Village 1 Sewer Service Analysis & E Street Trunk Capacity*



Assessment (Stantec, 2020). Alternatives 2 and 3 from this analysis present preliminary sewer plans that could serve the area and route flow directly to the sewer siphon.

Chambers Drive Sewer Confluence

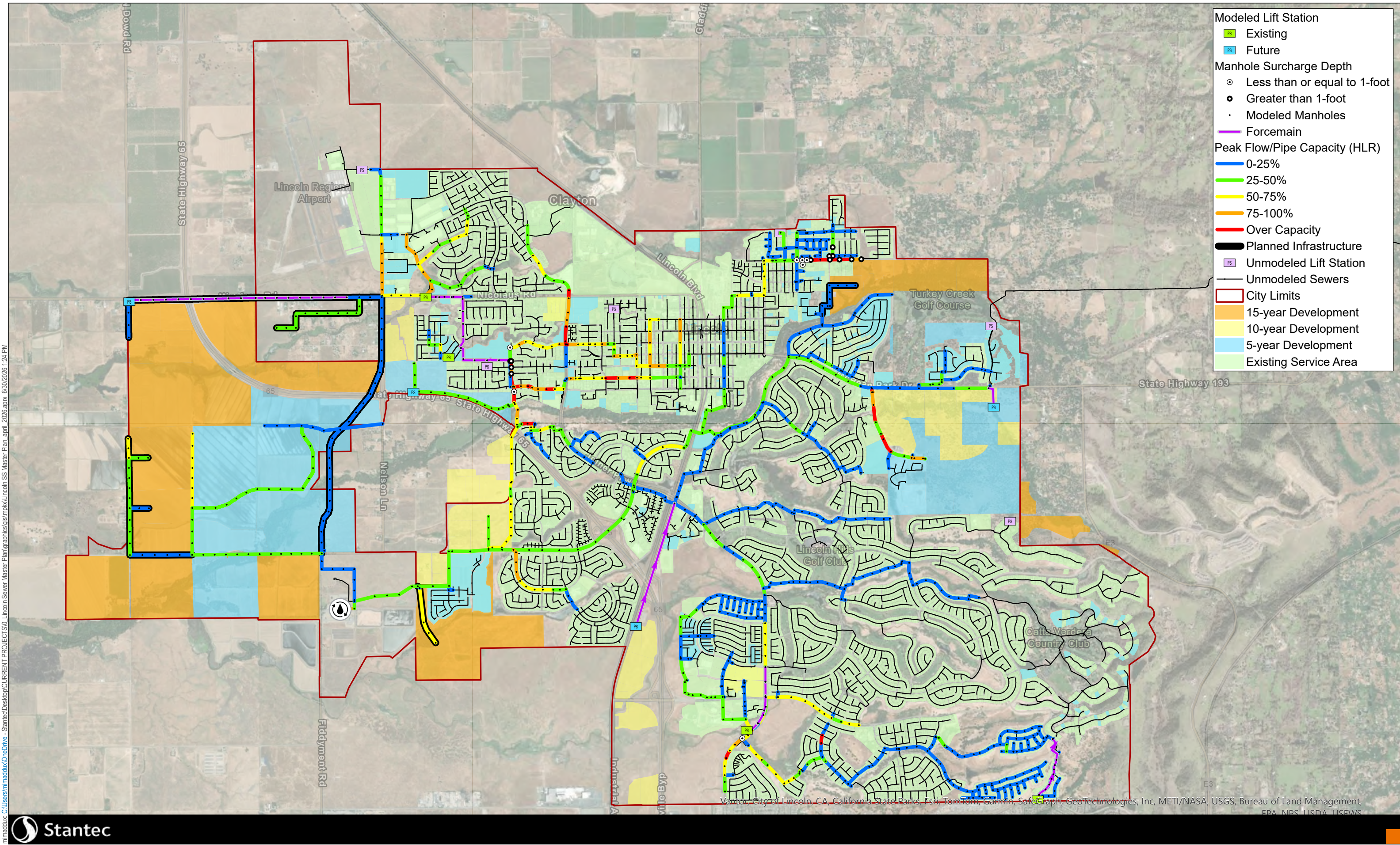
Surcharging predicted at the Chambers Drive sewer confluence can be eliminated by taking the NRPS offline. Construction of the 36-inch Nelson Lane sewer in this scenario allows for an additional CIP project to take the pump station out of service. A slope of 0.001 ft/ft or less is required for the 36-inch sewer in Nelson Lane to allow the upstream invert elevation to be low enough at Nicolaus Road to take the lift station offline (assuming it maintains the currently proposed alignment length, 12,871 LF). **The 36-inch sewer should be planned to achieve an upstream invert elevation of 96.4 or lower at the intersection of Nelson Lane and Nicolaus Road.**

It's recommended that the City take the opportunity to abandon sewers in close proximity to the ravine and further reduce I/I. An 18-inch sewer from the NRPS to the new 36-inch sewer in Nelson Lane is recommended. Two new 15-inch sewer segments are proposed to realign the existing sewers away from the Ravine north of Nicolaus Road.

Drawings provided for the Lincoln Square (Wildwood/Peery) Lift Station show a future connection point for it to also be taken offline by way of the Nelson Lane trunk sewer. A 15-inch sewer from the lift station to the Nelson Lane Trunk sewer should be constructed to take it offline.

The 15-year level of development model results are presented in **Figure 5-6**, which shows surcharged manhole locations and the HLR of sewers included in the collection system model.





Modeled Lift Station

- Existing
- Future

Manhole Surcharge Depth

- Less than or equal to 1-foot
- Greater than 1-foot
- Modeled Manholes

Forcemain

Peak Flow/Pipe Capacity (HLR)

- 0-25%
- 25-50%
- 50-75%
- 75-100%
- Over Capacity

Planned Infrastructure

- Unmodeled Lift Station
- Unmodeled Sewers

City Limits

- 15-year Development
- 10-year Development
- 5-year Development
- Existing Service Area

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FIGURE 5-6
SCENARIO 4: 15-YEAR LEVEL OF DEVELOPMENT MODEL RESULTS
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

5.3.4 Scenario 5: 20-year Level of Development

The 20-year level of development scenario extends sewer service to the unannexed portions of Village 5 and the Bella Breeze commercial area upstream of the ELPPS. This scenario adds 0.98 MGD of ADWF from the City of Lincoln and 0.14 MGD of ADWF from the SMD1 service area, simulating a total ADWF of 13.47 MGD. The peak flow predicted to occur at the WWTRF increases to 50.2 MGD with 16.4 MGD contributed from SMD1.

Scenario 5: Future Infrastructure

Small diameter (less than or equal to 12-inch) collector sewers were added to the model to collect flow from the portions of Village 5 that lie outside of the existing city limits boundary. These sewers were added to the model to ensure sufficient depth in trunk lines and properly distribute and assess flow contributions in the model. No new trunk sewers are added to the model in this scenario.

Scenario 5: Capacity Constraints

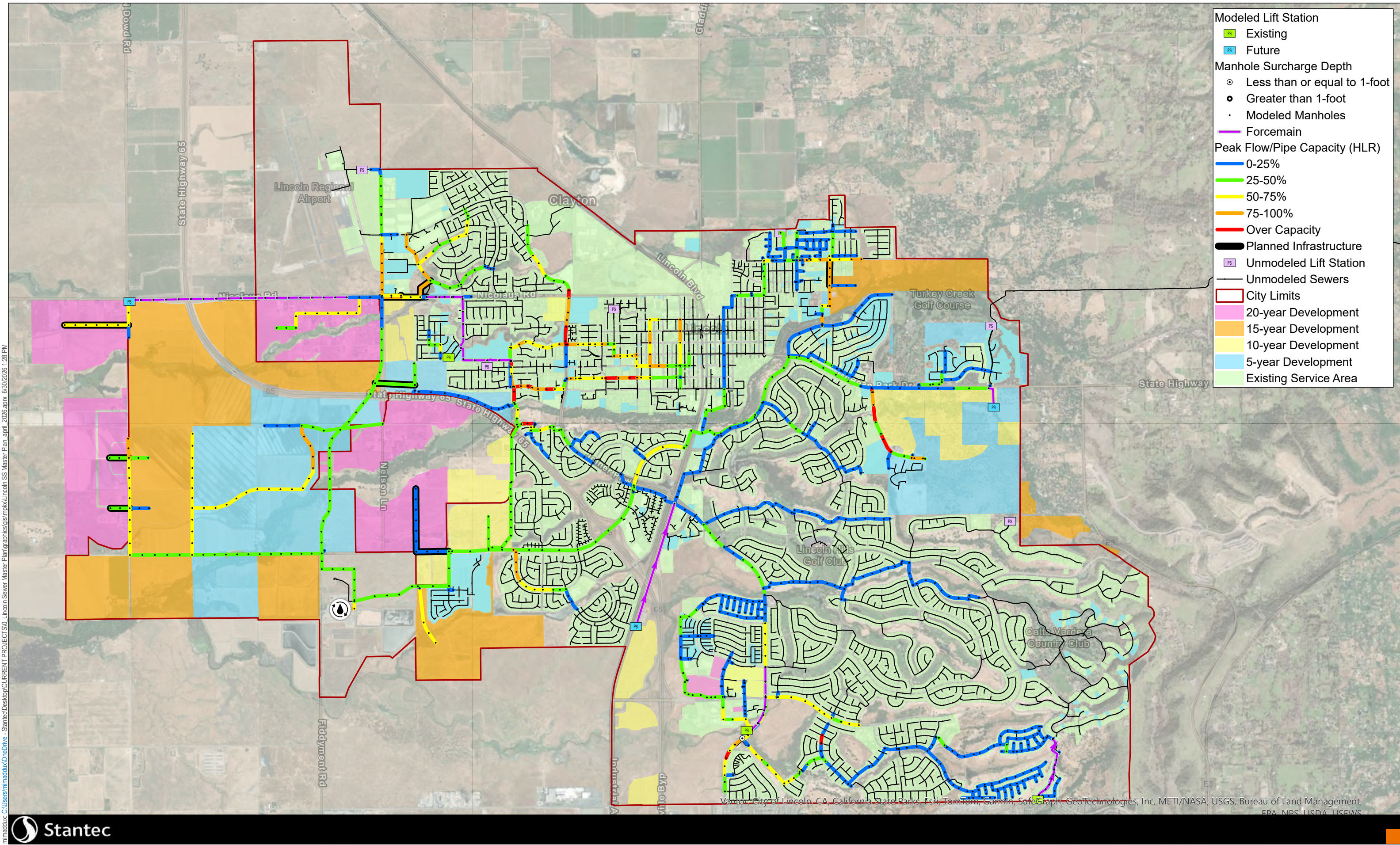
There are no new areas of surcharge or capacity constraints identified under the 20-year level of development scenario. The 20-year level of development model results are presented in **Figure 5-7**, which shows surcharged manhole locations and the HLR of sewers included in the collection system model.

Scenario 5: Residual Capacity Available for Buildout

The residual collection system capacity was reviewed under 20-year level of development conditions to identify potential pathways to serve buildout development. Residual capacity was reviewed from the WWTRF upstream to identify potential points of connection for the future SUD and Village sewer systems.

- **Regional Trunk Sewer:** The upstream 42 to 48-inch portion of the Regional Trunk Sewer, east of Joiner Parkway, has sufficient residual capacity to accept an additional 20 MGD of PWWF. In the downstream, west of Joiner Parkway, the 48 to 54-inch sewer has approximately 30 MGD of residual capacity, and the remaining 66-inch segment has approximately 45 MGD of residual capacity. These values consider the hydraulic capacity of each sewer and not the potential backwater effects imposed by the outfall conditions at the WWTRF.
- **Moore Road Trunk Sewer:** The 36-inch Auburn Ravine sewer crossing is predicted to have 6.5 MGD of residual capacity. Downstream of the crossing, there is approximately 13 MGD of residual capacity before it reaches the Regional Trunk Sewer. These conditions depend on re-routing the NRPS and the Lincoln Square Lift Station to the proposed Nelson Lane Trunk Sewer.
- **E Street Trunk Sewer:** The 30-inch portion of the E Street Trunk Sewer is projected to have approximately 6.5 to 8.5 MGD of residual capacity due to inconsistent pipe slope. Sewers with shallow slopes and lower residual capacity are between 1st Street and the Regional Trunk Sewer.
- **Ferrari Ranch Trunk Sewer:** The 24 to 30-inch sewer north of McBean Park Drive in Village 1 is projected to have approximately 5.6 MGD of residual capacity. Capacity is limited due to the shallow slope of the 30-inch sewer.





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FIGURE 5-7
SCENARIO 5: 20-YEAR LEVEL OF DEVELOPMENT MODEL RESULTS
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

5.3.5 Scenario 2-5: Improvement Recommendations Summary

The following wastewater collection system improvements are proposed to support the City's future growth areas and to address capacity limitations within the existing collection system up to the 20-year development phase. New infrastructure is sized to accommodate serving upstream buildout development. The collection system improvement projects included in the capital improvement program (CIP) are summarized in **Table 5-3** and illustrated in **Figure 5-8**.

Table 5-3. Scenarios 2-5: Future Collection System CIP Project Summary

CIP ID	Scenario Needed	Description	Length (LF)	Current Pipe Size (in)	Proposed Pipe Size (in)
3	2 (5-year)	Chambers Drive Sewer Diversion	62	18	18
4	2 (5-year)	Old Town South Trunk – Alley, Joiner Pkwy to R St.	1,627	15	18
5	2 (5-year)	New Influent Trunk Sewer from Moore and Fiddymont Road ⁽¹⁾	3,284	NA	54
6	2 (5-year)	New Moore Road Trunk Sewer - Phase I ⁽¹⁾	5,379	NA	42
7	4 (15-year)	Virginiatown Road Bypass - Epick Upsizing • 663 LF of 8-inch through Epick upsized to 10-inch • 902 LF of 10-inch in Virginiatown upsized to 12-inch • 1,923 LF of 10-inch bypass sewer in Liberty Lane	3,484	NA, 8, and 10	10 and 12
8	4 (15-year)	New Nelson Lane Trunk Sewer ⁽¹⁾	12,871	NA	36
9	4 (15-year)	Lincoln Square LS Bypass to Nelson Lane	1,651	NA	15
10	4 (15-year)	NRPS Bypass to Nelson Lane • 75 LF of 10-inch sewer • 895 LF of 15-inch sewer • 1,840 LF of 18-inch sewer	2,810	NA	10, 15, and 18
11	4 (15-year)	New Moore Road Trunk Sewer - Phase II ⁽¹⁾	2,581	NA	36
12	4 (15-year)	New N. Village 5/SUD-A PS (7.2 MGD) and Force Main ⁽¹⁾	9,045	NA	Dual 18-inch force main

1. Sized to accommodate flow from upstream SOI development.

Planned sewer infrastructure located within adopted specific plan areas, as well as facilities serving planned developments for which sewer plans were provided by the City, are not included in the Master Plan Update CIP. However, these planned sewers were incorporated into the hydraulic model to ensure adequate trunk line depths and to accurately distribute and evaluate flow contributions throughout the system. The planned infrastructure and the corresponding modeling scenarios in which they were included are summarized in **Table 5-4**.



Sewer Master Plan Update
Capacity Evaluation

Table 5-4. Modeled Future Infrastructure Excluded from the CIP

Planned Infrastructure	Scenario Added	Description	Location	Length (LF)
Epick Collection System and Siphon	2 (5-year)	8-inch Epick sewer segment, 8-inch dual siphon, 12-inch sewer downstream of the siphon connecting to the 30-inch sewer in Ferrari Ranch Road.	Epick Development, South of E. 8th Street	759
Oak Tree Lane Sewer	2 (5-year)	12 to 15-inch sewers. (Total length after Stardust lift station is decommissioned)	Oak Tree Lane and future road alignment.	9,463
Lincoln Square Collection System and LS	2 (5-year)	Lift Station (0.63 MGD) and 15-inch sewers upstream and downstream (Emery Drive).	Peery Development, Emery Drive, and Salum Drive	5,428
Stardust LS	2 (5-year)	Lift Station (0.40 MGD) and 6-inch force main.	South of Stardust Lane and McBean Park Drive	NA
N. Village 7 Sewer	3 (10-year)	12-inch sewer.	Future Liberty Parkway alignment, north of Ferrari Ranch Road.	1,326
Lincoln 270 Collection System and PS	3 (10-year)	Pump Station (0.80 MGD) and 6-inch dual force main	Pump Station located east of Industrial Avenue adjacent to Thornhill Lane, force main alignment follows Lincoln Boulevard to the existing manhole south of E. Joiner Parkway.	5,325
N. Village 1 Sewer	4 (15-year)	8-inch sewer.	N. Village 1 Development, east of Liberty Lane and north of E. 9th Street.	1,072
S. Village 7 Sewer	4 (15-year)	15-inch sewer and creek crossing (Ingram Slough)	East of Liberty at Lincoln near Splendor Drive.	2,534
W. Village 5 Sewers	4 (15-year)/ 5 (20-year)	10 to 21-inch sewers. Main trunk in S. Dowd Road.	in Village 5 north of Auburn Ravine	8,025
N. Village 5 Sewers	4 (15-year)/ 5 (20-year)	12 to 15-inch sewers upstream of the N. Village 5/SUD-A PS and Neighbor Lane.	North of Markham Ravine and south of Nicolaus Road.	8,829
E. Village 5 Sewers	5 (20-year)	8-inch sewer.	Along Moore Road east of Ferrari Ranch and extending north into southeast Village 5 parallel to Nelson Lane.	3,969



5.4 Buildout Development Results

This scenario simulates PWWF in the future collection system upon development of the City's full General Plan area. This scenario extends sewer service to the areas within the SOI boundary, adding flow from Villages 2, 3, 4, and 6, and SUD-A and SUD-C. The buildout level of development scenario adds 9.90 MGD of ADWF from the City of Lincoln and 2.63 MGD of ADWF from the SMD1 service area, simulating a total ADWF of 26.0 MGD. The peak flow predicted to occur at the WWTRF increases to 79.2 MGD with 22.7 MGD contributed from SMD1. The buildout model results are presented in **Figure 5-9**, which shows surcharged manhole locations and the HLR of sewers included in the collection system model.

Servicing strategies were redeveloped from those presented in the 2018 Master Plan. The buildout collection system is divided into three regions northeast encompassing Village 2 and Village 3, northwest encompassing SUD-A and Village 4, and southwest encompassing SUD-C and Village 6. The recommended servicing strategy provides a backbone layout for each specific plan area considering topography, flood zones, environmental reserve areas, and residual capacity in the existing system. Alignments, pump station capacities, and pipe sizes should be refined with specific plan development. The servicing strategies developed for each region of the buildout collection system are described below.

5.4.1 Northeast: Village 2 and Village 3

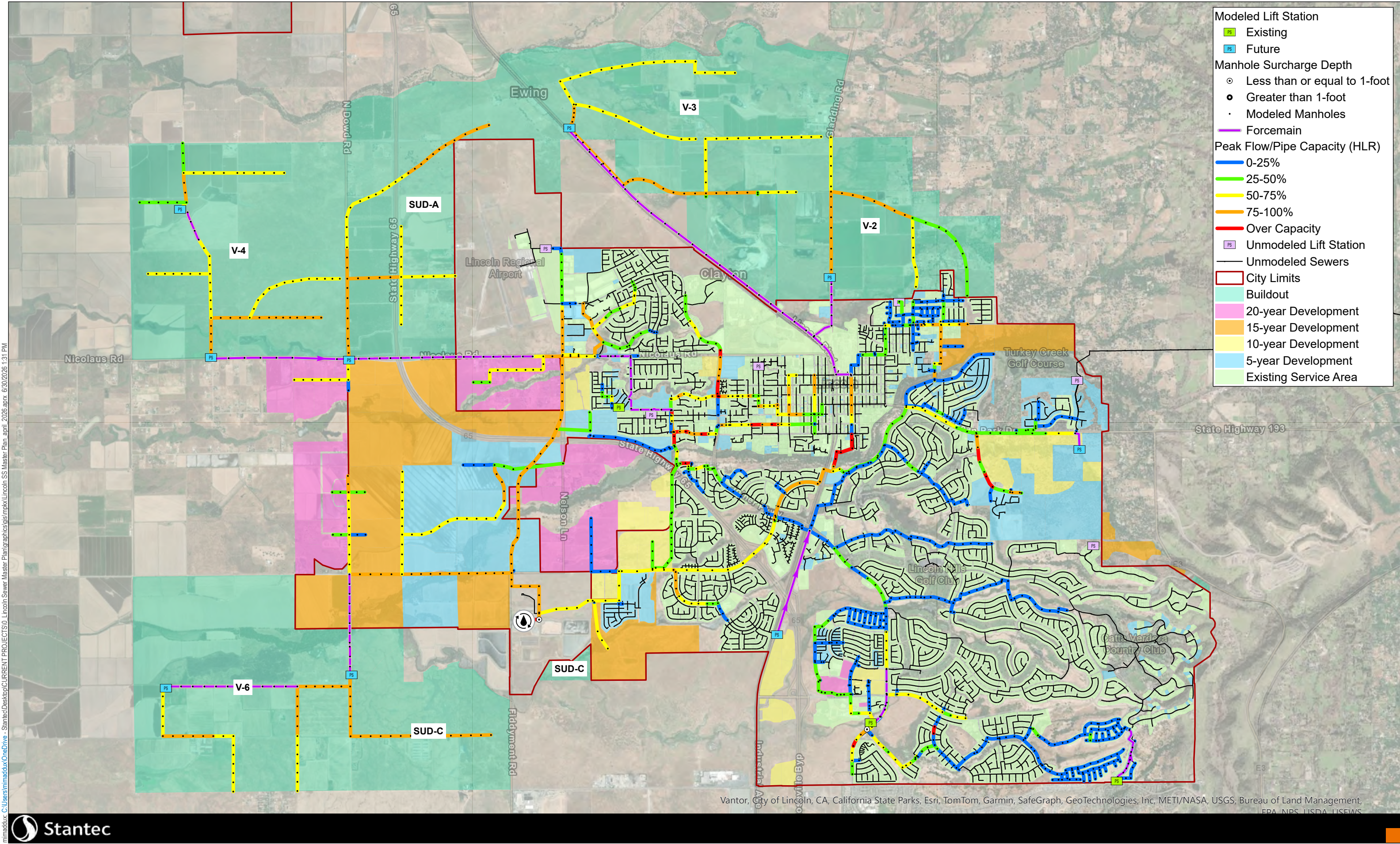
A new sewer service strategy has been developed for Villages 2 and 3 to accommodate future system phasing and take advantage of residual capacity in the existing collection system.

Village 2

A new pump station (V2-PS) is proposed north of the intersection of Gladding Road and city limits to serve Village 2. The pump station will require a reliable capacity of 2.8 MGD and a dual 10-inch force main. Two alternative force main alignments and connections to the existing system are considered: 1.) Connection to the E. Street Sewer at the intersection of 7th Street and E Street, and 2.) connection to the upstream end of the 24-inch sewer in Ferrari Ranch Road south of Hungry Hollow Road and Auburn Ravine. As discussed in **Section 5.3.4**, residual capacity exists in the existing system downstream of both locations to accept the projected flow from the future V2-PS. Each alternative requires a Ravine crossing within the 100-year floodplain, the first alternative crosses the Markham Ravine Drainage Ditch and the second crosses Auburn Ravine Creek. The first alignment alternative avoids currently developed areas, is shorter by over a mile, and allows for a portion of the force main to also be utilized by the future Village 3 pump station(s). Making the connection to the E Street sewer the preferred alternative. An 18-inch dual force main is needed for the portion shared with Village 3 (V2/V3-FM).

The proposed gravity system upstream of the pump station follows the existing topography which generally falls from east to west. A drop manhole at the downstream end of Project V2-5 is included in the model to accommodate the extreme drop in elevation in from the eastern edge of Village 2. A network of smaller steeper pipelines may be acceptable for this area depending on the ultimate layout of the specific plan.





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Based on the topography, the western edge of Village 2 may need to be served through the proposed pump station(s) in Village 3 depending on the ultimate depth and location of the Village 2 pump station. There are several small streams and tributaries to Markham Ravine throughout Village 2, major ravine crossings within the 100-year flood plain are noted in the table below.

A summary of the recommended Village 2 CIP projects is provided in **Table 5-5**.

Table 5-5. Village 2 CIP Projects

CIP ID	Description	Slope (ft/ft)	Length (LF)	Notes
V2-PS	Village 2 Pump Station (2.8 MGD)			
V2-FM	10-inch Dual Force Main (15-inch single)		3,328	Markham Ravine Crossing
V2/V3-FM	18-inch Dual Force Main (24-inch single)		3,014	Shared with V3 Pump Station(s) Downstream connection at 7th Street and E Street
V2-1	21-inch Sewer	0.00100	4,233	
V2-2	15-inch Sewer	0.00155	4,242	
V2-3	12-inch Sewer	0.00200	2,672	
V2-4	12-inch Sewer	0.00200	3,401	
V2-5	12-inch Sewer	0.00200	5,256	Drop manhole at downstream end
Alternative 2 Force Main				
V2-FM (ALT)	10-inch Dual Force Main (15-inch single)		11,863	Downstream connection at Ferrari Ranch Road south of Hungry Hollow Road and Auburn Ravine Auburn Ravine Crossing

Village 3

The Village 3 infrastructure will also serve the industrial area surrounding and containing the Gladding McBean clay mine. A phased approach to serving the area is possible through the proposed servicing strategy. Ultimately a new 5.5 MGD pump station is proposed to serve the area with the opportunity for a temporary pump station (3.9 MGD) to be built in the initial phase of development. Both pump stations are proposed along the east side of Lincoln Boulevard with a 15-inch dual force main to follow Lincoln Boulevard to merge with the force main from Village 2 (V2/V3-FM) at Gladding Road. Project V2/V3-FM will need to be included in Village 3 infrastructure if the alternative force main alignment is implemented for Village 2. As discussed in **Section 5.3.4**, residual capacity exists in the existing system downstream of the proposed point of connection. The combined flow from Villages 2 and 3 exceed the residual capacity of shallow sloped segments of the E Street sewer, despite flow exceeding pipe capacity surcharging is not predicted as a result due to the overall HGL of trunk sewer.

The temporary pump station could be located at the downstream end of Project V3-1 and tie into the first segment of force main (V3-FM-1) in Lincoln Boulevard to accommodate development phasing. Project V3-6



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is proposed to take the pump station offline by connecting both wet-wells. A ten-foot drop between Projects V3-1 and V3-6 is included in the model to facilitate the temporary lift station. If the temporary lift station is never constructed smaller diameter sewers with steeper slopes may be appropriate for projects V3-1 and V3-6. If the temporary pump station ends up being permanent, it will require a reliable capacity of 3.9 MGD. In this case, the northern pump station would need to have a reliable capacity of 1.5 MGD with a dual 8-inch force main (V3-FM-2) and Project V3-6 would not be needed. The CIP ultimately recommends serving the full area through the northern pump station with a reliable capacity of 5.5 MGD.

Like Village 2 the gravity network follows existing topography, generally falling from east to west and has several tributary stream crossings. The modeled pipe network includes several manhole drops, particularly for southern pipelines. As previously mentioned, smaller diameter sewers with steeper slopes may be applicable depending on the ultimate collection system layout. Major ravine crossings within the 100-year flood plain are noted for each project in the table below. A summary of the recommended Village 3 CIP projects is provided in **Table 5-6**.

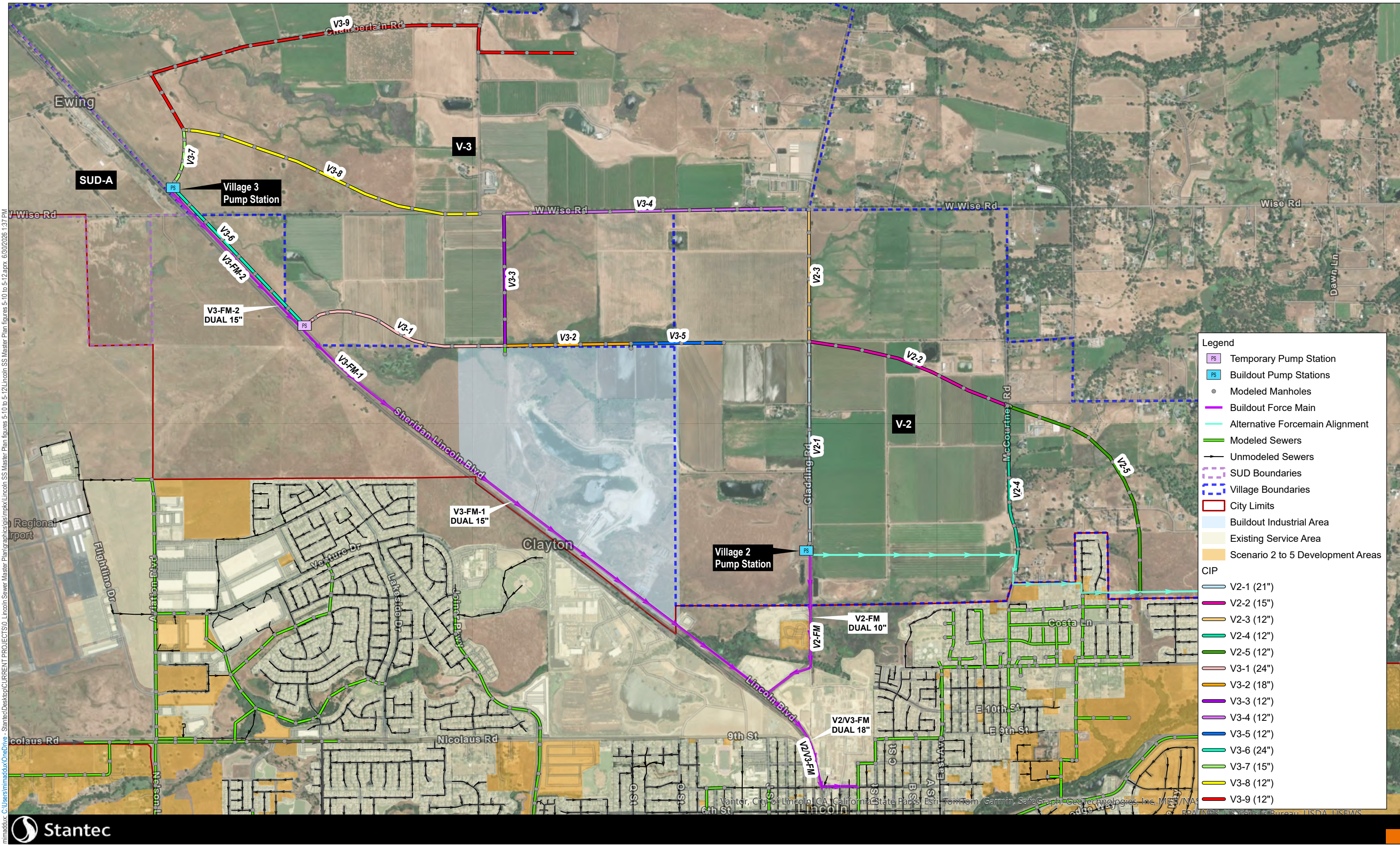
Table 5-6. Village 3 CIP Projects

CIP ID	Description	Slope (ft/ft)	Length (LF)	Notes
V3-PS	Village 3 Pump Station (5.5 MGD)			
V3-FM-1	15-inch Dual Force Main (18-inch single)		11,760	Markham Ravine Crossing
V3-FM-2	15-inch Dual Force Main (18-inch single)		4,083	
V3-1	24-inch Sewer	0.0010	4,269	Drop manhole at downstream end (temporary PS location)
V3-2	18-inch Sewer	0.0012	2,544	Drop manhole at downstream end
V3-3	12-inch Sewer	0.0020	2,670	Drop manhole at downstream end
V3-4	12-inch Sewer	0.0020	5,675	
V3-5	12-inch Sewer	0.0020	1,877	Drop manhole at downstream end
V3-6	24-inch Sewer	0.0010	3,846	Project not needed with two permanent pump stations
V3-7	15-inch Sewer	0.0015	1,215	
V3-8	12-inch Sewer	0.0020	6,285	Drop manhole at downstream end
V3-9	12-inch Sewer	0.0020	10,560	Coon Creek Tributary Crossing(s)
Temporary Pump Station or Two Permanent Stations				
V3-PS	Village 3 Pump Station (1.5 MGD)			Northern PS capacity with two permanent pump stations.
V3-Temp-PS	Village 3 Temporary Pump Station (3.9 MGD)			Temporary PS capacity or Southern PS capacity with two permanent pump stations.
V3-FM-2	8-inch Dual Force Main (10-inch single)		4,083	Force main sizing with two permanent pump stations.

The proposed northeast buildout servicing strategy and Village 2 and Village 3 collection system infrastructure are shown on **Figure 5-10**.



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Legend

PS

Temporary Pump Station

PS

Buildout Pump Stations

●

Modeled Manholes

Buildout Force Main

Alternative Forcemain Alignment

Modeled Sewers

Unmodeled Sewers

SUD Boundaries

Village Boundaries

City Limits

Buildout Industrial Area

Existing Service Area

Scenario 2 to 5 Development Areas

CIP

V2-1 (21")

V2-2 (15")

V2-3 (12")

V2-4 (12")

V2-5 (12")

V3-1 (24")

V3-2 (18")

V3-3 (12")

V3-4 (12")

V3-5 (12")

V3-6 (24")

V3-7 (15")

V3-8 (12")

V3-9 (12")

FIGURE 5-10
NORTHEAST BUILDOUT SERVICING STRATEGY: VILLAGE 2 AND VILLAGE 3 COLLECTION SYSTEM INFRASTRUCTURE
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5.4.2 Northwest: SUD-A and Village 4

The servicing strategy for SUD-A and Village 4 is updated from that presented in the 2018 Master Plan but still relies on the construction of the Nelson Lane Trunk Sewer (CIP 8) and New Influent Trunk Sewer (CIP 5) to convey flow the WWTRF. The new strategy is to accommodate future system phasing by dividing the service area into three pump station collection sheds as opposed to one large regional pump station service area.

The first collection shed combines SUD-A with the northern portion of Village 5 and eliminates the 42 to 36-inch trunk sewer in Nicolaus Road that was proposed in the 2018 Master Plan. This pump station has been presented as N. Village 5/SUD-A PS (7.2 MGD) and Force Main (CIP 12). Details of the previously identified CIP Projects that the northwest servicing strategy depend on are summarized in **Table 5-7**.

Table 5-7. Previously Identified CIP Project Details

CIP ID	Description	Slope (ft/ft)	Length (LF)	Notes
5	54-inch Influent Sewer	0.0004	3,284	Ties into the existing 54-inch sewer stub along the Regional Trunk Sewer upstream of the WWTRF headworks.
8	36-inch Nelson Lane Trunk Sewer	0.0010 ⁽¹⁾	12,871	Auburn Ravine and Markham Ravine Crossings Upstream invert elevation of 96.4 or lower at the intersection of Nelson Lane and Nicolaus Road needed to take the NRPS offline.
12	N. Village 5/SUD-A Pump Station (7.2 MGD) and Dual 18-inch Force Main	NA	9,045	Crossing Highway 65 at Nicolaus Road.

1. Greater than standard slope, maximum allowable slope for taking the NRPS offline in the proposed alignment. Aids in avoiding solids deposition and odor issues associated with the first phases of development.

SUD-A

As discussed above, the SUD-A service area will be tributary to the N. Village 5/SUD-A Pump Station (V5/SUDA-PS). This pump station will require a reliable capacity of 7.2 MGD. The pump station is proposed to be located at the southeast corner of the Nicolaus Road and Dowd Road intersection in Village 5. The dual 18-inch force main is sized to accommodate the tie in of the force main from Village 4, alternatively three 15-inch force mains could be installed to accommodate the phases of development.

The gravity network generally follows existing topography, generally falling from east to west before collecting in a 30-inch trunk sewer in Dowd Road extending south to the pump station. The topography is flatter and there are fewer ravine tributaries and streams than in the northwest service area. There are currently drainages and canals in the service area although they primarily exist outside of the 100-year flood plain. There are two proposed gravity sewer projects that will require crossing under Highway 65. A summary of the recommended SUD-A CIP projects is provided in **Table 5-8**.



Table 5-8. SUD-A CIP Projects

CIP ID	Description	Slope (ft/ft)	Length (LF)	Notes
SUDA-1	30-inch Sewer	0.0006	3,999	
SUDA-2	24-inch Sewer	0.0008	1,535	
SUDA-3	21-inch Sewer	0.0010	2,649	Highway 65 Sewer Crossing
SUDA-4	21-inch Sewer	0.0010	3,041	
SUDA-5	18-inch Sewer	0.0012	2,296	Highway 65 Sewer Crossing
SUDA-6	15-inch Sewer	0.0015	2,291	Coon Creek Tributary Crossing
SUDA-7	12-inch Sewer	0.0020	2,349	
SUDA-8	12-inch Sewer	0.0020	2,473	
SUDA-9	12-inch Sewer	0.0020	2,649	
SUDA-10	12-inch Sewer	0.0020	2,331	

Village 4

The Village 4 servicing strategy was revised to include two new sewer pump stations, and the gravity sewer layout was revised to avoid the large environmental reserve in the northeast corner and the flood plains on the western edge of the village. Two pump stations are required due to the low-lying topography and the depths required to serve the northwest corner of the village.

Village 4 Pump Station 1 (V4-PS-1) is proposed to be located on the north side of the intersection of Nicolaus Road and Maverick Lane and require a reliable capacity of 3.2 MGD. The 10-inch dual force main will tie into the N. Village 5/SUD-A force main.

Village 4 Pump Station 2 (V4-PS-2) will serve the northwest corner of the development area and require a reliable capacity of 1.1 MGD. The 6-inch dual force main will discharge at a manhole located at the upstream end of the V4-PS-1 collection system. Requiring that the downstream pump station and Projects V4-1, V4-2, and V4-4 are sized to accommodate the flow. Double pumping the flow from this northwest corner is not ideal but avoids the need for constructing another long force main for a relatively low amount of flow. It is also unknown as to when or if this far reach of the SOI will ever develop.

The topography generally falls from east to west, with the highest points is the southern portion of the environmental preserve area. The gravity system deviates from the roadway circulation diagram to accommodate the topography, phasing, and the proposed V4-PS-1 location. The drainages and canals from SUD-A cross the Village to meet the flood plains at the western edge. The northern drainage divides the pump station service areas. A summary of the recommended Village 4 CIP projects is provided in **Table 5-9**.



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Table 5-9. Village 4 CIP Projects

CIP ID	Description	Slope (ft/ft)	Length (LF)	Notes
V4-PS-1	Village 4 Pump Station 1 (3.2 MGD)			
V4-FM-1	10-inch Dual Force Main (15-inch single)		6,645	Ties into N. Village 5/SUD-A Pump Station force main
V4-1	24-inch Sewer	0.0008	1,953	
V4-2	18-inch Sewer	0.0012	2,165	
V4-3	15-inch Sewer	0.0015	1,901	
V4-4	15-inch Sewer	0.0015	1,837	
V4-5	12-inch Sewer	0.0020	3,040	
V4-6	12-inch Sewer	0.0020	5,280	
V4-7	12-inch Sewer	0.0020	3,507	
V4-PS-2	Village 4 Pump Station 2 (1.1 MGD)			
V4-FM-2	6-inch Dual Force Main (8-inch single)		1,457	
V4-8	15-inch Sewer	0.0015	457	
V4-9	12-inch Sewer	0.0020	2,913	
V4-10	12-inch Sewer	0.0020	2,291	
V4-11	12-inch Sewer	0.0020	4,935	

The proposed northwest buildout servicing strategy and SUD-A and Village 4 collection system infrastructure are shown on **Figure 5-11**.



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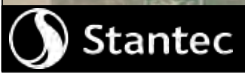
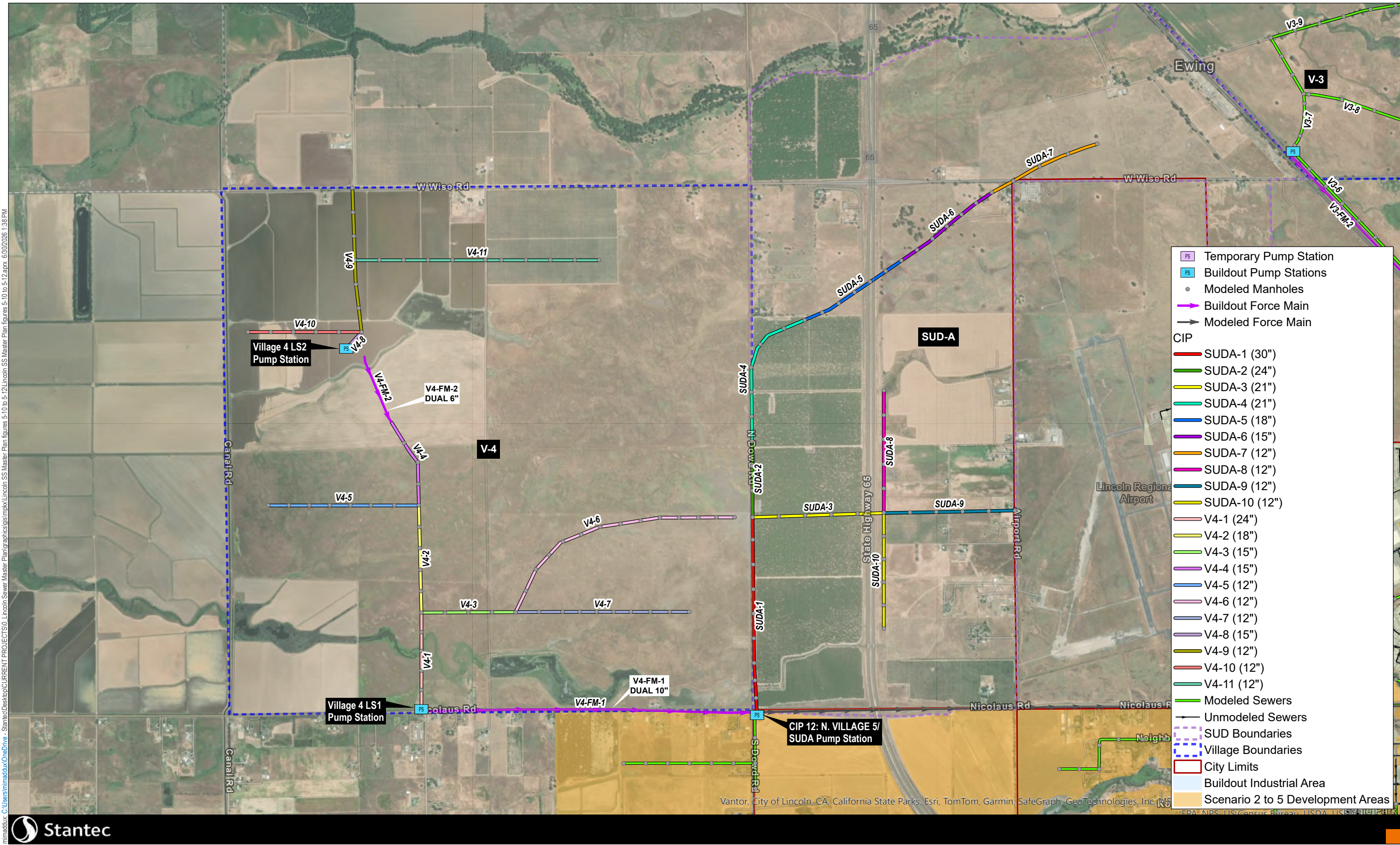


FIGURE 5-11
NORTHWEST BUILDOUT SERVICING STRATEGY: SUD-A AND VILLAGE 4 COLLECTION SYSTEM INFRASTRUCTURE
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

5.4.3 Southwest: SUD-C and Village 6

The southwest sewer servicing strategy was revised to consider the extensive floodplains and environmental reserve areas that exist in SUD-C and Village 6. The floodplain and environmental reserves occupy the northern portion of Village 6 and northeast corner of SUD-C, limiting the development potential of these areas. The strategy assumes future development will primarily be south of Auburn Ravine occupying the areas north and south Catlett Road in Village 6 and primarily south of Catlett Road in SUD-C. It should be noted that a small portion of land south of Moore Road, along the northern edge of Village 6 could potentially develop and would require a local pump station and force main to the proposed 36-inch sewer at the intersection of Dowd Road and Moore Road.

The revised layout includes two pump stations to accommodate the potential phasing and feasible location of future development. The primary pump station (V6/SUDC-PS) is proposed to serve all of SUD-C and a portion of Village 6 with an upstream secondary pump station (V6-PS) to serve the low-lying area in the southwest corner of Village 6. Similar to the northwest servicing strategy, the southwest approach still relies on the construction of CIP projects in the downstream collection system including both phases of the Moore Road Trunk Sewer (CIP 6 and CIP 11) and New Influent Trunk Sewer (CIP 5) to convey flow to the WWTRF. Details of the previously identified CIP Projects that the southwest servicing strategy depend on are summarized in **Table 5-10**.

Table 5-10. Previously Identified CIP Project Details

CIP ID	Description	Slope (ft/ft)	Length (LF)	Notes
5	54-inch Influent Sewer	0.00040	3,284	Ties into the existing 54-inch sewer stub along the Regional Trunk Sewer upstream of the WWTRF headworks.
6	42-inch Moore Road Trunk Sewer – Phase I ⁽¹⁾	0.00037	5,379	Auburn Ravine Crossing
11	36-inch Moore Road Trunk Sewer – Phase II ⁽¹⁾	0.00045	2,581	Falling topography may limit the length of this proposed trunk sewer. ^{(2) (3)}

1. The model matches invert elevations at 42-inch (Phase I) and 36-inch (Phase II) connection to maximize sewer depth in the upstream alignment.
2. If the proposed extent of the 36-inch gravity sewer is unachievable, the V6/SUDC-FM will need to be extended to reach the achievable upstream location.
3. The portion of Village 5 lying west of Dowd Road may need to be tributary to the V6/SUDC-PS or have its own local pump station depending on field surveys and the achievable 36-inch gravity sewer extent.

SUD-C

The primary pump station (V6/SUDC-PS) is proposed to be located along Aitken Road south of Auburn Ravine, near the northern border of SUD-C and will require a reliable capacity of approximately 5.4 MGD. The dual 15-inch force main will follow Aitken Road north to cross Auburn Ravine and connect to the upstream end of the proposed 36-inch trunk sewer in Moore Road (CIP 11).



The topography in SUD-C generally falls from the southeast to the northwest. The gravity system upstream of the lift station is proposed to follow the Aitken Road and Catlett Road corridors. The 30-inch sewer (V6/SUDC-1) into the V6/SUDC-PS will also accept flow from the Village 6 service area. The proposed SUD-C sewers in Catlett Road cross tributaries of Orchard Creek and Auburn Ravine outside of the 100-year floodplain. A summary of the recommended SUD-C CIP projects is provided in **Table 5-11**.

Table 5-11. SUD-C CIP Projects

CIP ID	Description	Slope (ft/ft)	Length (LF)	Notes
V6/SUDC-PS	Village 6/SUD-C Pump Station (5.4 MGD)			
V6/SUDC-FM	15-inch dual force main (18-inch single)		4,919	Auburn Ravine Crossing, Discharges at upstream end of CIP 11
V6/SUDC-1	30-inch Sewer	0.0006	599	
SUDC-1	18-inch Sewer	0.0012	2,446	
SUDC-2	18-inch Sewer	0.0012	2,955	
SUDC-3	12-inch Sewer	0.0020	3,940	

Village 6

The topography of the southern developable portion of Village 6 descends nearly 40 feet from east to west. To accommodate this drop in elevation an additional pump station will be necessary. The eastern half of the Village 6 development area can be served by gravity sewers upstream of the V6/SUDC-PS while the western half will need be served by the Village 6 Pump Station (V6-PS).

The V6-PS is proposed to be located at the northwest corner of the developable area, south of the Auburn Ravine floodplain. It will require a reliable capacity of 1.6 MGD and a dual 8-inch force main. The force main is proposed to be routed east along the south side of the Aitken Ranch Conservation Easement and discharge to a 21-inch sewer (V6-1) that connects to the 30-inch sewer (V6/SUDC-1) in Aitken Road and directs flow to the V6/SUDC-PS.

The 21-inch sewer (V6-1) will also accept gravity flow from the eastern half of Village 6. There are no notable creek crossings in the Village 6 development area. As discussed for Village 4, double pumping the flow from this area is not ideal but accommodates potential development phasing and existing topography. A summary of the recommended Village 6 CIP projects is provided in **Table 5-12**.



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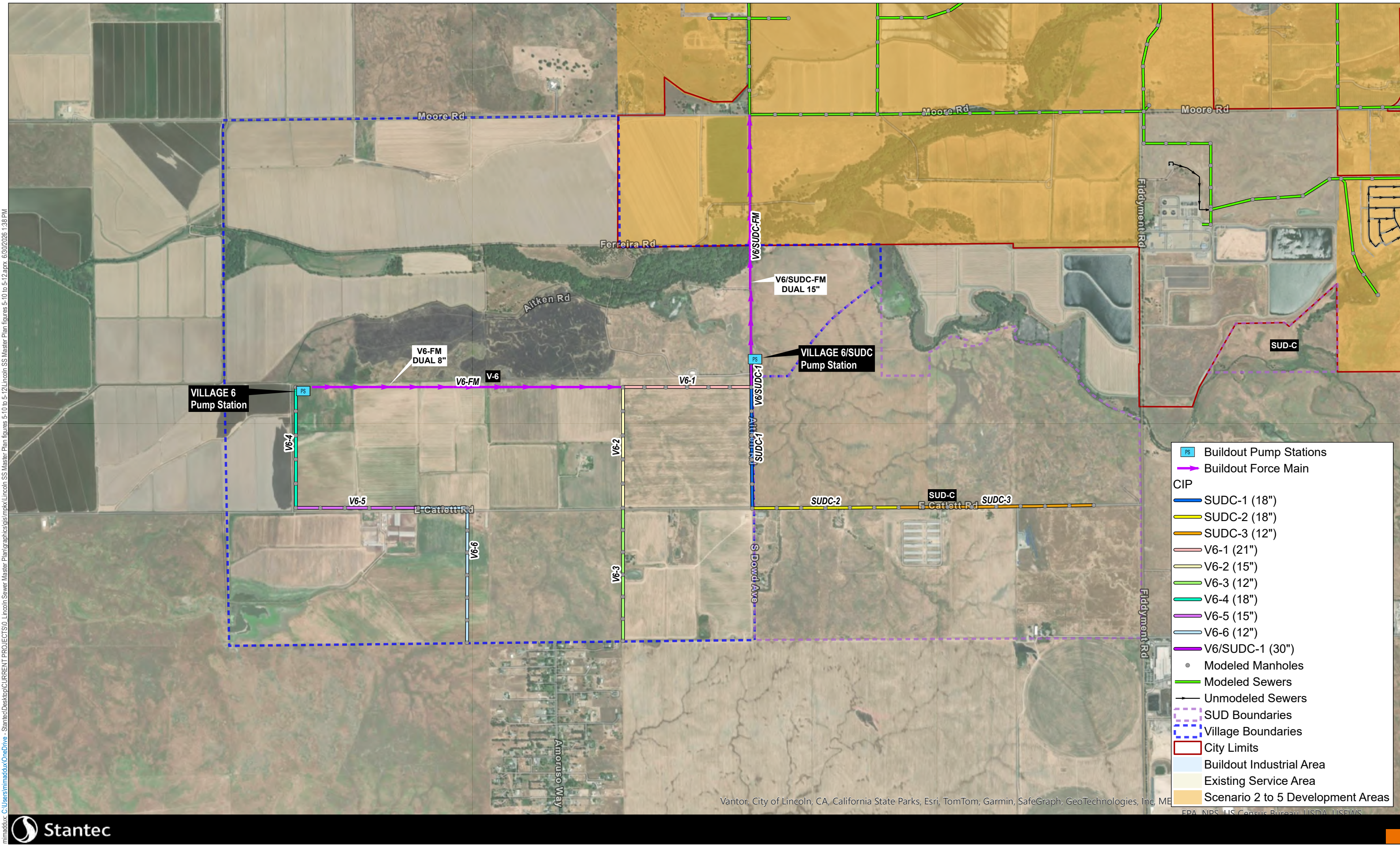
Table 5-12. Village 6 CIP Projects

CIP ID	Description	Slope (ft/ft)	Length (LF)	Notes
V6-PS	Village 6 Pump Station (1.6 MGD)			
V6-FM	8-inch Dual Force Main (10-inch single)		6,281	Ties into a V6-1
V6-1	21-inch Sewer	0.00100	2,591	
V6-2	15-inch Sewer	0.0015	2,438	
V6-3	12-inch Sewer	0.0020	2,693	
V6-4	18-inch Sewer	0.0012	2,607	
V6-5	15-inch Sewer	0.0015	2,474	
V6-6	12-inch Sewer	0.0020	3,713	

The proposed southwest buildout servicing strategy and SUD-C and Village 6 collection system infrastructure are shown on **Figure 5-12**.



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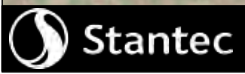


FIGURE 5-12
SOUTHWEST BUILDOUT SERVICING STRATEGY: SUD-C AND VILLAGE 6 COLLECTION SYSTEM INFRASTRUCTURE
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

5.5 Modeled Pump Station Capacity Evaluation

The reliable capacity and the peak simulated inflow at the pump stations included in the hydraulic model are presented for each level of development scenario in **Table 5-13**. As discussed in **Section 5.3**, two pump stations are projected to exceed their existing reliable pumping capacities. The Nicolaus Road Pump Station (NRPS) and the Independence Pump Station.

The maximum projected peak flow into the NRPS is approximately equal to the station's maximum pumping capacity and capacity improvements are not recommended due to difficult site conditions and constructability. To address this capacity deficiency the NRPS is proposed to be taken offline through proposed gravity sewer CIP projects (CIP 5, CIP 8, and CIP 10).

The model projects the Independence Pump Station to exceed its reliable capacity. This is likely a result of the model calibration and a conservative approach to predicting ADWF from vacant upstream lots. The calibrated sewer-shed also includes the oldest sewers in the collection system, higher I/I in the older sewers is likely influencing the amount of I/I predicted to occur at the station in model results.

Due to its recent construction (2023), capacity improvements are not recommended for the Independence Pump Station. It is recommended that the City monitors its ability to keep up with flow as more homes are occupied within the service area.

Table 5-13. Peak Modeled Pump Station Inflow at Each Level of Development

Modeled Pump Station	Reliable Capacity ⁽¹⁾ (MGD)	Peak Modeled Flow into the Pump Station (MGD)					
		Scenario 1B: Existing	Scenario 2: 5-year	Scenario 3: 10-year	Scenario 4: 15-year	Scenario 5: 20-year	Scenario 6: Buildout
East Lincoln Parkway	5.67	3.29	3.45	3.60	3.60	3.72	3.72
Nicolaus Road	3.40	3.13	3.57	3.60	3.60	NA	NA
Education Foundation	0.15	0.05	0.05	0.05	0.05	0.05	0.05
Independence	0.66	0.54	1.19	1.19	1.19	1.19	1.19
Lincoln Square (Peery)	1.38	NA	0.43	0.63	0.63	NA	NA
Stardust	0.36	NA	0.30	0.30	0.30	0.30	0.30
Lincoln 270	-	NA	NA	0.79	0.79	0.79	0.79
N. Village 5/SUDA PS	-	NA	NA	NA	0.32	1.09	7.15

1. Reliable capacity is defined as the maximum pumping capacity of the lift or pump station with the largest pump out of service.
2. NA = Not Applicable, pump station not included in modeled scenario.
3. Proposed pump stations only included at buildout (Scenario 6) to serve SOI development areas are sized to accommodate peak modeled flows and are excluded from the table.



5.6 Capacity Constraints Summary

A summary of the modeled capacity constraints, triggering scenario(s), LOS deficiency, and the resulting recommendation from this chapter is provided in **Table 5-14**.

Table 5-14. Summary of Modeled Capacity Constraints and Recommendations

Capacity Constraint	Location	Scenario	LOS Deficiency	Recommendation ⁽¹⁾
Upstream of the ELPPS	Twelve Bridges Drive/East Joiner Parkway	Existing 10-year, 24-hour Design Storm (Scenario 1)	Surcharge depth exceeds 1-foot above the pipe crown (Predicted surcharge depth = 4.4-feet)	CIP 1, CIP D, and upstream sewer capacity study
Old Town North Trunk	5th Street	Existing 10-year, 24-hour Design Storm (Scenario 1)	No surcharging allowed, less than 8-feet of freeboard (Predicted surcharge depth < 1-foot)	CIP 2 and upstream sewer capacity study
Old Town South Trunk	Alley between R Street and Joiner Parkway	5-year Level of Development Growth (Scenario 2)	No surcharging allowed, less than 8-feet of freeboard (Predicted surcharge depth < 1-foot)	CIP 4
Upstream of the NRPS	NRPS Influent Sewers	Existing 10-year, 24-hour Design Storm (Scenario 1) Lift Station Operations	Surcharge depth exceeds 1-foot above the pipe crown (Predicted surcharge depth > 2-feet)	CIP C, CIP 10
Chambers Drive Sewer Confluence	Chambers Drive (30-inch sewer)	Existing 10-year, 24-hour Design Storm, 5 to 15-year Level of Development Growth (Scenarios 1 to 4)	Surcharge depth exceeds 1-foot above the pipe crown (Predicted surcharge depth = 1.2 to 1.5-feet, varies with improvements at each scenario, surcharge depth increases without improvements)	CIP C (Scenario 1) CIP 3 (Scenario 2) CIP 10 (Scenario 4) CIP 11 (Scenario 4)
The NRPS Pumping Capacity	NRPS	5-year Level of Development Growth (Scenario 2)	Flow exceeds reliable pump station capacity	CIP C, CIP 10
Independence Pump Station Pumping Capacity	Independence PS	5-year Level of Development Growth (Scenario 2)	Flow exceeds reliable pump station capacity	Monitoring (New PS, conservative modeling)
Virginiatown Road	Virginiatown Road	15-year Level of Development Growth (Scenario 4)	Surcharge depth exceeds 1-foot above the pipe crown (Predicted surcharge depth = 3.4-feet)	CIP 7

1. CIP 10 and CIP 11 are dependent on construction of CIP 5 and CIP 8.



6 Condition Evaluation

The purpose of this chapter is to present an overview of the lift station and downtown sewer pipeline condition assessments. The key findings of the condition assessments are summarized in this chapter, and the full evaluations are presented in Technical Memorandum No. 4 – Condition Assessment of Lift Stations Technical Memorandum (TM 4) and Technical Memorandum No. 5 – Condition Assessment of Downtown Sewer Pipelines (TM 5) in **Appendix B**.

This chapter is divided into the following sections:

- Condition Assessment of Lift Stations
- Condition Assessment of Downtown Sewer Pipelines

6.1 Condition Assessment of Lift Stations

On August 7, 2025, Stantec staff conducted a site visit to each sewer lift station to assess the condition of structures and equipment. The results of this condition assessment will be used to identify projects that will be included in the City's Capital Improvement Program (CIP) as part of the Sewer Master Plan Update. The CIP will include a list of priority and strategic sewer lift station projects that will allow the City to continue operating the wastewater facilities efficiently and reliably.

The objectives of the condition assessment of existing lift stations include:

- Perform site inspections, record data, and assess the condition of the existing sewer lift stations.
- Assign Probability of Failure and Consequences of Failure ratings.
- Provide improvement recommendations and alternatives, where applicable.

A site visit by discipline experts was performed to assess the condition of structures and equipment. An operation and maintenance employee was present during the assessments to capture institutional knowledge related to process, function and areas of concern. Stantec developed a "Lincoln Lift Station Condition Field Assessment Form" and used it for each lift station. The Assessment Form is divided into the following major areas of inspection, which are further divided into sub-areas in assessing the lift stations.

The major areas of evaluation included:

- Pumps, Valves and Piping – the wet/dry well suction/discharge piping, valves, pumps, motors, odor control, auxiliary equipment, safety issues and other O&M concerns.
- Wet Well – top slab, wet/dry well interior walls and access hatch conditions.
- Above-Ground/Vault Piping – piping and valves located above-ground or in vaults at the station.
- Electrical and Instrumentation Equipment – of the motor control center (MCC), control panel, exposed conduits, generator, and PG&E service meter.
- Site Security – site access, fencing, chemical/odor exposure, and equipment clearance.
- Site Civil – includes evaluation for site paving, drainage and accessibility.



Each assessed lift station is given Probability of Failure Rating and Consequence of Failure Rating. The Probability of Failure Ratings and Consequence of Failure Ratings are determined based on each “Lincoln Lift Station Condition Field Assessment Form”, closely working with the City staff and institutional knowledge of our team.

During the site visit, close inspection of submersible pumps was not performed by Stantec. According to City Staff, inspection and maintenance of each lift station is performed biannually. City Staff did not relay any concerns or problems with the operation and mechanics of the pumps. Therefore, Stantec's condition assessment of submersible pumps and auxiliary equipment is solely based on the year of installation of the pump compared to a life expectancy of twenty-five (25) years. City has variable speed drives at all but two lift stations (Flightline and Silver Spur).

6.1.1 Critical Findings

Table 6-1 summarizes the most critical condition assessment findings of the existing lift stations.

Table 6-1. Sewer Lift Station Condition Assessment Critical Findings Summary

Lift Station	Critical Findings
3 rd Street	No fall protection in the wetwell
East Joiner (ELPPS)	Discharge piping coating is peeling
Education	Intermittent trouble in starting the standby generator
Flightline	- Pumps have exceeded expected service life - No fall protection in the wetwell - Electrical panels are approaching expected service life - Autodialer may not be functioning properly - Water supply solenoid controls may not be functioning properly - Seals missing on conduits entering the electrical panels
Independence	- Intermittent radio communication interference - Intermittent false high water level readings
Nicolaus (NRPS)	- Discharge piping in wetwell has some rust - Standby generator slightly impedes access to some electrical panels
Q Street	- Discharge piping is corroded - Discharge valves are corroded - Electrical panels are exposed and unprotected from the public - No functioning alarms - No back-up power onsite
Silver Spur	- There is no room for a standby generator onsite. Must be wheeled in during an outage. - Intermittent communications problems. - Reset pushbutton is missing on the motor control panel.
Village 19	No fall protection in the wetwell



6.1.2 Summary of Recommendations

Table 6-2 summarizes recommendations for each sewer lift station. Infrastructure Repair and Replacement (R&R) funds should be included in the CIP. The listed recommendations for each sewer lift station are sorted into O&M or CIP project categories.

Table 6-2. Lift Station Condition Assessment Recommendation Summary

Lift Station	Category	Recommendations
3 rd Street	O&M	- Add fall protection to the wetwell - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A) - Complete the planned project to add a new ATS for back-up power system
East Joiner (ELPPS)	O&M	- Replace or coat discharge piping within the wetwell - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Education	O&M	Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Flightline	CIP (CIP Project B)	- Replace submersible pumps - Replace motor control panels. Recommended to replace with the pumps. - Add fall protection to the wetwell - Investigate potential issues with the autodialer and water supply solenoid control systems - Add seals to conduits entering the electrical panels - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Independence	O&M	Investigate issues of intermittent radio communication interference and intermittent high water level readings
Nicolaus (NRPS)	O&M	- Re-coat discharge piping within the wetwell - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Q Street	CIP (Addressed under ongoing CIP project)	- Replace discharge piping within the wetwell - Replace piping and valves within the valve vault - Replace electrical panels in an enclosed area - Install a standby generator for back-up power - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Silver Spur	O&M	- Replace missing reset pushbutton on the motor control panel - Investigate intermittent communications problems
Village 19	O&M	Add fall protection to the wetwell

A recommended CIP project is defined as having costs estimated to be greater than \$75,000. Additionally, it is recommended that every five years, City staff review the existing CIP list and consult with operation and maintenance staff on their assessment of what requires attention, with inspections as required and a focus



on re-assessing the most critical pending CIP projects. An ongoing condition assessment CIP project is included in the proposed CIP. The full condition assessment of sewer lift stations analysis is presented in TM 4 in **Appendix B**.

6.2 Condition Assessment of Downtown Sewer Pipelines

CCTV inspection and condition assessment of select pipelines in the Downtown Area was conducted as part of the Master Plan Update. The CCTV investigation was limited to specific pipelines within the following boundaries: Joiner Parkway to the west, Auburn Ravine to the south, and up to Liberty Lane and North to East 12th Street/Virginatown Road. Pipelines were prioritized by the City and ultimately 27,064 LF of sewers were included in the assessment.

NorCal Pipeline Services (NorCal) conducted the CCTV inspections over the first week(s) of April 2025. The inspections were performed in accordance with the Pipeline Assessment Certification Program (PACP) administered by National Association of Sewer Service Companies (NASSCO). NorCal provided NASSCO certified reports with ratings for each pipeline. Structural, O&M, and overall pipe ratings using the NASSCO standard PACP grades and scoring system for each pipeline were used as the basis for the condition assessment. The full analysis is presented in Technical Memorandum No. 5 – Condition Assessment of Downtown Sewer Pipelines (TM 5) in **Appendix B**.

Key objectives of the condition assessment include:

- Summarizing downtown CCTV inspection coverage.
- Documenting the PACP rating methodology.
- Identifying pipelines with structural or operational defects.
- Classifying pipelines by condition severity.
- Supporting prioritization of rehabilitation and replacement projects.
- Providing recommendations for future inspection, maintenance, and asset management.

The data and reports provided by NorCal were used to develop a prioritized scoring system to rank pipes based on their condition and need for improvement.

6.2.1 Critical Findings

The downtown sewer system is in predominantly moderate condition overall based on the PACP rating indices. Most inspected segments (48 of 75 segments, 18,318 LF) fall within the 3.0 to 3.9 overall pipe rating index range, which indicates moderate structural and/or operational deficiencies. These conditions generally do not suggest imminent failure, but they do indicate that the system is aging and will require planned maintenance and medium-term rehabilitation to prevent continued deterioration.

A smaller but important portion of the system shows elevated condition concerns. Specifically, 12 segments totaling about 3,628 LF are rated 4.0 or higher, including 4 segments at 5.0 and 8 segments between 4.0 and 4.9. These are the system's highest-risk assets needing near-term follow-up, condition verification, and rehabilitation planning. The rating summaries also suggest that structural defects are the primary driver of



system condition concerns, while O&M issues are more limited and localized. Structural ratings show a similar concentration in the moderate range, with a subset of segments exhibiting advanced deterioration. In contrast, most segments had no coded O&M defects, indicating that operational problems such as roots, debris, and deposits are present but not widespread across the inspected system.

Overall, the system can be characterized as largely serviceable but aging, with most pipelines requiring monitoring and programmed rehabilitation, and a smaller subset needing more immediate attention to reduce risk and support proactive capital planning.

6.2.2 Summary of Recommendations

The priority scoring system combines the PACP scores for overall pipe rating index, structural rating, and O&M rating, as well as hydraulic capacity constraints identified in the hydraulic model assessment. The base score is overall pipe rating index multiplied by 20. Adjustments add points for structural (up to +10), O&M (up to +10), and capacity constraints (+10), producing a priority score of up to 130 points. Pipe segments were grouped into the planning categories shown in **Table 6-3** based on final Priority Score ranges, providing a structured approach to capital planning and rehabilitation scheduling over the 20-year planning horizon.

Table 6-3. Priority Score Planning Categories

Category	Score Range	Planning Interpretation
0–5 Years	≥ 90	Critical condition and/or hydraulic constraint; near-term rehabilitation
6–10 Years	70–89	Elevated condition; proactive rehabilitation recommended
11–20 Years	50–69	Moderate condition; planned rehabilitation

The PACP report data, priority score, and priority category for each pipeline is shown in a table provided as Attachment 1 to TM 5, which can be found in **Appendix B**.

Table 6-4. Prioritization Results by Diameter and Category

Diameter	Category Total Length (LF)				Total
	0–5 Years	6–10 Years	11–20 Years	Monitor	
6-inch	3,471	7,496	5,958	394	17,320
8-inch	108	3,431	1,698	694	5,930
10-inch	49	2,389	839	0	3,277
12-inch	0	489	0	47	536
Total	3,628	13,805	8,495	1,135	27,064

TM 5 presents planning level cost estimates for the improvements categories included in this condition assessment. It is assumed that these improvements will be funded by the City's on-going Infrastructure Repair and Replacement (R&R) Program (CIP Project A). Additional information can be found in **Chapter 7.0** and TM 5 in **Appendix B**.



7 Collection System Capital Improvement Program (CIP)

The purpose of this chapter is to present a Capital Improvement Program (CIP) that summarizes the recommended improvement projects identified in prior chapters of this Master Plan. Projects are presented chronologically to distribute costs over time in keeping with each project's criticality or other City priorities, but final project inclusion in the adopted Capital Improvement Program and associated dates are approximate and adjustable.

This chapter is divided into the following sections:

- Introduction
- Project Prioritization
- Cost Estimating Methodology
- Proposed Capital Improvement Program (CIP)

7.1 Introduction

Based on the completed hydraulic modeling, pump station inflow and infiltration (I/I) assessment, and condition assessments of the City of Lincoln's wastewater collection system, a prioritized Capital Improvement Program (CIP) was prepared. It's important to note that the CIP represents a snapshot of known/observed conditions as of April 2026. Due to the dynamic nature of the wastewater collection system and operations, project priorities and schedules may change over time. Furthermore, some projects identified will require additional analysis, beyond the scope of this Master Plan to determine the exact extent of the necessary improvements. Finally, the projects and associated costs identified herein are presented in 2026 dollars and should be reviewed and updated on an annual basis using the Engineering News Record Construction Cost Index (ENRCCI) or another recognized index.

The recommended CIP projects are segmented into three categories:

- Condition Improvement Projects: Condition related projects include projects identified from the pump station I/I and condition assessment performed as part of this Master Plan Update and recommendations for the on-going repair and replacement (R&R) program. These projects are categorized alphabetically in the overall CIP.
- Capacity Improvement Projects: Capacity related projects are those identified through hydraulic modeling Scenarios 1 through 5, addressing capacity needs in the existing system and for planned development through the 20-year development window. These projects are categorized numerically in the overall CIP.
- Buildout Improvement Projects: Buildout projects include future infrastructure projects proposed to serve development within the SOI. These projects are grouped and labeled based on the region and village or SUD to which they extend sewer service.



7.2 Project Prioritization

The CIP prioritization for scheduling projects is based on giving the highest priority to those projects that address concerns posing the most risk to the community. The priority ranking follows the sequence of projected development and is as follows:

- 1) The project addresses predicted surcharging above the recommended criteria from limited capacity under current flow conditions or was identified as a condition related project.
- 2) CIP addresses predicted surcharging in the existing system above the recommended criteria as a result of serving future development.
- 3) CIP addresses limited or new capacity to serve future growth through new infrastructure.

7.3 Cost Estimating Methodology

A key element to the CIP planning process is determining budgets for each of the identified capital improvement projects. The projects and associated costs identified herein are presented in April 2026 dollars (Engineering News Record Construction Cost Index [ENRCCI] of 14,158) and should be reviewed and updated on an annual basis using the ENRCCI or another recognized index. The project cost estimates include base construction costs and soft costs. The engineering opinion of probable costs for the wastewater collection system falls under Classification 5 (as defined by Association for the Advancement of Cost Engineering, AACE) with an expected accuracy range of -50% to +100%.

Construction costs were developed based on a combination of equipment quotes supplied from manufacturers, bids on other City wastewater facilities projects, construction cost estimates from similar type construction projects, and standard cost estimating guidelines. Soft costs include a 35 percent mark-up for construction cost estimating and a 30 percent mark-up of the total construction cost for engineering, construction management and administration, which includes engineering design and engineering services during construction, construction administration, construction inspection services, and general administration costs by City.

Similar to the planned infrastructure added to the hydraulic model, (summarized in **Table 5-4**), further expansion of the Lincoln collection system to serve future growth areas will consist of “in-development” improvements needed to collect wastewater and convey it to the City’s trunk system. Planned infrastructure added to the model and future “in-development” improvements are not included in this analysis as they are typically designed and constructed by the specific land developments that occur within the growth areas.

It is assumed that the recommended facilities will be developed in public ROW or on public property. Therefore, land acquisition costs have not been included. Construction cost estimates do not include cost for annual O&M or any allowance for project financing costs. For open-cut gravity sewer construction projects, Stantec’s depth vs diameter unit cost table was used to estimate costs. Stantec’s unit cost database was calibrated to match recent bid estimates provided by the City. These unit costs are assumed to include manholes, excavation/backfill, sheeting and shoring, pipe construction, dewatering, lateral/sewer main connection, repaving, and mobilization/demobilization.



For future pump station facilities, construction costs are capacity-based estimates using cost curves, supplemented with cost information from pump station projects in California. The estimates are representative of average site conditions and normal difficulty of construction. For pump station force main piping the assumed unit rates include excavation/backfill, sheeting and shoring, pipe construction, dewatering, repaving, and mobilization/demobilization. Additional allowances for canal and highway crossings where open cut construction is not allowed are also included. Cost estimates for gravity sewers are further broken out by pipe segment in **Appendix D**.

7.4 Condition Improvement Projects

The condition-related improvement projects include projects identified through condition assessments (**Chapter 1**) to be part of the City's on-going R&R budget, and specific projects developed to address larger lift station rehabilitation needs and I/I improvements identified from the pump station inflow and infiltration assessment (**Section 2.4**). Each project and the associated opinion of probable cost are presented below.

7.4.1 Project A: Infrastructure Repair and Replacement (R&R) Program

A robust repair and replacement (R&R) program is a fundamental component of a well-managed public infrastructure system and should continue alongside major capacity improvement projects. The City's R&R program includes an annual \$3 million investment dedicated to the systematic replacement of aging and deteriorating infrastructure. Replacing the entire sewer collection system at once would require a substantial financial commitment; therefore, the annual R&R allocation is intended to lessen the impact of these costs by addressing critical repair and replacement needs over time. This phased approach allows the City to extend the service life of the system while maintaining reliability and managing long-term costs.

As part of this effort, the existing Capital Improvement Program (CIP) list will be reviewed in coordination with operations and maintenance staff to incorporate their assessments of system needs. Inspections will be performed as necessary, with an emphasis on reevaluating the most critical pending CIP projects. The outcome of this review may include adjustments to project priorities or budgets and may also identify the need for new CIP projects. This effort is not intended to provide a comprehensive condition assessment of the entire system, but rather to update and refine the findings from the previous five-year assessment cycle.

The following items are recommended for inclusion in the City's on-going R&R program:

A.1: The Lift Station O&M Improvements identified in **Table 6-2** and Technical Memorandum No. 4 – Condition Assessment of Lift Stations Technical Memorandum (TM 4) in **Appendix B**. Improvements are identified for seven of the City's lift stations and are less than \$75,000 each.

A.2: Rehabilitation of the Downtown Sewer Pipelines as described in **Section 6.2** and Technical Memorandum No. 5 – Condition Assessment of Downtown Sewer Pipelines (TM 5) in **Appendix B**. The TM identifies priority pipelines and budgets to improve inspected pipelines. The cost to address pipes needing near-term rehabilitation is estimated as \$767,000.

A.3: The I/I Reduction Program described below.



Inflow and Infiltration (I/I) Reduction Program

Like the R&R Program, a comprehensive I/I (Inflow and Infiltration) Reduction Program should continue as a complement to major capital improvements with focused studies similar to those performed for the NRPS and ELPPS as part of this Master Plan Update. The purpose of the I/I program is to provide a structured, ongoing approach to identifying and mitigating sources of excessive inflow and infiltration that contribute to system capacity constraints, operational challenges, and increased treatment costs. The annual I/I program is designed to strategically target the most critical areas over time. By spreading improvements across multiple years, the program helps manage costs while steadily improving system performance and resiliency. The program may also include non-technical measures to further reduce I/I, such as public education programs.

The following five elements are recommended as part of the on-going I/I Reduction Program:

1. **Improve Sewer System Database** – The GIS database should be updated as the first element of this program including physical aspects of the system (pipes, manholes, laterals, etc.) as well as system assessment data (flow records, operation and maintenance logs, groundwater data, etc.)
2. **I/I Flow Monitoring Data** – Flow monitors should be strategically placed to further isolate areas with high I/I and evaluate the impacts of previously implemented I/I reduction projects. Data can also be used to keep the hydraulic model up to date and allow further refinement in unmonitored areas of the system.
3. **Sewer System Field Analysis** – This analysis involves an assessment of I/I sources through field activities using I/I isolation methods described below.
4. **System Remediation Plan** – This phase of the program considers rehabilitation or replacement project options to address sources of high I/I. Options should consider the structural and hydraulic conditions of the sewer system and future capacity requirements.
5. **System Remediation Plan Implementation** – Implementation of the remediation plan entails designing and constructing the rehabilitation and replacement projects, monitoring the results and reviewing the plan as needed.

After implementing I/I reduction projects determined by the program, the process should begin again by updating the sewer system database to include the improvements and data gathered throughout the process.

The following investigation methods are recommended for the sewer system field analysis:

- Find and remove illicit flow from the collection system, such as improperly connected storm drains.
- Conduct structural assessments to establish the degree of physical deterioration of the sewer and to determine the proper rehabilitation or replacement technique, prioritizing aging infrastructure near ravines and drainage courses.
- Perform the following investigation methods:
 - o Smoke Testing
 - o CCTV Inspection/ Leak Location
 - o Rainfall simulation/ Dye testing



7.4.2 Project B: Flightline Drive Lift Station Rehabilitation

The Flightline Drive Lift Station Rehabilitation project is identified as its own CIP project as opposed to being a part of the R&R Program and funding because its budget exceeds \$75,000, the opinion of probable cost is presented in **Table 7-1**. Project details can be found in the condition assessment provided in **Appendix B**.

Table 7-1. Project E: Flightline Drive Lift Station Rehabilitation Opinion of Probable Costs

Item	Description	Cost
1	Replace Submersible Pumps	\$130,000
2	Replace Motor Control Panels (MCC / Control Panel)	\$120,000
3	Add Fall Protection at Wetwell	\$20,000
4	Investigate Autodialer & Water Supply Solenoid Control Systems	\$25,000
5	Add Seals to Conduits Entering Electrical Panels	\$10,000
6	Add Arc Flash Hazard Labels (NEC 110.16(A))	\$8,000
7	I/I Mitigation	\$40,000
	Construction Costs:	\$350,000
8	Construction Estimating Contingency @ 35%	\$123,000
	Total Construction Costs:	\$473,000
9	Engineering, CM, and Admin @ 30%	\$142,000
	Total Project Costs:	\$615,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.

7.4.3 Project C: Nicolaus Road Pump Station (NRPS) I/I Improvements

The NRPS I/I Improvements Project includes conducting a sewer system field analysis and developing and implementing a remediation plan based on the results. The sewer system field analysis includes investigation and prioritization of the pipelines identified from the pump station I/I assessment described in **Section 2.4**. These pipelines are listed in **Table 2-8**. This effort should start with the priority I/I rehabilitation area identified in the assessment (highlighted in **Figure 2-3**).

City staff should perform a review of surface drain connections and their operation at the corporation yard, airport, and industrial facilities as part of the field investigation. Sources of I/I and improvements to mitigate them should be incorporated into Project E: Flightline Drive Lift Station Rehabilitation. Based on the data collected in the field analysis, a final remediation plan should be developed and implemented including rehabilitation or replacement projects to address sources of high I/I. The CIP project cost estimate is estimated as cured-in-place pipe (CIPP) lining of all the sewer pipes identified in the initial pump station I/I assessment. The unit cost for CIPP lining includes bypass pumping, sewer cleaning and CCTV, traffic control, and connects to service laterals and manholes.



Project C: NRPS I/I Improvements opinion of probable cost is presented in **Table 7-2**

Table 7-2. Project C: NRPS I/I Improvements Opinion of Probable Costs

Item	Description	Cost
1	CIPP Lining (6-inch to 8-inch)	\$71,000
2	CIPP Lining (10-inch to 12-inch)	\$990,000
3	CIPP Lining (15-inch to 18-inch)	\$373,000
	Construction Costs:	\$1,434,000
4	Construction Estimating Contingency @ 35%	\$502,000
	Total Construction Costs:	\$1,936,000
5	Engineering, CM, and Admin @ 30%	\$581,000
	Total Project Costs:	\$2,517,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.

7.4.4 Project D: East Lincoln Parkway Pump Station (ELPPS) I/I Improvements

The ELPPS I/I Improvements Project should include the same elements described above for Project C: Nicolaus Road Pump Station (NRPS) I/I Improvements. The following notes are provided for the ELPPS I/I Improvements:

- Smoke testing is recommended to identify the specific sources of I/I in Basin 9B. The sewer stubs in Basin 9B should be inspected to ensure they are watertight.
- The sewer creek crossing between flow monitoring Sites 7 and 10 should be prioritized.
- Sewer pipes identified in the initial pump station I/I assessment are listed in **Table 2-9 (Figure 2-5)**.

Project D: ELPPS I/I Improvements opinion of probable cost is presented in **Table 7-3**.

Table 7-3. Project D: ELPPS I/I Improvements Opinion of Probable Costs

Item	Description	Cost
1	CIPP Lining (6-inch to 8-inch)	\$216,000
2	CIPP Lining (10-inch to 12-inch)	\$346,000
3	CIPP Lining (15-inch to 18-inch)	\$355,000
	Construction Costs:	\$917,000
4	Construction Estimating Contingency @ 35%	\$321,000
	Total Construction Costs:	\$1,238,000
5	Engineering, CM, and Admin @ 30%	\$371,000
	Total Project Costs:	\$1,609,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.



7.5 Capacity Improvement Projects

The capacity improvement projects, CIP Projects 1 through 12, were identified through the hydraulic model assessment under existing and future development conditions through the 20-year level of development scenario. Details of each project are provided in **Chapter 5**. A breakdown of each Project's opinion of probable cost is presented in **Appendix D**.

A summary of the opinions of probable cost for CIP Projects 1 through 12 is presented in **Table 7-4**.

Table 7-4. CIP Capacity Improvement Projects Opinion of Probable Costs

CIP Project	Name	Description	Model Scenario	Total Project Cost
1	Joiner/Twelve Bridges Dr.	Upsize 4,485 LF of 12-inch sewer to 15-inch sewer.	1 (Existing)	\$3,283,000
2	Old Town North Trunk, 5th Street - Joiner Pkwy to R St.	Upsize 1,552 LF of 15-inch sewer to 18-inch sewer.	1 (Existing)	\$1,113,000
3	Chambers Drive Sewer Diversion	62 LF of new 18-inch sewer diverting flow to the 30-inch sewer in Chamber Drive.	2 (5-year)	\$64,000
4	Old Town South Trunk, Alley - Joiner Pkwy to R St.	Upsize 1,627 LF of 15-inch sewer to 18-inch sewer.	2 (5-year)	\$1,139,000
5	Influent Trunk Sewer from Moore and Fiddymont Road	3,284 LF of new 54-inch sewer.	2 (5-year)	\$11,609,000
6	Moore Road Trunk Sewer - Phase I	5,379 LF of new 42-inch sewer.	2 (5-year)	\$14,339,000
7	Virginiatown Road Bypass - Epick Upsizing	663 LF of 8-inch through Epick upsized to 10-inch 902 LF of 10-inch in Virginiatown upsized to 12-inch 1,923 LF of 10-inch bypass sewer in Liberty Lane	4 (15-year)	\$3,164,000
8	Nelson Lane Trunk Sewer	12,871 LF of new 36-inch sewer	4 (15-year)	\$34,187,000
9	Lincoln Square LS Bypass to Nelson Lane	1,651 LF of new 15-inch sewer	4 (15-year)	\$1,879,000
10	NRPS Bypass to Nelson Lane	75 LF of 10-inch sewer 895 LF of 15-inch sewer 1,840 LF of 18-inch sewer	4 (15-year)	\$3,717,000
11	Moore Road Trunk Sewer - Phase II	2,581 LF of new 36-inch sewer	4 (15-year)	\$3,827,000
12	N. Village 5/SUD-A PS and Dual Force Main	7.2 MGD pump station and 9,045 LF of dual 18-inch force main	4 (15-year)	\$35,100,000
Total:				\$113,421,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.



7.6 Buildout Improvement Projects

The buildout sewer system extends service to the northeast, northwest, and southwest regions of the SOI. The servicing strategy and proposed CIP projects for each are discussed in **Section 5.4**. A breakdown of each Project's opinion of probable cost is presented in **Appendix D**.

7.6.1 Northeast

The northeast sewer projects extend service to Village 2 and Village 3. The opinions of probable cost for the projects in region are summarized in **Table 7-5** and **Table 7-6**.

below.

Table 7-5. Village 2 CIP Projects Opinion of Probable Costs

CIP Project(s)	Description	Total Project Costs:
V2-PS	Village 2 Pump Station (2.8 MGD)	\$6,423,000
V2-FM	10-inch Dual Force Main	\$4,254,000
V2/V3-FM	18-inch Dual Force Main	\$5,896,000
V2-1	21-inch Sewer	\$5,073,000
V2-2	15-inch Sewer	\$4,047,000
V2-3, V2-4, V2-5	12-inch Sewer	\$9,057,000
Total:		\$34,750,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.

Table 7-6. Village 3 CIP Projects Opinion of Probable Costs

CIP Project(s)	Description	Total Project Costs:
V3-PS	Village 3 Pump Station (5.5 MGD)	\$10,670,000
V3-FM-1, V3-FM-2	15-inch Dual Force Main	\$26,469,000
V3-1, V3-6	24-inch Sewer	\$12,249,000
V3-2	18-inch Sewer	\$3,078,000
V3-7	15-inch Sewer	\$1,330,000
V3-3, V3-4 V3-5, V3-8, V3-9	12-inch Sewer	\$24,314,000
Total:		\$78,110,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.



7.6.2 Northwest

The northwest sewer projects extend service to SUD-A and Village 4. The opinions of probable cost for the projects in region are summarized in **Table 7-7** and **Table 7-8** below.

Table 7-7. SUD-A CIP Projects Opinion of Probable Costs

CIP Project(s)	Description	Total Project Costs:
SUDA-1	30-inch Sewer	\$6,774,000
SUDA-2	24-inch Sewer	\$2,236,000
SUDA-3, SUDA-4	21-inch Sewer	\$7,632,000
SUDA-5	18-inch Sewer	\$3,140,000
SUDA-6	15-inch Sewer	\$2,350,000
SUDA-8, SUDA-9, SUDA-10	12-inch Sewer	\$7,983,000
Total:		\$30,115,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.

Table 7-8. Village 4 CIP Projects Opinion of Probable Costs

CIP Project(s)	Description	Total Project Costs:
V4-PS-1	Village 4 Pump Station 1 (3.2 MGD)	\$7,090,000
V4-PS-2	Village 4 Pump Station 2 (1.1 MGD)	\$3,177,000
V4-FM-1	10-inch Dual Force Main	\$7,366,000
V4-FM-2	6-inch Dual Force Main	\$1,425,000
V4-1	24-inch Sewer	\$2,487,000
V4-2	18-inch Sewer	\$2,159,000
V4-3, V4-4, V4-8	15-inch Sewer	\$3,614,000
V4-5, V4-6, V4-7, V4-9, V4-10, V4-11	12-inch Sewer	\$16,400,000
Total:		\$43,718,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.



7.6.3 Southwest

The southwest sewer projects extend service to SUD-C and Village 6. The opinions of probable costs for the projects in region are summarized in **Table 7-9** and **Table 7-10** below.

Table 7-9. SUD-C CIP Projects Opinion of Probable Costs

CIP Project(s)	Description	Total Project Costs:
V6/SUDC-PS	Village 6/SUD-C Pump Station (5.4 MGD)	\$10,495,000
V6/SUDC-FM	15-inch Dual Force Main	\$9,247,000
V6/SUDC-1	30-inch Sewer	\$1,001,000
SUDC-1, SUDC-2	18-inch Sewer	\$6,129,000
SUDC-3	12-inch Sewer	\$3,439,000
Total:		\$30,311,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.

Table 7-10. Village 6 CIP Projects Opinion of Probable Costs

CIP Project(s)	Description	Total Project Costs:
V6-PS	Village 6 Pump Station (1.6 MGD)	\$4,212,000
V6-FM	8-inch Dual Force Main	\$6,552,000
V6-1	21-inch Sewer	\$3,311,000
V6-4	18-inch Sewer	\$2,756,000
V6-2, V6-5	15-inch Sewer	\$4,398,000
V6-3, V6-6	12-inch Sewer	\$4,995,000
Total:		\$43,718,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.

7.7 Capital Improvement Program (CIP) Overview

An overview of the wastewater collection system CIP projects is shown on **Figure 7-1**. The 20-year CIP program is shown as **Table 7-11**, the implementation of projects will ultimately depend on the actual timing of future development. Buildout projects are assumed to occur at the time of development, buildout service areas dependent on the 20-year CIP projects are noted in **Table 7-11**. Opinion of probable costs for all projects are summarized in **Table 7-12** and **Table 7-13**.



Sewer Master Plan Update

7 Collection System Capital Improvement Program (CIP)

Table 7-11. 20-year Capital Improvement Program (CIP)

CIP ID	Name	0-5 Years	6-10 Years	11-15 Years	16-20 Years	Service Area(s)
<i>Condition Improvement Projects</i>						
A	Infrastructure Repair and Replacement (R&R) Program	Annual Budget: \$3,000,000 (including A.1 to A.3)				Existing/Future
A.1	Lift Station O&M Improvements (Appendix B: TM 4)	Items identified to be included in the overall R&R Program.				Existing
A.2	Rehabilitation of Downtown Sewer Pipelines (Appendix B: TM 5)					Existing
A.3	Inflow and Infiltration (I/I) Reduction Program					Existing
B	Flightline Drive Lift Station Rehabilitation	\$615,000				Existing
C	Nicolaus Road Pump Station (NRPS) I/I Improvements	\$2,517,000				Existing
D	East Lincoln Parkway Pump Station (ELPPS) I/I Improvements	\$1,609,000				Existing
<i>Capacity Improvement Projects</i>						
1	Joiner/Twelve Bridges Dr.	\$3,283,000				Existing
2	Old Town North Trunk, 5th Street - Joiner Pkwy to R St.	\$1,113,000				Existing
3	Chambers Drive Sewer Diversion	\$64,000				Existing
4	Old Town South Trunk, Alley - Joiner Pkwy to R St.	\$1,139,000				Existing
5	Influent Trunk Sewer from Moore and Fiddymont Road		\$11,609,000			Existing, Village 4, 5, & 6 SUD A & C
6	Moore Road Trunk Sewer - Phase I		\$14,339,000			Village 5, 6, SUD C
7	Virginiatown Road Bypass - Epick Upsizing			\$3,164,000		Existing, North Village 1
8	Nelson Lane Trunk Sewer			\$34,187,000		Existing, Village 4, 5, SUD A
9	Lincoln Square LS Bypass to Nelson Lane			\$1,879,000		Existing
10	NRPS Bypass to Nelson Lane			\$3,717,000		Existing
11	Moore Road Trunk Sewer - Phase II				\$3,827,000	Village 5, 6, SUD C
12	N. Village 5/SUD-A PS (7.2 MGD) and Dual 18-inch Force Main				\$35,100,000	Village 4, 5, SUD A
Total:		\$10,340,000	\$25,948,000	\$42,947,000	\$38,927,000	

1. ENRCCI = 14,158, cost details provided in **Appendix D**.



Sewer Master Plan Update

7 Collection System Capital Improvement Program (CIP)

Table 7-12. Capital Improvement Program (CIP) Costs – 5-year to 20-year Condition and Capacity Projects

CIP ID	Name	Base Construction Costs	Construction Estimating Contingency @ 35%	Total Construction Costs:	Engineering, CM, and Admin @ 30%	Total Project Costs:
<i>Condition Improvement Projects</i>						
A	Infrastructure Repair and Replacement (R&R) Program	Annual Budget: \$3,000,000 (including A.1 to A.3)				
A.1	Lift Station O&M Improvements (Appendix B: TM 4)	Items identified in this Master Plan Update to be included in the overall R&R Program.				
A.2	Rehabilitation of Downtown Sewer Pipelines (Appendix B: TM 5)					
A.3	Inflow and Infiltration (I/I) Reduction Program					
B	Flightline Drive Lift Station Rehabilitation	\$350,000	\$123,000	\$473,000	\$142,000	\$615,000
C	Nicolaus Road Pump Station (NRPS) I/I Improvements	\$1,434,000	\$502,000	\$1,936,000	\$581,000	\$2,517,000
D	East Lincoln Parkway Pump Station (ELPPS) I/I Improvements	\$917,000	\$321,000	\$1,238,000	\$371,000	\$1,609,000
<i>Capacity Improvement Projects</i>						
1	Joiner/Twelve Bridges Dr.	\$1,870,000	\$655,000	\$2,525,000	\$758,000	\$3,283,000
2	Old Town North Trunk, 5th Street - Joiner Pkwy to R St.	\$634,000	\$222,000	\$856,000	\$257,000	\$1,113,000
3	Chambers Drive Sewer Diversion	\$36,000	\$13,000	\$49,000	\$15,000	\$64,000
4	Old Town South Trunk, Alley - Joiner Pkwy to R St.	\$649,000	\$227,000	\$876,000	\$263,000	\$1,139,000
5	Influent Trunk Sewer from Moore and Fiddymment Road	\$6,615,000	\$2,315,000	\$8,930,000	\$2,679,000	\$11,609,000
6	Moore Road Trunk Sewer - Phase I	\$8,170,000	\$2,860,000	\$11,030,000	\$3,309,000	\$14,339,000
7	Virginiatown Road Bypass - Epick Upsizing	\$1,803,000	\$631,000	\$2,434,000	\$730,000	\$3,164,000
8	Nelson Lane Trunk Sewer	\$19,480,000	\$6,818,000	\$26,298,000	\$7,889,000	\$34,187,000
9	Lincoln Square LS Bypass to Nelson Lane	\$1,070,000	\$375,000	\$1,445,000	\$434,000	\$1,879,000
10	NRPS Bypass to Nelson Lane	\$2,118,000	\$741,000	\$2,859,000	\$858,000	\$3,717,000
11	Moore Road Trunk Sewer - Phase II	\$2,181,000	\$763,000	\$2,944,000	\$883,000	\$3,827,000
12	N. Village 5/SUD-A PS (7.2 MGD) and Dual 18-inch Force Main	\$20,000,000	\$7,000,000	\$27,000,000	\$8,100,000	\$35,100,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.



Sewer Master Plan Update

7 Collection System Capital Improvement Program (CIP)

Table 7-13. Capital Improvement Program (CIP) Costs – Buildout Projects

CIP ID	Name	Base Construction Costs	Construction Estimating Contingency @ 35%	Total Construction Costs:	Engineering, CM, and Admin @ 30%	Total Project Costs:
<i>Northeast - Village 2</i>						
V2-PS	Village 2 Pump Station (2.8 MGD)	\$3,660,000	\$1,281,000	\$4,941,000	\$1,482,000	\$6,423,000
V2-FM	10-inch Dual Force Main	\$2,424,000	\$848,000	\$3,272,000	\$982,000	\$4,254,000
V2/V3-FM	18-inch Dual Force Main	\$3,359,000	\$1,176,000	\$4,535,000	\$1,361,000	\$5,896,000
V2-1	21-inch Sewer	\$2,890,000	\$1,012,000	\$3,902,000	\$1,171,000	\$5,073,000
V2-2	15-inch Sewer	\$2,306,000	\$807,000	\$3,113,000	\$934,000	\$4,047,000
V2-3	12-inch Sewer	\$1,171,000	\$410,000	\$1,581,000	\$474,000	\$2,055,000
V2-4	12-inch Sewer	\$1,555,000	\$544,000	\$2,099,000	\$630,000	\$2,729,000
V2-5	12-inch Sewer	\$2,435,000	\$852,000	\$3,287,000	\$986,000	\$4,273,000
<i>Northeast - Village 3</i>						
V3-PS	Village 3 Pump Station (5.5 MGD)	\$6,080,000	\$2,128,000	\$8,208,000	\$2,462,000	\$10,670,000
V3-FM-1	15-inch Dual Force Main	\$11,366,000	\$3,978,000	\$15,344,000	\$4,603,000	\$19,947,000
V3-FM-2	15-inch Dual Force Main	\$3,716,000	\$1,301,000	\$5,017,000	\$1,505,000	\$6,522,000
V3-1	24-inch Sewer	\$3,490,000	\$1,222,000	\$4,712,000	\$1,414,000	\$6,126,000
V3-2	18-inch Sewer	\$1,754,000	\$614,000	\$2,368,000	\$710,000	\$3,078,000
V3-3	12-inch Sewer	\$1,270,000	\$445,000	\$1,715,000	\$515,000	\$2,230,000
V3-4	12-inch Sewer	\$2,723,000	\$953,000	\$3,676,000	\$1,103,000	\$4,779,000
V3-5	12-inch Sewer	\$1,016,000	\$356,000	\$1,372,000	\$412,000	\$1,784,000
V3-6	24-inch Sewer	\$3,489,000	\$1,221,000	\$4,710,000	\$1,413,000	\$6,123,000
V3-7	15-inch Sewer	\$758,000	\$265,000	\$1,023,000	\$307,000	\$1,330,000
V3-8	12-inch Sewer	\$3,104,000	\$1,086,000	\$4,190,000	\$1,257,000	\$5,447,000
V3-9	12-inch Sewer	\$5,740,000	\$2,009,000	\$7,749,000	\$2,325,000	\$10,074,000



Sewer Master Plan Update

7 Collection System Capital Improvement Program (CIP)

CIP ID	Name	Base Construction Costs	Construction Estimating Contingency @ 35%	Total Construction Costs:	Engineering, CM, and Admin @ 30%	Total Project Costs:
<i>Northwest - SUD-A</i>						
SUDA-1	30-inch Sewer	\$3,860,000	\$1,351,000	\$5,211,000	\$1,563,000	\$6,774,000
SUDA-2	24-inch Sewer	\$1,274,000	\$446,000	\$1,720,000	\$516,000	\$2,236,000
SUDA-3	21-inch Sewer	\$2,343,000	\$820,000	\$3,163,000	\$949,000	\$4,112,000
SUDA-4	21-inch Sewer	\$2,006,000	\$702,000	\$2,708,000	\$812,000	\$3,520,000
SUDA-5	18-inch Sewer	\$1,789,000	\$626,000	\$2,415,000	\$725,000	\$3,140,000
SUDA-6	15-inch Sewer	\$1,339,000	\$469,000	\$1,808,000	\$542,000	\$2,350,000
SUDA-7	12-inch Sewer	\$1,031,000	\$361,000	\$1,392,000	\$418,000	\$1,810,000
SUDA-8	12-inch Sewer	\$1,170,000	\$410,000	\$1,580,000	\$474,000	\$2,054,000
SUDA-9	12-inch Sewer	\$1,290,000	\$452,000	\$1,742,000	\$523,000	\$2,265,000
SUDA-10	12-inch Sewer	\$1,056,000	\$370,000	\$1,426,000	\$428,000	\$1,854,000
<i>Northwest - Village 4</i>						
V4-PS-1	Village 4 Pump Station 1 (3.2 MGD)	\$4,040,000	\$1,414,000	\$5,454,000	\$1,636,000	\$7,090,000
V4-FM-1	10-inch Dual Force Main	\$4,197,000	\$1,469,000	\$5,666,000	\$1,700,000	\$7,366,000
V4-1	24-inch Sewer	\$1,417,000	\$496,000	\$1,913,000	\$574,000	\$2,487,000
V4-2	18-inch Sewer	\$1,230,000	\$431,000	\$1,661,000	\$498,000	\$2,159,000
V4-3	15-inch Sewer	\$940,000	\$329,000	\$1,269,000	\$381,000	\$1,650,000
V4-4	15-inch Sewer	\$880,000	\$308,000	\$1,188,000	\$356,000	\$1,544,000
V4-5	12-inch Sewer	\$1,087,000	\$380,000	\$1,467,000	\$440,000	\$1,907,000
V4-6	12-inch Sewer	\$2,354,000	\$824,000	\$3,178,000	\$953,000	\$4,131,000
V4-7	12-inch Sewer	\$1,520,000	\$532,000	\$2,052,000	\$616,000	\$2,668,000
V4-PS-2	Village 4 Pump Station 2 (1.1 MGD)	\$1,810,000	\$634,000	\$2,444,000	\$733,000	\$3,177,000
V4-FM-2	6-inch Dual Force Main	\$812,000	\$284,000	\$1,096,000	\$329,000	\$1,425,000
V4-8	15-inch Sewer	\$239,000	\$84,000	\$323,000	\$97,000	\$420,000
V4-9	12-inch Sewer	\$1,302,000	\$456,000	\$1,758,000	\$527,000	\$2,285,000
V4-10	12-inch Sewer	\$970,000	\$340,000	\$1,310,000	\$393,000	\$1,703,000
V4-11	12-inch Sewer	\$2,112,000	\$739,000	\$2,851,000	\$855,000	\$3,706,000



Sewer Master Plan Update

7 Collection System Capital Improvement Program (CIP)

CIP ID	Name	Base Construction Costs	Construction Estimating Contingency @ 35%	Total Construction Costs:	Engineering, CM, and Admin @ 30%	Total Project Costs:
<i>Southwest - SUD-C</i>						
V6/SUDC-PS	Village 6/SUD-C Pump Station (5.4 MGD)	\$5,980,000	\$2,093,000	\$8,073,000	\$2,422,000	\$10,495,000
V6/SUDC-FM	15-inch Dual Force Main	\$5,269,000	\$1,844,000	\$7,113,000	\$2,134,000	\$9,247,000
V6/SUDC-1	30-inch Sewer	\$570,000	\$200,000	\$770,000	\$231,000	\$1,001,000
SUDC-1	18-inch Sewer	\$1,724,000	\$603,000	\$2,327,000	\$698,000	\$3,025,000
SUDC-2	18-inch Sewer	\$1,769,000	\$619,000	\$2,388,000	\$716,000	\$3,104,000
SUDC-3	12-inch Sewer	\$1,959,000	\$686,000	\$2,645,000	\$794,000	\$3,439,000
<i>Southwest - Village 6</i>						
V6-PS	Village 6 Pump Station (1.6 MGD)	\$2,400,000	\$840,000	\$3,240,000	\$972,000	\$4,212,000
V6-FM	8-inch Dual Force Main	\$3,733,000	\$1,307,000	\$5,040,000	\$1,512,000	\$6,552,000
V6-1	21-inch Sewer	\$1,887,000	\$660,000	\$2,547,000	\$764,000	\$3,311,000
V6-2	15-inch Sewer	\$1,194,000	\$418,000	\$1,612,000	\$484,000	\$2,096,000
V6-3	12-inch Sewer	\$1,161,000	\$406,000	\$1,567,000	\$470,000	\$2,037,000
V6-4	18-inch Sewer	\$1,570,000	\$550,000	\$2,120,000	\$636,000	\$2,756,000
V6-5	15-inch Sewer	\$1,312,000	\$459,000	\$1,771,000	\$531,000	\$2,302,000
V6-6	12-inch Sewer	\$1,685,000	\$590,000	\$2,275,000	\$683,000	\$2,958,000

1. ENRCCI = 14,158, cost details provided in **Appendix D**.



Sewer Master Plan Update

7 Collection System Capital Improvement Program (CIP)

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Appendices



Appendix A

Post 2018 Master Plan Collection System Planning Details



Appendix A Post 2018 Master Plan Collection System Planning Details

Sewerage of the Silver Spur Service Area Preliminary Engineering (11/27/2018)

This study used the hydraulic model to develop preliminary servicing alternatives for the area currently served by the Silver Spur Lift Station. Sewers between the Silver Spur lift station and the sewer in East 12th Street were added to the model as part of this evaluation. This includes the sewers in Silver Spur Circle, Blacksmith Avenue, and Buckboard Drive. The evaluation considered alternatives that directed flow to the WWTRF through lift station improvements or by constructing new open channel flow sewers. Lift station improvements were ultimately implemented by the City.

The as-built or record drawings that were initially used to develop the model in the area of 12th Street and Virginiatown Road were outdated by those discovered as part of this preliminary design report. As a result, manhole invert elevations and pipe slopes were adjusted in the model to reflect those presented in the latest version of the record drawings. Portions of the upstream collection system were also added to the model to further refine flow distributions within the collection system in the 12th Street area. As a result of these adjustments, CIP 4 from the 2018 Master Plan was revised to reflect capacity improvements required under the revised conditions.

Prunella Court Sewer Capacity Evaluation (12/18/2018)

This study evaluated sewer service from the Crocker Knoll and Hidden Hills development areas through the existing City sewer system with a connection at the 10-inch sewer stub-out near Prunella Court. To assess available capacity in the sewers terminating in the Prunella 10-inch sewer stub-out, sewer GIS data was used to add sewers to the City model, extending new sewers from Sun City Boulevard to Prunella Court. The results of the model simulations indicated that the existing sewers, with infill of vacant areas within city limits (excluding Crocker Knoll), consumed the full flow capacity of the existing sewers.

The evaluation affirmed the 2018 Master Plan recommendation for a new sewer line to be constructed in the Oak Tree Lane corridor that would tie into the 42-inch sewer in McBean Park Drive (Regional Trunk Sewer). This would provide sufficient capacity for the developments and the surrounding area. Based on the hydraulic profile of the sewers downstream of the Prunella Court sewer stub, surcharging appeared to be less than a foot above the pipe crown as a result of adding flow from the developments. It is likely that the City accepted this level of predicted surcharge in order to avoid costs associated with constructing the recommended sewer in Oak Tree Lane.

Lincoln Parkway Sewer Lift Station Expansion – Pump Evaluation Preliminary Design (2/19/2019)

Stantec re-evaluated the buildout capacity requirements of the East Lincoln Parkway Pump Station (ELPPS) using the hydraulic model as part of the preliminary design report of the lift station expansion project. As part of the evaluation, the City's hydraulic model was expanded to include all main branches



Sewer Master Plan Update

Appendix A Post 2018 Master Plan Collection System Planning Details

of the sewer system upstream of the lift station. The ELPPS collection area was re-delineated within the model to reflect actual conditions imposed by recent developments.

The lift station service area was expanded by incorporating Twelve Bridges Village 1, Village 2, Village 4, and Education Foundation (Village 11); in addition to portions of Village 10, Tramonte, and Piamonte developments. These areas were previously assumed to be served by gravity sewers downstream of the lift station. Specific plan information was provided for the developments and flow projections were updated based on the approved number of equivalent dwelling units (EDU). A total of 1,650 EDUs were added to the service area, adding approximately 0.40 MGD to the projected buildout ADWF of the ELPPS.

The updated model predicted that the ELPPS will experience a peak wet-weather flow (PWWF) of 5.8 MGD, under 10-year, 24-hour storm conditions, an increase of approximately 1.1 MGD from that predicted in the 2018 Master Plan.

Lincoln Meadows – Wastewater Collection System Capacity Assessment (6/20/2019) & Lincoln Meadows/ Virginiatown Road Flow Monitoring Study (5/12/2020)

The Lincoln Meadows Capacity Assessment expanded the sewer model to include 8- and 10-inch sewers upstream of the intersection of Harrison Avenue and Virginiatown Road, which are tributary to the E Street trunk sewer. This included those associated with the Lincoln Highland and Cresleigh subdivisions. The capacity assessment considered the impacts of adding flow from the Lincoln Meadows subdivision, which was beyond the buildout boundaries of the service area considered in the 2018 Master Plan. The E Street trunk sewer was previously identified as a capacity constraint, and CIP 4 was proposed to address this. The evaluation ran several model scenarios and ultimately recommended significant collection system improvements would be required as part of CIP 4 to allow service to Lincoln Meadows.

The model, calibrated with 2017 flow data, assumed consistent I/I conditions across the E Street trunk service area. To refine the distribution of I/I within E Street trunk service area and validate the results of the Lincoln Meadows Capacity Assessment, a flow monitoring study was conducted. The results confirmed significant I/I contributions from the upstream area where Lincoln Meadows would connect, reinforcing the need for CIP 4 unless I/I could be substantially reduced.

North Village 1 Sewer Service Analysis & E Street Trunk Capacity Assessment (11/21/2020)

This study consisted of a sewer service analysis for the City's northern Village 1 development area and a capacity assessment of the downstream E Street Trunk sewer building on prior studies. The sewer service analysis presented alternative sewer servicing strategies for the portion of the Village 1 development area that lies north of Auburn Ravine. These alternatives consider serving the area through the existing sewer collection system with a point of connection (POC) in the northeast corner of the City.

The 2018 Master Plan proposed serving the northern Village 1 development area through a new sewer alignment that originates from the existing collection system at the southeast corner of Village 1, which is tributary to the Regional Trunk sewer in McBean Park Drive. The proposed alignment runs through the



South Village 1 development area before crossing Auburn Ravine to reach the North Village 1 development area. The alternative servicing approach would eliminate the need to construct another sewer crossing in Auburn Ravine and mitigate environmental costs, future I/I issues, construction risks and other operational concerns related to having a sewer in the creek corridor.

The E Street Trunk sewer capacity assessment evaluates the available sewer capacity in this portion of the system and identifies downstream impacts associated with the expanded service area and each Village 1 sewer service alternative. The projected wastewater flow estimate associated with North Village 1 was confirmed to reflect the most recent planning information. Since the development of the 2018 Master Plan, this portion of the collection system has been further studied and refined within the model, per the previously described studies. After the completion of the North Village 1 Sewer Service Analysis & E Street Trunk Capacity Assessment, the City's collection system model included all sewers known to exist at that time upstream of the intersection of 12th Street and East Avenue and portions of the original model had been updated per record drawings.

The assessment concludes that to expand the service area, CIP 4 must also be expanded to provide capacity to convey the additional flow to the point where residual capacity exists in the downstream E Street Trunk, or I/I reduced, or new sewer branches extending from this point must be constructed to serve the expanded areas.

Evaluation of the Independence Pump Station Capacity (11/24/2021)

Stantec reviewed the proposed plans and sewer servicing strategies for the development associated with the Independence Pump Station. The pump station serves 194 acres within City Limits and ties into the existing Nicolaus Road Pump Station (NRPS) force main. The proposed system was modeled based on submittal drawings. The study also evaluated the developer's wastewater flow estimates, sewer system, the impact to NRPS pump station and force main, and impacts to the recommendations presented in the 2018 Master Plan.

The report notes that expanding the NRPS service area beyond that considered in the 2018 Master Plan would exacerbate the capacity issues predicted at the NRPS under future development conditions. The NRPS is identified to be approaching its reliable pumping capacity. Expanding the sewer-shed and allowing another pump station connection to a common force main increases the need for additional capacity and reduces its existing reliable capacity. The most recent capacity improvement project at the NRPS was challenging due to limited space and depth, but a cost-effective option was identified. Expanding the NRPS capacity further would require significant structure and electrical improvements.



Appendix B

City of Lincoln – Master Plan Update Technical Memorandums



SITE 01A

Site Information

MH ID: NW319SS03

Location: 3004 Nicolaus Rd, Lincoln

Coordinates: 121.3359°

Rlm Elevation: 117 feet

Expected Pipe Diameter: 10 inch

Measured Pipe Diameter: 10 inch

ADWF: 0.016

Peak Measured Flow: 0.14

Sediment: None

TM 1.

Flow Monitoring Plan



Sanitary Map

Flow Sketch



Street View



Plan View

To:	Araceli Cazarez	From:	Breanna Webb
	City of Lincoln		Stantec Consulting Services, Inc.
Project/File:	Sewer Master Plan Update	Date:	February 25, 2025

TECHNICAL MEMORANDUM NO. 1 – FLOW MONITORING PLAN

The purpose of this Technical Memorandum m No. 1 (TM 1) is to present the overall 2025 Flow Monitoring Plan developed by Stantec Consulting Services, Inc. (Stantec) to monitor flow in the collections system as part of the City of Lincoln (City) Sewer Master Plan Update. The Flow Monitoring Plan identifies locations to monitor flow within the collection system, the plan approach, collection areas, and the number of selected flow monitors. At this time, the monitors are already in place, as coordinated and approved by the City. This memo is to document the process of evaluating the monitor placement, and details of their placement.

Stantec's subconsultant V&A and Associates (V&A) performed site visits to verify the accessibility and coordination concerns at the proposed flow monitoring locations. The monitors were installed without incident and are currently collecting flow data. This data will be used to recalibrate the trunk sewer model reflecting current wet-weather conditions in the collection system. The flow data will also support the completeness of the collection system assessment by providing insights related to localized inflow and infiltration (I/I) of the collection system and aid in developing flow projection criteria.

Stantec will also obtain and analyze available flow data from the Lincoln-SMD1 Wastewater Authority (LiSWA) wastewater treatment and reclamation facility (WWTRF) and discharge from the SMD1 Regional Pump Station in order to balance the total flow in the City's collection system.

This TM is divided into the following sections:

- Plan Approach
- 2025 Flow Monitoring Plan

1 Plan Approach

The City's two goals in the development of the Flow Monitoring Plan and data collection include 1) to collect flow monitoring data sufficient to recalibrate the collection system model, and 2) perform an I/I assessment at the two major pump stations in the collection system, the Nicolaus Road Pump Station (NRPS) and the East Lincoln Parkway Pump Station (ELPPS). Based on these goals and the available budget, V&A provided several options for their services. The options included a single mobilization effort to monitor flow for the longest duration at the most locations, or two separate mobilization efforts and durations to address each of the City's goals.

Reference: Flow Monitoring Plan

The first option of a single effort was selected, and a plan was developed to monitor flow at twelve locations within the collection system for a duration of 8-weeks. This option was selected as opposed to splitting the monitoring in two separate durations based on the following considerations:

- Reduce the amount of budget attributed to mobilization activities, such as installation and traffic control, allowing more flow monitors to be included for the budget
- Allows the monitors to be installed for the longest duration, which provides the best chance of capturing rainfall events
- Provides a consistent timeline for all the data, reducing error associated with the model calibration process
- To address the pump station I/I analysis, flow monitors are placed in the upstream collection area allowing I/I to be measured in the pump station collection shed.

The starting point for developing the flow monitoring plan was to review the flow monitoring that was conducted as part of the 2018 Wastewater Collection System Master Plan (2018 Master Plan) effort. The City monitored flow within the collection system from January 4, 2017 to March 7, 2017. This work was also conducted by V&A and summarized in a technical report dated May 2017. Open channel flow monitoring was performed at nine sites and volumetric-time flow monitoring was performed at two pump stations with state-loggers. The quality of the data collected at these nine locations was reviewed. Some sewersheds were combined to allow for more monitors to be placed upstream of the pump stations for the I/I analysis to be performed.

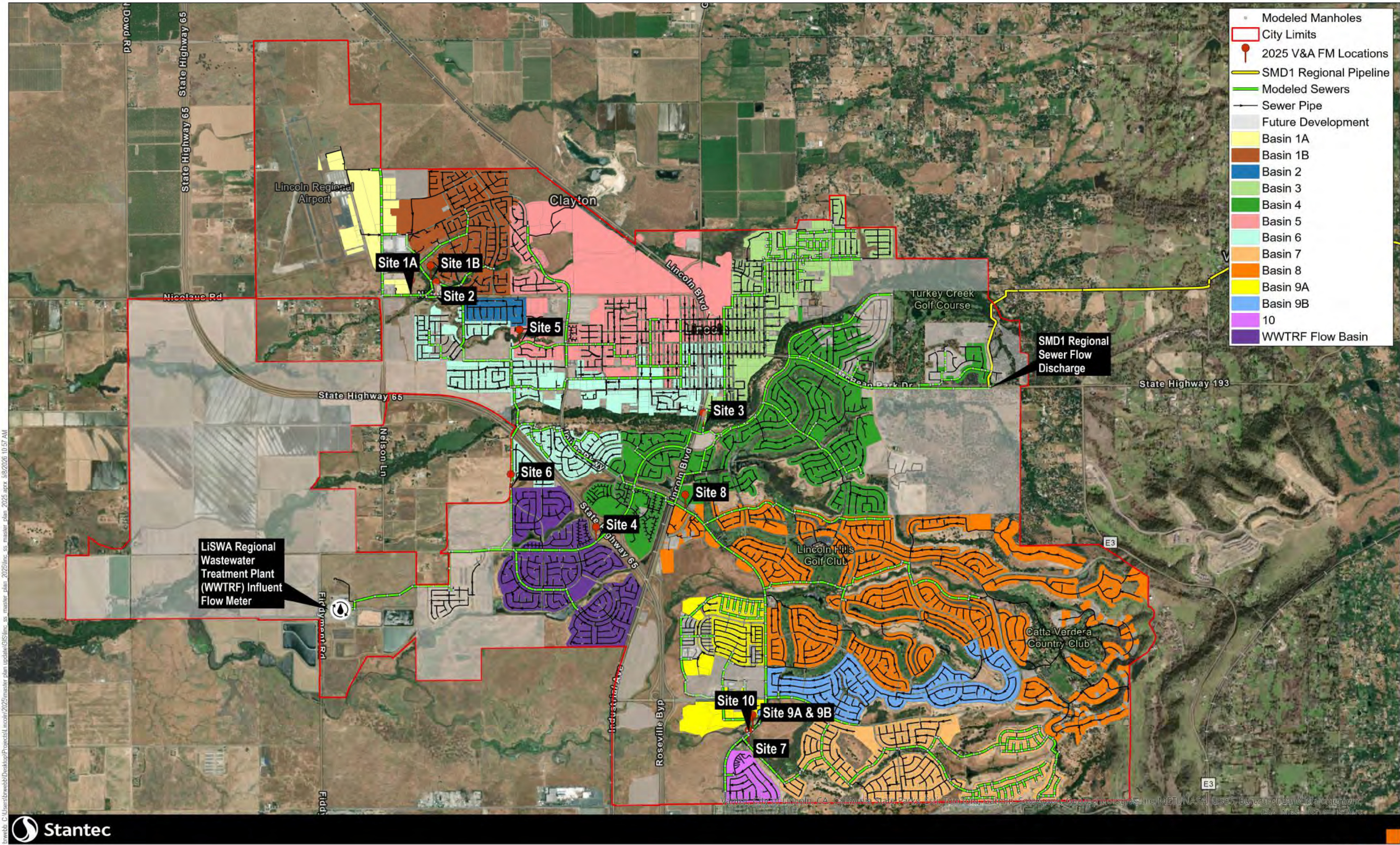
2 2025 Flow Monitoring Plan

The flow monitoring locations for the 2025 Flow Monitoring Plan are summarized in **Table 2-1** and shown on **Figure 2-1**. Several sites remain the same as were used in the 2018 Master Plan: these sites include Site 3, Site 6, and Site 8. The total of flows recorded upstream of the pump stations are also equal to Sites 1 (NRPS) and 10 (ELPPS) from the 2018 Master Plan. Sites 1A, 1B, and 2 will delineate flow upstream of the NRPS and Sites 7, 9A, 9B, and 10 will delineate flow upstream of the ELPPS. The data collected upstream of the lift stations will be used in the lift station I/I evaluation. As previously mentioned, the remaining sites were adjusted to refine the data and the corresponding model calibration. Flow monitors were installed on February 10th, 2025 and will be removed on April 8th, 2025.

Reference: Flow Monitoring Plan

Table 2-1. Flow Monitoring Locations for the 2025 Flow Monitoring Plan

Flow Monitor	Manhole ID	Pipe Size (in)	Monitored Pipe	Area (Acres)	Description
Site 1A	NW319SS03	10	West Inlet	160	Aviation/Lincoln Regional Airport (NRPS)
Site 1B	NW318SS03	15	Southeast Outlet	349	Markham Ravine Drainage (NRPS)
Site 2	NW319SS07	18	East Inlet	51	Abbyhill Road Subdivision (NRPS)
Site 3	SE459SS29	30	North Inlet	394	E Street and 12th Street
Site 4	SW428SS01	48	Northeast Inlet	743	Sun City & North Regional Sewer Subdivisions (North of Joiner Parkway)
Site 5	NW388SS01	24	Northeast Inlet	793	5th Street and Joiner Parkway
Site 6	SW359SS001	36	North Inlet	512	1st Street and Moore Road
Site 7	R13060	15	Southeast Inlet	420	South Twelve Bridges (ELPPS)
Site 8	SE461SS09	24	Southeast Inlet	1,164	Stoneridge Golf Club/Country Club
Site 9A	SE502SS10	15	Northwest Inlet	232	Bella Breeze Developments (ELPPS)
Site 9B	SE502SS10	12	Northeast Inlet	255	Spring Valley and Parkside (ELPPS)
Site 10	SE502SS11	15	Southwest Inlet	71	Southwest Twelve Bridges (ELPPS)
WWTRF	Influent PS	Influent Flow Meter	NA	420	South Regional Sewer Subdivisions (South of Joiner Parkway)
SMD1	Regional PS	Discharge Flow Meter	NA	NA	SMD1 Service Area Flow



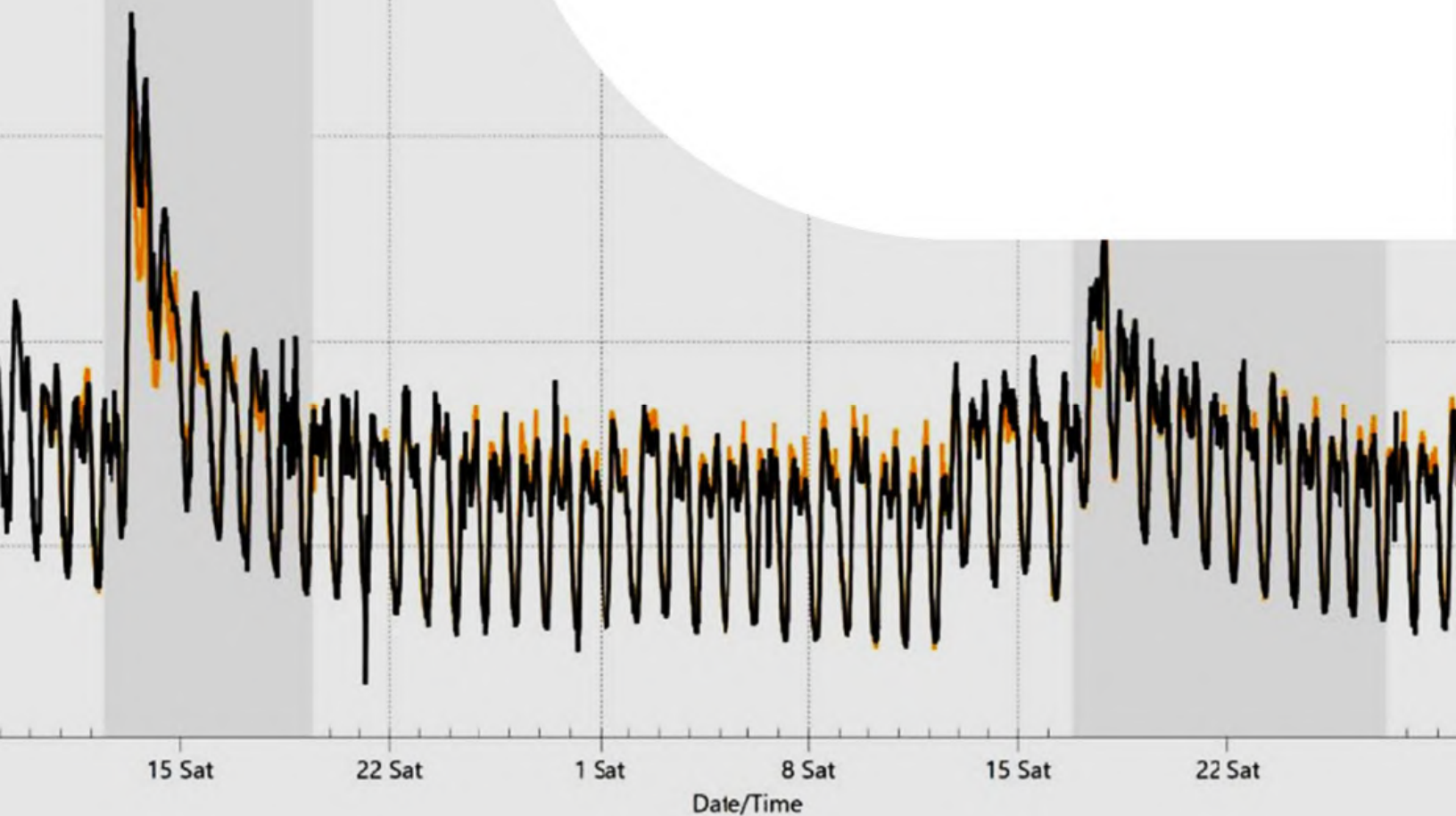
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FIGURE 2-1
2025 FLOW MONITORING LOCATIONS
 CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

CDEC LNC Rainfall — V&A Flow Data — Influent Flow Data

TM 2.

Collection System Model Update and Calibration



To:	Araceli Cazarez City of Lincoln	From:	Breanna Webb Roseville
Project/File:	2025 Sewer Master Plan Update	Date:	September 8, 2025

TECHNICAL MEMORANDUM NO. 2 – COLLECTION SYSTEM MODEL UPDATE AND CALIBRATION

The purpose of this Technical Memorandum (TM) is to present an overview of the update and recalibration of the City of Lincoln (City) sewer collection system hydraulic model prepared as part of the Sewer Master Plan Update.

This TM is divided into the following sections:

- Model Approach
- Model Structure Updates
- Flow Monitoring Study
- Model Calibration

1 Model Approach

The City's existing hydraulic model was originally developed using PCSWMM software by Computational Hydraulics Inc., as part of the 2018 Wastewater Collection System Master Plan (2018 Master Plan) and has been used in subsequent assessments to evaluate specific portions of the collection system. The original model approach was to develop a dynamic trunk model which included all pipes greater than or equal to 12-inches in diameter within the existing collection system. Smaller pipes have been added to the model through subsequent assessments in specific areas. The approach to this model update included updating the model to the latest version of PCSWMM software, adjusting the physical model to reflect recent system improvements, and re-calibrating the model using updated flow monitoring data.

1.1 Model Update Process

The process for updating the City's existing system model is outlined below.

1. Convert the existing system model files to the most up to date version of the hydraulic modeling software.
2. Review record drawings, GIS databases, and recent system improvements to be incorporated into the model.
3. Collect new flow monitoring data for use in recalibrating the model.
4. Calibrate the model using the collected flow monitoring data.

Reference: Collection System Model Update and Calibration

2 Model Structure Updates

The City maintains a GIS database of its collection system facilities. During the model update process, the physical network of sewers, manholes, pump stations, and structures were adjusted based on the City's GIS database, system records drawings, and discussions with City staff. The physical network becomes the underlying framework for the model. Therefore, it is crucial that the infrastructure is reviewed for completeness and proper connectivity and changes.

The City provided record drawings reflecting changes to collection system since the 2018 Master Plan was developed. After the record drawings were incorporated into the physical network of the hydraulic model, the City's most recent GIS files were used to incorporate new system infrastructure and areas of the existing system where additional information is now available. Parcel data was used to expand sewer shed areas reflect growth within the service area.

Areas where Stantec had evaluated specific portions of the system and expanded the model as part of specific sewer study reports were also incorporated into the overall system model. This included the collection system upstream of the East Lincoln Parkway Pump Station (ELPPS), portions of the system upstream of the E. Street sewer along 12th Street, and the Independence Pump Station.

The 2018 model had only included the City's two largest lift stations, the ELPPS and the Nicolaus Road Pump Station (NRPS). The capacities and configurations of these stations were reviewed to incorporate improvements. The ELPPS pump station capacity was expanded to reflect these improvements.

3 Flow Monitoring Study

The City monitored flow within the collection system from February 10, 2025 to April 8, 2025. This work was conducted by V&A Consulting Engineers (V&A) and summarized in a technical report dated June 2025 and included as **Attachment 1**. The City's two goals in data collection include 1.) to collect flow monitoring data sufficient to recalibrate the collection system model, and 2.) perform an I/I assessment at the two major pump stations in the collection system, the Nicolaus Road Pump Station (NRPS) and the East Lincoln Parkway Pump Station (ELPPS). Based on these goals and the available budget, a flow monitoring plan was developed and detailed in Technical Memorandum No. 1 – Flow Monitoring Plan (TM 1).

The data collected during the 2025 Flow Monitoring Study provides the basis for model calibration. The model is calibrated for each sewer-shed using the associated flow monitoring data. Many of the flow monitors were aligned in series, such that a downstream monitor receives flow from one or more upstream monitors. As part of the calibration process, the most upstream area is calibrated first and subsequent calibration for downstream areas are based on the difference in areas between the sewer-sheds. To accomplish this, flows are subtracted for monitors in series to get the associated flow for the difference in areas. There are inherent errors introduced when subtracting flow monitors in series due to variations in data quality, and travel time between monitors. Despite the induction of error, the use of unique parameters

Reference: Collection System Model Update and Calibration

for each area between successive monitors provides increased resolution on both dry weather diurnal patterns and wet weather flow responses.

After review of the flow monitoring data additional data for the NRPS was provided by the City. The flow meter data from the pump station provided insights into the amount of I/I entering the station downstream of the V&A flow monitors. The V&A flow meters upstream of the NRPS were summed and compared to the lift station data provided by the City. The graphed results of the assessment are shown in **Figure 3-1**.

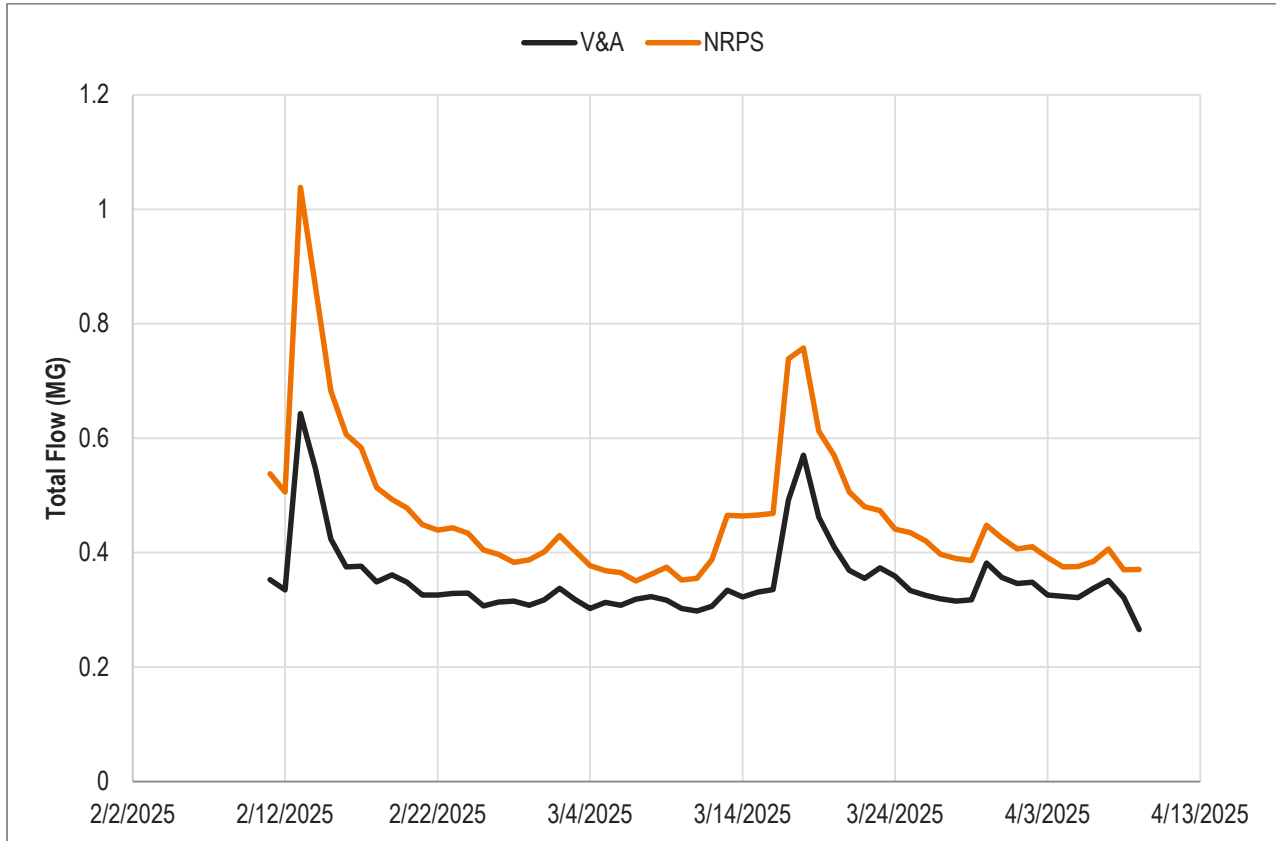


Figure 3-1. NRPS I/I Evaluation

The flow monitoring locations of the 2025 Flow Monitoring Plan are summarized in **Table 3-1** and shown on **Figure 2-1** in **TM 1**.

Reference: Collection System Model Update and Calibration

Table 3-1. Flow Monitoring Locations and Sewer-sheds

Flow Monitor	Manhole ID	Pipe Size (in)	Monitored Pipe	ADWF (MGD)	Area (Acres)	Sewer-shed Description
Site 1A	NW319SS03	10	West Inlet	0.01	160	Aviation/Lincoln Regional Airport (NRPS Micro Basin)
Site 1B	NW318SS03	15	Southeast Outlet	0.25	349	Markham Ravine Drainage (NRPS Micro Basin)
Site 2	NW319SS07	18	East Inlet	0.06	51	Abbyhill Road Subdivision (NRPS Micro Basin)
NRPS	NRPS Flow Data	NA	NA	0.07	NA	Additional Inflow and Infiltration recorded downstream of the V&A FM at the NRPS
Site 3	SE459SS29	30	North Inlet	0.37	394	E Street and 12 th Street Subdivisions
Site 4	SW428SS01	48	Northeast Inlet	1.43	743	Sun City & North Regional Sewer Subdivisions (North of Joiner Parkway)
Site 5	NW388SS01	24	Northeast Inlet	0.40	793	5th Street and Joiner Parkway
Site 6	SW359SS001	36	North Inlet	0.42	512	1st Street and Moore Road Subdivisions
Site 7	R13060	15	Southeast Inlet	0.36	420	South Twelve Bridges (ELPPS Micro Basin)
Site 8	SE461SS09	24	Southeast Inlet	0.48	1,164	Stoneridge Golf Club/Country Club
Site 9A	SE502SS10	15	Northwest Inlet	0.24	232	Bella Breeze Developments (ELPPS Micro Basin)
Site 9B	SE502SS10	12	Northeast Inlet	0.26	255	Spring Valley and Parkside (ELPPS Micro Basin)
Site 10	SE502SS11	15	Southwest Inlet	0.11	71	Southwest Twelve Bridges (ELPPS Micro Basin)
WWTRF	Influent PS	NA	NA	0.20	420	South Regional Sewer Subdivisions (South of Joiner Parkway)
SMD1	Regional PS	NA	NA	1.41	NA	SMD1 Regional Flow
Total				6.08	5,564	

Reference: Collection System Model Update and Calibration

4 Model Calibration

The calibration process is required to verify the accuracy of the model at predicting the system performance under vary flow conditions. Adequate calibration establishes the level of confidence in the predictive capabilities of a hydraulic model. Model calibration is the adjustment of parameters in hydraulic model so that modeled flows correlate with observed (metered) flows within an acceptable range. Calibration included modification of parameters such as wastewater generation rate, manning's n, and RTK values.

The model is first calibrated to the monitored dry weather flow (DWF), considering weekday and weekend flow patterns. The calibrated sanitary system model is then used to perform the wet weather calibration to monitored wet weather flow (WWF) events. Parameters were input on a trial basis and the routed flow hydrographs produced by the model at each flow monitoring site were compared to the observed monitored flow. The parameters were then varied in a systematic manner within a reasonable range until an acceptable fit to the observed flow was obtained.

Comparisons were made between modeled versus monitored flow, depth, velocity, and volume. The calibration prioritized representing PWWF and total flow volume for each monitoring location, as these parameters are more indicative of potential capacity restrictions. Parameters for velocity and depth typically indicate significant differences between modeled and observed data, as field conditions, such as sediment depth, minor defects and obstructions, and actual pipe slope in the vicinity of the flow monitor may vary from modeled conditions.

The flow monitoring data from the 2025 V&A flow monitoring study were used to calibrate the model under observed dry weather and wet weather conditions. The calibrated model can then be used to assess system performance under design storm conditions.

4.1 Dry Weather Calibration

Data recorded from local rain gauges were used to identify dry weather days suitable for calibration. Ideally, if rainfall is not recorded at the rain gauges during and for 48 hours prior to that day, it can be identified as a dry weather day. For calibration at least two 7-day periods under these conditions are needed. The model was calibrated to the following 7-dry weather day periods (Event 1: February 22, 2025 – March 1, 2025, and Event 2: March 5, 2025 – March 12, 2025). The flows assigned to each sewer-shed in the hydraulic model were adjusted to reflect the flows observed in the 2025 flow monitoring study.

The average flow per timestep for all weekdays and weekend days in each of these dry weather periods were calculated to create diurnal flow patterns for weekday and weekend flow in each flow monitoring basin. These derived patterns were further adjusted to account for travel time during the dry weather flow calibration process. If the resultant model diurnal curve has a time lag (due to the effect of long travel times), a time offset is applied to the input curve to achieve better agreement between the meter and modeled diurnal flow patterns. Similarly, if the resultant model diurnal curve is flattened (due to the effect of flow attenuation), an exponential “amplification factor” is applied to the input curve to achieve better agreement between the metered and modeled results.

Reference: Collection System Model Update and Calibration

Note that each diurnal pattern represents the characteristics of the contributing service area i.e., residential, or commercial or industrial flow patterns. The contributing area for most of the Lincoln meters was predominantly residential and the diurnal pattern behavior reflected the service area as shown in **Figure 4-1**.

The criteria used for assessing the accuracy of the dry weather flow calibration are taken from the Chartered Institution of Water and Environmental Management (CIWEM) guidelines, which are summarized below:

- The volume of the modeled versus metered flow should be in the range of $\pm 10\%$.
- The modeled versus metered peak flow rate should be in the range of $\pm 10\%$.
- The modeled versus metered peak flow depth should be in the range of ± 0.5 feet.

In general, for this analysis, the above criteria are viewed as objectives rather than as inviolable standards. If one or more of these criteria are not met, any such deviation is viewed in terms of whether the model maintains acceptable accuracy while remaining adequately conservative in its predictive capabilities using engineering judgement. The volume of modeled versus metered flow and modeled versus metered flows were also considered to be acceptable within ± 0.1 MG or ± 0.1 MGD. Velocity data is also considered during the calibration process and considered acceptable within ± 0.5 fps of recorded values.

The model calibration process began by calibrating the most upstream flow meters in the collection system and working downstream. Base flow data and sewer attributes were modified, within reasonable ranges, until there was less than a 10% difference between modeled average flow and measured average flow at each flow monitoring location. The adjustment process continued downstream and was repeated until the model reached an acceptable level of calibration with respect to the recorded ADWFs.

Modeled versus metered flows were compared to assess the accuracy of the dry weather calibration and to identify where disparities exist. An example of the dry weather calibration at Site 6 during Event 1 is shown in **Figure 4-1**. Where the simulated results are shown in orange and the metered data is shown in black. The metered versus modeled flow graphs for all flow monitoring sites are presented in **Attachment 2**.

Reference: Collection System Model Update and Calibration

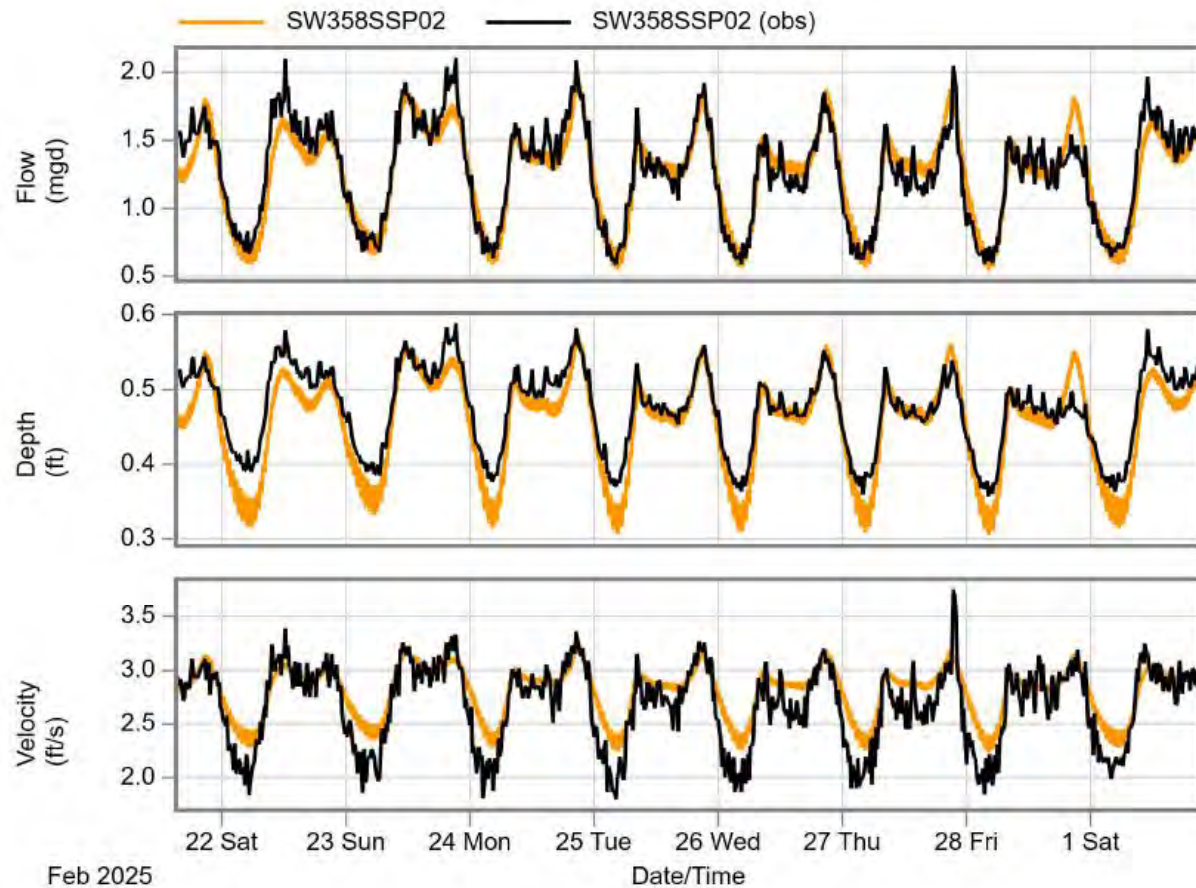


Figure 4-1. Metered versus Modeled Flow, Depth, and Velocity – DWF Calibration Period 1 - Site 6

Modeled versus metered flows for all metering sites are compared for Period 1 in **Table 4-1** and for Period 2 in **Table 4-2**. As shown in the tables, modeled vs. metered dry weather flow volumes compare well at all sites aside from Site 1A which experiences low and sporadic flows that do not follow a typical residential pattern. The flow volume at Site 1A is low during Period 1 and high during Period 2. Total flow volume variances for all the other sites are within +/-15 percent with the majority meeting CIWEM guidelines indicating an acceptable calibration. Modeled versus metered peak flows show a larger discrepancy. This is generally due to data outliers, or “flow spikes” that are observed in the data, and the daily variation in flow patterns. This can be seen for Site 10 during Period 1 in **Figure 4-2**.

Reference: Collection System Model Update and Calibration

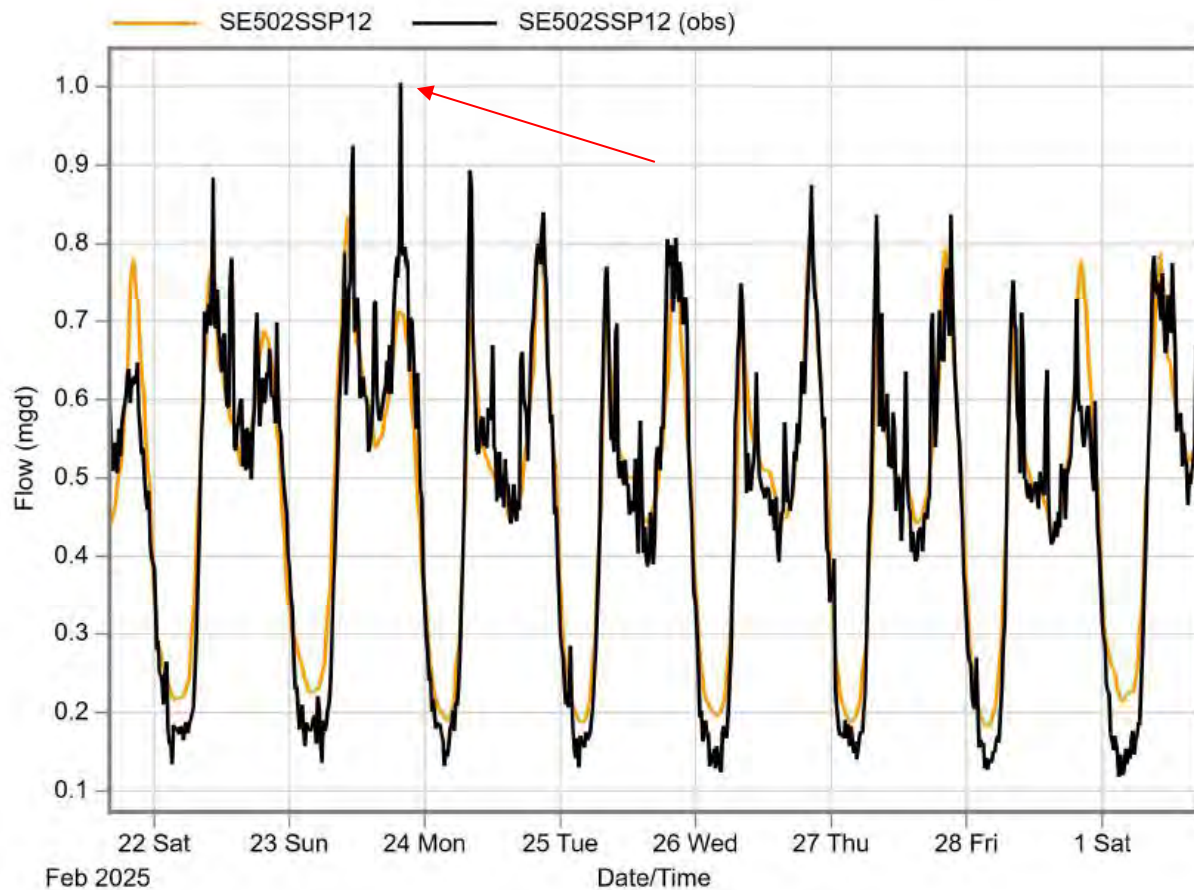


Figure 4-2. Sporadic Flow Spike at Site 10 – Calibration Period 1

Peak flows during Period 2 are within -10% to +10%, or +/- 0.1 MGD of observed values for all sites aside from SMD1. The metered data for SMD1 was provided by the County, the data is recorded at the upstream SMD1 Regional Pump Station in North Auburn. The data was provided at sporadic increments and is largely influenced by the pump station. The data is not representative of the flows at the point where they enter the gravity collection system in the City of Lincoln. Flows are likely further attenuated as they pass through the 13-mile force main connecting the pump station to gravity system.

Reference: Collection System Model Update and Calibration

Table 4-1. DWF Calibration Period 1 (February 22 - March 1, 2025) – Modeled vs. Observed Flows

Meter	Peak Flow (MGD)				Volume (MG)				Average Flow (MGD)				Minimum Flow (MGD)			
	Goal: -10% to +10% of observed values, or +/- 0.1 MGD				Goal: -10% to +10% of observed values, or +/- 0.1 MG				Goal: -10% to +10% of observed values, or +/- 0.1 MGD				Goal: -10% to +10% of observed values, or +/- 0.1 MGD			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.05	0.06	0.0	-8%	0.07	0.10	0.0	-29%	0.01	0.01	0.0	-29%	0.00	0.00	0.0	2%
Site 01B	0.39	0.42	0.0	-5%	1.73	1.74	0.0	-1%	0.25	0.25	0.0	-1%	0.11	0.12	0.0	-9%
Site 02	0.09	0.09	0.0	0%	0.39	0.39	0.0	1%	0.06	0.06	0.0	1%	0.03	0.03	0.0	4%
Site 03	0.56	0.65	0.1	-14%	2.56	2.72	0.2	-6%	0.37	0.39	0.0	-6%	0.18	0.19	0.0	-4%
Site 04	6.49	6.73	0.2	-4%	32.72	33.41	0.7	-2%	4.67	4.77	0.1	-2%	2.42	2.31	0.1	5%
Site 05	0.62	0.70	0.1	-10%	2.92	3.08	0.2	-5%	0.42	0.44	0.0	-5%	0.19	0.17	0.0	13%
Site 06	1.89	2.11	0.2	-10%	8.71	8.78	0.1	-1%	1.24	1.26	0.0	-1%	0.61	0.58	0.0	5%
Site 07	0.61	0.69	0.1	-12%	2.48	2.45	0.0	1%	0.35	0.35	0.0	1%	0.16	0.15	0.0	5%
Site 08	2.21	2.14	0.1	3%	10.14	9.97	0.2	2%	1.45	1.43	0.0	2%	0.69	0.74	0.1	-7%
Site 09A	0.38	0.41	0.0	-8%	1.71	1.70	0.0	0%	0.24	0.24	0.0	0%	0.11	0.10	0.0	6%
Site 09B	0.54	0.59	0.1	-10%	1.83	1.85	0.0	-1%	0.26	0.26	0.0	-1%	0.10	0.09	0.0	14%
Site 10	0.81	1.01	0.2	-19%	3.25	3.29	0.0	-1%	0.46	0.47	0.0	-1%	0.18	0.12	0.1	47%
SMD1	1.88	2.48	0.6	-24%	9.87	10.25	0.4	-4%	1.41	1.46	0.1	-4%	0.75	0.52	0.2	46%
WWTRF	8.54	9.06	0.5	-6%	42.73	41.12	1.6	4%	6.10	5.87	0.2	4%	3.18	2.44	0.7	30%

Reference: Collection System Model Update and Calibration

Table 4-2. DWF Calibration Period 2 (March 5 - March 12, 2025) – Modeled vs. Observed Flows

Meter	Peak Flow (MGD)				Volume (MG)				Average Flow (MGD)				Minimum Flow (MGD)			
	Goal: -10% to +10% of observed values, or +/- 0.1 MGD				Goal: -10% to +10% of observed values, or +/- 0.1 MG				Goal: -10% to +10% of observed values, or +/- 0.1 MGD				Goal: -10% to +10% of observed values, or +/- 0.1 MGD			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.05	0.04	0.0	24%	0.07	0.06	0.0	17%	0.01	0.01	0.0	17%	0.00	0.00	0.0	2%
Site 01B	0.39	0.38	0.0	2%	1.73	1.71	0.0	1%	0.25	0.24	0.0	1%	0.11	0.12	0.0	-4%
Site 02	0.09	0.11	0.0	-14%	0.39	0.40	0.0	-3%	0.06	0.06	0.0	-3%	0.03	0.02	0.0	23%
Site 03	0.56	0.56	0.0	0%	2.56	2.42	0.1	6%	0.37	0.35	0.0	6%	0.18	0.17	0.0	10%
Site 04	6.49	6.66	0.2	-3%	32.72	31.87	0.8	3%	4.67	4.55	0.1	3%	2.42	1.81	0.6	34%
Site 05	0.63	0.61	0.0	4%	2.92	2.60	0.3	12%	0.42	0.37	0.0	12%	0.19	0.13	0.1	46%
Site 06	1.89	1.99	0.0	-5%	8.71	8.11	0.6	7%	1.24	1.16	0.1	7%	0.61	0.51	0.1	20%
Site 07	0.61	0.76	0.1	-19%	2.48	2.56	0.0	-3%	0.35	0.37	0.0	-3%	0.16	0.15	0.0	7%
Site 08	2.21	2.28	0.1	-3%	10.14	10.46	0.3	-3%	1.45	1.50	0.0	-3%	0.69	0.71	0.0	-2%
Site 09A	0.38	0.47	0.1	-19%	1.71	1.70	0.0	0%	0.24	0.24	0.0	0%	0.11	0.10	0.0	5%
Site 09B	0.54	0.53	0.0	1%	1.83	1.79	0.0	2%	0.26	0.26	0.0	2%	0.10	0.10	0.0	2%
Site 10	0.81	0.95	0.1	-15%	3.25	3.30	0.0	-1%	0.46	0.47	0.0	-1%	0.18	0.11	0.1	69%
SMD1	1.65	2.49	0.8	-34%	8.68	9.57	0.9	-9%	1.24	1.37	0.1	-9%	0.66	0.50	0.2	33%
WWTRF	8.54	7.87	0.7	9%	42.73	38.53	4.2	11%	6.10	5.51	0.6	11%	3.18	2.53	0.65	26%

Reference: Collection System Model Update and Calibration

Modeled versus metered depths and velocities are also compared in assessing the accuracy of the dry weather calibration to determine where unexplained disparities exist. Peak flow depth was evaluated using the CIWEM guideline of +/- 0.5 feet of observed values. There are no CIWEM guidelines for velocity, but a goal of +/- 0.5 fps was established. Modeled versus metered depths and velocities for all metering sites are compared for Period 1 in Error! Not a valid bookmark self-reference. and **Table 4-5**, and Period 2 in **Table 4-4** and **Table 4-6**.

Flow depths for all sites are within CIWEM guidelines and velocities are typically within the established goal aside from sites under the influence of downstream pump stations. These sites include Site 1A, 1B, 2, 9A, 9B, and 10. Based on the results of the metered vs modeled comparisons and CIWEM guidelines, the calibration was deemed sufficient for this analysis using best engineering judgement.

Table 4-3. DWF Calibration Period 1 (February 22 - March 1, 2025) – Modeled vs. Observed Depth

Meter	Peak Depth (ft)				Average Depth (ft)				Minimum Depth (ft)			
	Goal: +/- 0.5 ft of observed values				Goal: +/- 0.5 ft of observed values				Goal: +/- 0.5 ft of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.19	0.22	0.0	-12%	0.08	0.11	0.0	-26%	0.05	0.06	0.0	-24%
Site 01B	0.45	0.56	0.1	-20%	0.35	0.48	0.1	-28%	0.23	0.39	0.2	-41%
Site 02	0.17	0.17	0.0	0%	0.13	0.13	0.0	-2%	0.09	0.10	0.0	-9%
Site 03	0.37	0.40	0.0	-7%	0.29	0.31	0.0	-6%	0.21	0.24	0.0	-11%
Site 04	0.90	0.95	0.0	-5%	0.75	0.76	0.0	0%	0.55	0.54	0.0	3%
Site 05	0.52	0.58	0.1	-11%	0.42	0.47	0.0	-10%	0.30	0.35	0.0	-14%
Site 06	0.56	0.59	0.0	-5%	0.45	0.47	0.0	-4%	0.32	0.36	0.0	-10%
Site 07	0.49	0.49	0.0	0%	0.37	0.38	0.0	-4%	0.25	0.30	0.0	-15%
Site 08	0.45	0.46	0.0	-1%	0.36	0.37	0.0	-2%	0.26	0.27	0.0	-3%
Site 09A	0.47	0.50	0.0	-6%	0.38	0.39	0.0	-4%	0.25	0.29	0.0	-11%
Site 09B	0.26	0.31	0.0	-15%	0.18	0.21	0.0	-16%	0.12	0.14	0.0	-17%
Site 10	0.42	0.41	0.0	3%	0.31	0.27	0.0	15%	0.20	0.10	0.1	46%

Reference: Collection System Model Update and Calibration

Table 4-4. DWF Calibration Period 2 (March 5 - March 12, 2025) – Modeled vs. Observed Depth

Meter	Peak Depth (ft)				Average Depth (ft)				Minimum Depth (ft)			
	Goal: +/- 0.5 ft of observed values				Goal: +/- 0.5 ft of observed values				Goal: +/- 0.5 ft of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.19	0.20	0.0	-4%	0.08	0.10	0.0	-18%	0.05	0.05	0.0	-12%
Site 01B	0.45	0.57	0.1	-21%	0.35	0.49	0.1	-29%	0.23	0.39	0.2	-41%
Site 02	0.17	0.18	0.0	-5%	0.13	0.14	0.0	-5%	0.09	0.10	0.0	-6%
Site 03	0.37	0.37	0.0	0%	0.29	0.30	0.0	-1%	0.21	0.22	0.0	-2%
Site 04	0.90	0.90	0.0	-1%	0.75	0.74	0.0	2%	0.56	0.49	0.1	13%
Site 05	0.52	0.52	0.0	-1%	0.42	0.42	0.0	-1%	0.30	0.31	0.0	-5%
Site 06	0.56	0.57	0.0	-1%	0.45	0.45	0.0	0%	0.32	0.33	0.0	-3%
Site 07	0.49	0.51	0.0	-2%	0.37	0.39	0.0	-5%	0.25	0.30	0.1	-17%
Site 08	0.45	0.49	0.0	-7%	0.36	0.38	0.0	-5%	0.26	0.26	0.0	-1%
Site 09A	0.47	0.49	0.0	-3%	0.38	0.39	0.0	-3%	0.25	0.28	0.0	-9%
Site 09B	0.26	0.31	0.1	-17%	0.18	0.22	0.0	-17%	0.12	0.15	0.0	-20%
Site 10	0.42	0.42	0.0	0%	0.31	0.27	0.0	13%	0.20	0.14	0.1	47%

Table 4-5. DWF Calibration Period 1 (February 22 - March 1, 2025) – Modeled vs. Observed Velocity

Meter	Peak Velocity (fps)				Average Velocity (fps)				Minimum Velocity (fps)			
	Goal: +/- 0.5 fps of observed values				Goal: +/- 0.5 fps of observed values				Goal: +/- 0.5 fps of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.89	1.09	0.2	-18%	0.48	0.45	0.0	6%	0.27	0.12	0.1	124%
Site 01B	1.54	1.34	0.2	15%	1.35	0.86	0.5	56%	1.12	0.53	0.6	111%
Site 02	1.33	1.43	0.1	-7%	1.14	1.10	0.0	3%	0.92	0.76	0.2	21%
Site 03	1.93	2.06	0.1	-6%	1.71	1.69	0.0	1%	1.42	1.25	0.2	13%
Site 04	4.78	4.92	0.1	-3%	4.30	4.39	0.1	-2%	3.57	3.39	0.2	5%
Site 05	1.52	1.61	0.1	-5%	1.31	1.29	0.0	1%	1.03	0.81	0.2	27%
Site 06	3.18	3.76	0.6	-15%	2.80	2.66	0.1	5%	2.31	1.80	0.5	28%
Site 07	2.10	2.52	0.4	-17%	1.76	1.65	0.1	7%	1.40	0.99	0.4	41%
Site 08	6.39	6.23	0.2	3%	5.58	5.41	0.2	3%	4.53	4.34	0.2	4%
Site 09A	1.32	1.56	0.2	-16%	1.05	1.10	0.1	-5%	0.75	0.70	0.0	7%
Site 09B	5.09	4.80	0.3	6%	4.06	3.24	0.8	25%	3.13	2.08	1.1	51%
Site 10	3.42	4.52	1.1	-24%	2.89	3.51	0.6	-18%	2.25	2.27	0.0	-1%

Reference: Collection System Model Update and Calibration

Table 4-6. DWF Calibration Period 2 (March 5 - March 12, 2025) – Modeled vs. Observed Velocity

Meter	Peak Velocity (fps)				Average Velocity (fps)				Minimum Velocity (fps)			
	Goal: +/- 0.5 fps of observed values				Goal: +/- 0.5 fps of observed values				Goal: +/- 0.5 fps of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.89	1.06	0.2	-16%	0.48	0.32	0.2	50%	0.27	0.12	0.1	124%
Site 01B	1.54	1.15	0.4	34%	1.35	0.84	0.5	60%	1.12	0.55	0.6	103%
Site 02	1.33	1.52	0.2	-12%	1.14	1.09	0.0	4%	0.92	0.68	0.2	36%
Site 03	1.93	1.99	0.1	-3%	1.71	1.62	0.1	6%	1.42	1.20	0.2	18%
Site 04	4.78	4.95	0.2	-4%	4.30	4.31	0.0	0%	3.57	3.20	0.4	12%
Site 05	1.52	1.57	0.0	-3%	1.31	1.25	0.1	5%	1.03	0.71	0.3	44%
Site 06	3.13	3.41	0.2	-7%	2.80	2.58	0.2	9%	2.31	1.74	0.6	33%
Site 07	2.10	2.52	0.4	-17%	1.76	1.69	0.1	4%	1.40	0.99	0.4	41%
Site 08	6.39	6.20	0.2	3%	5.58	5.37	0.2	4%	4.53	4.45	0.1	2%
Site 09A	1.32	1.61	0.3	-18%	1.05	1.11	0.1	-6%	0.75	0.74	0.0	1%
Site 09B	5.09	4.37	0.7	16%	4.06	3.07	1.0	32%	3.13	2.07	1.1	51%
Site 10	3.42	4.51	1.1	-24%	2.89	3.46	0.6	-16%	2.25	2.23	0.0	1%

Reference: Collection System Model Update and Calibration

4.2 Wet Weather Calibration

Once the dry weather flow calibration was completed for each flow monitoring site, wet weather calibration is performed using observed storm events. Ideally, a storm event occurs during the flow monitoring study so that a response is measured in the system at each flow meter. The flow monitoring for Lincoln was conducted during the wet season and multiple storm events occurred during this time period (February 10, 2025, through April 9, 2025). Even though none of these storms were considered a 10-year return period type event, the impact on the system during the storms was significant enough that wet weather calibration could be performed.

V&A analyzed rainfall data from five publicly available weather stations from Weather Underground. These stations are all centrally located within the City, and their locations are shown on a map in Figure 3-1 of the V&A Flow Monitoring Report. Rainfall within the City was also assessed using precipitation data available through the California Department of Water Resources California Data Exchange Center (CDEC) website. The CDEC LNC weather station provided insights into rainfall in the eastern portion of the City. Rainfall data recorded in the SMD1 service area was obtained from the California Irrigation Management Information System (CIMIS) website using Station 195 for North Auburn.

Stantec reviewed influent flow data from the WWTRF to identify the storm events that produced the most significant response in wastewater flows for calibration. The data reviewed for event selection is graphed in **Figure 4-3**. Unfortunately, the most significant system response is shown during an event which occurred one week before the start of the flow monitoring period. Although this event (Event 3) could not be used for the initial calibration, it was used to further validate the model.

Two rainfall events occurred during the flow monitoring period which elicited minor inflow and infiltration (I/I) responses in the collection system suitable for wet weather calibration. The most significant storm event was on February 12, 2025 – February 14, 2025, which produced 1.52 inches of rain when averaged over the rain gauges used in the flow monitoring study. This storm event, Event 1, provided the basis for initial wet weather flow (WWF) calibration of the collection system model. The initial calibration utilized the triangulated rainfall provided by V&A for each sewer-shed and the CIMIS station data for the SMD1 sewer-shed.

The results of the calibration were validated by simulating the second storm event, Event 2 which occurred during the flow monitoring period. Due to the spatial variability of this storm, meaning the large range in rainfall totals experienced across rain gauges when compared to Event 1, a secondary validation was also performed. The secondary validation swapped the V&A provided rainfall data for that recorded at the CDEC LNC weather station, simulating consistent rainfall across the service area. The results of this simulation were compared against the observed data for Event 1 and Event 2 and the WWTRF influent flow data for Event 3, the most significant event which preceded the flow monitoring study.

The rainfall totals for the events used for the model calibration process are summarized in **Table 4-7**.

Reference: Collection System Model Update and Calibration

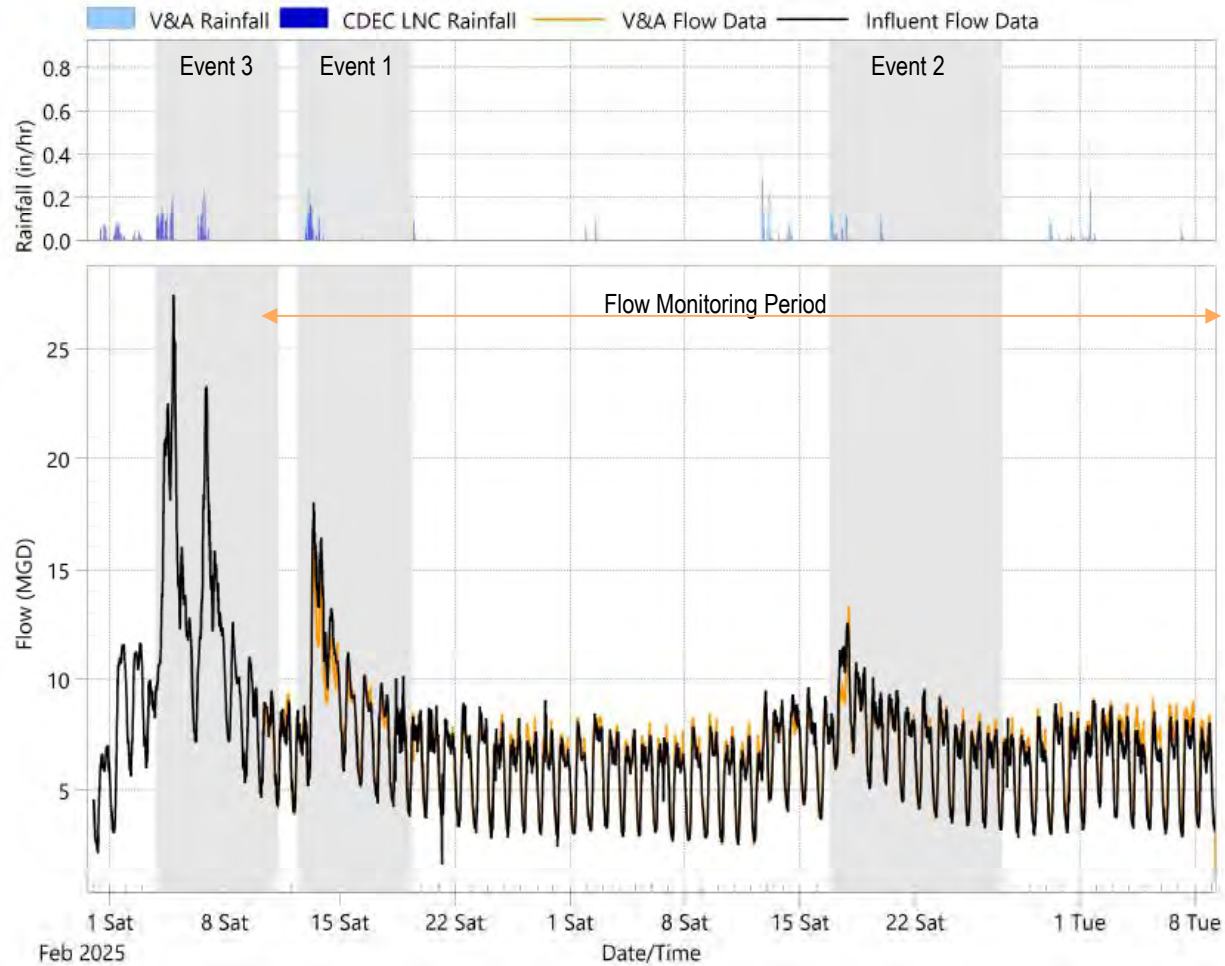


Figure 4-3. Wet-Weather Calibration Events and System Rainfall Response

Table 4-7. Rainfall Totals Calibration Events

Rain Gauge	WWF Calibration Event 1 2/12/25 – 2/14/25 Total Rainfall (in)	WWF Calibration Event 2 3/16/25 – 3/18/25 Total Rainfall (in)	WWF Calibration Event 3 2/3/25 – 2/6/25 Total Rainfall (in)
V&A Rain Gauge: - Southwest - West - South - North - Northwest	1.440 1.455 1.615 1.545 1.650	1.115 1.245 1.190 1.320 1.625	NA
CDEC Station: LCN– Lincoln	1.29	0.80	3.58
CIMIS Station: 195 – North Auburn	1.70	1.59	4.02

Reference: Collection System Model Update and Calibration

The wet-weather calibration process is summarized below:

1. Calibrate the model to the largest storm event recorded during the flow monitoring period, Event 1. Adjusting model parameters until simulated vs. observed flows fall within calibration guidelines.
2. Validate the model calibration by simulating the second largest storm event during the flow monitoring period, Event 2 and comparing the simulated vs. observed flows.
3. Based on the results of the validation, perform a secondary validation considering an additional event, Event 3 using alternative rainfall data.

The wet weather response is generated in the model based on RTK input parameters for each sewer-shed, the RTK parameters were derived from the flow monitoring response over the Event 1 calibration period. Event 2 and Event 3 were used for validation of the calibrated wet weather parameters.

The criteria used for assessing the accuracy of the wet weather flow calibration are taken from CIWEM guidelines noted for wet weather calibration and are summarized below:

- The modeled versus metered peak flow rate should be in the range of -15% to +25%.
- The volume of the modeled versus metered flow during and following the calibration of the storm should be in the range of -10% to +20%.
- The modeled versus metered flow non-surcharged depth should be in the range of ± 0.5 feet.

In general, for this analysis, the above criteria are viewed as objectives rather than as inviolable standards. If one or more of these criteria are not met, any such deviation is viewed in terms of whether the model maintains acceptable accuracy while remaining adequately conservative in its predictive capabilities using engineering judgement. The volume of modeled versus metered flow and modeled versus metered flows were also considered to be acceptable within ± 0.1 MG or ± 0.1 MGD.

Modeled versus metered flows for all metering sites are compared for Event 1 in **Table 4-8** and for Event 2 in **Table 4-9**. As shown in the tables, the calibrated model flows meet the calibration criterion for wet weather flow for Event 1. The results for Event 2 showed varied results for Sites located further from the rain gauges used in the V&A flow monitoring study, which were used in the initial calibration. These sites include Site 03, Site 05, Site 06, and Site 08. Based on the rainfall data, Event 1 had a much more spatially consistent rainfall pattern than the rainfall that occurred during Event 2. Due to the spatial variability of the rainfall during Event 2, the model was further validated by switching the simulated rainfall to that recorded at the CDEC LNC station. The updated results were compared for Event 1, Event 2, and Event 3 during this validation. The results for this validation are shown in **Table 4-10**, **Table 4-11**, and **Table 4-12**.

Based on the results of this secondary model validation, the model is calibrated to a degree adequate to provide a basis for sound collection system capacity analysis and planning. It should be understood, however, that the collection system response to major storm events may be highly variable, based on factors such as total event rainfall, peak storm intensity, antecedent rainfall, and possibly other factors. It is therefore appropriate in collection system planning to use an adequately conservative design storm condition. The metered versus modeled flow graphs for all flow monitoring sites are presented in Attachment 1 for the initial calibration and validation for Events 1 and 2, corresponding to the data presented in **Table 4-8** and **Table 4-9**.

Reference: Collection System Model Update and Calibration

Table 4-8. WWF Calibration, Event 1 (February 12 – February 19, 2025) – Modeled vs. Observed Flows

Meter	Peak Flow (MGD)				Volume (MG)				Average Flow (MGD)				Minimum Flow (MGD)			
	Goal: -15% to +25% of observed values, or +/- 0.1 MGD				Goal: -10% to +20% of observed values, or +/- 0.1 MG				Goal: -10% to +20% of observed values, or +/- 0.1 MGD				Goal: +/- 0.1 MGD of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.15	0.15	0.0	4%	0.21	0.22	0.0	-5%	0.03	0.03	0.0	-5%	0.01	0.00	0.0	128%
Site 01B	0.71	0.73	0.0	-3%	2.43	2.44	0.0	0%	0.35	0.35	0.0	0%	0.14	0.13	0.0	9%
Site 02	0.09	0.09	0.0	1%	0.40	0.39	0.0	3%	0.06	0.06	0.0	3%	0.03	0.03	0.0	-13%
Site 03	1.30	1.31	0.0	-1%	4.20	4.25	0.1	-1%	0.60	0.61	0.0	-1%	0.24	0.25	0.0	-4%
Site 04	12.20	11.64	0.6	5%	46.05	46.14	0.1	0%	6.58	6.59	0.0	0%	2.94	3.17	0.2	-7%
Site 05	1.77	1.81	0.0	-2%	4.95	4.99	0.0	-1%	0.71	0.71	0.0	-1%	0.26	0.33	0.1	-22%
Site 06	5.74	5.80	0.1	-1%	13.96	13.95	0.0	0%	2.00	1.99	0.0	0%	0.75	0.78	0.0	-4%
Site 07	0.74	0.72	0.0	3%	2.85	2.94	0.1	-3%	0.41	0.42	0.0	-3%	0.18	0.15	0.0	19%
Site 08	2.90	3.10	0.2	-6%	12.06	11.92	0.1	1%	1.72	1.70	0.0	1%	0.74	0.88	0.1	-16%
Site 09A	0.48	0.50	0.0	-6%	1.91	1.91	0.0	0%	0.27	0.27	0.0	0%	0.11	0.10	0.0	9%
Site 09B	0.95	0.98	0.0	-3%	2.87	2.88	0.0	0%	0.41	0.41	0.0	0%	0.13	0.15	0.0	-14%
Site 10	1.07	1.05	0.0	2%	3.90	3.98	0.1	-2%	0.56	0.57	0.0	-2%	0.20	0.13	0.1	54%
SMD1	6.29	6.08	0.2	4%	18.87	18.94	0.1	0%	2.70	2.70	0.0	0%	1.08	0.99	0.1	9%
WWTRF	17.65	18.0	0.4	-2%	61.99	61.84	0.1	0%	8.86	8.84	0.0	0%	3.84	3.80	0.0	1%

Reference: Collection System Model Update and Calibration

Table 4-9. WWF Validation, Event 2 (March 16 – March 27, 2025) – Modeled vs. Observed Flows

Meter	Peak Flow (MGD)				Volume (MG)				Average Flow (MGD)				Minimum Flow (MGD)			
	Goal: -15% to +25% of observed values, or +/- 0.1 MGD				Goal: -10% to +20% of observed values, or +/- 0.1 MG				Goal: -10% to +20% of observed values, or +/- 0.1 MGD				Goal: +/- 0.1 MGD of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.12	0.08	0.0	39%	0.25	0.19	0.1	31%	0.02	0.02	0.0	31%	0.00	0.00	0.0	88%
Site 01B	0.69	0.64	0.1	8%	3.26	3.35	0.1	-3%	0.31	0.32	0.0	-3%	0.11	0.12	0.0	-2%
Site 02	0.11	0.11	0.0	-7%	0.59	0.69	0.1	-14%	0.06	0.07	0.0	-14%	0.03	0.03	0.0	-15%
Site 03	1.20	0.78	0.4	52%	5.58	4.28	1.3	30%	0.52	0.41	0.1	29%	0.19	0.20	0.0	-6%
Site 04	11.00	10.73	0.3	3%	62.54	59.70	2.8	5%	5.93	5.66	0.3	5%	2.50	2.53	0.0	-1%
Site 05	1.54	1.09	0.4	41%	6.42	5.41	1.0	19%	0.61	0.51	0.1	19%	0.20	0.21	0.0	-5%
Site 06	4.83	3.39	1.4	42%	18.36	16.57	1.8	11%	1.74	1.57	0.2	11%	0.64	0.69	0.1	-8%
Site 07	0.73	0.78	0.1	-7%	4.07	4.24	0.2	-4%	0.39	0.40	0.0	-4%	0.16	0.17	0.0	-2%
Site 08	2.74	2.31	0.4	19%	16.87	15.27	1.6	10%	1.60	1.45	0.2	10%	0.70	0.74	0.0	-5%
Site 09A	0.44	0.52	0.1	-16%	2.72	2.74	0.0	-1%	0.26	0.26	0.0	-1%	0.11	0.12	0.0	-6%
Site 09B	0.72	0.77	0.0	-5%	3.66	3.42	0.2	7%	0.35	0.32	0.0	7%	0.11	0.11	0.0	-6%
Site 10	1.03	0.99	0.0	4%	5.45	5.44	0.0	0%	0.52	0.52	0.0	0%	0.19	0.12	0.1	52%
SMD1	5.17	4.60	0.6	12%	24.08	23.18	0.9	4%	2.29	2.20	0.1	4%	0.80	0.79	0.0	1%
WWTRF	16.35	12.59	3.8	30%	83.72	76.13	7.6	10%	7.94	7.22	0.7	10%	3.27	3.18	0.1	3%

Reference: Collection System Model Update and Calibration

Table 4-10. WWF Secondary Validation, Event 1 (February 12 – February 19, 2025) – Modeled vs. Observed Flows (CDEC Rainfall)

Meter	Peak Flow (MGD)				Volume (MG)				Average Flow (MGD)				Minimum Flow (MGD)			
	Goal: -15% to +25% of observed values, or +/- 0.1 MGD				Goal: -10% to +20% of observed values, or +/- 0.1 MG				Goal: -10% to +20% of observed values, or +/- 0.1 MGD				Goal: +/- 0.1 MGD of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.13	0.15	0.0	-13%	0.19	0.22	0.0	-15%	0.03	0.03	0.0	-15%	0.01	0.00	0.0	133%
Site 01B	0.62	0.73	0.1	-15%	2.31	2.44	0.1	-5%	0.33	0.35	0.0	-5%	0.13	0.13	0.0	1%
Site 02	0.09	0.09	0.0	1%	0.40	0.39	0.0	2%	0.06	0.06	0.0	2%	0.03	0.03	0.0	-13%
Site 03	1.13	1.31	0.2	-14%	3.99	4.25	0.3	-6%	0.57	0.61	0.0	-6%	0.23	0.25	0.0	-7%
Site 04	12.06	11.64	0.4	4%	45.84	46.14	0.3	-1%	6.55	6.59	0.0	-1%	2.91	3.17	0.3	-8%
Site 05	1.49	1.81	0.3	-18%	4.67	4.99	0.3	-7%	0.67	0.71	0.0	-7%	0.25	0.33	0.1	-24%
Site 06	4.86	5.80	0.9	-16%	13.30	13.95	0.6	-5%	1.90	1.99	0.1	-5%	0.73	0.78	0.1	-7%
Site 07	0.73	0.72	0.0	2%	2.82	2.94	0.1	-4%	0.40	0.42	0.0	-4%	0.18	0.15	0.0	17%
Site 08	2.81	3.10	0.3	-10%	11.78	11.92	0.1	-1%	1.68	1.70	0.0	-1%	0.74	0.88	0.1	-16%
Site 09A	0.46	0.50	0.0	-8%	1.87	1.91	0.0	-2%	0.27	0.27	0.0	-2%	0.11	0.10	0.0	9%
Site 09B	0.86	0.98	0.1	-13%	2.71	2.88	0.2	-6%	0.39	0.41	0.0	-6%	0.13	0.15	0.0	-16%
Site 10	1.04	1.05	0.0	-1%	3.82	3.98	0.2	-4%	0.55	0.57	0.0	-4%	0.20	0.13	0.1	53%
SMD1	6.45	6.69	0.2	-4%	19.22	18.93	0.3	2%	2.75	2.70	0.0	2%	1.08	0.96	0.1	13%
WWTRF	17.04	18.02	1.0	-5%	61.09	61.84	0.8	-1%	8.73	8.84	0.1	-1%	3.80	3.80	0.0	0%

Reference: Collection System Model Update and Calibration

Table 4-11. WWF Secondary Validation, Event 2 (March 16 – March 27, 2025) – Modeled vs. Observed Flows (CDEC Rainfall)

Meter	Peak Flow (MGD)				Volume (MG)				Average Flow (MGD)				Minimum Flow (MGD)			
	Goal: -15% to +25% of observed values, or +/- 0.1 MGD				Goal: -10% to +20% of observed values, or +/- 0.1 MG				Goal: -10% to +20% of observed values, or +/- 0.1 MGD				Goal: +/- 0.1 MGD of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
Site 01A	0.08	0.08	0.0	-6%	0.19	0.19	0.0	3%	0.02	0.02	0.0	3%	0.00	0.00	0.0	48%
Site 01B	0.49	0.64	0.1	-23%	3.00	3.35	0.4	-11%	0.28	0.32	0.0	-11%	0.12	0.12	0.0	-1%
Site 02	0.09	0.11	0.0	-20%	0.59	0.69	0.1	-15%	0.06	0.07	0.0	-15%	0.03	0.03	0.0	-15%
Site 03	0.87	0.78	0.1	11%	4.93	4.28	0.6	15%	0.47	0.41	0.1	15%	0.19	0.20	0.0	-5%
Site 04	10.27	10.73	0.5	-4%	61.03	59.70	1.3	2%	5.79	5.66	0.1	2%	2.50	2.53	0.0	-1%
Site 05	0.99	1.09	0.1	-9%	5.64	5.41	0.2	4%	0.54	0.51	0.0	4%	0.20	0.21	0.0	-5%
Site 06	3.00	3.39	0.4	-12%	16.31	16.57	0.3	-2%	1.55	1.57	0.0	-2%	0.63	0.69	0.1	-9%
Site 07	0.67	0.78	0.1	-15%	3.94	4.24	0.3	-7%	0.37	0.40	0.0	-7%	0.16	0.17	0.0	-2%
Site 08	2.40	2.31	0.1	4%	16.26	15.27	1.0	6%	1.54	1.45	0.1	6%	0.70	0.74	0.0	-5%
Site 09A	0.41	0.52	0.1	-22%	2.66	2.74	0.1	-3%	0.25	0.26	0.0	-3%	0.11	0.12	0.0	-6%
Site 09B	0.63	0.77	0.1	-18%	3.33	3.42	0.1	-3%	0.32	0.32	0.0	-3%	0.11	0.11	0.0	-6%
Site 10	0.92	0.99	0.1	-7%	5.24	5.44	0.2	-4%	0.50	0.52	0.0	-4%	0.19	0.12	0.1	52%
SMD1	5.17	4.62	0.6	12%	24.08	23.19	0.9	4%	2.29	2.20	0.1	4%	0.79	0.79	0.0	0%
WWTRF	13.68	12.59	1.1	9%	79.94	76.13	3.8	5%	7.58	7.22	0.4	5%	3.27	3.18	0.1	3%

Table 4-12. WWF Secondary Validation, Event 3 (February 3 – February 11, 2025) – Modeled vs. Observed Flows (CDEC Rainfall)

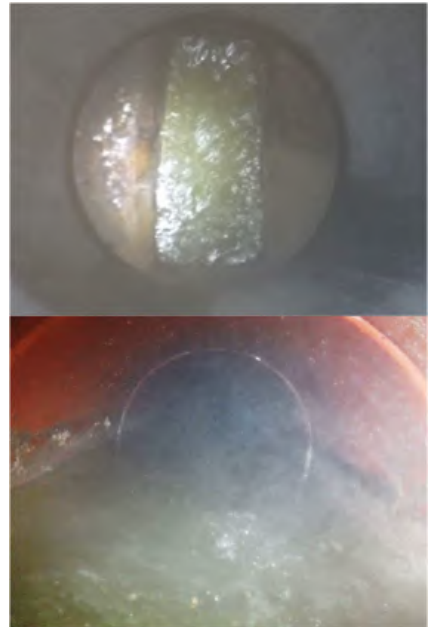
Meter	Peak Flow (MGD)				Volume (MG)				Average Flow (MGD)				Minimum Flow (MGD)			
	Goal: -15% to +25% of observed values, or +/- 0.1 MGD				Goal: -10% to +20% of observed values, or +/- 0.1 MG				Goal: -10% to +20% of observed values, or +/- 0.1 MGD				Goal: +/- 0.1 MGD of observed values			
	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)	Model	Obs.	Diff (Abs)	Error (%)
WWTRF	23.18	27.41	4.2	-15%	96.05	89.43	6.6	7%	12.81	11.92	0.9	7%	4.65	4.22	0.4	10%

Reference: Collection System Model Update and Calibration

Attachment 1: V&A Sanitary Sewer Flow Monitoring Study Report

City of Lincoln

Sanitary Sewer Flow Monitoring Study



Prepared for:

Stantec Consulting Services, Inc.
2250 Douglas Blvd., Suite 260,
Roseville, CA 95661

Original Report Date:

June 10th, 2025

Revision 01 Date:

June 26th, 2025

Prepared by:



V&A Project No. 24-0304, Rev01

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Abbreviations and Acronyms

Abbreviations/Acronyms	Definition
ADWF	Average Dry Weather Flow
AVG.	Average
CCTV	Closed-Circuit Television
CIP	Capital Improvement Plan
CIPP	Cured-In-Place Pipe
CO	Carbon Monoxide
DIA.	Diameter
DIP	Ductile Iron Pipe
d/D.....	Depth/Diameter Ratio
FPS.....	Feet/Second
FT.	Feet
FM.....	Flow Monitor
GPD.....	Gallons per Day
GPM	Gallons per Minute
GWl	Groundwater Infiltration
H2S	Hydrogen Sulfide
IN.	Inch
I/I.....	Inflow and Infiltration
IDM	Inch-Diameter Mile
IDW	Inverse Distance Weighting
LEL	Lower Explosive Limit
MAX.....	Maximum
MGD.....	Million Gallons per Day
MIN.	Minimum
NOAA	National Oceanic and Atmospheric Administration
N/A	Not applicable
PF.....	Peaking Factor
PS	Pump Station
PWS	Personal Weather Station
PVC	Polyvinyl Chloride
Q	Flow Rate
QAQC.....	Quality Assurance Quality Control
RDI	Rainfall-Dependent Infiltration
RG	Rain Gauge
SSO	Sanitary Sewer Overflow
V&A	V&A Consulting Engineers, Inc.
VCP	Vitrified Clay Pipe
WEF.....	Water Environment Federation
WRCC	Western Regional Climate Center
WU	Weather Underground

Terms and Definitions

Term	Definition
Average dry weather flow (ADWF)	The average flow rate or pattern from days without noticeable inflow or infiltration response. ADWF usage patterns for weekdays and weekends differ and must be computed separately. ADWF is expressed as a numeric average and may include the influence of normal groundwater infiltration (not related to a rain event).
Basin	Sanitary sewer collection systems upstream of a given location (often a flow meter), including all pipelines, inlets, and appurtenances, also refer to the ground surface area near and enclosed by pipelines. A basin may refer to the entire collection system upstream from a flow meter or exclude separately monitored basins upstream.
Depth/diameter (d/D) ratio	The depth of water in a pipe is a fraction of the pipe's diameter. A measure of the fullness of the pipe used in the capacity analysis.
Infiltration and inflow	Infiltration and inflow (I/I) rates are calculated by subtracting the ADWF flow curve from the instantaneous flow measurements taken during and after a storm event. Flow in excess of the baseline consists of inflow, rainfall-responsive infiltration, and rainfall-dependent infiltration. Combined I/I is the total sum in gallons of additional flow attributable to a storm event.
Infiltration, groundwater	Groundwater infiltration (GWI) is groundwater that enters the collection system through pipe defects. GWI depends on the depth of the groundwater table above the pipelines as well as the percentage of the system that is submerged. The variation of groundwater levels and subsequent groundwater infiltration rates are seasonal by nature. On a day-to-day basis, groundwater infiltration rates are relatively steady and will not fluctuate greatly.
Infiltration, rainfall-dependent	Rainfall-dependent infiltration (RDI) is similar to groundwater infiltration but occurs as a result of stormwater. The stormwater percolates into the soil, submerges more of the pipe system and enters through pipe defects. RDI is the slowest component of storm-related infiltration and inflow, beginning gradually and often lasting 24 hours or longer. The response time depends on the soil permeability and saturation levels.
Inflow	Inflow is defined as water discharged into the sewer system, including private sewer laterals, from direct connections such as downspouts, yard, and area drains, holes in manhole covers, cross-connections from storm drains, or catch basins. Inflow creates a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. Overflows are often attributable to high inflow rates.
Peak Wet Weather Flow	The highest daily flow during and immediately after a significant storm event includes sanitary flow, infiltration, and inflow.
Peaking factor (PF)	PF is the ratio of peak measured flow to average dry weather flow. This ratio expresses the degree of fluctuation in flow rate over the monitoring period and is used in the capacity analysis.
Surcharge	When the flow level is higher than the crown of the pipe, then the pipeline is said to be in a surcharged condition. The pipeline is surcharged when the d/D ratio is greater than 1.0.

Executive Summary

Scope and Purpose

This executive summary is a general overview of V&A Consulting Engineers' (V&A) findings, conclusions, and recommendations of the temporary flow performed on portions of the City of Lincoln's (City) sanitary sewer collection system. V&A Consulting Engineers (V&A) was retained by Stantec Consulting Services, Inc. (Stantec) to perform sanitary sewer flow monitoring and rainfall monitoring with I/I analysis at twelve (12) scoped flow monitoring locations in ten (10) manholes over a period of eight (8) weeks from February 10th to April 9th, 2025. There were three general purposes of this study:

1. Establish the baseline sanitary sewer flows at the flow monitoring sites
2. Establish the peak flow condition during the rainfall events and indicate the relative available sewer capacity at the flow monitoring nodes.
3. Quantify I/I at the applicable flow monitoring sites, isolate flow monitoring basins (where applicable), and conduct I/I analysis to determine basins with the highest relative I/I contributions.

Monitoring Sites and Basins

The flow monitoring site locations were selected and approved by Stantec and the City and are listed in Table ES-1.

Table ES-1. List of Monitoring Sites

Monitoring Site	Manhole No.	Monitored Pipe	Measured Pipe Diameter (in)	Location
Site 01A	NW319SS03	West Inlet	10	3004 Nicolaus Rd
Site 01B	NW318SS03	Southeast Outlet	15	Field off of 2910 3004 Nicolaus Rd
Site 02	NW319SS07	East Inlet	17.5	2885 Nicolaus Rd
Site 03	SE459SS29	North Inlet	29	Field behind 89 Lincoln Blvd
Site 04	SW428SS01	Northeast Inlet	48	155 Ferrari Ranch Rd
Site 05	NW388SS01	Northeast Inlet	23	2168 5th St
Site 06	SW359SS001	North Inlet	36	2009 Moore Rd
Site 07	S14089	Southeast Inlet	15	2325 E Joiner Pkwy at loop near Wilson Park Playground
Site 08	SE461SS09	Southeast Inlet	24	Parking lot behind Raley's, 39 Lincoln Blvd
Site 09A	SE502SS10	Northwest Inlet	16	In the roundabout at Fieldstone Dr and E Joiner Pkwy
Site 09B	SE502SS10	Northeast Inlet	12	In the roundabout at Fieldstone Dr and E Joiner Pkwy
Site 10	SE502SS11	Southwest Inlet	15	E Joiner Pkwy, across from the lift station

The rainfall monitoring site locations were selected by V&A and are listed in Table ES-2.

Table ES-2. List of Rain Gauge Sites

Rain Gauge	Source	X (Longitude)	Y (Latitude)	Total Rain (in)
RG Southwest	WU (KCALINCO239)	-121.317	38.874	4.62
RG West	WU (KCALINCO126)	-121.319	38.878	4.77
RG South	WU (KCALINCO223)	-121.308	38.863	5.30
RG North	WU (KCALINCO167)	-121.317	38.893	4.78
RG Northwest	WU (KCALINCO253)	-121.321	38.889	5.46

Findings

The following briefly discusses the findings of V&A's evaluation of the wastewater collection system flow data within the Study Area.

- A total of 915,301 linear feet of sanitary sewer was flow monitored as part of the project.
- The maximum pipe diameter within the metered collection system was 60 inches.
- The minimum pipe diameter with the metered collection system was 2 inches.
- The metered collection system comprises various pipe materials, including PVC, DIP, CIPP, VCP, and undocumented pipe material. The most common documented material in the metered areas was VCP.
- A triangulated total of 4.96 inches of rainfall was recorded during the flow metering period. Three events from this period were analyzed:
 - Rain Event 1 (February 12th – February 14th) had a triangulated average of 1.52 inches and was classified as approximately a 1.5-year, 6-hour event.
 - Rain Event 2 (March 11th – March 15th) had a triangulated average of 1.19 inches and was classified as approximately a 1-year, 2-hour event.
 - Rain Event 3 (March 16th – March 18th) had a triangulated average of 1.15 inches and was classified as approximately a 3-year, 1-hour event.
- All sites appear to have adequate dry weather flow capacity with d/D ratios ranging from 0.09 to 0.39.
- Site 01A had a peaking factor of 14.6 calculated for this monitoring period.
- No site had a max d/D ratio greater than 0.75.
- Flow monitoring Sites / Basins 04, 05, and 06 ranked highest for normalized peak I/I rates per the three inflow categories utilized for analysis.
- Flow monitoring Sites / Basins 03, 04, and 05 ranked highest for overall RDI per the three RDI categories utilized for analysis.
- Flow monitoring Sites / Basins 03, 04, and 05 ranked highest for overall combined I/I per the three categories utilized for analysis.
- All sites, except Site 10, indicated GWI rates higher than typical standards, indicating possible high groundwater infiltration rates.

Figure ES-1 shows the location of all monitoring devices utilized as part of this study.

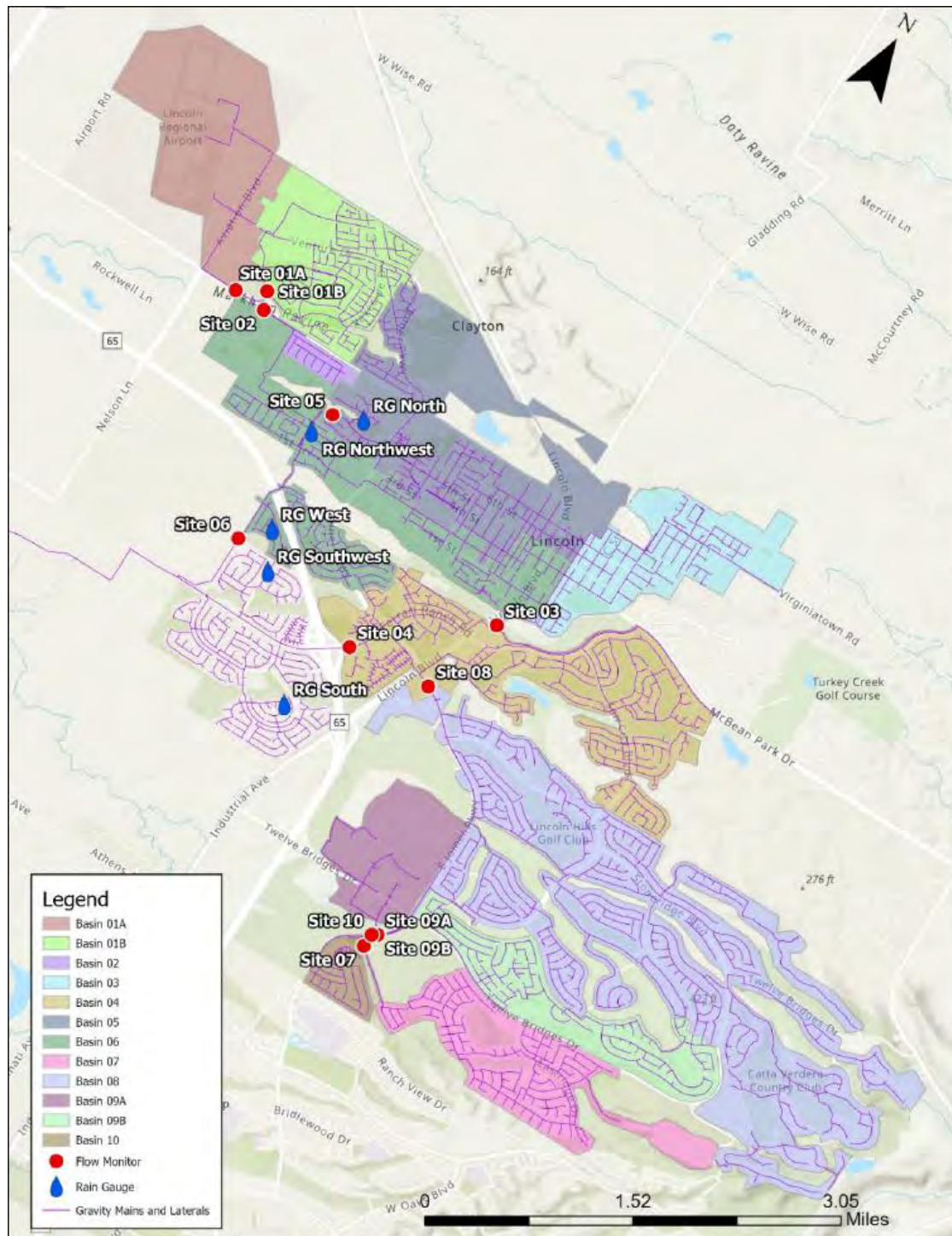


Figure ES-1. Map of Monitoring Sites and Basin

Recommendations

V&A advises that future I/I reduction plans consider the following recommendations:

1. **Master Plan and Model Implementation:** This study focuses on inflow and infiltration generation; the study results can be used to update the master plan and compare with previous model assumptions and flow monitoring results.
2. **Capacity Analysis:**
 - a. **Dry weather:** No site showed an average flow level greater than 50% full pipe conditions ($d/D > 0.5$).
 - b. **Wet Weather:** No site showed a maximum flow level greater than 75% full pipe conditions ($d/D > 0.75$), and with the exception of Site 01A, wet weather peaking factors ranged from 1.9 to 4.8. This is typically considered to be within acceptable limits, and no further action is recommended unless the City wishes to pursue I/I identification. It should be noted that while these limits may be within normally acceptable limits, higher intensity storms than those that occur during the monitoring period could cause higher wet weather responses.
3. **Determine I/I Reduction Program:** If the City should decide to pursue some I/I reduction in the future, consider the following I/I reduction programs:
 - a. If peak flows, sanitary sewer overflows, and pipeline capacity issues are of greater concern; then priority can be given to investigating and reducing sources of inflow within the basins with the greatest inflow problems. The highest inflow occurred within Basins 04, 05, and 06.
 - b. Suppose total infiltration and general pipeline deterioration are of greater concern. In that case, the program can be weighted to investigate and reduce sources of infiltration within the basins with the greatest infiltration problems. The highest RDI occurred in Basins 03, 04, and 05. Additionally, all Basins showed evidence of elevated GWI.
4. **I/I Investigation Methods:** Potential I/I investigation methods include the following:
 - a. Smoke testing.
 - b. Mini-basin flow monitoring.
 - c. Night-time reconnaissance work is done to (1) investigate and determine direct point sources of inflow and (2) determine the areas and/or pipe reaches responsible for high levels of infiltration contribution.
 - d. CCTV inspection.
 - e. Manhole assessment.
5. **I/I Reduction Cost Effective Analysis:** If the City is considering pursuing I/I reduction, a study can be conducted to determine which is more cost-effective: (1) locating the sources of inflow/infiltration and systematically rehabilitating or replacing the faulty pipelines or (2) continued treatment of the additional rainfall-dependent I/I flow.

1 Introduction

1.1 Scope and Purpose

V&A Consulting Engineers (V&A) was retained by Stantec Consulting Services, Inc. (Stantec) to perform sanitary sewer flow monitoring and rainfall monitoring with I/I analysis within the City of Lincoln's (City) collection system. Flow and rainfall monitoring were performed at twelve (12) scoped flow monitoring locations in ten (10) manholes over the period of eight (8) weeks from February 10th to April 9th, 2025. There were three general purposes of this study:

1. Establish the baseline sanitary sewer flows at the flow monitoring sites
2. Establish the peak flow condition during the rainfall events and indicate the relative available sewer capacity at the flow monitoring nodes.
3. Quantify I/I at the applicable flow monitoring sites, isolate flow monitoring basins (where applicable), and conduct I/I analysis to determine basins with the highest relative I/I contributions.

1.2 Flow Monitoring Sites and Isolated Sewerage Basins

Flow monitoring sites are defined as the manholes where flow monitors are secured and the pipelines in which flow sensors are placed. Capacity analysis and flow rate information are presented on a site-by-site basis. The flow monitoring sites were selected and approved by Stantec and the City of Lincoln. Information regarding the flow monitoring locations is listed in Table 1-1 and illustrated in ¹IDM is the total miles of sewer multiplied by the average diameter (in inches) of sewer pipe.

²Basin 04, Basin 06, and Basin 08 are downstream of pump stations.

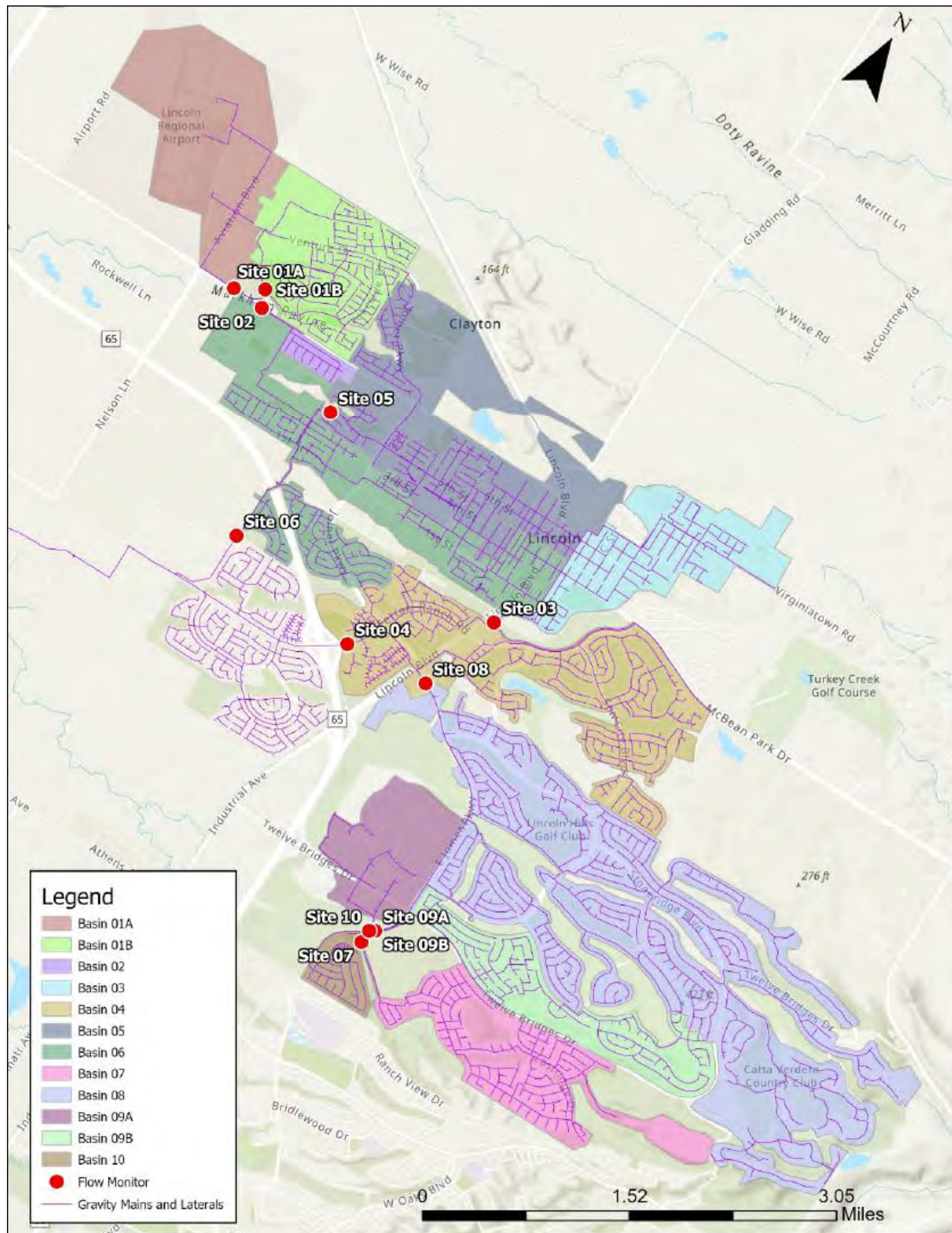


Figure 1-1. Detailed descriptions of the individual flow monitoring sites, including photographs, are included in Appendix A.

Flow monitoring site data may include the flows of one or many drainage basins. Flow monitoring basins are localized areas of a sanitary sewer collection system upstream of a given location (often a flow meter), including all pipelines, inlets, and appurtenances. The basin refers to the ground surface area near and enclosed by the pipelines. A basin may refer to the entire collection system upstream from a flow meter or may exclude separately monitored basins upstream, requiring basin isolation (subtraction of upstream flows). The I/I analysis results will be presented on an isolated basin basis. The basins, basin attributes, and basin isolation equations are listed in Table 1-2.

Table 1-1. List of Monitoring Locations

Monitoring Site	Manhole No.	Monitored Pipe	Expected Pipe Diameter (in)	Measured Pipe Diameter (in)	Location
Site 01A	NW319SS03	West Inlet	10	10	3004 Nicolaus Rd
Site 01B	NW318SS03	Southeast Outlet	15	15	Field off of 2910 3004 Nicolaus Rd
Site 02	NW319SS07	East Inlet	18	17.5	2885 Nicolaus Rd
Site 03	SE459SS29	North Inlet	30	29	Field behind 89 Lincoln Blvd
Site 04	SW428SS01	Northeast Inlet	48	48	155 Ferrari Ranch Rd
Site 05	NW388SS01	Northeast Inlet	24	23	2168 5th St
Site 06	SW359SS001	North Inlet	36	36	2009 Moore Rd
Site 07	S14089	Southeast Inlet	15	15	2325 E Joiner Pkwy at loop near Wilson Park Playground
Site 08	SE461SS09	Southeast Inlet	24	24	Parking lot behind Raley's, 39 Lincoln Blvd
Site 09A	SE502SS10	Northwest Inlet	15	16	In the roundabout at Fieldstone Dr and E Joiner Pkwy
Site 09B	SE502SS10	Northeast Inlet	12	12	In the roundabout at Fieldstone Dr and E Joiner Pkwy
Site 10	SE502SS11	Southwest Inlet	15	15	E Joiner Pkwy, across from the lift station

Table 1-2. Isolated Flow Monitoring Basin Characteristics

Isolated Basin	Flow Meter	Flow Isolation Calculation	Iso Area (Acres)	IDM ¹	Pipe Length (miles)
Basin 01A	Site 01A	$Q_{01A} = Q_{01A}$	693	24	2.4
Basin 01B	Site 01B	$Q_{01B} = Q_{01B}$	509	104	14.1
Basin 02	Site 02	$Q_{02} = Q_{02}$	51	15	1.8
Basin 03	Site 03	$Q_{03} = Q_{03}$	498	119	12.1
Basin 04 ²	Site 04	$Q_{04} = Q_{04} - Q_{03} - Q_{08}$	983	372	28.0
Basin 05	Site 05	$Q_{05} = Q_{05}$	1002	147	17.6
Basin 06 ²	Site 06	$Q_{06} = Q_{06} - Q_{05} - Q_{01A} - Q_{01B} - Q_{02}$	835	216	20.8
Basin 07	Site 07	$Q_{07} = Q_{07}$	528	118	13.1
Basin 08 ²	Site 08	$Q_{08} = Q_{08} - Q_{10} - Q_{09A} - Q_{09B}$	2005	355	45.6
Basin 09A	Site 09A	$Q_{09A} = Q_{09A}$	342	29	2.6
Basin 09B	Site 09B	$Q_{09B} = Q_{09B}$	416	84	11.4
Basin 10	Site 10	$Q_{10} = Q_{10} - Q_{07}$	98	30	3.8

¹IDM is the total miles of sewer multiplied by the average diameter (in inches) of sewer pipe.

²Basin 04, Basin 06, and Basin 08 are downstream of pump stations.

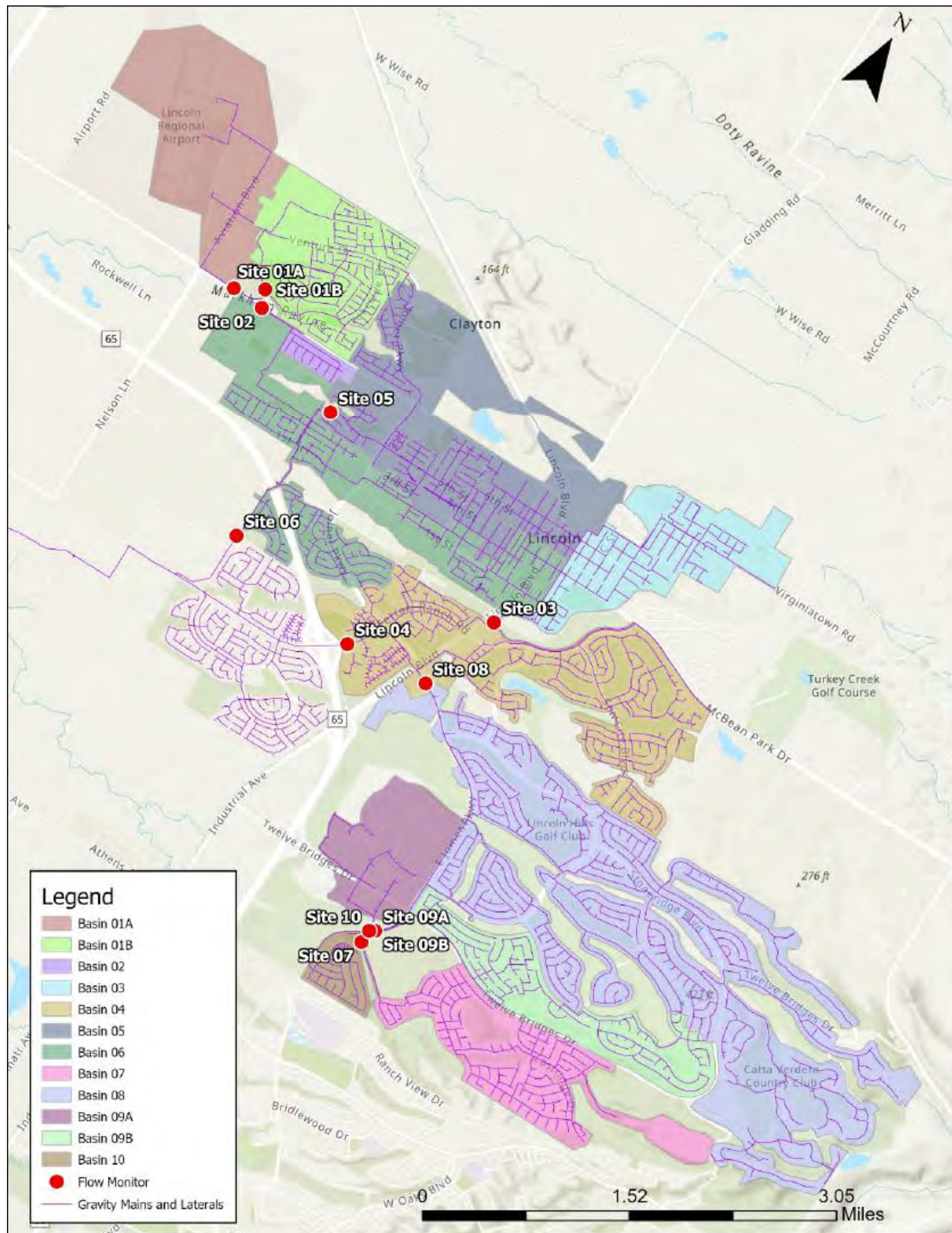


Figure 1-1. Map of Flow Monitoring Sites and Basins

2 Methods and Procedures

2.1 Confined Space Entry

A confined space (Photo 2-1) is defined as any space that is large enough and so configured that a person can bodily enter and perform assigned work, has limited or restricted means for entry or exit, and is not designed for continuous employee occupancy. In general, the atmosphere must be constantly monitored for sufficient levels of oxygen (19.5% to 23.5%), the presence of hydrogen sulfide (H_2S) gas, carbon monoxide (CO) gas, and lower explosive limit (LEL) levels. A typical confined space entry crew has members with OSHA-defined responsibilities of Entrant, Attendant, and Supervisor. The Entrant is the individual performing the work. He or she is equipped with the necessary personal protective equipment needed to perform the job safely, including a personal four-gas monitor (Photo 2-2). If it is not possible to maintain line-of-sight with the Entrant, then more Entrants are required until line-of-sight can be maintained. The Attendant is responsible for maintaining contact with the Entrants to monitor the atmosphere using another four-gas monitor and maintaining records of all Entrants if there is more than one. The Supervisor is responsible for developing the safe work plan for the job at hand prior to entering.



Photo 2-1. Confined Space Entry



Photo 2-2. Typical Personal Four-Gas Monitor

2.2 Flow Meter Installation

V&A installed area-velocity flow meters for temporary monitoring within the collection system using Hach FL904 manufactured equipment. Hach FL904 meters use submerged sensors with a pressure transducer to collect depth readings and an ultrasonic Doppler sensor to determine the average fluid velocity. The ultrasonic sensor emits high-frequency sound waves, which are reflected by air bubbles and suspended particles in the flow. The sensor receives the reflected signal and determines the Doppler frequency shift, which indicates the estimated average flow velocity. The sensor is typically mounted at a manhole inlet to take advantage of smoother upstream flow conditions. The sensor may be offset to one side of the pipe to lessen the chances of fouling and sedimentation where these problems are expected to occur. Manual level and velocity measurements were taken during the installation of the flow meters, and again, when they were removed, they were compared to simultaneous level and velocity readings from the flow meters to ensure proper calibration and accuracy. Figure 2-1 shows a typical installation for a flow meter with a submerged sensor.

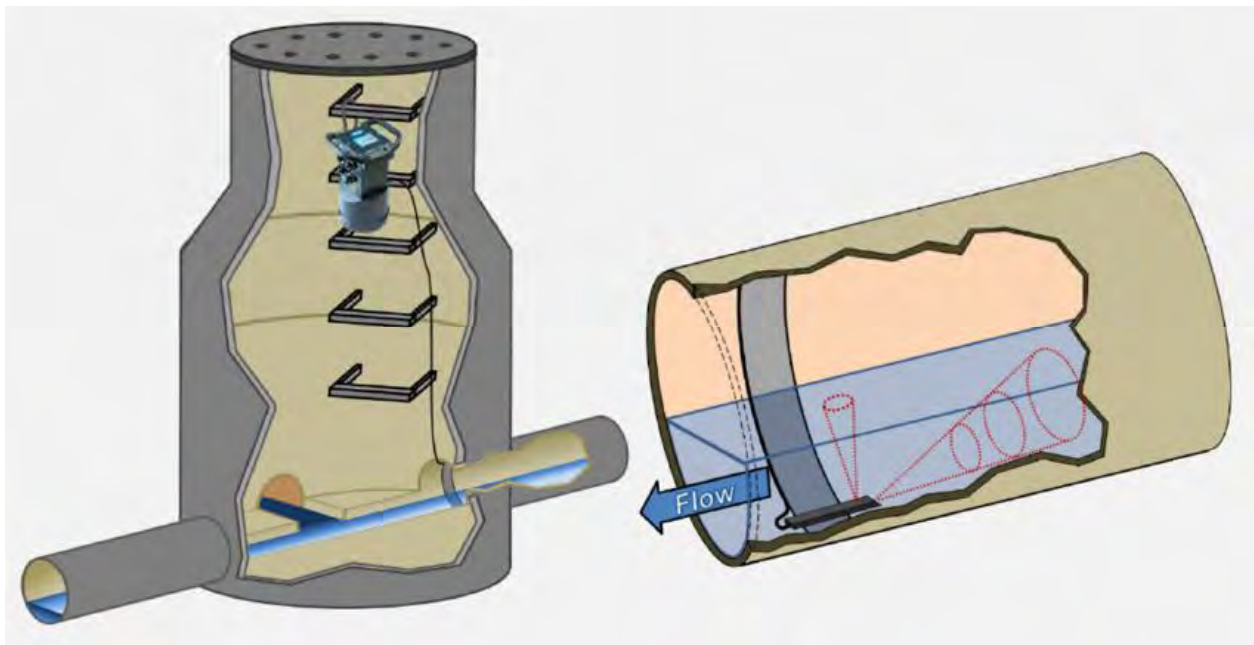


Figure 2-1. Typical Installation Flow Meter with Submerged Sensor

2.3 Flow Calculation

Data retrieved from the flow meters is placed into a spreadsheet program for analysis. Data analysis includes comparison to field calibration measurements as well as necessary geometric adjustments as required for sediment (sediment reduces the pipe's wetted cross-sectional area available to carry flow). Area-velocity flow metering uses the continuity equation,

$$Q = v \cdot A = v \cdot (A_T - A_S)$$

where Q : volume flow rate

v : average velocity as determined by the ultrasonic sensor

A : cross-sectional area available to carry the flow

A_T : total cross-sectional area with both wastewater and sediment

A_S : cross-sectional area of sediment

For circular pipe,

$$A_T = \left[\frac{D^2}{4} \cos^{-1} \left(1 - \frac{2d_w}{D} \right) \right] - \left[\left(\frac{D}{2} - d_w \right) \left(\frac{D}{2} \right) \sin \left(\cos^{-1} \left(1 - \frac{2d_w}{D} \right) \right) \right]$$

$$A_S = \left[\frac{D^2}{4} \cos^{-1} \left(1 - \frac{2d_s}{D} \right) \right] - \left[\left(\frac{D}{2} - d_s \right) \left(\frac{D}{2} \right) \sin \left(\cos^{-1} \left(1 - \frac{2d_s}{D} \right) \right) \right]$$

where d_w : distance between wastewater level and pipe invert

d_s : depth of sediment

D : pipe diameter

2.4 Measurement Error and Uncertainty

For traditional engineering applications, measurement “error” is a difference between a computed, estimated, or measured value and the generally accepted true or theoretically correct value. It can also be considered a difference between the desired and the actual performance of equipment. For equipment, an error is usually expressed as a percentage relative to accuracy (i.e., “...the velocity sensor has an accuracy of $\pm 2\%$ of the reading...”).

However, for this study and flow monitoring applications, the cause of the measurement difference is important, and a distinction will be made between the equipment not performing to industry standards (“error”) and expected inaccuracies (“uncertainty”) associated with monitoring technology limitations.

Gauging “**error**” occurs when the equipment does not meet industry standards. This can occur as a result of the following common categories of conditions that can be encountered at a wastewater monitoring site.

- Malfunctioning equipment (i.e., a sensor is damaged, battery life ends, or a desiccant canister becomes saturated)
- Improper equipment choice or maintenance (i.e., the selected gauging equipment technologies are incompatible with hydraulic conditions within the sewer, or excessive gravel deposits are allowed to accumulate around the sensors without being removed)
- Improper equipment calibration (i.e., depth and/or velocity measurements are incorrectly taken within the sewer, or equipment is allowed to drift out of calibration)
- Field conditions within the sewer (i.e., foaming at the water surface that “blinds” an ultrasonic depth sensor or toilet paper catching and accumulating on a combination sensor, blinding the acoustic Doppler velocity meter)

For flow monitoring applications, gauging “**uncertainty**” is used to describe and quantify the expected inaccuracies that result from the limitations of the technologies that utilize indirect measurements to quantify wastewater flow.

It is important to try to install flow meters in “ideal” flow conditions. Ideal flow conditions are generally defined as laminar flow in a straight-through, constant-slope pipeline with no disturbances (elbows, tees, hydraulic shifts, etc.) 10 diameters upstream and 5 diameters downstream from the flow monitoring location. If ideal flow conditions are met, then an expected uncertainty of final flow calculation from an open-channel flow meter may be approximately $\pm 5\%$. In many situations, ideal flow conditions cannot be met, and uncertainties increase.

2.4.1 Flow Addition versus Flow Subtraction

Due to the uncertainties involved in subtracting flows of similar magnitudes, adding flows at multiple monitoring sites is usually preferred over subtracting flows. Subtraction becomes an issue, especially when the flow difference from the subtraction falls within the measurement uncertainty range of the two larger flow data sets (i.e., subtracting a large flow from another large flow to obtain a small difference).

The following example best demonstrates this concept:

1. Meter A measures 2.00 MGD of flow and has an expected uncertainty of $\pm 5\%$; thus, the uncertainty range of the flow measurement is ± 0.10 MGD.

2. Meter B measures 2.50 MGD of flow and has an expected uncertainty of $\pm 6\%$; thus, the uncertainty range of the flow measurement is ± 0.15 MGD.
3. Meter C measures 0.50 MGD of flow and has an expected uncertainty of $\pm 8\%$; thus, the uncertainty range of the flow measurement is ± 0.04 MGD.

Scenario 1 – Flow Addition

- Meter A + Meter B = 2.00 MGD (± 0.10) + 2.50 MGD (± 0.15) = 4.50 MGD (± 0.25)
- Overall uncertainty = $\pm 0.25 / 4.50 = \pm 5.6\%$
- The final uncertainty is essentially a weighted average of the component uncertainties for flow addition.

Scenario 2 – Flow Subtraction, Large Flow less Small Flow

- Meter B - Meter C = 2.50 MGD (± 0.15) - 0.50 MGD (± 0.04) = 2.00 MGD (± 0.19)
- Overall uncertainty = $\pm 0.19 / 2.00 = \pm 9.5\%$
- The final uncertainty will always be greater than the component uncertainties for flow subtraction.
- When subtracting a small flow from a large flow, the resulting uncertainties can still be manageable.

Scenario 3 – Flow Subtraction, Large Flow less a similarly Large Flow

- Meter B - Meter A = 2.50 MGD (± 0.15) - 2.00 MGD (± 0.10) = 0.50 MGD (± 0.25)
- Overall uncertainty = $\pm 0.25 / 0.50 = \pm 50\%$
- The resulting uncertainties may not be manageable when subtracting similarly sized flow rates. In this example, an uncertainty of $\pm 50\%$ may be considered unacceptable for confident analyses.

Scenario 3 is a very “real-world” situation. The uncertainties for Meter A and Meter B are extremely reasonable (indeed, most flow monitoring service providers would be extremely pleased with true meter uncertainties of $\pm 5\%$ to $\pm 6\%$). However, the reality of the math is clear, and the above example demonstrates the concept of flow subtraction and compounding or inflating uncertainty ranges.

The following points are emphasized in relation to the items of this section:

- For subtraction of flows, the overall uncertainty can be an inflated value that far exceeds the component uncertainties.
- The smaller the resultant flow from the subtraction equation, the larger the percentage uncertainty.
- Whenever possible, basin flows should be directly measured rather than calculated as a subtraction of two or more flow meters.
- If flow subtraction cannot be avoided, it is better to have the magnitudes of the component flows be as dissimilar as possible.

2.5 Average Dry Weather Flow Determination

For this study, four distinct average dry weather flow curves were established for each site location:

- Mondays – Thursdays
- Fridays
- Saturdays
- Sundays

Flows for many sites differ on Friday evenings compared to Mondays through Thursdays. Starting around 7 p.m., the flows often decrease (compared to Monday through Thursday). Similarly, flow patterns for Saturday and Sunday were also separated due to their unique evening flow pattern. This type of differentiation can be important when determining I/I response, especially if a rain event occurs on a Friday, Saturday, or Sunday evening.

Figure 2-2 illustrates a sample of varying flow patterns within a typical dry week¹.

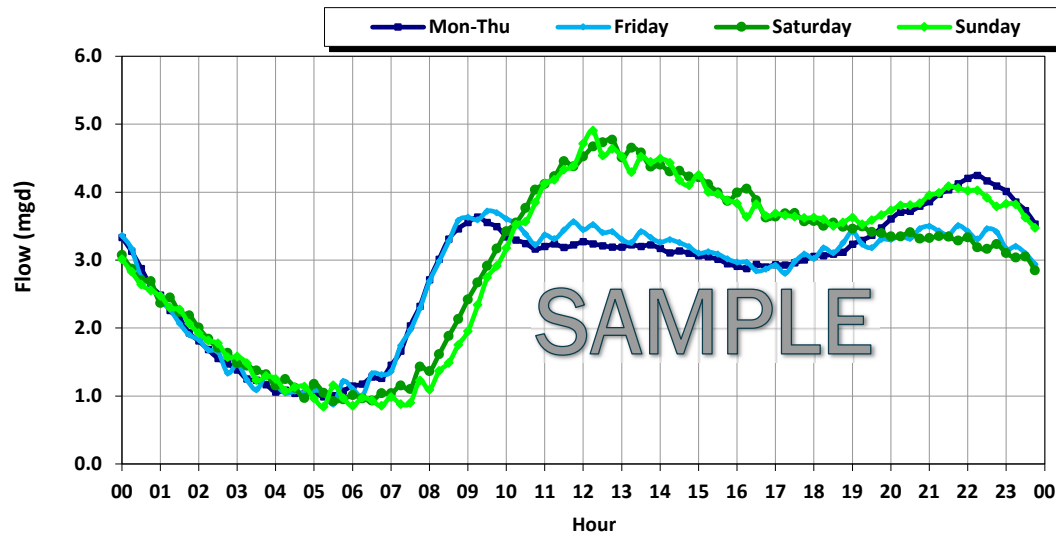


Figure 2-2. Sample ADWF Diurnal Flow Patterns

ADWF curves are taken from “Dry Days” when RDI had the least impact on the baseline flow. The overall average dry weather flow (ADWF) is calculated using the following equation:

$$ADWF = \left(ADWF_{Mon-Thu} \times \frac{4}{7} \right) + \left(ADWF_{Fri} \times \frac{1}{7} \right) + \left(ADWF_{Sat} \times \frac{1}{7} \right) + \left(ADWF_{Sun} \times \frac{1}{7} \right)$$

¹ Holiday flows can be extremely variable. Christmas flows are different from Thanksgiving flows and different from MLK Day flows. See Section 3.3 for details on whether holiday ADWF curves were established for this project’s I/I analysis.

2.6 Flow Attenuation

Flow attenuation in a sewer collection system is the natural process of reducing the peak flow rate through redistribution of the same flow volume over a longer period of time. This occurs as a result of friction (resistance), internal storage, and diffusion along the sewer pipes. Fluids are constantly working towards equilibrium. For example, a volume of fluid poured into a static vessel with no outside turbulence will eventually stabilize to a static state with a smooth fluid surface without peaks and valleys. Attenuation within a sanitary sewer collection system is based upon this concept. A flow profile with a strong peak will tend to stabilize towards equilibrium, as shown in Figure 2-3.

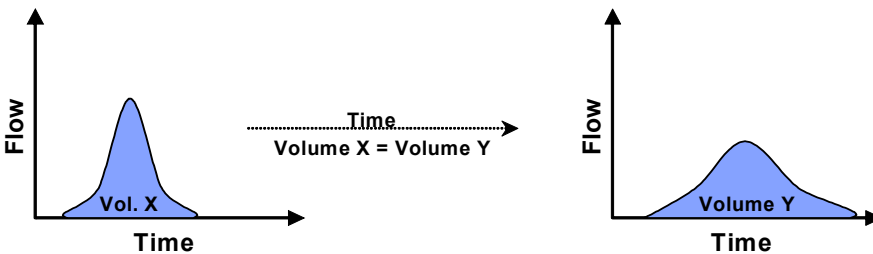


Figure 2-3. Attenuation Illustration

Each basin will have a specific flow profile within a sanitary sewer collection system. As the flows from the basins combine within the trunk sewer lines, the peaks from each basin will not necessarily coincide at the same time, and peak flows may attenuate prior to reaching the treatment facility due to the length and time of travel through the trunk sewers. The sum of the peak flows of the individual basins within a collection system will usually be greater than the peak flows observed at the treatment facility.

2.7 Inflow / Infiltration Analysis: Definitions and Identification

Inflow and infiltration (I/I) consist of stormwater and groundwater that enters the sewer system through pipe defects and improper storm drainage connections and are defined as follows:

- **Inflow:** Stormwater inflow is defined as water discharged into the sewer system, including private sewer laterals, from direct connections such as downspouts, yard and area drains, holes in manhole covers, cross-connections from storm drains, or catch basins.
- **Infiltration:** Infiltration is defined as water entering the sanitary sewer system through defects in pipes, pipe joints, and manhole walls, which may include cracks, offset joints, root intrusion points, and broken pipes.

Figure 2-4 illustrates the possible sources and components of I/I.

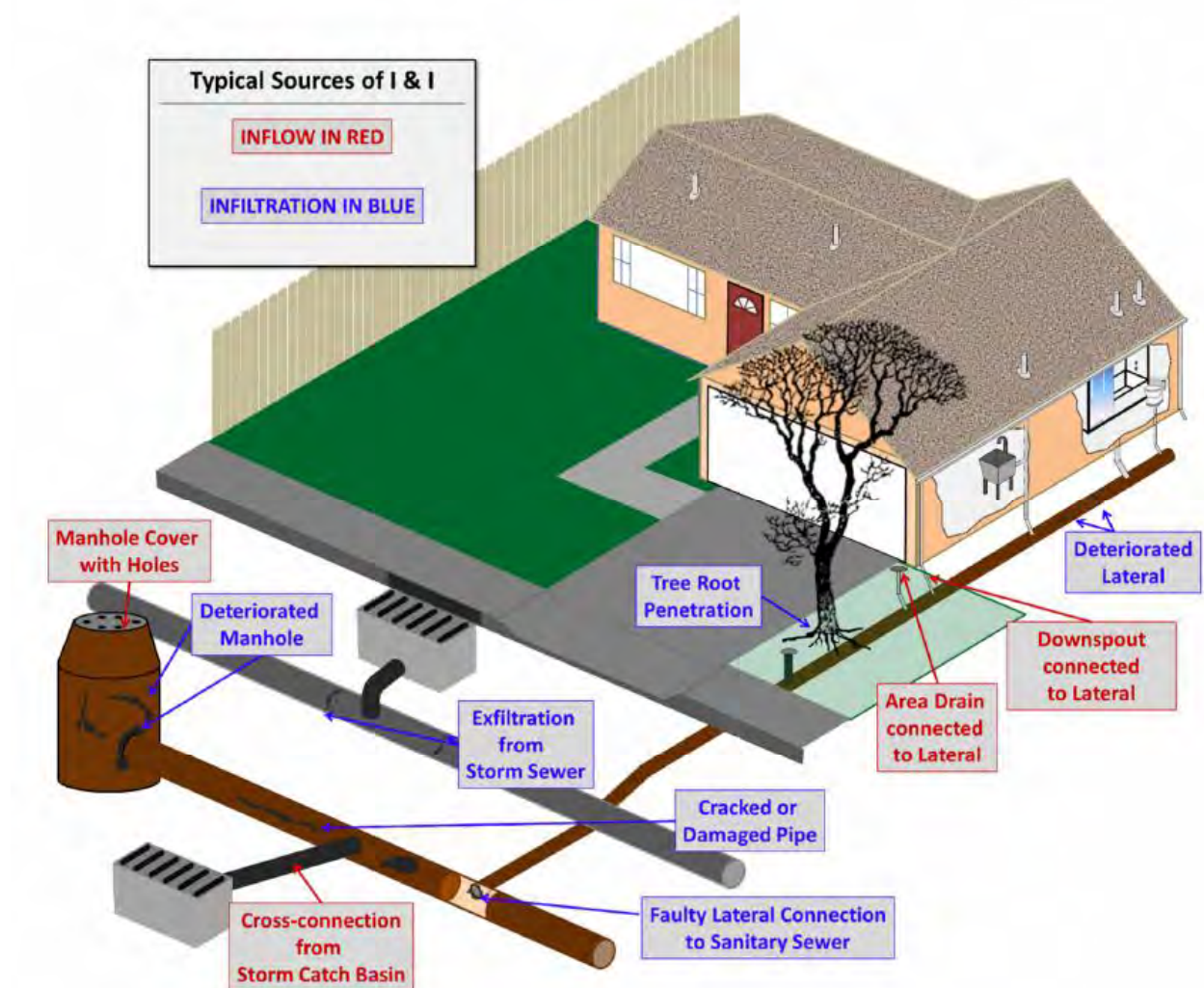


Figure 2-4. Typical Sources of Infiltration and Inflow

2.7.1 Infiltration Components

Infiltration can be further subdivided into components as follows:

- **Groundwater Infiltration:** Groundwater infiltration depends on the depth of the groundwater table above the pipelines as well as the percentage of the system submerged. The variation of groundwater levels and subsequent groundwater infiltration rates are seasonal by nature. On a day-to-day basis, groundwater infiltration rates are relatively steady and will not fluctuate greatly.
- **Rainfall-Dependent Infiltration:** This component occurs as a result of stormwater and enters the sewer system through pipe defects, as with groundwater infiltration. The stormwater first percolates directly into the soil and then migrates to an infiltration point. Typically, the time of concentration for rainfall-related infiltration may be 24 hours or longer, but this depends on the soil permeability and saturation levels.
- **Rainfall-Responsive Infiltration** is stormwater that enters the collection system indirectly through pipe defects, but normally in sewers constructed close to the ground surface, such as private laterals. Rainfall-responsive infiltration is independent of the groundwater table and reaches defective sewers via the pipe trench in which the sewer is constructed, particularly if the pipe is placed in impermeable soil and is bedded and backfilled with granular material. In this case, the pipe trench serves as a conduit similar to a French drain, conveying storm drainage to defective joints and other openings in the system. This type of infiltration can have a quick response and can look very similar to inflow graphically.

2.7.2 Impact and Cost of Source Detection and Removal

- **Inflow:**
 - **Impact:** Inflow creates a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows. Because the response and magnitude of inflow are closely tied to the storm event's intensity, the short-term peak instantaneous flows may result in surcharging and overflows within a collection system. Severe inflow may result in sewage dilution, resulting in upsetting the biological treatment (secondary treatment) at the treatment facility.
 - **Cost of Source Identification and Removal:** Inflow locations are usually less difficult to find and less expensive to correct. These sources include direct and indirect cross-connections with storm drainage systems, roof downspouts, and various types of surface drains. Generally, the costs to identify and remove sources of inflow are low compared to potential benefits to public health and safety or the costs of building new facilities to convey and treat the resulting peak flows.
- **Infiltration:**
 - **Impact:** Infiltration typically creates long-term annual volumetric problems. The major impact is the cost of pumping and treating the additional volume of water and of paying for treatment (for municipalities billed strictly on flow volume).
 - **Cost of Source Detection and Removal:** Infiltration sources are usually harder to find and more expensive to correct than inflow sources. Infiltration sources include defects in deteriorated sewer pipes or manholes that may be widespread throughout a sanitary sewer system.

2.7.3 Graphical Identification of I/I

Inflow is usually recognized graphically by large-magnitude, short-duration spikes immediately following a rain event. Infiltration is often recognized graphically by a gradual increase in flow after a wet-weather

event. The increased flow is typically sustained after rainfall stops and then gradually drops off as soils become less saturated and groundwater levels recede to normal levels. Real-time flows are plotted against ADWF to analyze the I/I response to rainfall events. Figure 2-5 illustrates a sample of how this analysis is conducted and some of the measurements that are used to distinguish infiltration and inflow. Similar graphs have been generated for the individual flow monitoring sites and can be found in Appendix A.

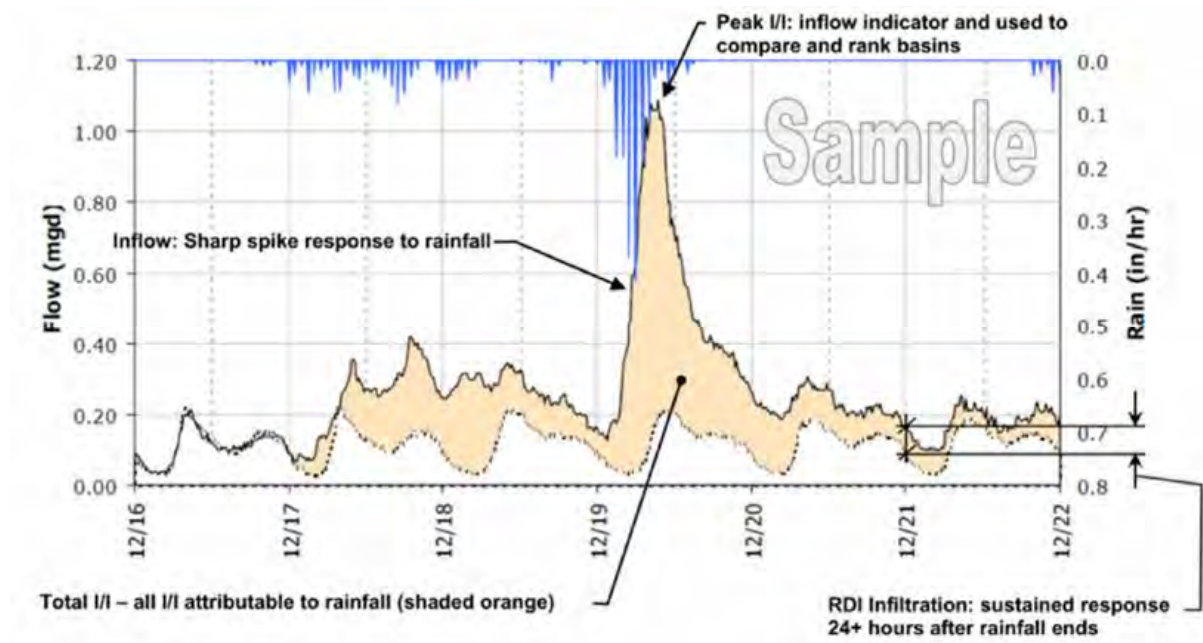


Figure 2-5. Sample Infiltration and Inflow Isolation Graph

2.7.4 Analysis Metrics

After differentiating I/I flows from ADWF flows, various calculations can be made to determine which I/I component (inflow or infiltration) is more prevalent at a particular site and to compare the relative magnitudes of the I/I components between drainage basins and between storm events:

- **Inflow – Peak I/I Flow Rate:** Inflow is characterized by sharp, direct spikes occurring during rainfall. Peak I/I rates are used for inflow analysis.
- **Groundwater Infiltration (GWI):** GWI analysis is conducted by looking at minimum dry weather flow to average dry weather flow ratios and comparing them to established standards to quantify the rate of excess groundwater infiltration.
- **Rainfall-Dependent Infiltration (RDI):** RDI Analysis is conducted by looking at the infiltration rates at set periods after the conclusion of a storm event. Depending on the collection system and the time required for flows to return to ADWF levels, different periods may be examined to determine the basins with the greatest or most sustained rainfall-dependent infiltration rates.
- **Combined I/I:** The combined inflow and infiltration are measured in gallons per site and storm event. Because it is based on combined I/I volume, it is used to identify the overall volumetric influence of I/I within the monitoring basin.

2.7.5 Normalization Methods

There are three ways to *normalize* the I/I analysis metrics for an “apples-to-apples” comparison among the different drainage basins:

- **Per-IDM:** The metric is divided by the length of the pipe [IDM (inch-diameter mile)) contained within the upstream basin. Final units typically are gallons per day (gpd) per IDM.
- **Per-ACRE:** The metric is divided by the acreage of the upstream basin. Final units typically are gallons per day (gpd) per ACRE.
- **Per-ADWF:** The metric is divided by the established average dry weather flow rate and is typically expressed as a ratio. Peaking Factors are examples of using ADWF to normalize data from different sites.

The infiltration and inflow indicators were normalized by the methods listed above in this report, and these results will be shown in the sections relating to the I/I analysis results. For the purposes of basin rankings, the following weighting decisions are given:

- **Per-IDM:** Per-IDM values were assigned 40% weighting towards final rankings.
- **Per-ACRE:** Per-ACRE values were assigned 40% weighting towards final rankings. The topography is known and should result in valid per-ACRE analyses.
- **Per-ADWF:** Per-ADWF metrics were assigned 20% weighting towards final rankings. It is noted that abnormal waste usage could result in low ADWF values, which could skew results and lead to possible misinterpretation of data.

3 Results and Analysis

3.1 Rainfall Monitoring

3.1.1 Rain Gauge Locations

V&A analyzed rainfall data from five (5) publicly available personal weather stations (PWS) on Weather Underground². Table 3-1 lists the recorded rainfall over the monitoring period at each site. Figure 3-1 illustrates the locations and labeling convention used for the rain gauges as well as the location of the metered basins.

Table 3-1. Recorded Rainfall

Rain Gauge	Source	X (Longitude)	Y (Latitude)	Total Rain (in)
RG Southwest	WU (KCALINC0239)	-121.317	38.874	4.62
RG West	WU (KCALINC0126)	-121.319	38.878	4.77
RG South	WU (KCALINC0223)	-121.308	38.863	5.30
RG North	WU (KCALINC0167)	-121.317	38.893	4.78
RG Northwest	WU (KCALINC0253)	-121.321	38.889	5.46

3.1.2 Flow Study Rainfall Data

Three rainfall events elicited minor I/I responses during the flow monitoring periods. These events were of similar intensity and duration. These selected events are summarized in Table 3-2 and illustrated in Figure 3-2 to provide context.

- Event 1 was a multi-day event from February 12th through February 14th, which resulted in an I/I response. A triangulated average of 1.52 inches of rainfall was recorded over the 2-day period. This event was classified as approximately a 1.5-year, 6-hour event.
- Event 2 was a multi-day event from March 11th through March 15th, which resulted in an I/I response. A triangulated average of 1.19 inches of rainfall was recorded over the 4-day period. This event was classified as approximately a 1-year, 2-hour event.
- Event 3 was a multi-day event from March 16th through March 18th, which resulted in an I/I response. A triangulated average of 1.15 inches of rainfall was recorded over the 2-day period. This event was classified as approximately a 3-year, 1-hour event.

² Weather Underground (wunderground.com) collects data from 180,000+ weather stations across the country, including Automated Surface Observation System (ASOS) at airports, personal weather stations (PWS), and Meteorological Assimilation Data Ingest System (MADIS) managed by the National Oceanic and Atmospheric Administration (NOAA). While V&A has no direct control over the rain gauges, V&A performs additional QA/QC on the data to assure its suitability for use.

Table 3-2. Summary of Rainfall Data

Rain Gauge	Rain Event 1 Feb 12th – 14th (in)	Rain Event 2 March 11th – 15th (in)	Rain Event 3 March 16th – 18th (in)
RG Southwest (KCALINCO239)	1.43	1.12	1.01
RG West (KCALINCO126)	1.45	1.13	1.13
RG South (KCALINCO223)	1.61	1.32	1.08
RG North (KCALINCO167)	1.54	1.10	1.19
RG Northwest (KCALINCO253)	1.64	1.25	1.51
Triangulated to the area centroid	1.52	1.19	1.15

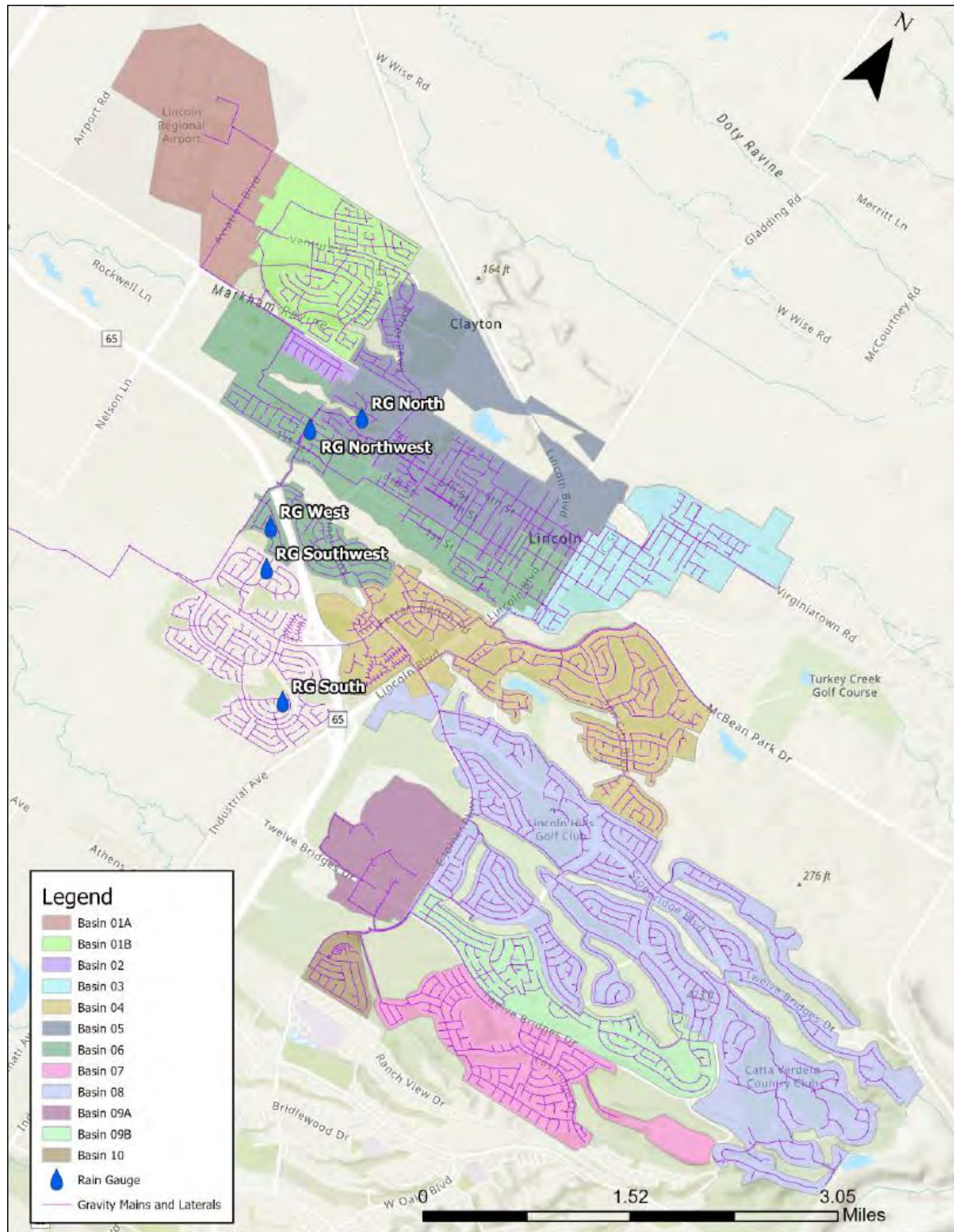


Figure 3-1. Location of Rain Gauges

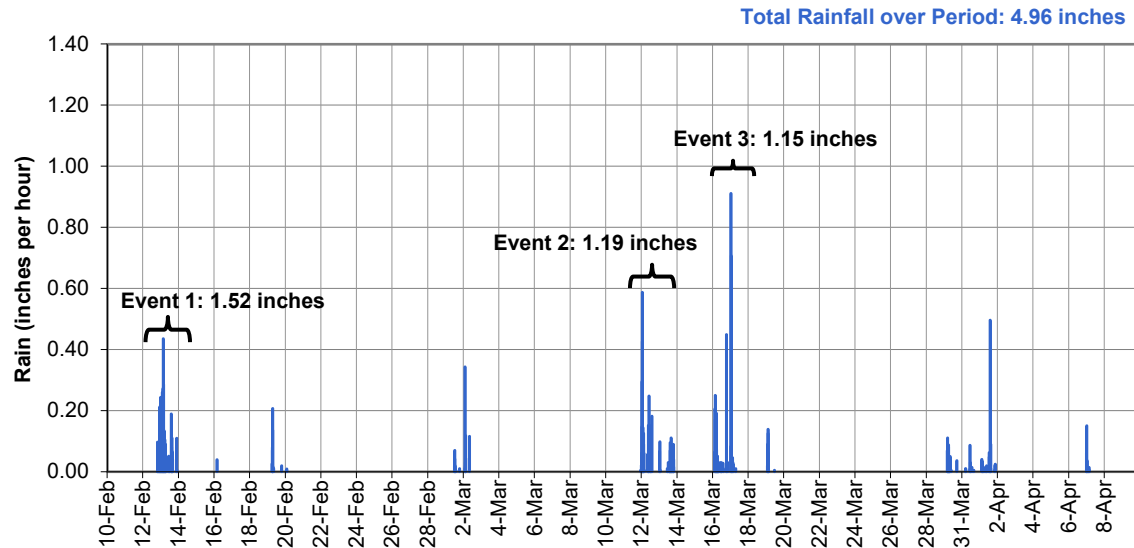


Figure 3-2. Rainfall Monitoring (triangulated to the area centroid)

Figure 3-3 shows the rain accumulation plot of the period rainfall, as well as the historical average rainfall³ triangulated to the area centroid, which was 4.96/6.86, or approximately 72%, of the historical precipitation averages over the same period.

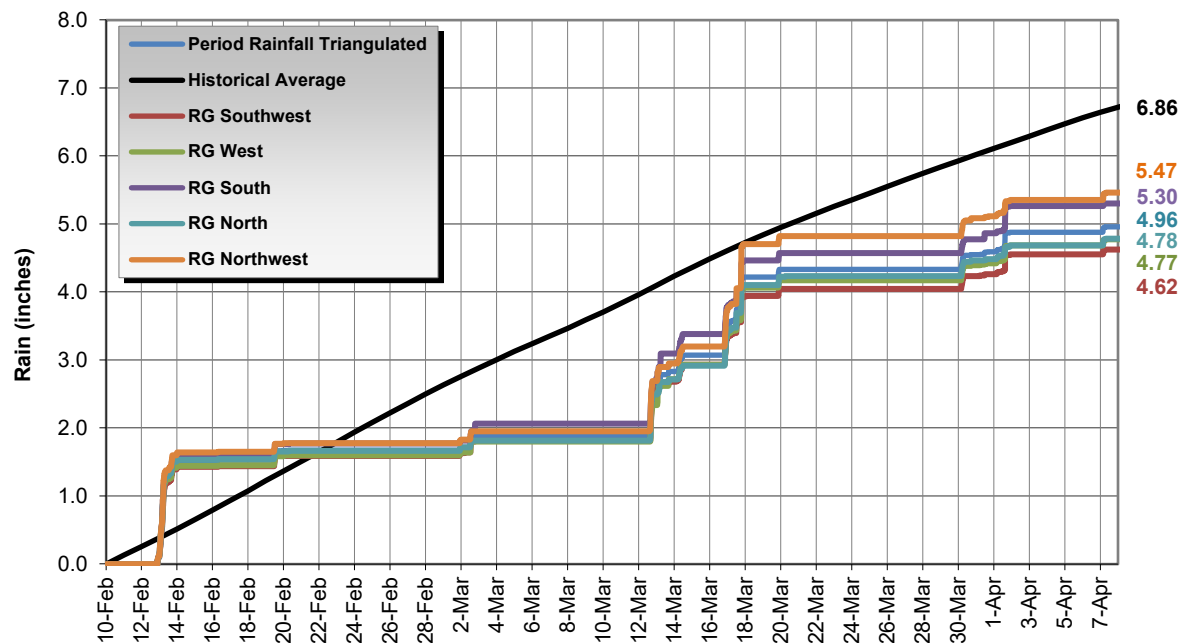


Figure 3-3. Rainfall Accumulation Plot

³ Historical data taken from the Western Regional Climate Center (Station 040383 at Auburn and Station 047516 at Rocklin): <http://www.wrcc.dri.edu/summary/climsmnca.html>

3.1.3 Regional Rainfall Event Classification

It is important to classify the relative size of a major storm event that occurs over the course of a flow monitoring period⁴. Rainfall events are classified by intensity and duration. Based on historical data, the NOAA has developed frequency contour maps for storm events of given intensity and duration for all areas within the continental United States (Figure 3-4).

For example, the NOAA Rainfall Frequency Atlas⁵ classifies a 10-year, 24-hour storm event at RG West as 3.32 inches. This means that in any given year, at this specific location, there is a 10% chance that 3.32 inches of rain will fall in any 24-hour period.

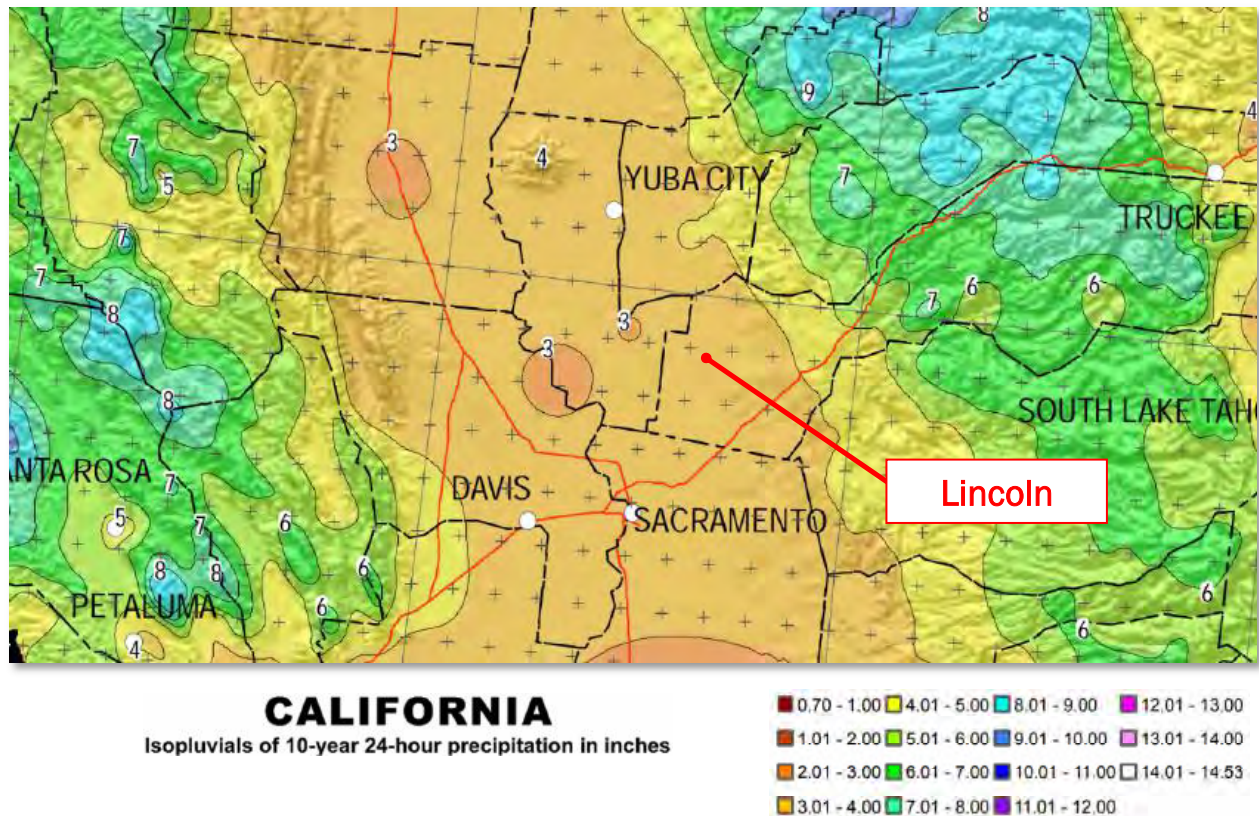


Figure 3-4. NOAA Northern California Rainfall Frequency Map

From the NOAA frequency maps, for a specific latitude and longitude, the rainfall densities for period durations ranging from 1 hour to 20 days are known for rain events ranging from 1-year to 10-year intensities. These are plotted to develop a rain event frequency map specific to each rainfall monitoring site. Superimposing the peak measured densities for the rainfall events on the rain event frequency plot determines the classification of the rainfall event.

Figure 3-5, Figure 3-6, Figure 3-7, Figure 3-8, and Figure 3-9 show the classification plots for the rain events from each rain gauge over the flow monitoring period.

⁴ Sanitary sewers are often designed to withstand I/I contribution to sanitary flows for specific-sized “design” storm events.

⁵ NOAA Western U.S. Precipitation Frequency Maps Atlas 14, Volume 6, 2011:
<http://hdsc.nws.noaa.gov/pub/hdsc/data/sw/ca10y24h.pdf>

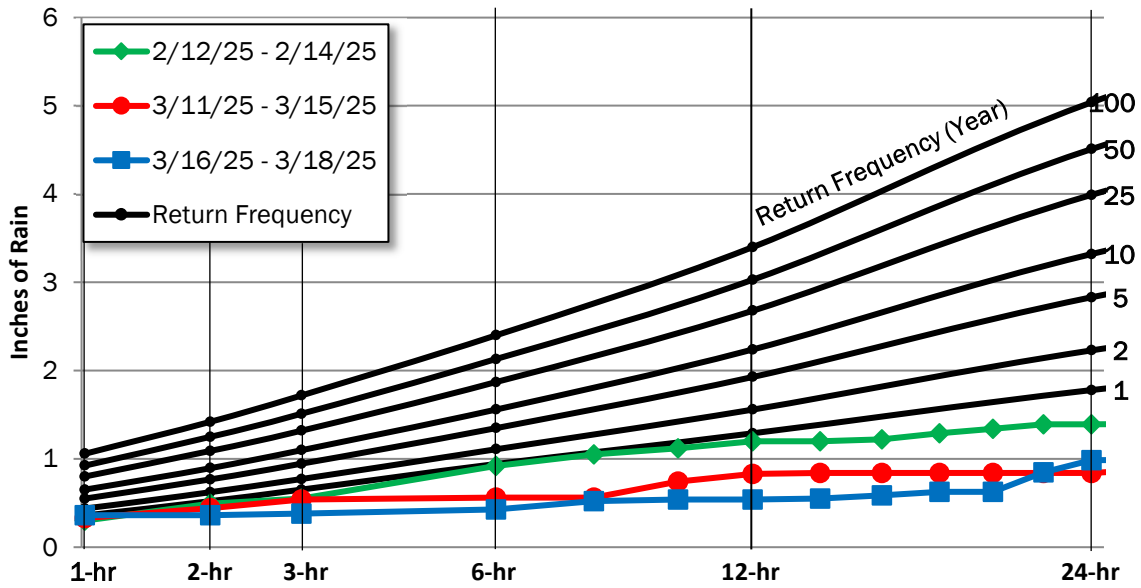


Figure 3-5. Rainfall Event Classification - 24-Hour Period (RG Southwest)

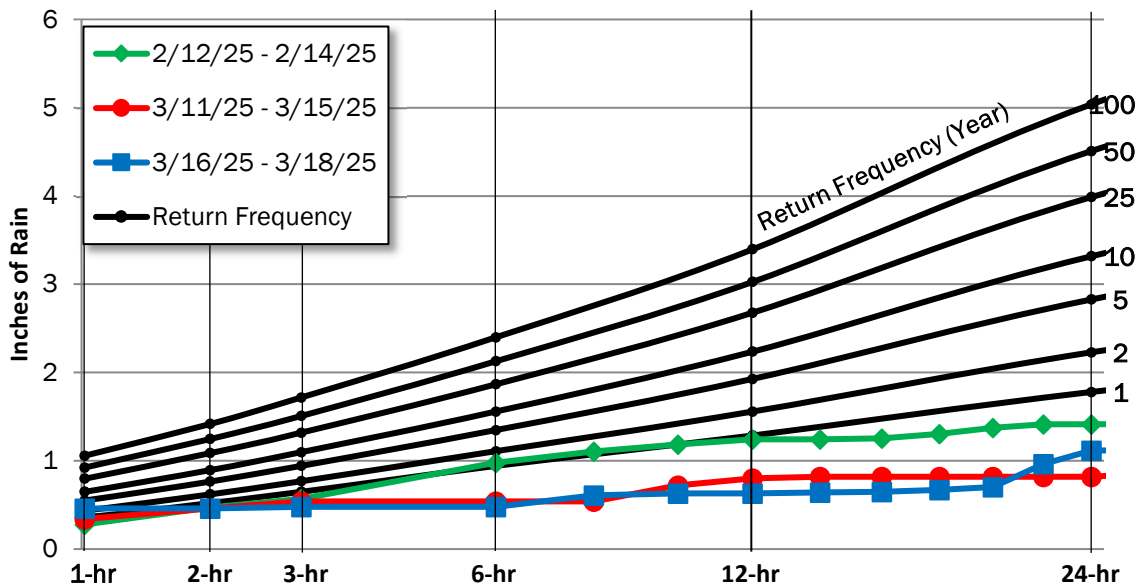


Figure 3-6. Rainfall Event Classification - 24-Hour Period (RG West)

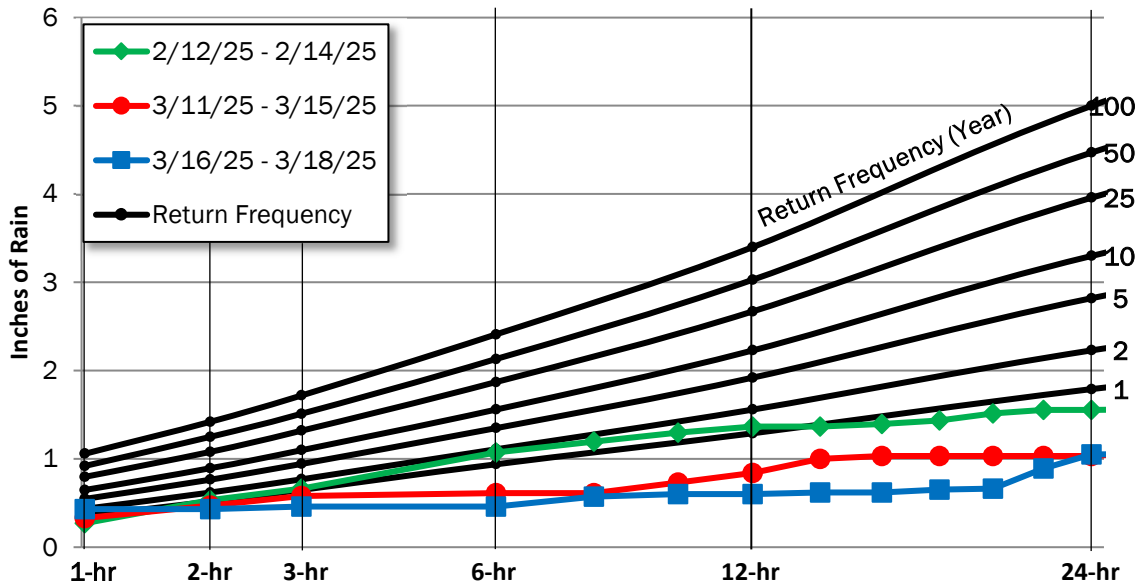


Figure 3-7. Rainfall Event Classification - 24-Hour Period (RG South)

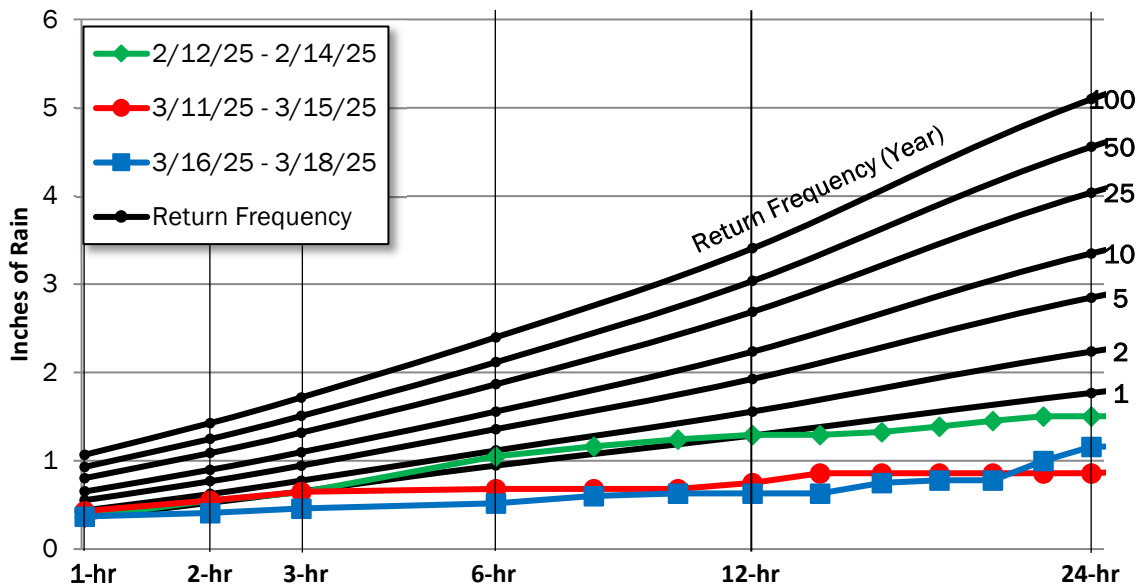


Figure 3-8. Rainfall Event Classification - 24-Hour Period (RG North)

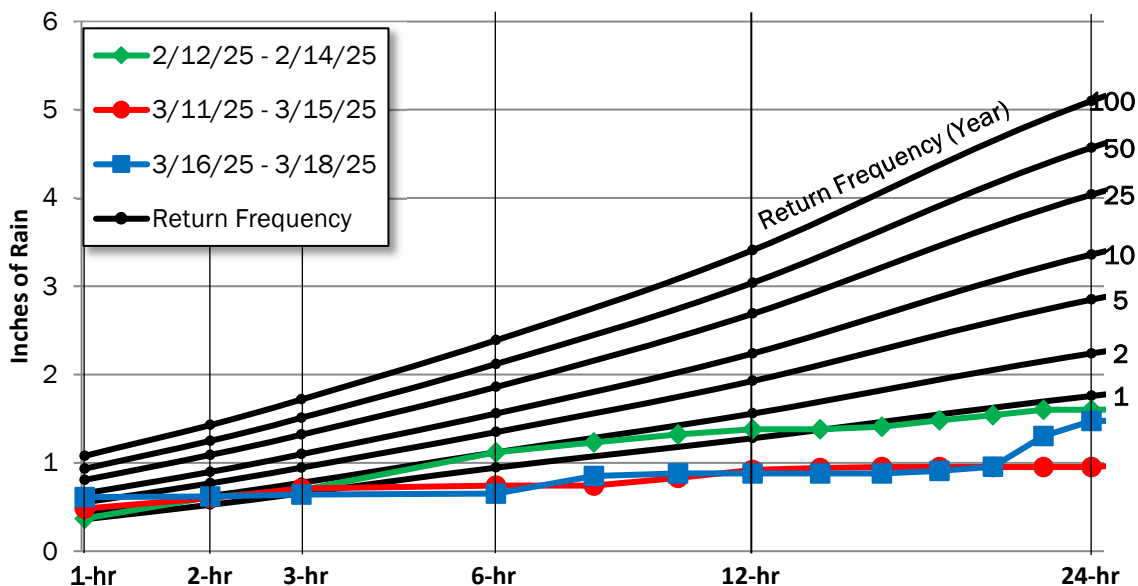


Figure 3-9. Rainfall Event Classification – 24-Hour Period (RG Northwest)

Table 3-3. Rainfall Event Classification Summary

Rain Gauge	Rain Event #1 Classification	Rain Event #2 Classification	Rain Event #3 Classification
RG Southwest (KCALINCO239)	1-year, 6-hour	1-year, 2-hour	1-year, 1-hour
RG West (KCALINCO126)	1.2-year, 6-hour	1-year, 1-hour	3-year, 1-hour
RG South (KCALINCO223)	2-year, 6-hour	1-year, 3-hour	3-year, 1-hour
RG North (KCALINCO167)	1.8-year, 6-hour	2-year, 1-hour	1-year, 1-hour
RG Northwest (KCALINCO253)	2-year, 6-hour	2-year, 1-hour	8-year, 1-hour

3.1.4 Rain Gauge Triangulation Distribution

The rainfall affecting the sanitary sewer collection system basins must be calculated based on their proximity to the rain gauge locations. The mean precipitation for each site's upstream basin was calculated by taking data from the rain gauges and using the inverse distance weighting (IDW) method. IDW is an interpolation method that assumes the influence of each rain gauge location diminishes with distance. The center of an upstream basin⁶ is identified, and a weighted triangulated average of the precipitation data from nearby rain gauge locations is taken.

⁶ Note that the full basin upstream of the site was used instead of the isolated basins as the rain data will be compared to the flow at each site

The IDW function is as follows:

$$weight(d) = \frac{1/d^p}{\sum 1/d^p},$$

where: d = distance
 p = power ($p > 0$)

The value of p is user-defined. The most common choice for hydrological studies of watershed areas is $p = 2$.

Figure 3-10 illustrates the IDW method with sample data. The rain gauge distribution, as calculated for each flow monitoring site, is shown in Table 3-4.

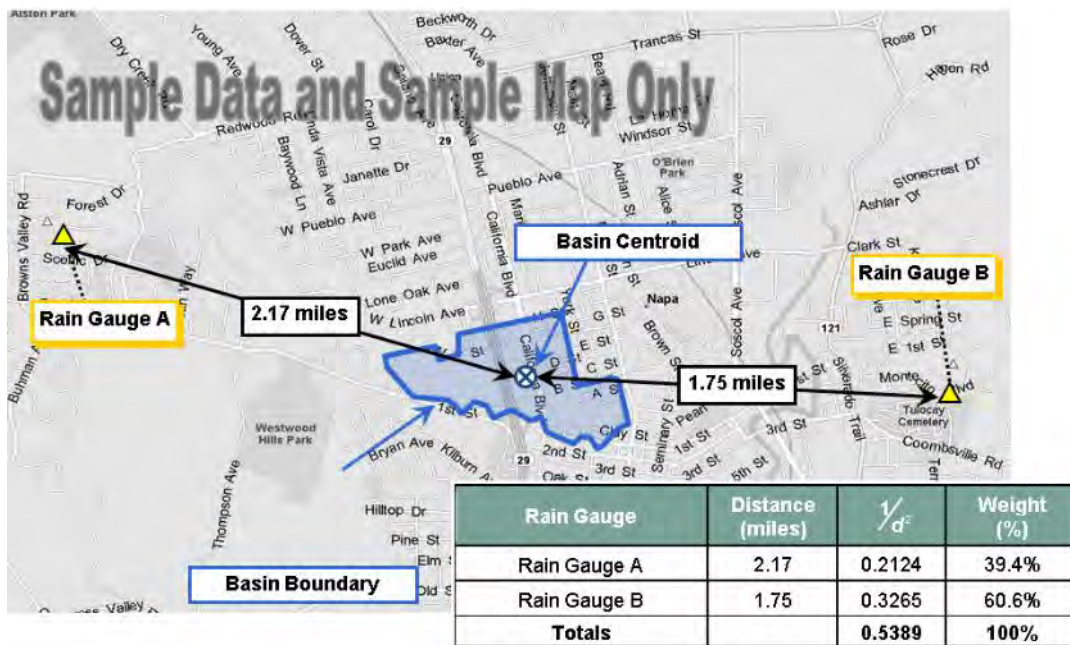


Figure 3-10. Rainfall Inverse Distance Weighting Method

Table 3-4. Rain Gauge Distribution per Monitoring Site

Site	RG Southwest	RG West	RG South	RG North	RG Northwest
Site 01A	13.8%	17.1%	8.1%	30.8%	30.2%
Site 01B	9.2%	12.2%	4.8%	41.3%	32.5%
Site 02	4.1%	6.2%	1.7%	49.5%	38.5%
Site 03	16.9%	18.2%	13.7%	29.0%	22.2%
Site 04	21.3%	19.2%	29.4%	15.4%	14.7%
Site 05	7.2%	9.4%	3.7%	56.3%	23.4%
Site 06	9.2%	13.1%	4.5%	41.4%	31.8%
Site 07	20.6%	17.8%	35.5%	12.9%	13.2%
Site 08	20.3%	17.8%	34.8%	13.6%	13.5%
Site 09A	17.3%	13.4%	53.9%	7.4%	8.0%
Site 09B	20.7%	18.3%	32.5%	14.2%	14.3%
Site 10	19.7%	16.8%	39.7%	11.7%	12.1%

3.2 Flow Monitoring

3.2.1 Average Flow Analysis

Average dry weather flow (ADWF) curves were established during dry days when I/I had the least impact on the baseline flow. Table 3-5 summarizes the dry weather flow data measured for this study. ADWF curves for each site can be found in Appendix A.

Figure 3-11 shows a flow schematic of the average daily flows and levels. The following ADWF analysis results are noted:

- No site showed an average dry weather flow level greater than 50% pipe full conditions (greater than 0.5 d/D).

Table 3-5. Dry Weather Flow

Monitored Site	Sediment (in.)	Average d/D Ratio	Mon-Thu ADWF (MGD)	Friday ADWF (MGD)	Saturday ADWF (MGD)	Sunday ADWF (MGD)	Overall ADWF (MGD)
Site 01A	none	0.13	0.012	0.009	0.008	0.007	0.010
Site 01B	none	0.39	0.243	0.247	0.259	0.256	0.247
Site 02	none	0.09	0.055	0.057	0.058	0.060	0.056
Site 03	none	0.13	0.359	0.347	0.383	0.397	0.366
Site 04	none	0.19	4.683	4.608	4.697	4.637	4.667
Site 05	0.5	0.23	0.397	0.382	0.426	0.436	0.405
Site 06	none	0.15	1.190	1.142	1.248	1.308	1.208
Site 07	none	0.31	0.357	0.343	0.373	0.383	0.361
Site 08	none	0.19	1.473	1.447	1.469	1.469	1.468
Site 09A	0.5	0.29	0.245	0.237	0.242	0.249	0.244
Site 09B	none	0.21	0.260	0.252	0.272	0.267	0.261
Site 10	none	0.22	0.468	0.442	0.477	0.508	0.471

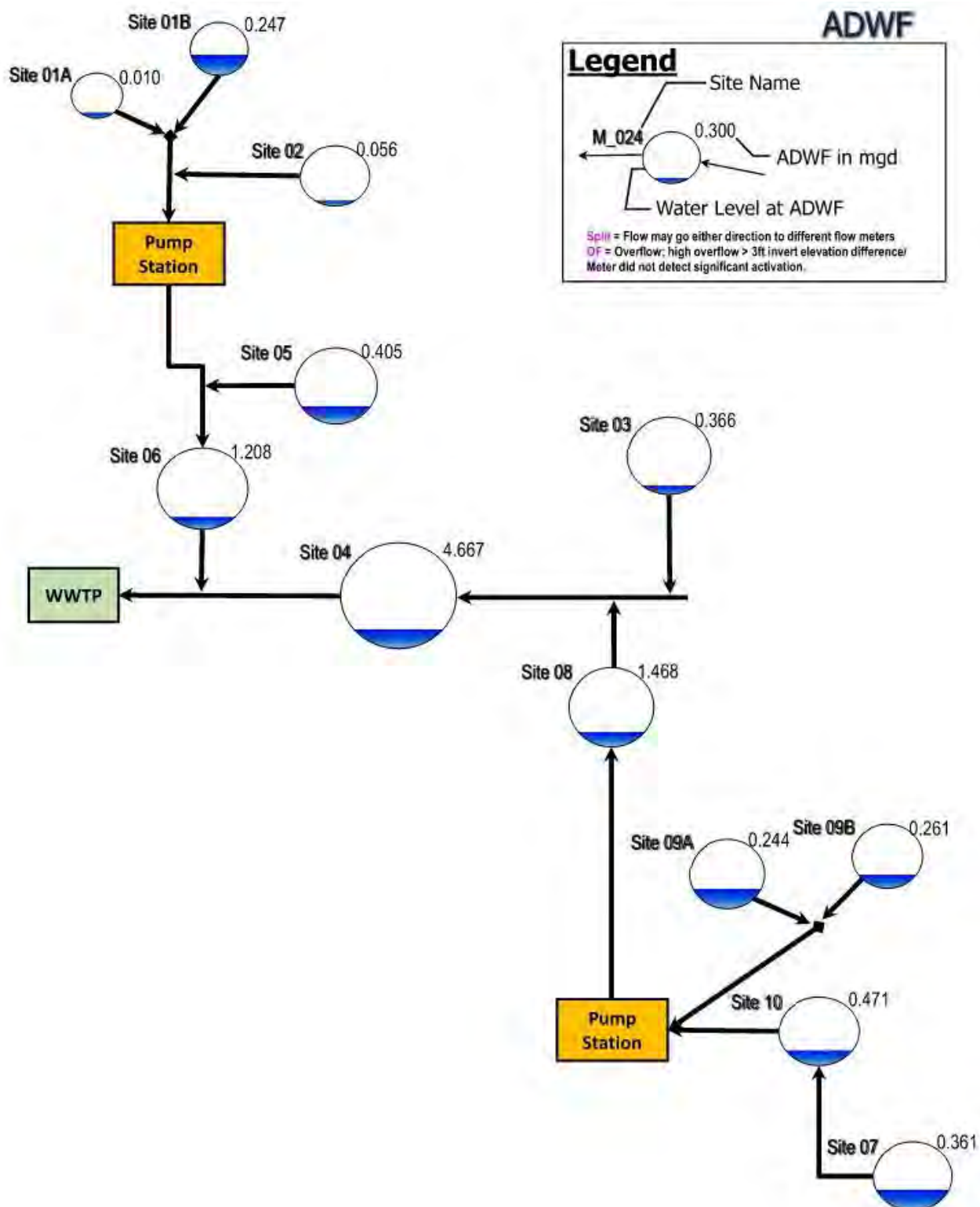


Figure 3-11. Average Dry Weather Flow (Flow Schematic)

3.2.2 Peak Measured Flows and Pipeline Capacity Analysis

Peak measured flows and the hydraulic grade line data (flow depths) are important to understanding the capacity limitations of a collection system. The peak flows, and flow levels are the peak measurements taken across the entirety of the flow monitoring period. For this study, peak flows and peak levels correspond to rainfall events. The following capacity analysis definitions will be used:

- **The Peaking Factor (PF)** is defined as the peak measured flow divided by the average dry weather flow (ADWF). Peaking factors are influenced by many factors, including size and topography of the tributary area, flow attenuation, flow restrictions, characteristics of I/I entering the collection system, and hydraulic features such as pump stations.
 - For this report, if $PF > 7$ is highlighted in **RED**⁷, the City should refer to City standards when evaluating peaking factors. Peaking factor data should be used at the discretion of the City Engineer.
- **d/D Ratio** is the peak measured depth of flow (d) divided by the pipe diameter (D). The d/D ratio for each site is computed based on the maximum depth of flow for the study. Standards for the d/D ratio vary from agency to agency but typically range between $d/D \leq 0.5$ and $d/D \leq 0.75$
 - For this report, if d/D ratios > 0.75 , it is highlighted in **RED**; however, the City should refer to City standards when evaluating d/D ratios, to be used at the discretion of the City Engineer.

Table 3-6 summarizes the peak recorded flows, depths, d/D ratios, and peaking factors per site during the flow monitoring period. Capacity analysis data are presented on a site-by-site basis and represent the hydraulic conditions only at the site locations; hydraulic conditions in other areas of the collection system will differ. Figure 3-12 and Figure 3-13 show bar graph summaries of the peaking factors and d/D ratios, respectively. Figure 3-14 shows the schematic diagram of the peak measured flows in each section with peak flow levels.

The following capacity analysis results are noted:

- **Peaking Factors**
 - Site 01A had a peaking factor greater than 7. This is due to the low ADWF value for this site.
- **d/D Ratio:**
 - No site had a max d/D ratio greater than 0.75 during the monitoring period.

⁷ WEF Manual of Practice FD-6 and ASCE Manual No. 62 suggests typical peaking factor ratios range between 3 and 4, with higher values possibly indicative of pronounced I/I flows.

Table 3-6. Capacity Analysis Summary

Site	ADWF (MGD)	Peak Measured Flow (MGD)	Peaking Factor	Pipe Diameter, D (IN)	Max Depth, d (IN)	Max d/D Ratio	Surcharge above pipe crown (FT)
Site 01A	0.010	0.147	14.6	10	3.3	0.33	n/a
Site 01B	0.247	0.728	2.9	15	8.7	0.58	n/a
Site 02	0.056	0.114	2.0	17.5	2.2	0.13	n/a
Site 03	0.366	1.307	3.6	29	6.7	0.23	n/a
Site 04	4.667	11.642	2.5	48	16.3	0.34	n/a
Site 05	0.405	1.806	4.5	23	10.9	0.47	n/a
Site 06	1.208	5.795	4.8	36	11.4	0.32	n/a
Site 07	0.361	0.799	2.2	15	6.4	0.43	n/a
Site 08	1.468	3.101	2.1	24	6.7	0.28	n/a
Site 09A	0.244	0.522	2.1	16	6.8	0.42	n/a
Site 09B	0.261	0.981	3.8	12	4.3	0.36	n/a
Site 10	0.471	1.044	2.2	15	5.5	0.37	n/a

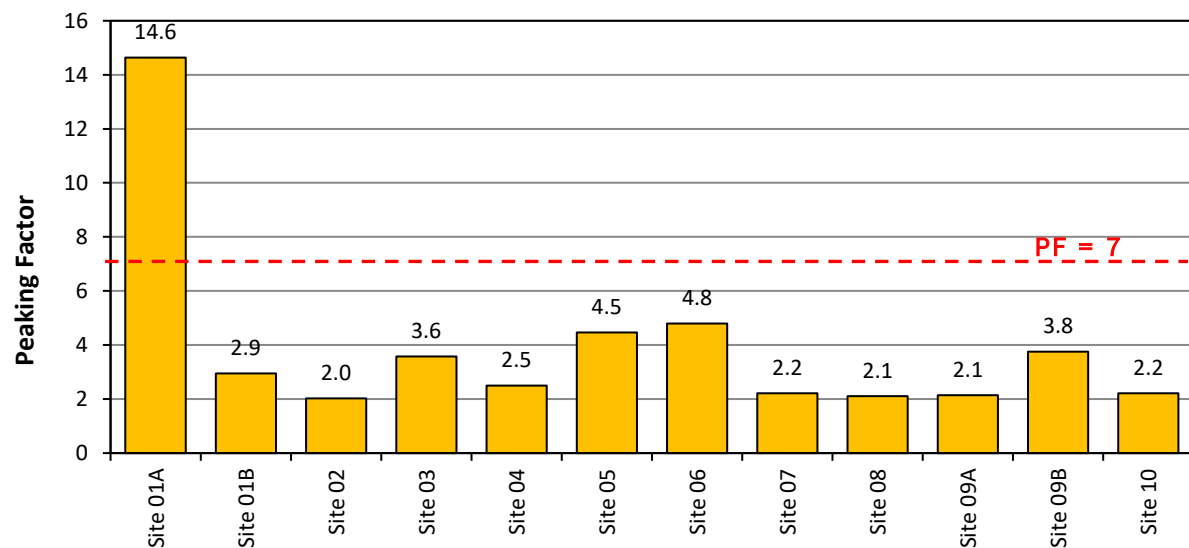


Figure 3-12. Peaking Factors

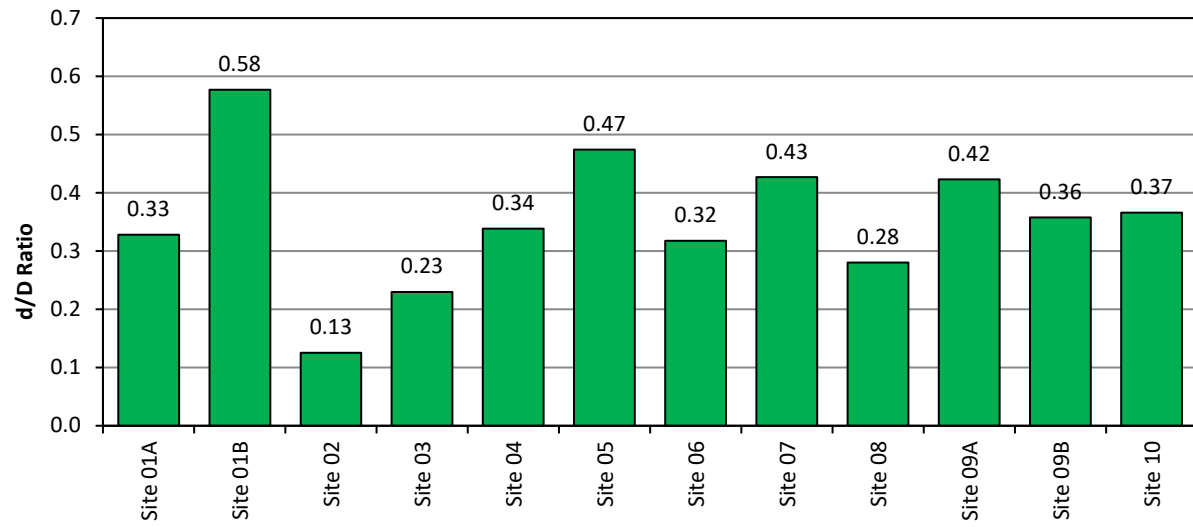


Figure 3-13. Capacity Summary: Max d/D Ratios

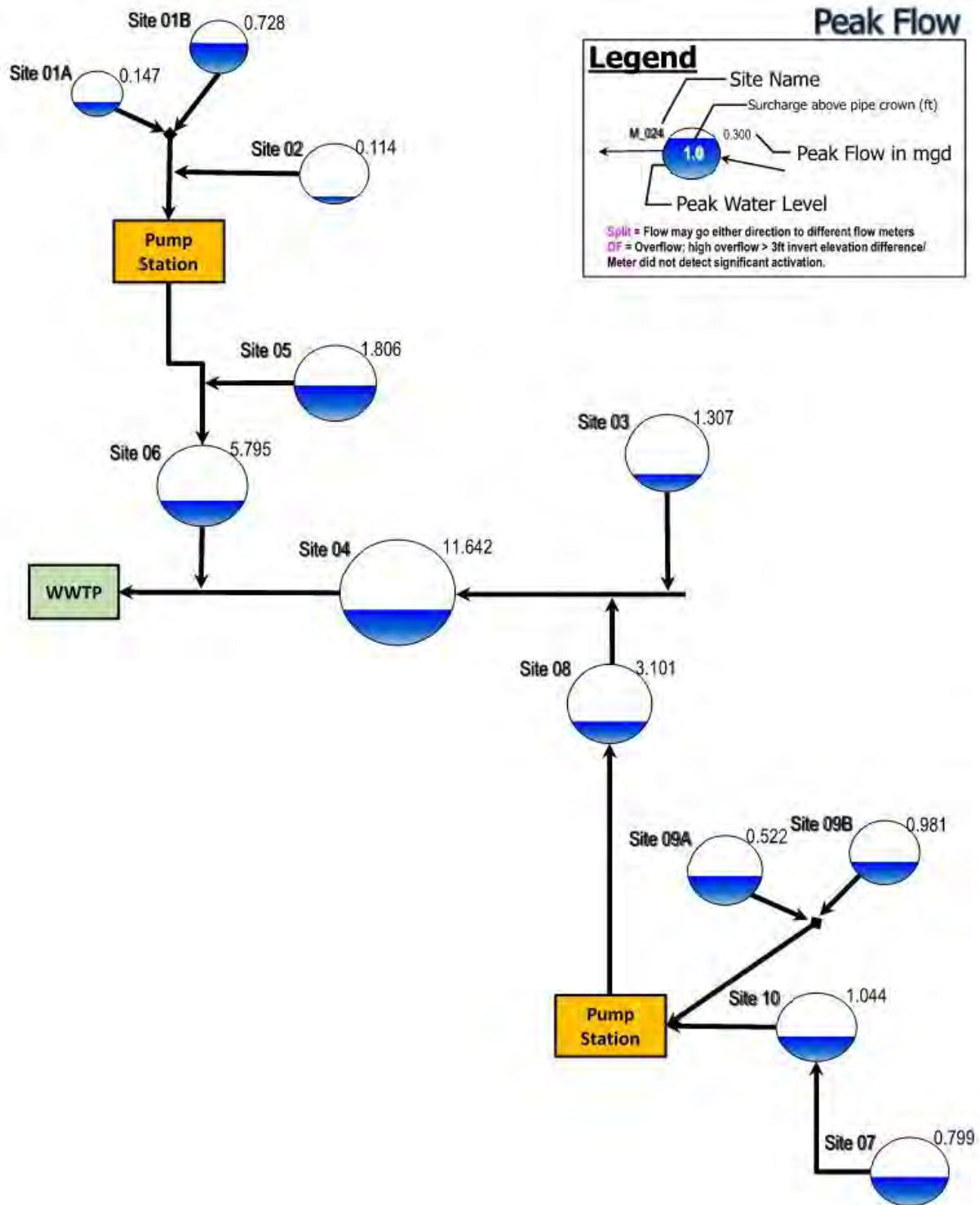


Figure 3-14. Peak Measured Flow (Flow Schematic)

3.3 Inflow and Infiltration: Results

3.3.1 Preface

I/I analyses are presented on a basin-by-basin basis. Items relevant to the analysis in this study are noted below and referenced in Figure 3-15:

- **I/I Isolation:** The I/I flow rate is the real-time flow less the estimated average dry weather flow rate (shown below as the **RED** line).
- **Inflow:** Inflow is usually recognized graphically by large-magnitude, short-duration spikes immediately following a rain event. The peak inflow rate is the highest spike in the isolated I/I hydrograph immediately following the evaluated rainfall event.
- **RDI:** RDI is typically taken as the average I/I flow rate measured approximately 24 hours after the rainfall event has concluded.
- **Combined I/I:** the totalized volume (in gallons) of inflow and RDI over a rainfall event (shown below as the shaded orange area).

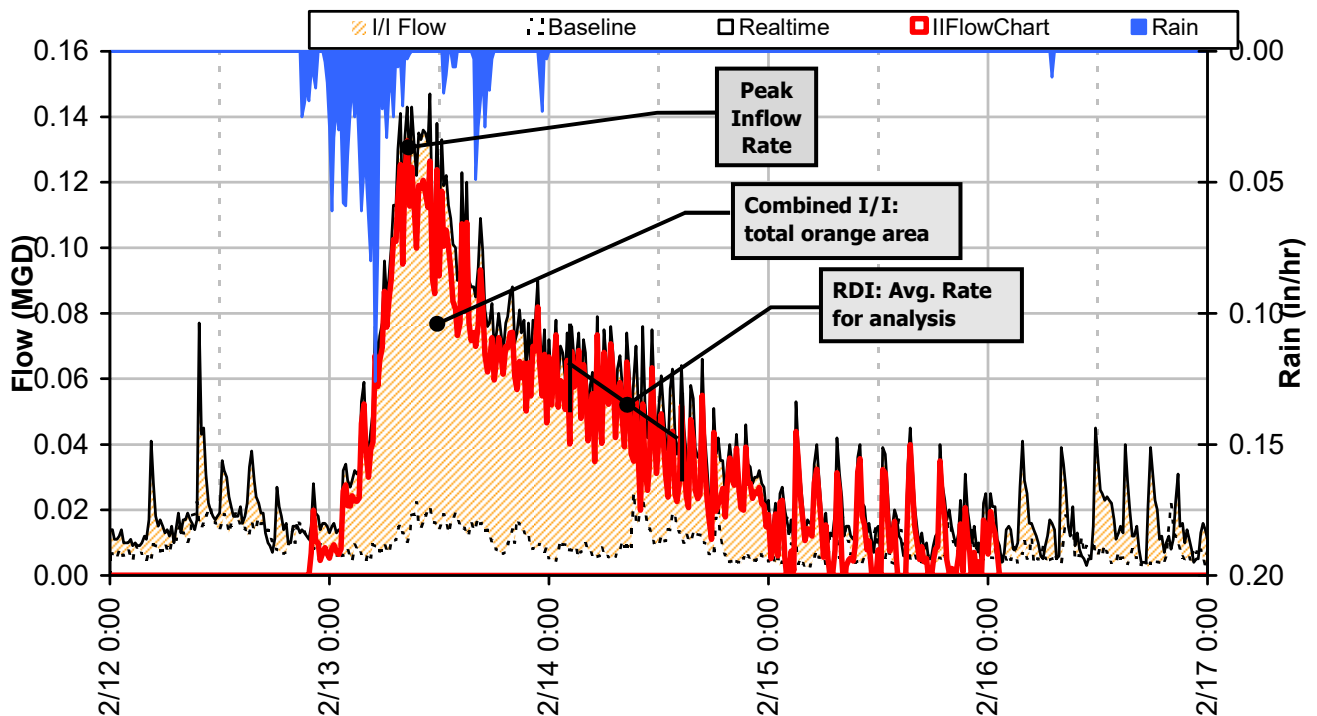


Figure 3-15. I/I Isolation, Site 01 Event #1

To isolate the sewerage areas of some flow monitoring basins, a subtraction of flow(s) was required (reference Table 1-2). Please reference Section 1.2 and Section 2.4 for additional information on flow subtraction.

3.3.2 Inflow Results Summary

Inflow is stormwater discharged into the sewer system through direct connections such as downspouts, area drains, cross-connections to catch basins, etc. These sources transport rainwater directly into the sewer system, and the corresponding flow rates are tied closely to the intensity of the storm. This component of I/I often causes a peak flow problem in the sewer system and often dictates the required capacity of downstream pipes and transport facilities to carry these peak instantaneous flows.

Table 3-7 and Figure 3-16 through Figure 3-18 summarize the peak measured inflow and inflow analysis results for the relevant flow monitoring basins. The “Top 3” basins for each category have been shaded in **RED**. The following inflow results are noted:

- Flow monitoring Sites / Basins 04, 05, and 6 had the highest normalized peak I/I rates per the 3 inflow categories utilizing the method listed in Section 2.7.5.
- Flow monitoring Site / Basin 04 ranked the highest for inflow per IDM and overall, with a rate of 13,221 gpd/IDM.
- Flow monitoring Site / Basin 04 ranked the highest for inflow per Acre, with a rate of 5,003 gpd/Acre.
- Flow monitoring Site / Basin 01A ranked the highest for inflow per ADWF, with a ratio of 13.2.

Table 3-7. Results and Rankings of Inflow Analysis

Site & Basin ID	ISO ADWF (MGD)	ISO IDM	ISO Basin Acreage	Max Inflow Rate (MGD)	Inflow per-IDM Ranking	Inflow per-Acre Ranking	Inflow per-ADWF Ranking	Final Inflow Ranking
01A	0.010	24	693	0.13	6	12	1¹	7
01B	0.247	104	509	0.55	7	5	5	5
02	0.056	15	51	0.04	10	7	11	10
03	0.366	119	498	0.99	4	3	4	4
04	2.833	372	983	4.92	1	1	6	1
05	0.405	147	1,002	1.38	3	4	3	3
06	0.490	216	835	2.55	2	2	2	2
07	0.361	118	528	0.40	9	8	8	9
08	0.492	355	2,005	0.44	12	11	9	12
09A	0.244	29	342	0.15	5	9	10	8
09B	0.261	84	416	0.40	8	6	7	6
10	0.110	30	98	0.05	11	10	12	11

¹Basin 01A Inflow per-ADWF ranking skewed due to low ADWF value

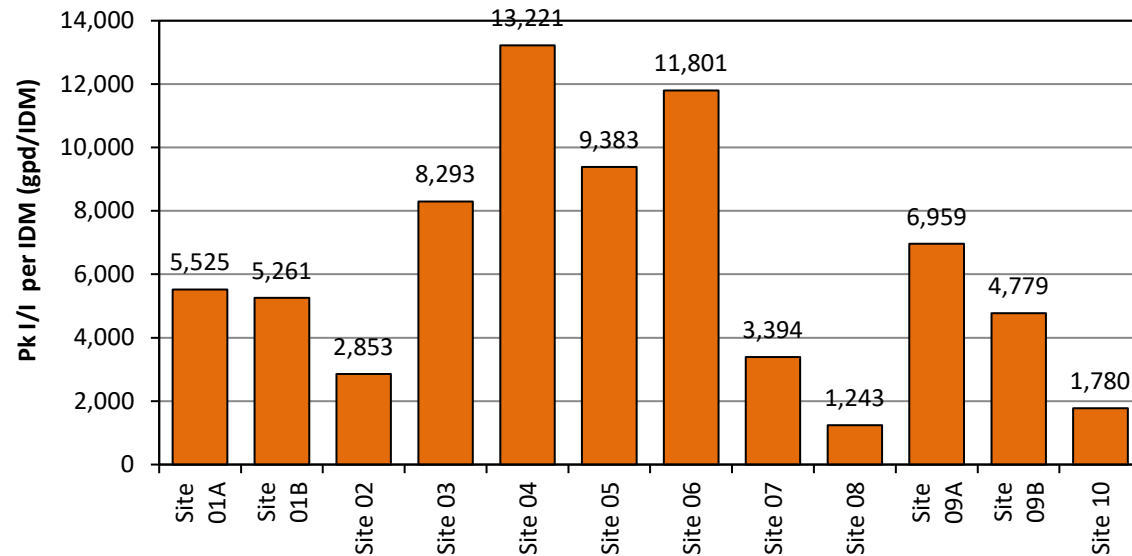


Figure 3-16. Averaged Peak I/I per IDM Analysis

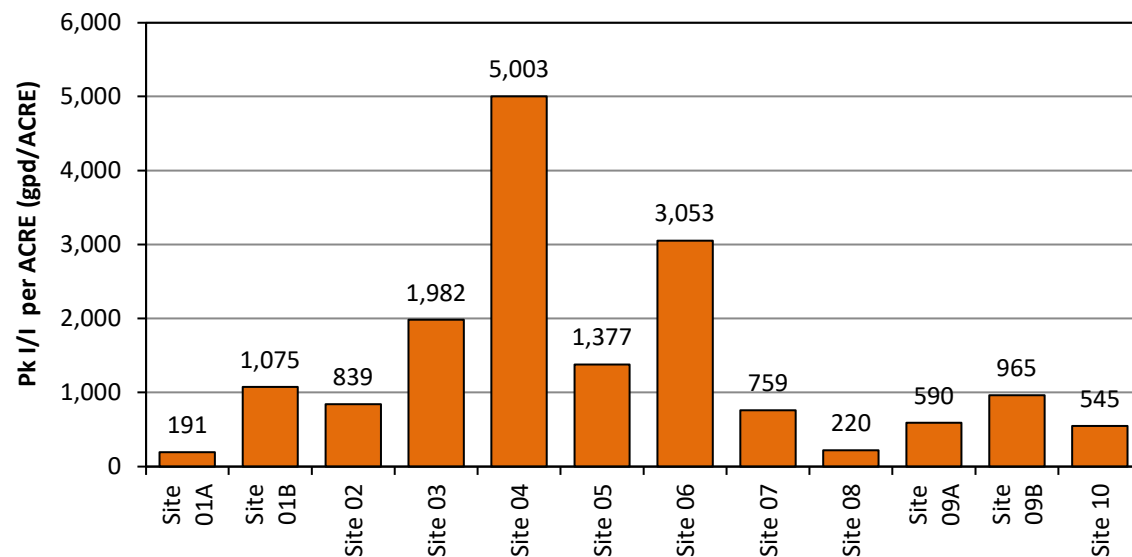


Figure 3-17. Averaged Peak I/I per Acre Analysis

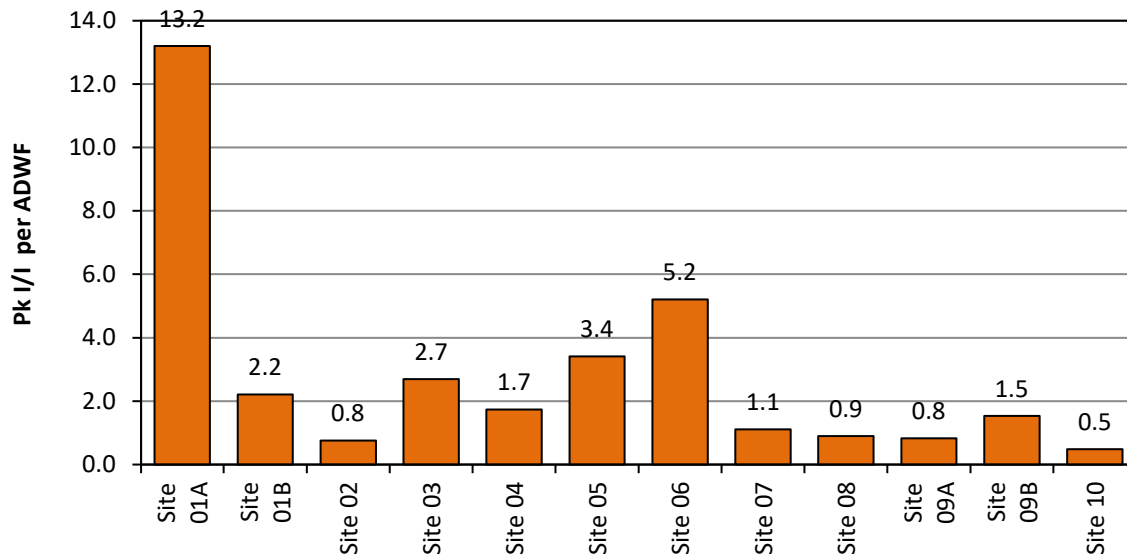


Figure 3-18. Averaged Peak I/I per ADWF Analysis

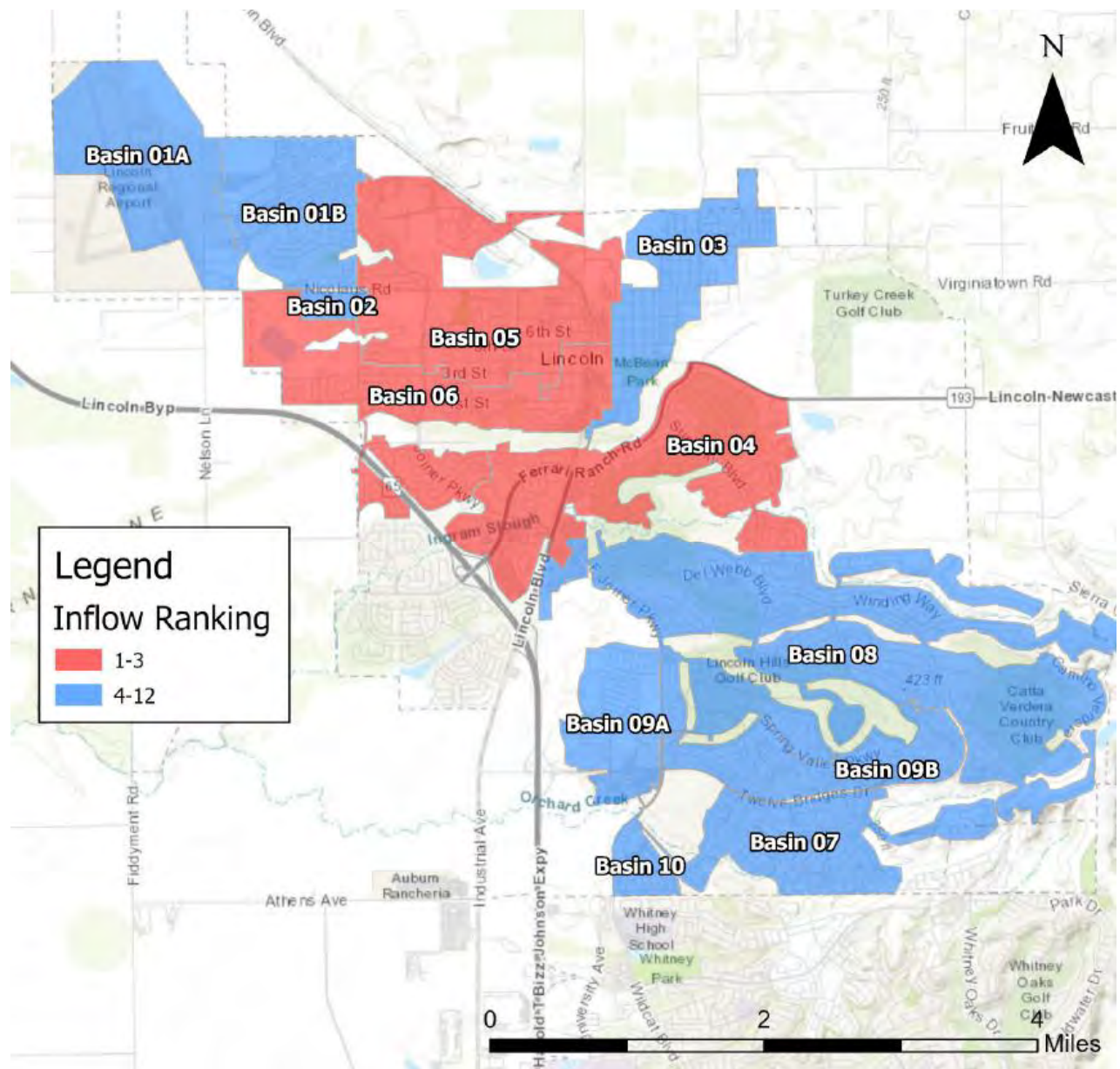


Figure 3-19. Temperature Map: Inflow Final Basin Rankings

3.3.3 Rainfall-Dependent Infiltration Results Summary

Infiltration is water entering the sanitary sewer system through defects in pipes, pipe joints, and manhole walls, including cracks, offset joints, root intrusion points, and broken pipes. Increased flows into the sanitary sewer system are usually tied to groundwater and soil saturation levels. Infiltration sources transport rainwater into the system indirectly; flow levels in the sanitary system increase gradually, are typically sustained for a period after rainfall has stopped, and then gradually decrease as soils become less saturated and groundwater levels recede to normal.

Infiltration typically creates long-term annual volumetric problems. The major impact is the cost of pumping and treating the additional volume of water and of paying for treatment (for municipalities that are billed strictly on flow volume).

RDI results were taken from February 13th, March 13th, and March 18th for Events 1, 2, and 3, respectively. Table 3-8 and Figure 3-20 through Figure 3-22 summarize the RDI analysis results for the relevant flow monitoring basins. The “Top 3” basins for each category have been shaded in **RED**. The following inflow results are noted:

- Flow monitoring Sites / Basins 03, 04, and 05 ranked highest overall RDI per IDM, per Acre, and per ADWF
- Flow monitoring Site / Basin 04 ranked the highest for inflow per IDM and overall, with a rate of 7,578 gpd/IDM.
- Flow monitoring Site / Basin 04 ranked the highest for inflow per Acre, with a rate of 2,868 gpd/Acre.
- Flow monitoring Site / Basin 01A ranked the highest for inflow per ADWF, with a ratio of 6.6.

Table 3-8. Results and Rankings of RDI Analysis

Site & Basin ID	ISO ADWF (MGD)	IDM	ISO Basin Acreage	Max RDI Rate (MGD)	RDI per-IDM Ranking	RDI per-Acre Ranking	RDI per-ADWF Ranking	Final RDI Ranking
01A	0.010	24	693	0.07	6	11	1¹	6
01B	0.247	104	509	0.25	7	5	5	5
02	0.056	15	51	0.02	10	8	11	10
03	0.366	119	498	0.52	3	2	4	2
04	2.833	372	983	2.82	1	1	6	1
05	0.405	147	1,002	0.77	2	4	2	3
06	0.490	216	835	0.82	4	3	3	4
07	0.361	118	528	0.10	11	10	12	11
08	0.492	355	2,005	0.14	12	12	10	12
09A	0.244	29	342	0.08	5	9	8	8
09B	0.261	84	416	0.20	8	6	7	6
10	0.110	30	98	0.04	9	7	9	9

¹Basin 01A RDI per-ADWF ranking skewed due to low ADWF value

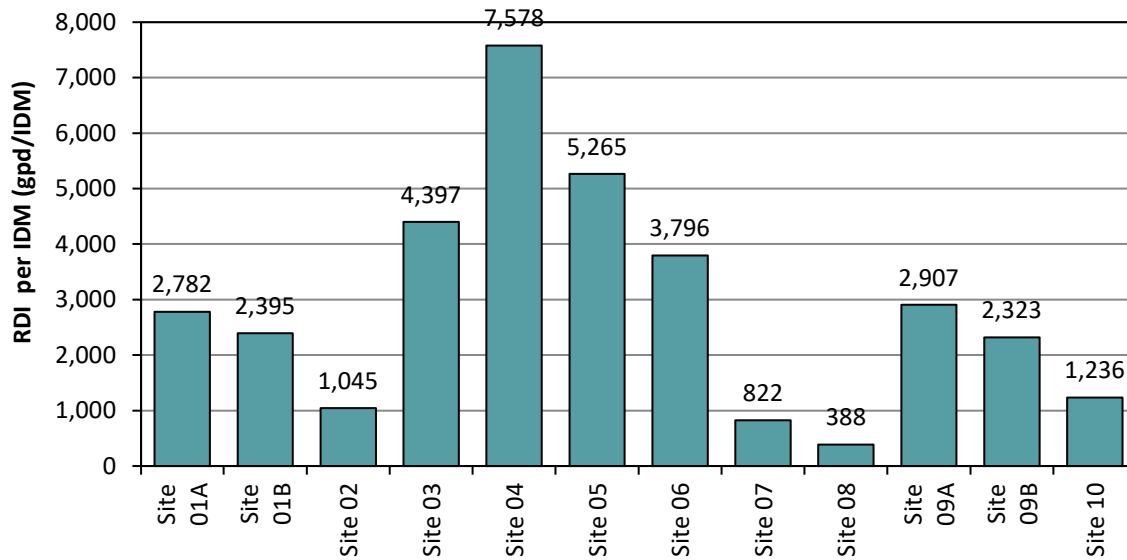


Figure 3-20. RDI per IDM

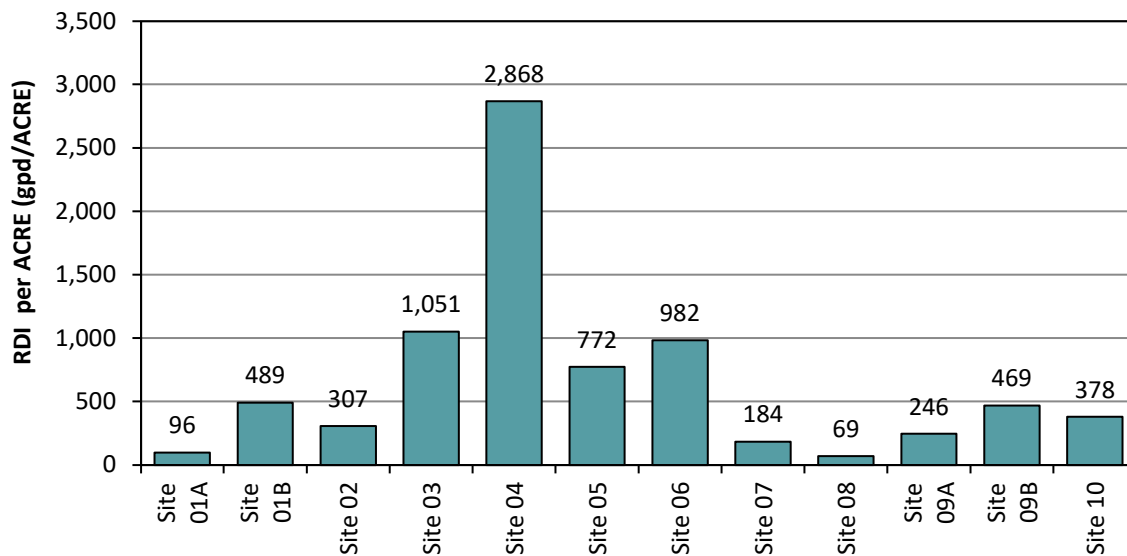


Figure 3-21. RDI per Acre

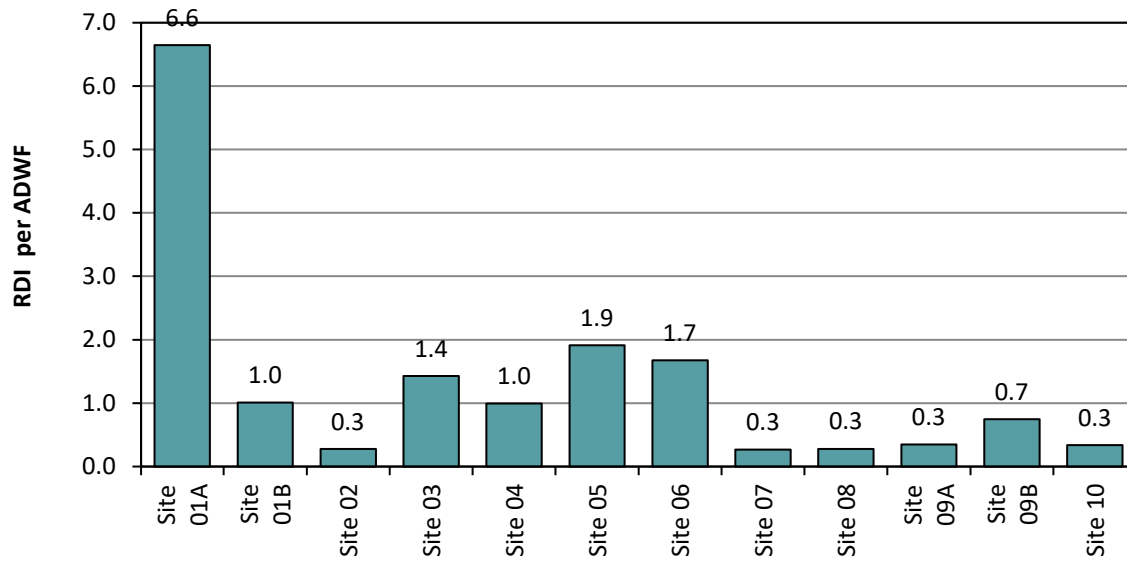


Figure 3-22. RDI per ADWF

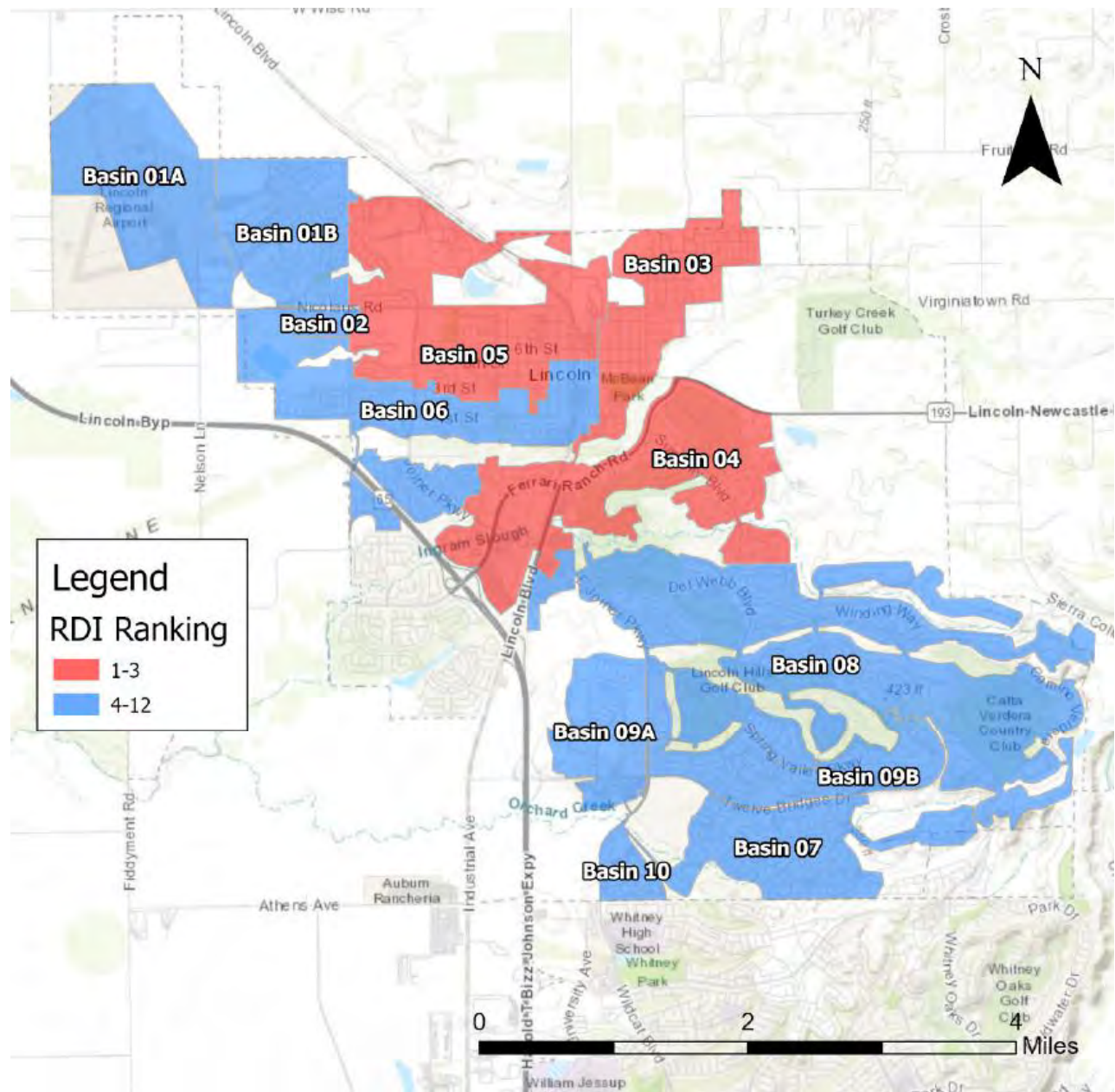


Figure 3-23. Temperature Map: RDI Final Basin Rankings

3.3.4 Combined I/I Results

Combined I/I analysis considers the totalized volume (in gallons) of inflow and rainfall-dependent infiltration over a storm event.

Table 3-9 and Figure 3-24 through Figure 3-26 summarize the combined I/I analysis results for the relevant flow monitoring basins. The “Top 3” basins for each category have been shaded in **RED**. The following inflow results are noted:

- Flow monitoring Sites / Basins 03, 04, and 05 ranked highest overall combined I/I per IDM, per Acre, and per ADWF.
- Flow monitoring Site / Basin 04 ranked the highest for combined I/I per IDM and overall, with a rate of 14,665 gallons per IDM.
- Flow monitoring Site / Basin 04 ranked the highest in R-value, with a value of 20.4%. This value could be skewed slightly due to the extremely small size of the basin.
- Flow monitoring Site / Basin 01A ranked the highest for combined I/I per ADWF, with a ratio of 8.09

Table 3-9. Combined I/I Analysis Summary

Site & Basin ID	ISO ADWF (MGD)	ISO IDM	ISO Basin Acre	Max Event I/I (gallons)	Combined I/I per IDM per inch-rain Ranking	Combined I/I per Acre per inch-rain (R-Value) Ranking	Combined I/I per ADWF per inch-rain Ranking	Final Combined I/I Ranking
01A	0.010	24	693	125,336	8	11	1¹	7
01B	0.247	104	509	574,169	4	5	6	5
02	0.056	15	51	34,930	10	7	9	10
03	0.366	119	498	1,311,724	3	2	4	2
04	2.833	372	983	8,366,465	1	1	5	1
05	0.405	147	1,002	1,738,619	2	4	2	3
06	0.490	216	835	2,039,595	4	3	3	4
07	0.361	118	528	248,542	9	8	8	9
08	0.492	355	2,005	70,278	12	12	12	12
09A	0.244	29	342	187,053	6	9	10	8
09B	0.261	84	416	459,646	7	6	7	6
10	0.110	30	98	32,116	11	10	11	11

¹Basin 01A Combined I/I per-ADWF ranking skewed due to low ADWF value

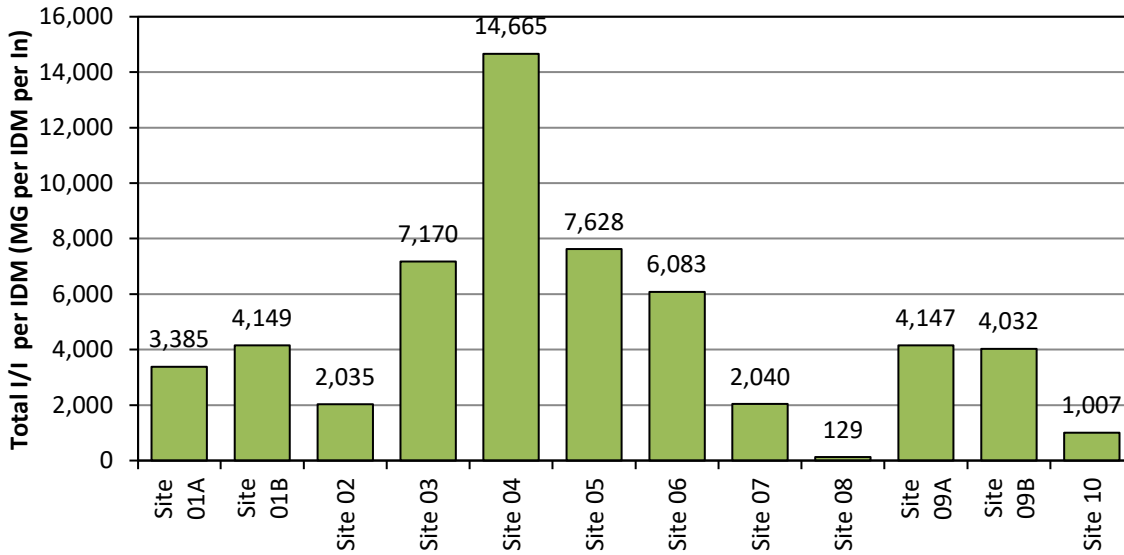


Figure 3-24: Combined I/I per IDM

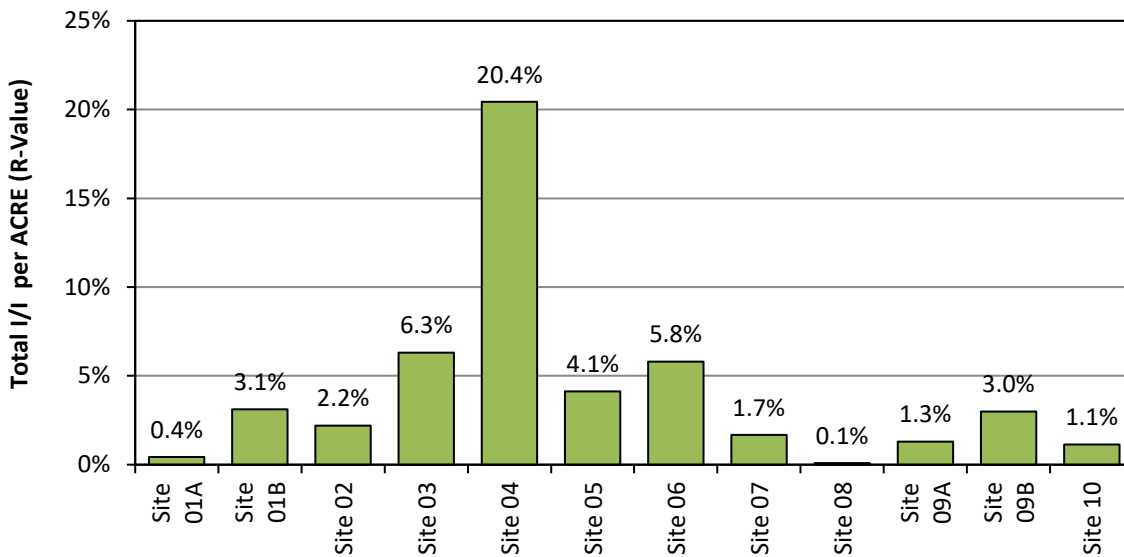


Figure 3-25: Combined I/I per Acre

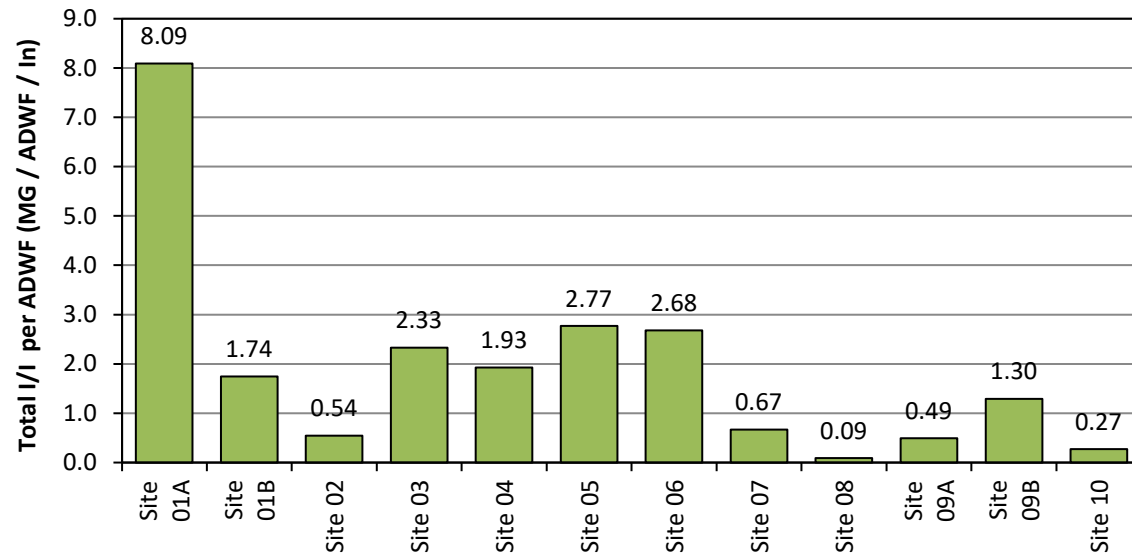


Figure 3-26: Combined I/I per ADWF

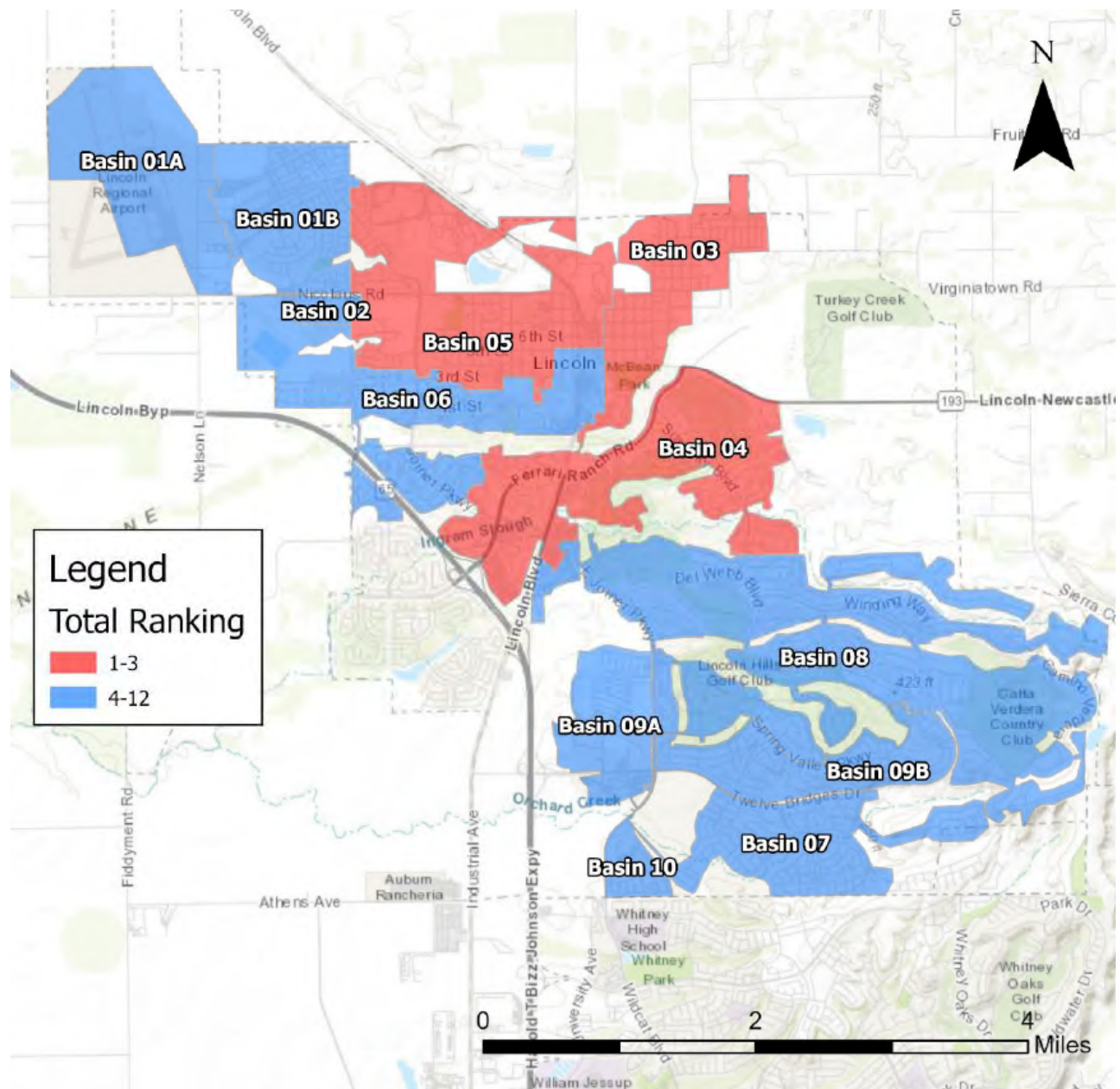


Figure 3-27. Temperature Map: Combined I/I Final Basin Rankings

3.3.5 Groundwater Infiltration Results Summary

Dry weather flow can be expected to have a predictable diurnal flow pattern. While each site is unique, experience has shown that, given a reasonable volume of flow and typical loading conditions, the daily flows fall into a predictable range when compared to the daily average flow. If a site has a large percentage of groundwater infiltration occurring during the periods of dry weather flow measurement, the amplitudes of the peak and low flows will be dampened⁸. Figure 3-28 shows a sample of two flow monitoring sites, both with nearly the same average daily flow but with considerably different peak and low flows. In this sample case, Site B1 may have a considerable volume of groundwater infiltration.

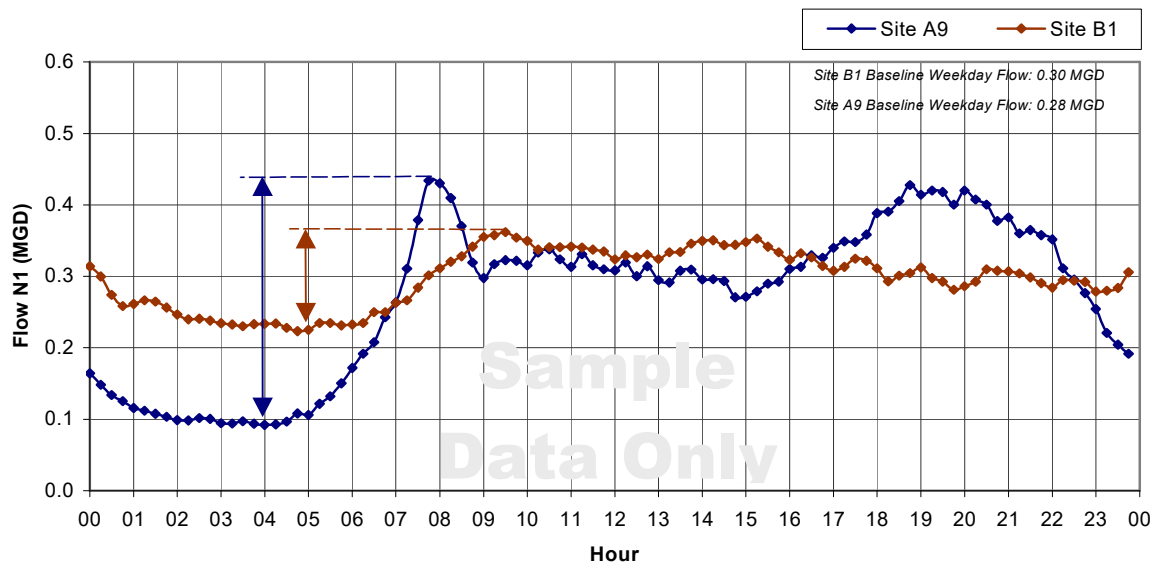


Figure 3-28. Groundwater Infiltration Sample Figure

It can be useful to compare the low-to-ADWF flow ratios for the flow monitoring sites. A site with abnormal ratios and no other reasons to suspect abnormal flow patterns (such as proximity to a pump station, treatment facilities, etc.) has a possibility of higher levels of groundwater infiltration in comparison to the rest of the collection system.

Figure 3-29 plots the low-to-ADWF flow ratios⁹ against the ADWF flows for the relevant flow monitoring sites. The brown dashed line shows “typical” low-to-ADWF ratios per the Water Environment Federation (WEF).

WEF derived these ratios from residential sanitary sewer data. It is noted that the type of service in this project (airport and shipping) is not residential, and there exists the possibility of excessive early-morning flows due to abnormal working hours. This analysis is presented for reference only. The following GWI results are noted:

- All sites, except Site 10, indicated GWI rates higher-than typical standards, indicating possible high groundwater infiltration rates.

⁸ In an extreme case, perhaps 0.2 mgd of ADWF flow and 2.0 mgd of groundwater infiltration, the peaks and lows would be barely recognizable; the ADWF flow would be nearly a straight line.

⁹ The Minimum to Average flow ratio is calculated by taking the minimum flow and dividing by the ADWF value (using the Mon-Thu ADWF curve).

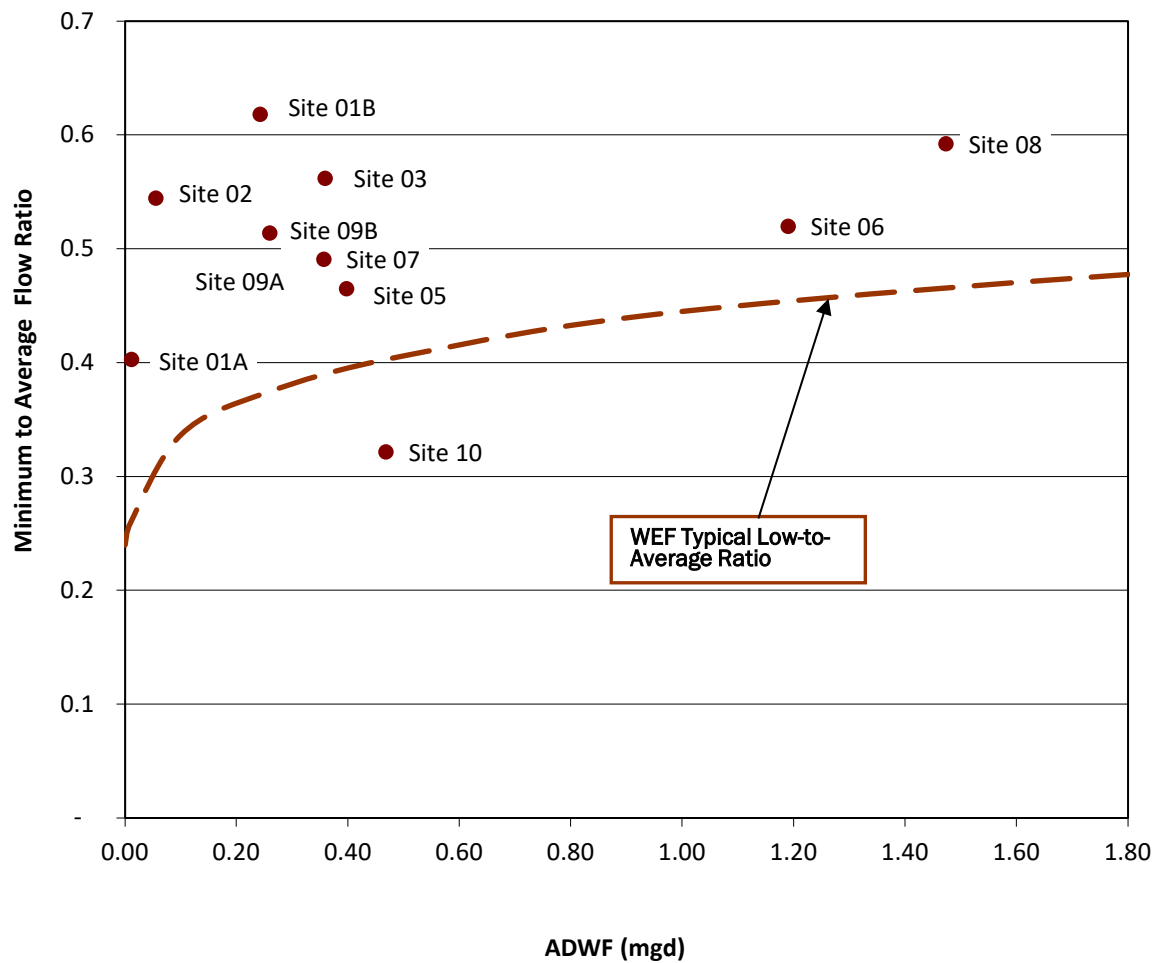


Figure 3-29. Minimum Flow Ratios vs ADWF¹⁰

¹⁰ Due to attenuation, it should be expected that sites with larger flow volumes should not have quite the peak-to-average and low-to-average flow ratios as sites with lesser flow volumes. This is why the WEF typical trend line's slope is closer to 1.0 as the ADWF increases, as shown in the figure.

4 Recommendations

V&A advises that future I/I reduction plans consider the following recommendations:

1. **Master Plan and Model Implementation:** This study focuses on inflow and infiltration generation; the study results can be used to update the master plan and compare with previous model assumptions and flow monitoring results.
2. **Capacity Analysis:**
 - a. **Dry weather:** No site showed an average flow level greater than 50% full pipe conditions ($d/D > 0.5$).
 - b. **Wet Weather:** No site showed a maximum flow level greater than 75% full pipe conditions ($d/D > 0.75$), and with the exception of Site 01A, wet weather peaking factors ranged from 1.9 to 4.8. This is typically considered to be within acceptable limits, and no further action is recommended unless the City wishes to pursue I/I identification. It should be noted that while these limits may be within normally acceptable limits, higher intensity storms than those that occur during the monitoring period could cause higher wet weather responses.
3. **Determine I/I Reduction Program:** If the City should decide to pursue some I/I reduction in the future, consider the following I/I reduction programs:
 - a. If peak flows, sanitary sewer overflows, and pipeline capacity issues are of greater concern; then priority can be given to investigating and reducing sources of inflow within the basins with the greatest inflow problems. The highest inflow occurred within Basins 04, 05, and 06.
 - b. Suppose total infiltration and general pipeline deterioration are of greater concern. In that case, the program can be weighted to investigate and reduce sources of infiltration within the basins with the greatest infiltration problems. The highest RDI occurred in Basins 03, 04, and 05. Additionally, all Basins showed evidence of elevated GWI.
4. **I/I Investigation Methods:** Potential I/I investigation methods include the following:
 - a. Smoke testing.
 - b. Mini-basin flow monitoring.
 - c. Night-time reconnaissance work is done to (1) investigate and determine direct point sources of inflow and (2) determine the areas and/or pipe reaches responsible for high levels of infiltration contribution.
 - d. CCTV inspection.
 - e. Manhole assessment.
5. **I/I Reduction Cost Effective Analysis:** If the City is considering pursuing I/I reduction, a study can be conducted to determine which is more cost-effective: (1) locating the sources of inflow/infiltration and systematically rehabilitating or replacing the faulty pipelines or (2) continued treatment of the additional rainfall-dependent I/I flow.

Appendix A

Flow Monitoring Sites: Data, Graphs, Information

Monitoring Site: Site 01A

Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: 3004 Nicolaus Rd, Lincoln, CA

Data Summary Report



Vicinity Map: Site 01A

SITE 01A

Site Information

MH ID: NW319SS03

Location: 3004 Nicolaus Rd, Lincoln, CA

Coordinates: 121.3359° W, 38.8974° N

Rim Elevation: 117 feet

Expected Pipe Diameter: 10 inches

Measured Pipe Diameter: 10 inches

ADWF: 0.010 mgd

Peak Measured Flow: 0.147 mgd

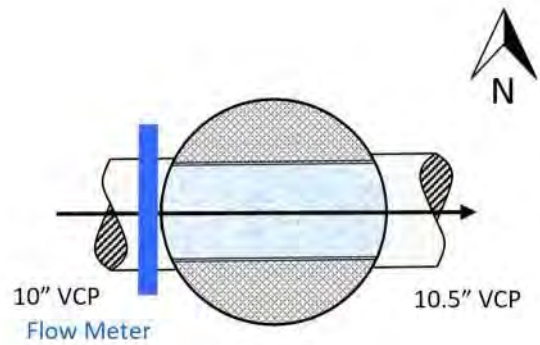
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View

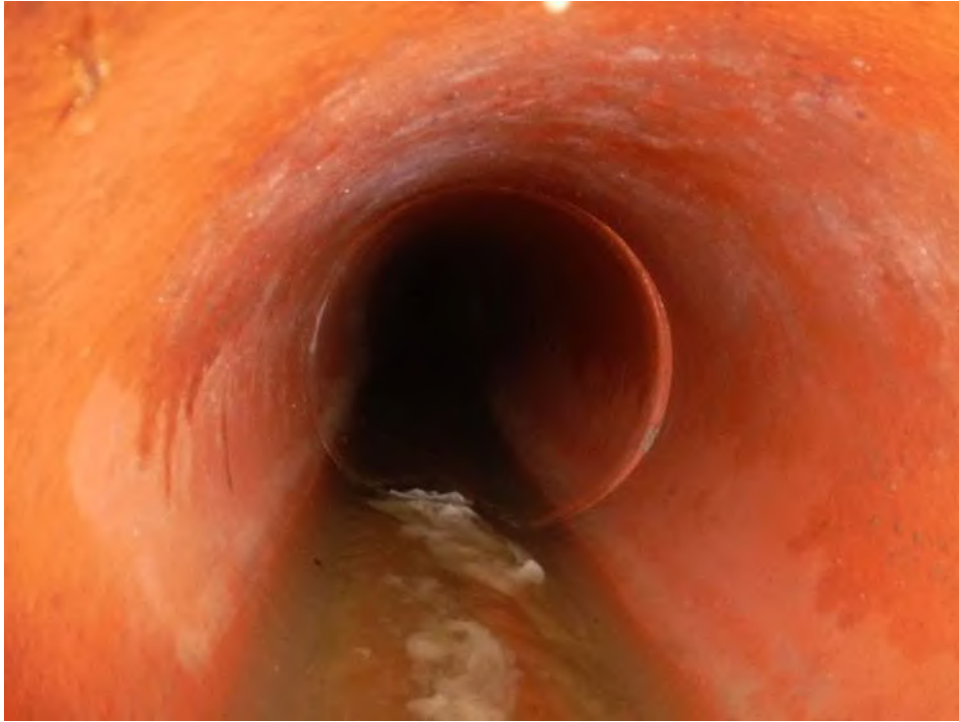


Plan View

SITE 01A

Additional Site Photos

East Effluent Pipe



Monitored West Influent Pipe

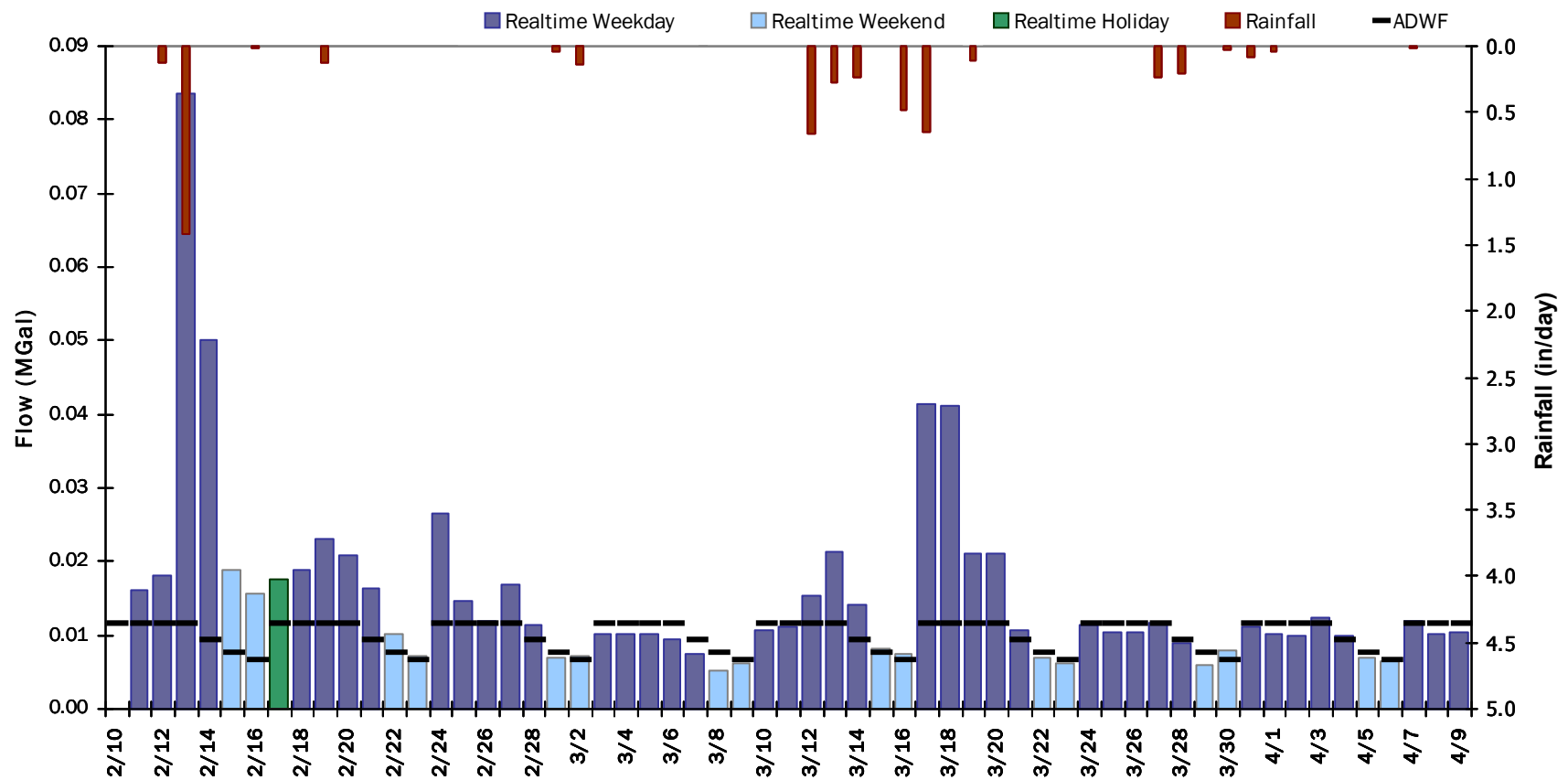


SITE 01A

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.015 MGal Peak Daily Flow: 0.084 MGal Min Daily Flow: 0.005 MGal

Total Rainfall: 4.90 inches



SITE 01A

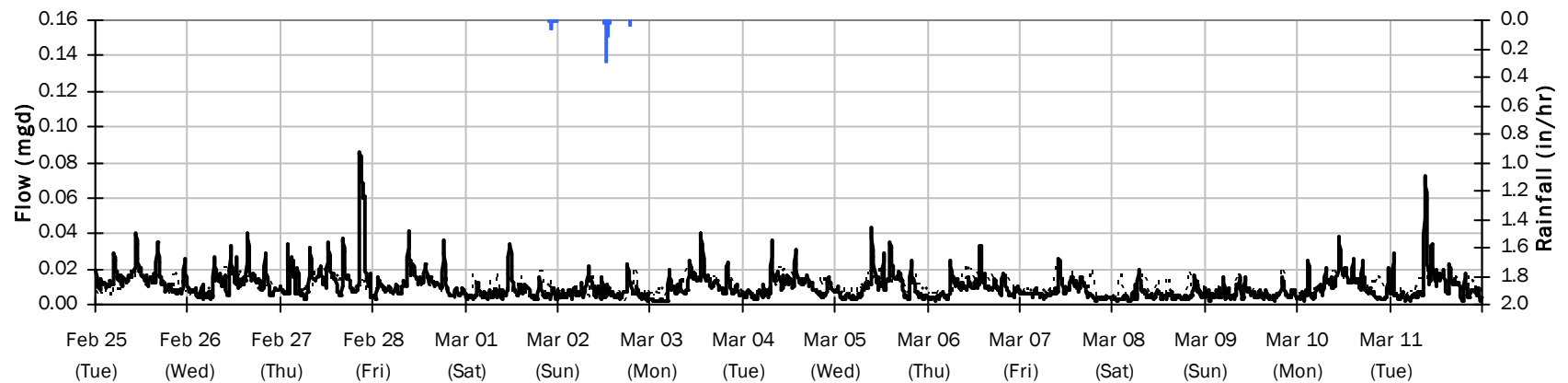
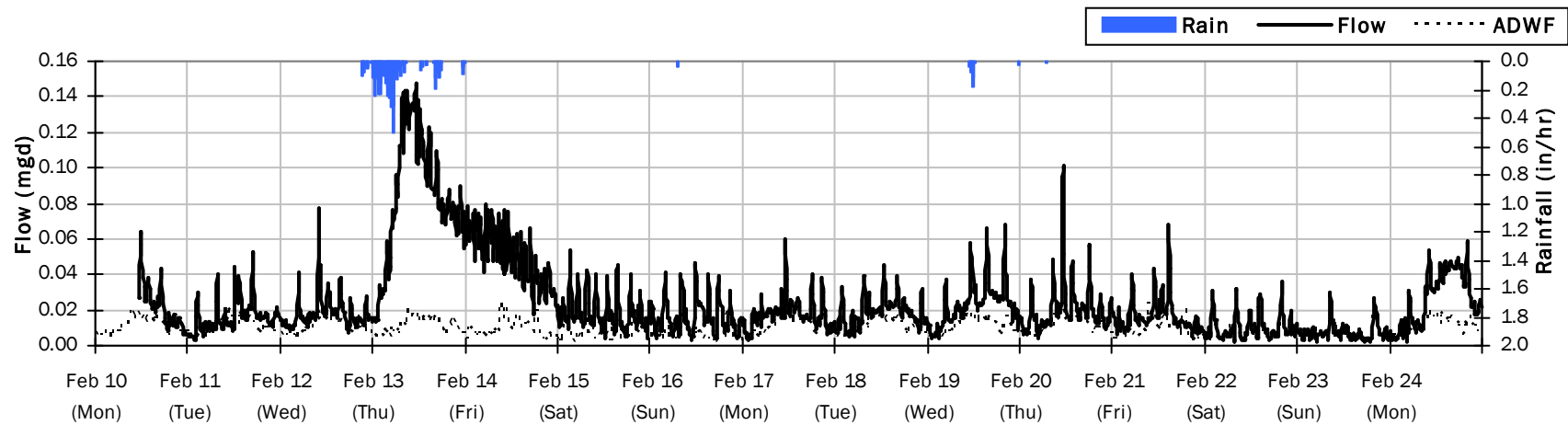
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.87 inches

Period Avg Flow: 0.017 mgd

Period Peak Flow: 0.147 mgd

Period Min Flow: 0.002 mgd



SITE 01A

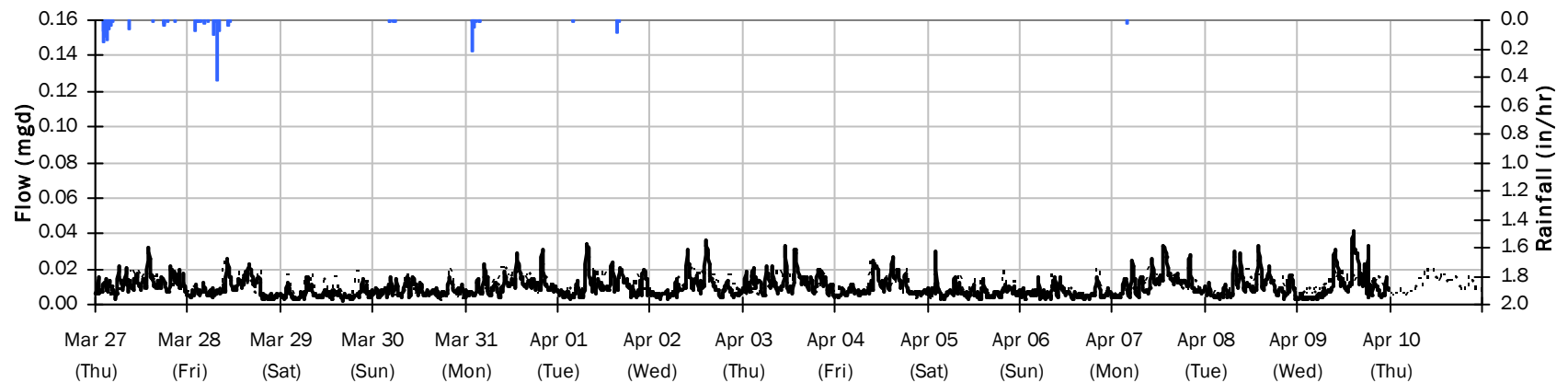
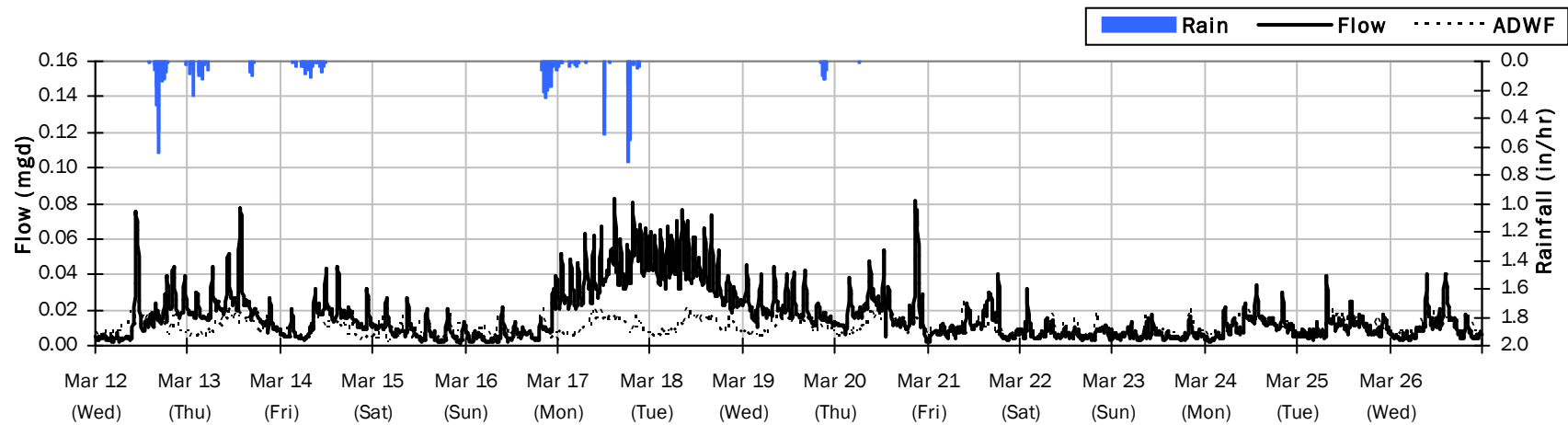
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.03 inches

Period Avg Flow: 0.013 mgd

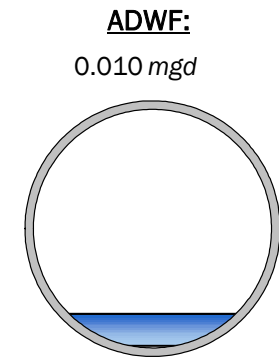
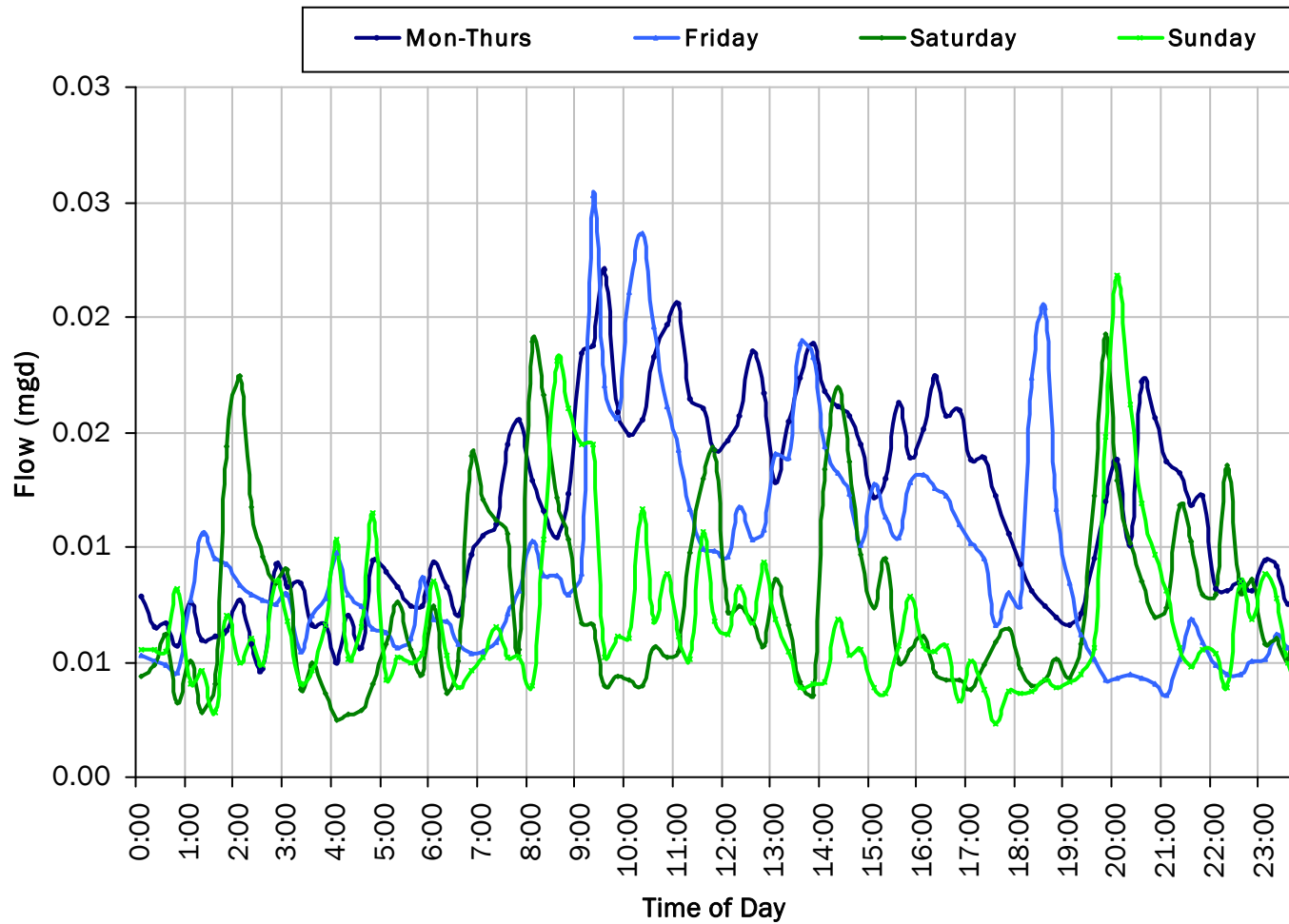
Period Peak Flow: 0.083 mgd

Period Min Flow: 0.001 mgd



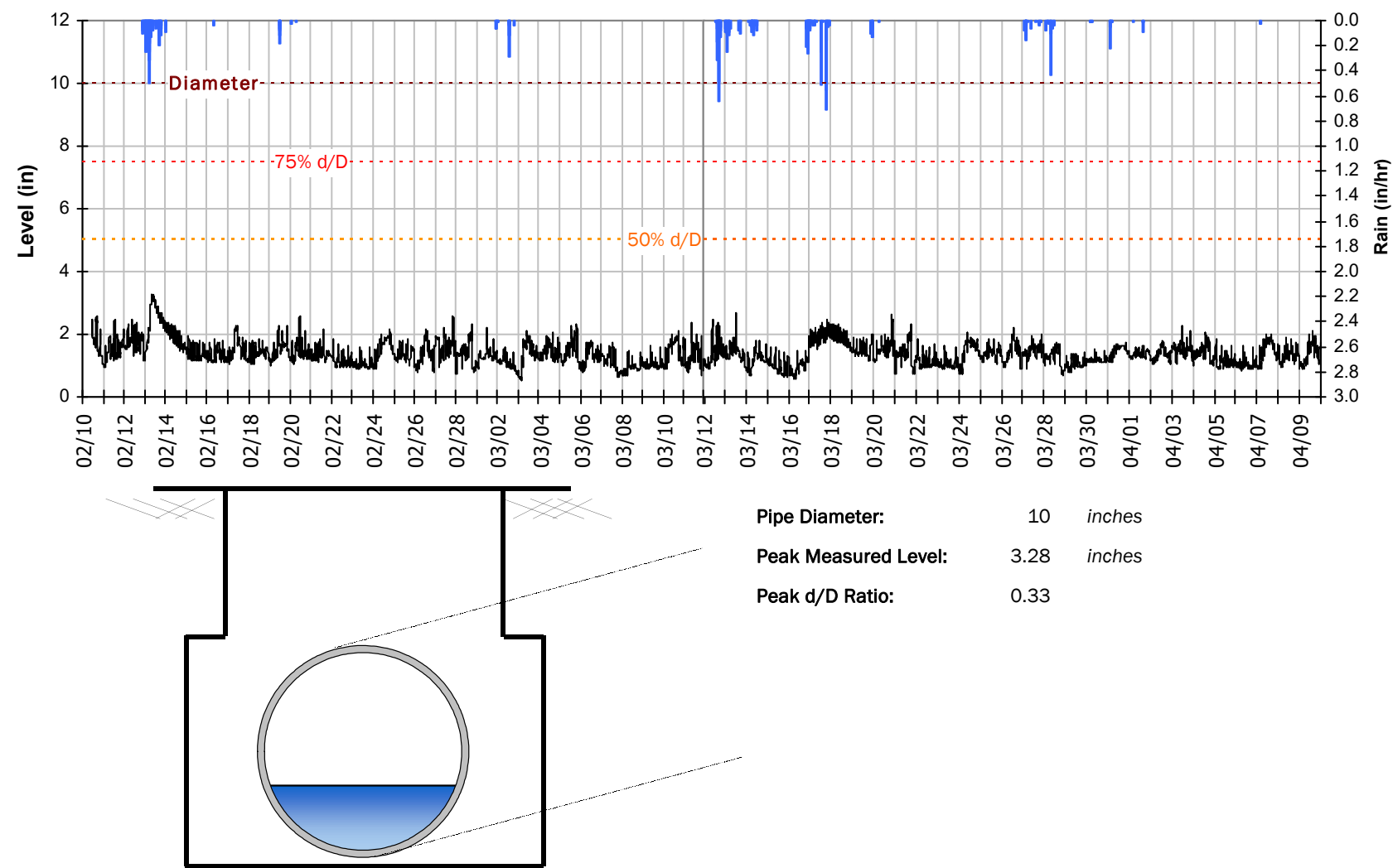
SITE 01A

Average Dry Weather Flow Hydrographs



SITE 01A
Site Capacity and Surge Summary

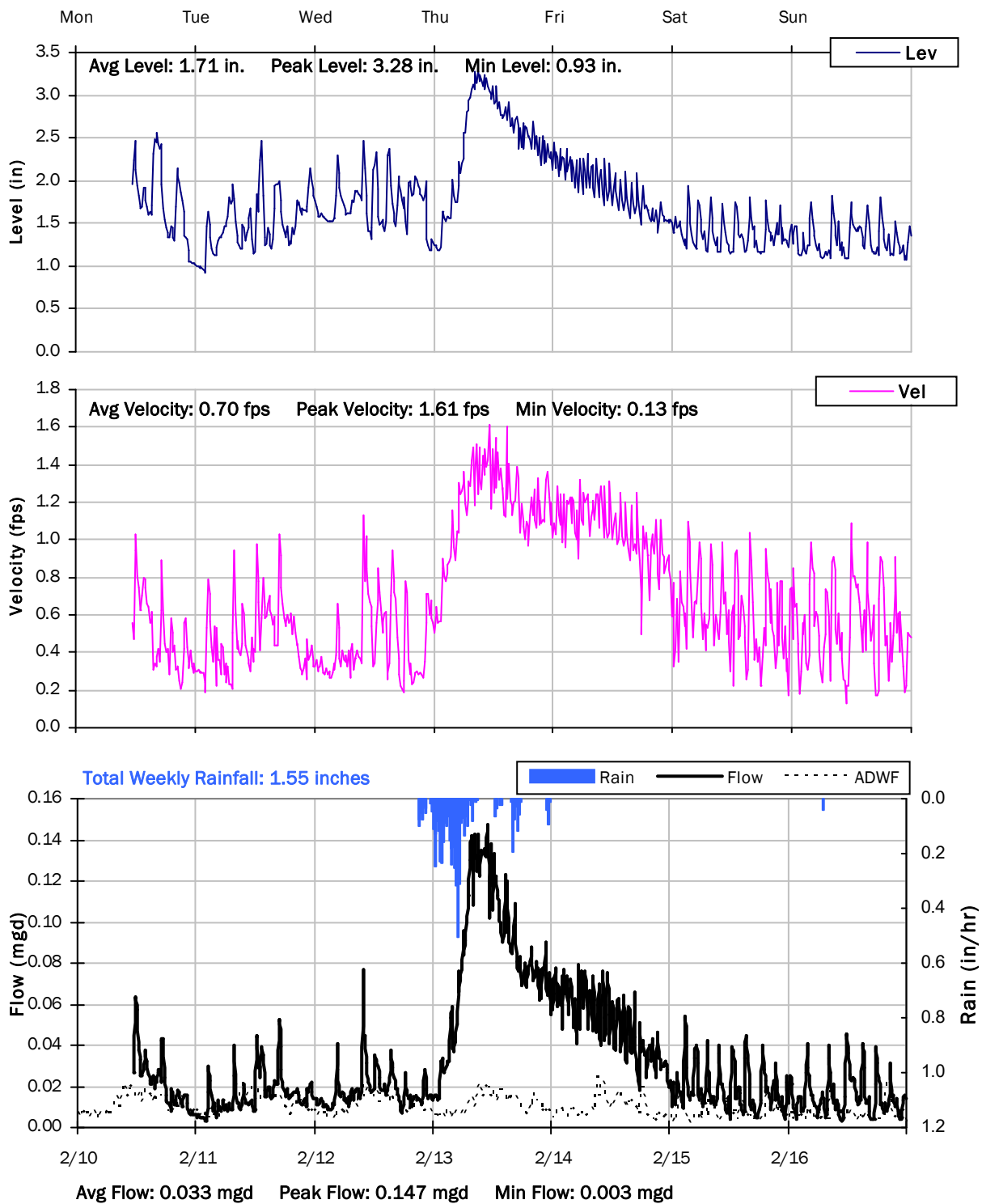
Realtime Flow Levels with Rainfall Data over Peak Level Period



SITE 01A

Weekly Level, Velocity and Flow Hydrographs

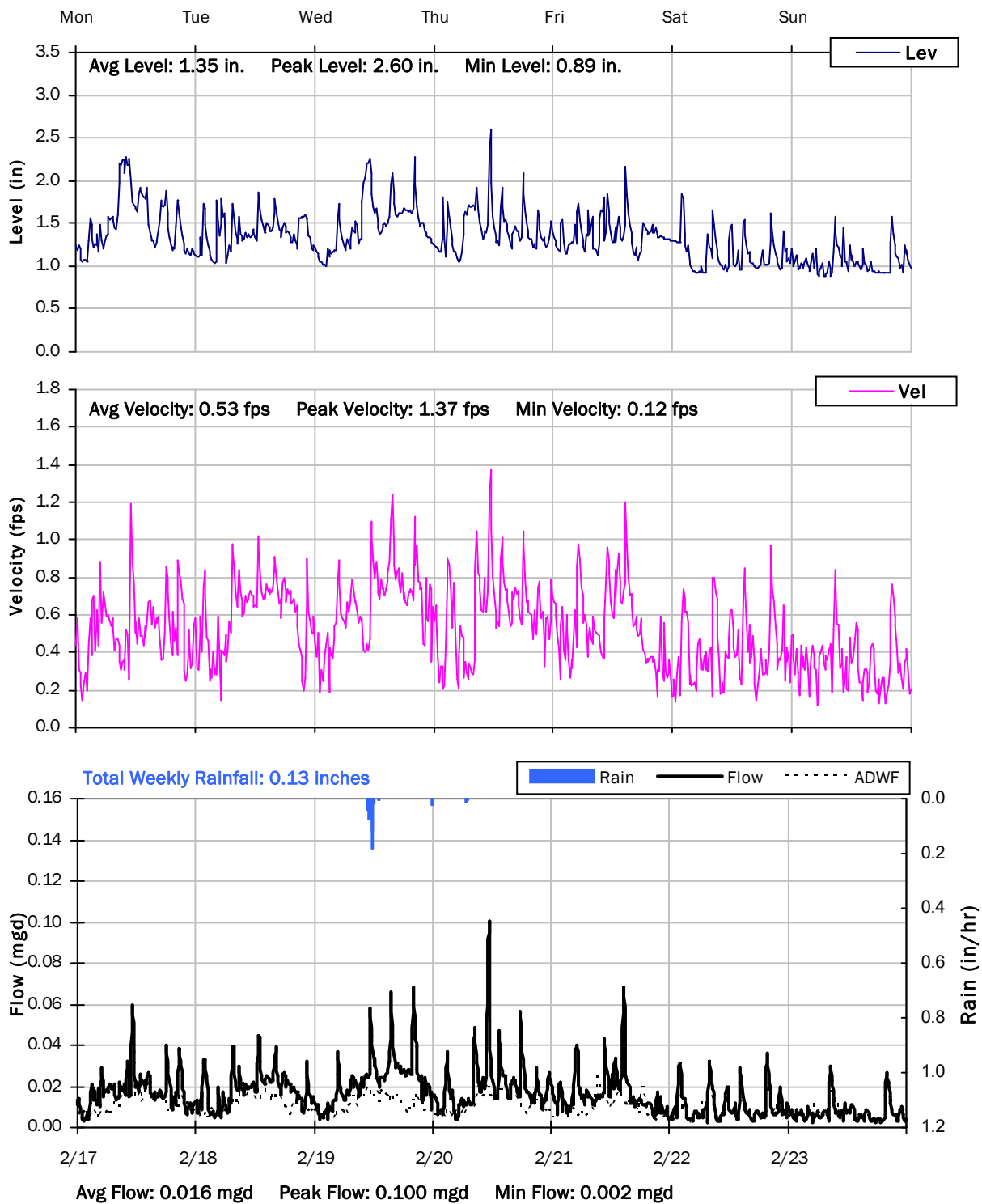
2/10/2025 to 2/17/2025



SITE 01A

Weekly Level, Velocity and Flow Hydrographs

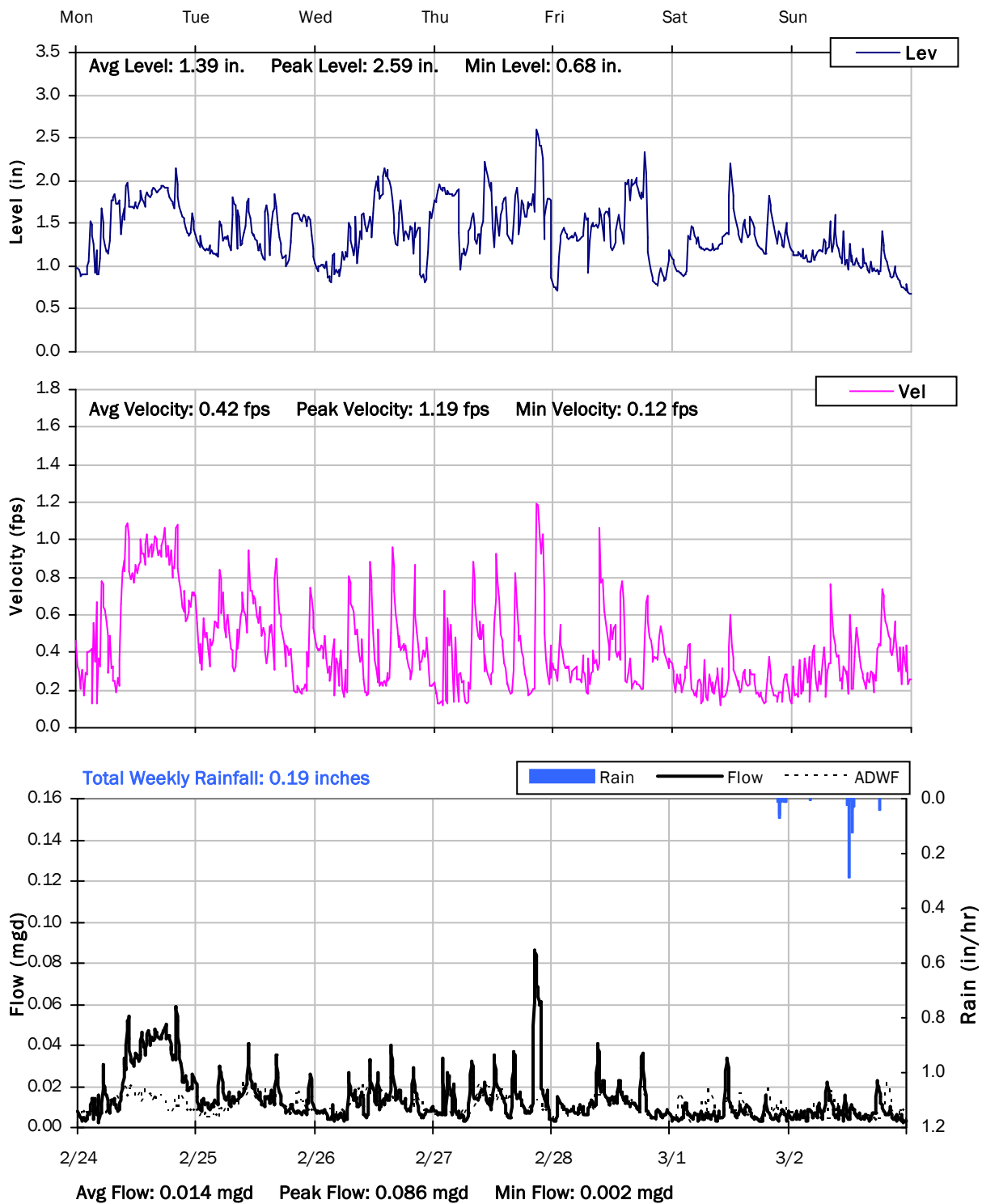
2/17/2025 to 2/24/2025



SITE 01A

Weekly Level, Velocity and Flow Hydrographs

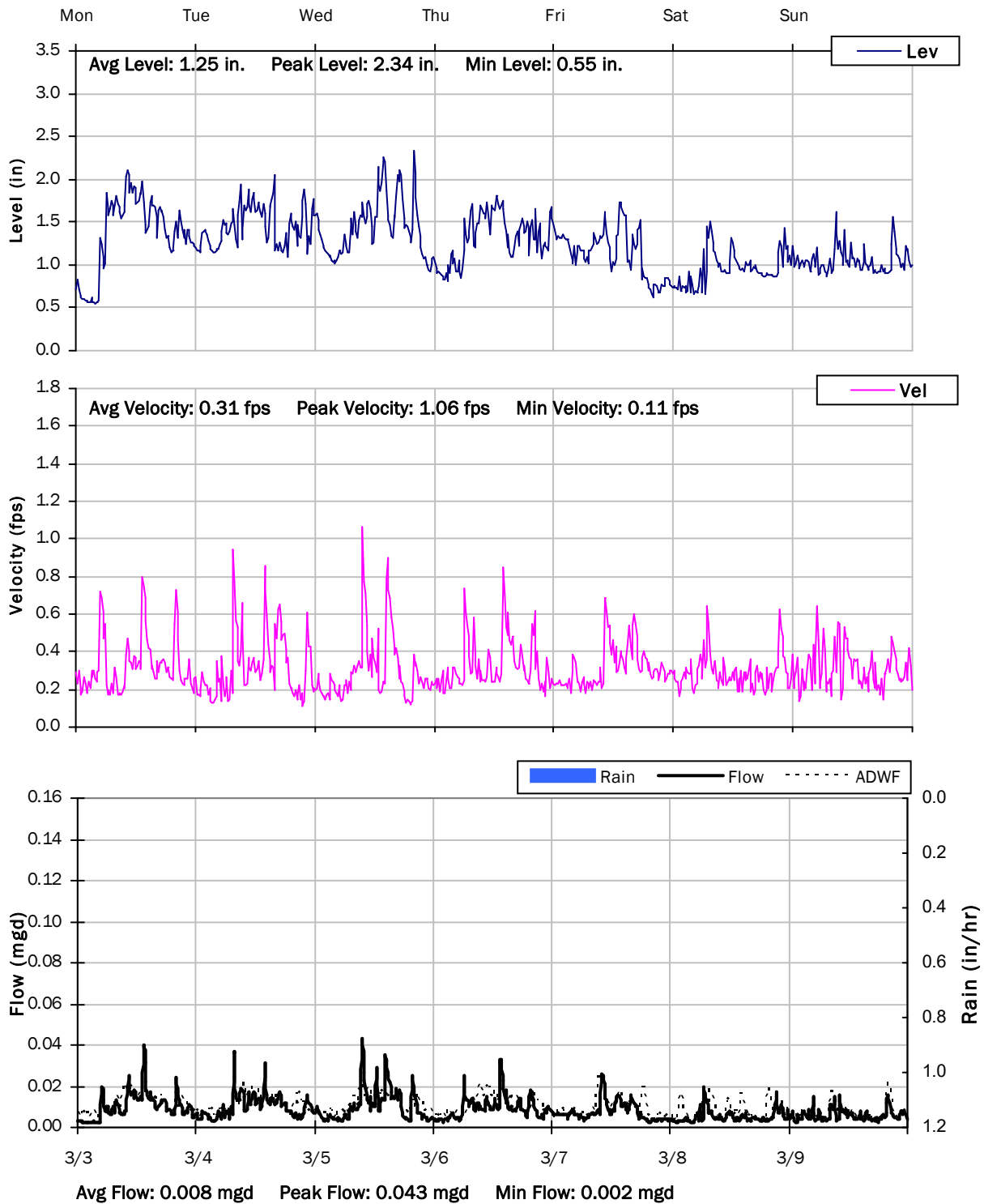
2/24/2025 to 3/3/2025



SITE 01A

Weekly Level, Velocity and Flow Hydrographs

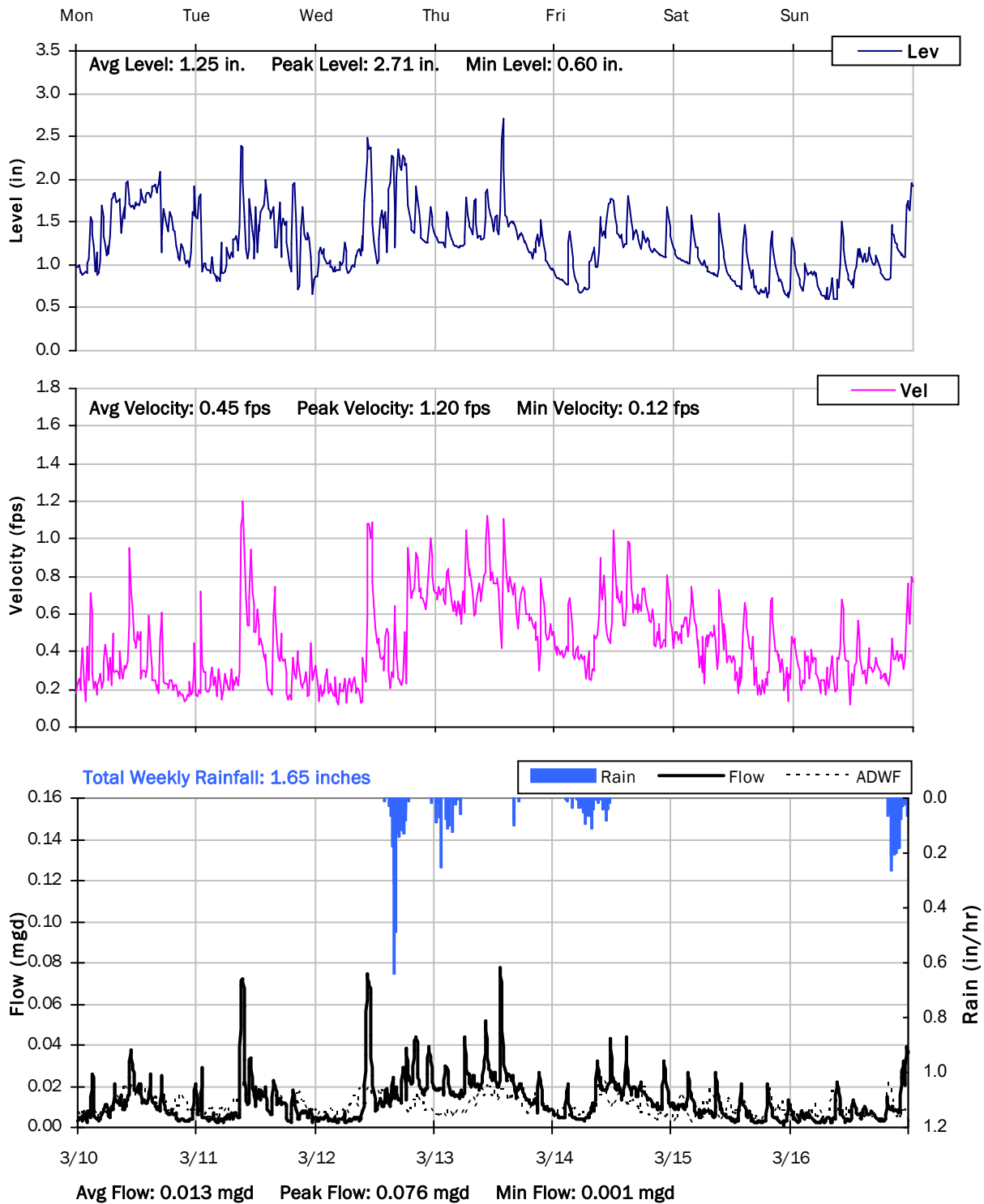
3/3/2025 to 3/10/2025



SITE 01A

Weekly Level, Velocity and Flow Hydrographs

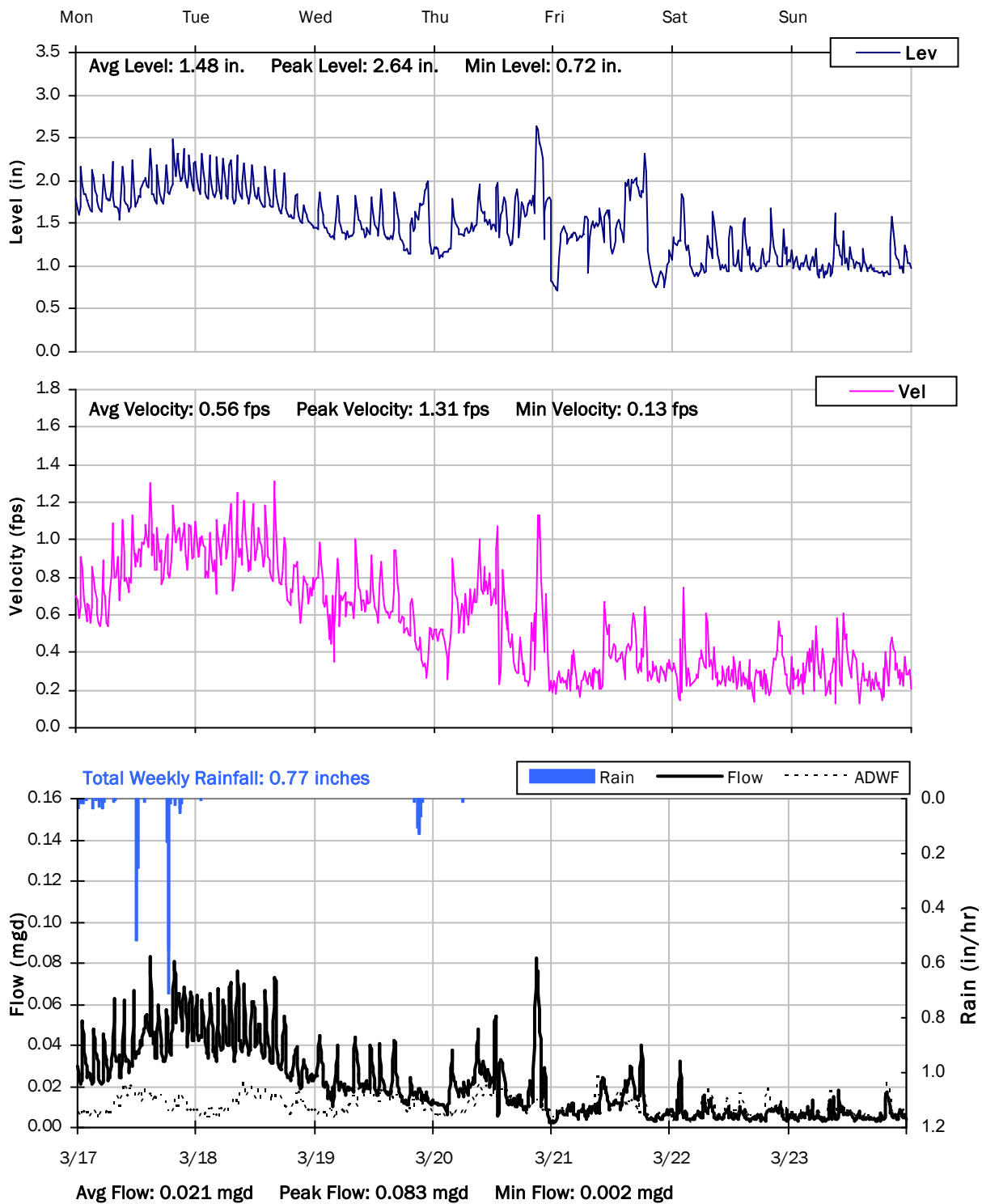
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SITE 01A

Weekly Level, Velocity and Flow Hydrographs

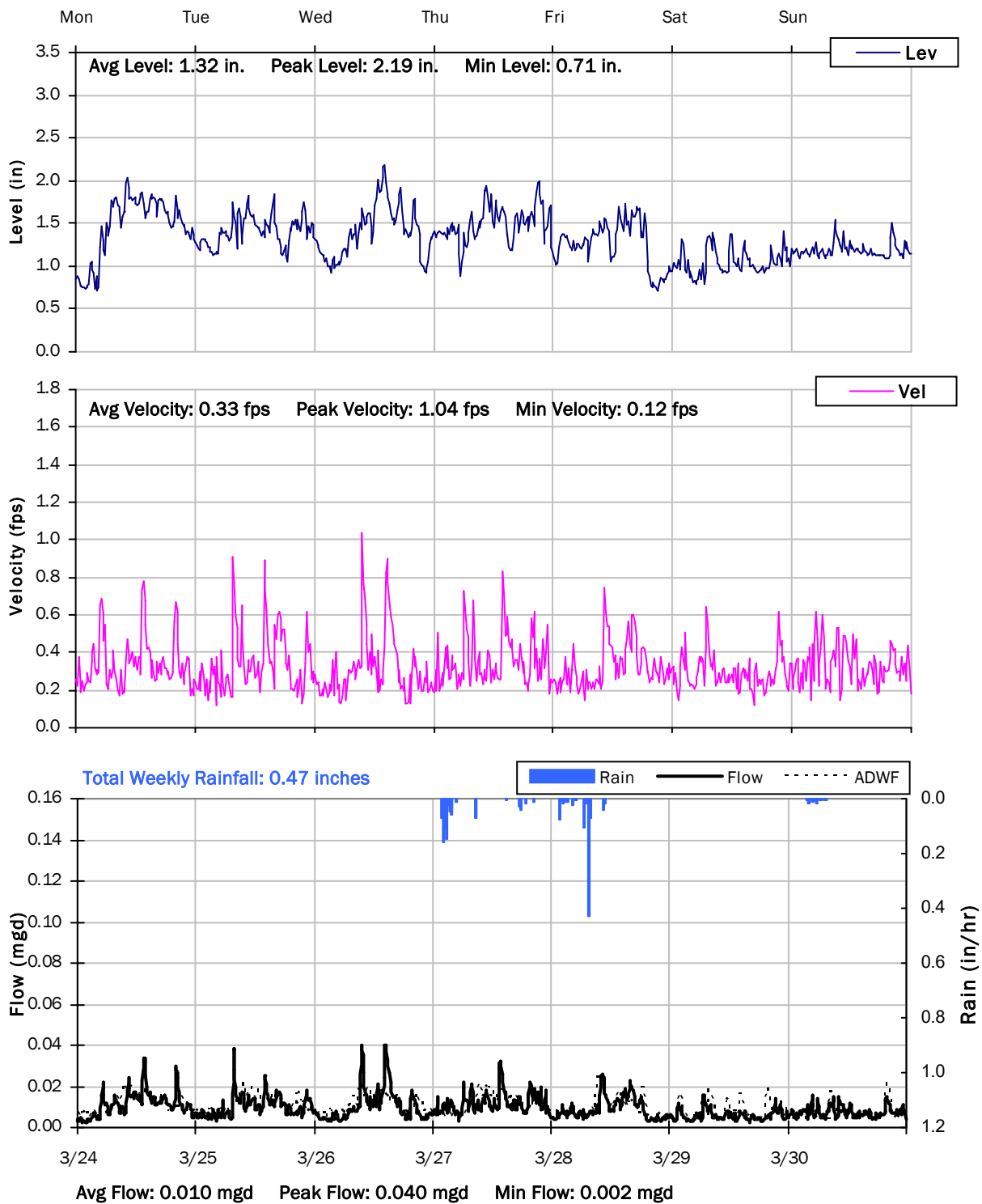
3/17/2025 to 3/24/2025



SITE 01A

Weekly Level, Velocity and Flow Hydrographs

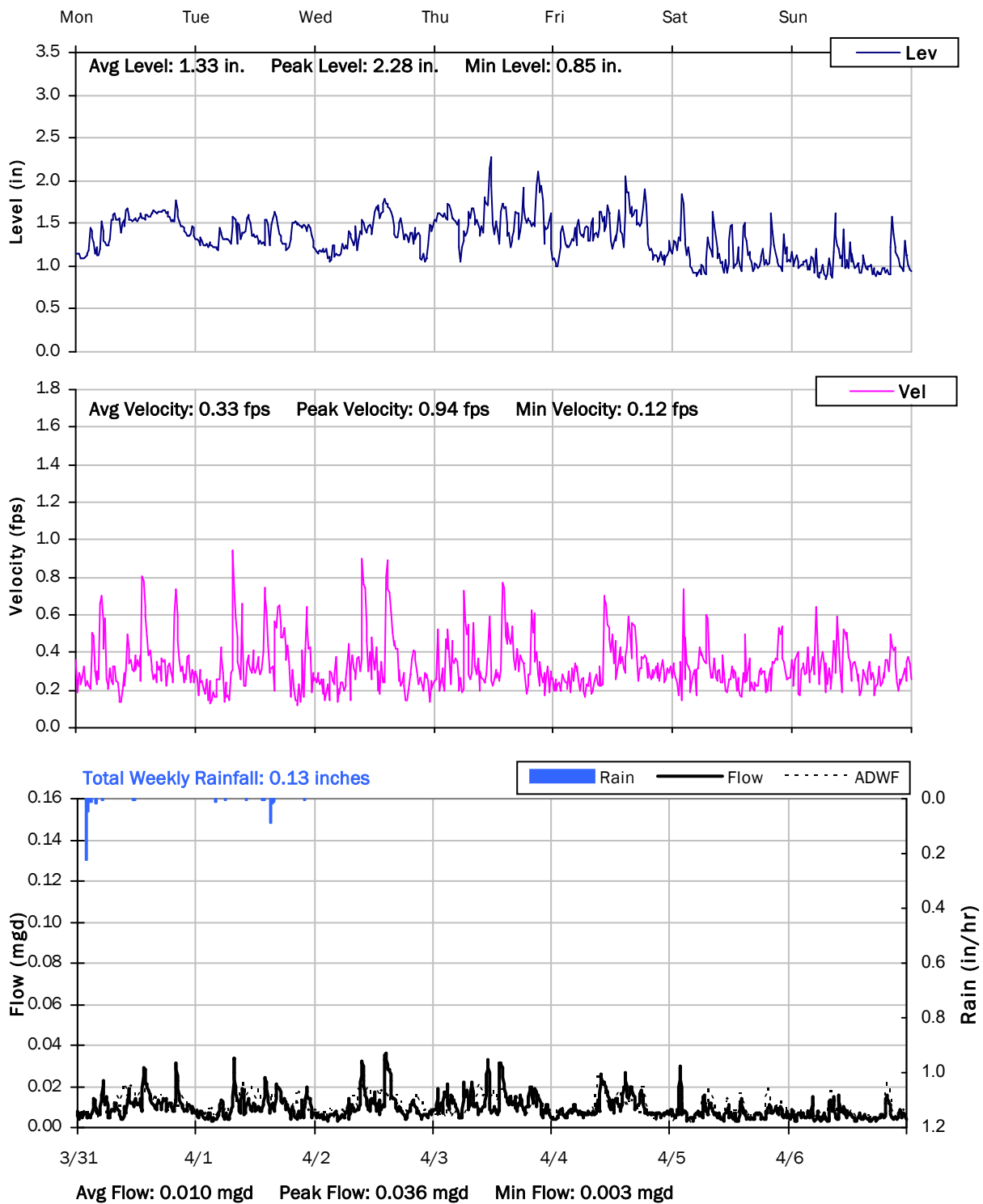
3/24/2025 to 3/31/2025



SITE 01A

Weekly Level, Velocity and Flow Hydrographs

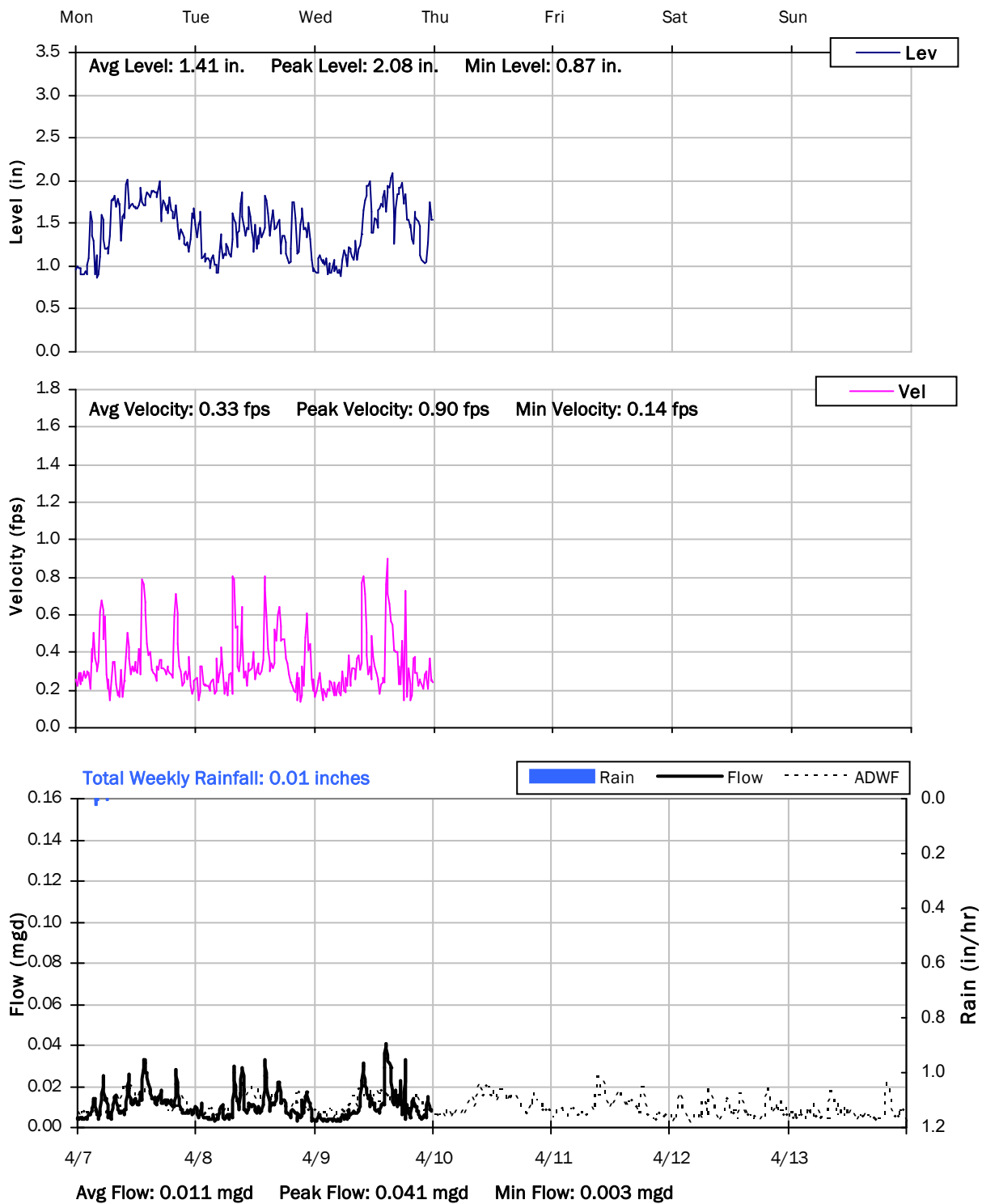
3/31/2025 to 4/7/2025



SITE 01A

Weekly Level, Velocity and Flow Hydrographs

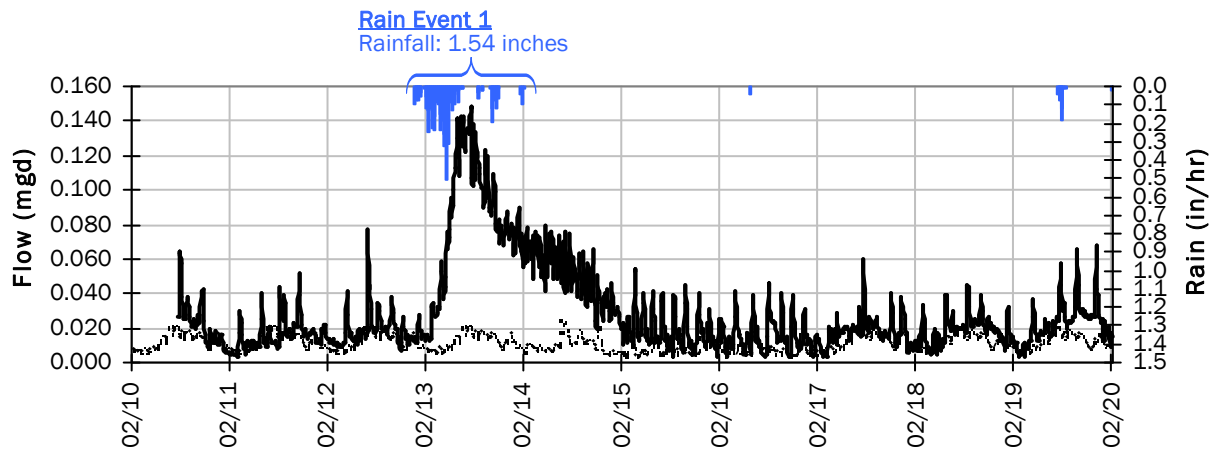
4/7/2025 to 4/14/2025



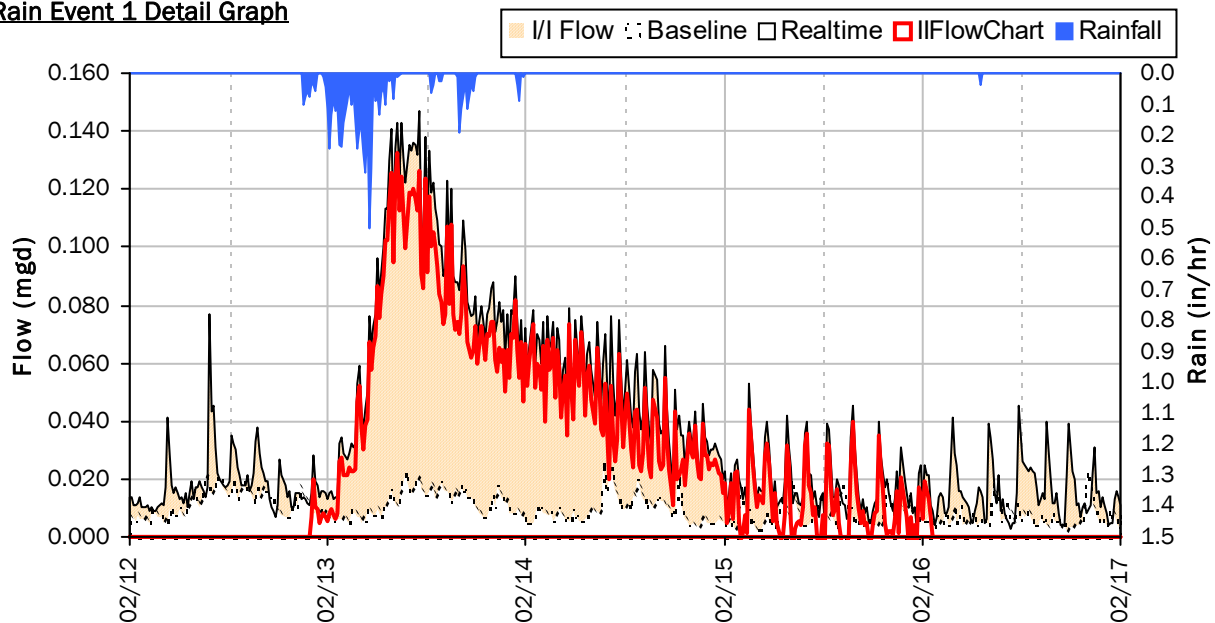
SITE 01A

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



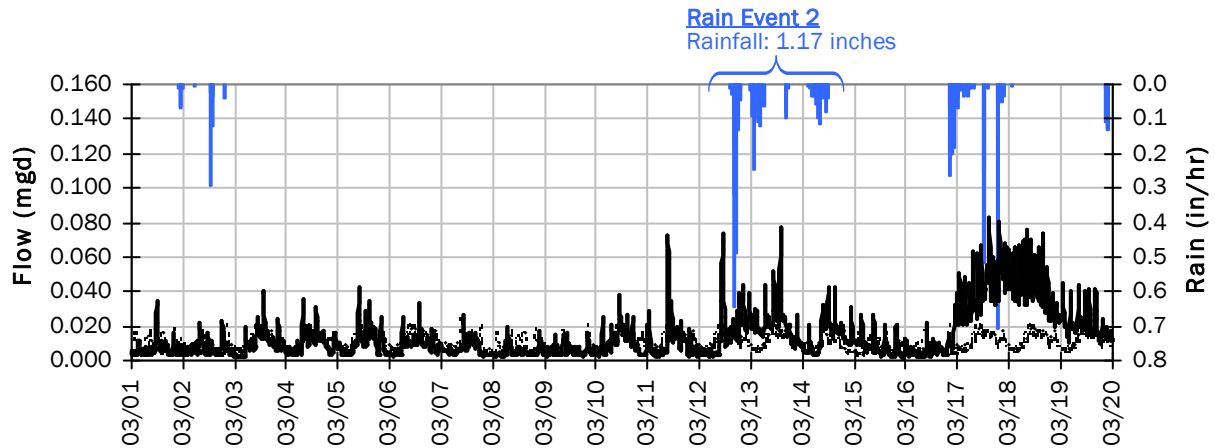
Storm Event I/I Analysis (Rain = 1.54 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.147 mgd	Peak I/I Rate:	0.133 mgd
PF:	14.64	Total I/I:	125,000 gallons
Peak Level:	3.28 in		
d/D Ratio:	0.33		

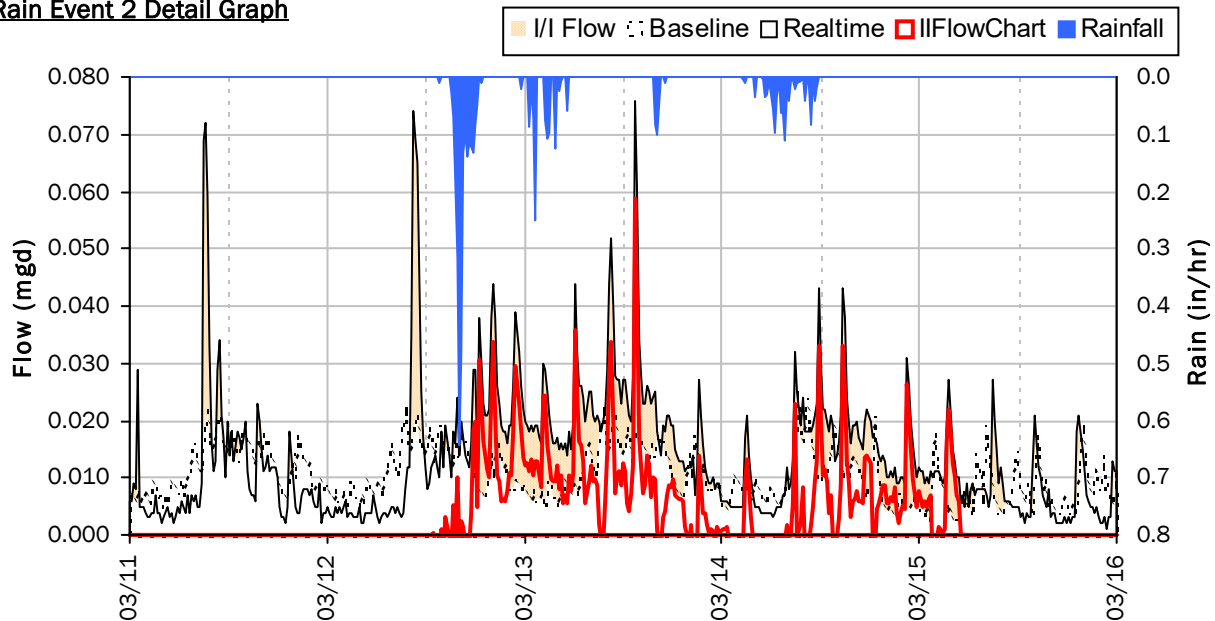
SITE 01A

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph

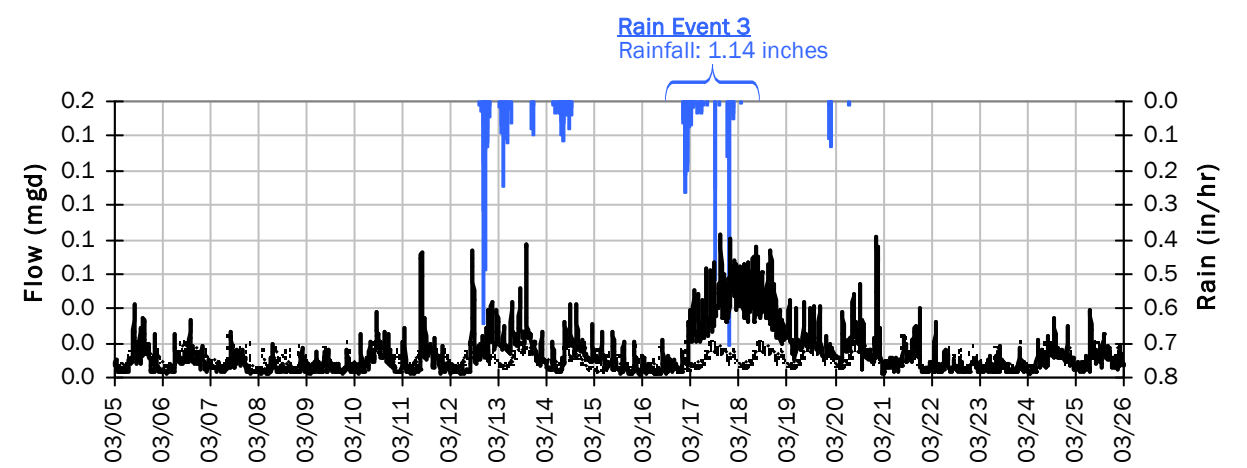


Storm Event I/I Analysis (Rain = 1.17 inches)

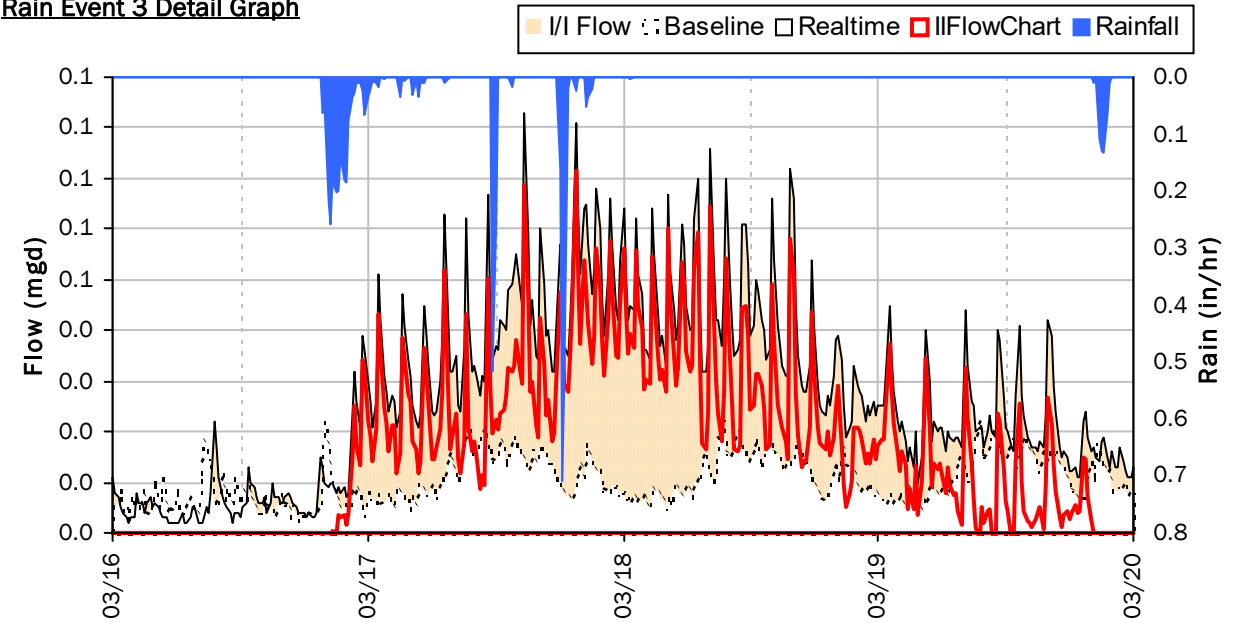
Capacity		Inflow / Infiltration	
Peak Flow:	0.076 mgd	Peak I/I Rate:	0.059 mgd
PF:	7.57	Total I/I:	20,000 gallons
Peak Level:	2.71 in		
d/D Ratio:	0.27		

SITE 01A
I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.14 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.08 mgd	Peak I/I Rate:	0.07 mgd
PF:	8.26	Total I/I:	70,000 gallons
Peak Level:	2.48 in		
d/D Ratio:	0.25		

Monitoring Site: Site 01B

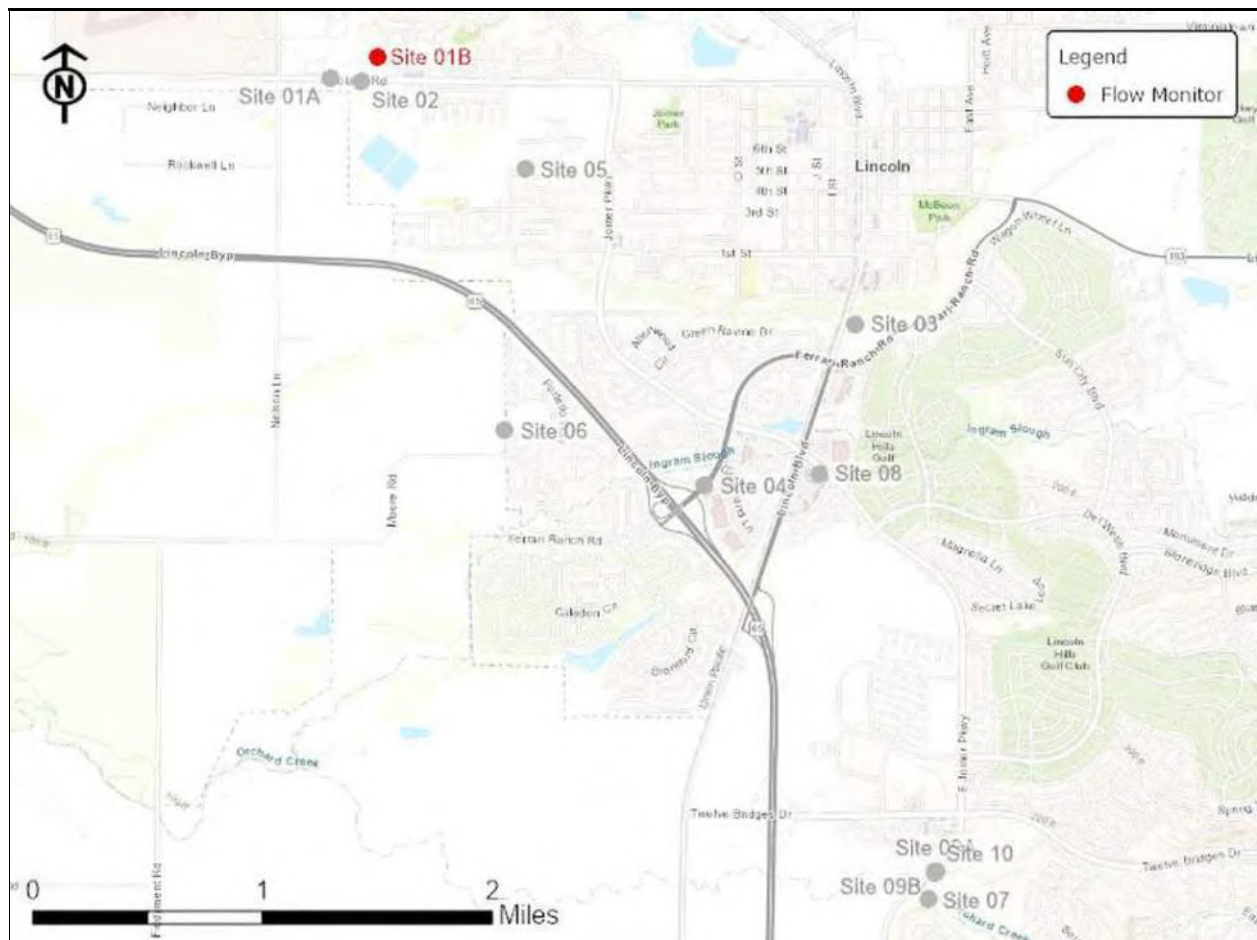
Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: Field off of 2910 3004 Nicolaus Rd, Lincoln, CA

Data Summary Report



Vicinity Map: Site 01B

SITE 01B

Site Information

MH ID: NW318SS03

Location: Field off of 2910 3004
Nicolaus Rd, Lincoln, CA

Coordinates: 121.3330° W, 38.8991° N

Rim Elevation: 116 feet

Expected Pipe Diameter: 15 inches

Measured Pipe Diameter: 15 inches

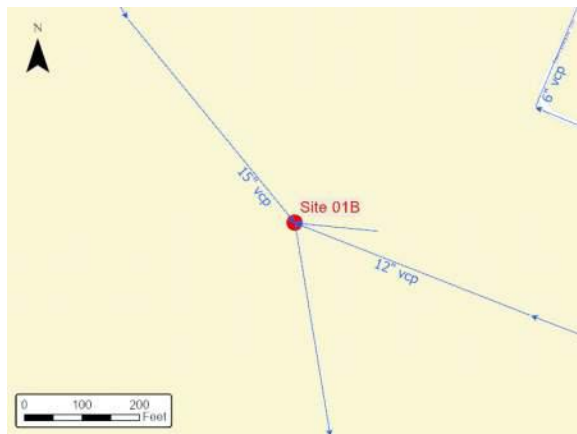
ADWF: 0.247 mgd

Peak Measured Flow: 0.728 mgd

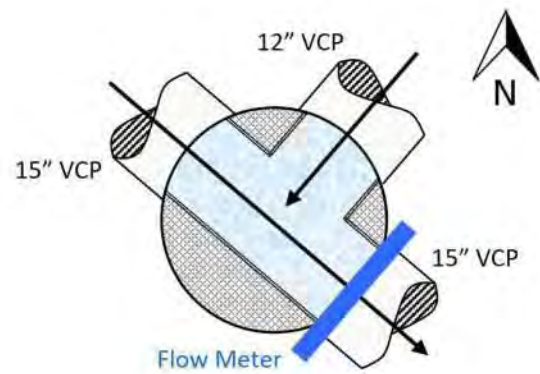
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 01B

Additional Site Photos

Monitored Southeast Effluent Pipe



Northwest Influent Pipe



SITE 01B

Additional Site Photos

Northeast Influent Pipe

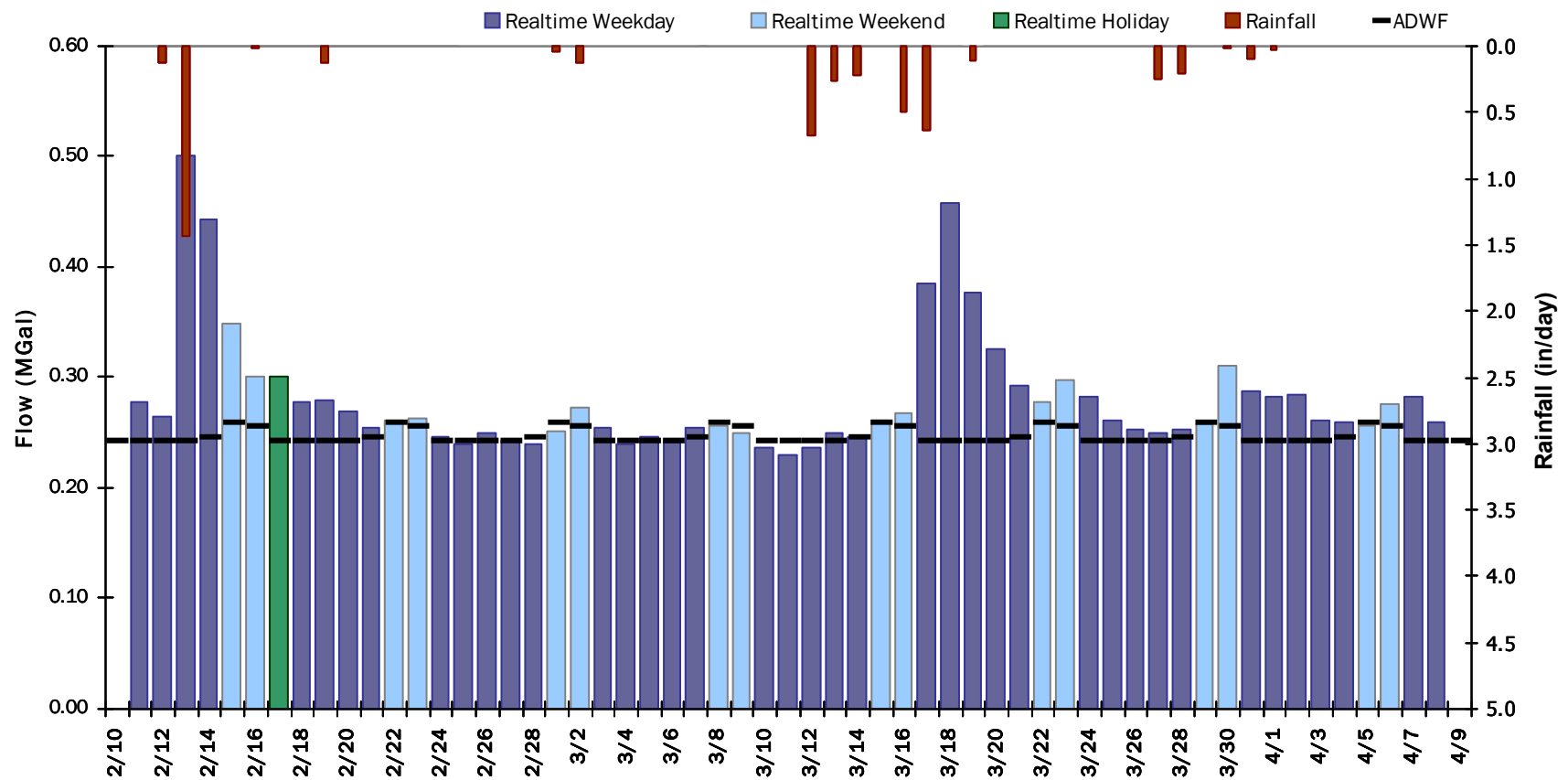


SITE 01B

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.280 MGal Peak Daily Flow: 0.500 MGal Min Daily Flow: 0.215 MGal

Total Rainfall: 4.88 inches



SITE 01B

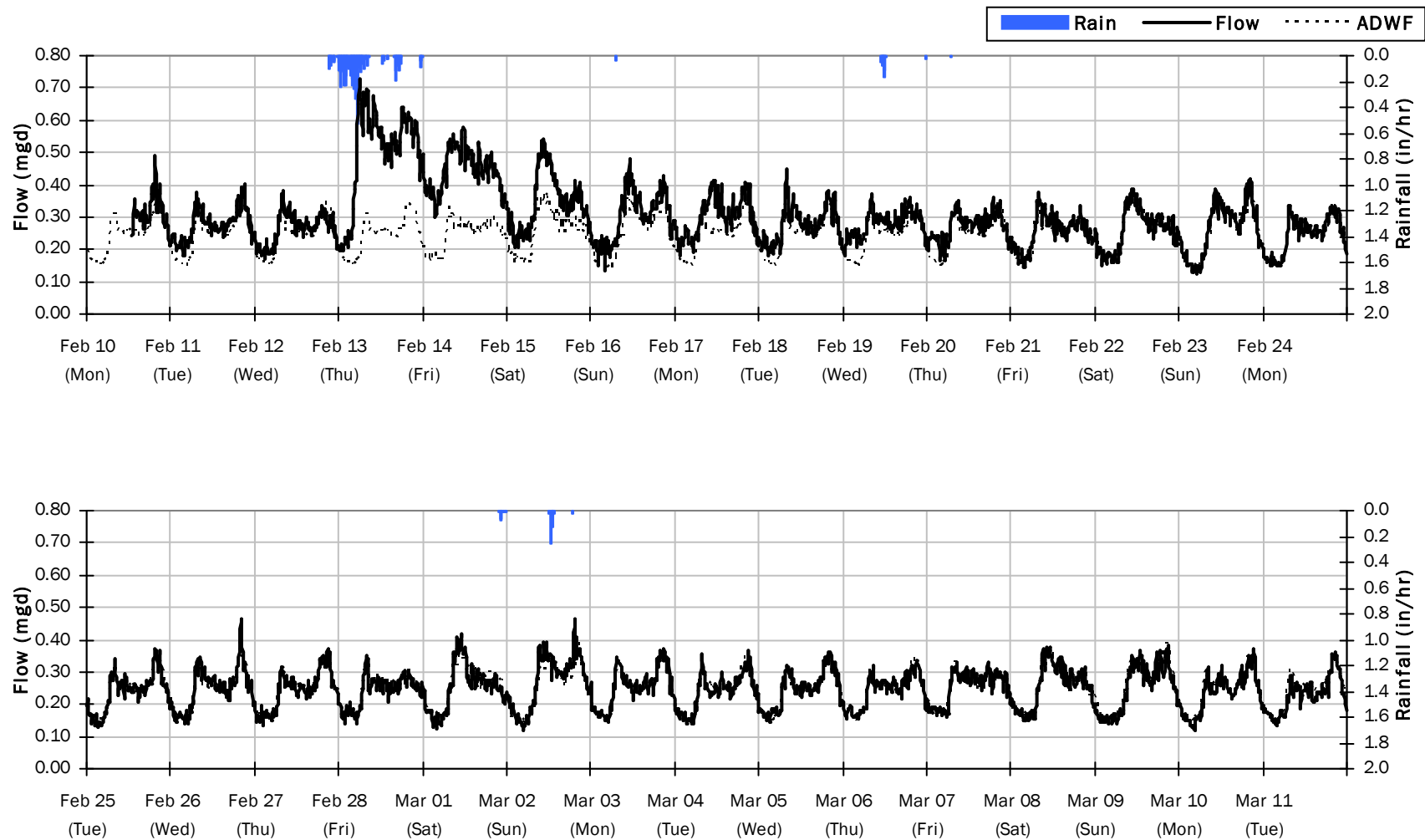
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.87 inches

Period Avg Flow: 0.276 mgd

Period Peak Flow: 0.728 mgd

Period Min Flow: 0.118 mgd



SITE 01B

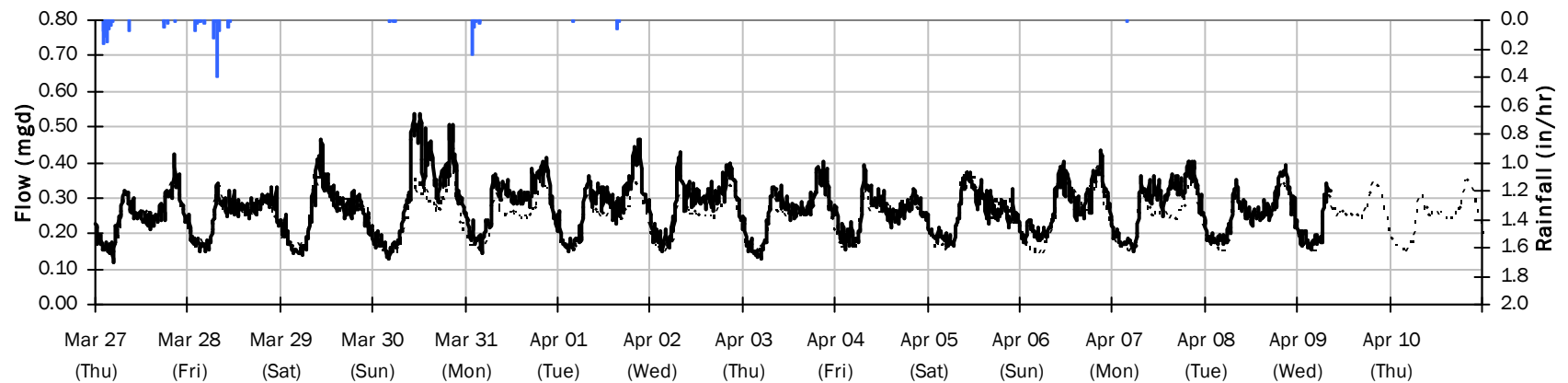
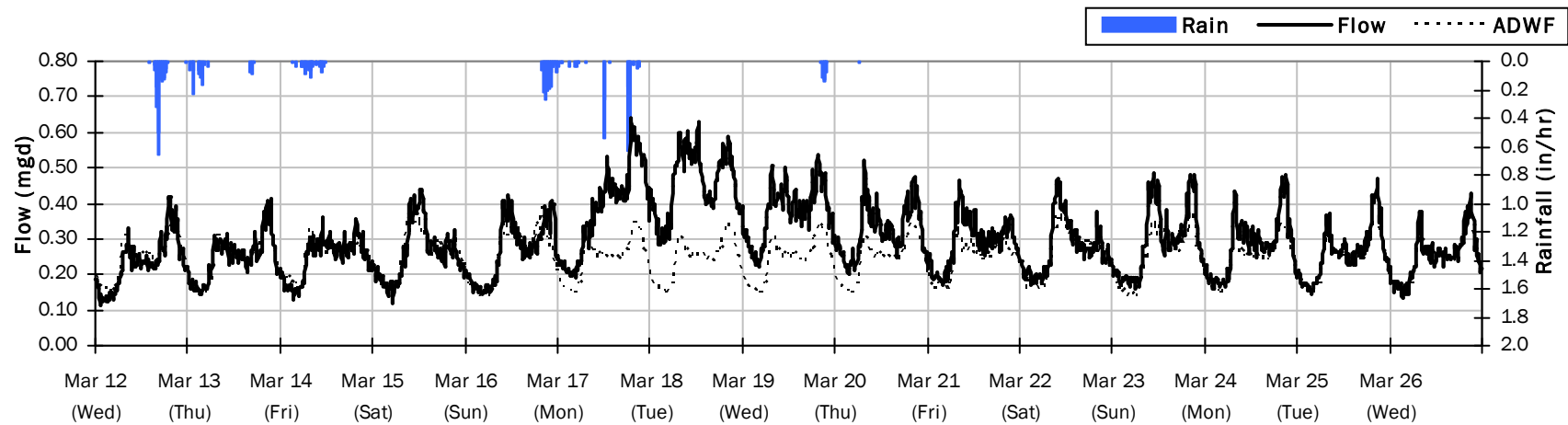
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.01 inches

Period Avg Flow: 0.285 mgd

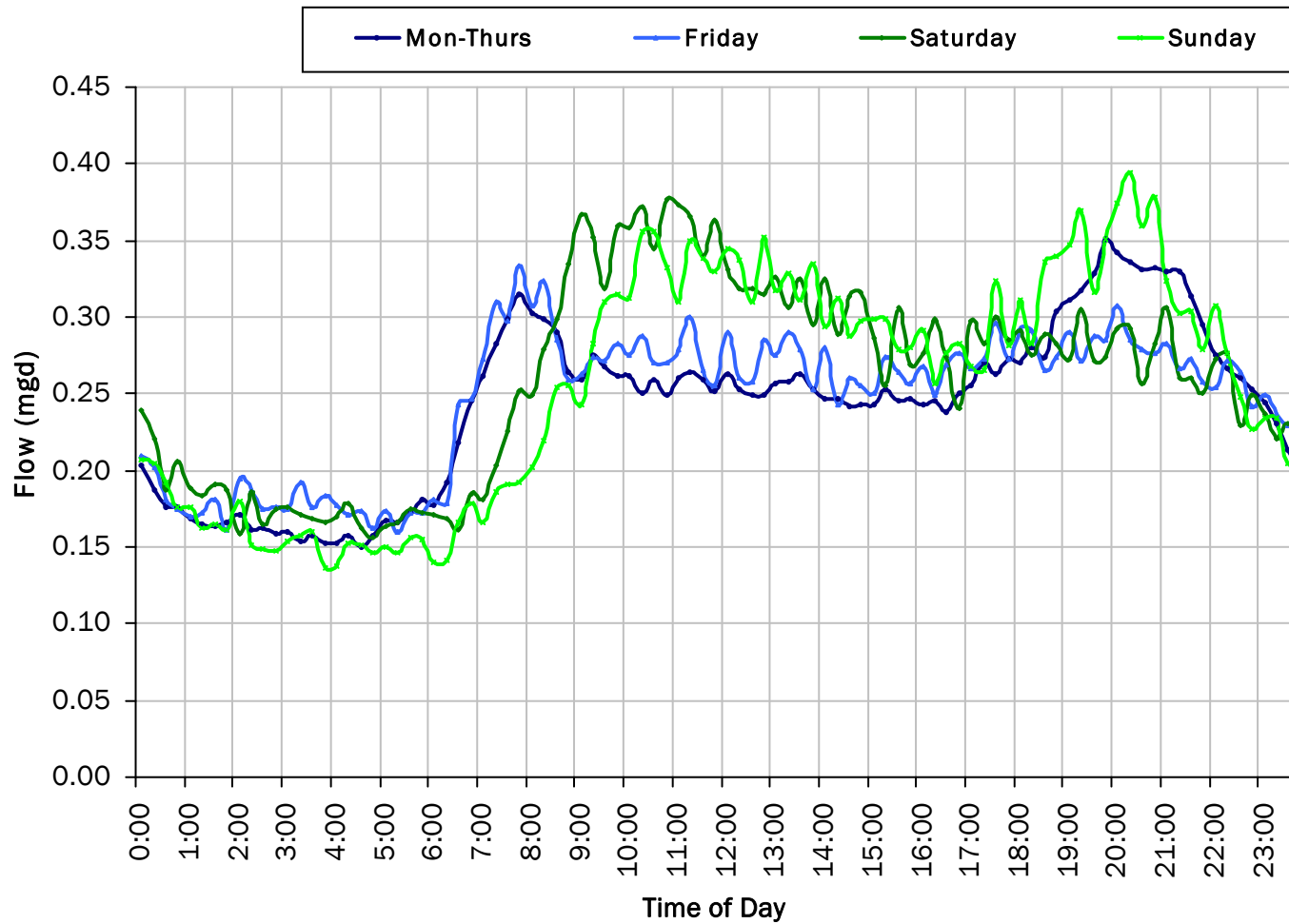
Period Peak Flow: 0.641 mgd

Period Min Flow: 0.116 mgd

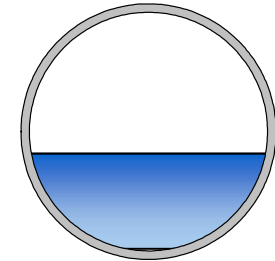


SITE 01B

Average Dry Weather Flow Hydrographs

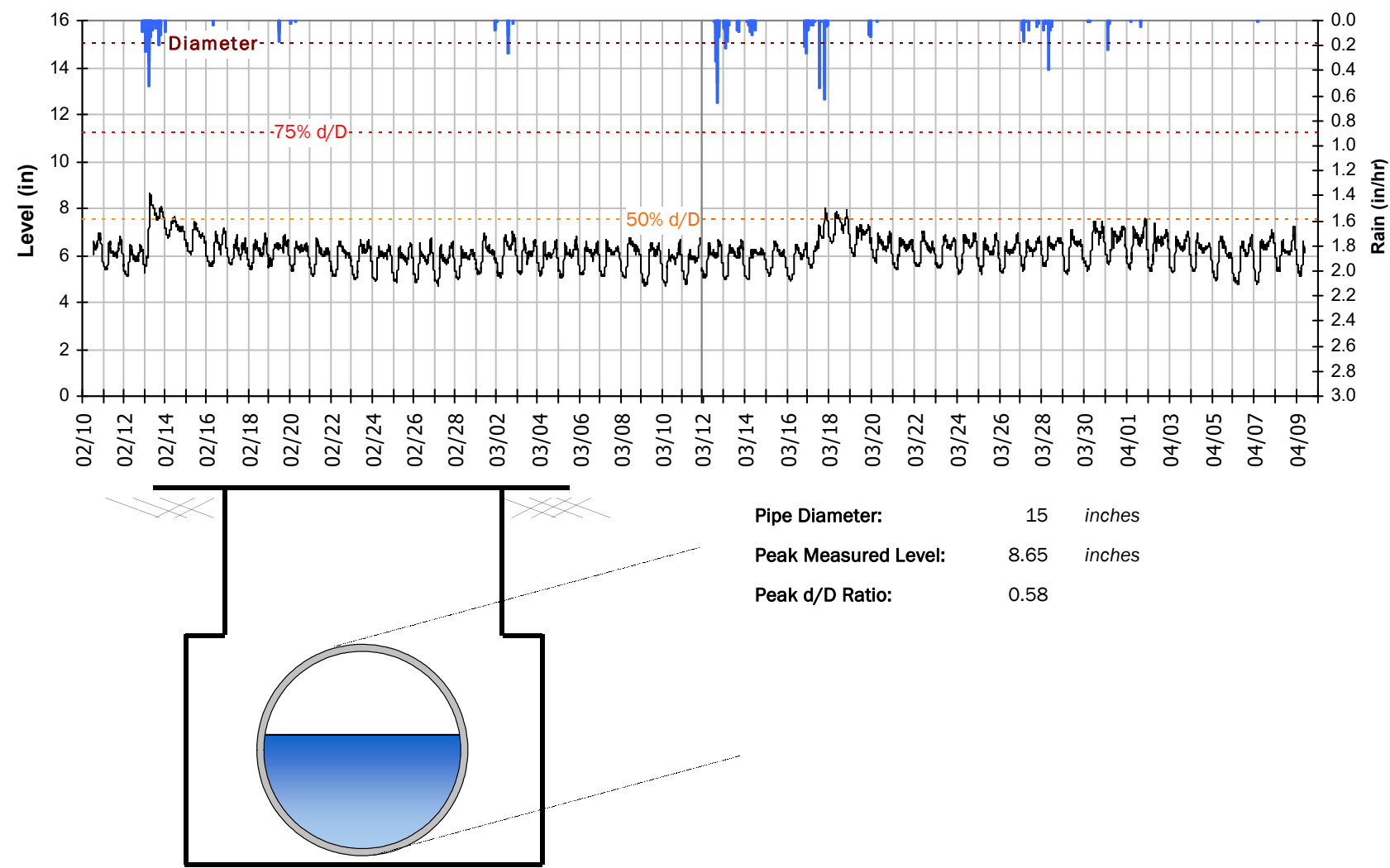


ADWF:
0.247 mgd



SITE 01B
Site Capacity and Surge Summary

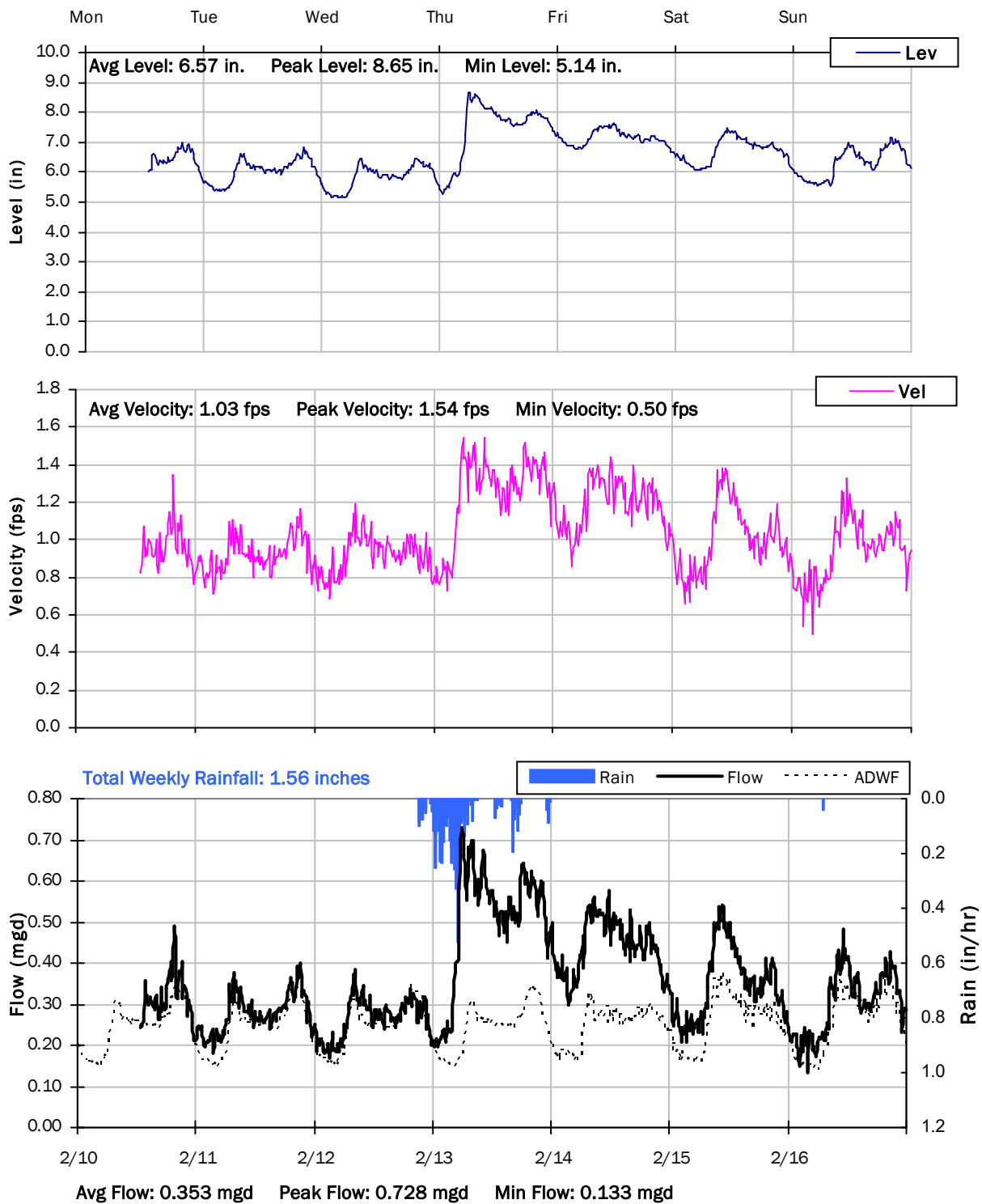
Realtime Flow Levels with Rainfall Data over Peak Level Period



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

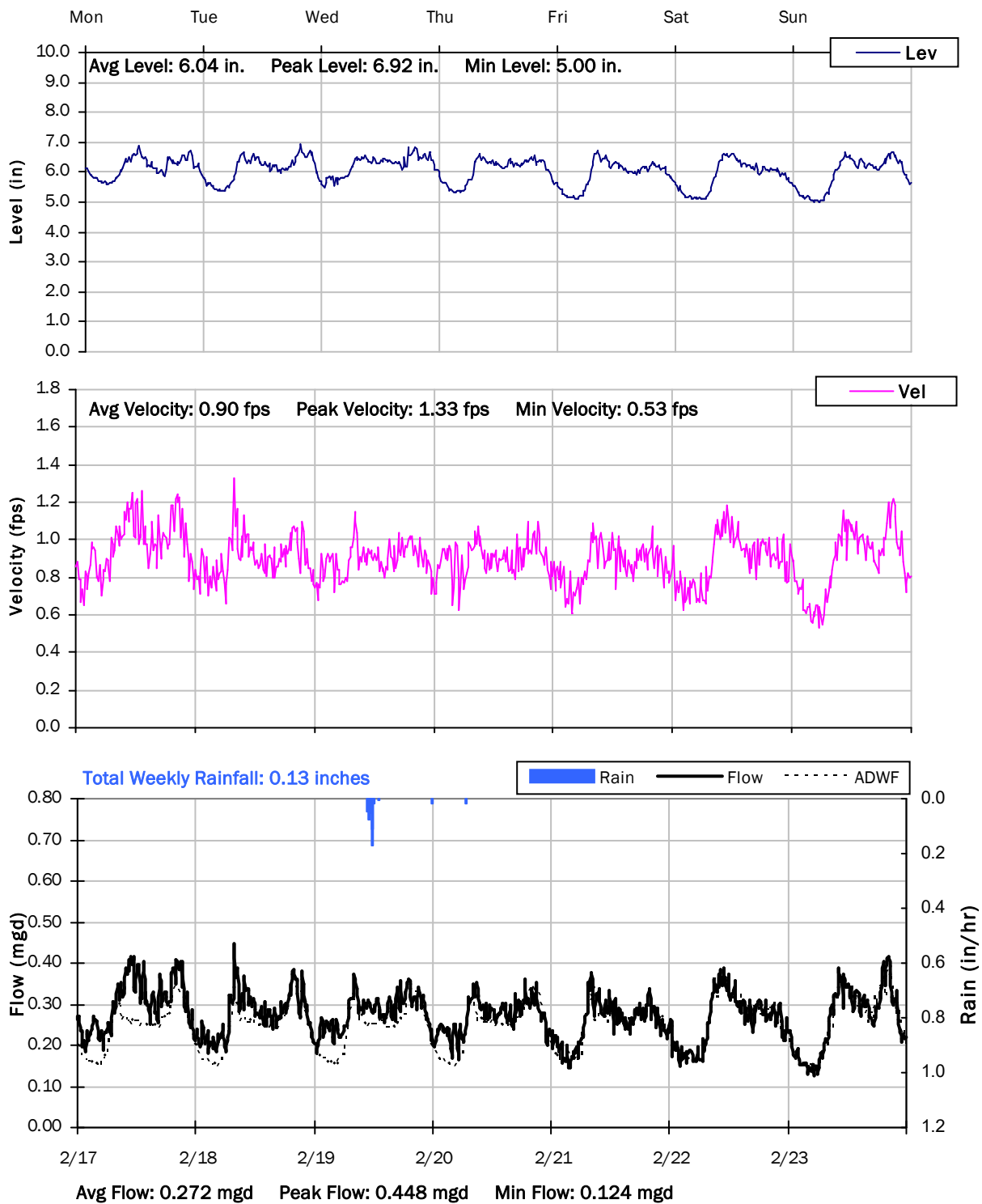
2/10/2025 to 2/17/2025



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

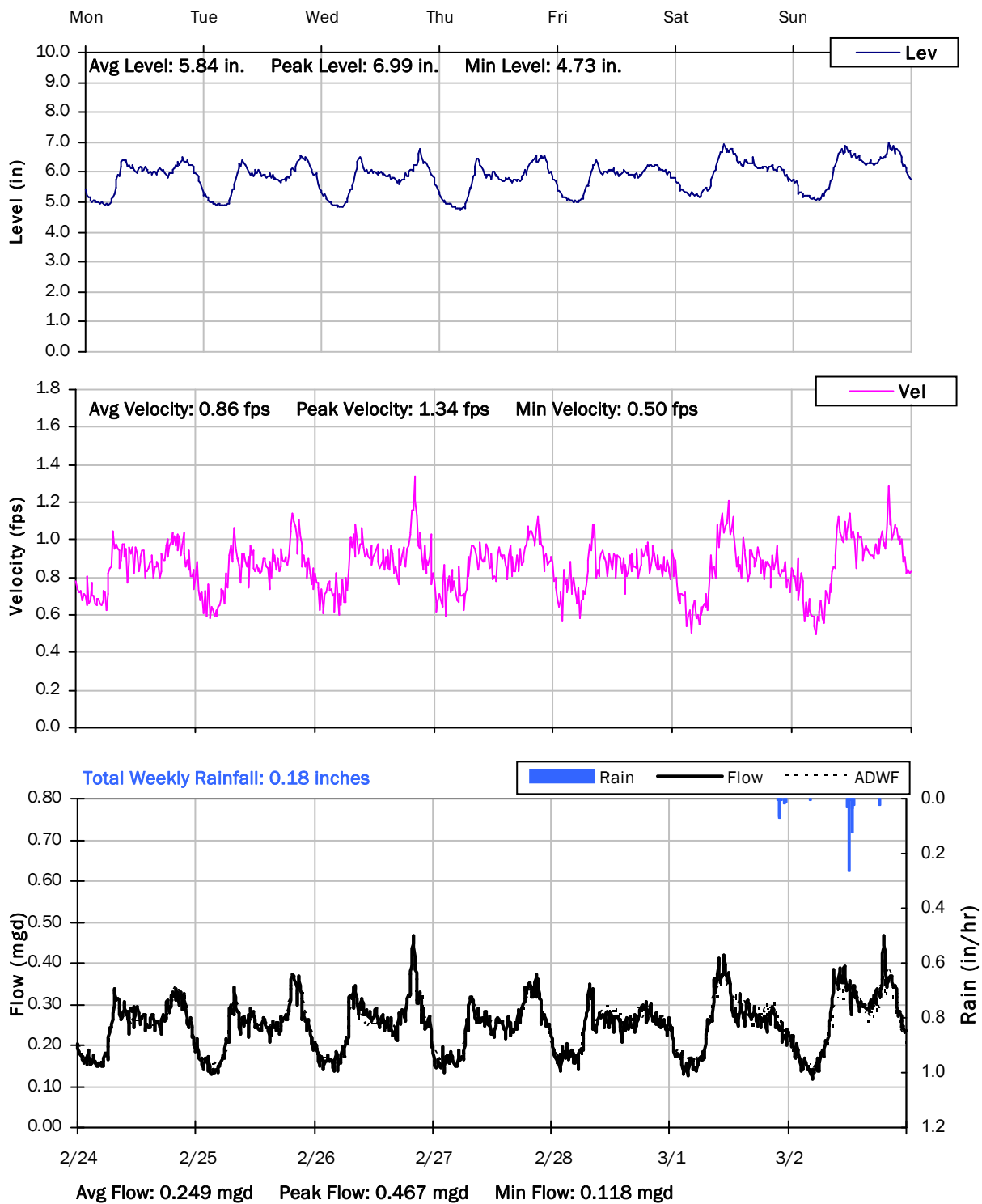
2/17/2025 to 2/24/2025



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

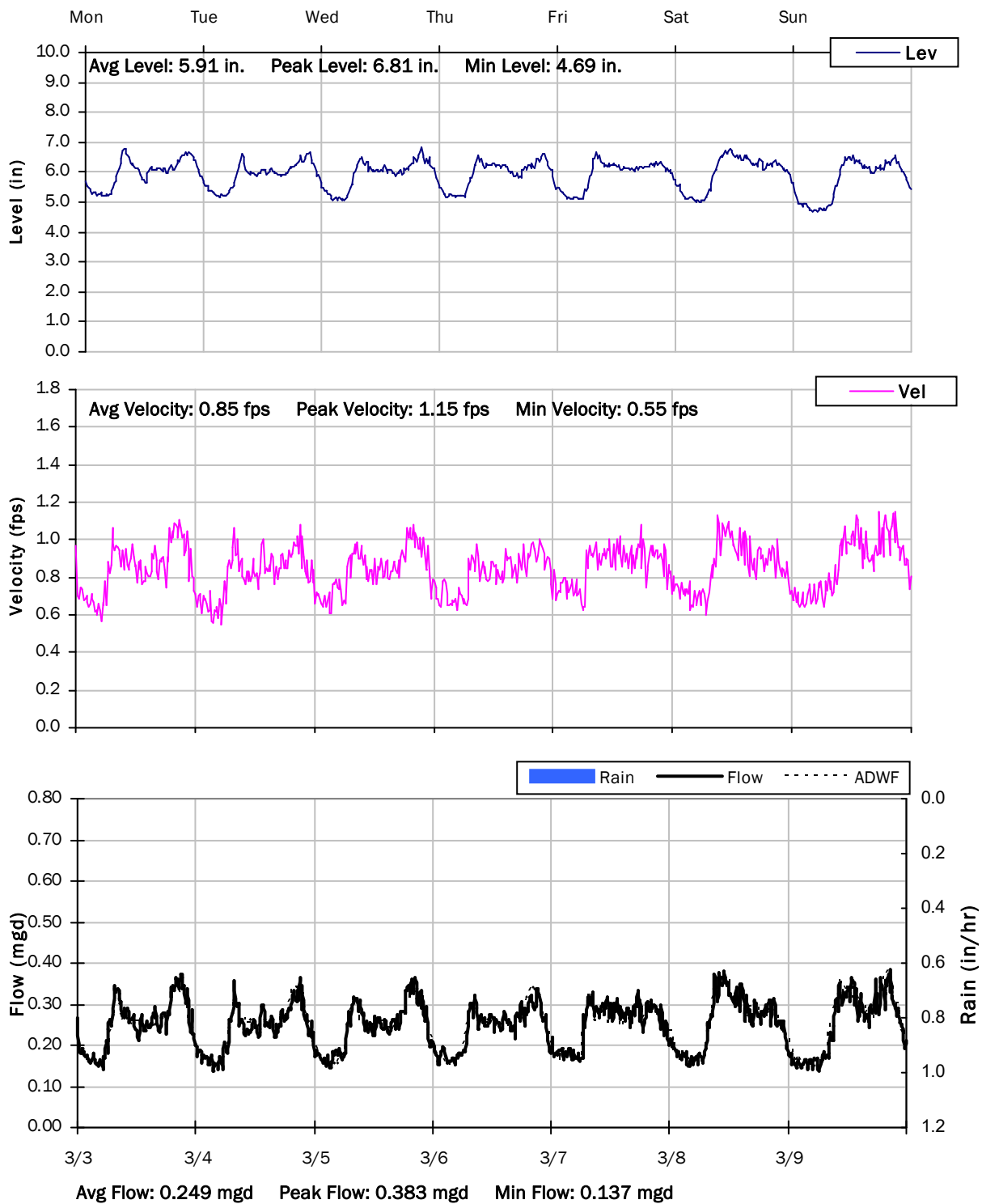
2/24/2025 to 3/3/2025



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

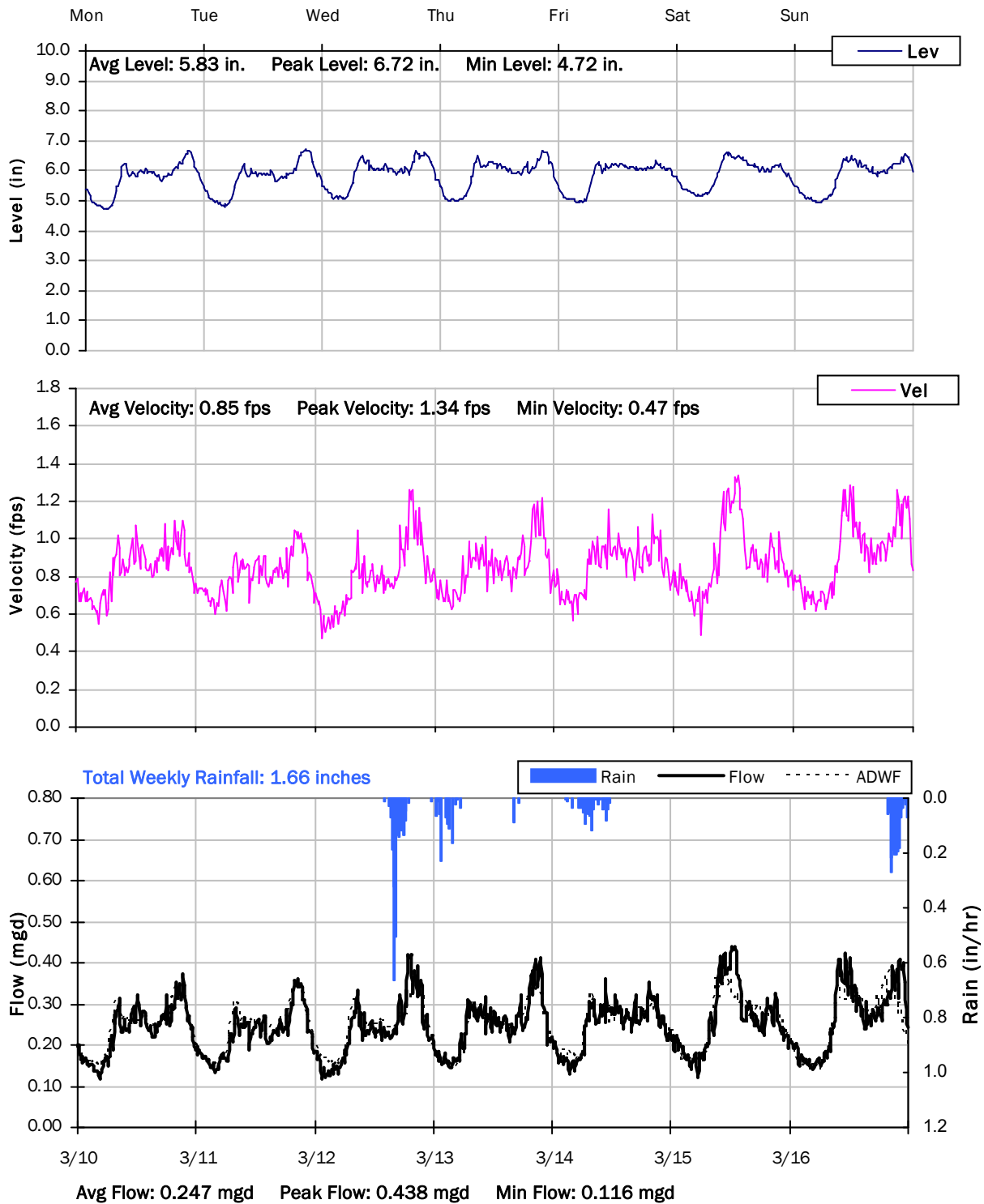
3/3/2025 to 3/10/2025



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

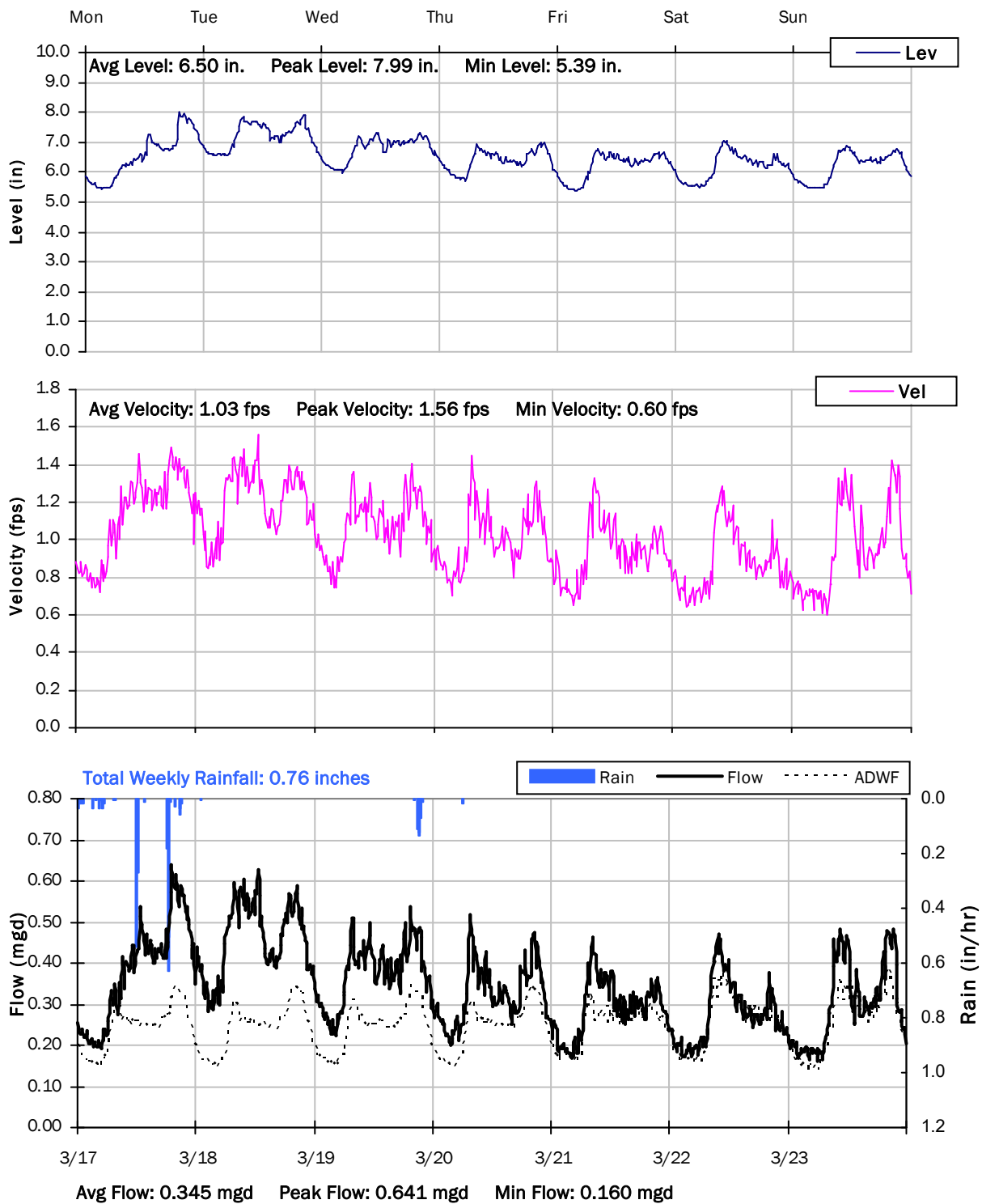
3/10/2025 to 3/17/2025



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

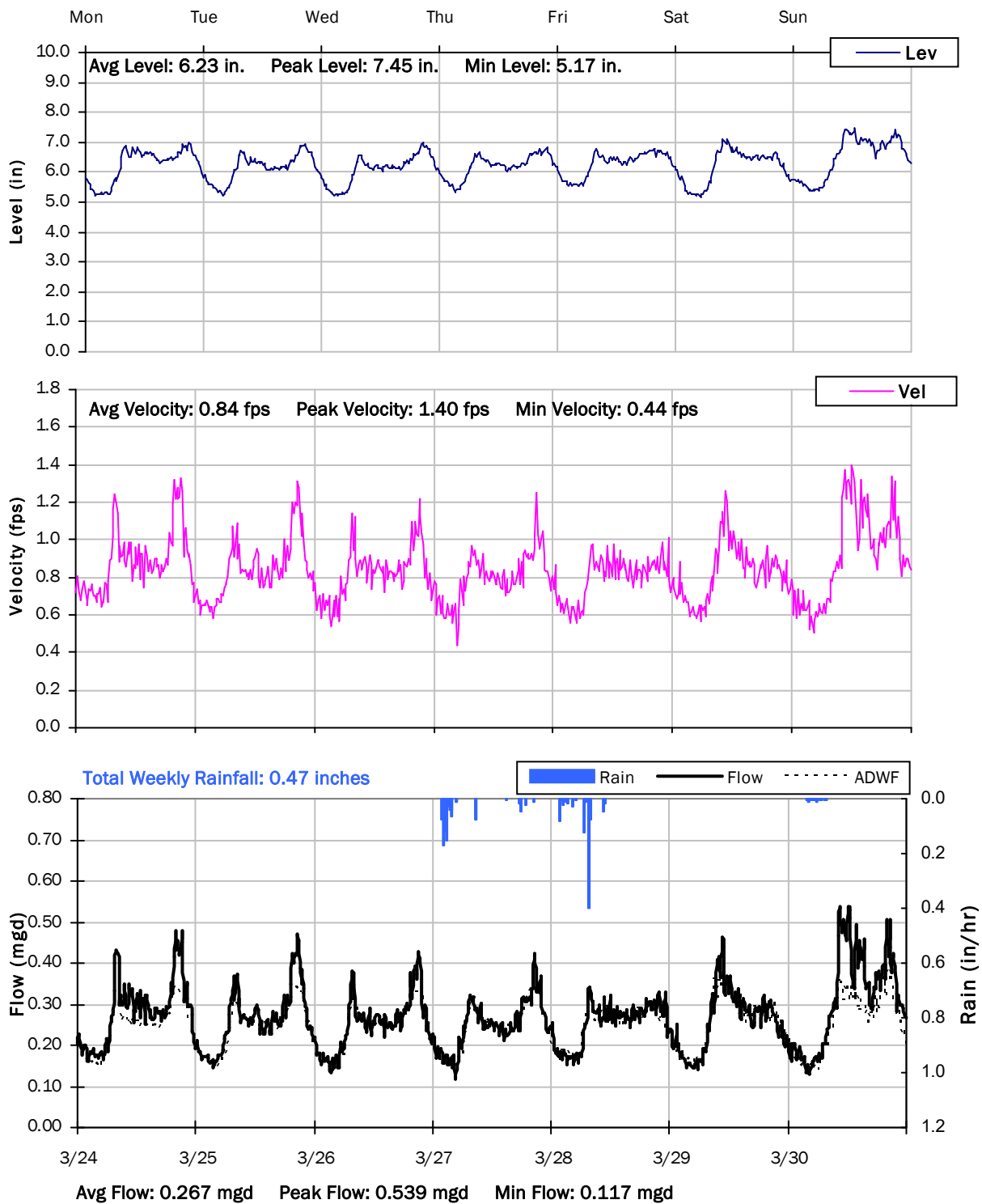
3/17/2025 to 3/24/2025



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

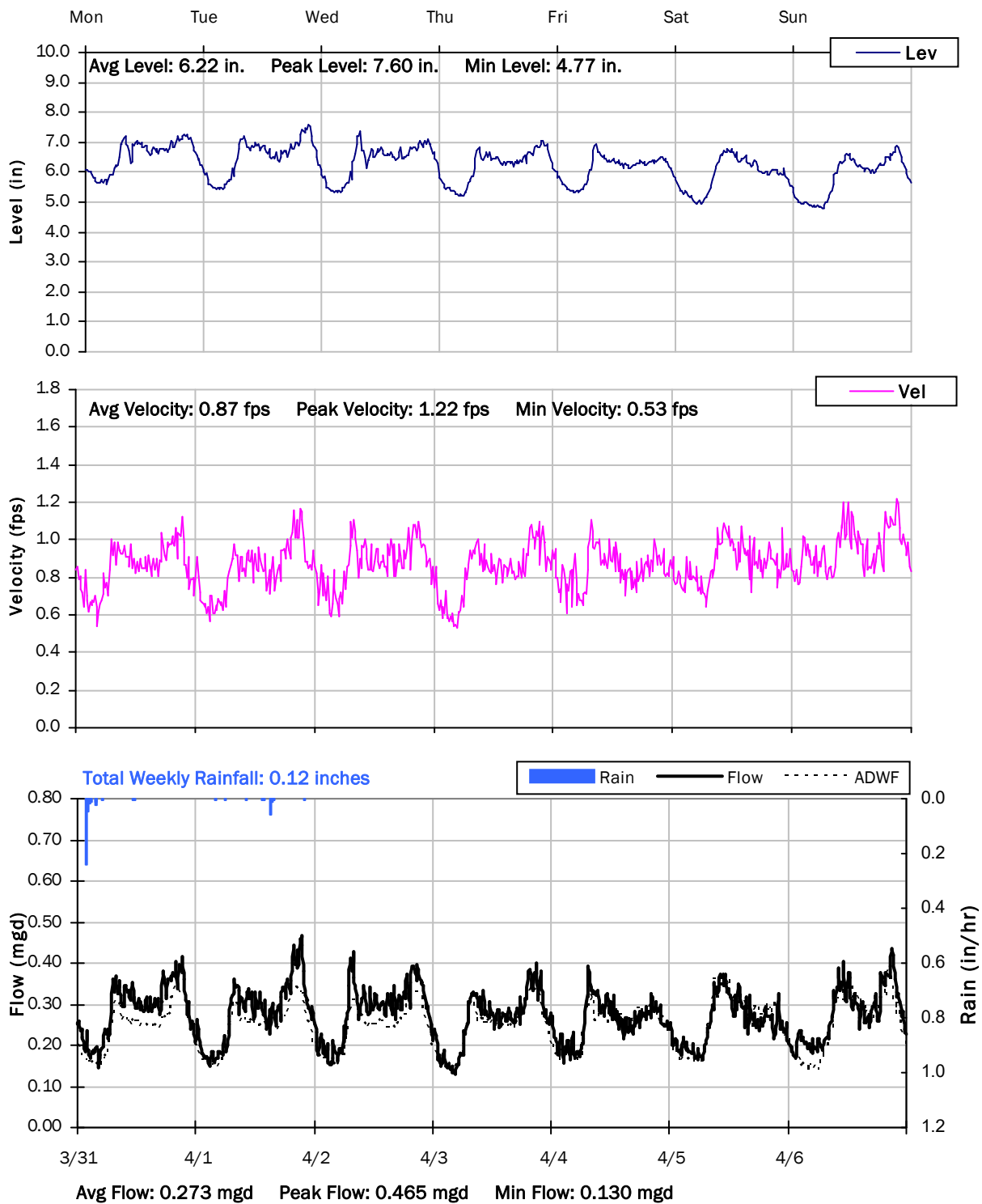
3/24/2025 to 3/31/2025



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

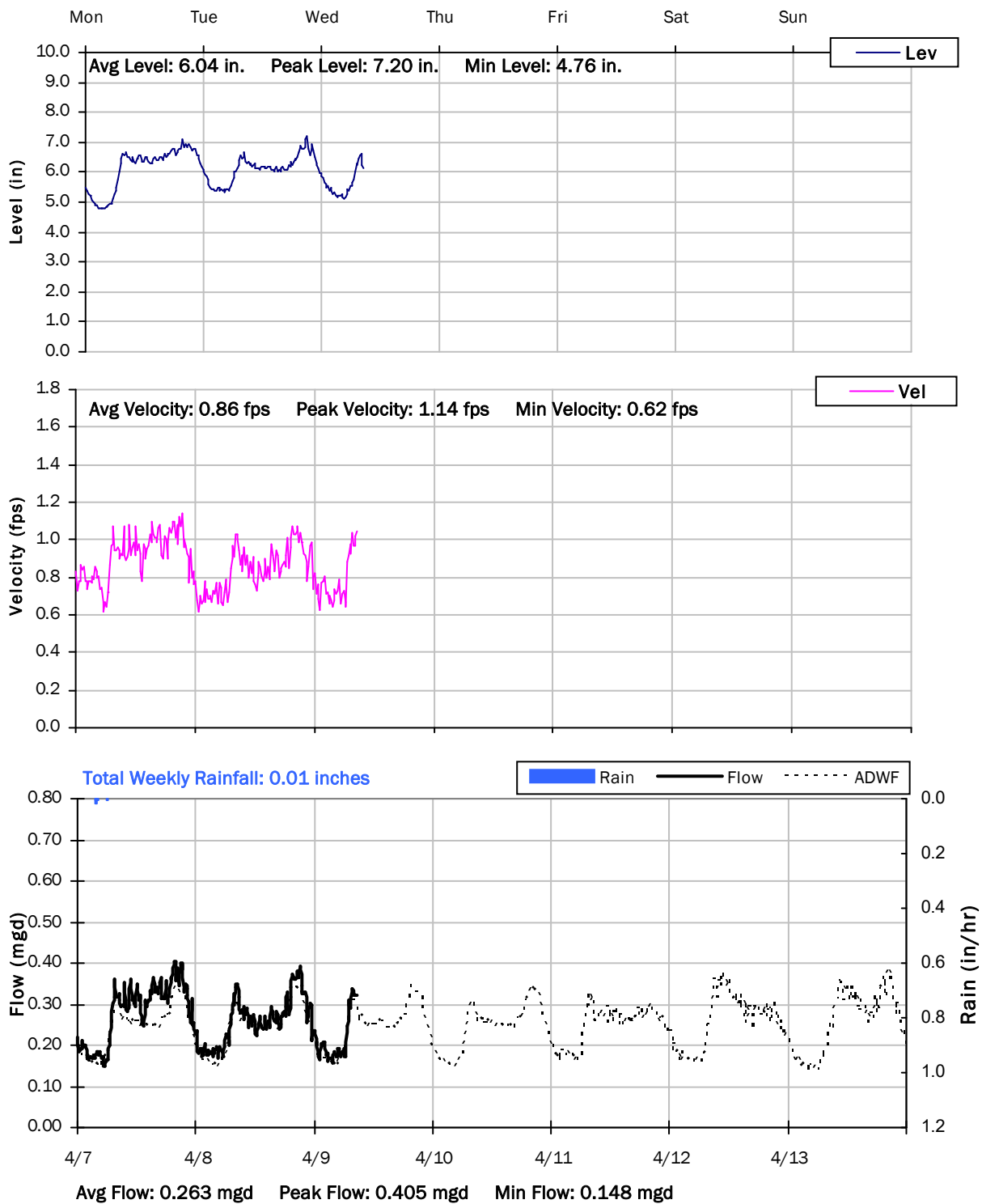
3/31/2025 to 4/7/2025



SITE 01B

Weekly Level, Velocity and Flow Hydrographs

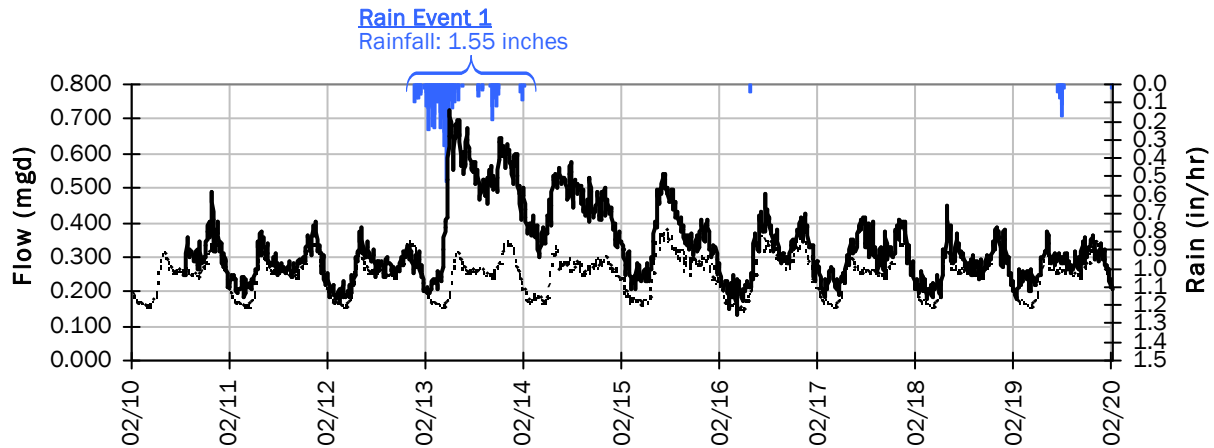
4/7/2025 to 4/14/2025



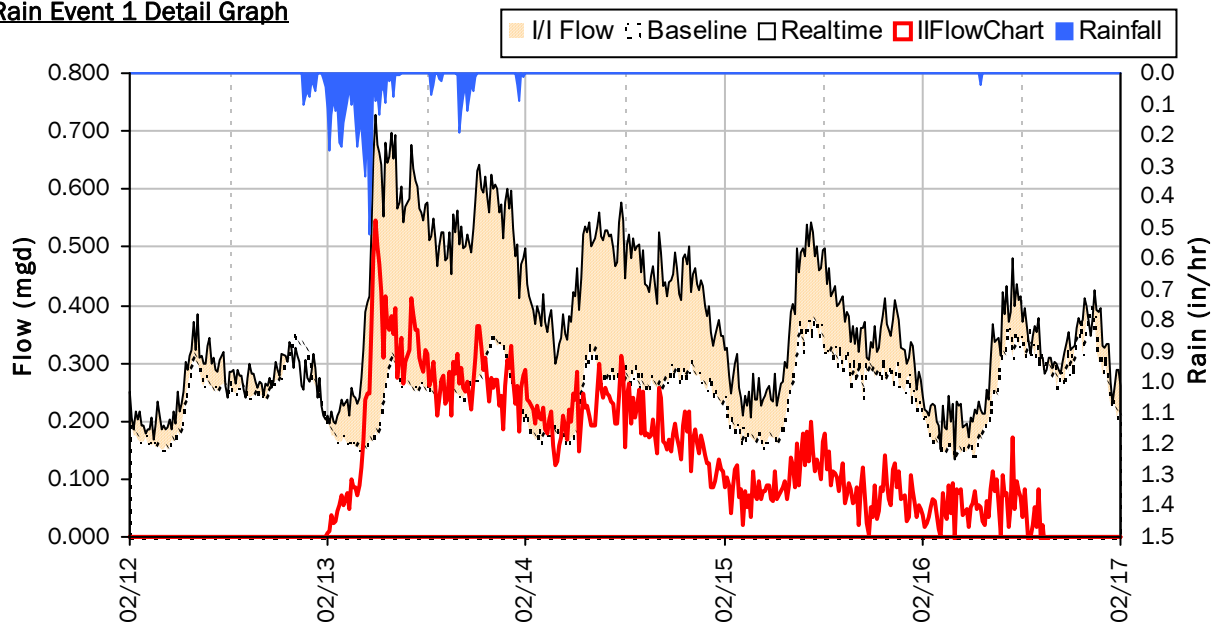
SITE 01B

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.55 inches)

Capacity

Peak Flow: 0.728 mgd
PF: 2.94

Peak Level: 8.65 in
d/D Ratio: 0.58

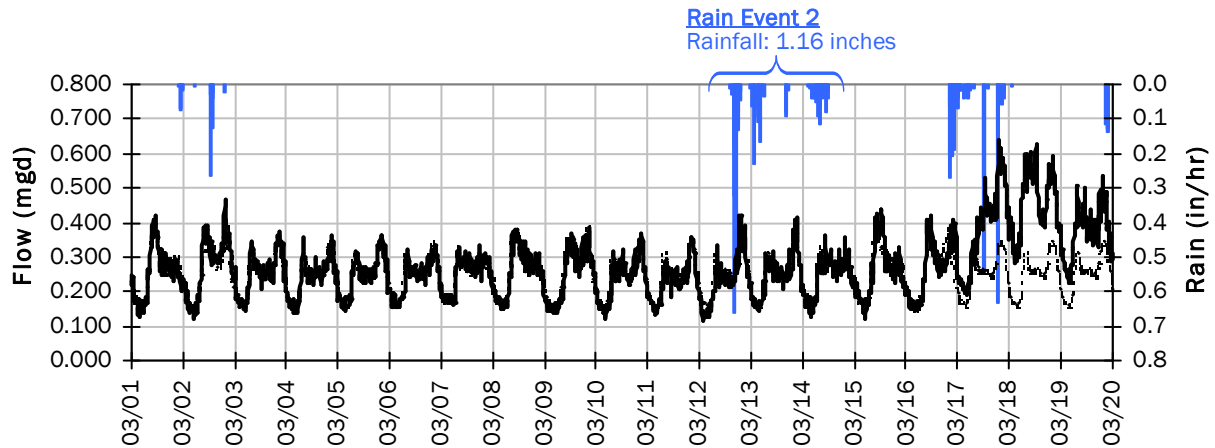
Inflow / Infiltration

Peak I/I Rate: 0.547 mgd
Total I/I: 574,000 gallons

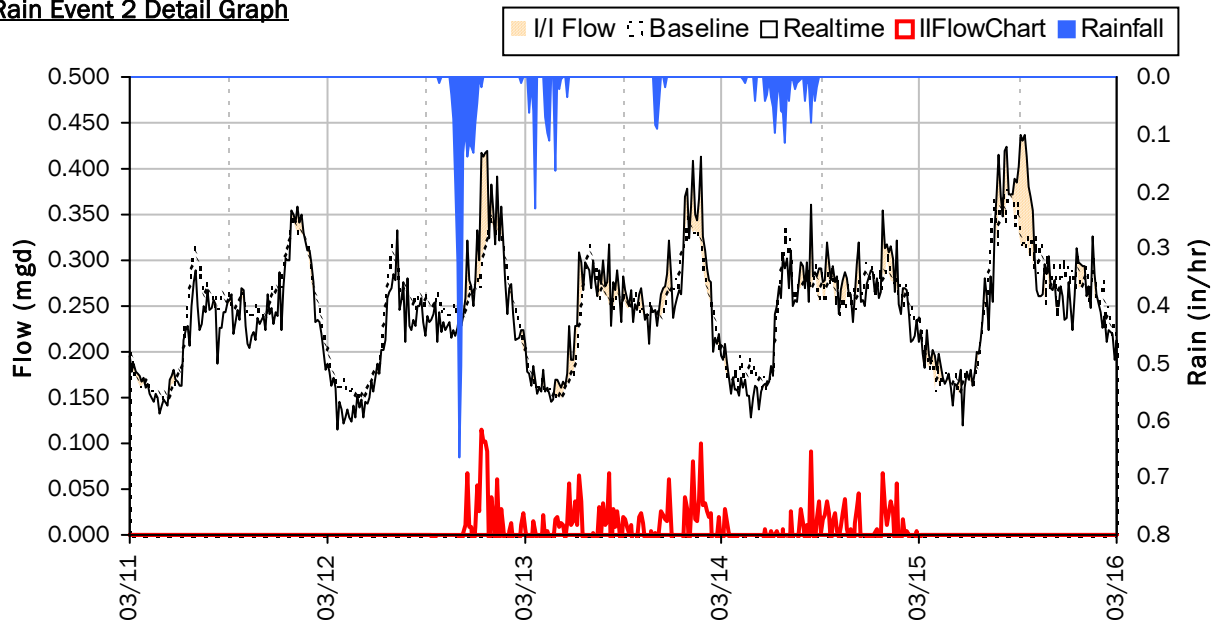
SITE 01B

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.16 inches)

Capacity

Peak Flow: 0.419 mgd
PF: 1.69
Peak Level: 6.69 in
d/D Ratio: 0.45

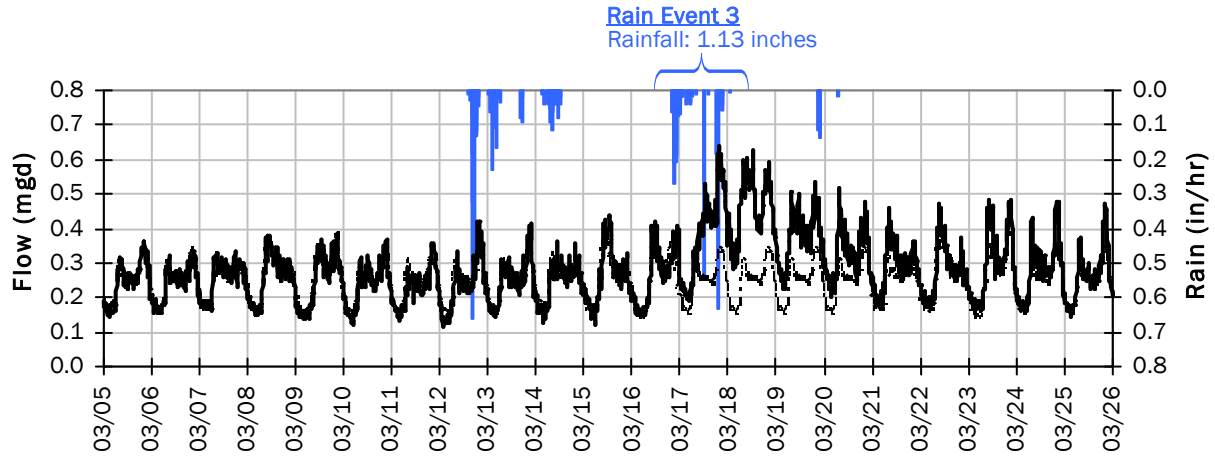
Inflow / Infiltration

Peak I/I Rate: 0.115 mgd
Total I/I: 13,000 gallons

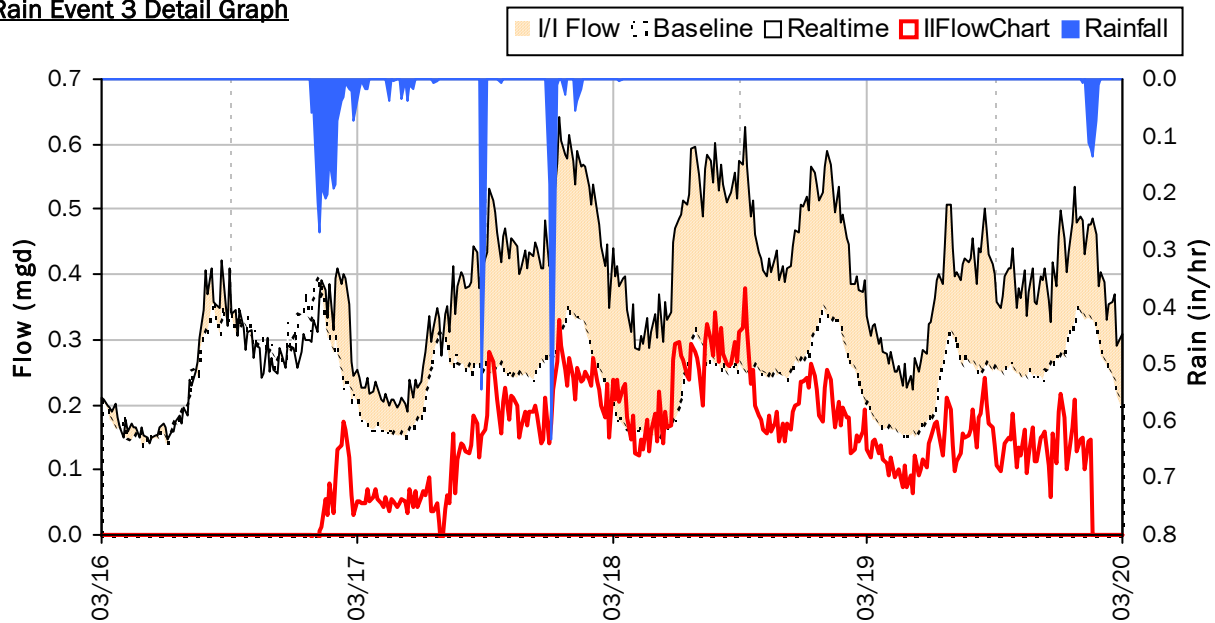
SITE 01B

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.13 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.64 mgd	Peak I/I Rate:	0.38 mgd
PF:	2.59	Total I/I:	489,000 gallons
Peak Level:	7.99 in		
d/D Ratio:	0.53		

Monitoring Site: Site 02

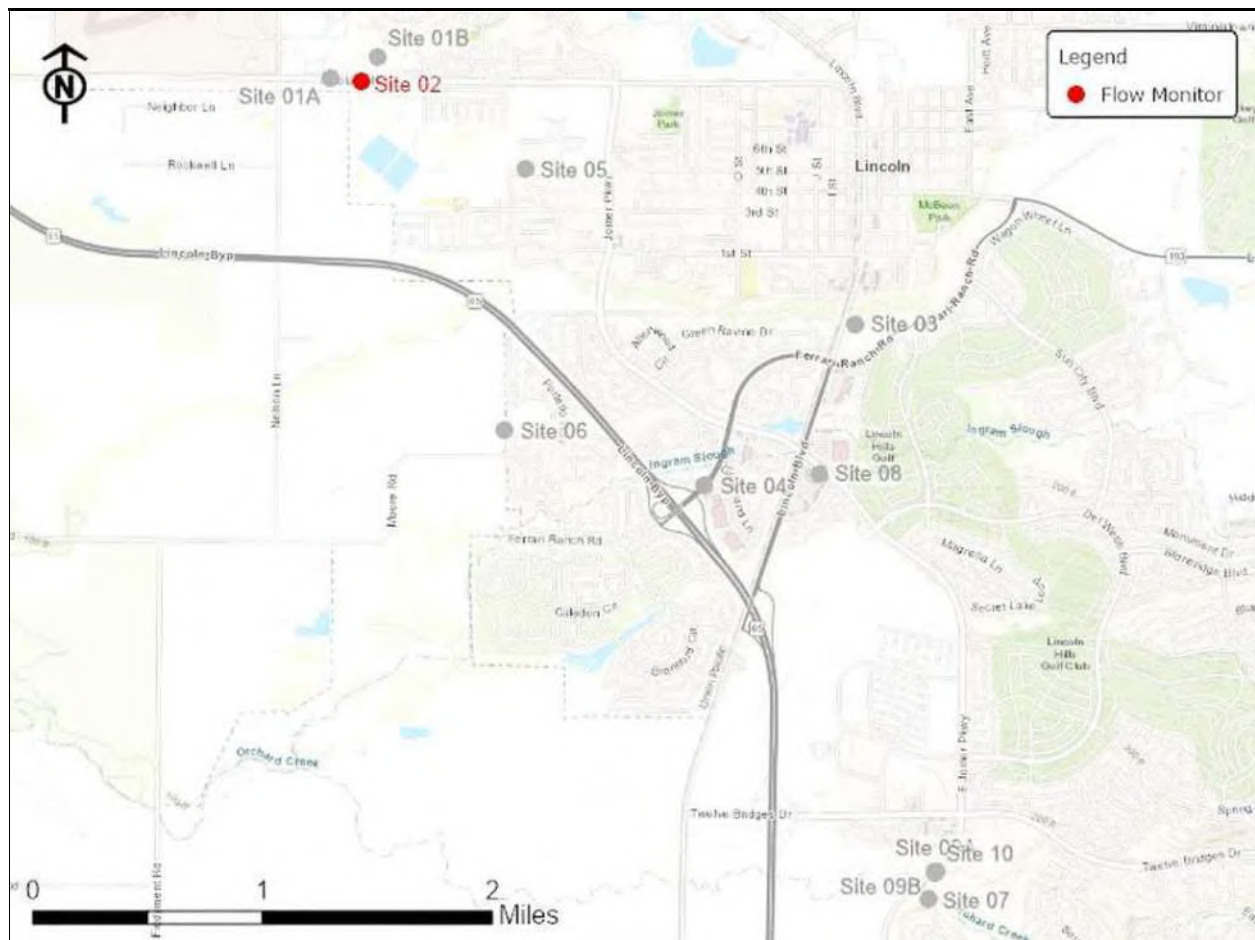
Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: 2885 Nicolaus Rd, Lincoln, CA

Data Summary Report



Vicinity Map: Site 02

SITE 02

Site Information

MH ID: NW319SS07

Location: 2885 Nicolaus Rd, Lincoln, CA

Coordinates: 121.3322° W, 38.8972° N

Rim Elevation: 117 feet

Expected Pipe Diameter: 18 inches

Measured Pipe Diameter: 17.5 inches

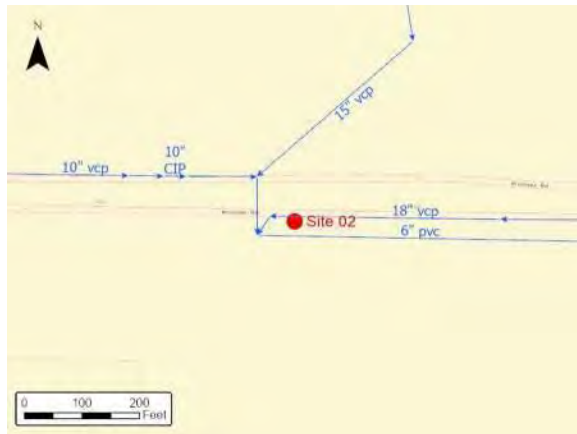
ADWF: 0.056 mgd

Peak Measured Flow: 0.114 mgd

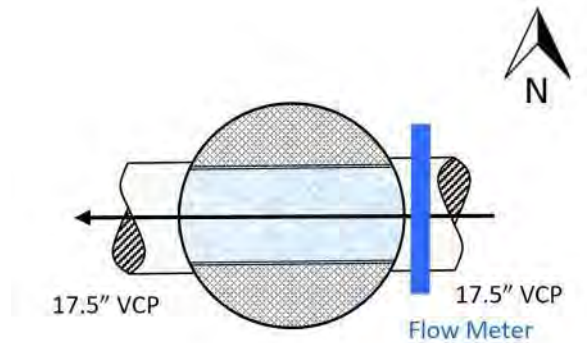
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 02

Additional Site Photos

West Effluent Pipe



Monitored East Influent Pipe

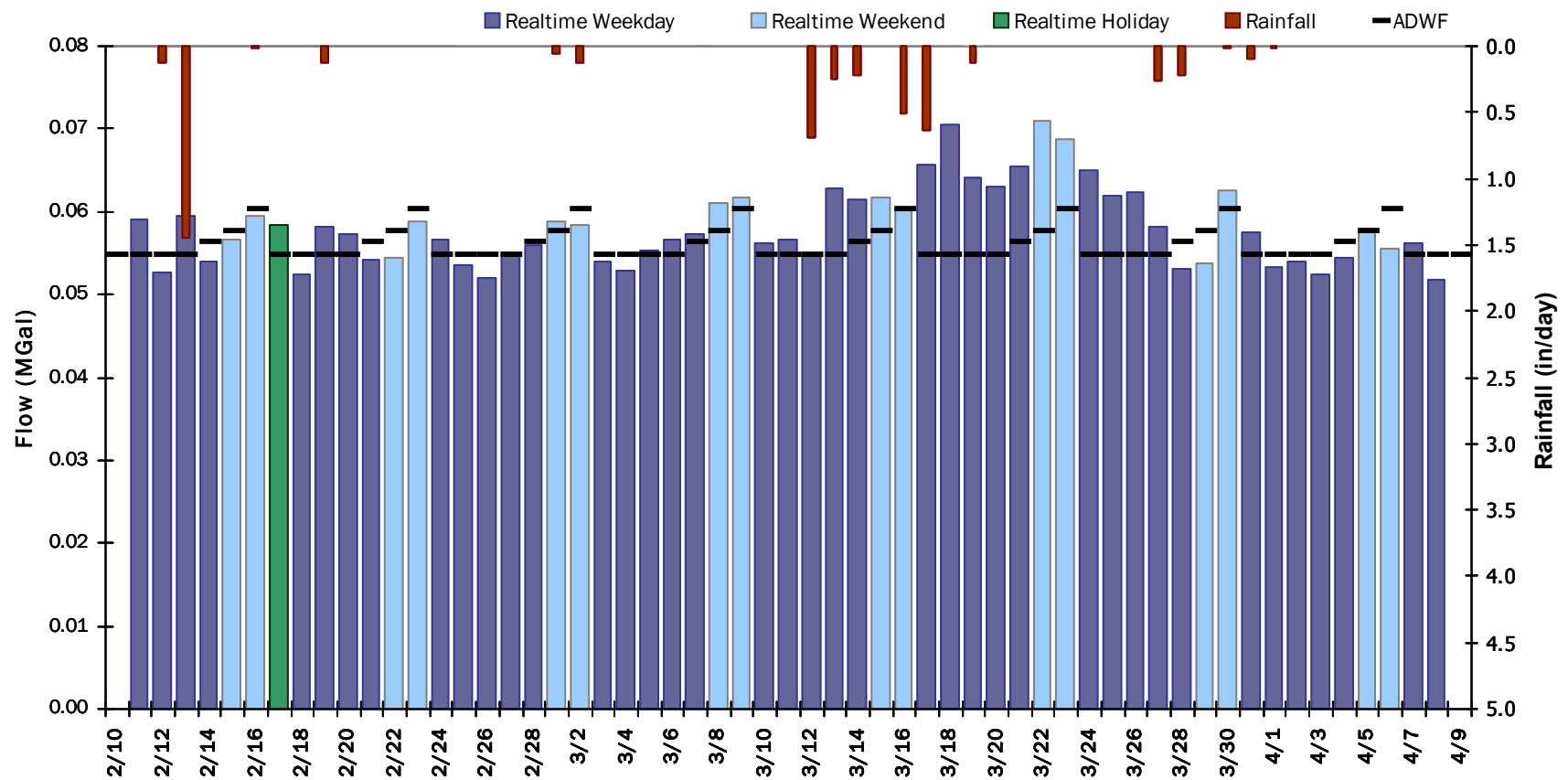


SITE 02

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.058 MGal Peak Daily Flow: 0.071 MGal Min Daily Flow: 0.040 MGal

Total Rainfall: 4.89 inches



SITE 02

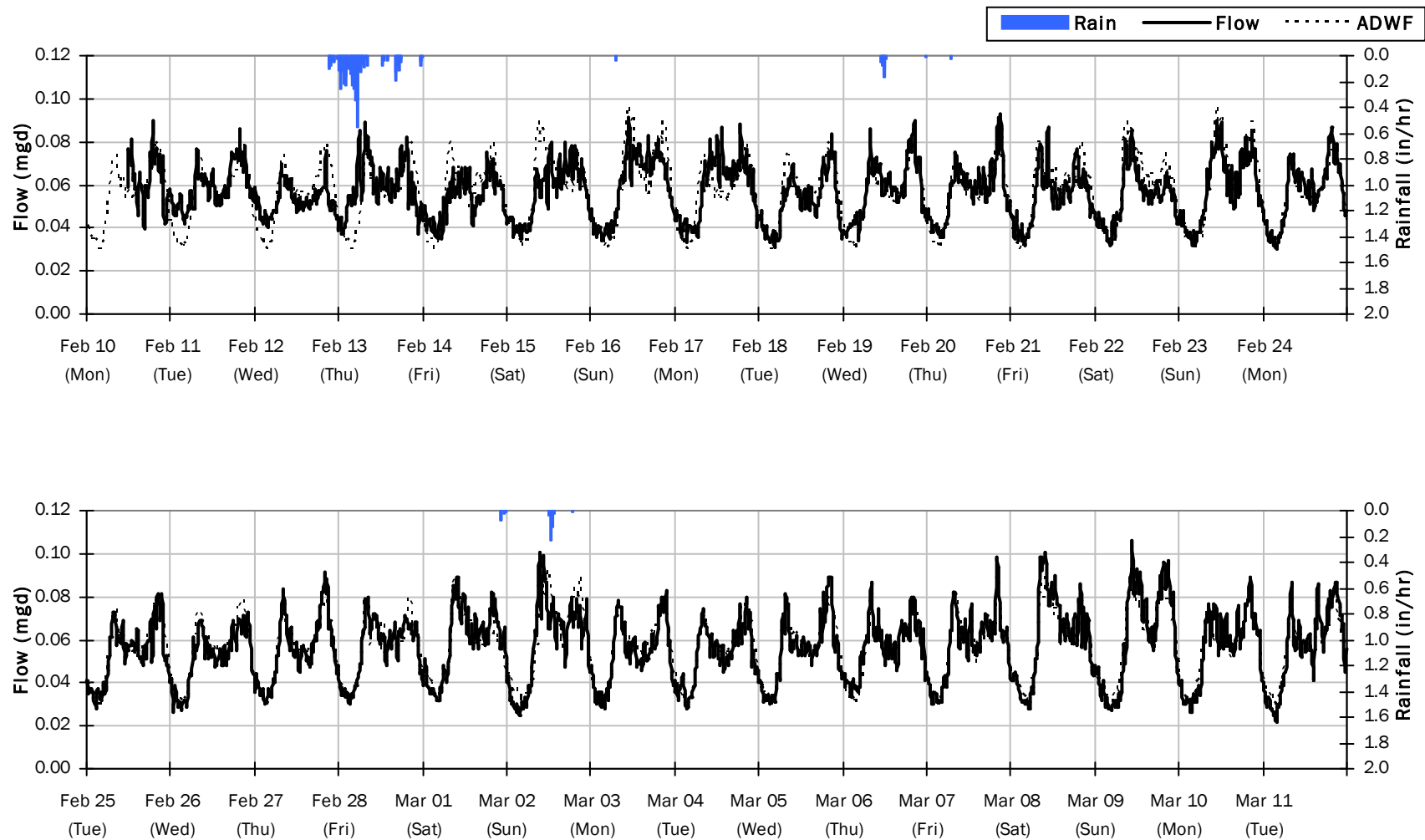
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.87 inches

Period Avg Flow: 0.057 mgd

Period Peak Flow: 0.106 mgd

Period Min Flow: 0.022 mgd



SITE 02

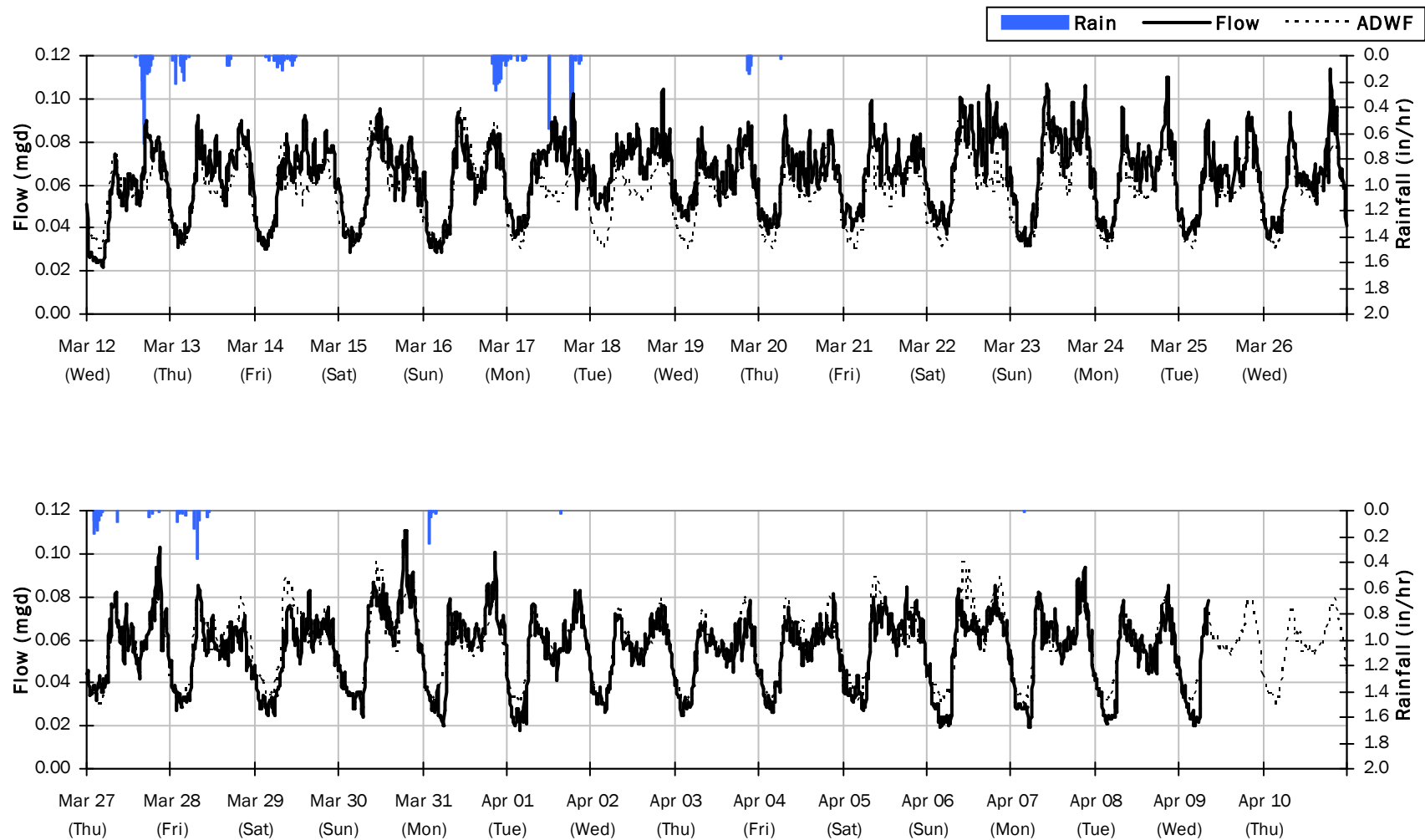
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.02 inches

Period Avg Flow: 0.060 mgd

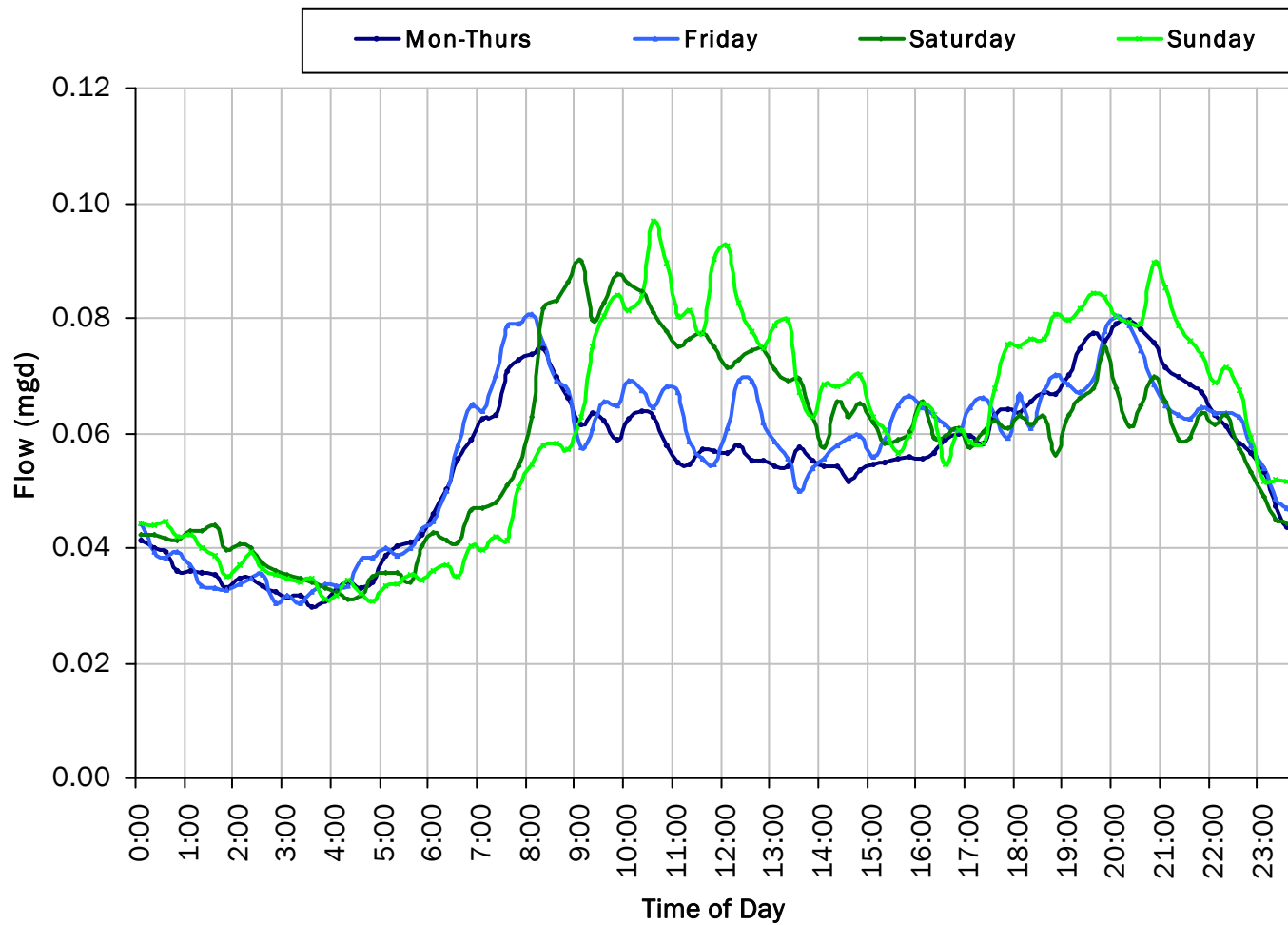
Period Peak Flow: 0.114 mgd

Period Min Flow: 0.018 mgd



SITE 02

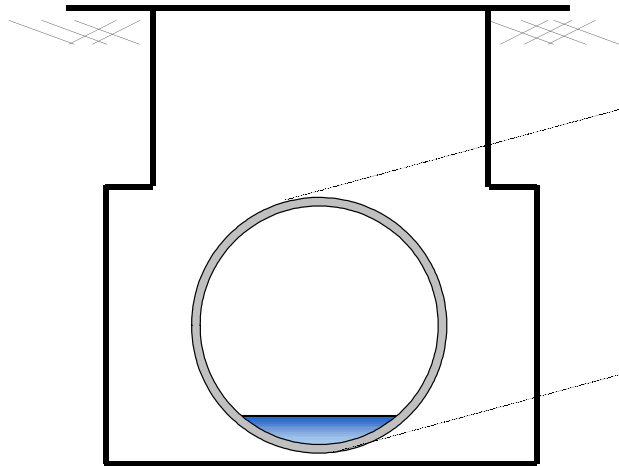
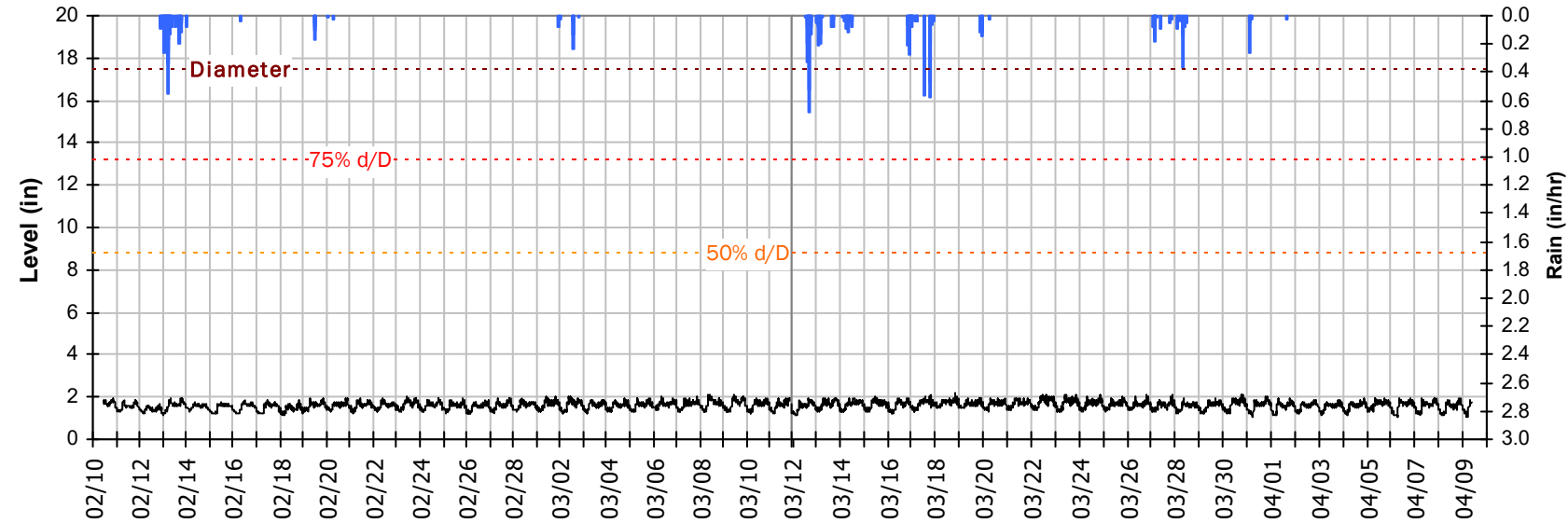
Average Dry Weather Flow Hydrographs



SITE 02

Site Capacity and Surge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period

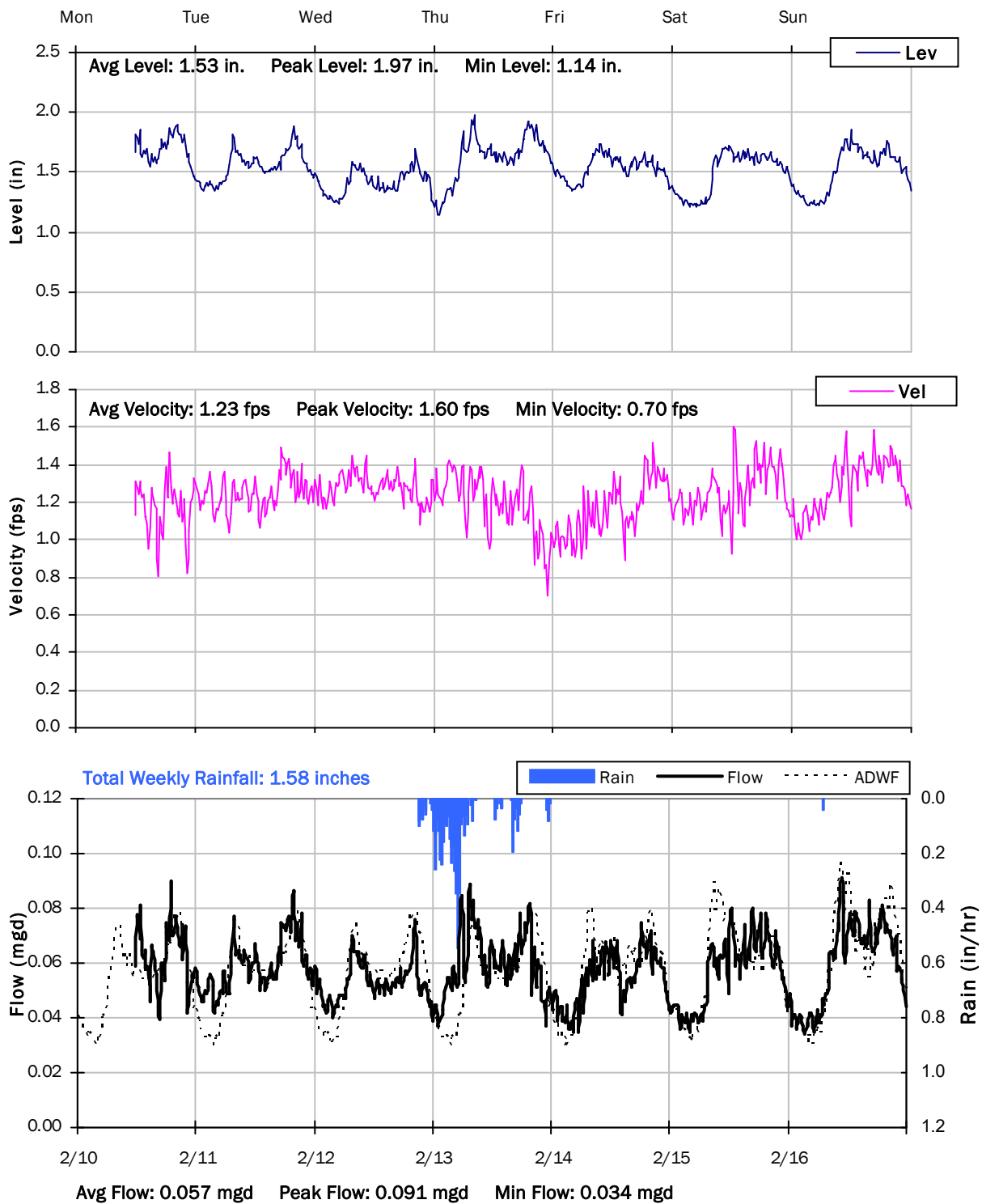


Pipe Diameter: 17.5 inches
Peak Measured Level: 2.19 inches
Peak d/D Ratio: 0.13

SITE 02

Weekly Level, Velocity and Flow Hydrographs

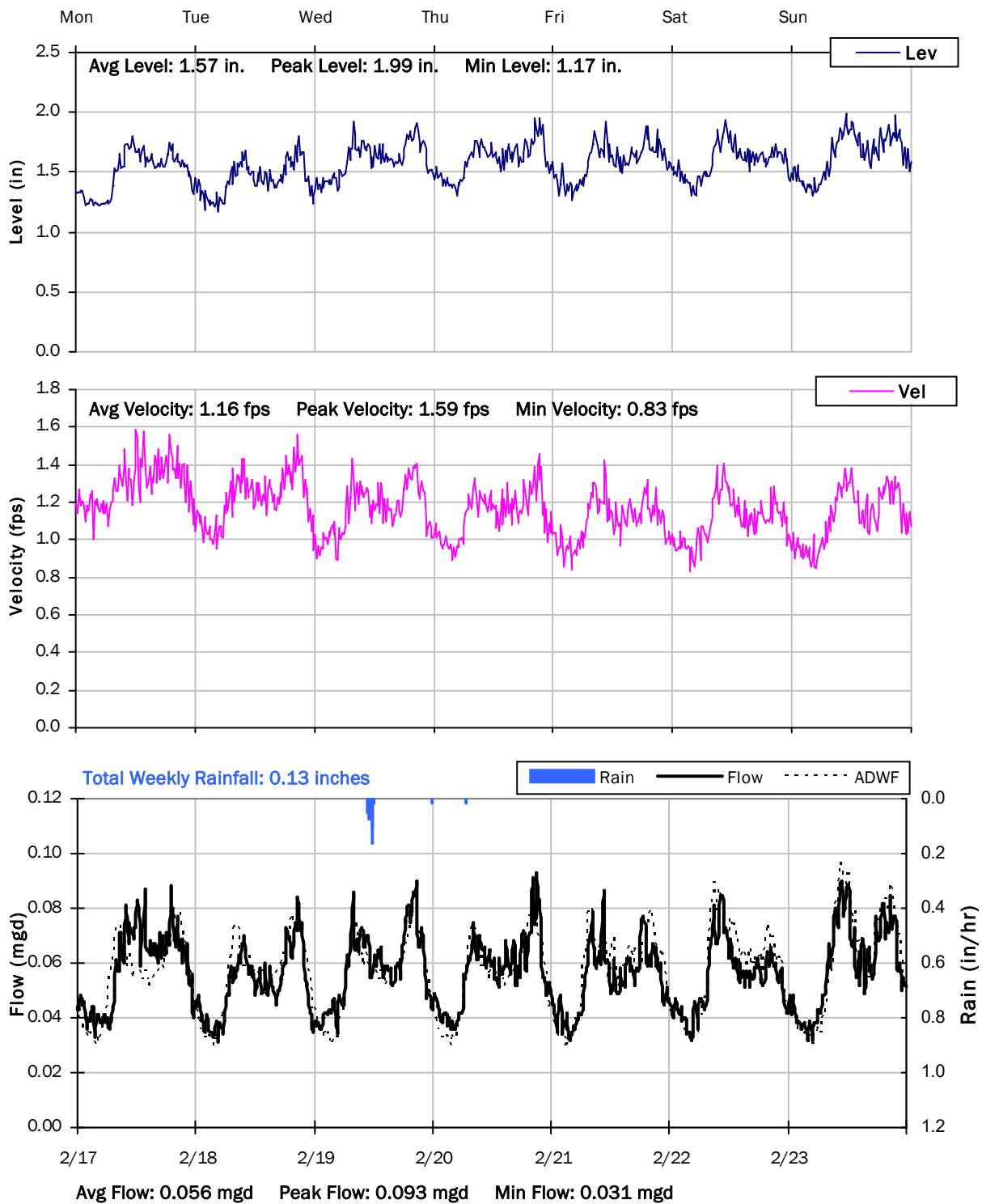
2/10/2025 to 2/17/2025



SITE 02

Weekly Level, Velocity and Flow Hydrographs

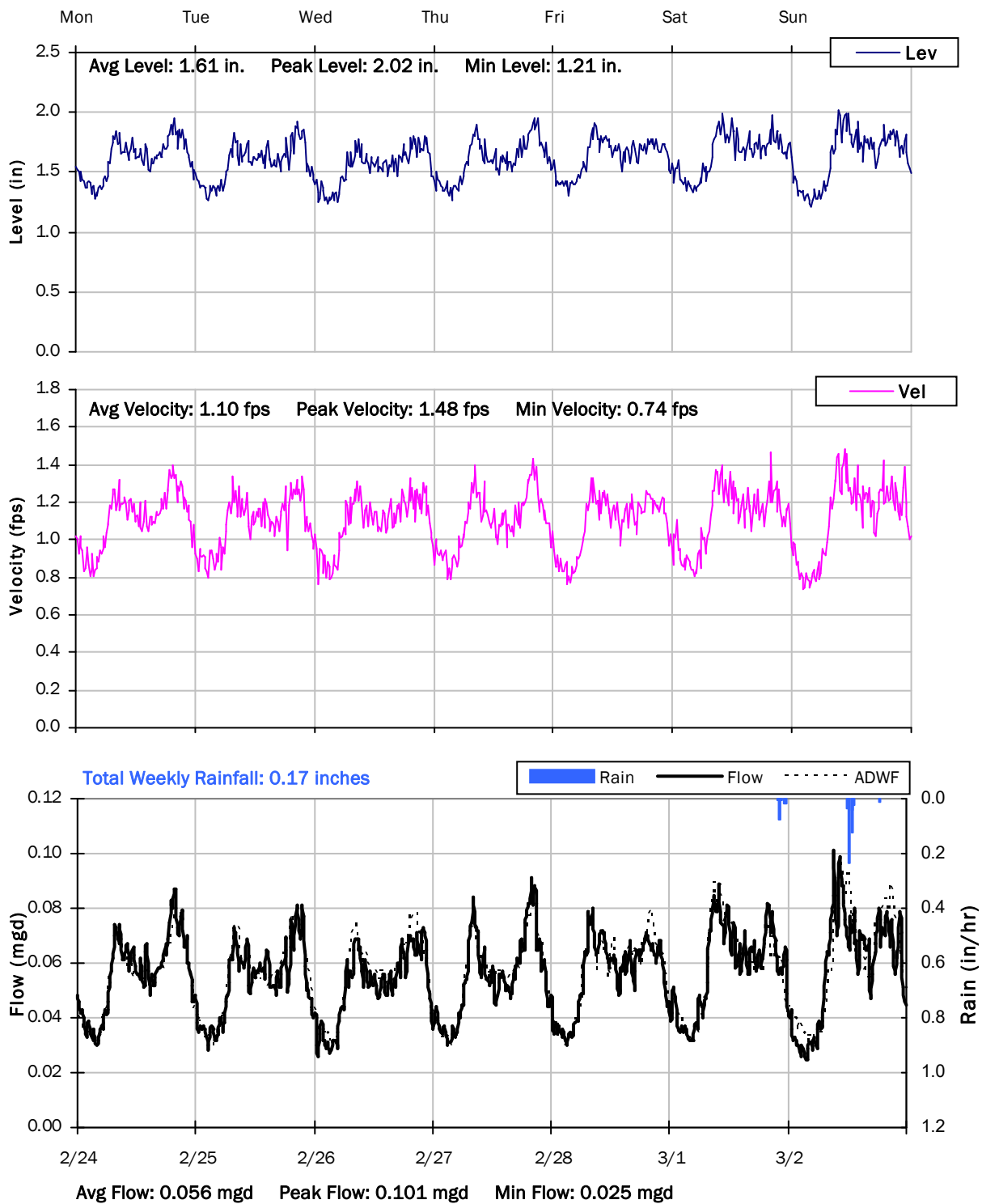
2/17/2025 to 2/24/2025



SITE 02

Weekly Level, Velocity and Flow Hydrographs

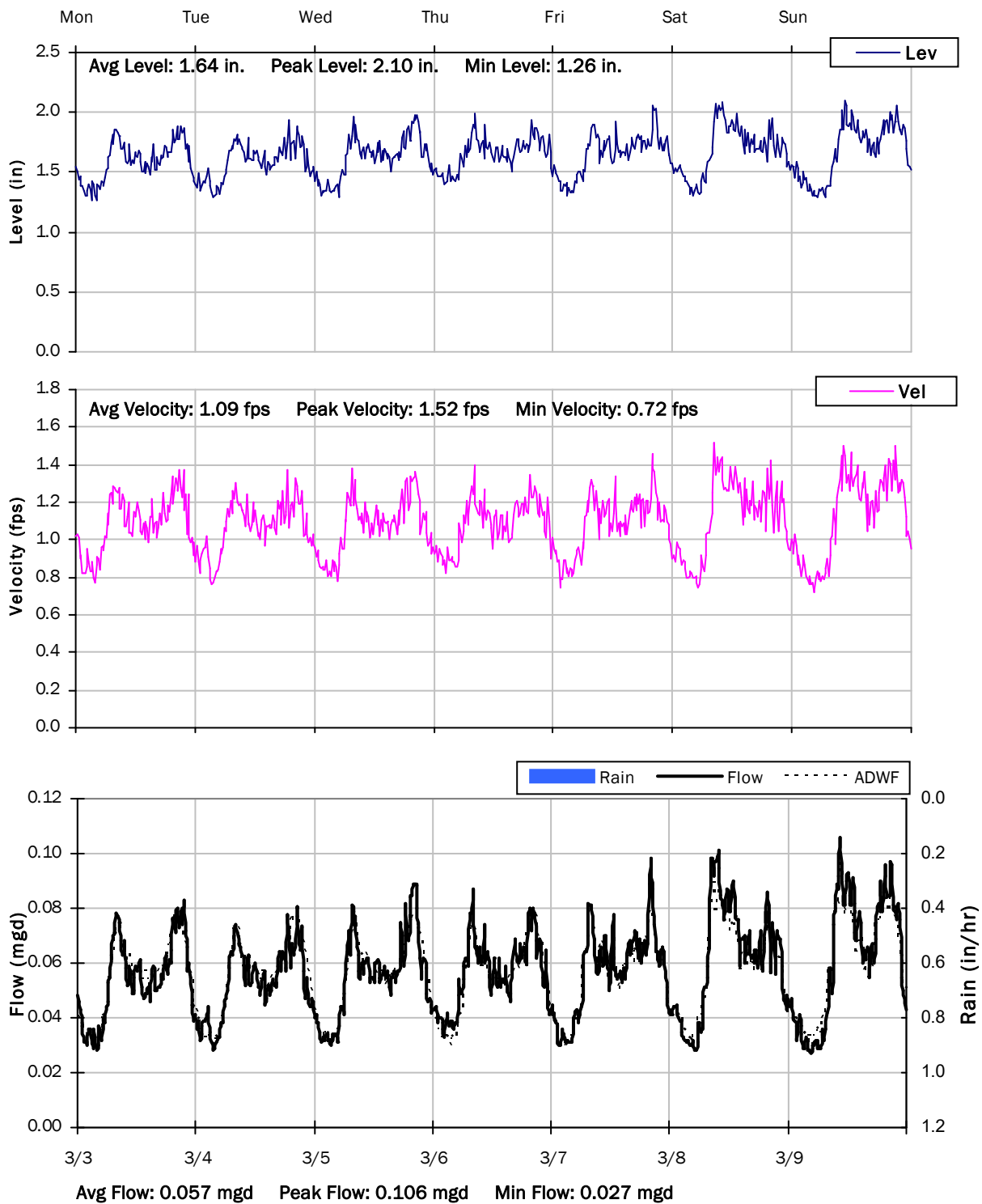
2/24/2025 to 3/3/2025



SITE 02

Weekly Level, Velocity and Flow Hydrographs

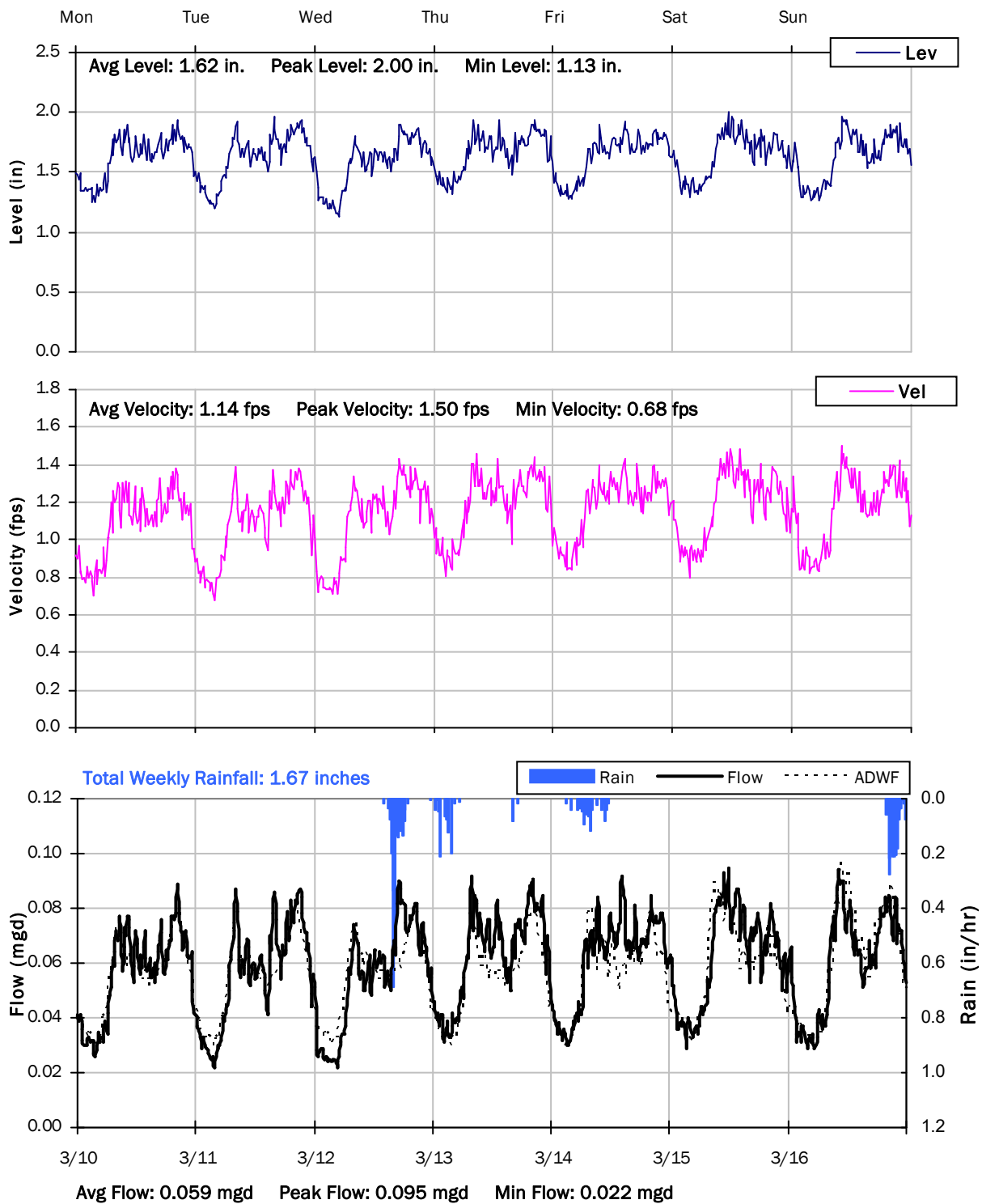
3/3/2025 to 3/10/2025



SITE 02

Weekly Level, Velocity and Flow Hydrographs

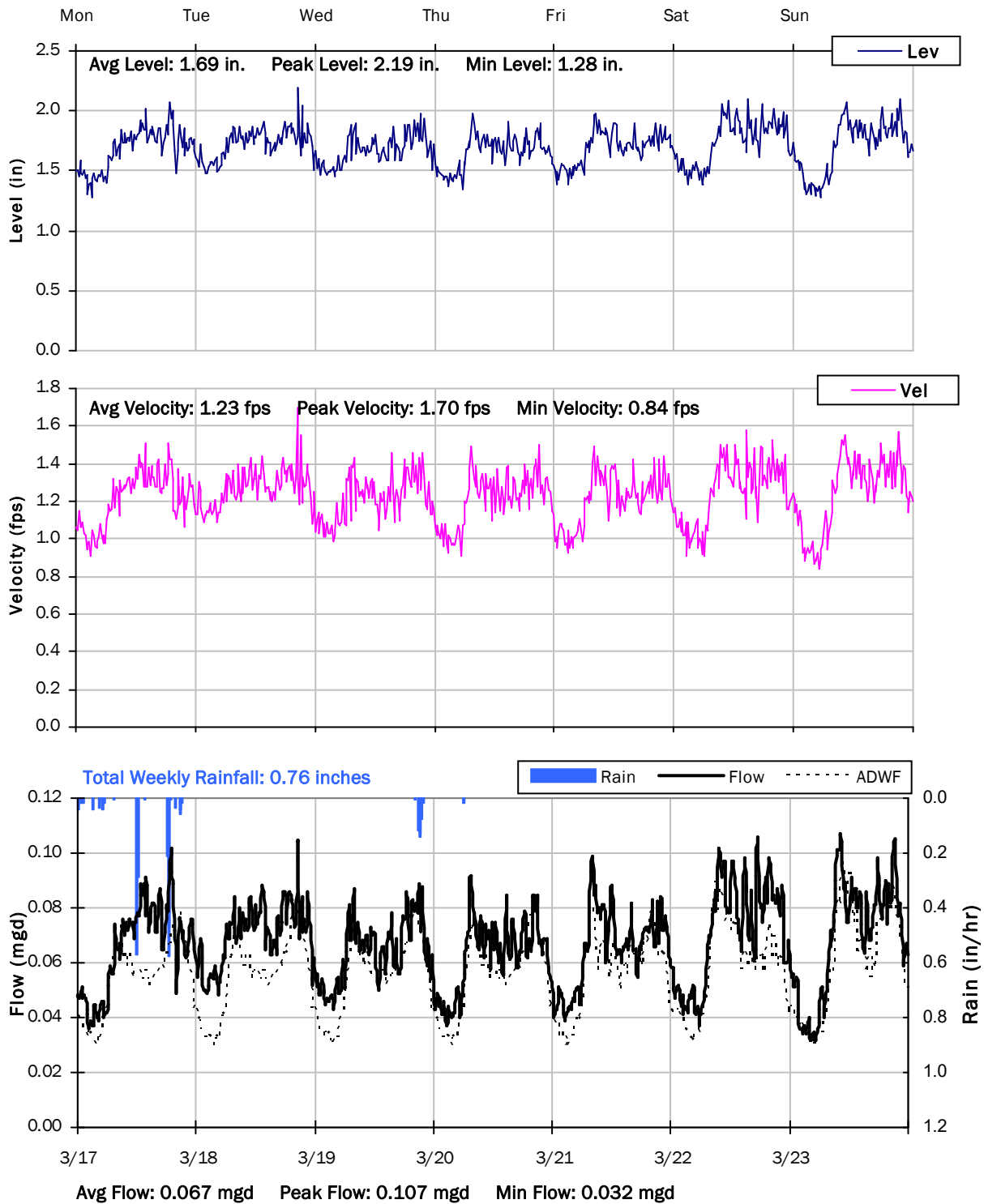
3/10/2025 to 3/17/2025



SITE 02

Weekly Level, Velocity and Flow Hydrographs

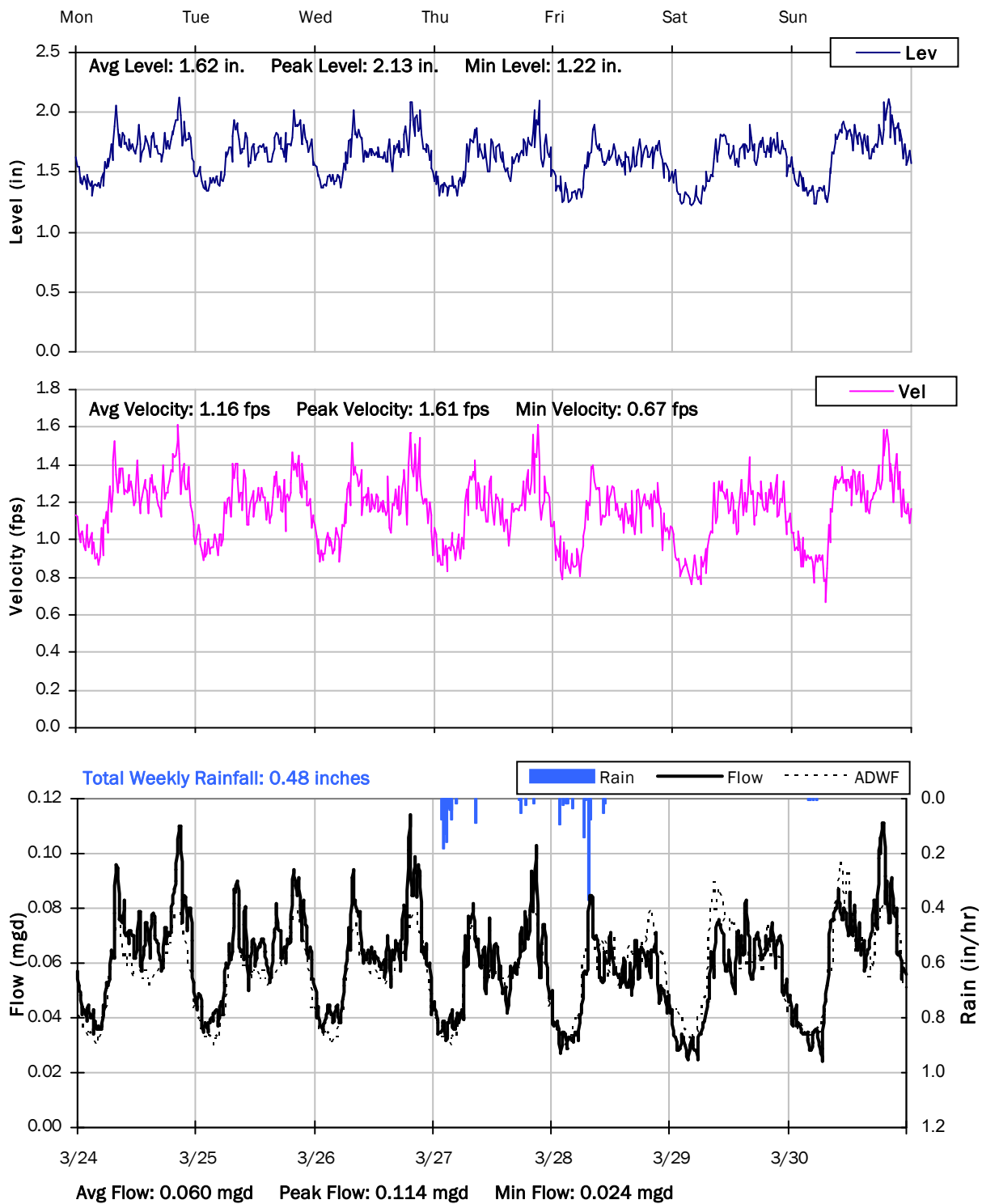
3/17/2025 to 3/24/2025



SITE 02

Weekly Level, Velocity and Flow Hydrographs

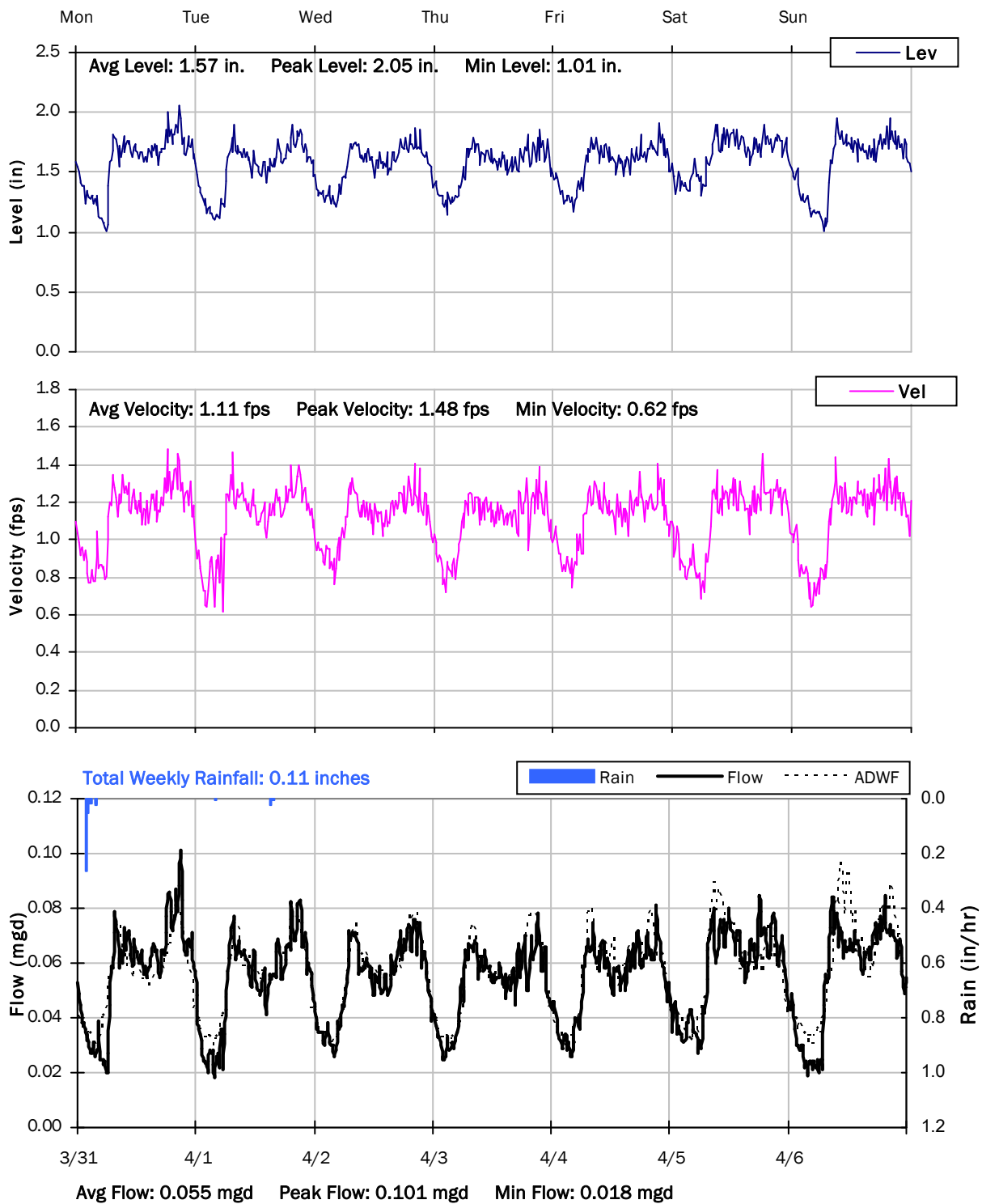
3/24/2025 to 3/31/2025



SITE 02

Weekly Level, Velocity and Flow Hydrographs

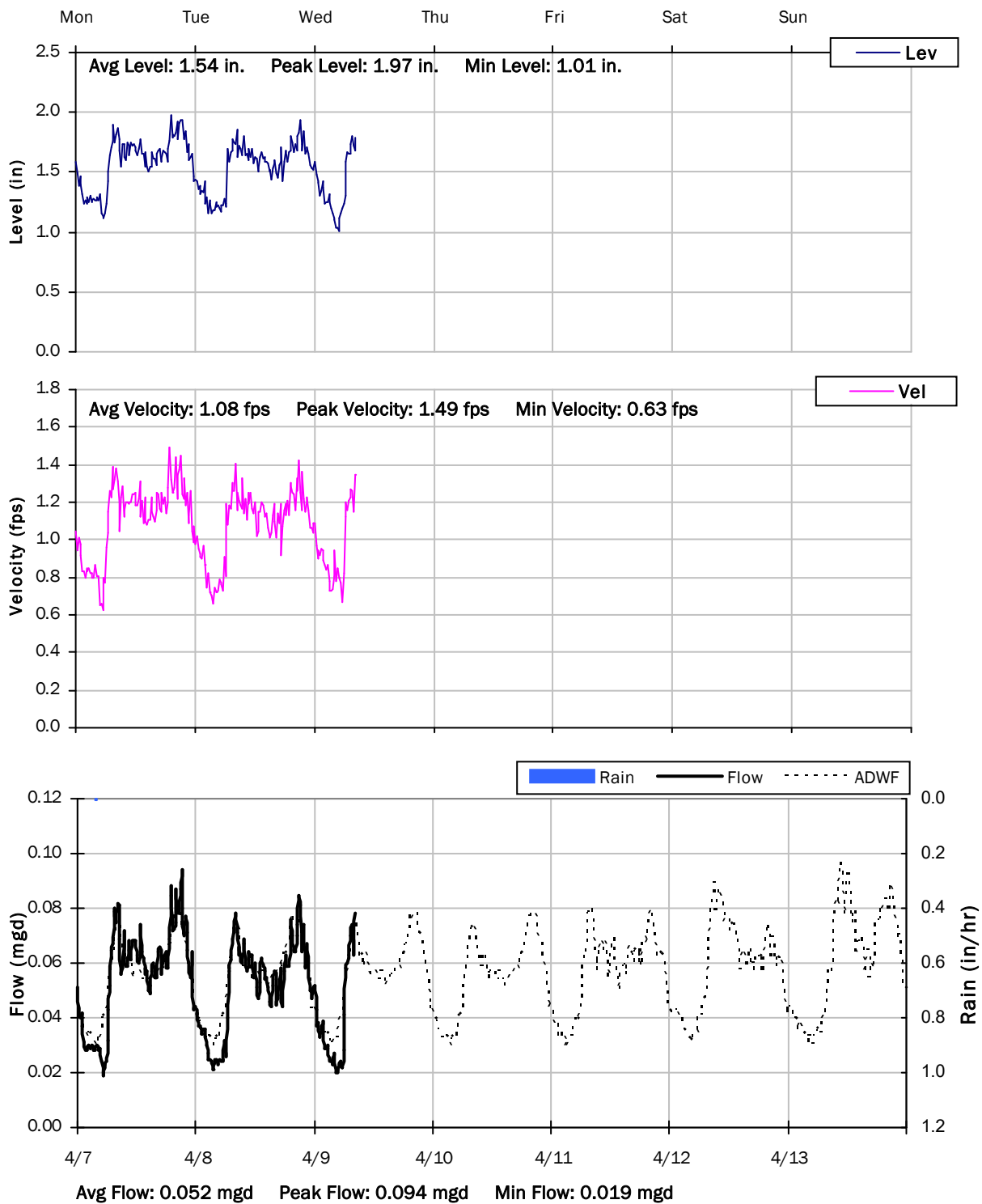
3/31/2025 to 4/7/2025



SITE 02

Weekly Level, Velocity and Flow Hydrographs

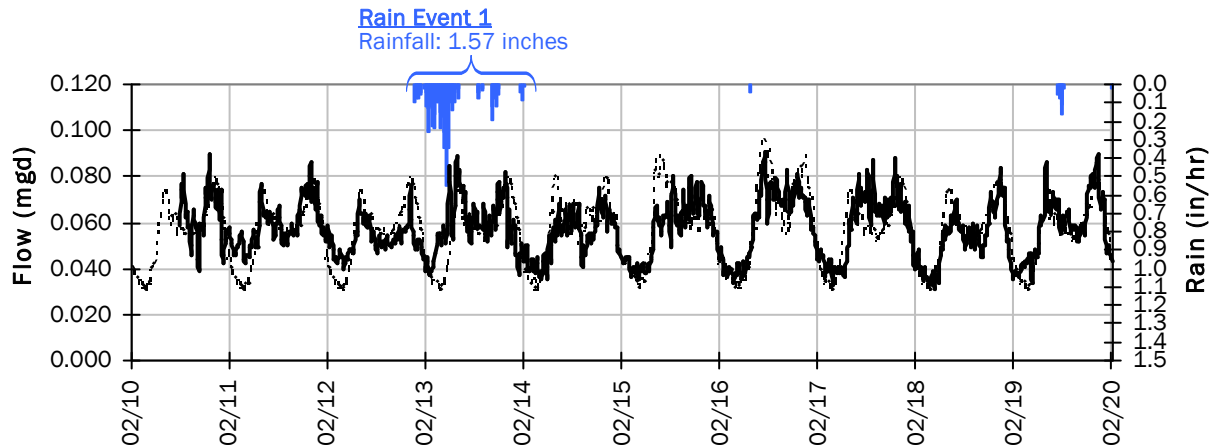
4/7/2025 to 4/14/2025



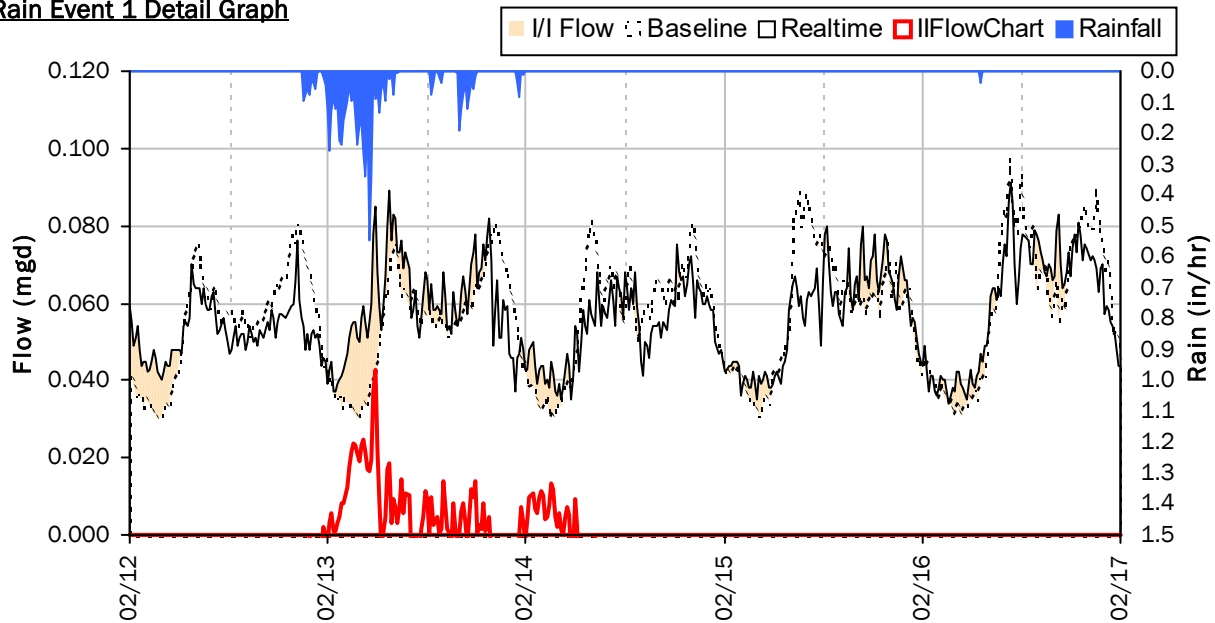
SITE 02

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.57 inches)

Capacity

Peak Flow: 0.089 mgd
PF: 1.58
Peak Level: 1.97 in
d/D Ratio: 0.11

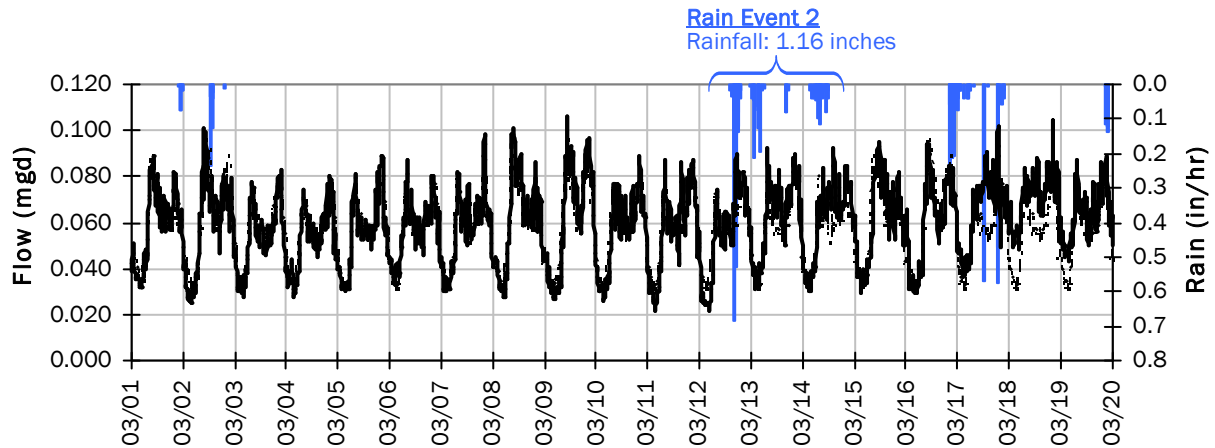
Inflow / Infiltration

Peak I/I Rate: 0.043 mgd
Total I/I: 4,000 gallons

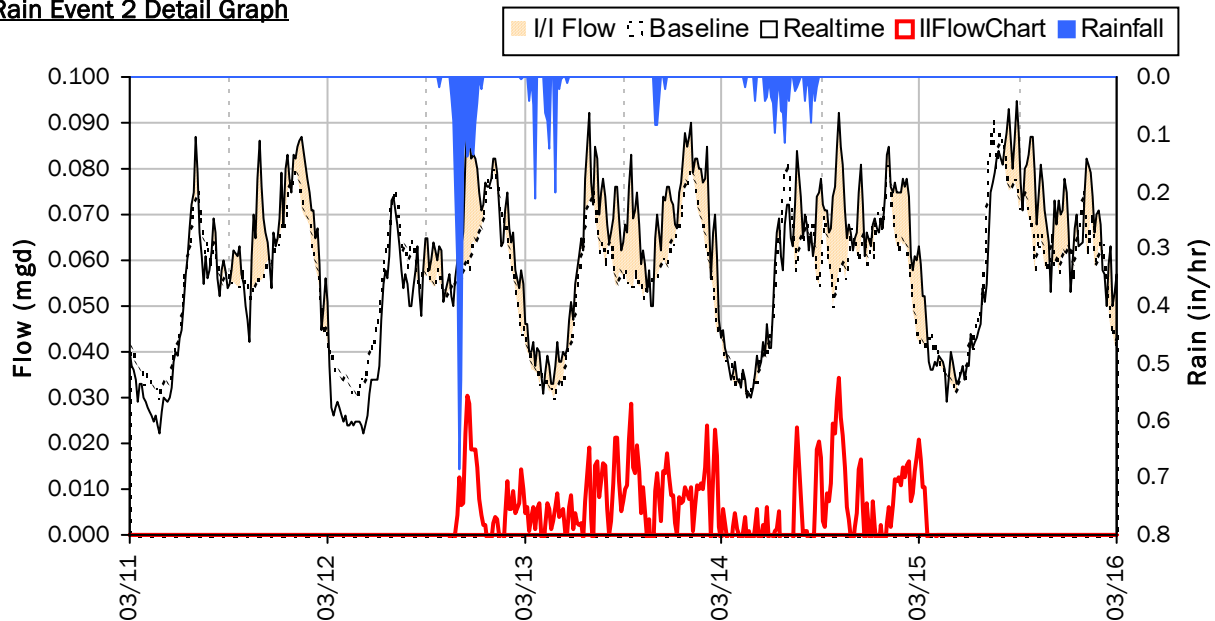
SITE 02

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.16 inches)

Capacity

Peak Flow: 0.092 mgd
PF: 1.63

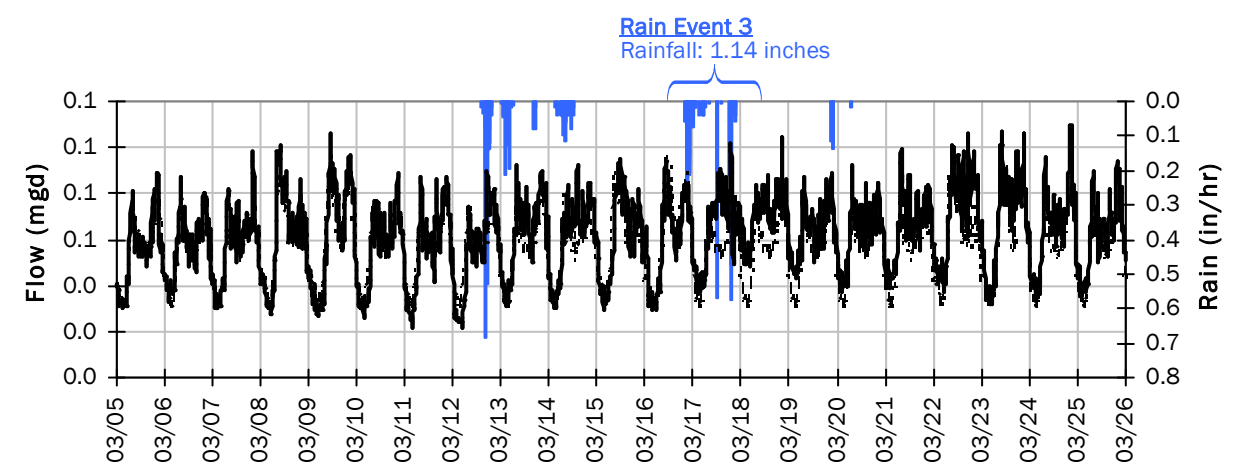
Peak Level: 1.94 in
d/D Ratio: 0.11

Inflow / Infiltration

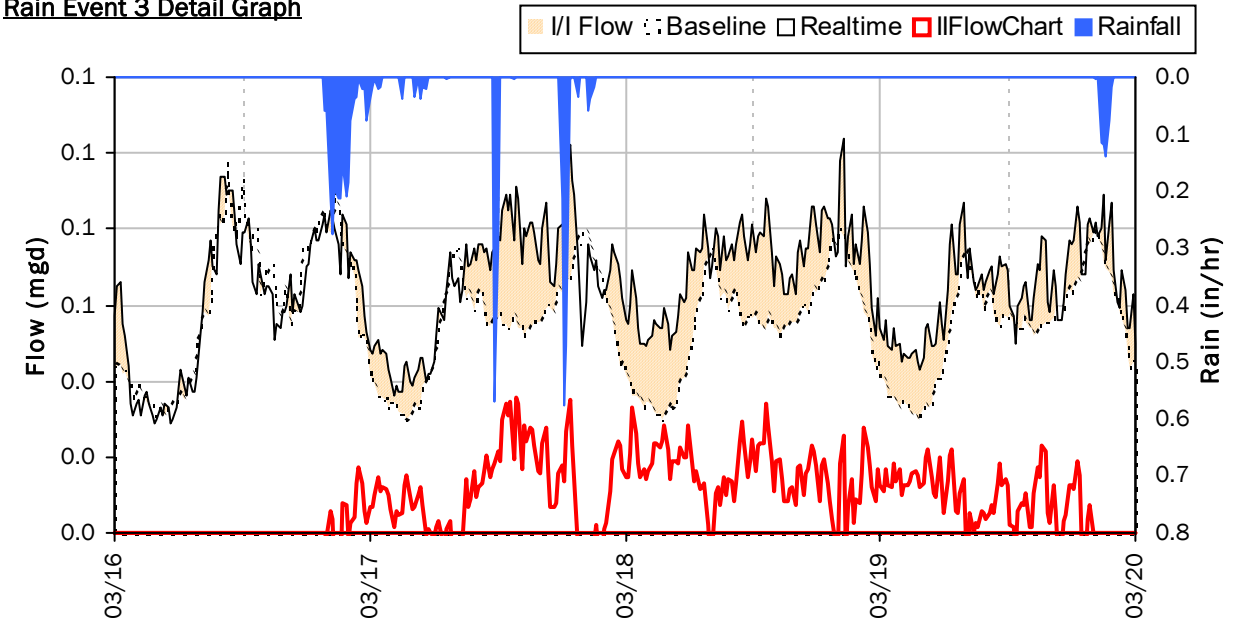
Peak I/I Rate: 0.034 mgd
Total I/I: 16,000 gallons

SITE 02
I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.14 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.10 mgd	Peak I/I Rate:	0.04 mgd
PF:	1.85	Total I/I:	35,000 gallons
Peak Level:	2.19 in		
d/D Ratio:	0.13		

Monitoring Site: Site 03

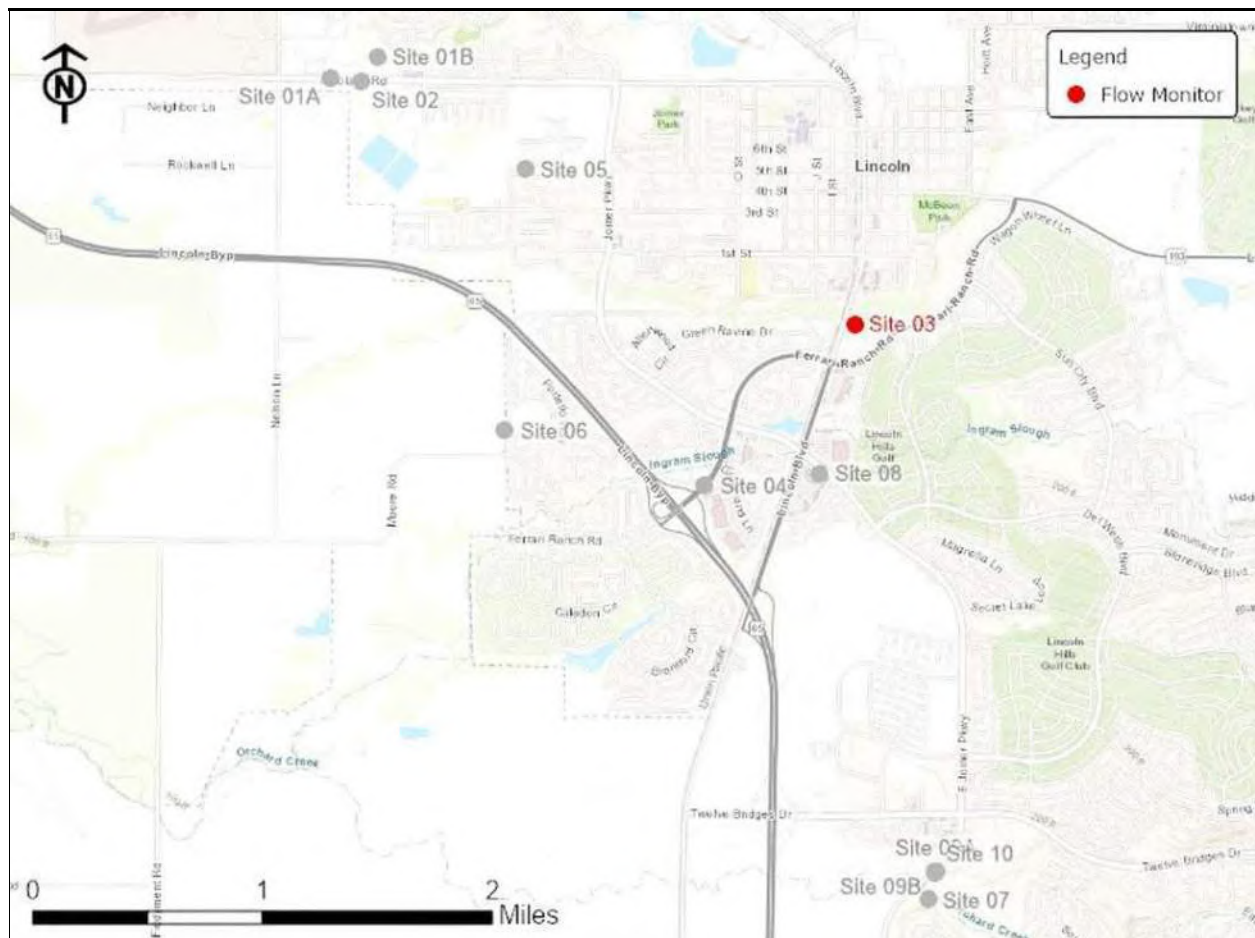
Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: Field behind 89 Lincoln Blvd, Lincoln, CA

Data Summary Report



Vicinity Map: Site 03

SITE 03

Site Information

MH ID: SE459SS29

Location: Field behind 89 Lincoln Blvd,
Lincoln, CA

Coordinates: 121.2934° W, 38.8821° N

Rim Elevation: 149 feet

Expected Pipe Diameter: 30 inches

Measured Pipe Diameter: 29 inches

ADWF: 0.366 mgd

Peak Measured Flow: 1.307 mgd

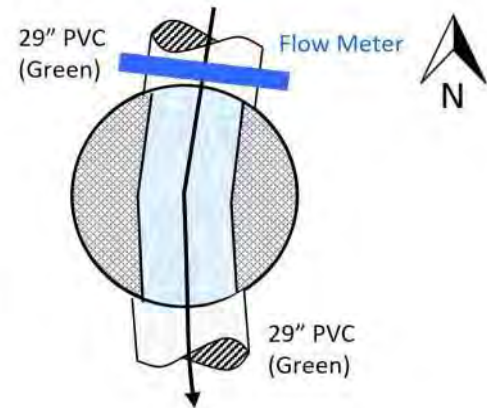
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 03

Additional Site Photos

South Effluent Pipe



Monitored North Influent Pipe

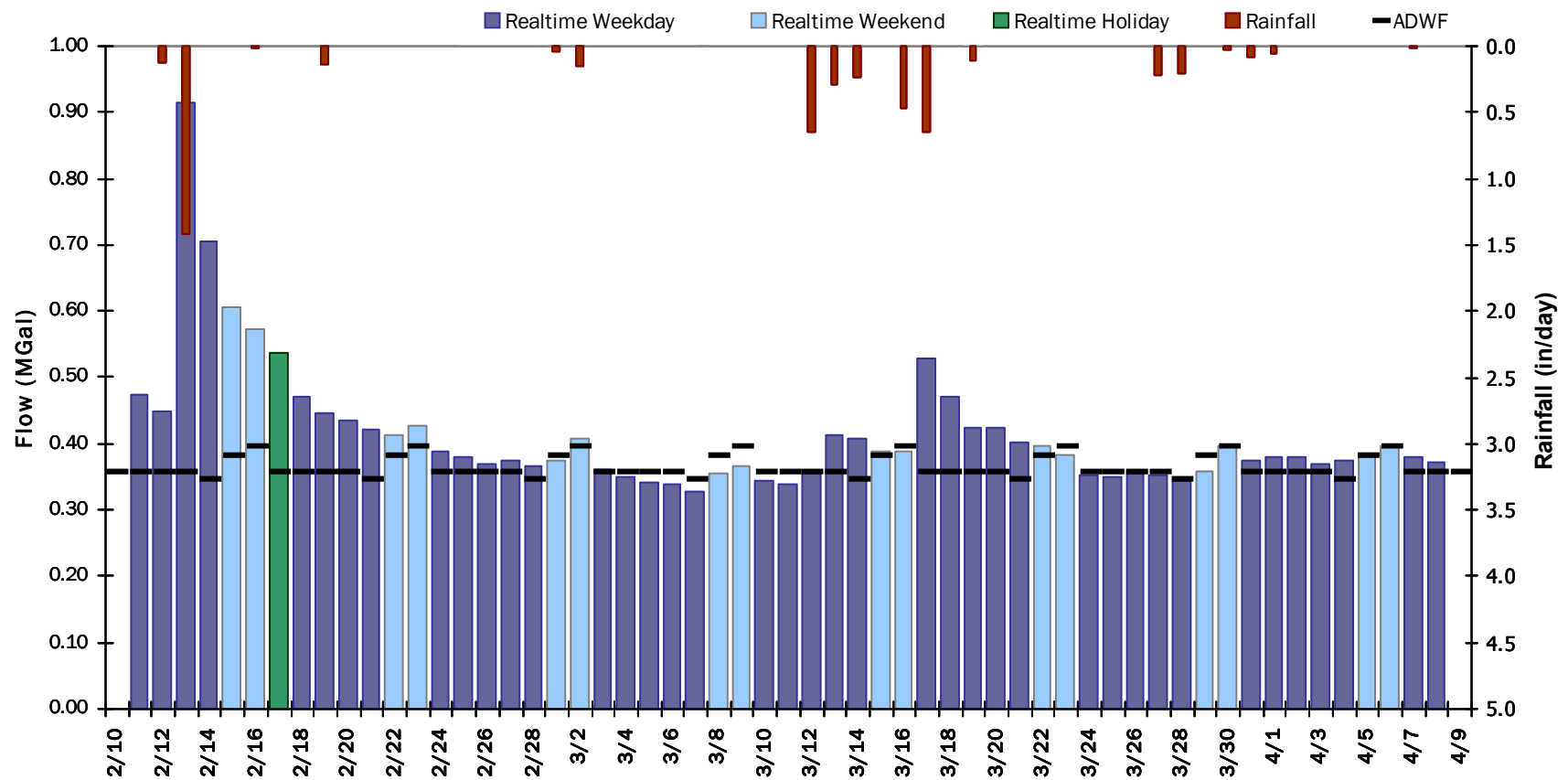


SITE 03

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.414 MGal Peak Daily Flow: 0.914 MGal Min Daily Flow: 0.244 MGal

Total Rainfall: 4.89 inches



SITE 03

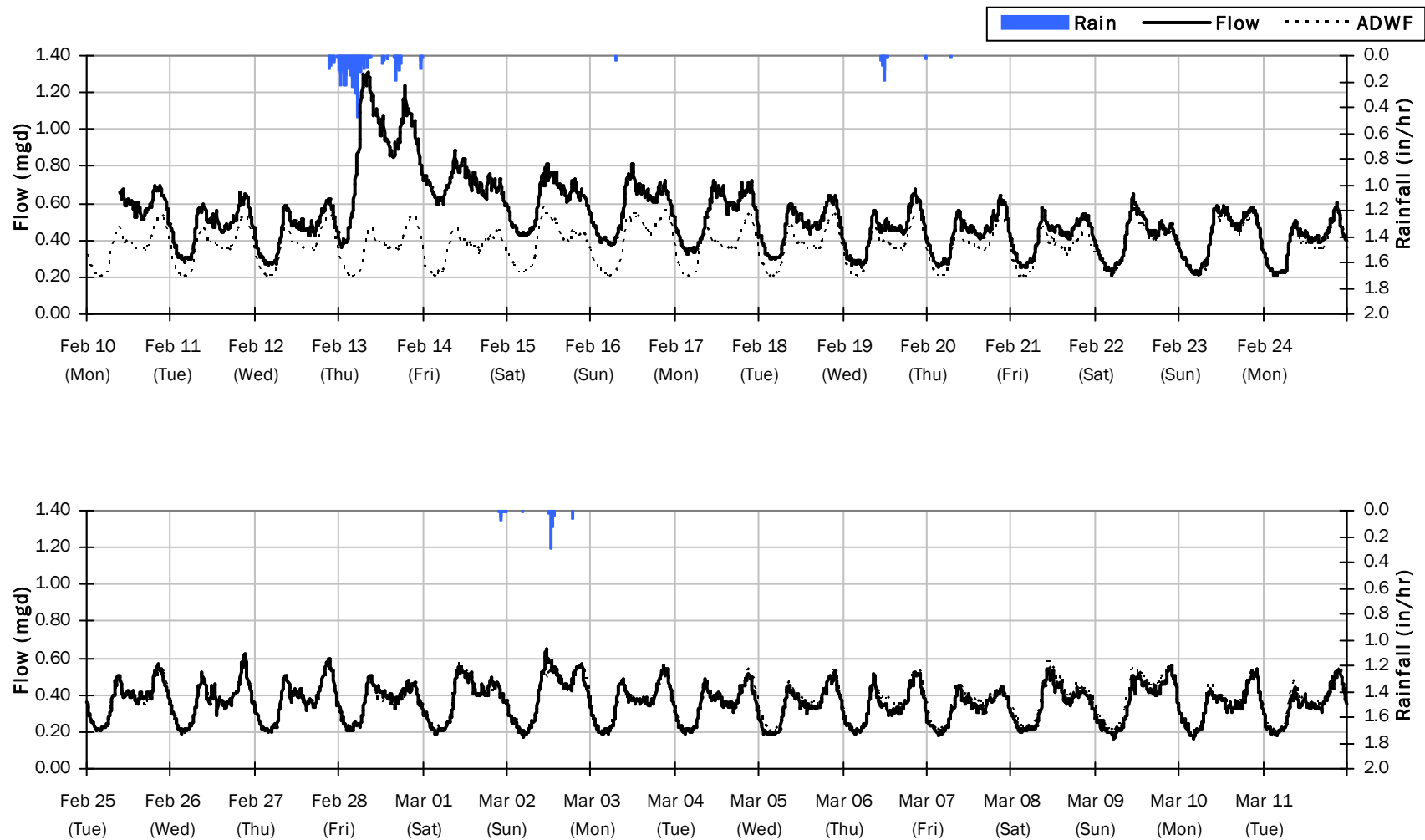
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.88 inches

Period Avg Flow: 0.440 mgd

Period Peak Flow: 1.307 mgd

Period Min Flow: 0.165 mgd



SITE 03

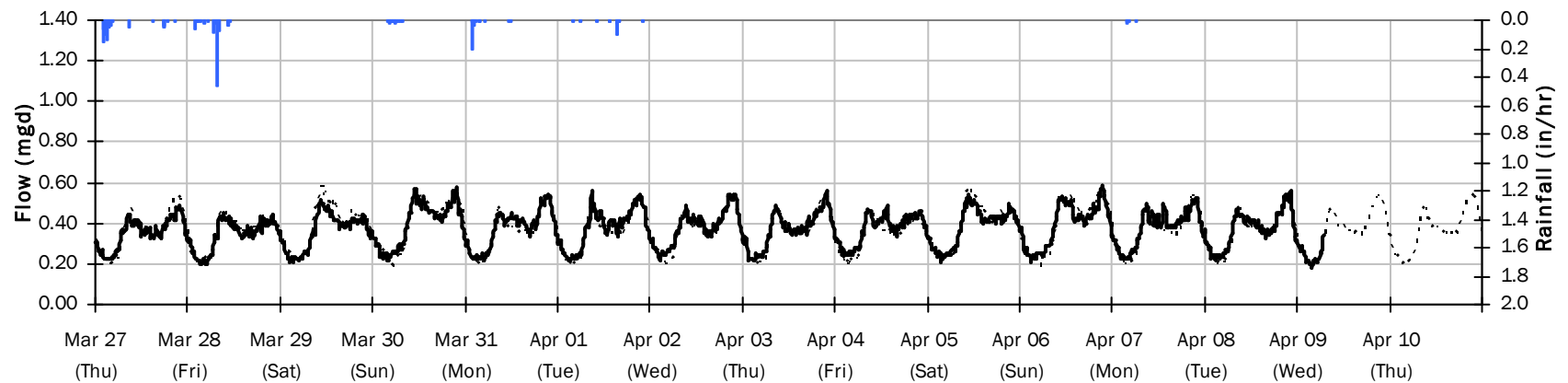
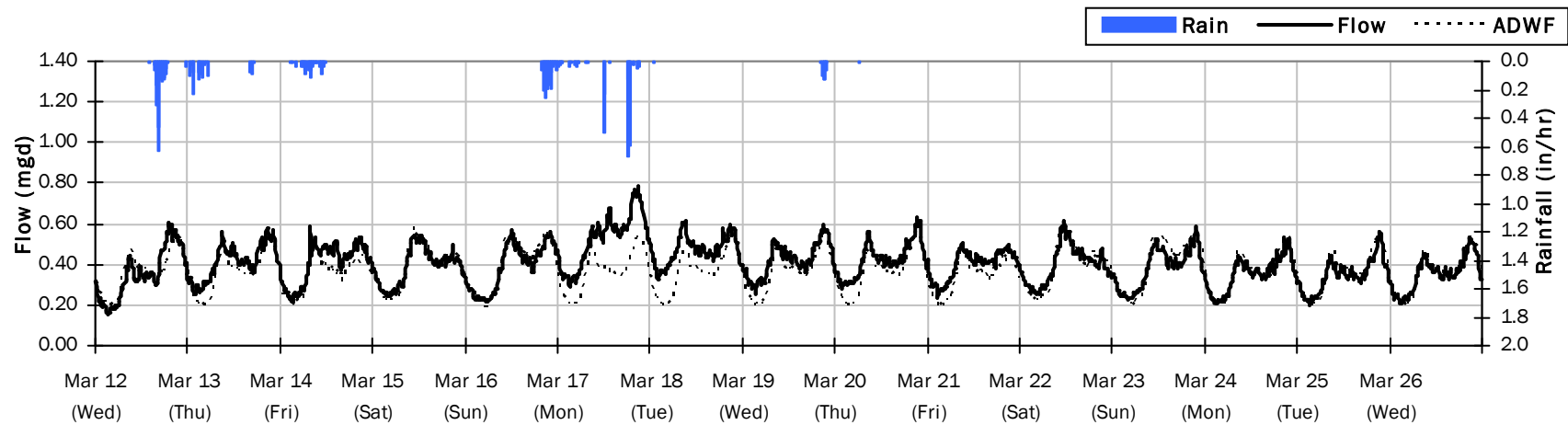
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.01 inches

Period Avg Flow: 0.388 mgd

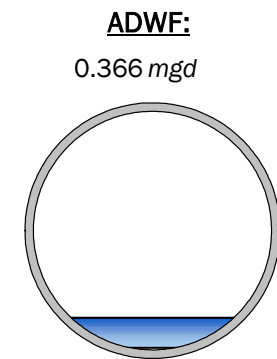
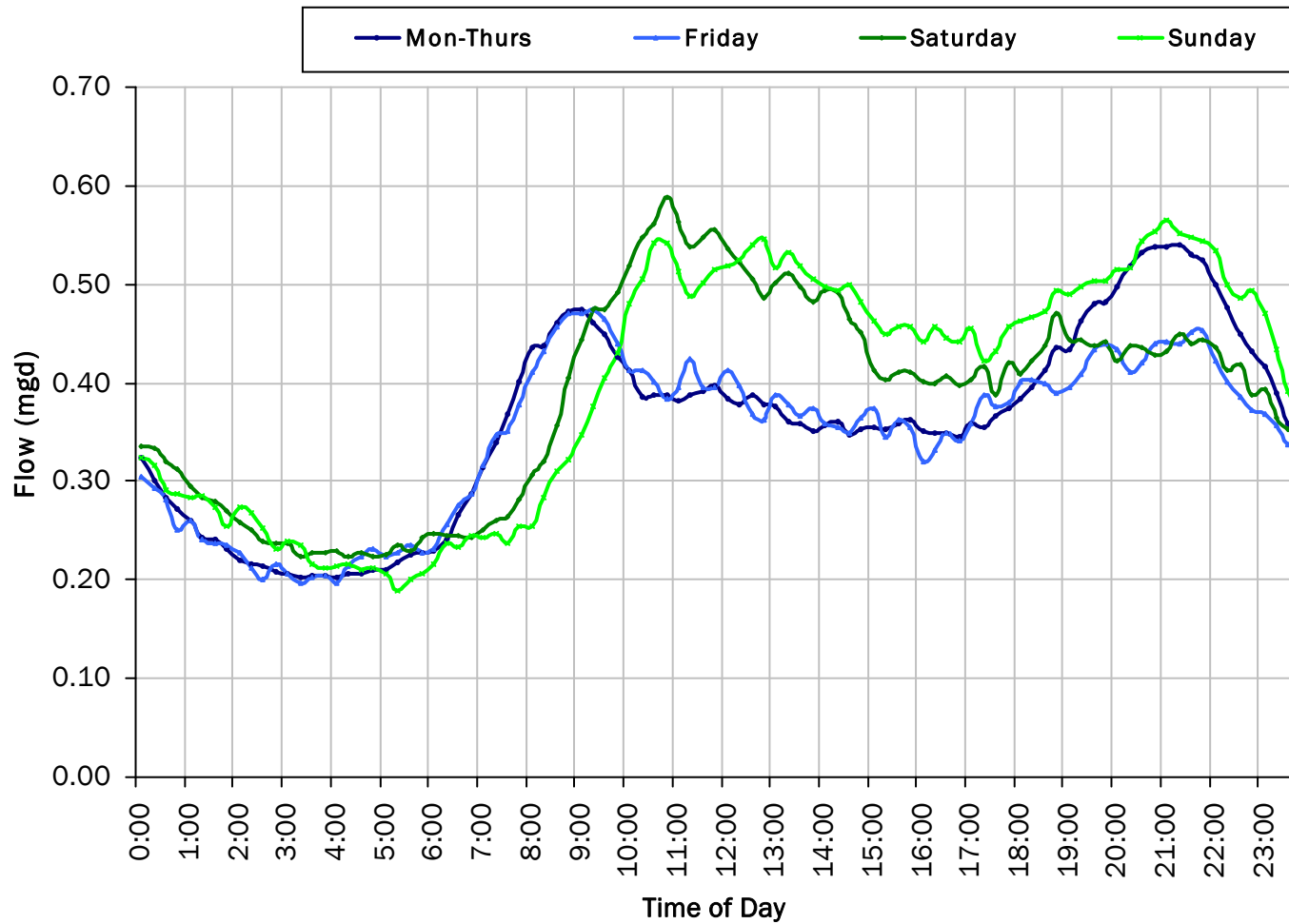
Period Peak Flow: 0.784 mgd

Period Min Flow: 0.158 mgd



SITE 03

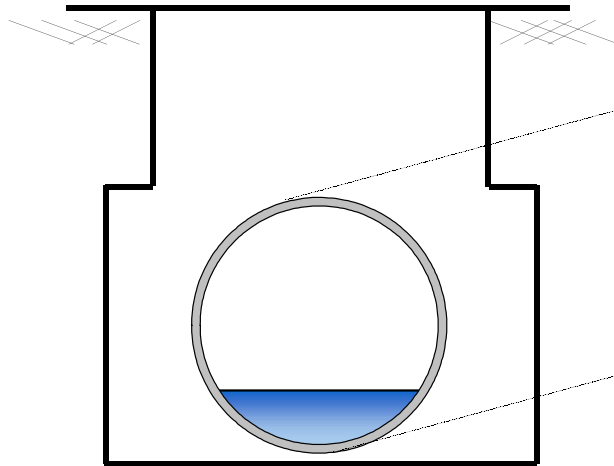
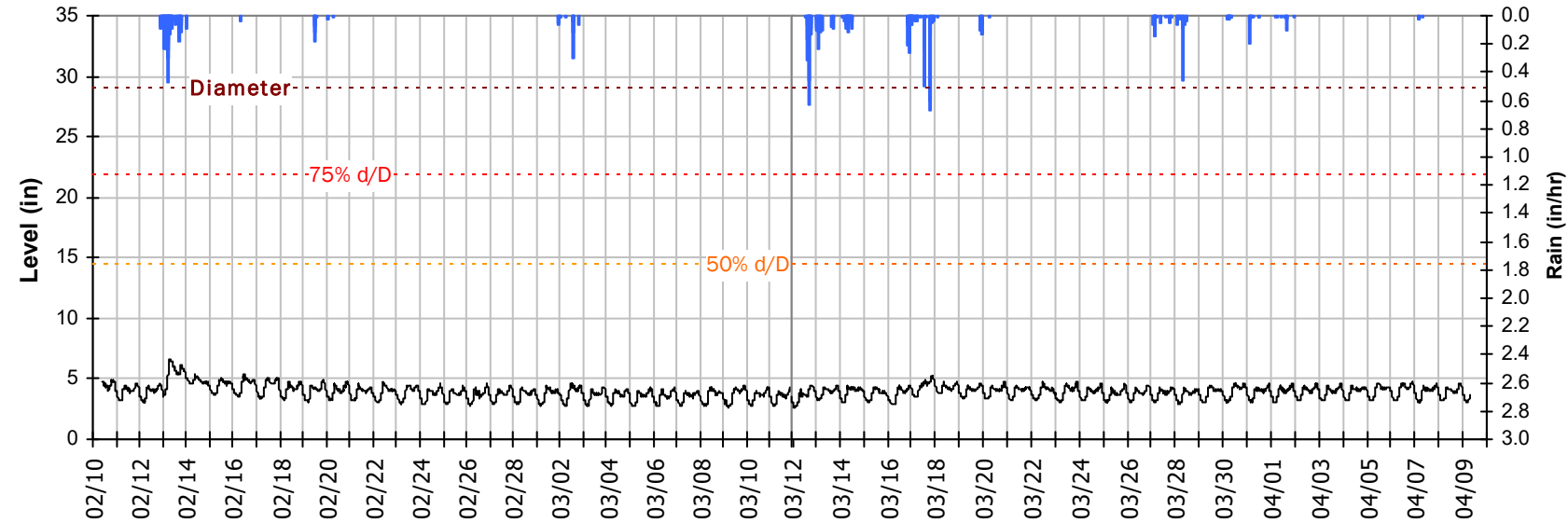
Average Dry Weather Flow Hydrographs



SITE 03

Site Capacity and Surge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period

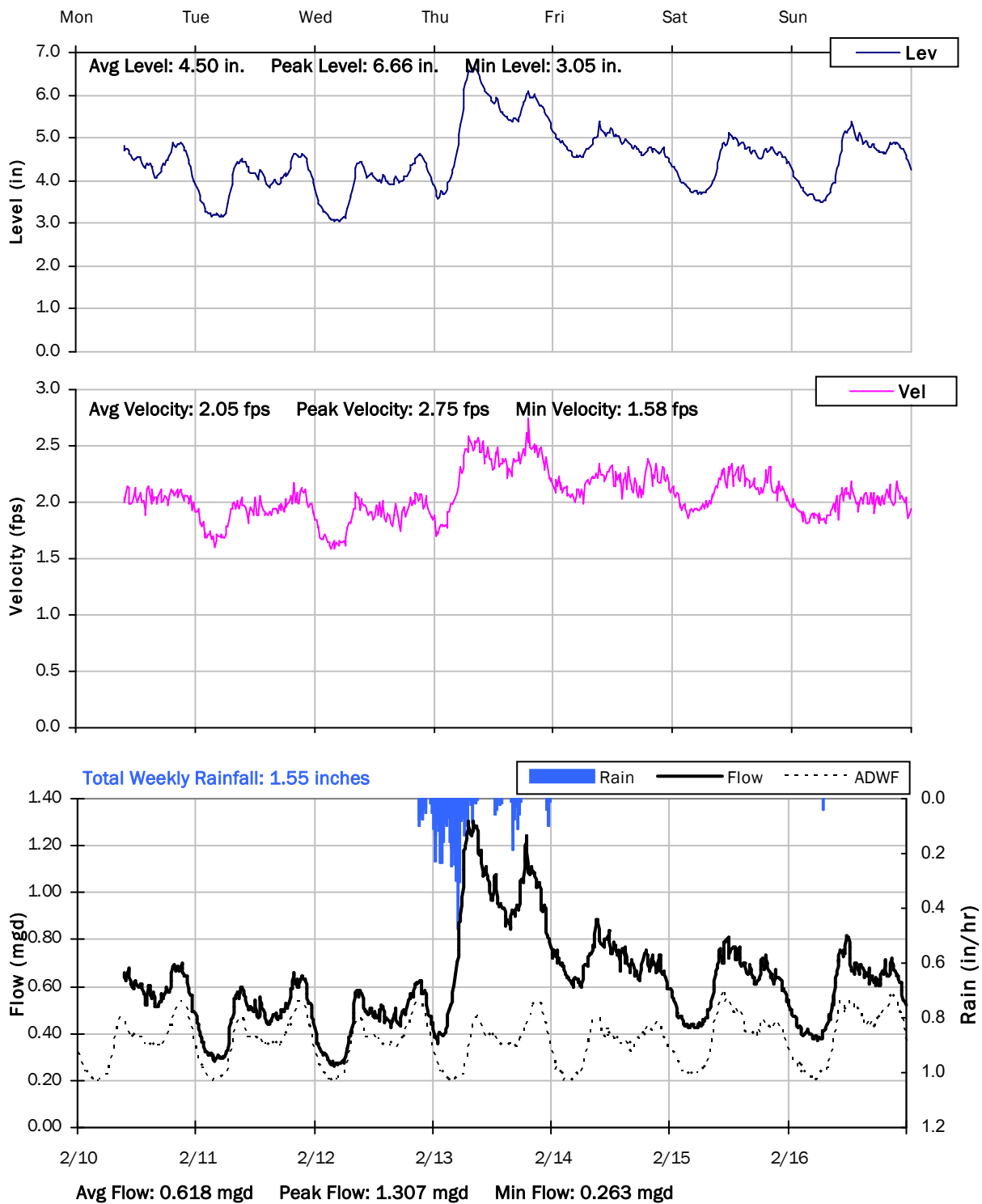


Pipe Diameter: 29 inches
Peak Measured Level: 6.66 inches
Peak d/D Ratio: 0.23

SITE 03

Weekly Level, Velocity and Flow Hydrographs

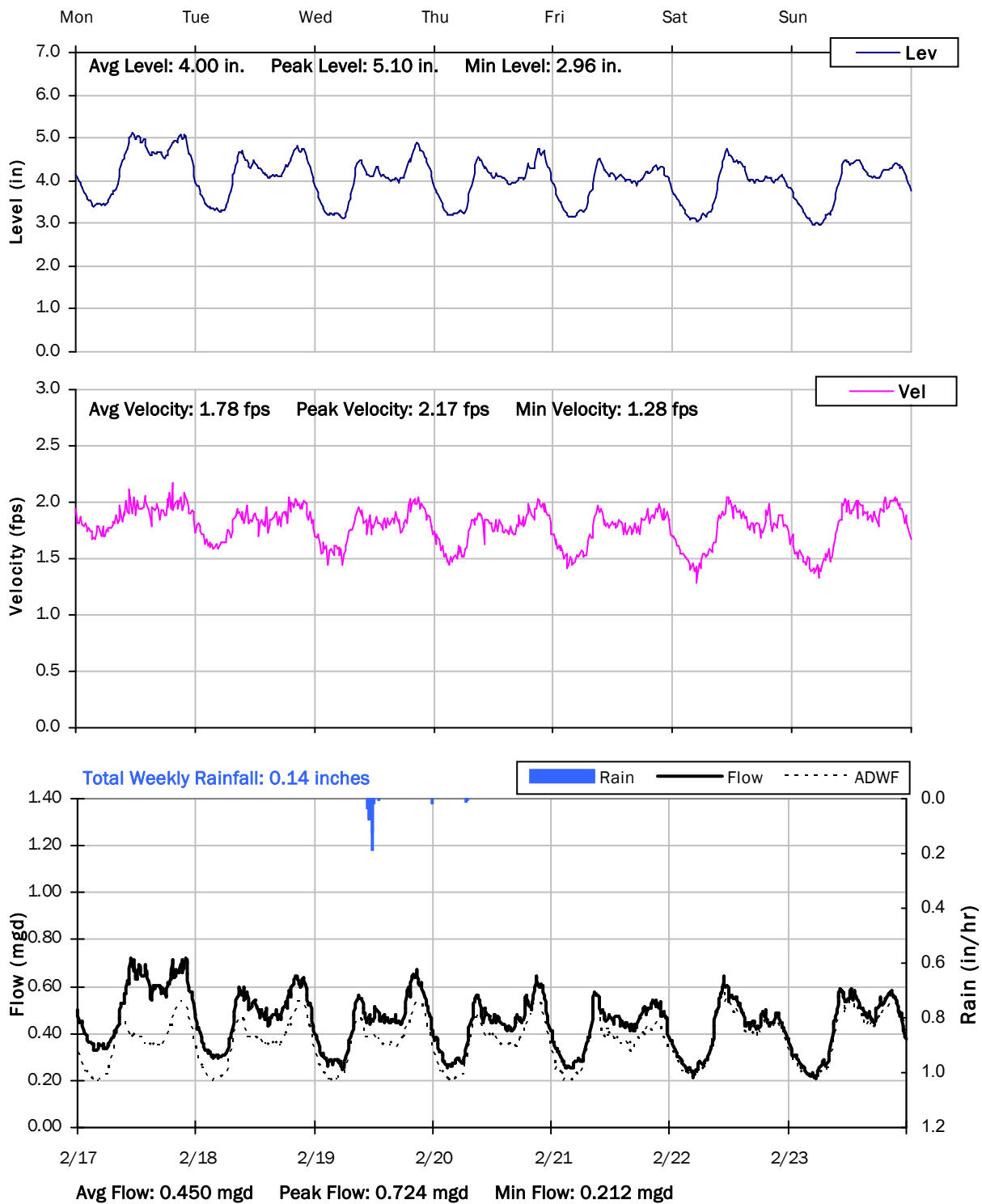
2/10/2025 to 2/17/2025



SITE 03

Weekly Level, Velocity and Flow Hydrographs

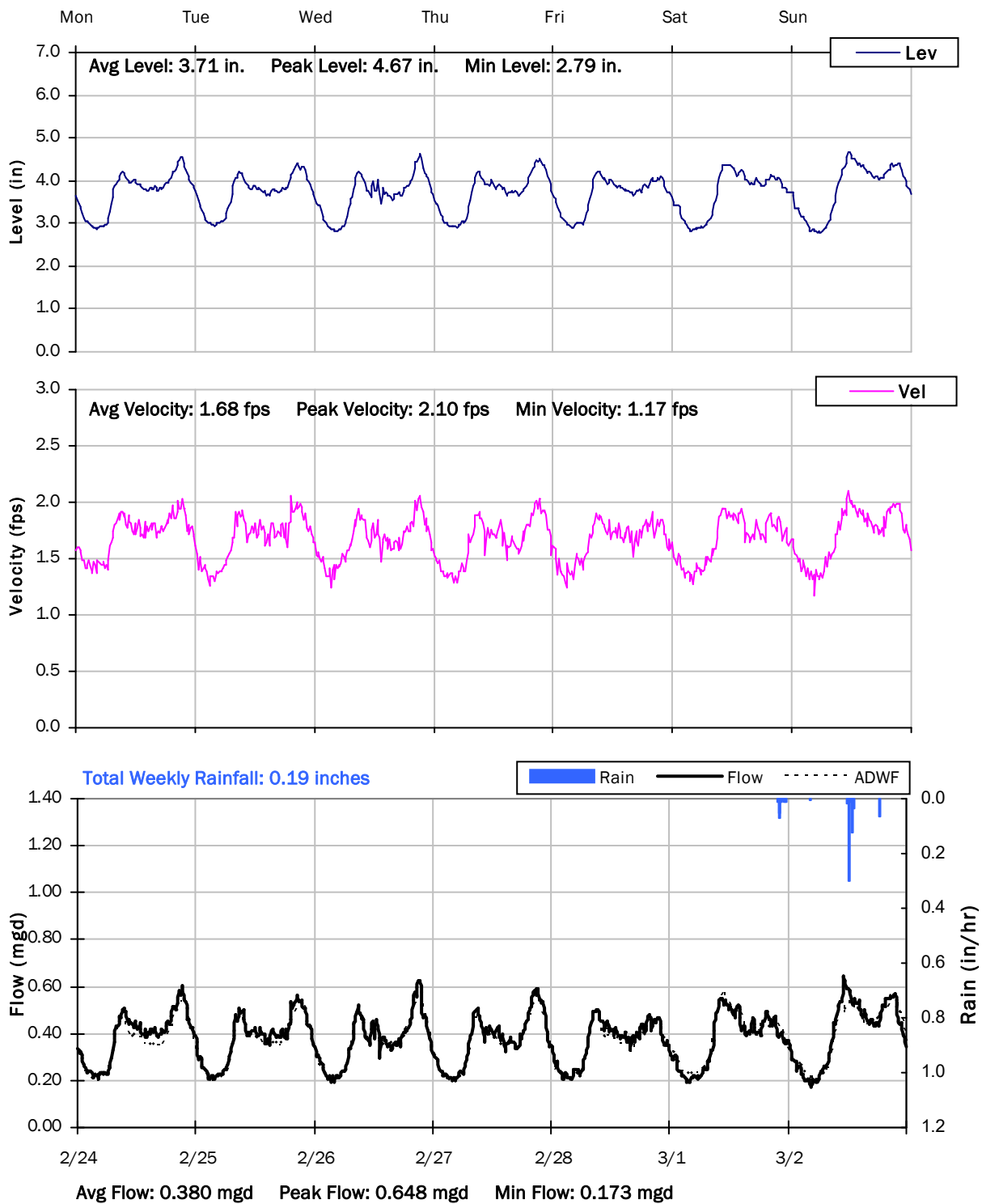
2/17/2025 to 2/24/2025



SITE 03

Weekly Level, Velocity and Flow Hydrographs

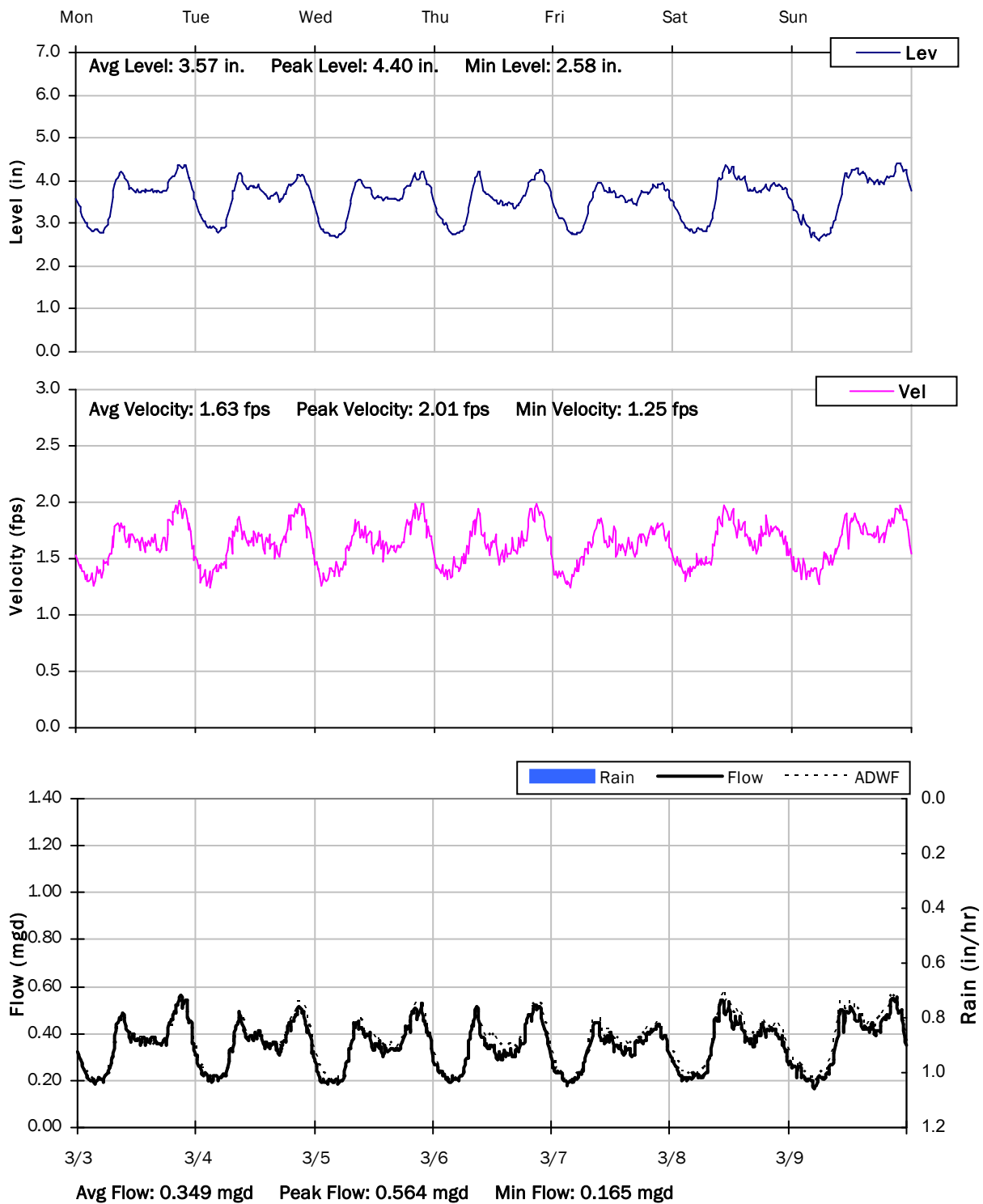
2/24/2025 to 3/3/2025



SITE 03

Weekly Level, Velocity and Flow Hydrographs

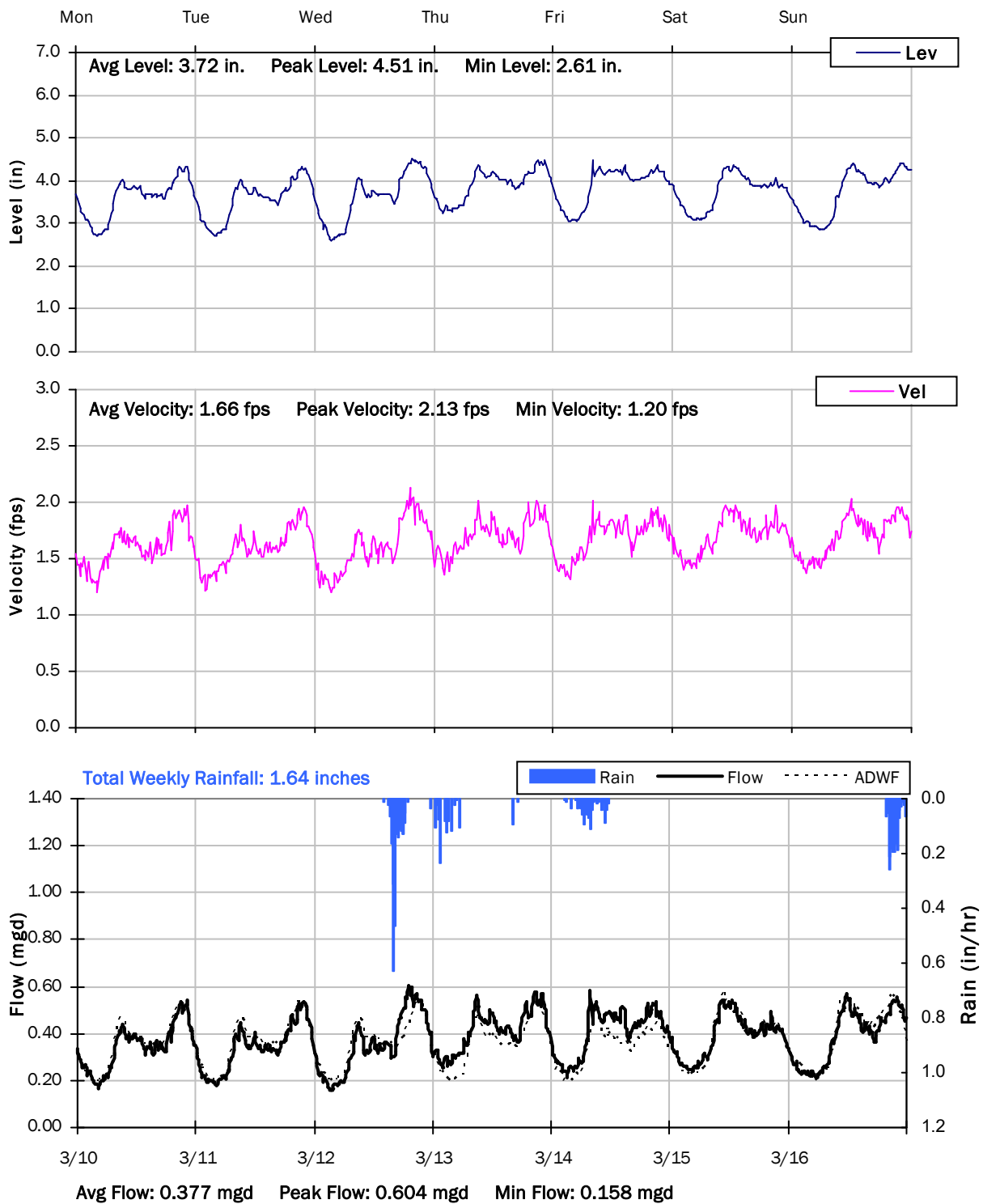
3/3/2025 to 3/10/2025



SITE 03

Weekly Level, Velocity and Flow Hydrographs

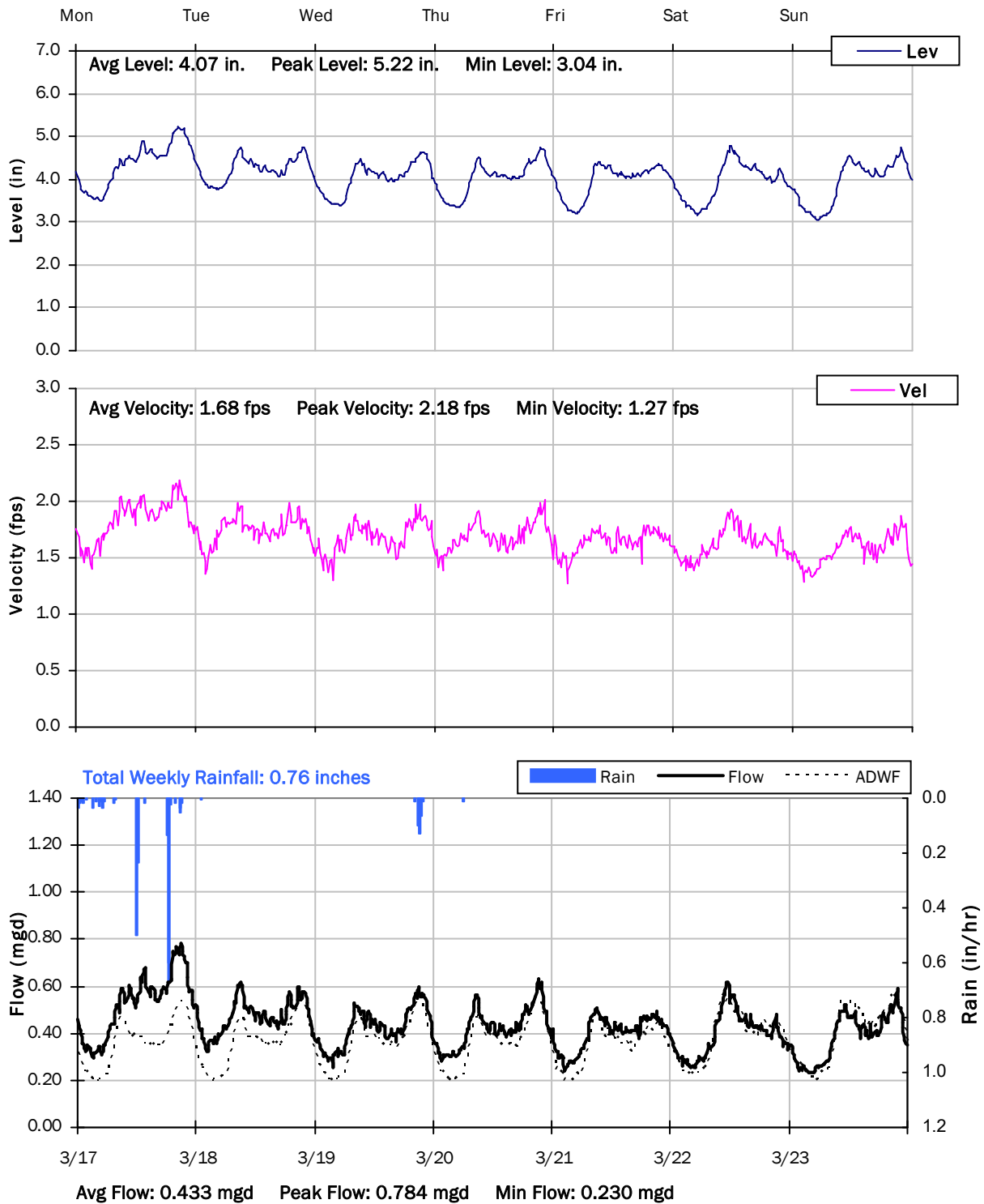
3/10/2025 to 3/17/2025



SITE 03

Weekly Level, Velocity and Flow Hydrographs

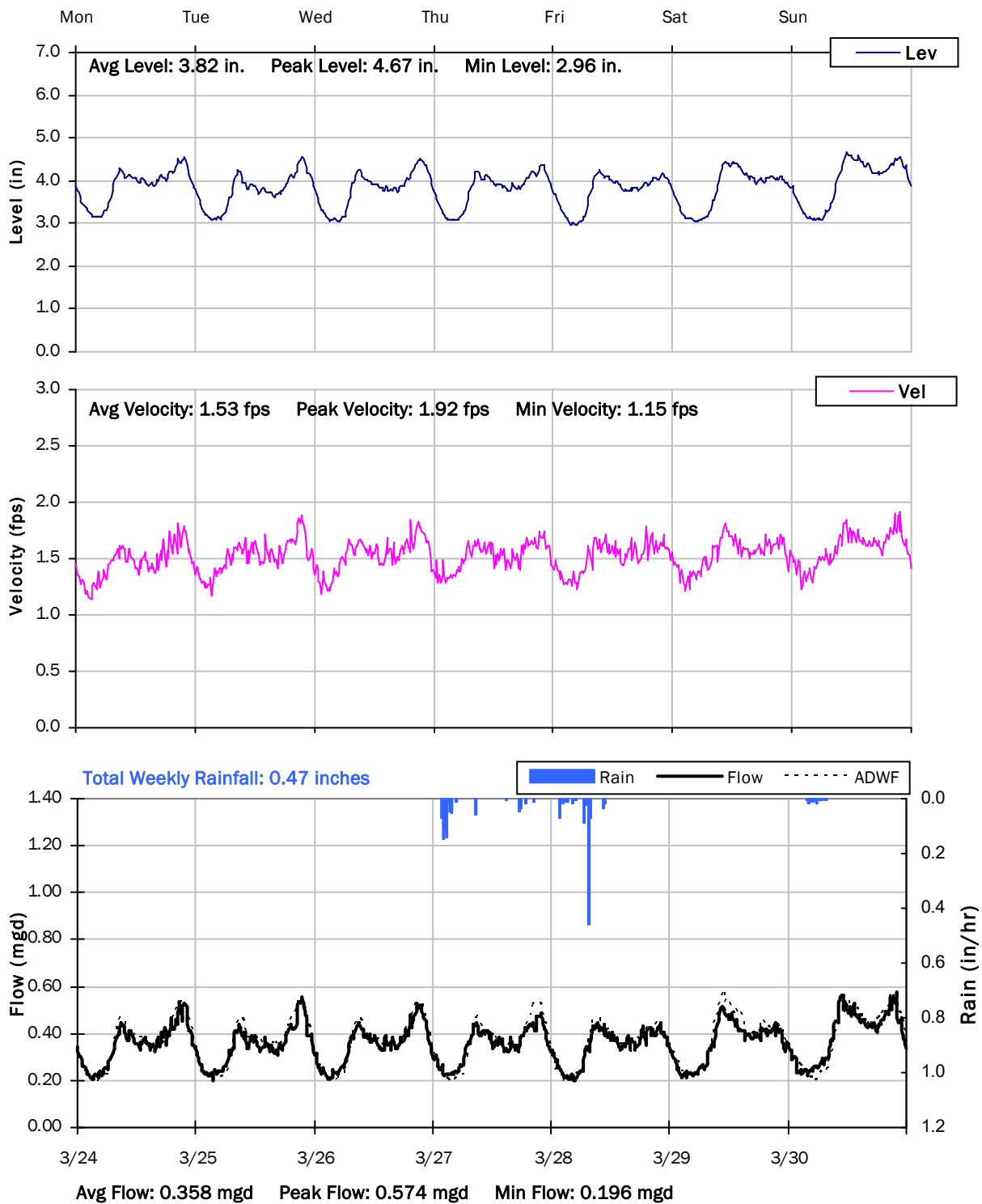
3/17/2025 to 3/24/2025



SITE 03

Weekly Level, Velocity and Flow Hydrographs

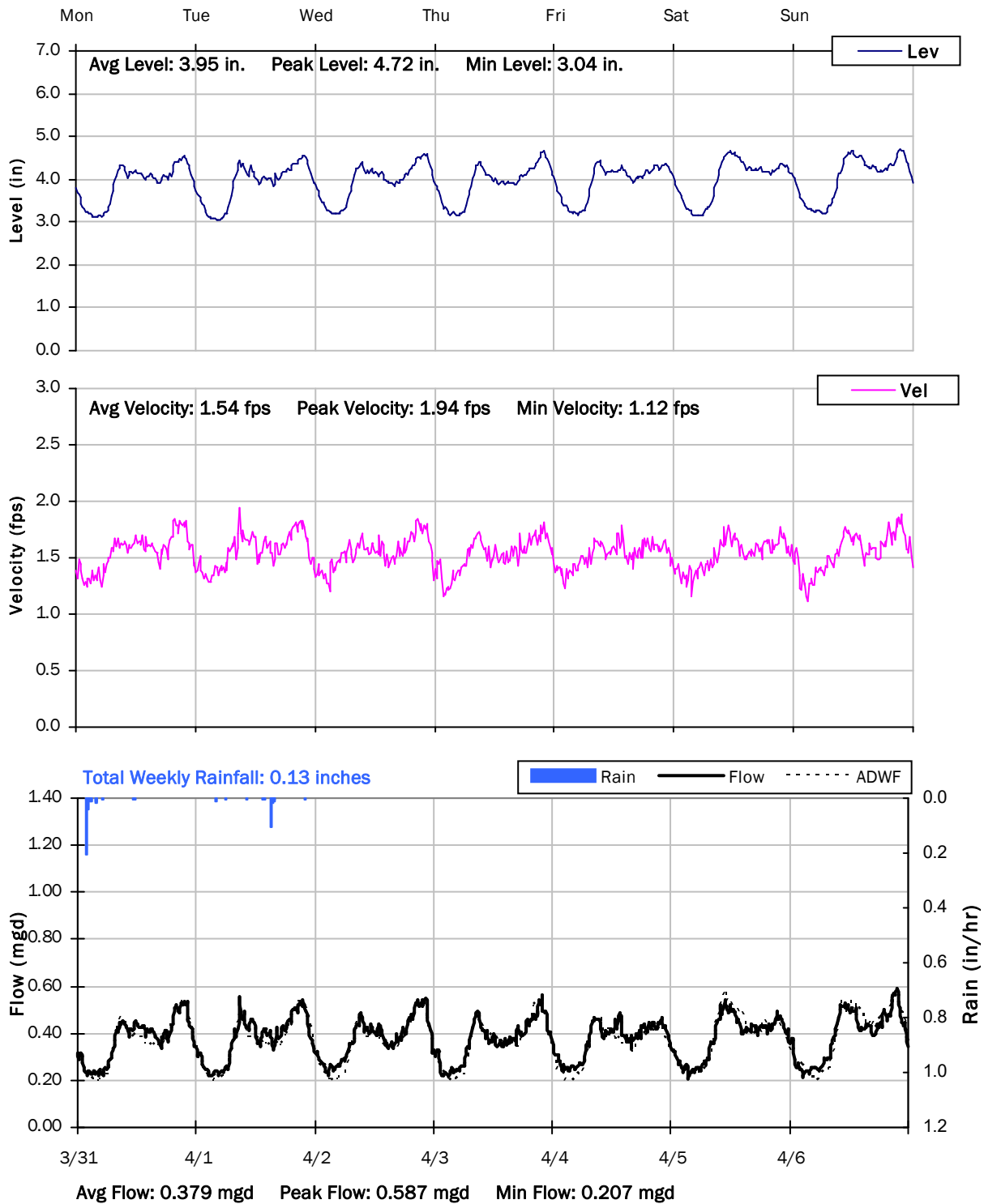
3/24/2025 to 3/31/2025



SITE 03

Weekly Level, Velocity and Flow Hydrographs

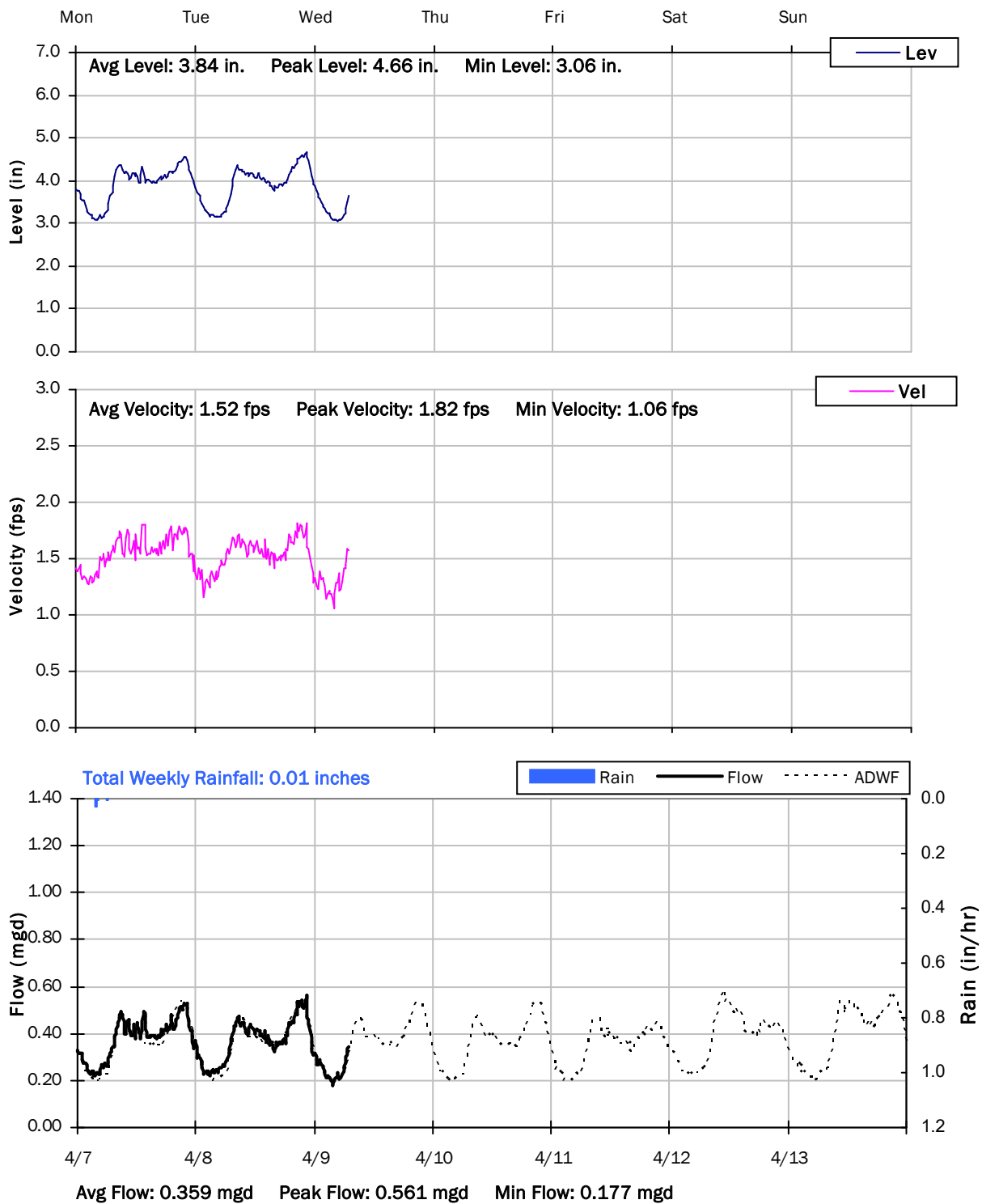
3/31/2025 to 4/7/2025



SITE 03

Weekly Level, Velocity and Flow Hydrographs

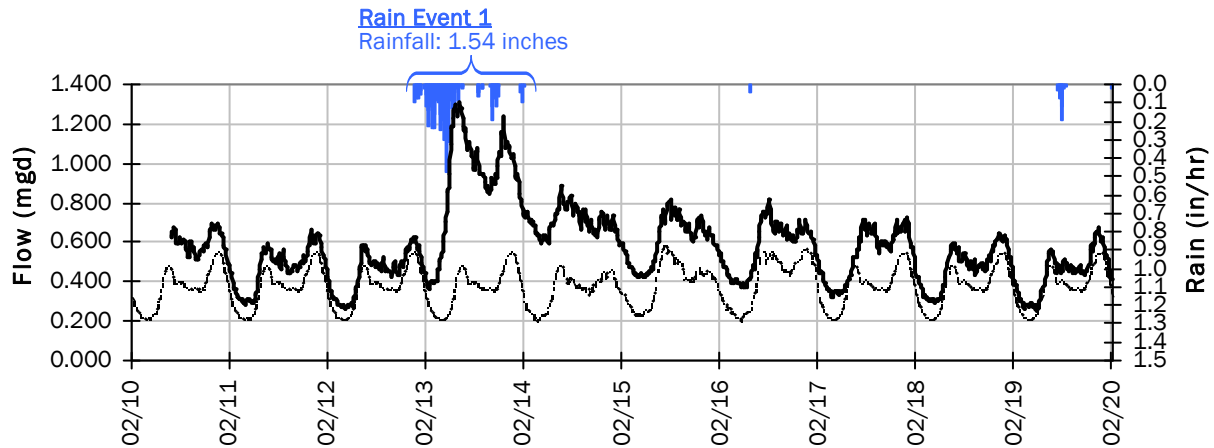
4/7/2025 to 4/14/2025



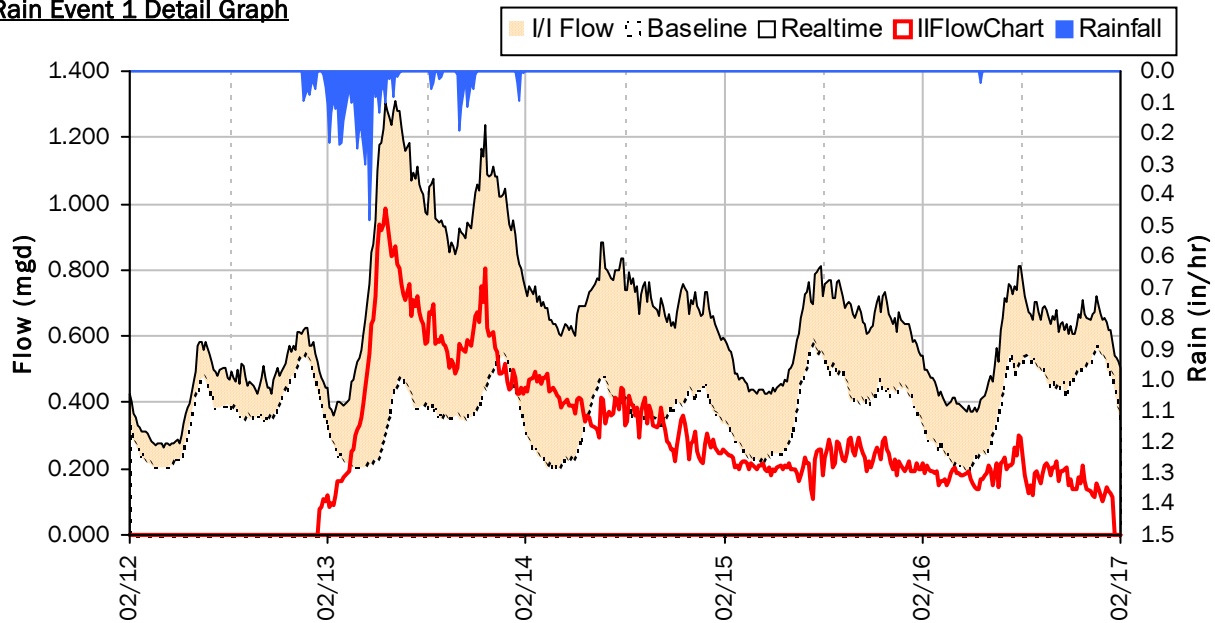
SITE 03

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.54 inches)

Capacity

Peak Flow: 1.307 mgd
PF: 3.57
Peak Level: 6.66 in
d/D Ratio: 0.23

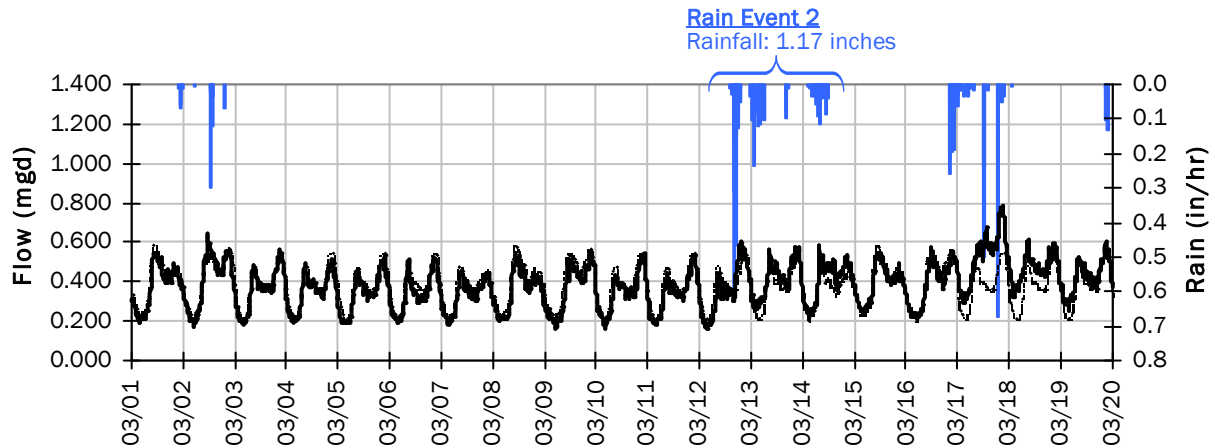
Inflow / Infiltration

Peak I/I Rate: 0.987 mgd
Total I/I: 1,312,000 gallons

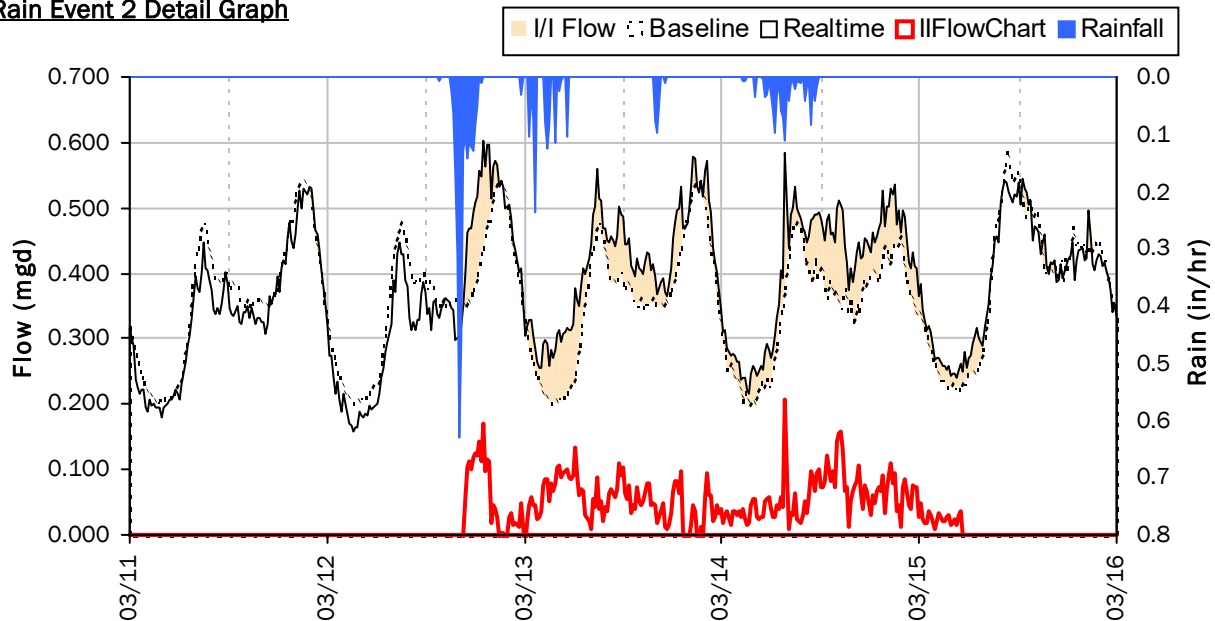
SITE 03

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.17 inches)

Capacity

Peak Flow: 0.604 mgd
PF: 1.65
Peak Level: 4.51 in
d/D Ratio: 0.16

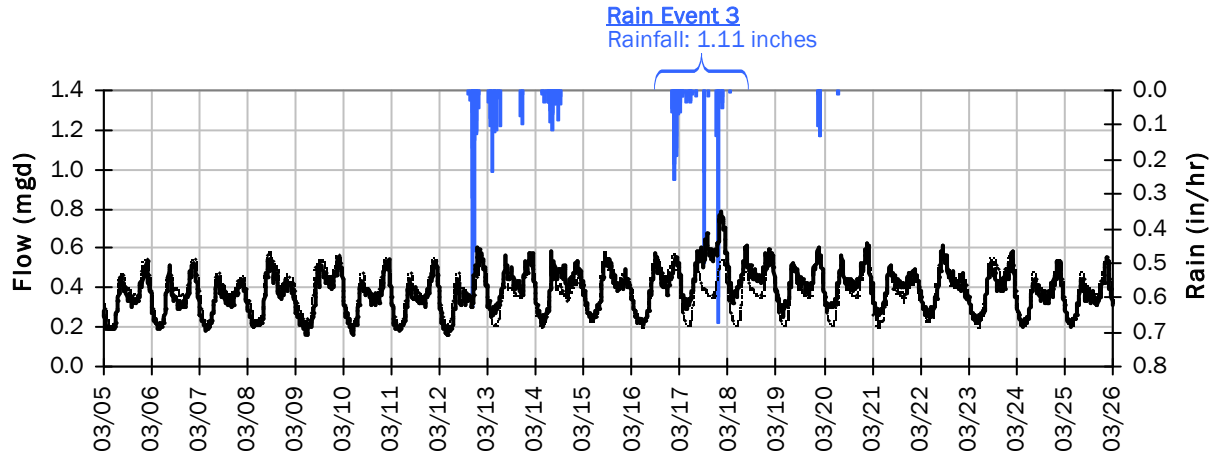
Inflow / Infiltration

Peak I/I Rate: 0.206 mgd
Total I/I: 135,000 gallons

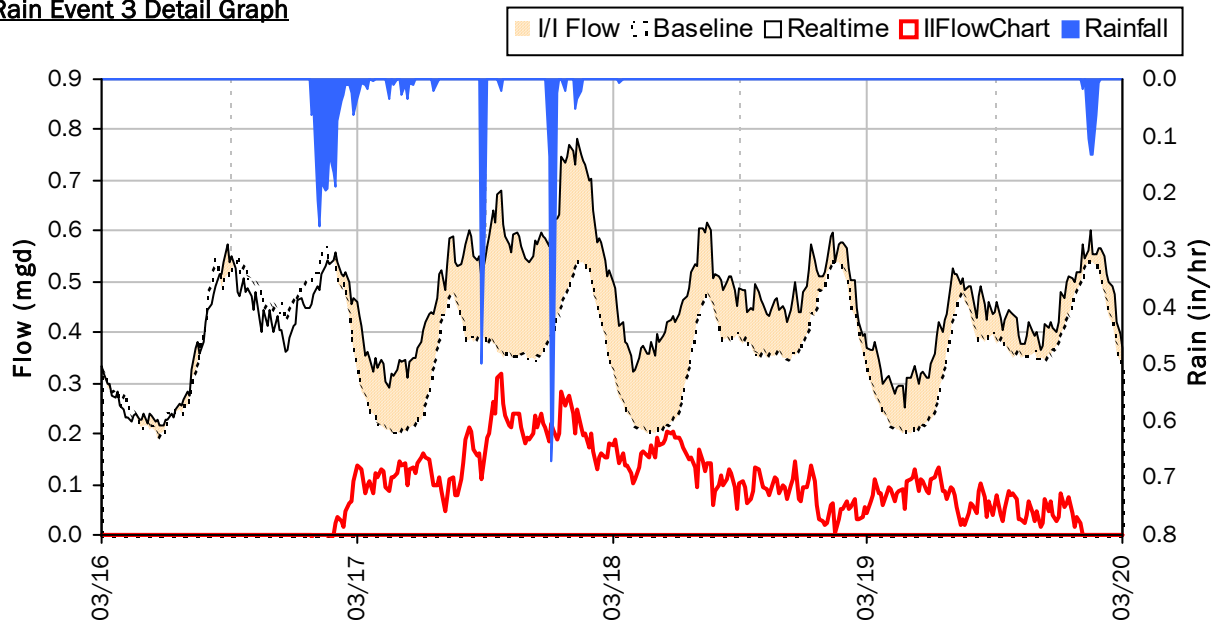
SITE 03

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.11 inches)

Capacity

Peak Flow: 0.78 mgd
PF: 2.14
Peak Level: 5.22 in
d/D Ratio: 0.18

Inflow / Infiltration

Peak I/I Rate: 0.32 mgd
Total I/I: 339,000 gallons

Monitoring Site: Site 04

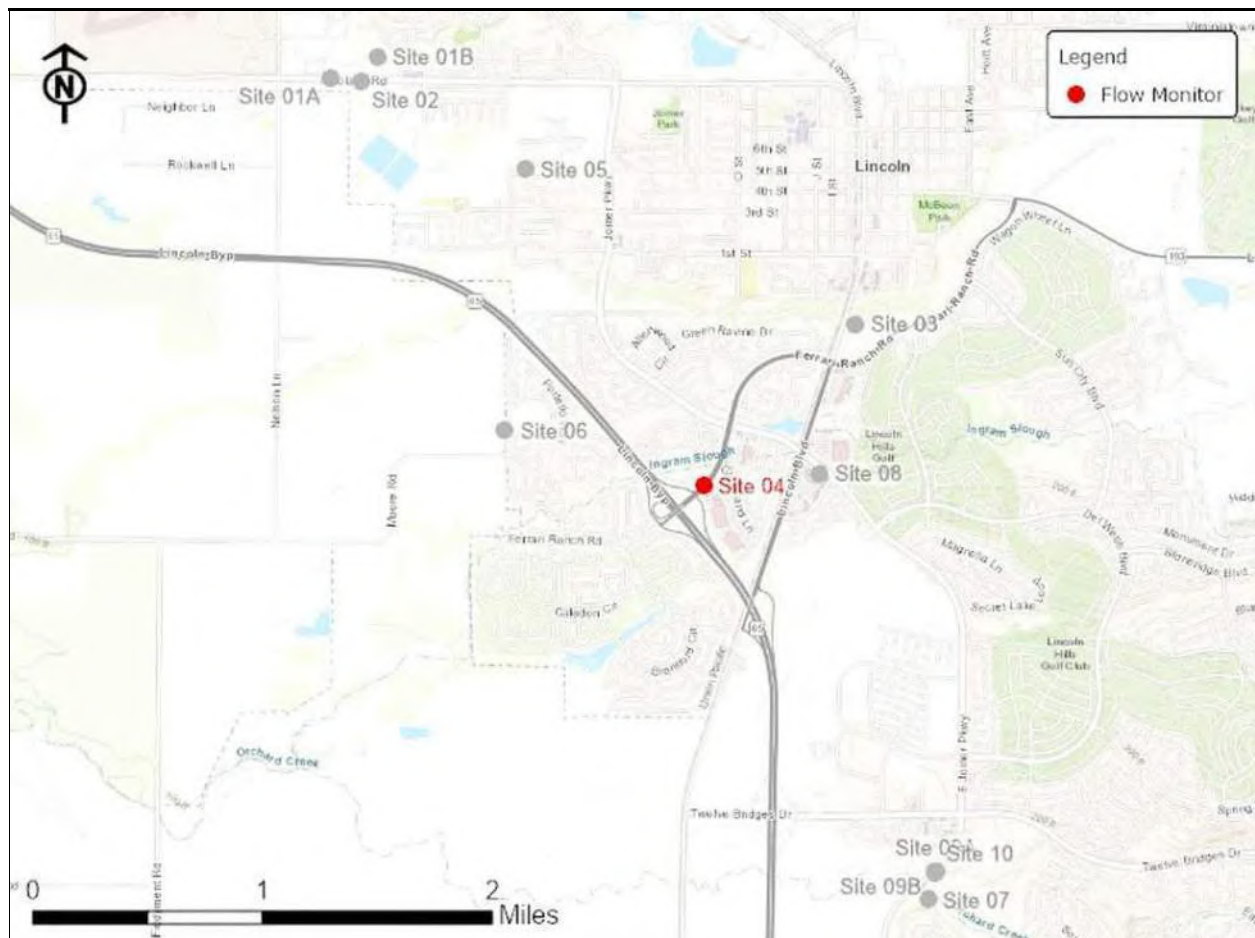
Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: 155 Ferrari Ranch Rd, Lincoln, CA

Data Summary Report



Vicinity Map: Site 04

SITE 04

Site Information

MH ID: SW428SS01

Location: 155 Ferrari Ranch Rd, Lincoln, CA

Coordinates: 121.3054° W, 38.8718° N

Rim Elevation: 137 feet

Expected Pipe Diameter: 48 inches

Measured Pipe Diameter: 48 inches

ADWF: 4.668 mgd

Peak Measured Flow: 11.642 mgd

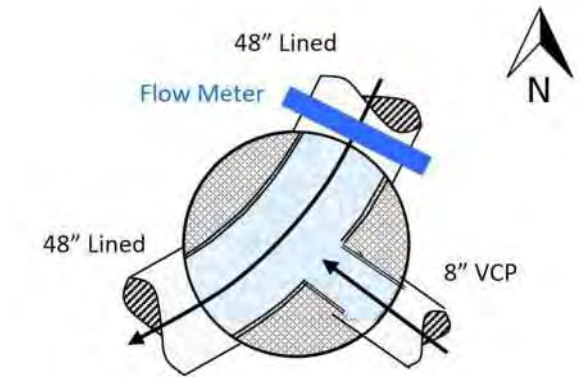
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 04

Additional Site Photos

Southwest Effluent Pipe



Monitored Northeast Influent Pipe



SITE 04

Additional Site Photos

Southeast Influent Pipe

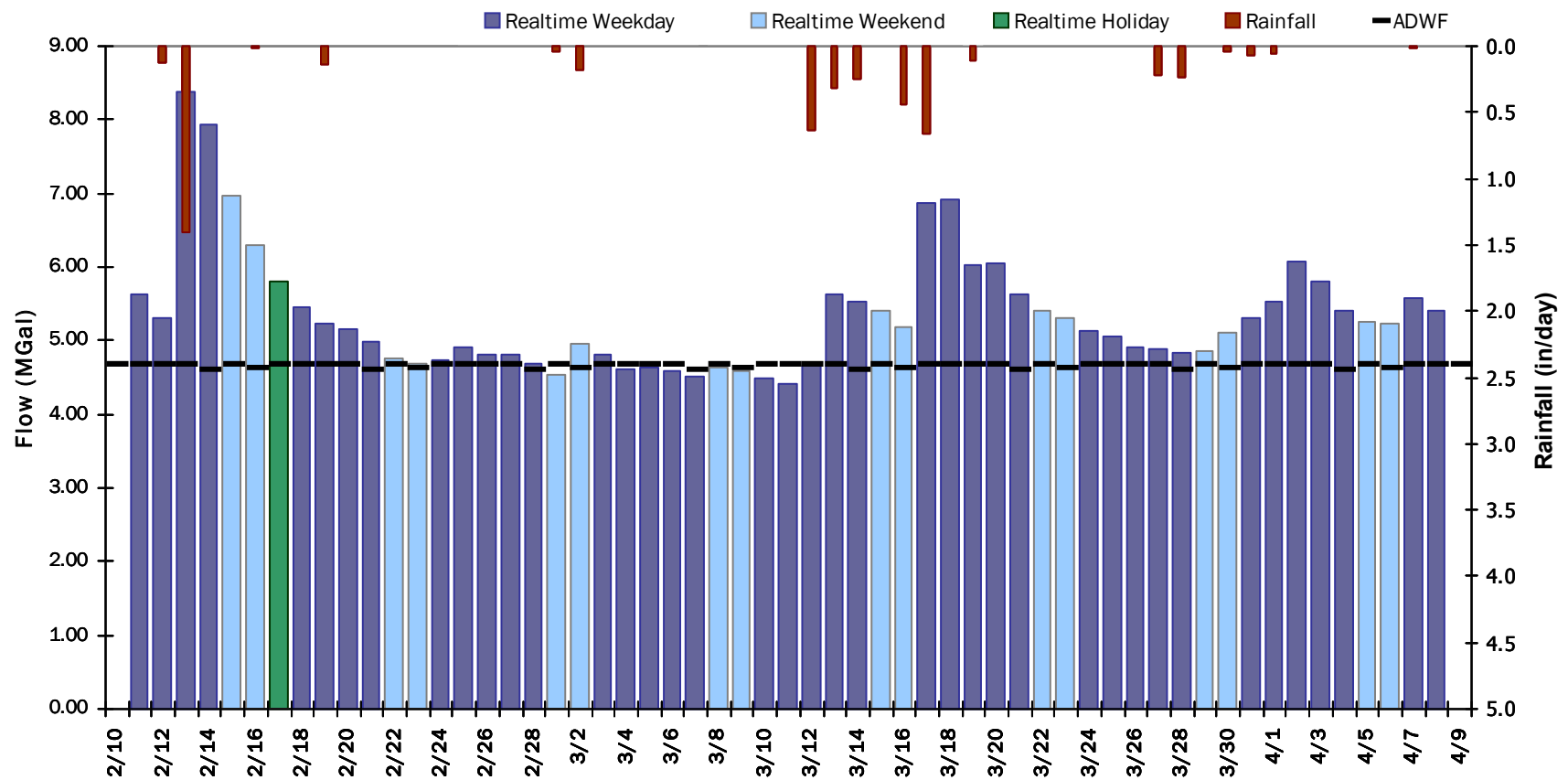


SITE 04

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 5.321 MGal Peak Daily Flow: 8.374 MGal Min Daily Flow: 3.486 MGal

Total Rainfall: 4.95 inches



SITE 04

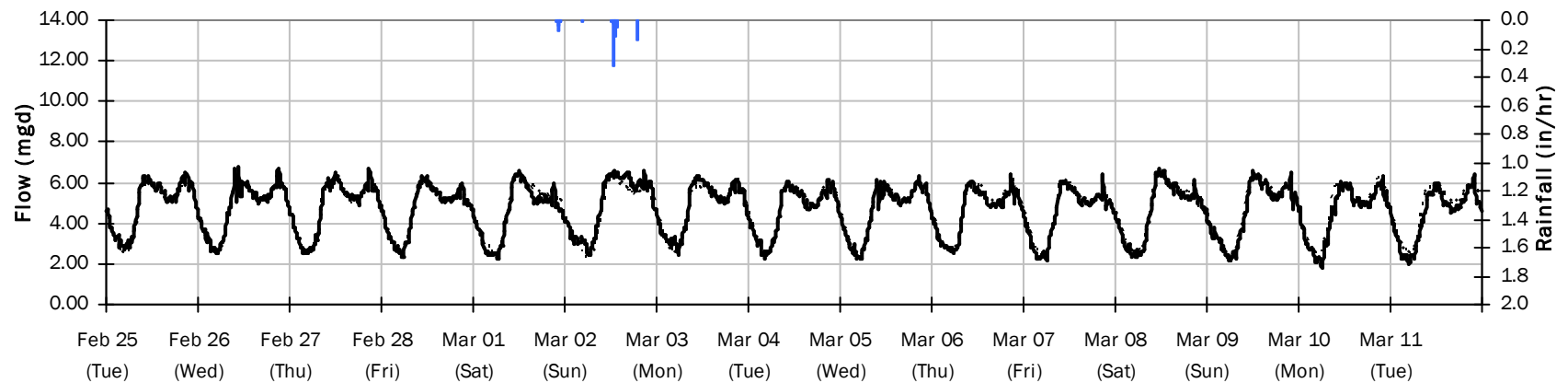
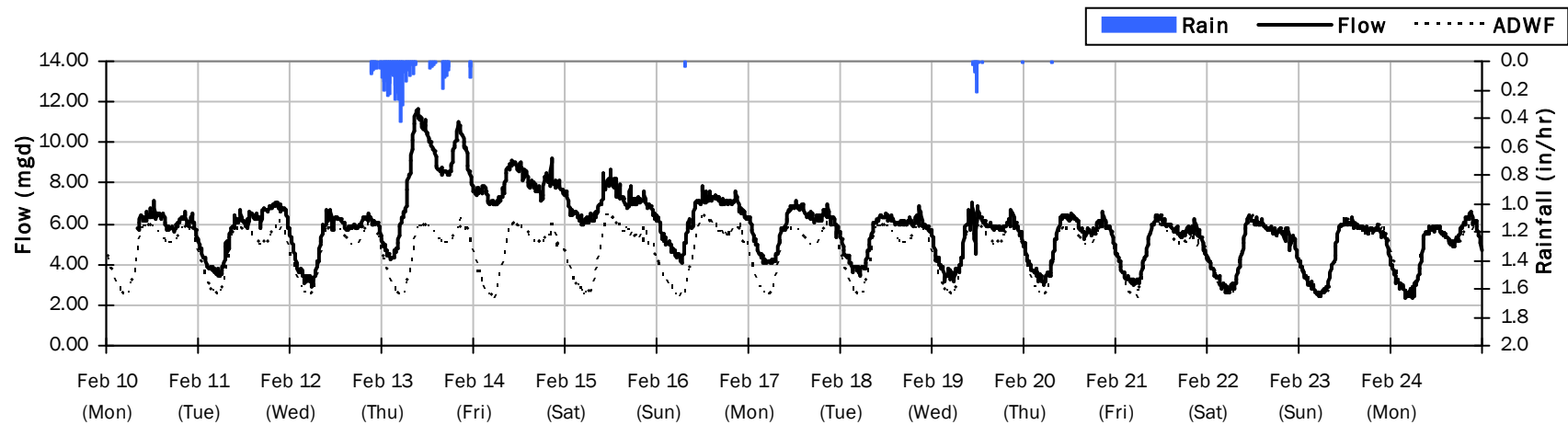
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.91 inches

Period Avg Flow: 5.239 mgd

Period Peak Flow: 11.642 mgd

Period Min Flow: 1.809 mgd



SITE 04

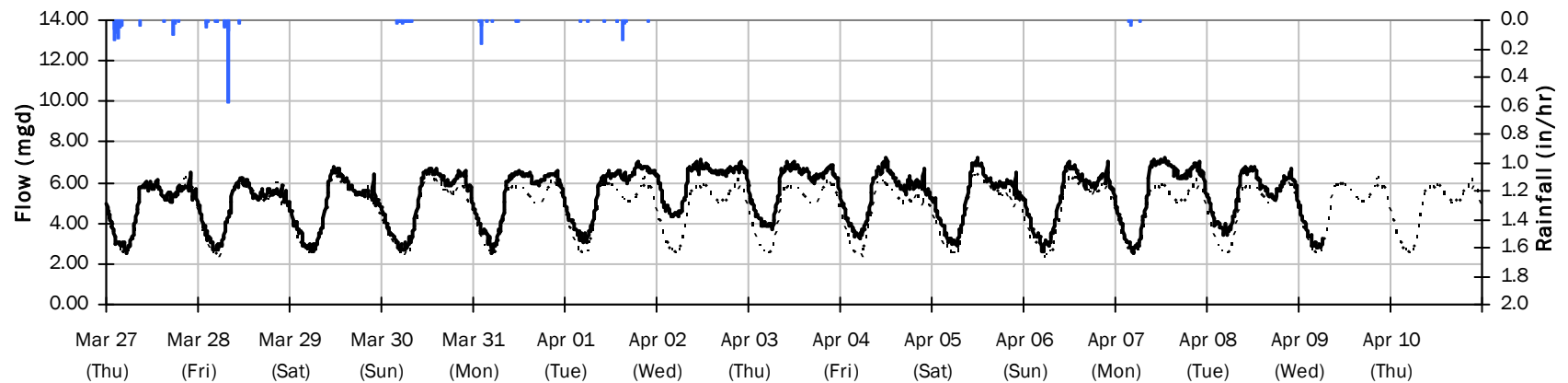
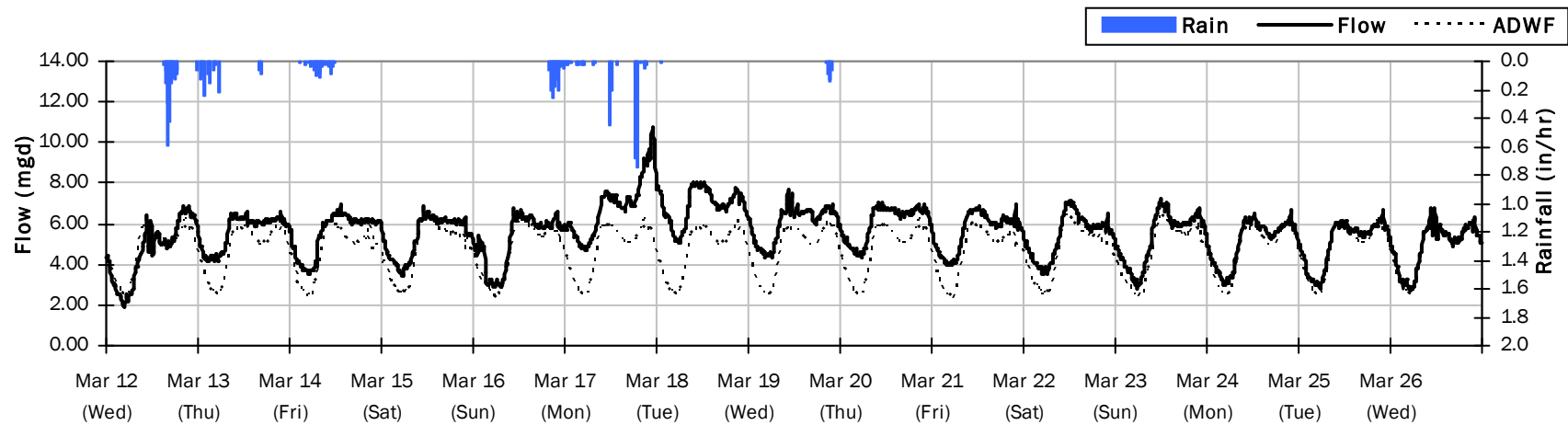
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.05 inches

Period Avg Flow: 5.444 mgd

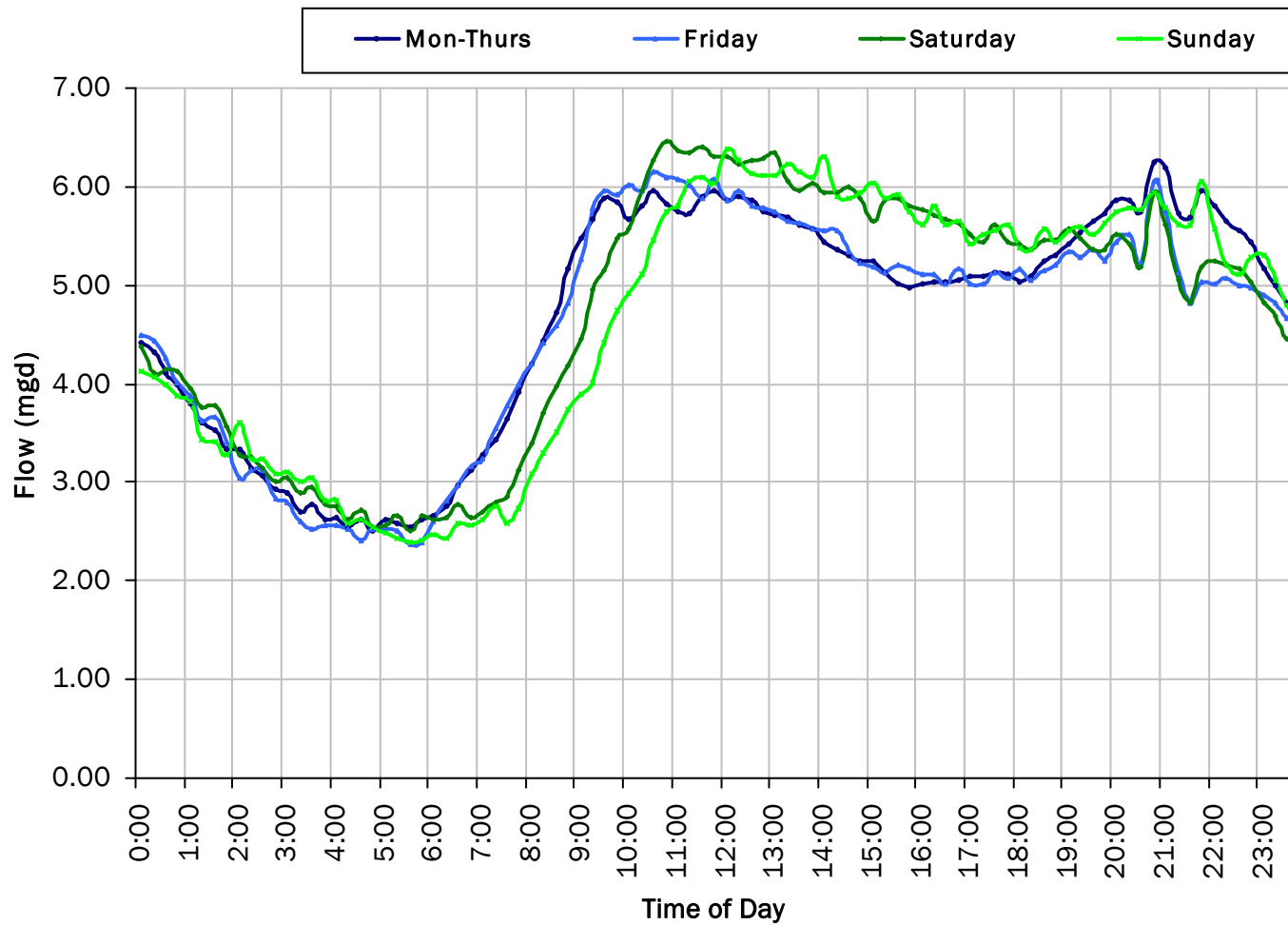
Period Peak Flow: 10.727 mgd

Period Min Flow: 1.916 mgd

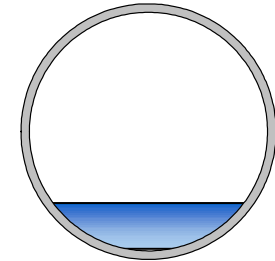


SITE 04

Average Dry Weather Flow Hydrographs

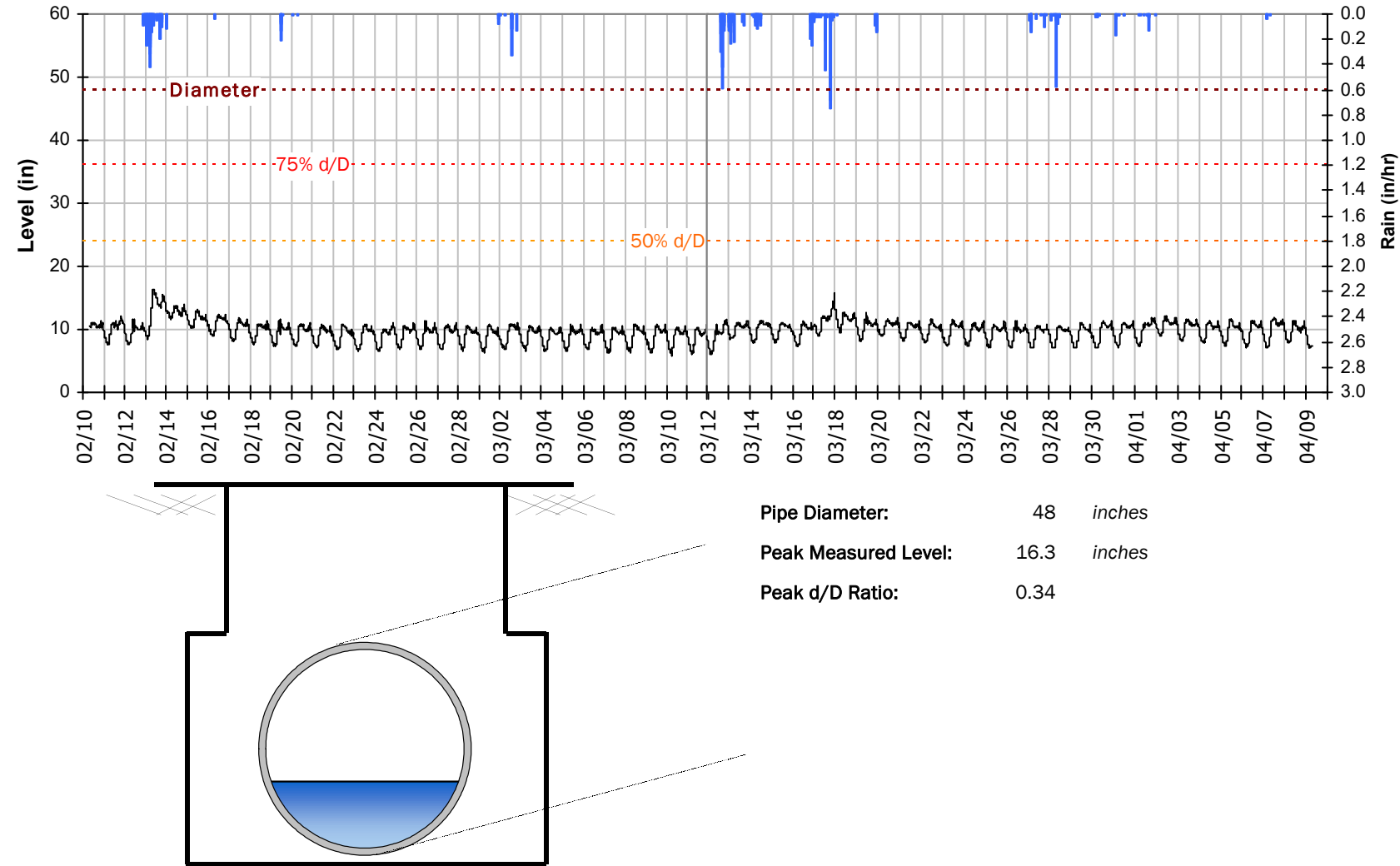


ADWF:
4.668 mgd



SITE 04
Site Capacity and Surge Summary

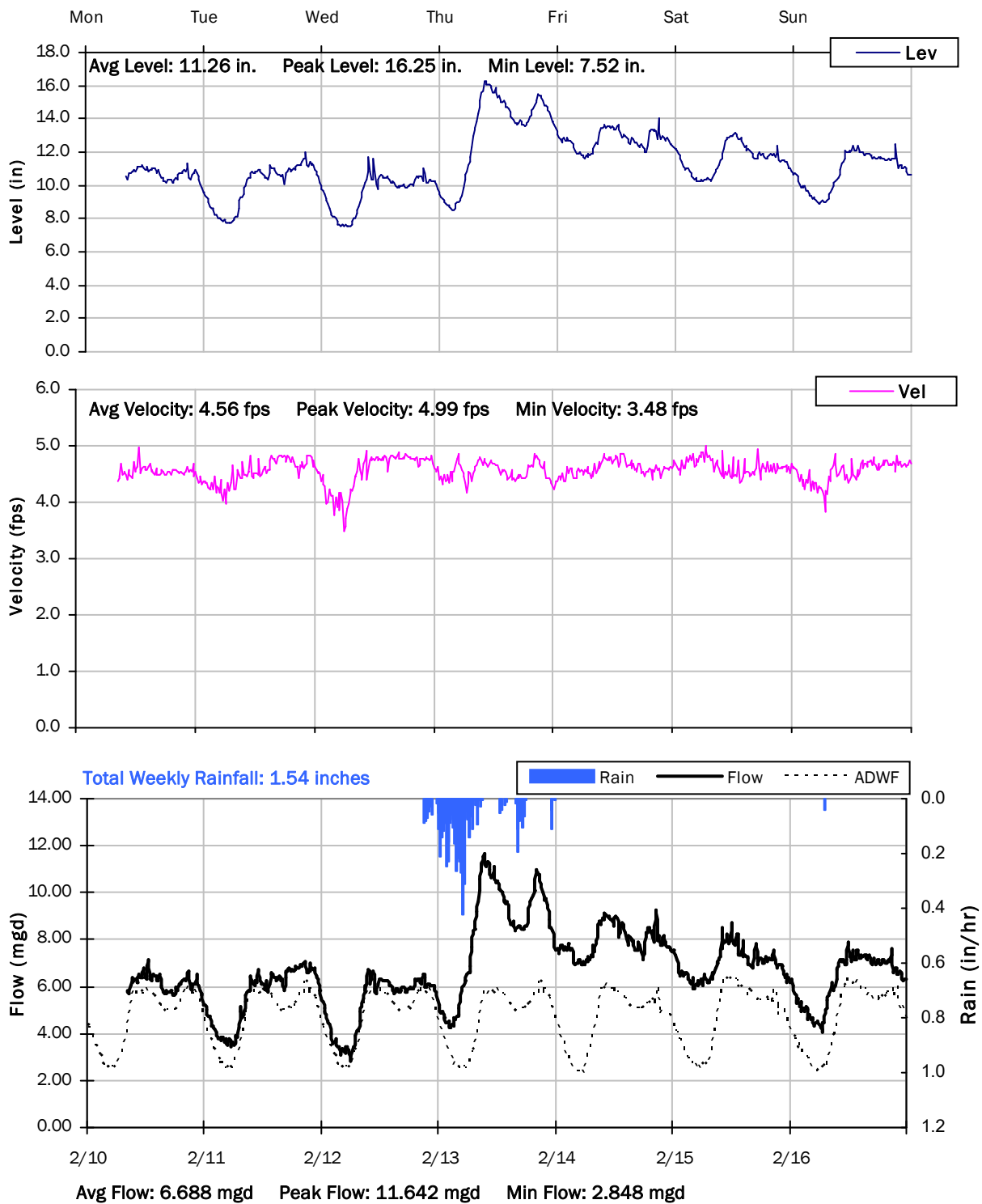
Realtime Flow Levels with Rainfall Data over Peak Level Period



SITE 04

Weekly Level, Velocity and Flow Hydrographs

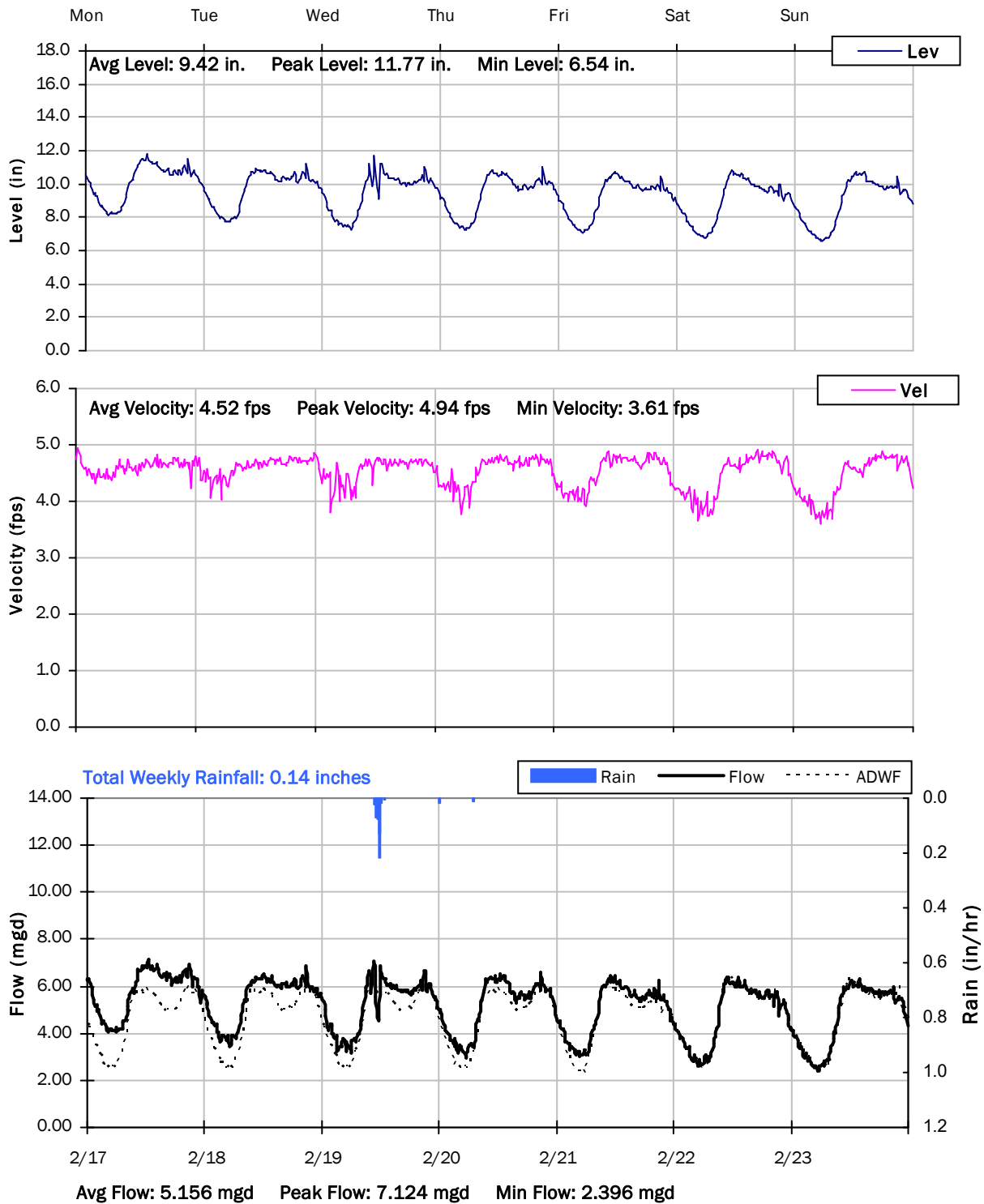
2/10/2025 to 2/17/2025



SITE 04

Weekly Level, Velocity and Flow Hydrographs

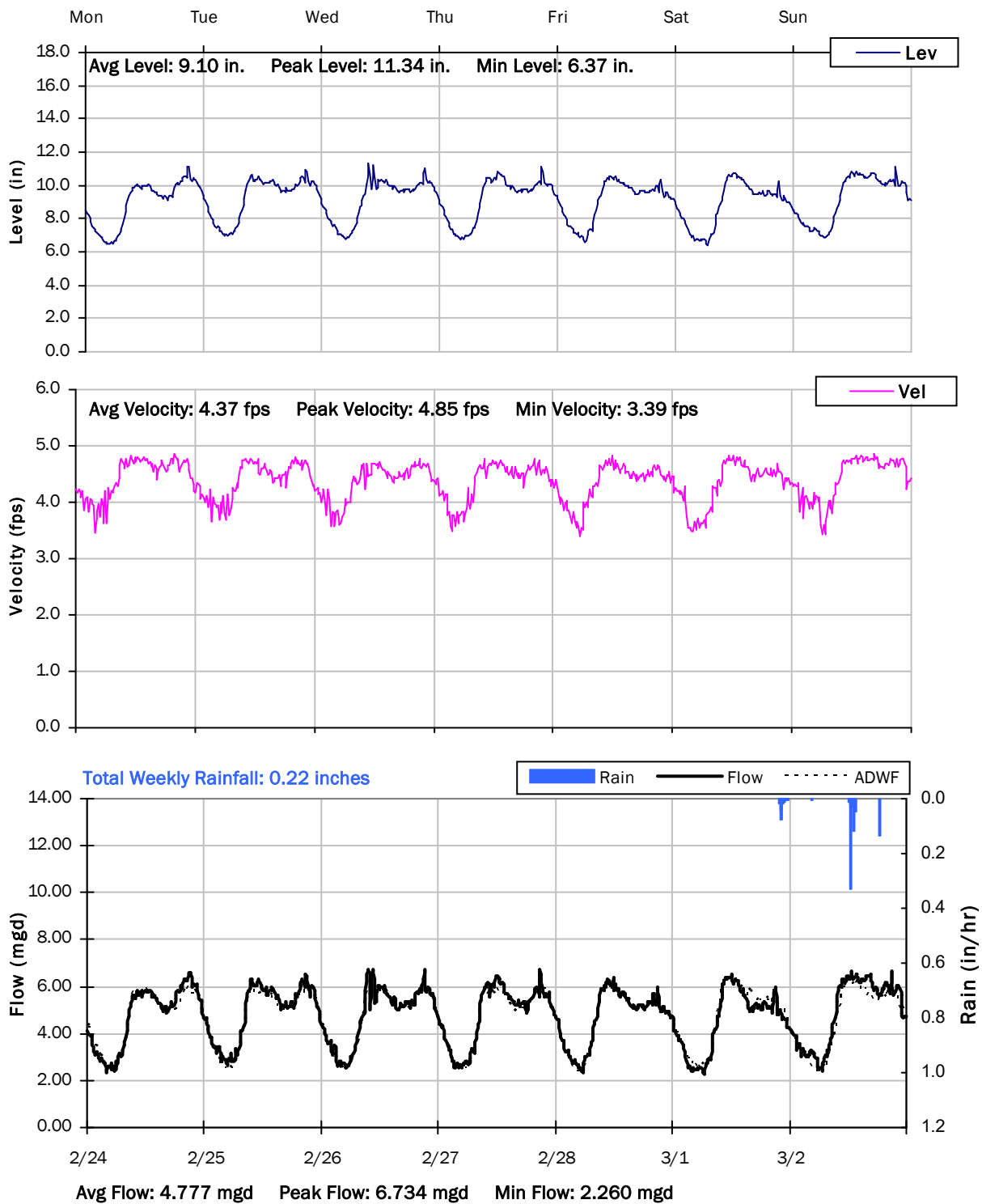
2/17/2025 to 2/24/2025



SITE 04

Weekly Level, Velocity and Flow Hydrographs

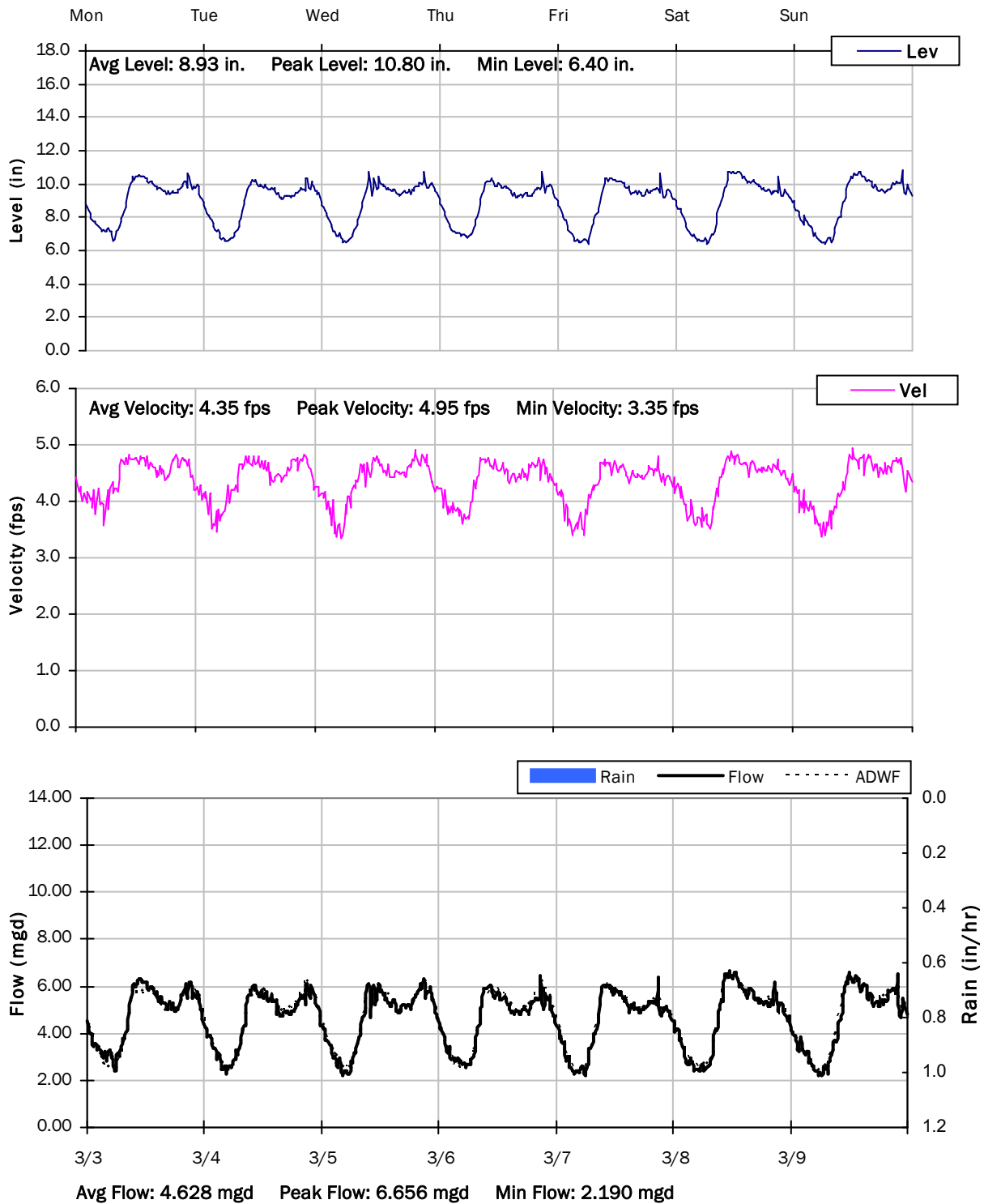
2/24/2025 to 3/3/2025



SITE 04

Weekly Level, Velocity and Flow Hydrographs

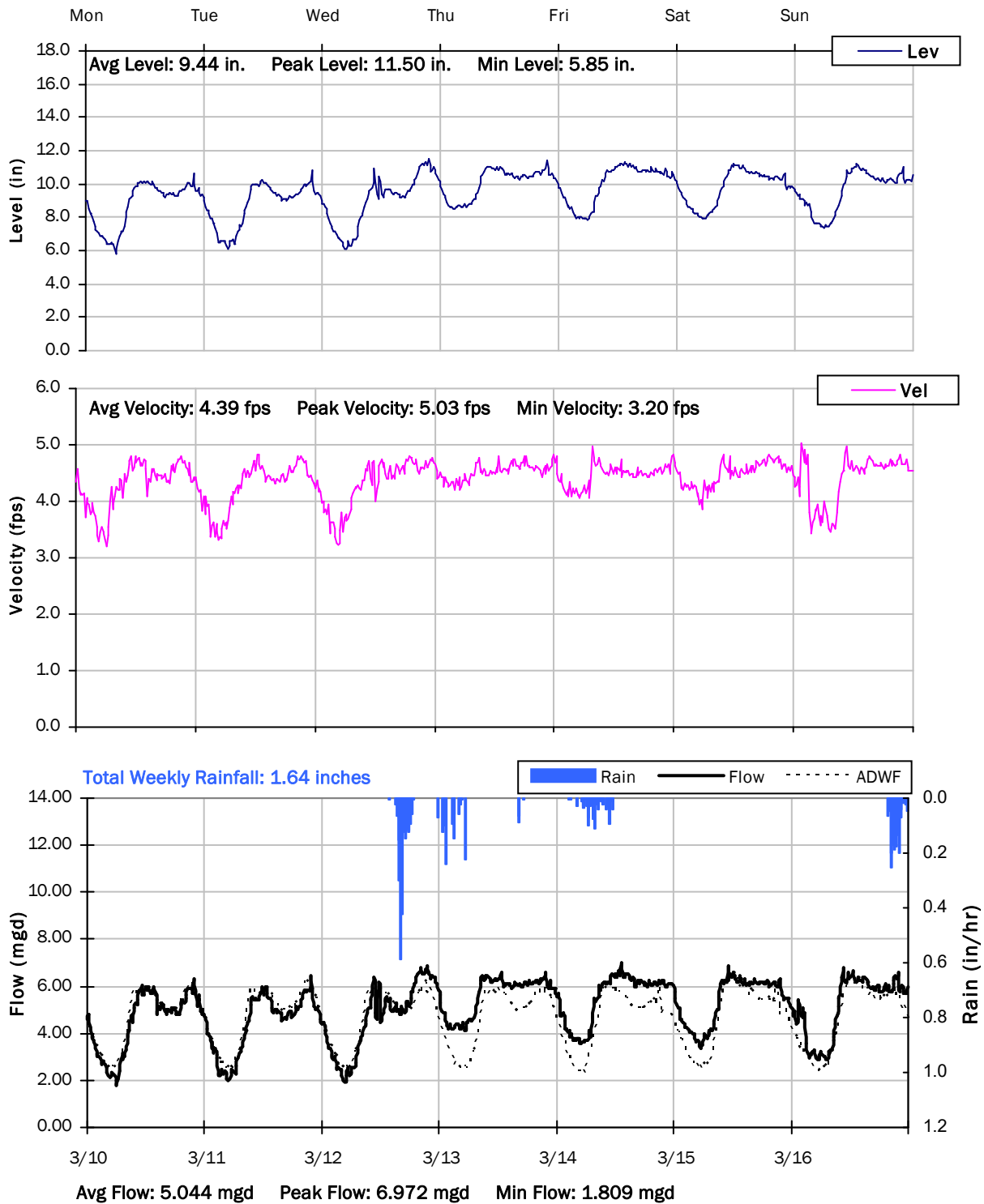
3/3/2025 to 3/10/2025



SITE 04

Weekly Level, Velocity and Flow Hydrographs

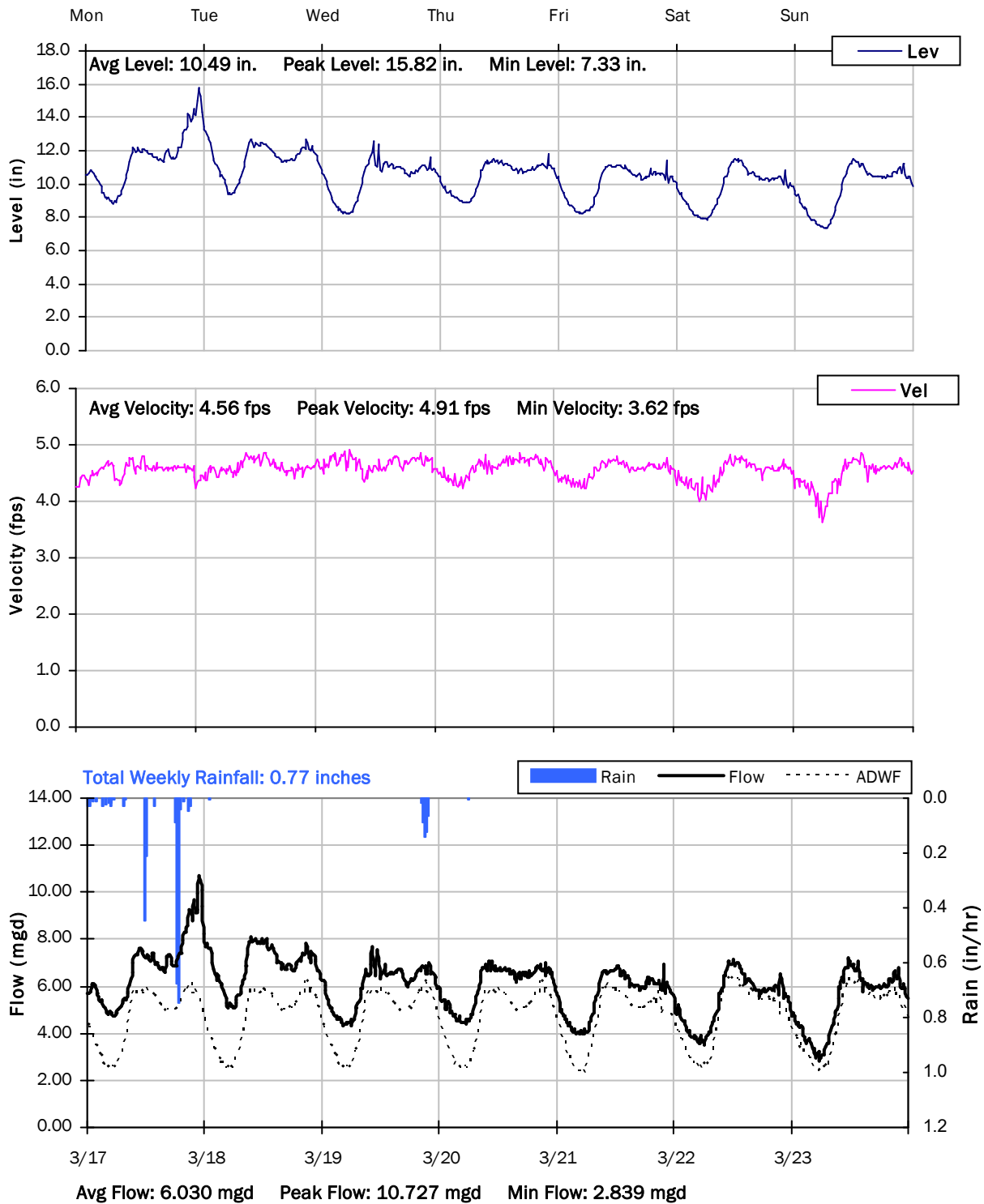
3/10/2025 to 3/17/2025



SITE 04

Weekly Level, Velocity and Flow Hydrographs

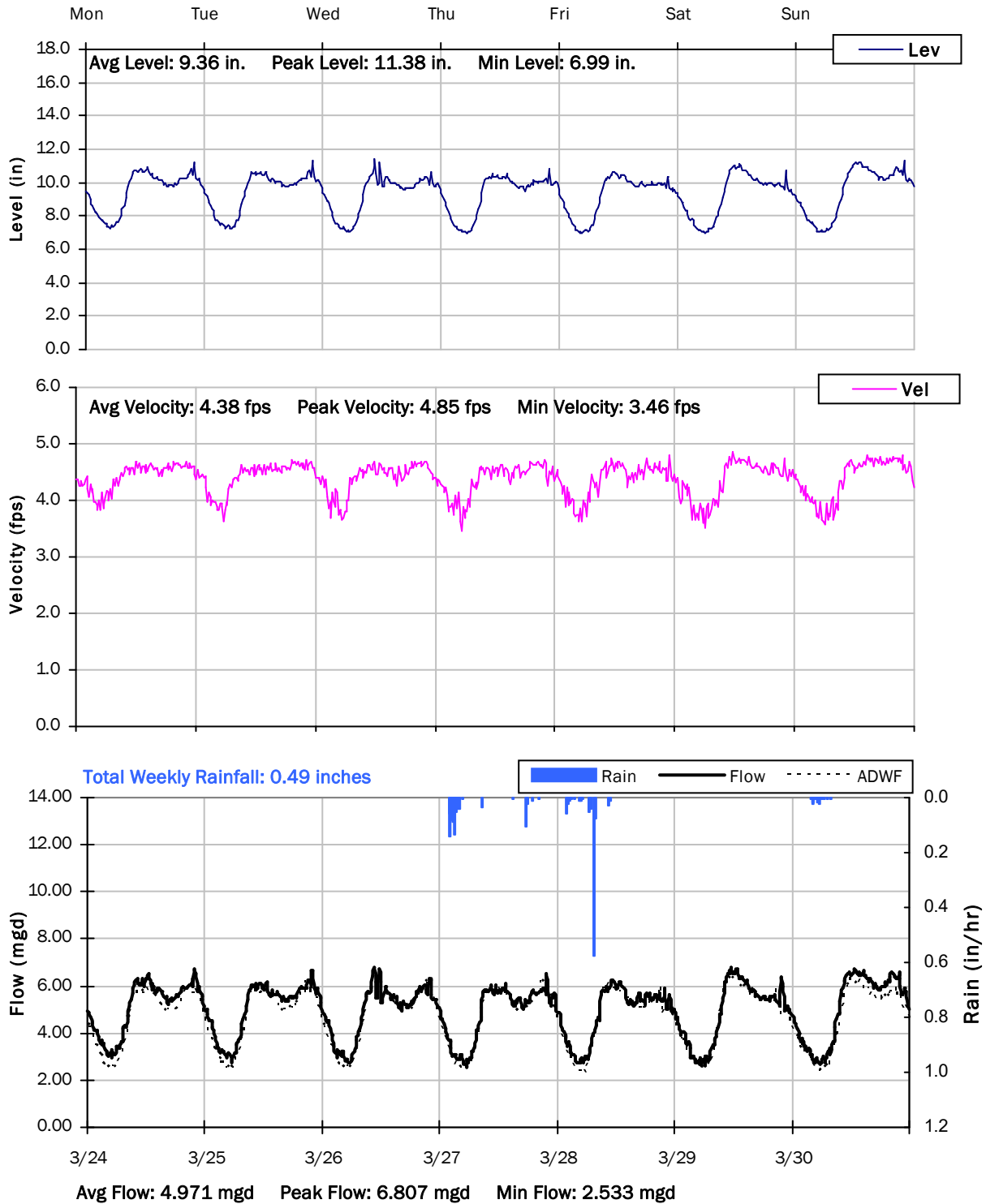
3/17/2025 to 3/24/2025



SITE 04

Weekly Level, Velocity and Flow Hydrographs

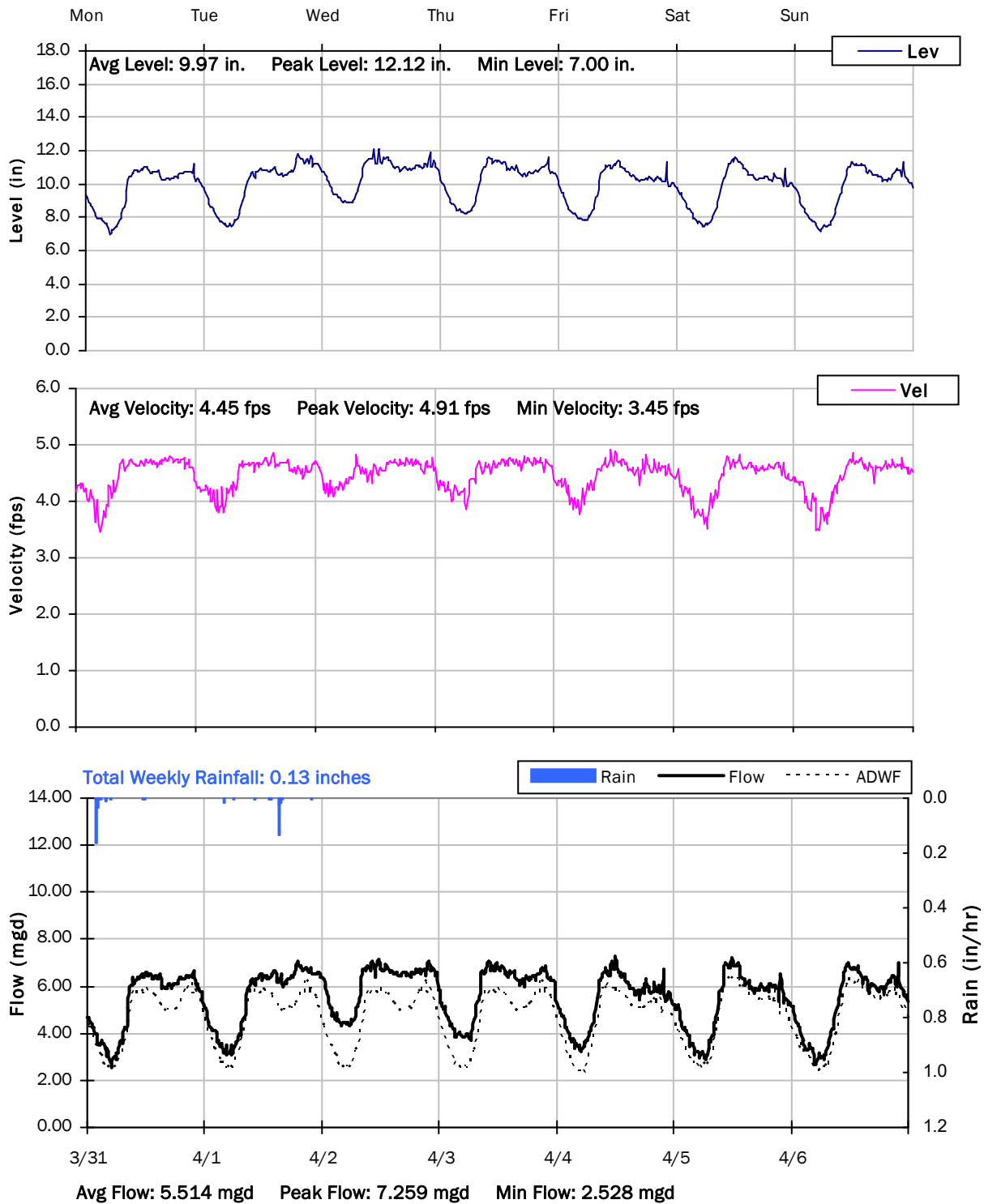
3/24/2025 to 3/31/2025



SITE 04

Weekly Level, Velocity and Flow Hydrographs

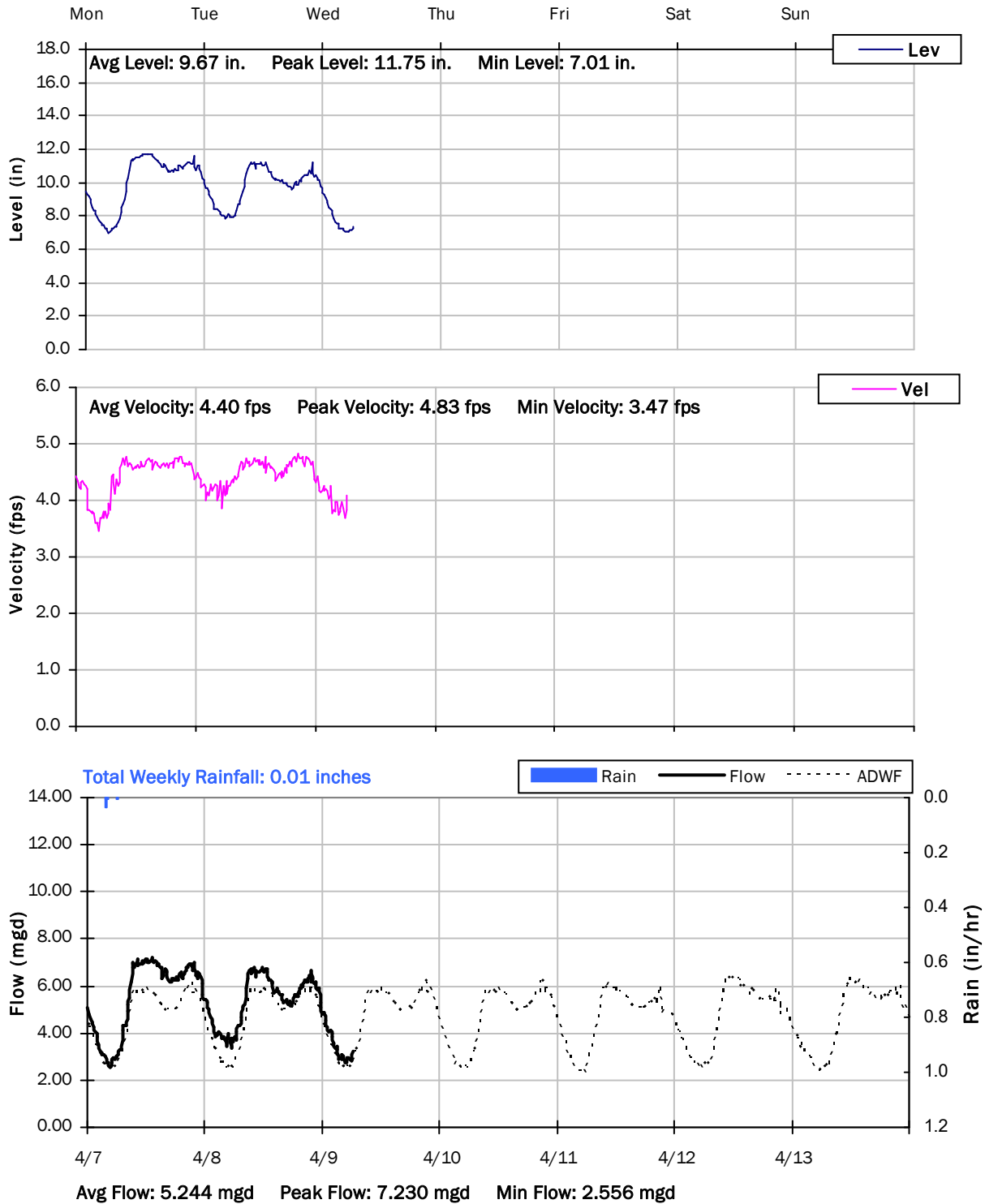
3/31/2025 to 4/7/2025



SITE 04

Weekly Level, Velocity and Flow Hydrographs

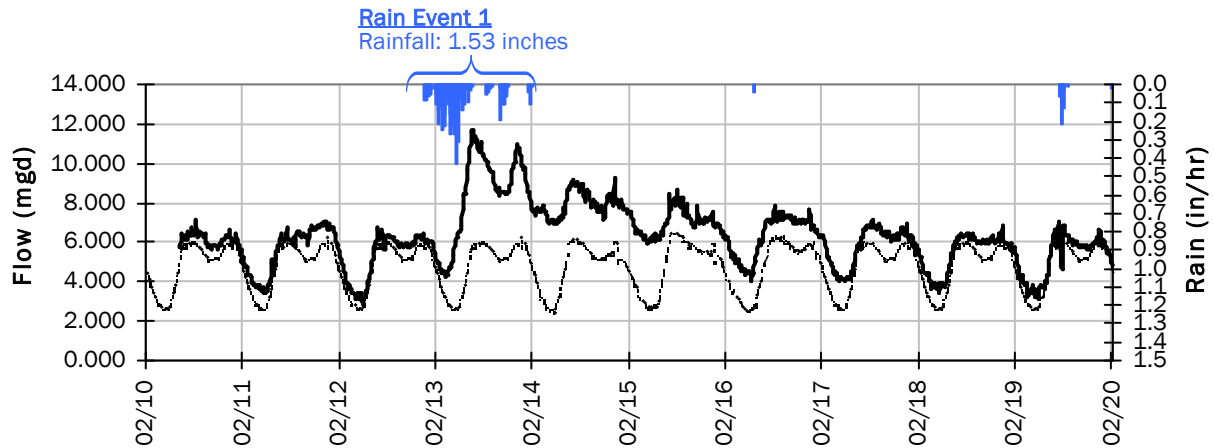
4/7/2025 to 4/14/2025



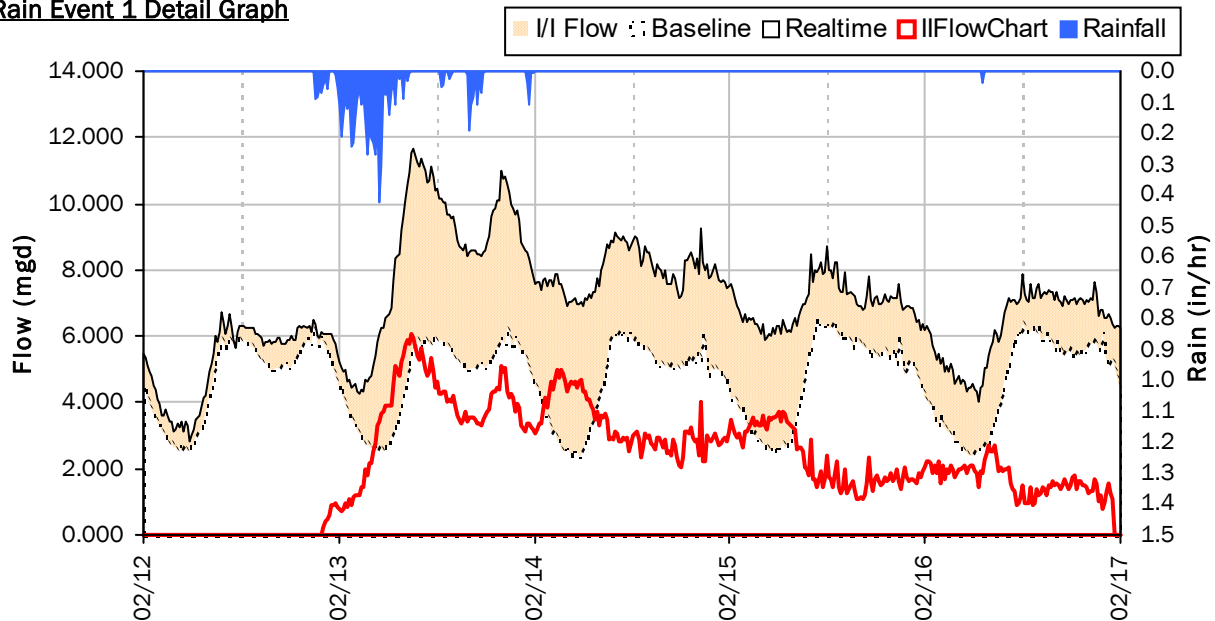
SITE 04

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.53 inches)

Capacity

Peak Flow: 11.642 mgd
PF: 2.49

Peak Level: 16.25 in
d/D Ratio: 0.34

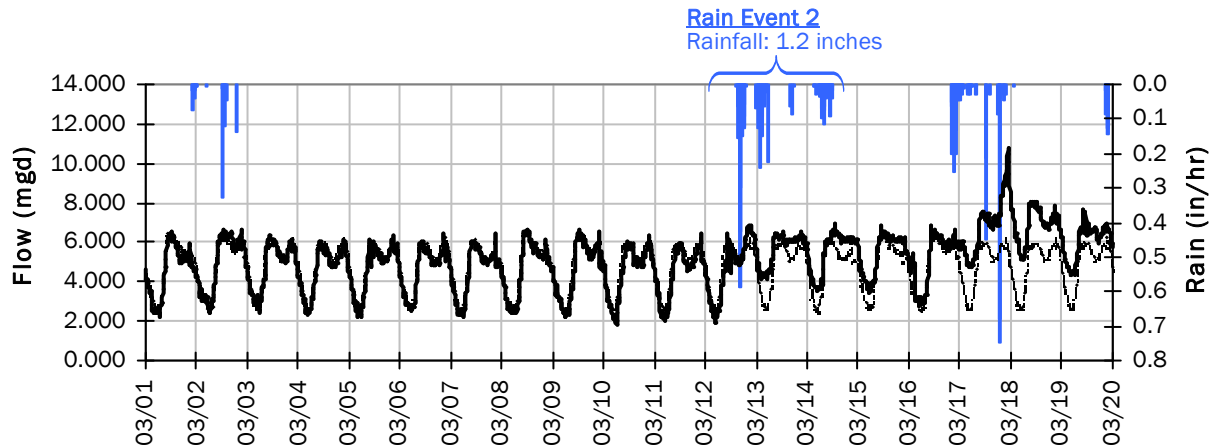
Inflow / Infiltration

Peak I/I Rate: 6.061 mgd
Total I/I: 10,956,000 gallons

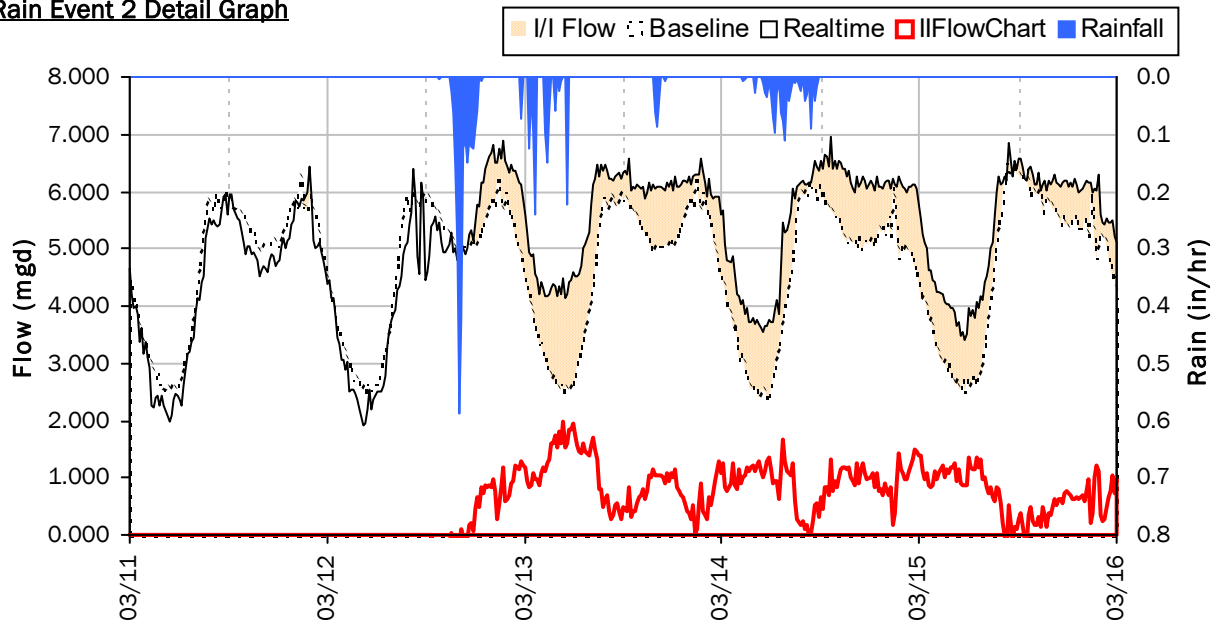
SITE 04

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.20 inches)

Capacity

Peak Flow: 6.972 mgd
PF: 1.49

Peak Level: 11.50 in
d/D Ratio: 0.24

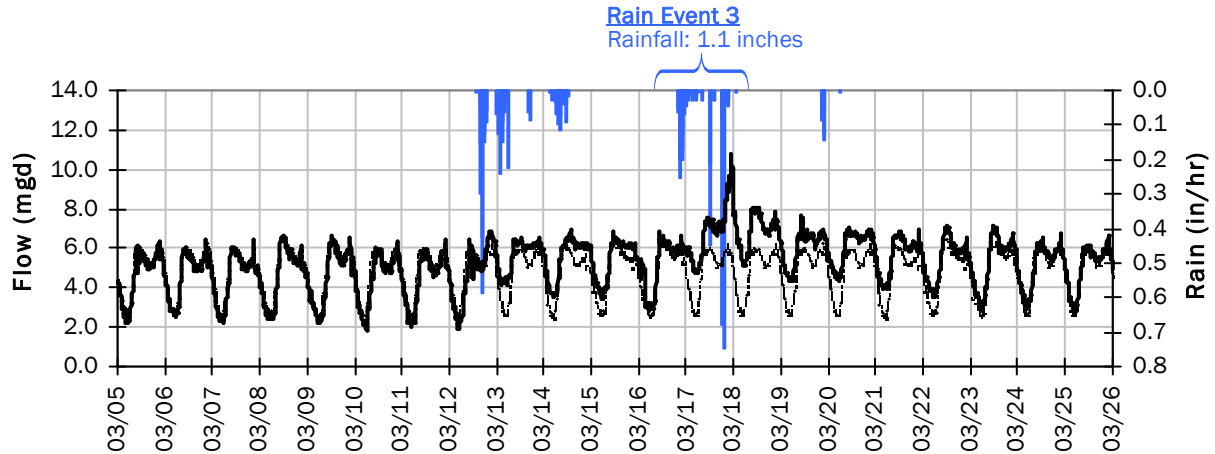
Inflow / Infiltration

Peak I/I Rate: 1.989 mgd
Total I/I: 2,770,000 gallons

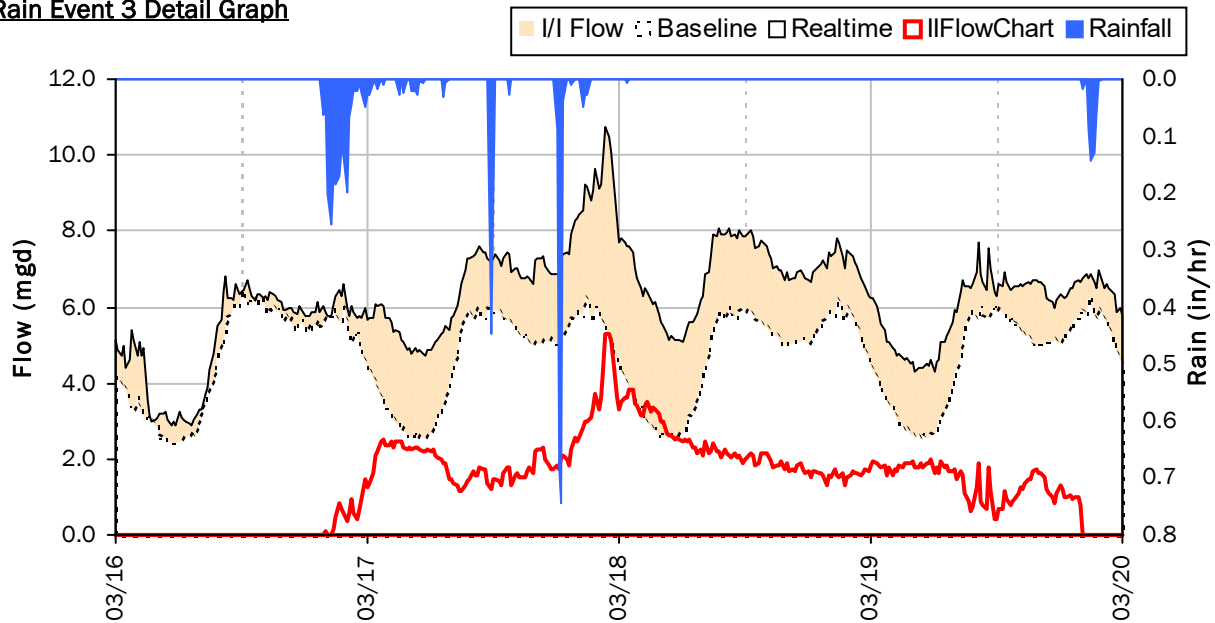
SITE 04

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.10 inches)

Capacity

Peak Flow: 10.73 mgd
PF: 2.30

Peak Level: 15.82 in
d/D Ratio: 0.33

Inflow / Infiltration

Peak I/I Rate: 5.30 mgd
Total I/I: 5,672,000 gallons

Monitoring Site: Site 05

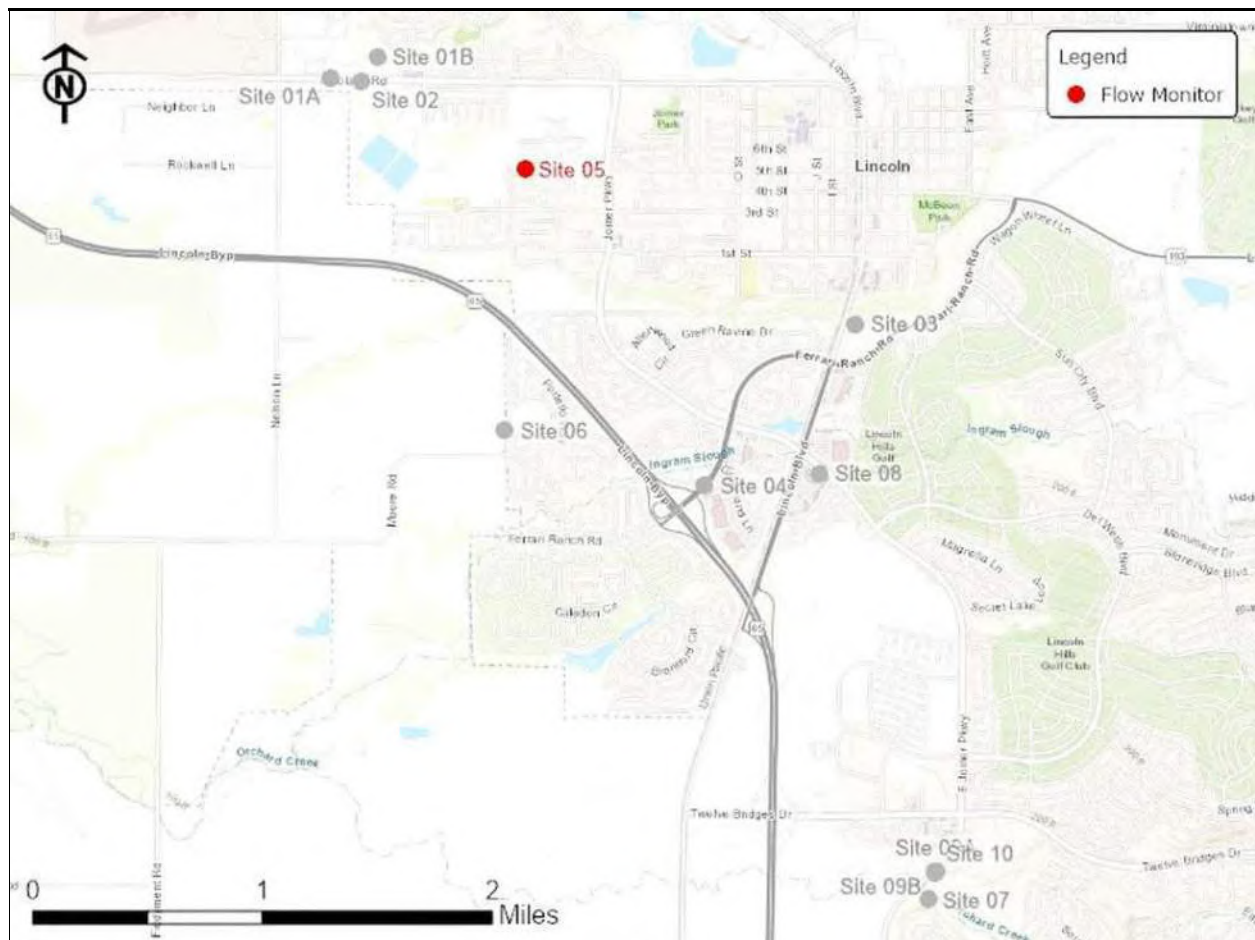
Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: 2168 5th St, Lincoln, CA

Data Summary Report



Vicinity Map: Site 05

SITE 05

Site Information

MH ID: NW388SS01

Location: 2168 5th St, Lincoln, CA

Coordinates: 121.3201° W, 38.8917° N

Rim Elevation: 132 feet

Expected Pipe Diameter: 24 inches

Measured Pipe Diameter: 23 inches

ADWF: 0.405 mgd

Peak Measured Flow: 1.806 mgd

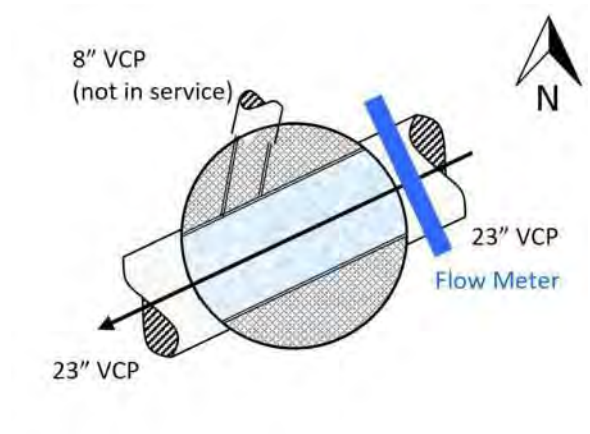
Sediment: 0.5 inches



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 05

Additional Site Photos

Southwest Effluent Pipe



North Influent Pipe (not in service)



SITE 05

Additional Site Photos

Monitored Northeast Influent Pipe

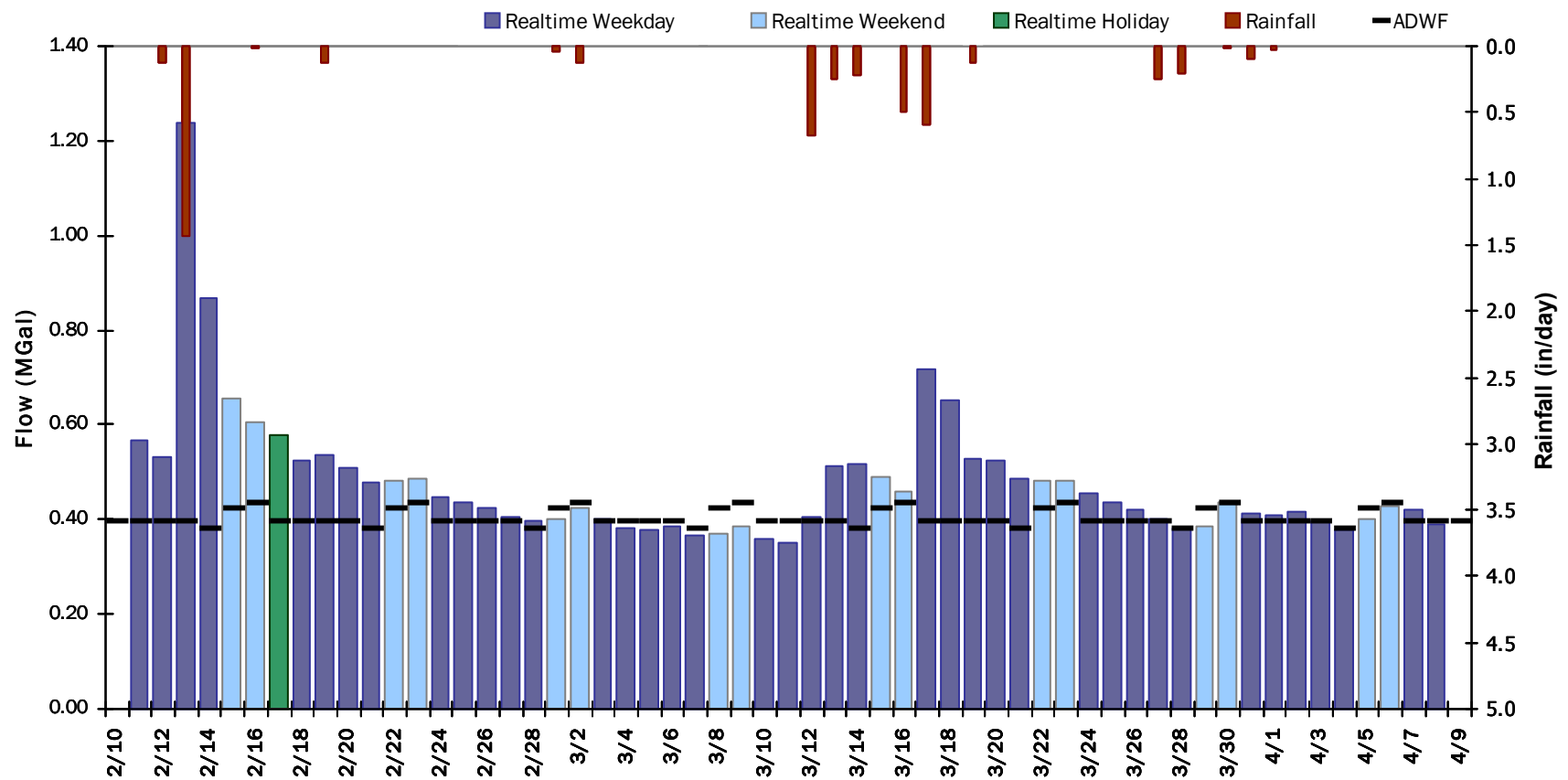


SITE 05

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.477 MGal Peak Daily Flow: 1.240 MGal Min Daily Flow: 0.254 MGal

Total Rainfall: 4.80 inches



SITE 05

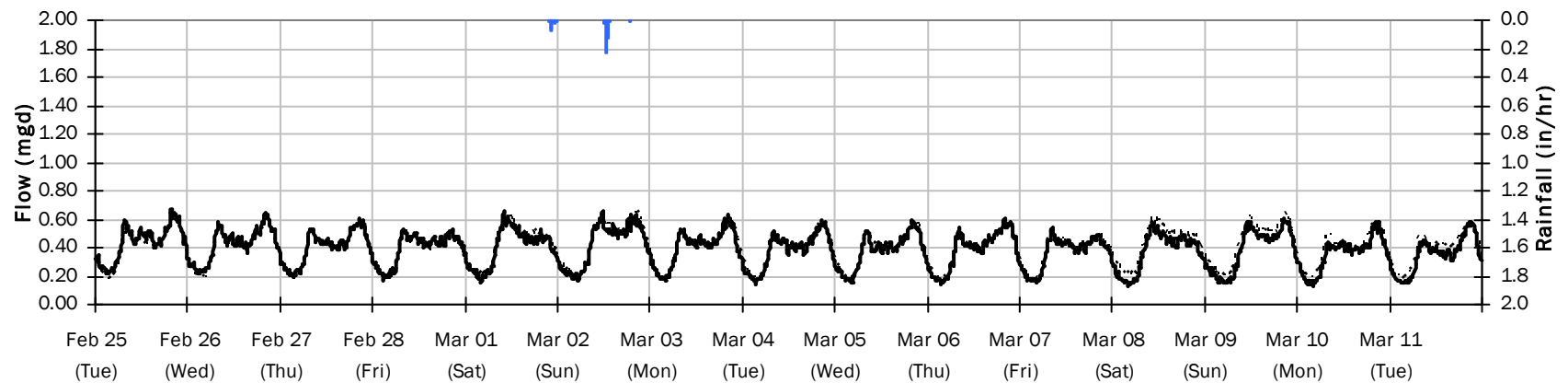
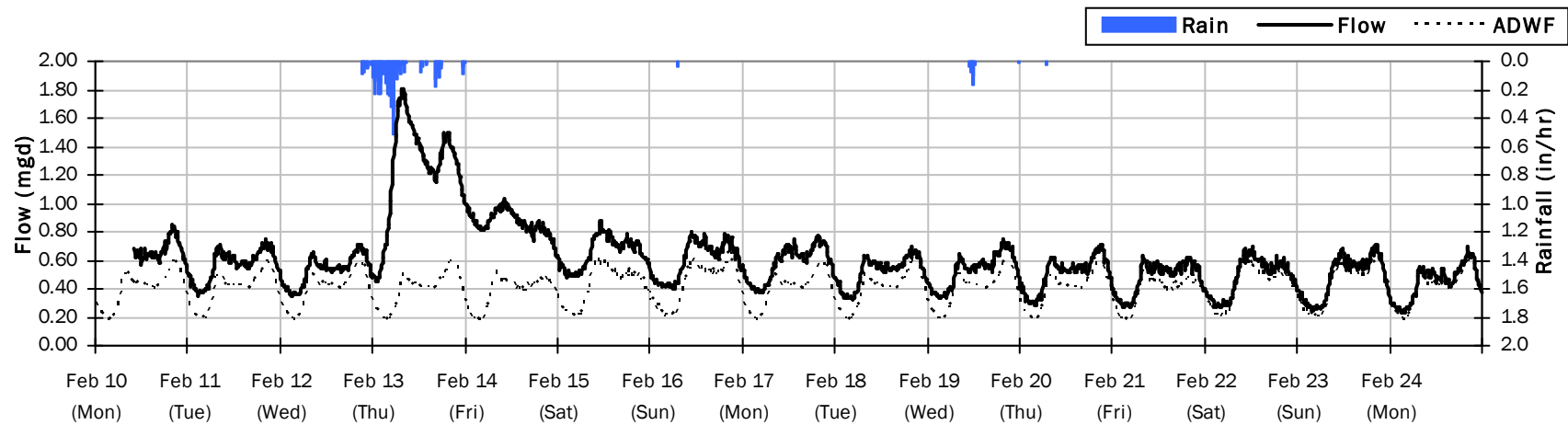
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.86 inches

Period Avg Flow: 0.499 mgd

Period Peak Flow: 1.806 mgd

Period Min Flow: 0.132 mgd



SITE 05

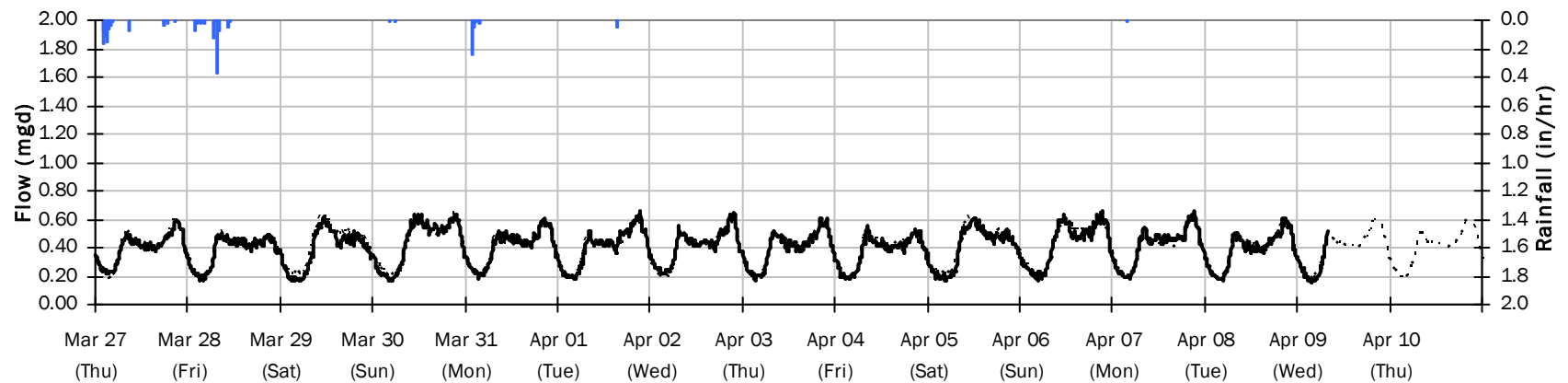
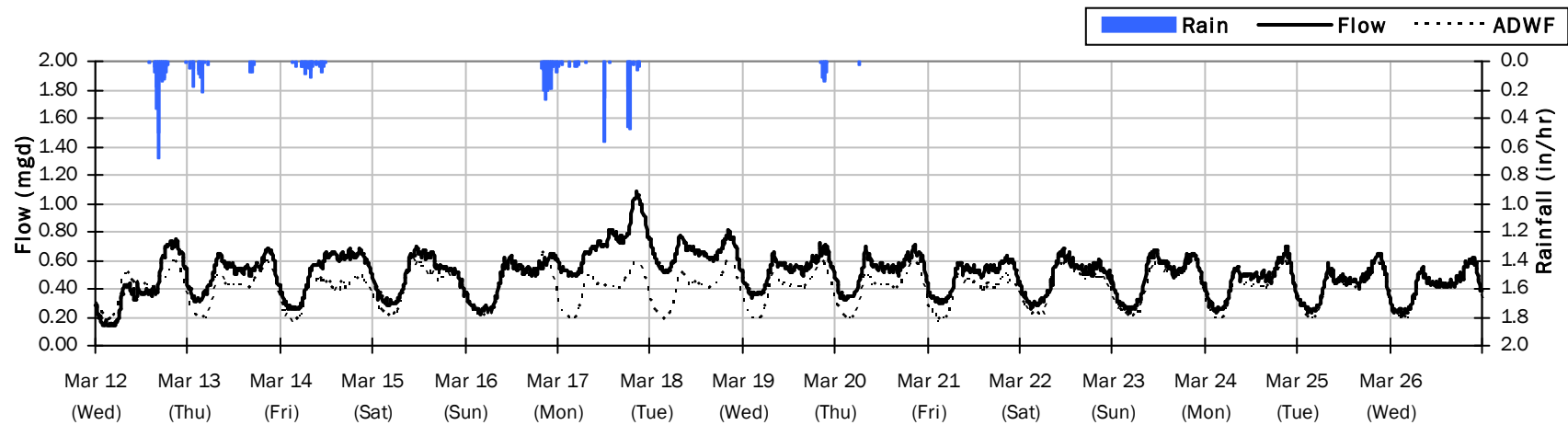
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 2.94 inches

Period Avg Flow: 0.456 mgd

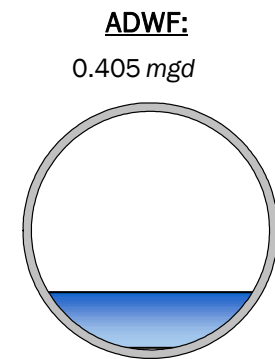
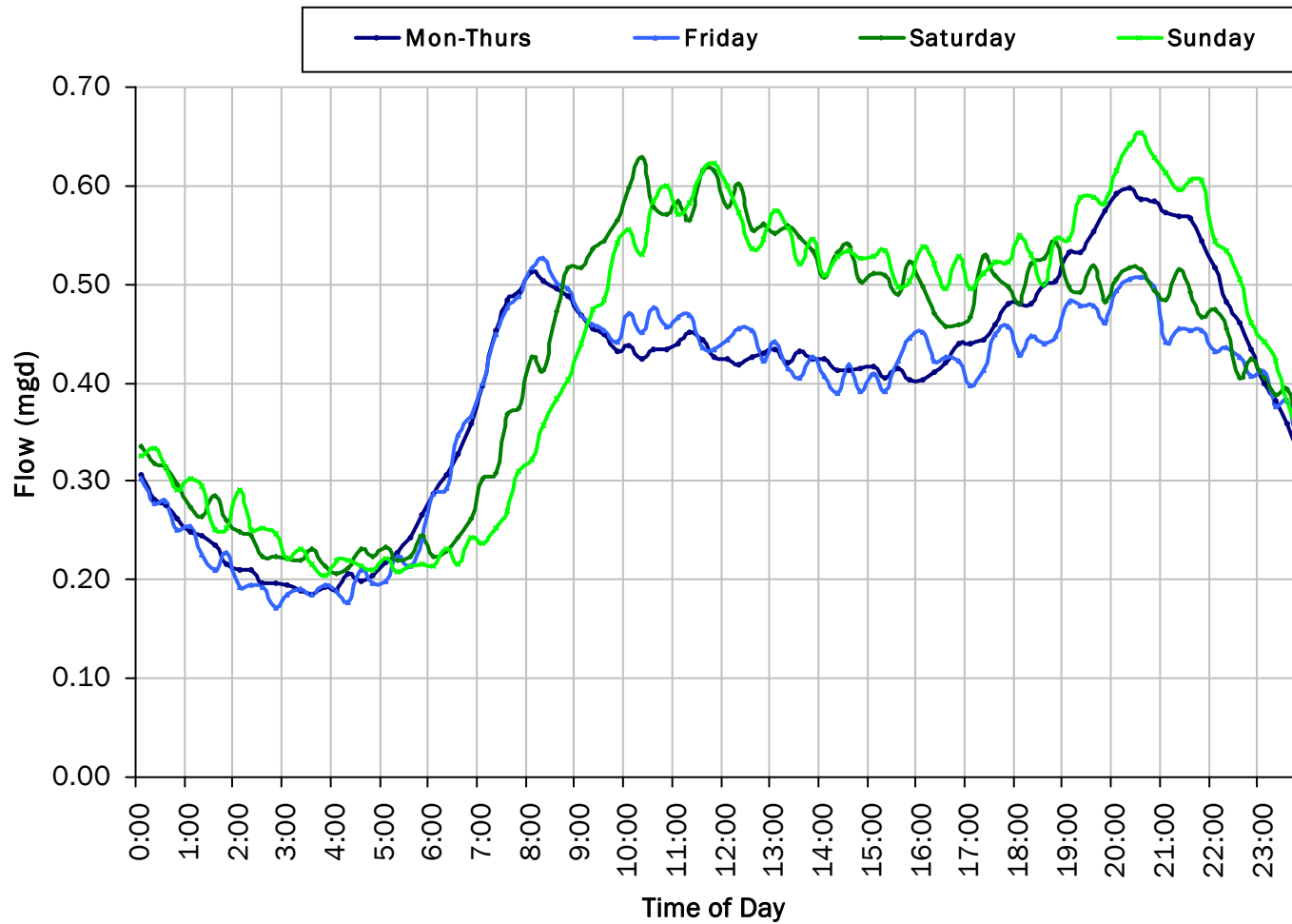
Period Peak Flow: 1.089 mgd

Period Min Flow: 0.138 mgd



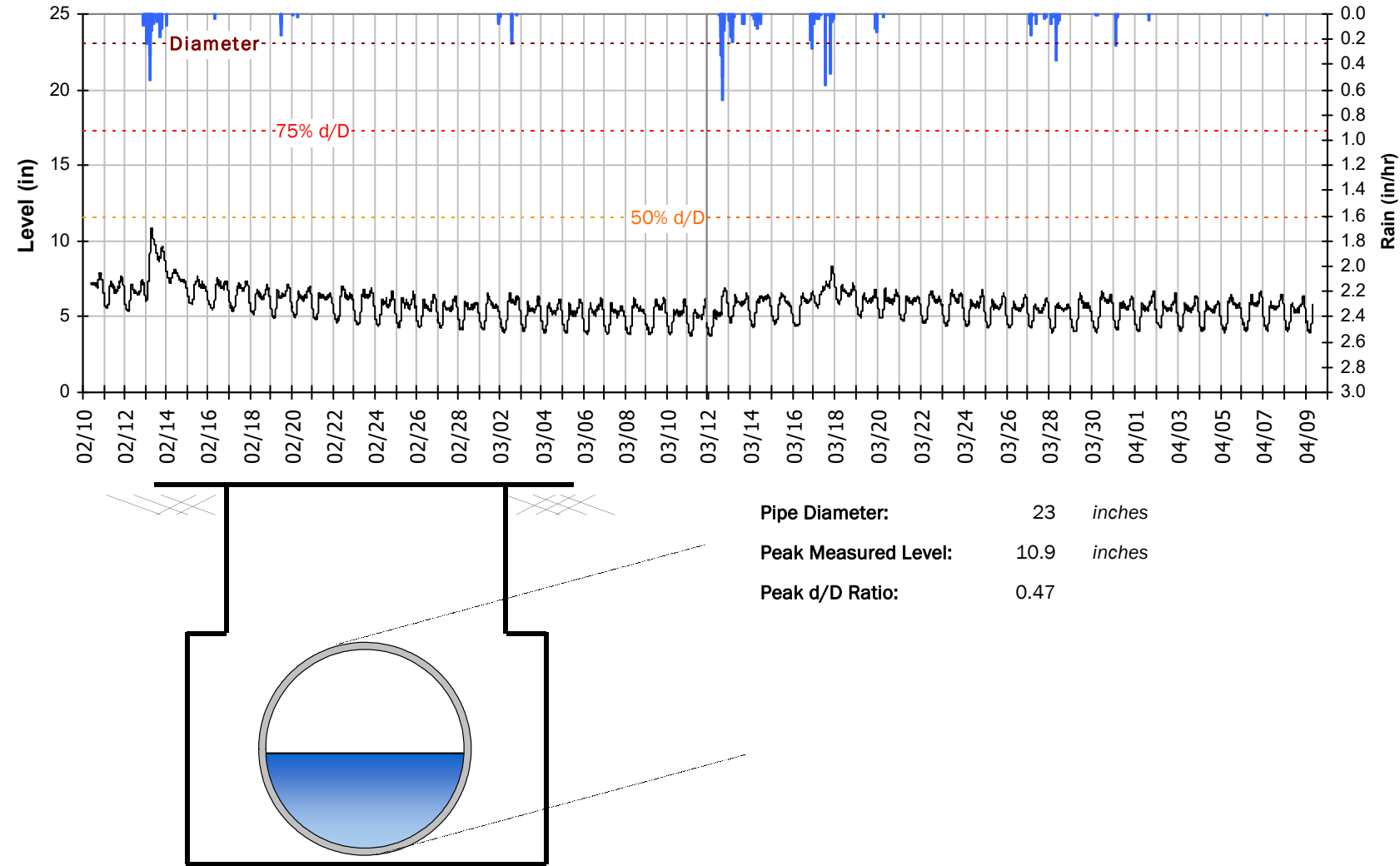
SITE 05

Average Dry Weather Flow Hydrographs



SITE 05
Site Capacity and Surge Summary

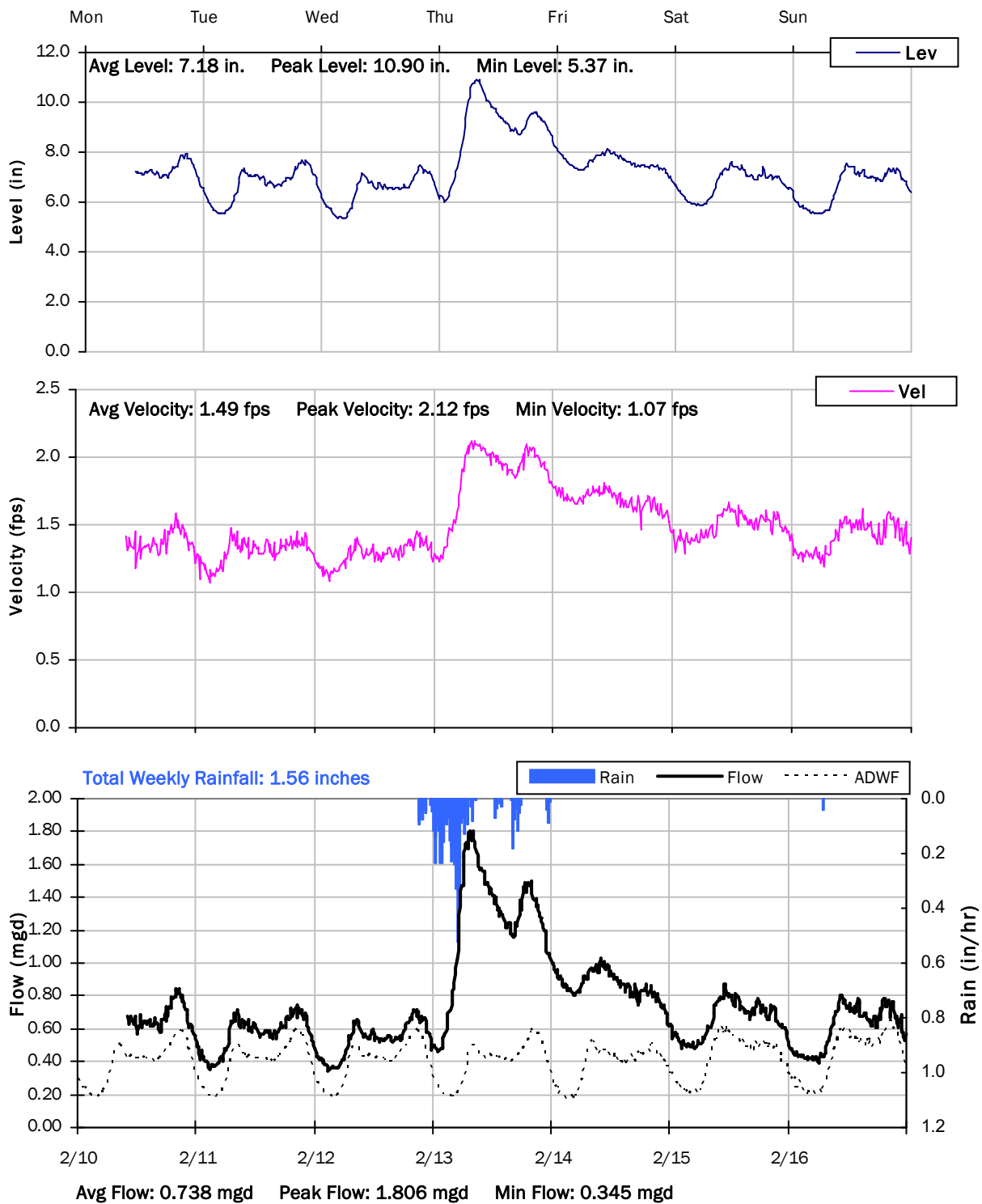
Realtime Flow Levels with Rainfall Data over Peak Level Period



SITE 05

Weekly Level, Velocity and Flow Hydrographs

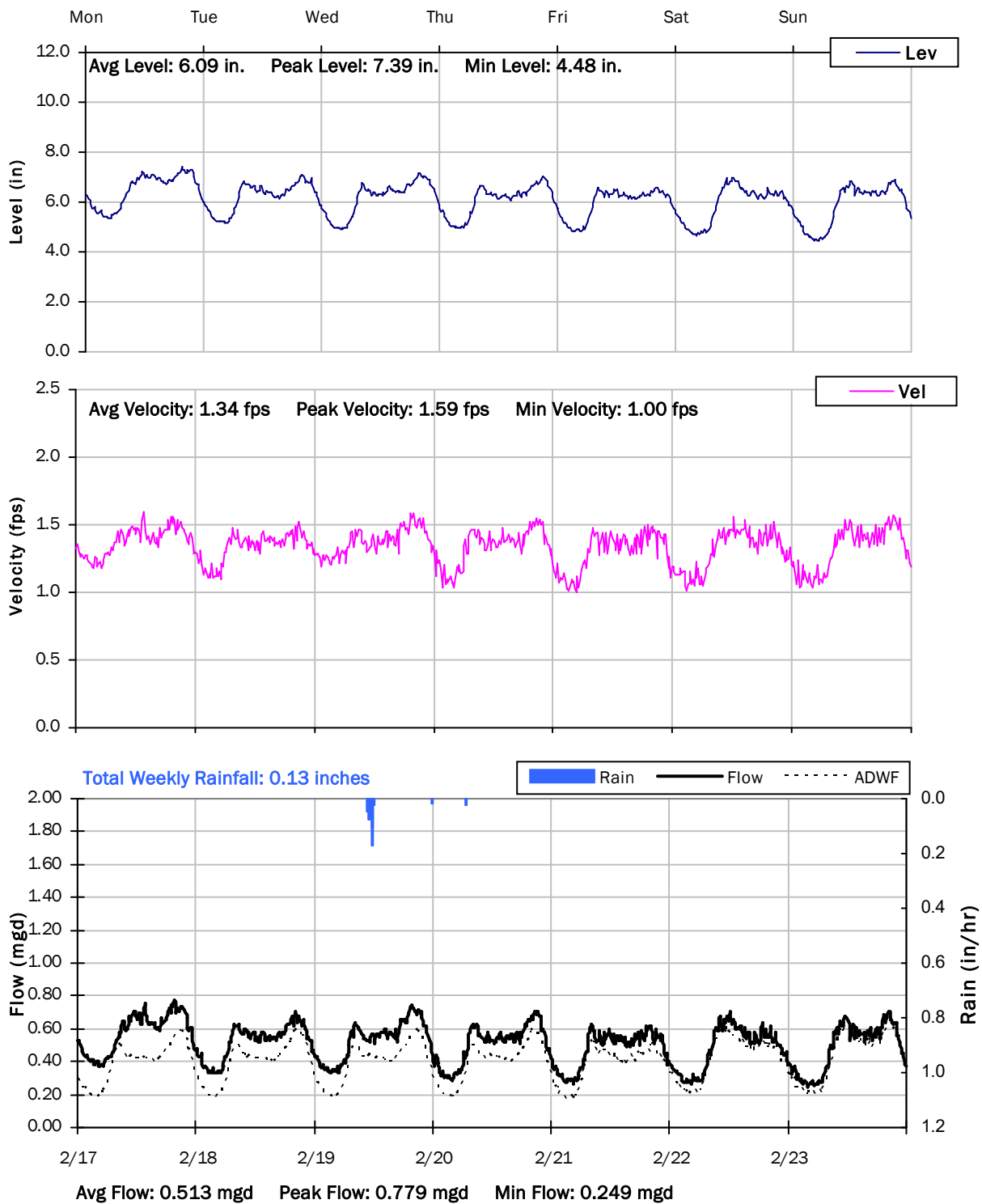
2/10/2025 to 2/17/2025



SITE 05

Weekly Level, Velocity and Flow Hydrographs

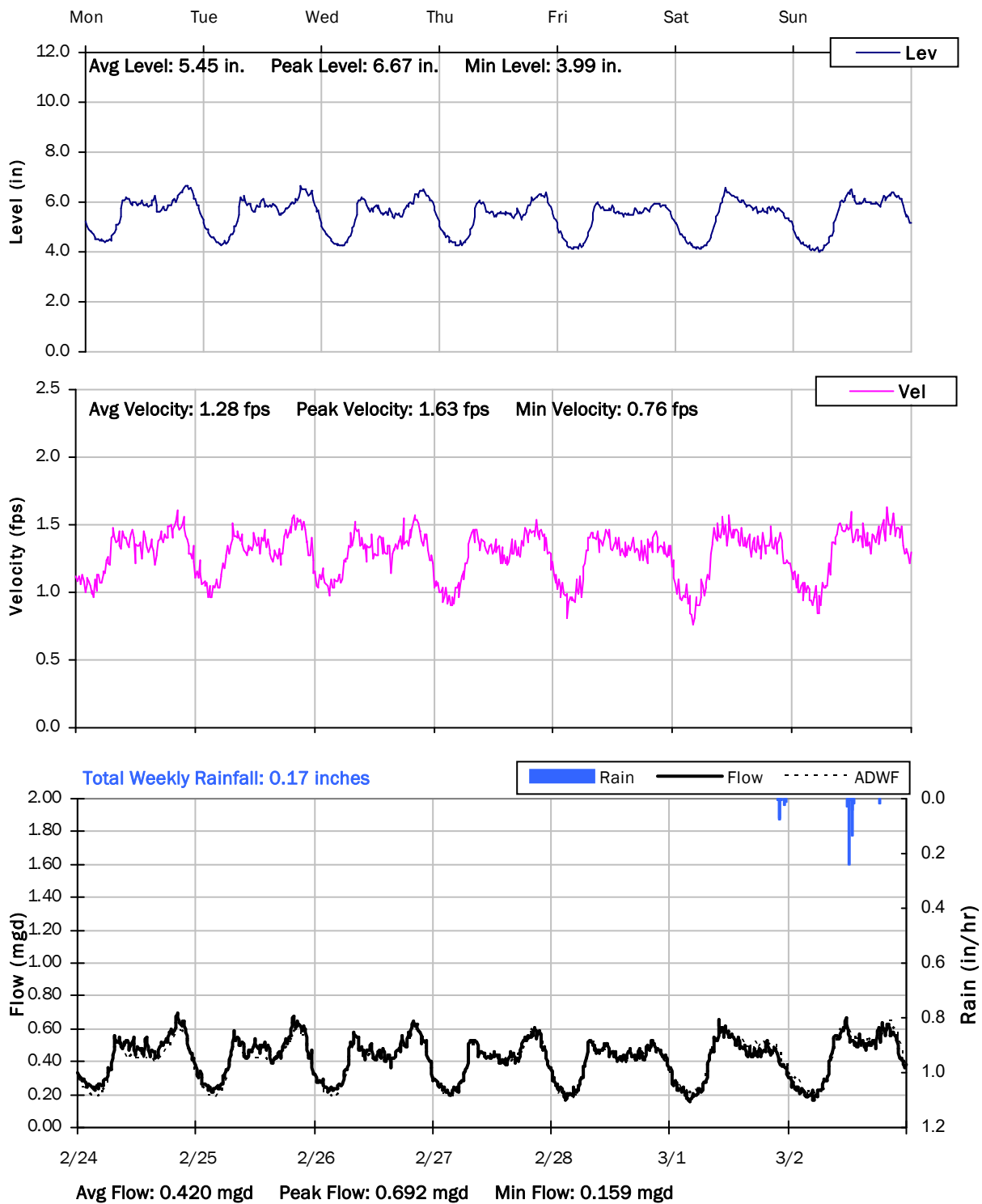
2/17/2025 to 2/24/2025



SITE 05

Weekly Level, Velocity and Flow Hydrographs

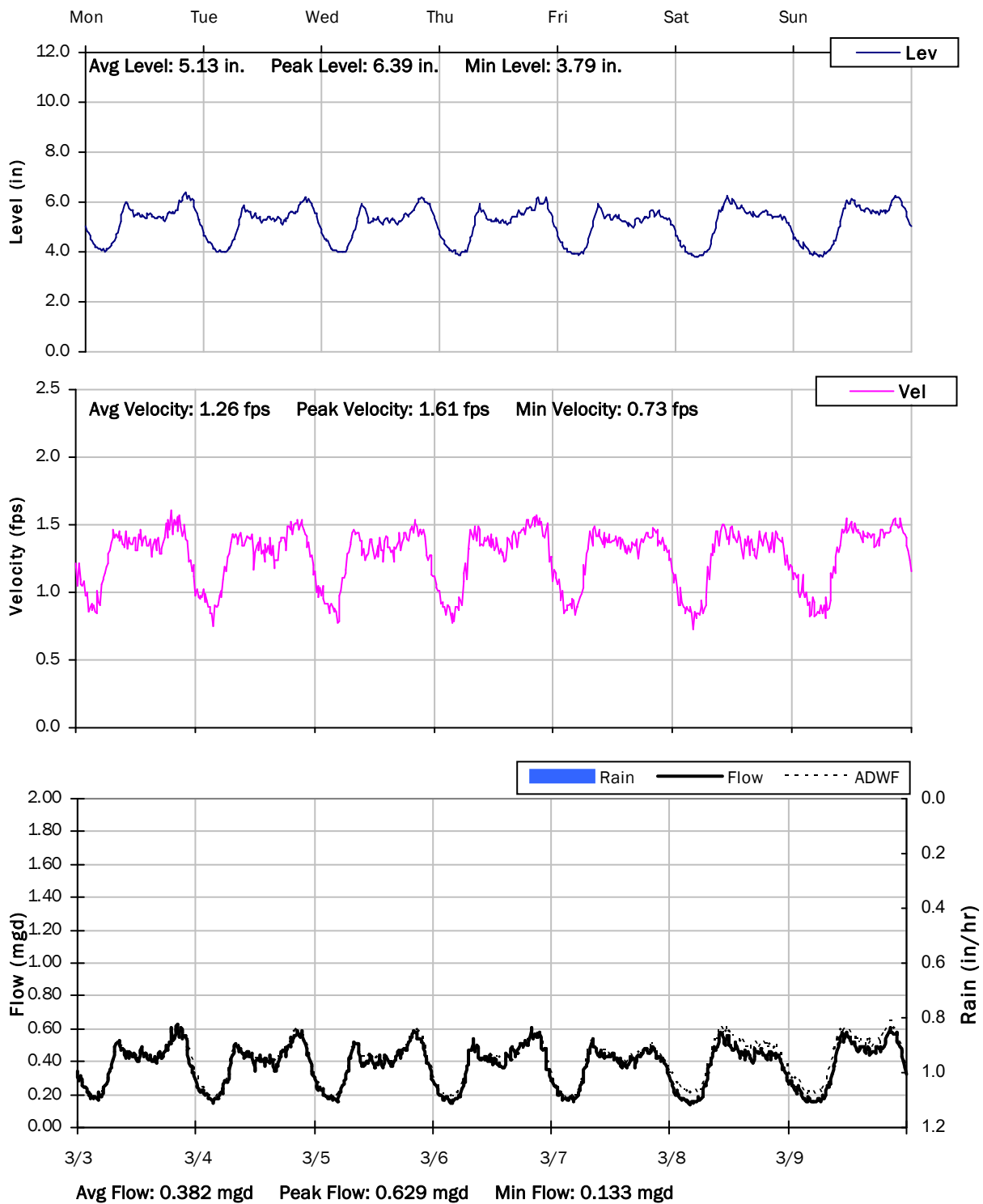
2/24/2025 to 3/3/2025



SITE 05

Weekly Level, Velocity and Flow Hydrographs

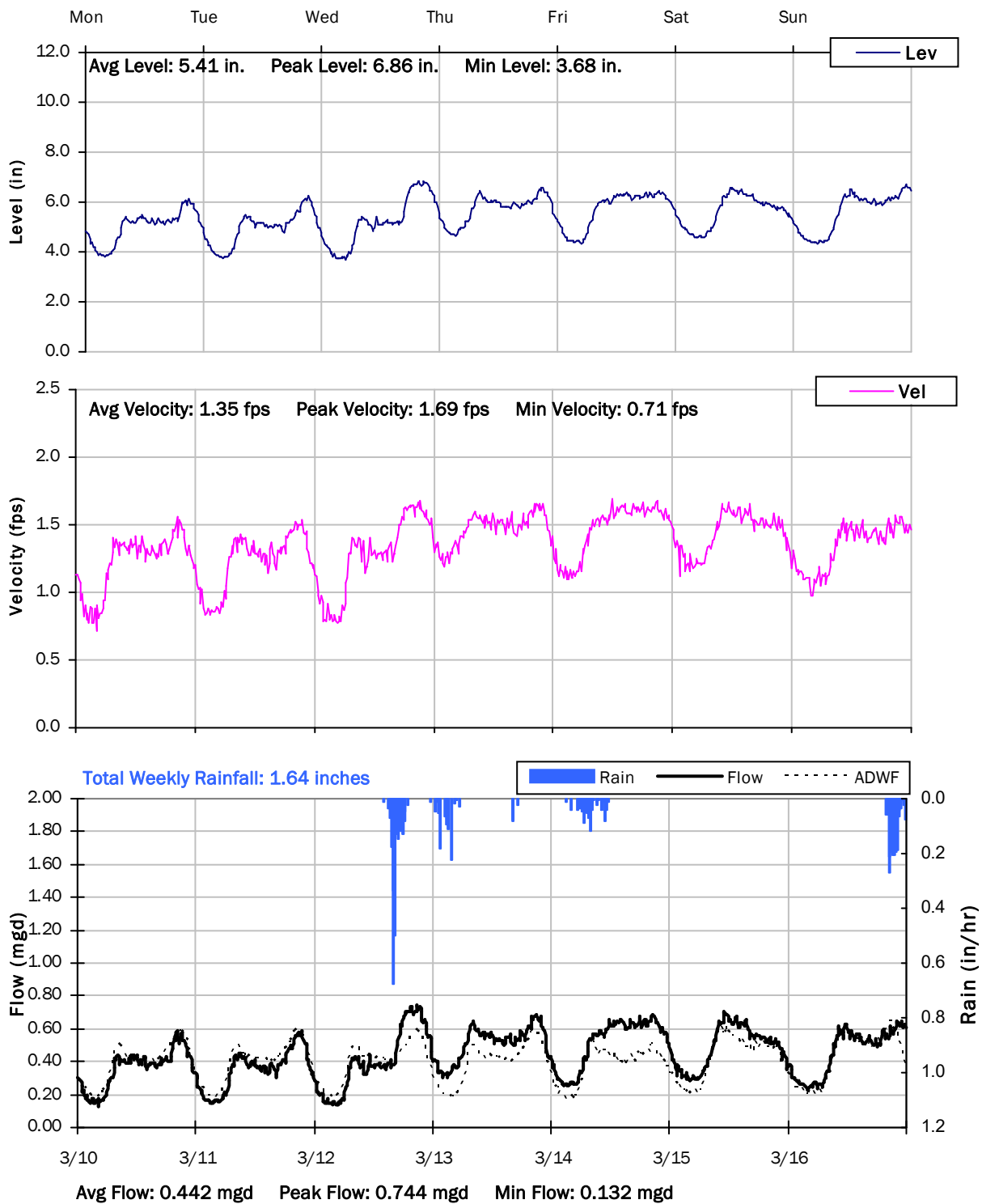
3/3/2025 to 3/10/2025



SITE 05

Weekly Level, Velocity and Flow Hydrographs

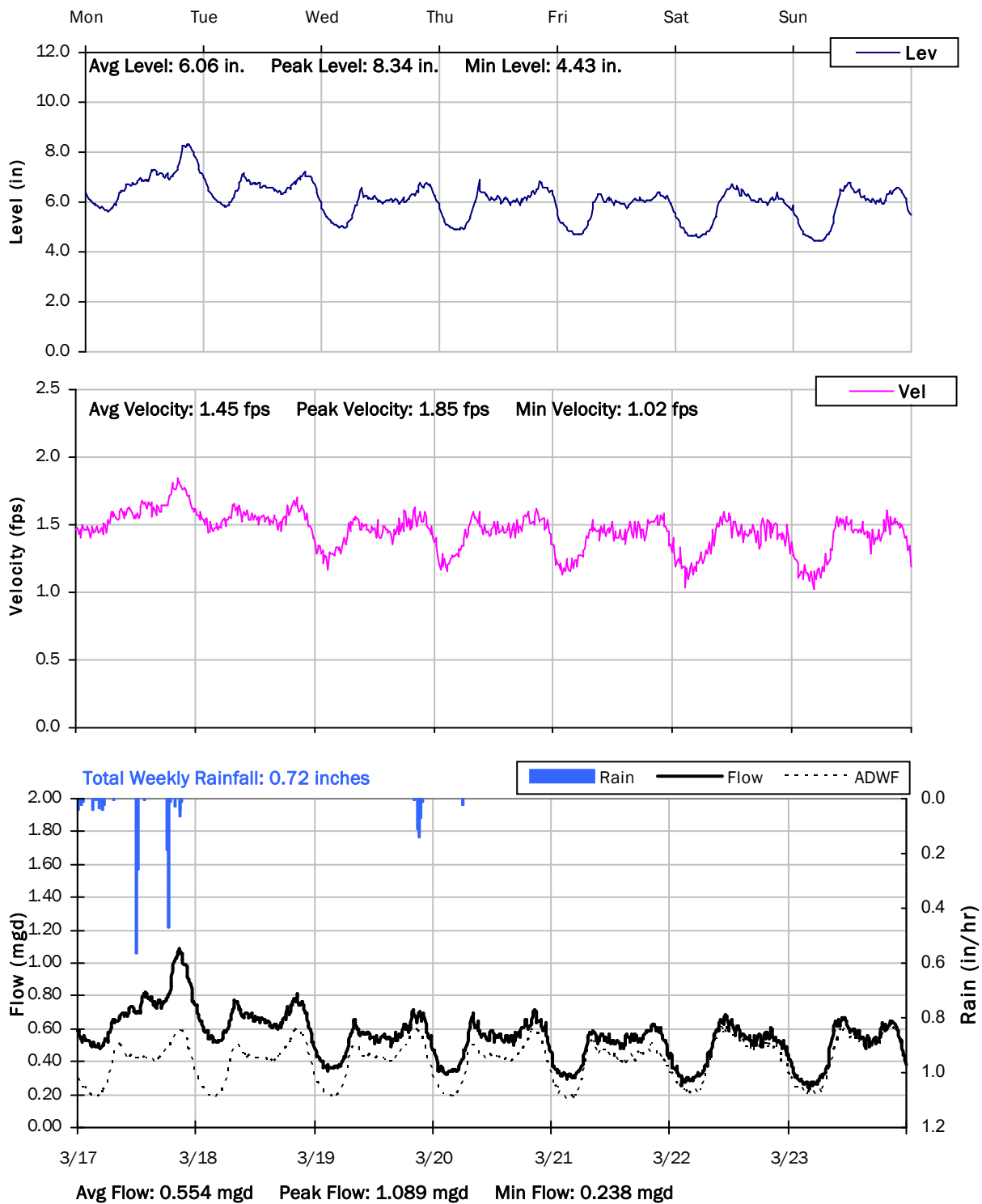
3/10/2025 to 3/17/2025



SITE 05

Weekly Level, Velocity and Flow Hydrographs

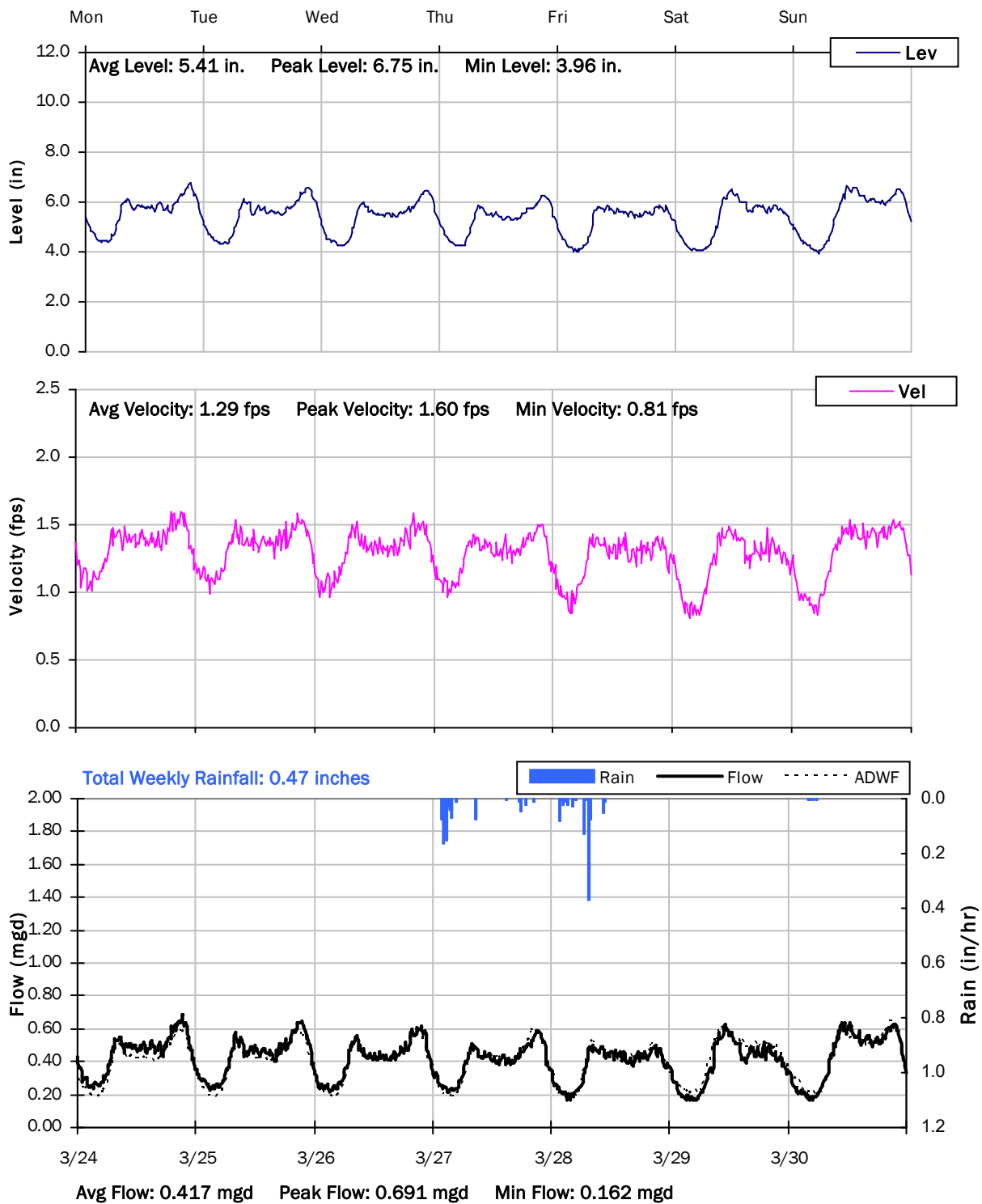
3/17/2025 to 3/24/2025



SITE 05

Weekly Level, Velocity and Flow Hydrographs

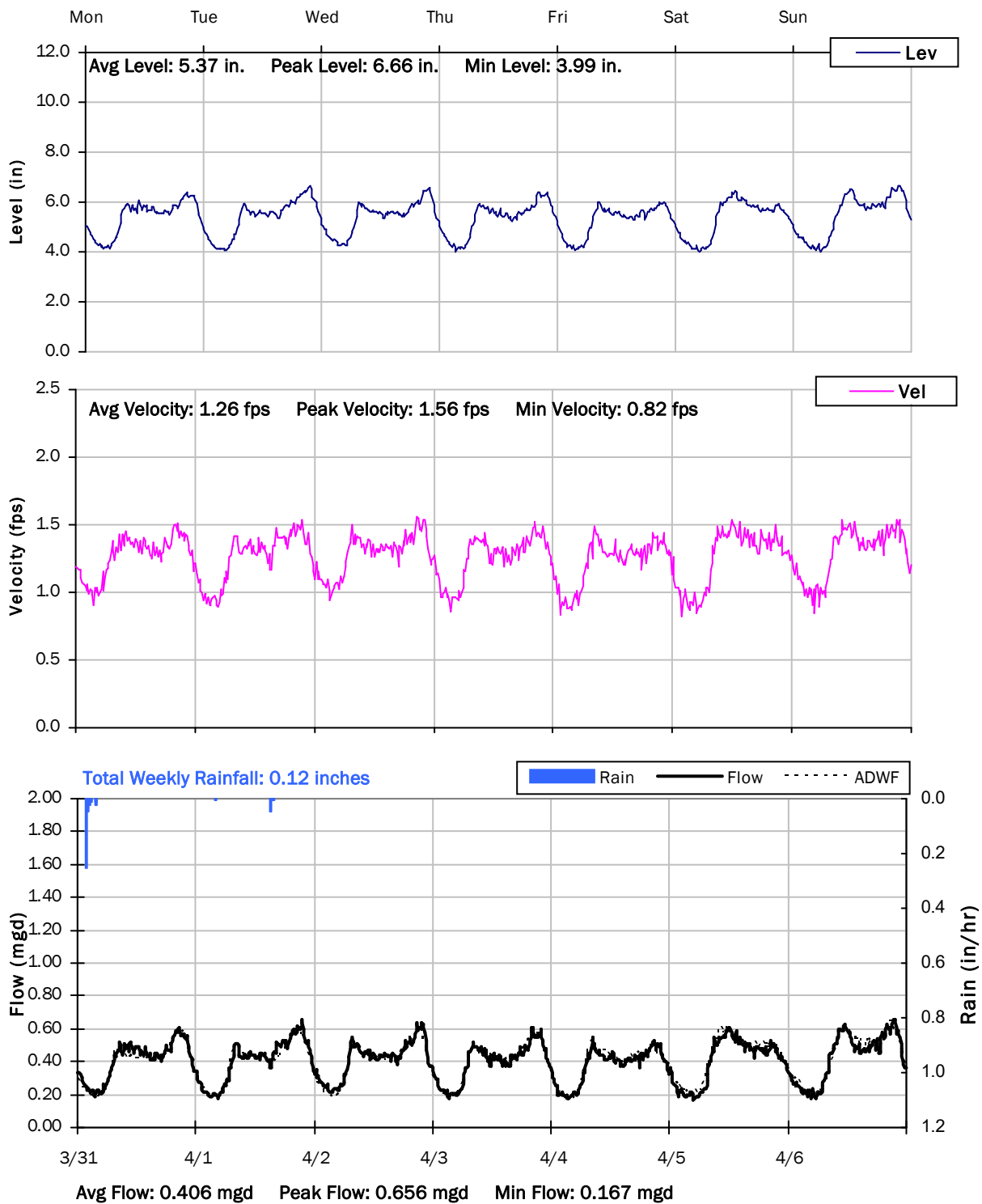
3/24/2025 to 3/31/2025



SITE 05

Weekly Level, Velocity and Flow Hydrographs

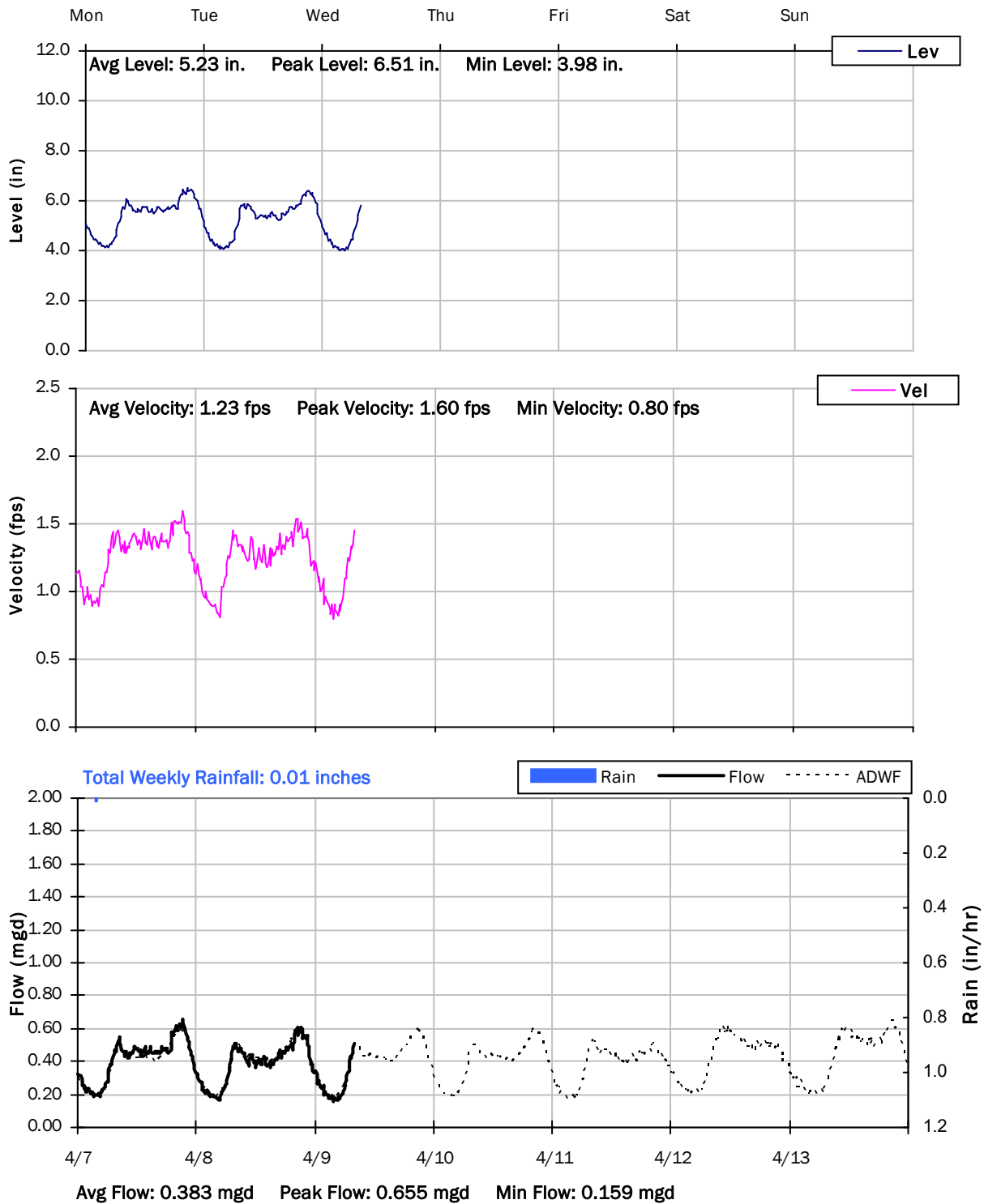
3/31/2025 to 4/7/2025



SITE 05

Weekly Level, Velocity and Flow Hydrographs

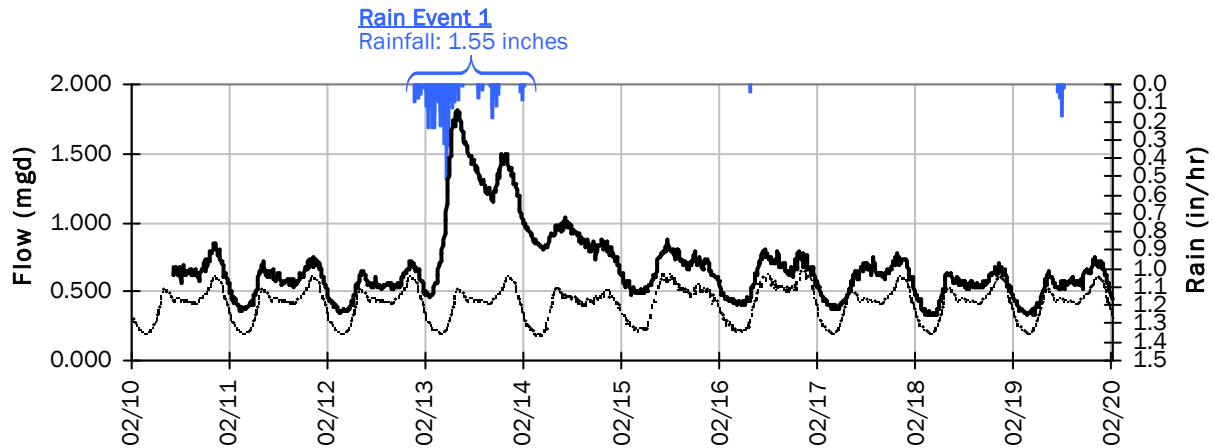
4/7/2025 to 4/14/2025



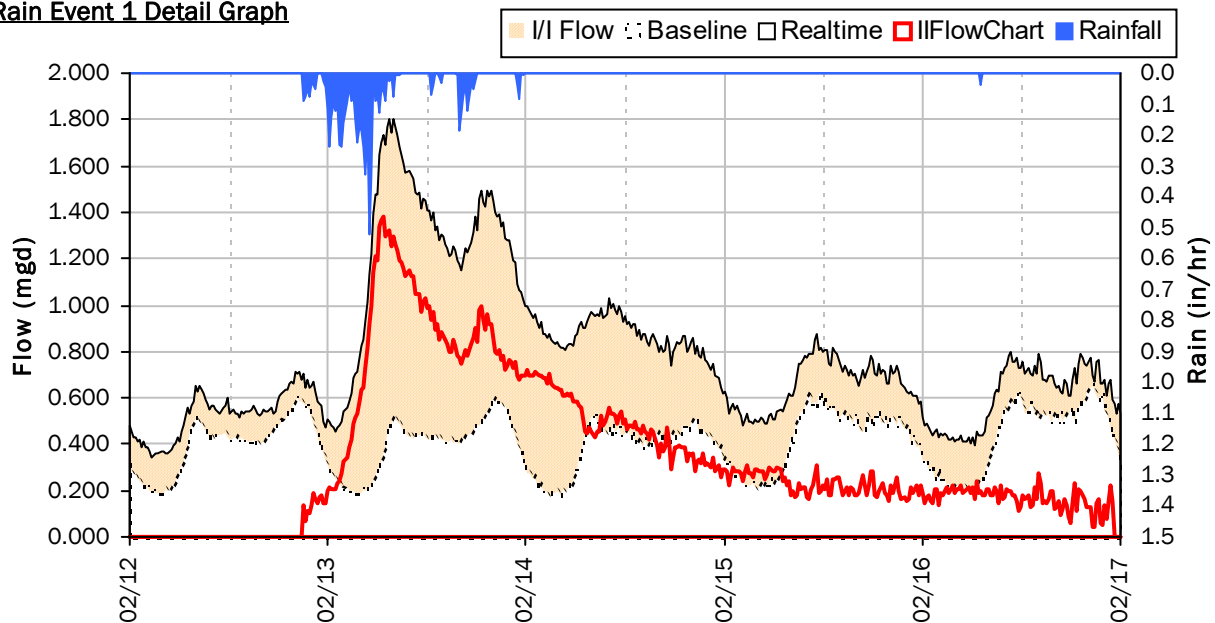
SITE 05

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



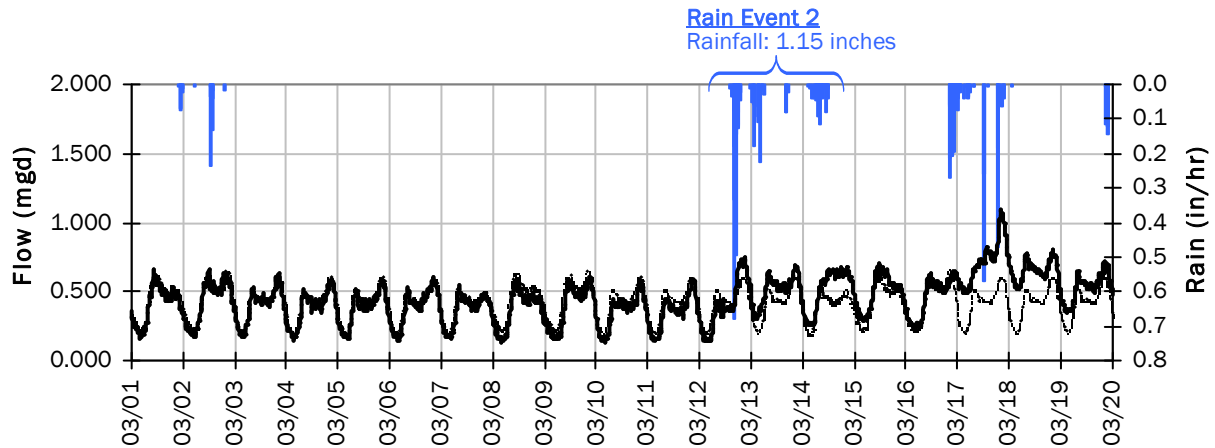
Storm Event I/I Analysis (Rain = 1.55 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	1.806 mgd	Peak I/I Rate:	1.379 mgd
PF:	4.46	Total I/I:	1,739,000 gallons
Peak Level:	10.90 in		
d/D Ratio:	0.47		

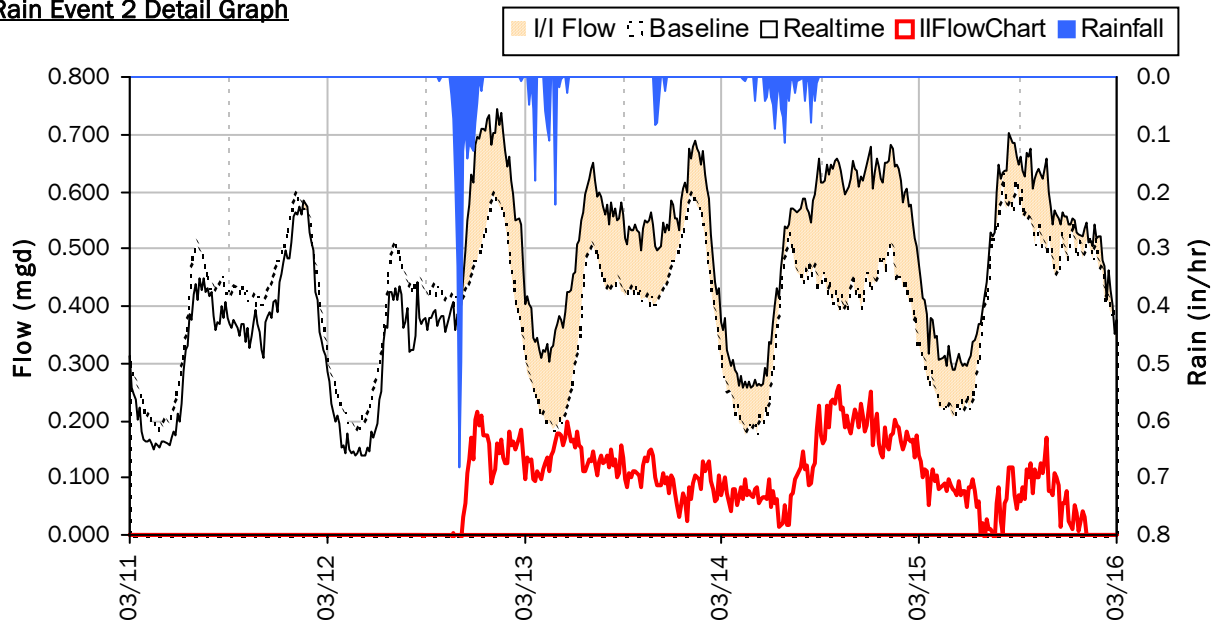
SITE 05

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.15 inches)

Capacity

Peak Flow: 0.744 mgd
PF: 1.84

Peak Level: 6.86 in
d/D Ratio: 0.30

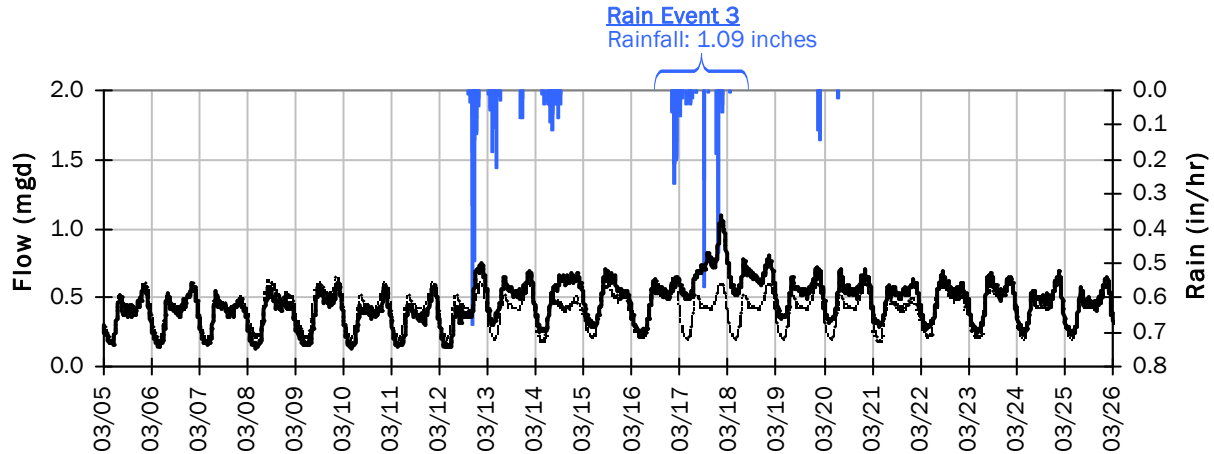
Inflow / Infiltration

Peak I/I Rate: 0.261 mgd
Total I/I: 350,000 gallons

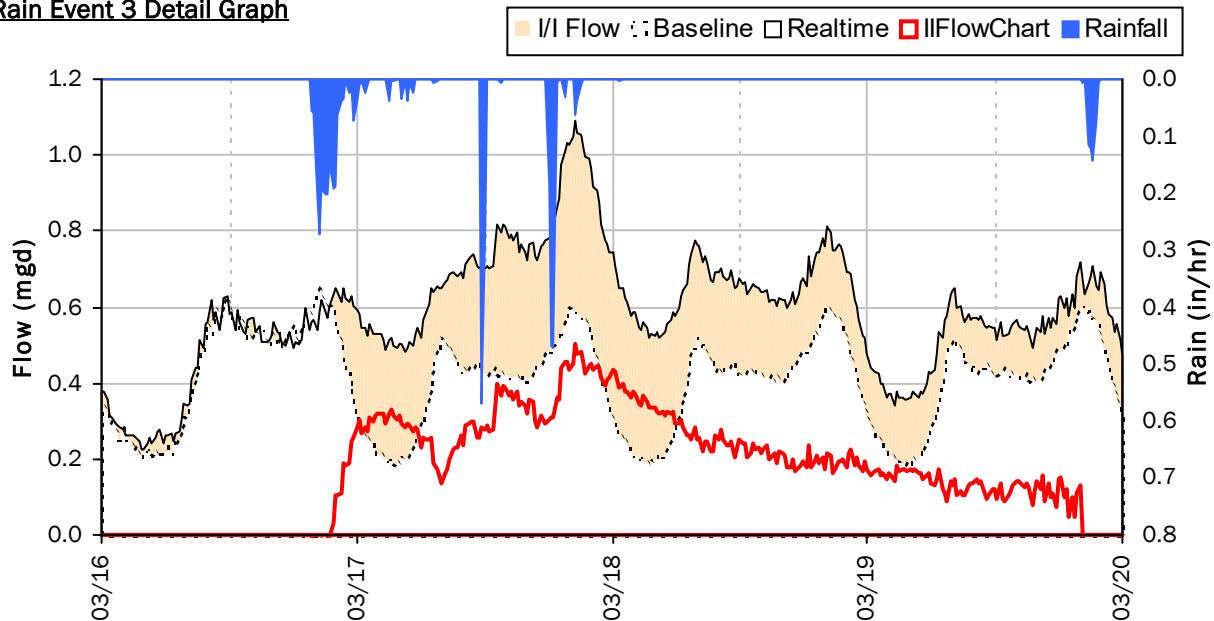
SITE 05

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.09 inches)

Capacity

Peak Flow: 1.09 mgd
PF: 2.69
Peak Level: 8.34 in
d/D Ratio: 0.36

Inflow / Infiltration

Peak I/I Rate: 0.50 mgd
Total I/I: 699,000 gallons

Monitoring Site: Site 06

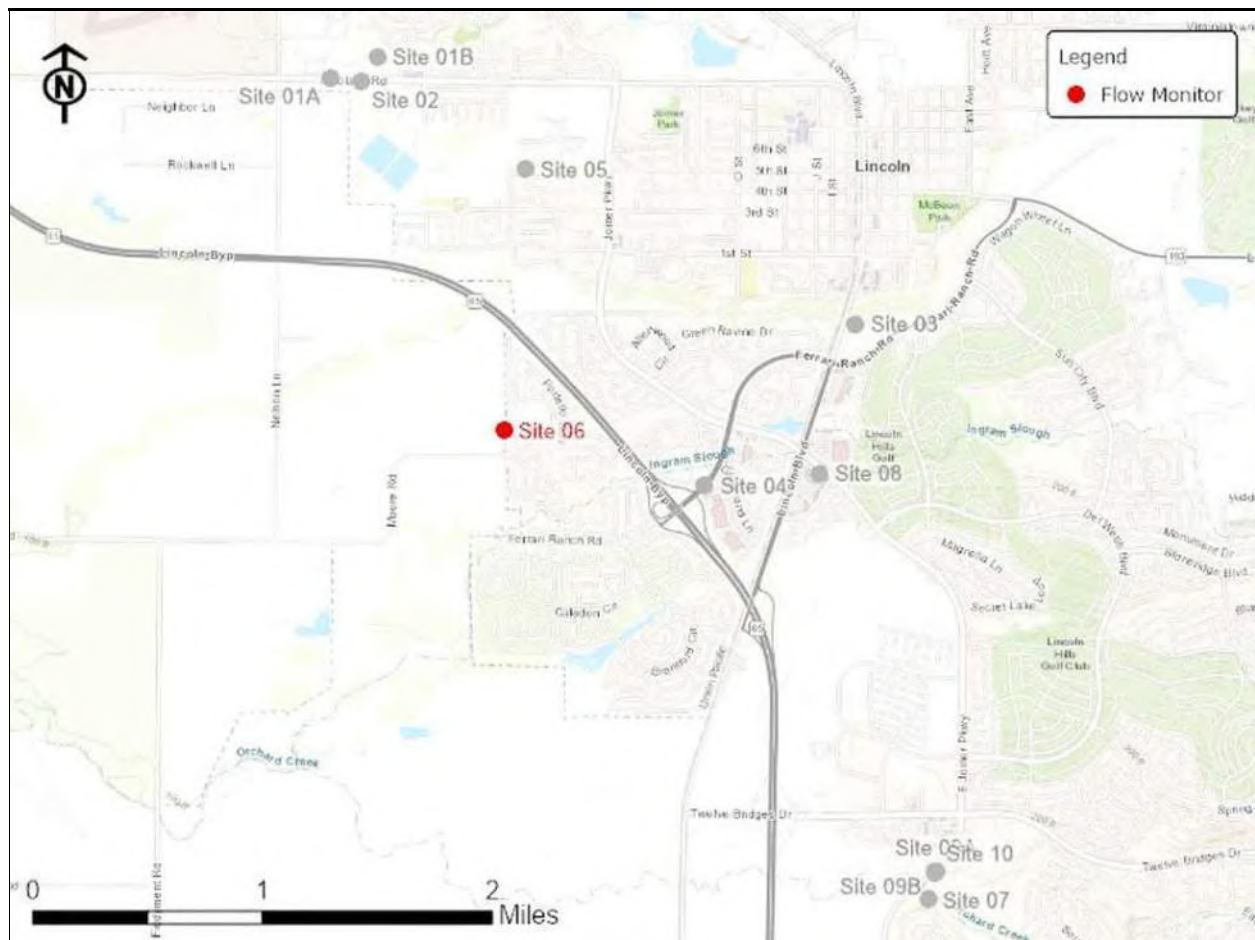
Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: 2009 Moore Rd, Lincoln, CA

Data Summary Report



Vicinity Map: Site 06

SITE 06

Site Information

MH ID: SW359SS001

Location: 2009 Moore Rd, Lincoln, CA

Coordinates: 121.3215° W, 38.8753° N

Rim Elevation: 139 feet

Expected Pipe Diameter: 36 inches

Measured Pipe Diameter: 36 inches

ADWF: 1.208 mgd

Peak Measured Flow: 5.795 mgd

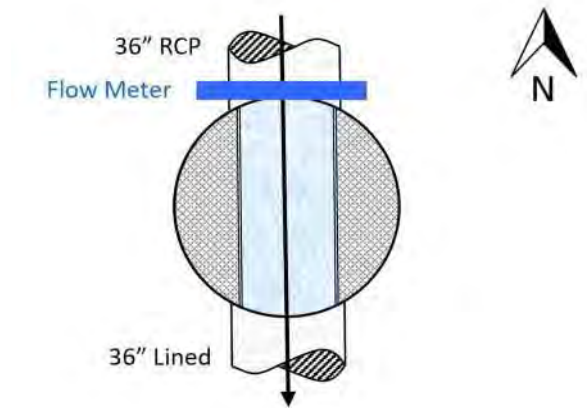
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 06

Additional Site Photos

South Effluent Pipe



Monitored North Influent Pipe

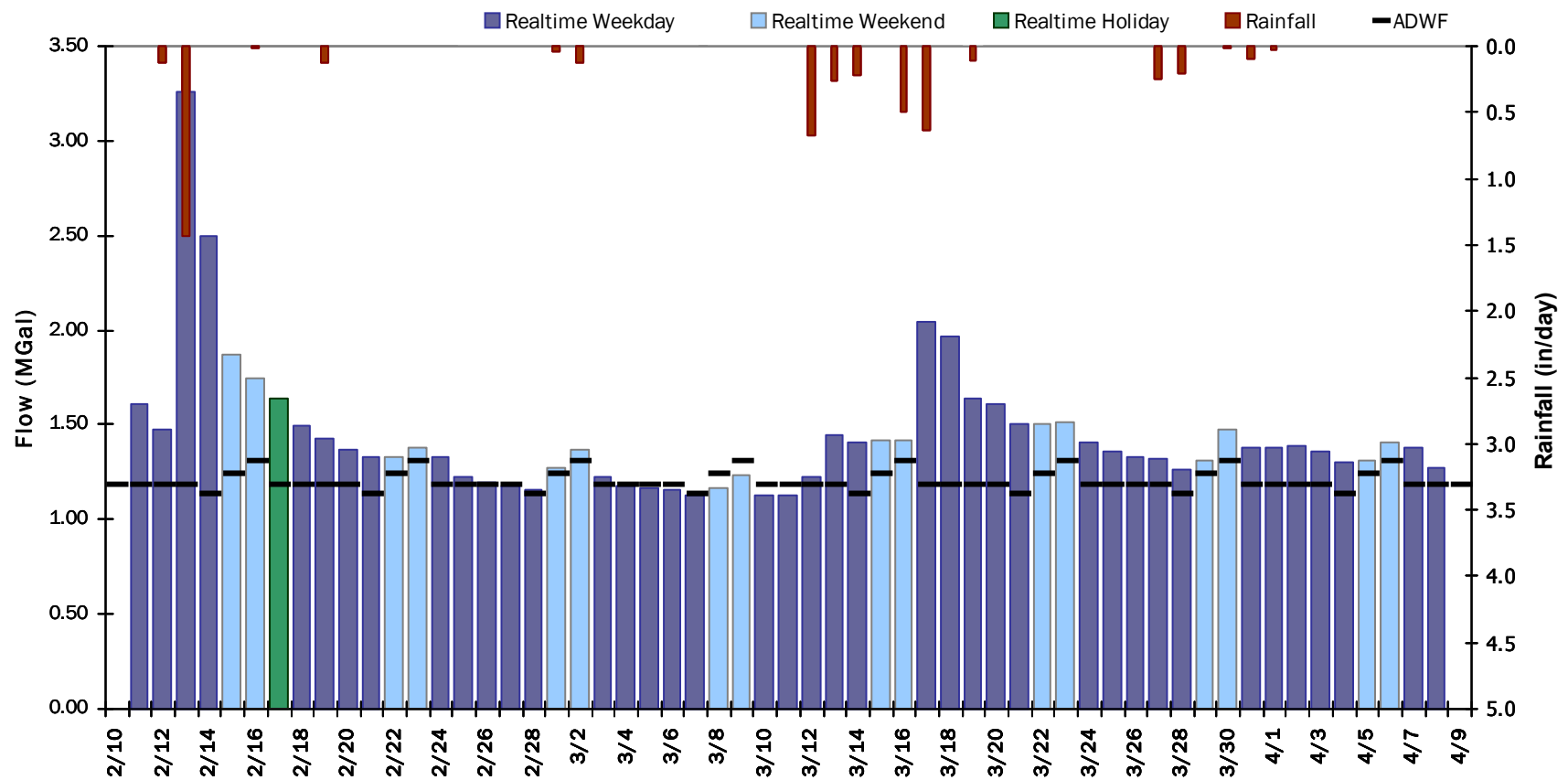


SITE 06

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 1.438 MGal Peak Daily Flow: 3.255 MGal Min Daily Flow: 0.843 MGal

Total Rainfall: 4.88 inches



SITE 06

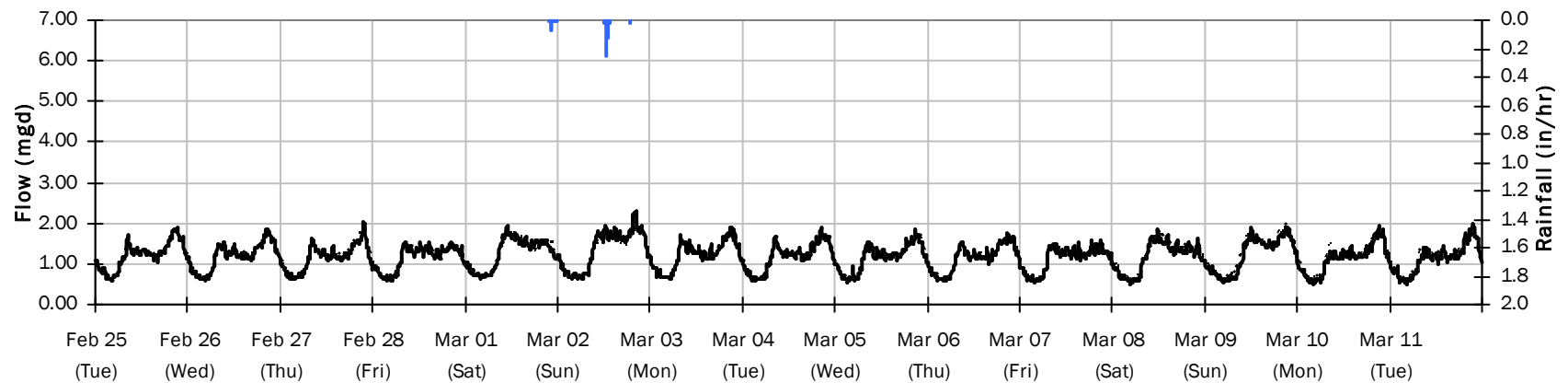
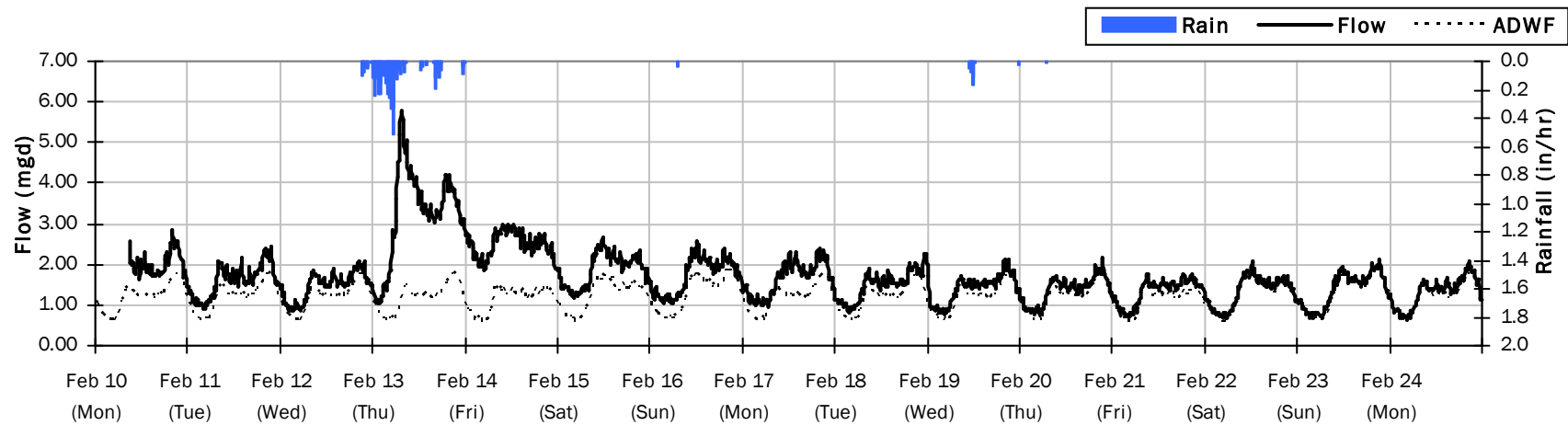
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.87 inches

Period Avg Flow: 1.449 mgd

Period Peak Flow: 5.795 mgd

Period Min Flow: 0.509 mgd



SITE 06

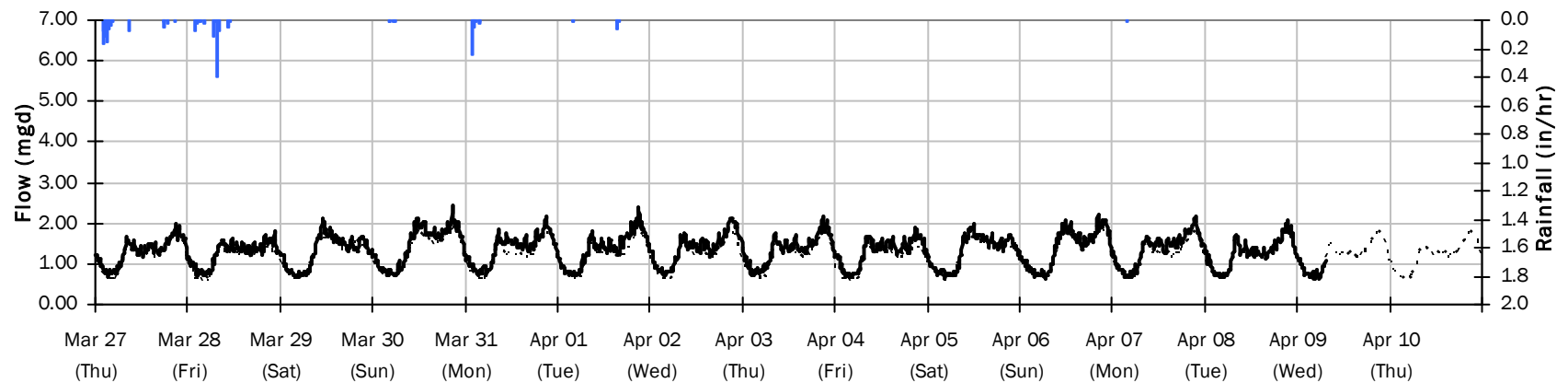
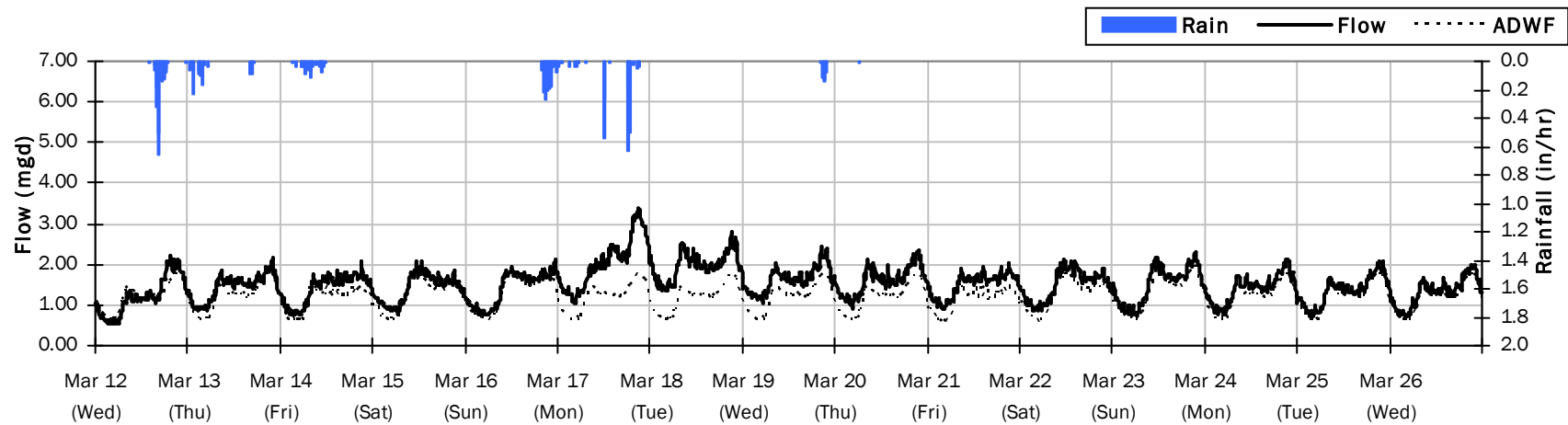
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.01 inches

Period Avg Flow: 1.433 mgd

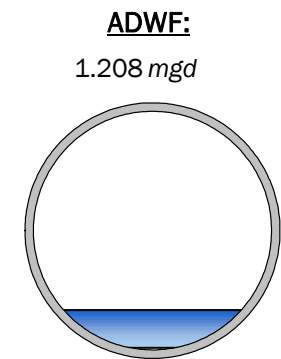
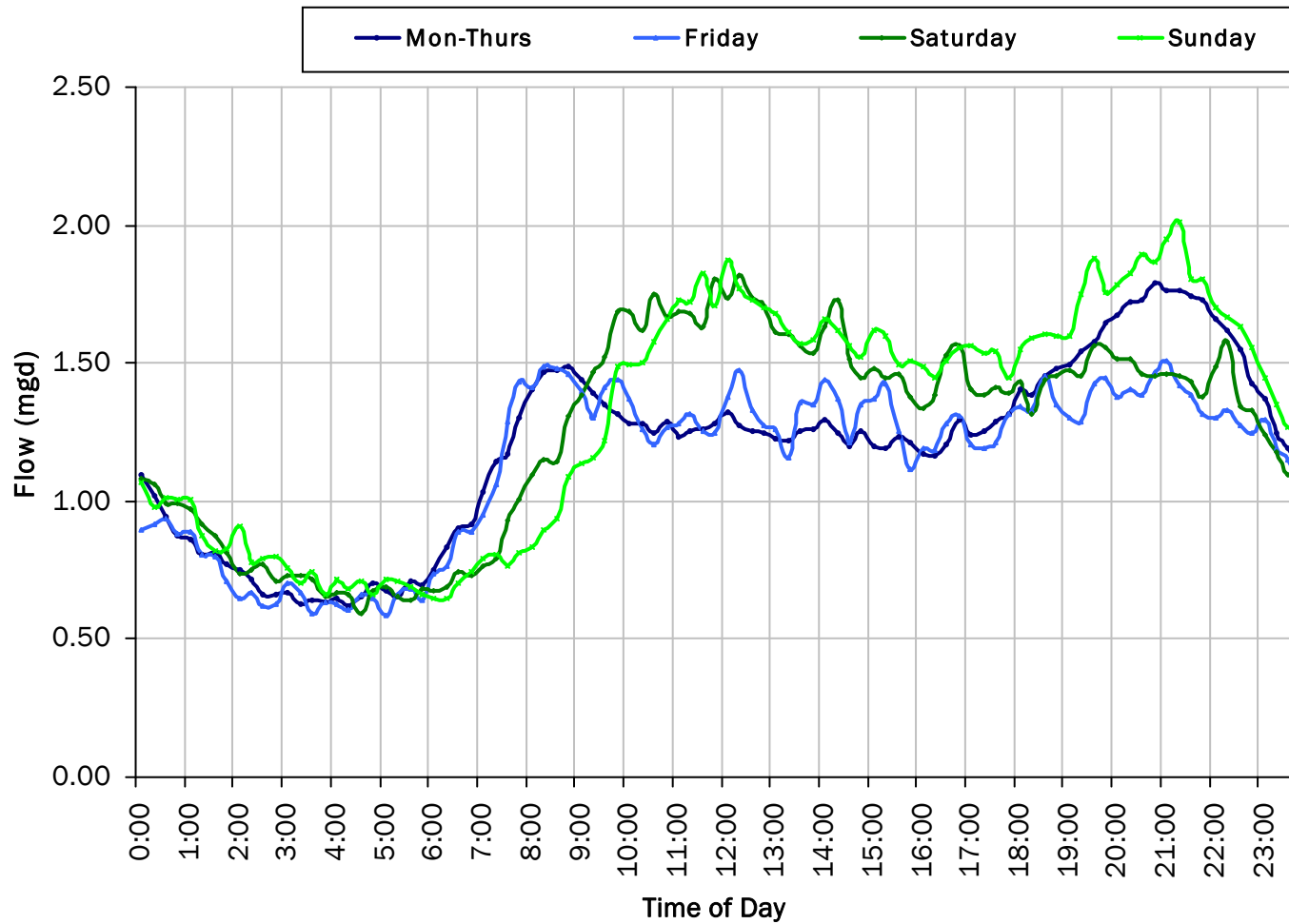
Period Peak Flow: 3.391 mgd

Period Min Flow: 0.525 mgd



SITE 06

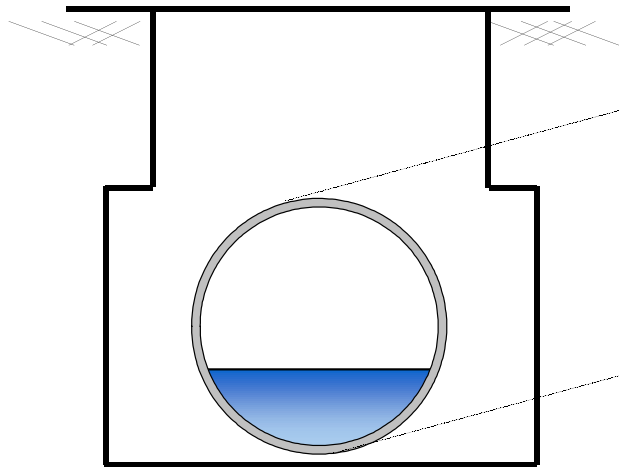
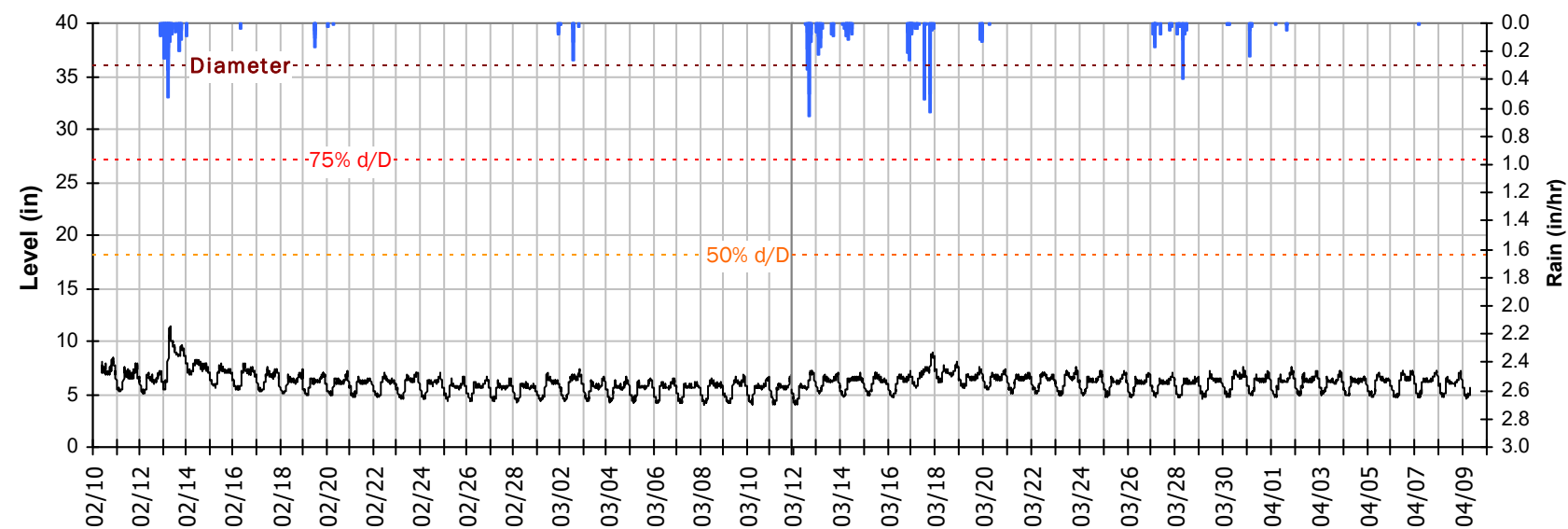
Average Dry Weather Flow Hydrographs



SITE 06

Site Capacity and Surge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period

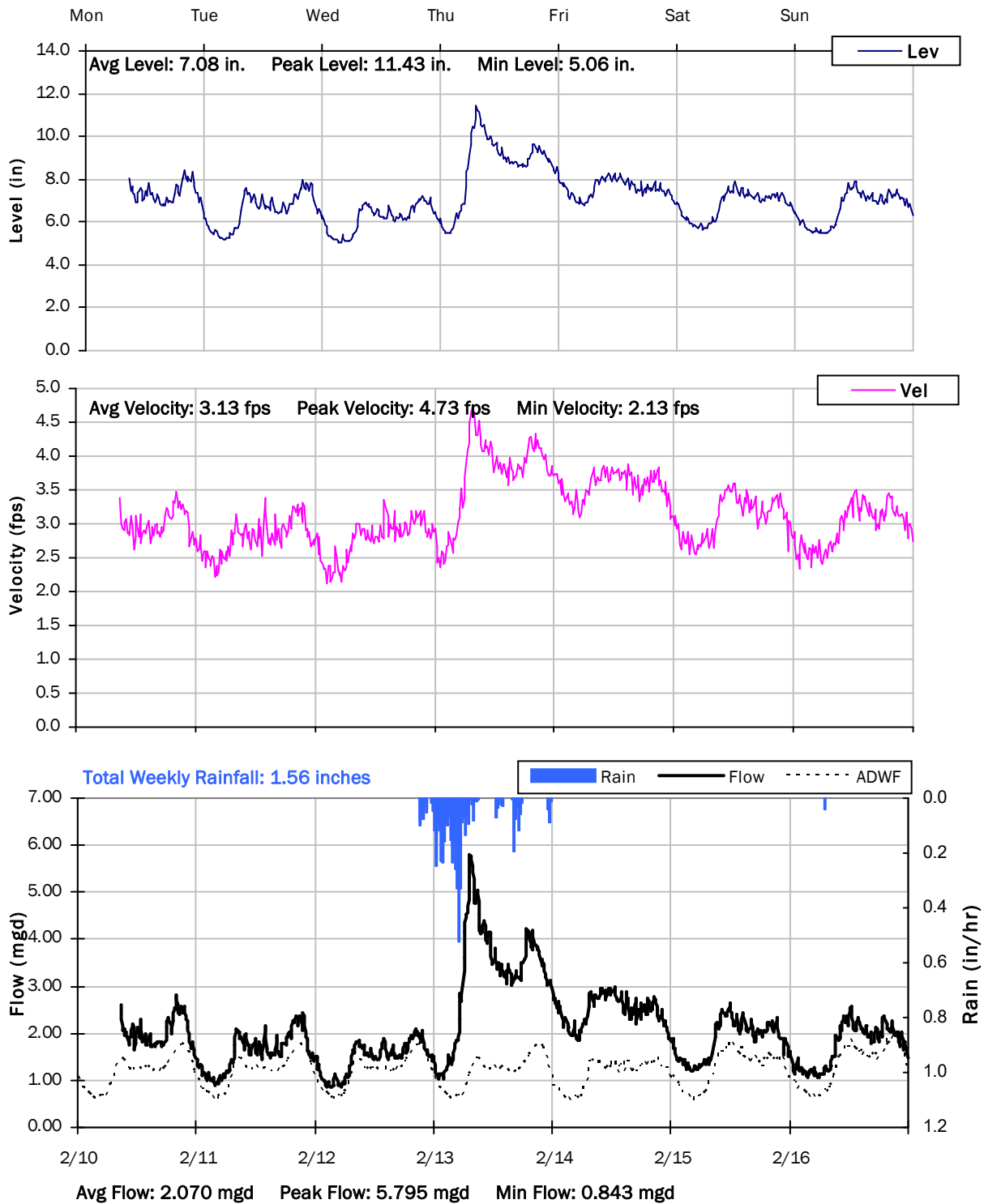


Pipe Diameter: 36 inches
Peak Measured Level: 11.4 inches
Peak d/D Ratio: 0.32

SITE 06

Weekly Level, Velocity and Flow Hydrographs

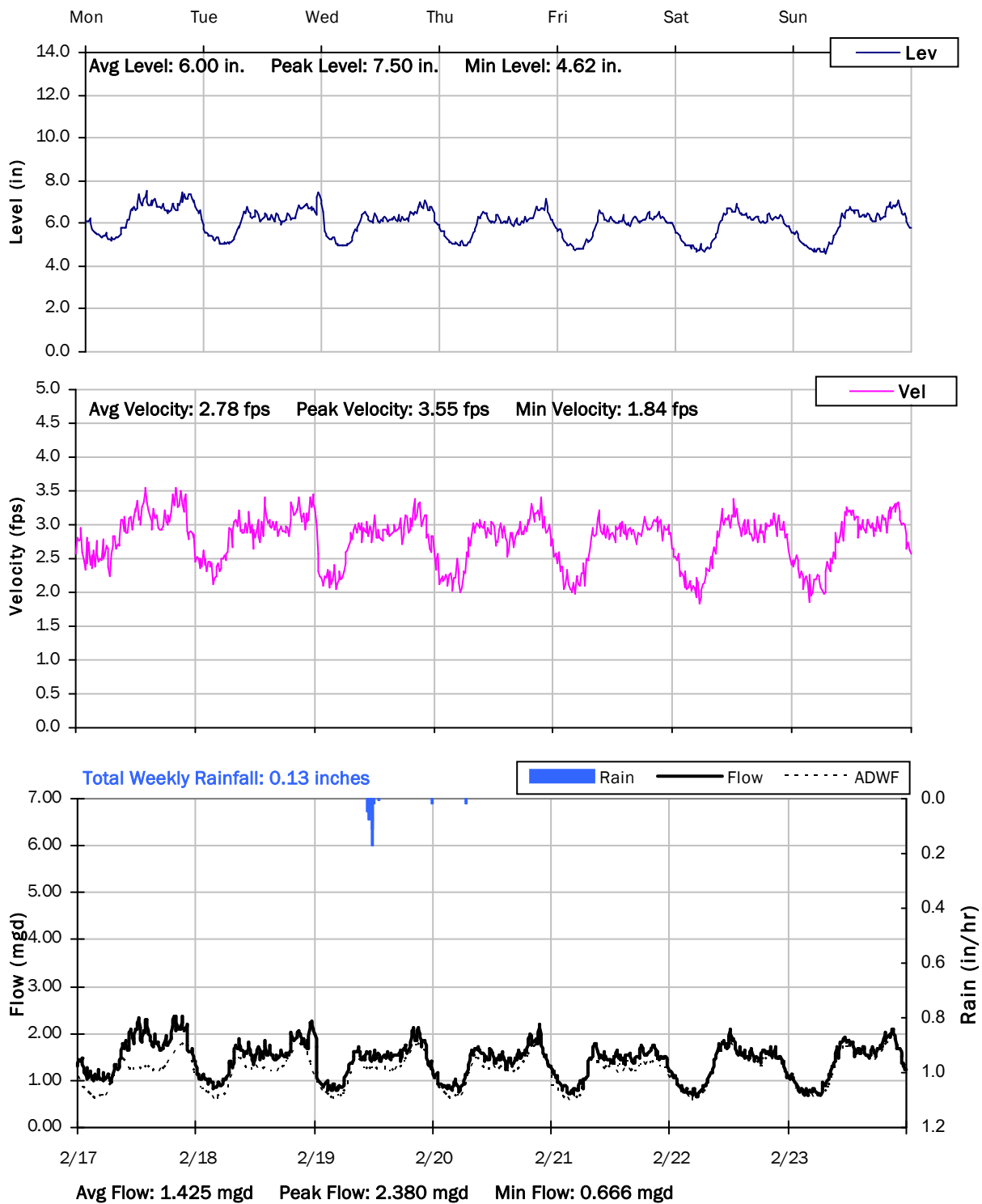
2/10/2025 to 2/17/2025



SITE 06

Weekly Level, Velocity and Flow Hydrographs

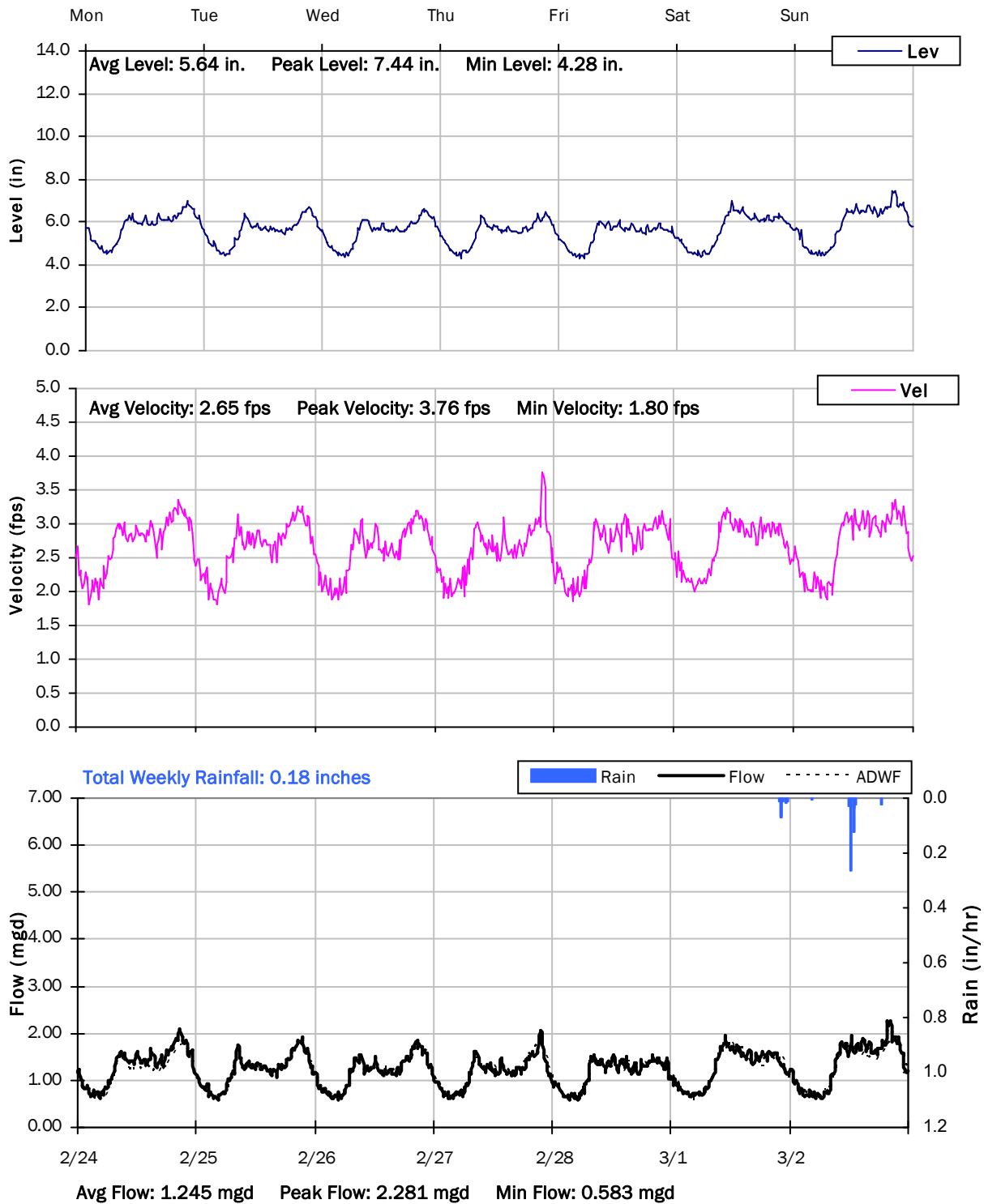
2/17/2025 to 2/24/2025



SITE 06

Weekly Level, Velocity and Flow Hydrographs

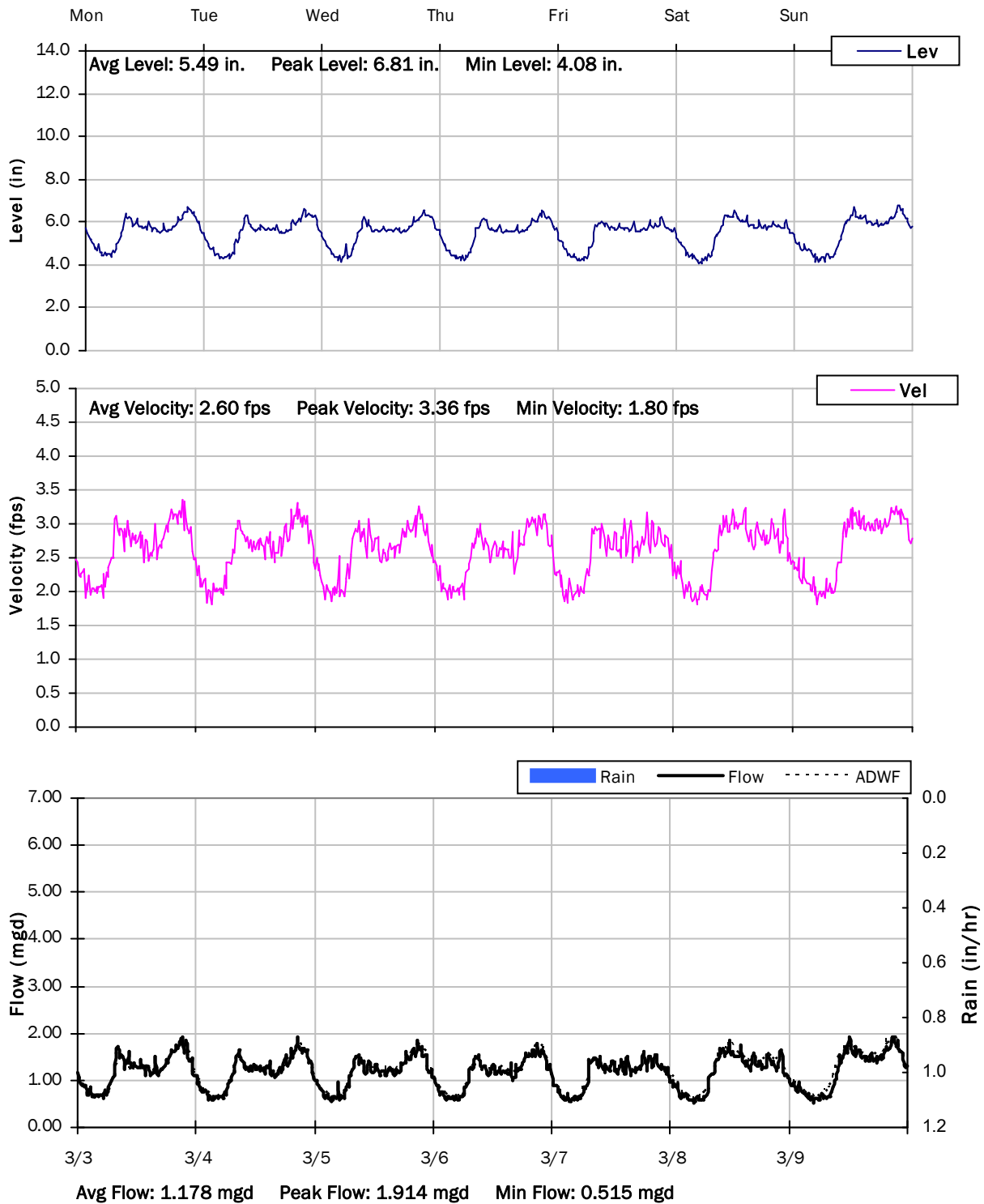
2/24/2025 to 3/3/2025



SITE 06

Weekly Level, Velocity and Flow Hydrographs

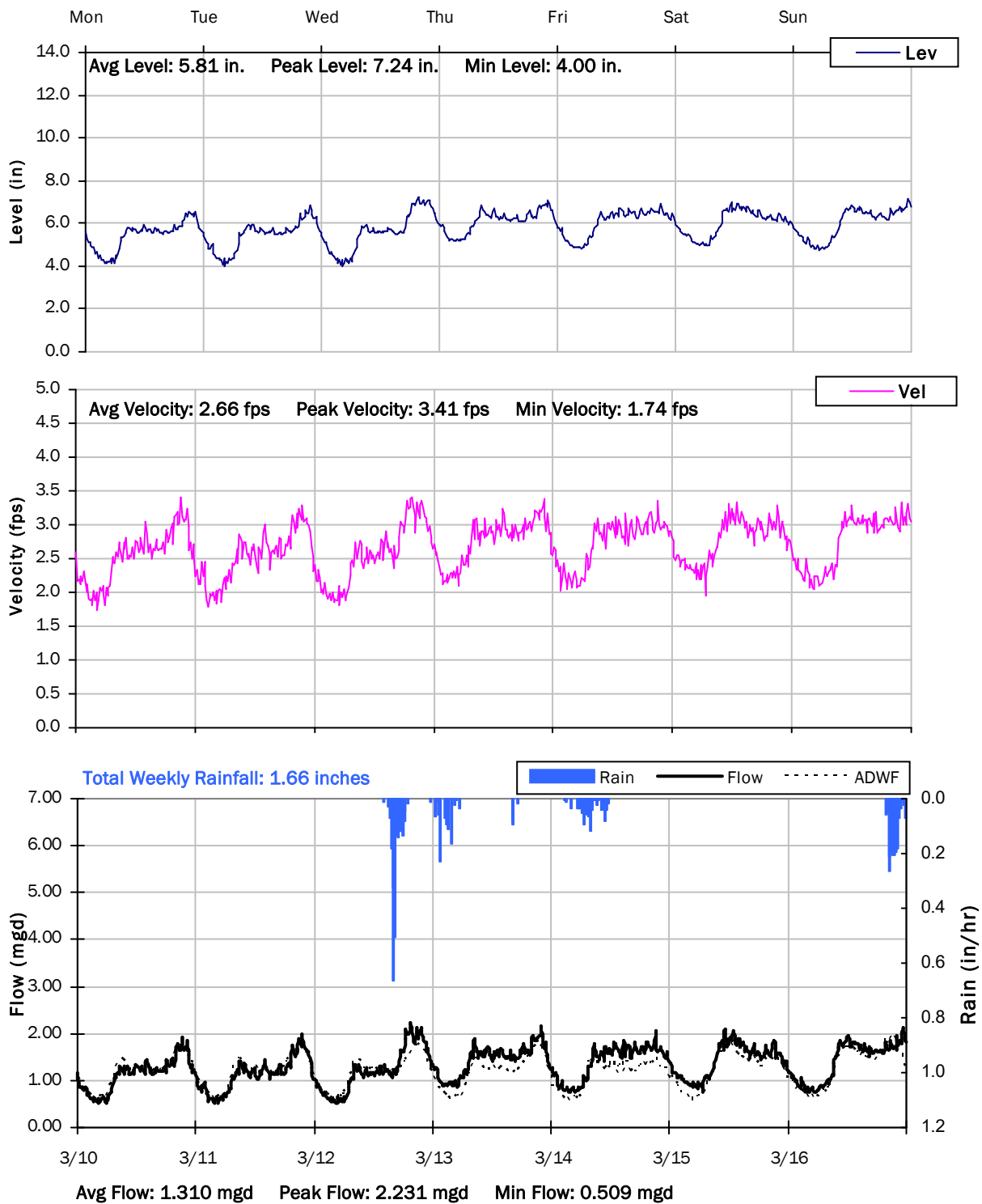
3/3/2025 to 3/10/2025



SITE 06

Weekly Level, Velocity and Flow Hydrographs

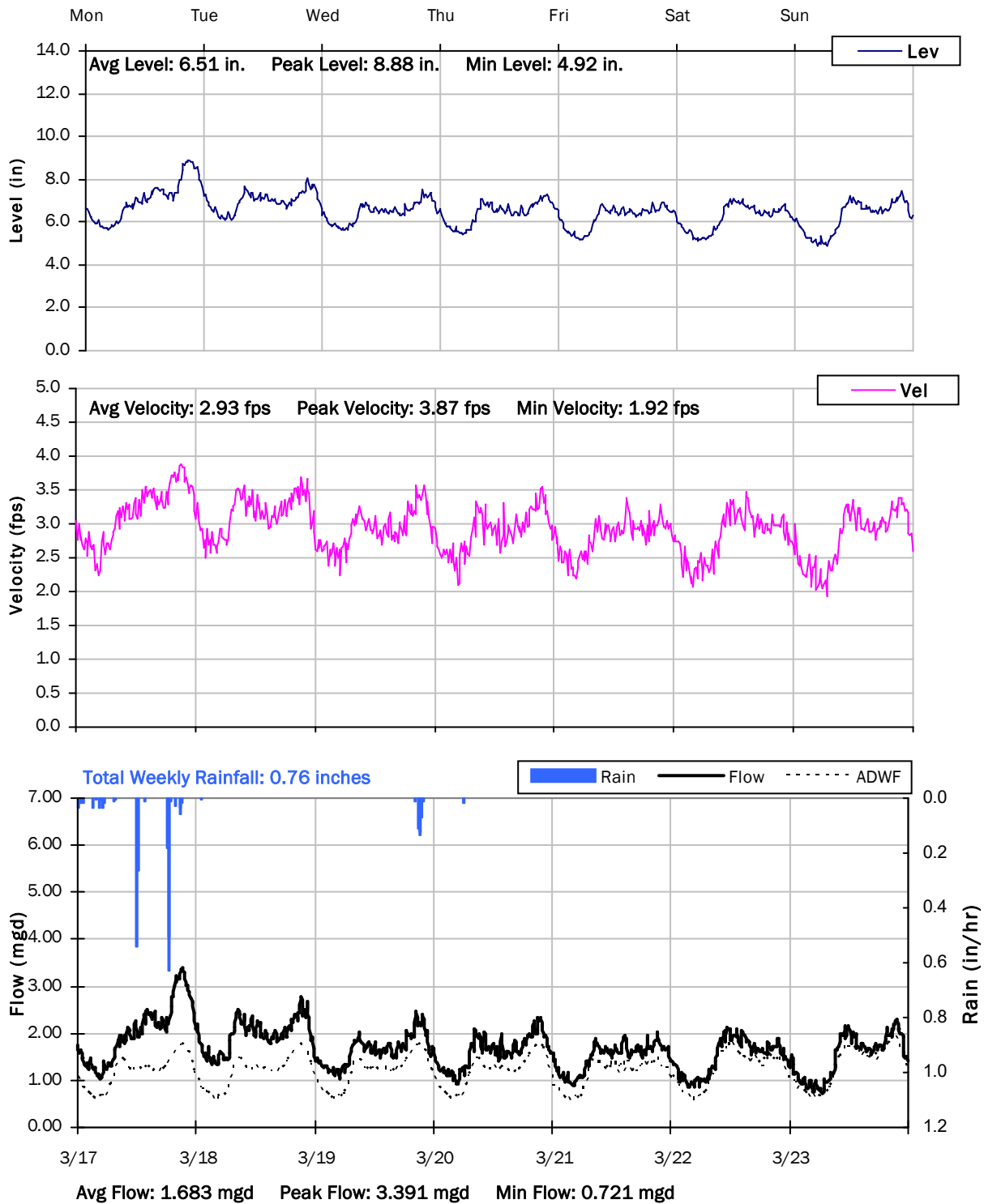
3/10/2025 to 3/17/2025



SITE 06

Weekly Level, Velocity and Flow Hydrographs

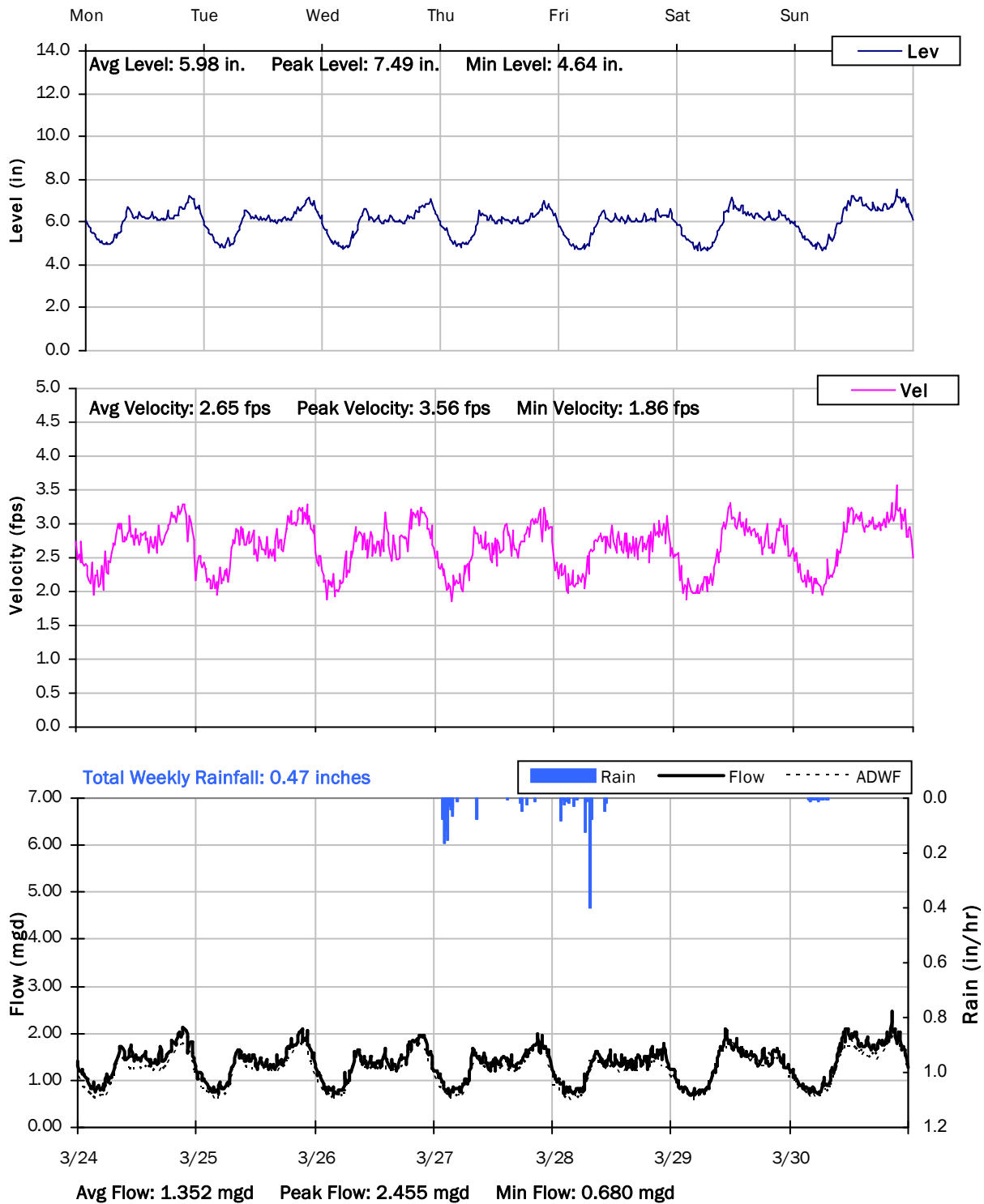
3/17/2025 to 3/24/2025



SITE 06

Weekly Level, Velocity and Flow Hydrographs

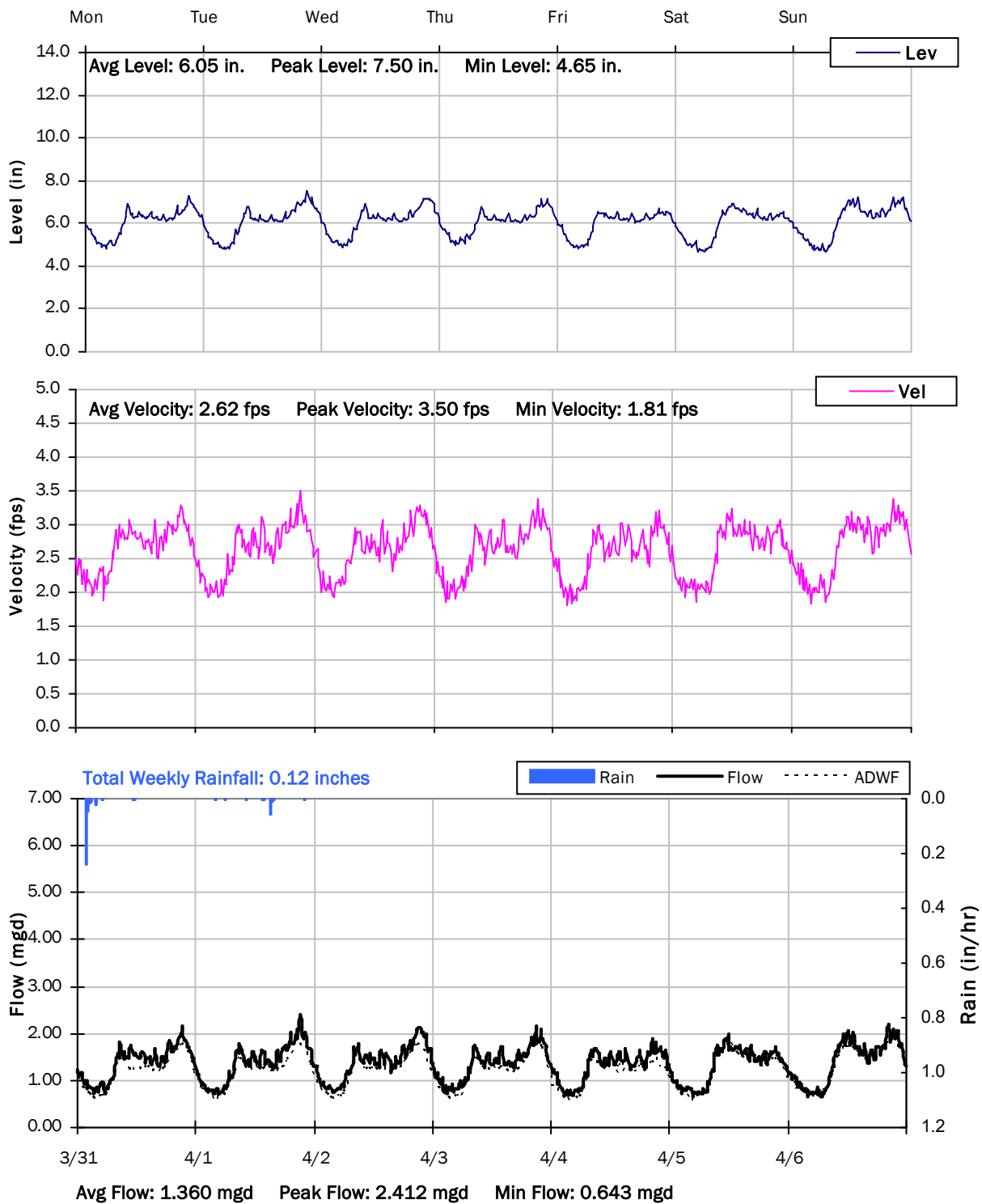
3/24/2025 to 3/31/2025



SITE 06

Weekly Level, Velocity and Flow Hydrographs

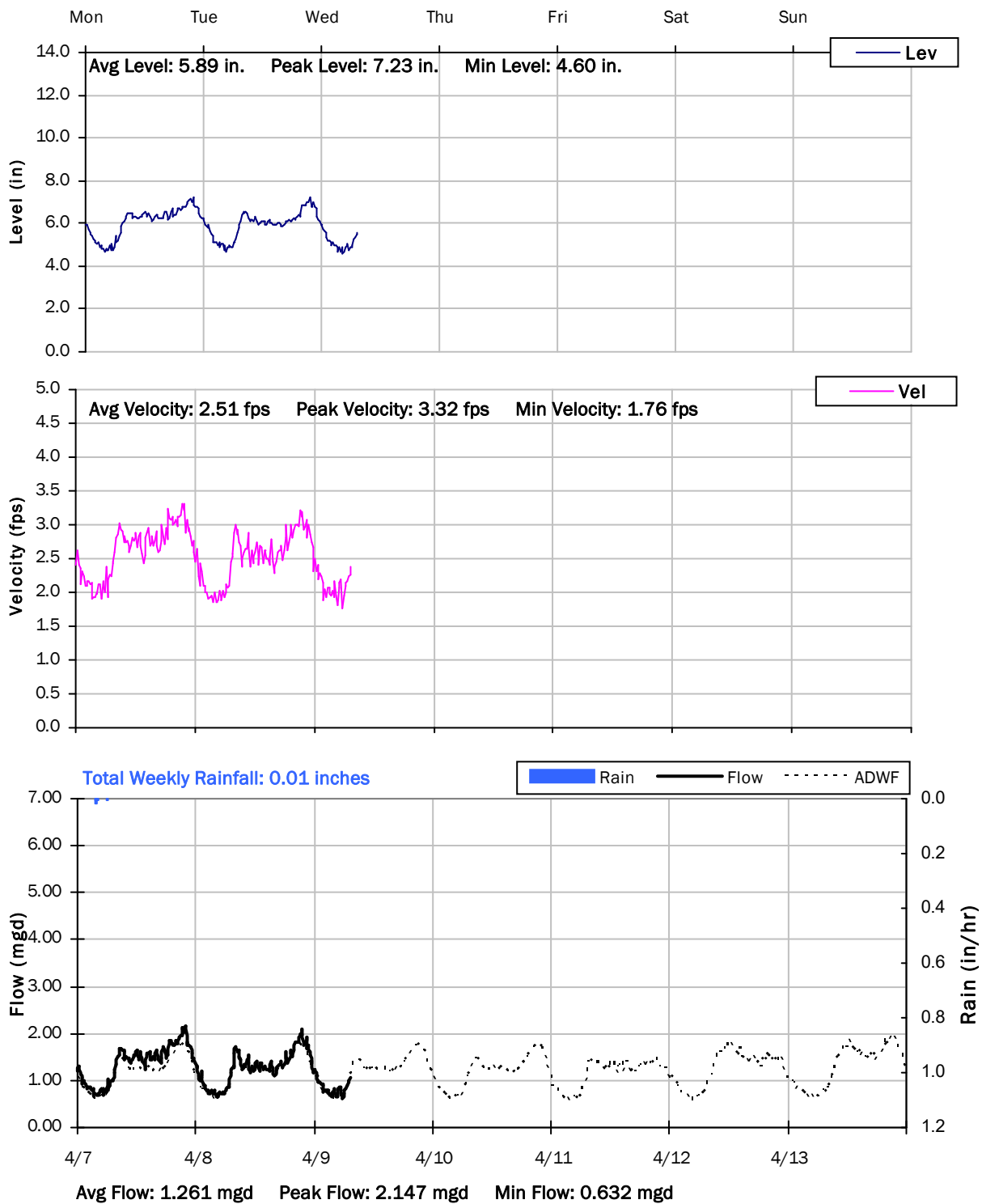
3/31/2025 to 4/7/2025



SITE 06

Weekly Level, Velocity and Flow Hydrographs

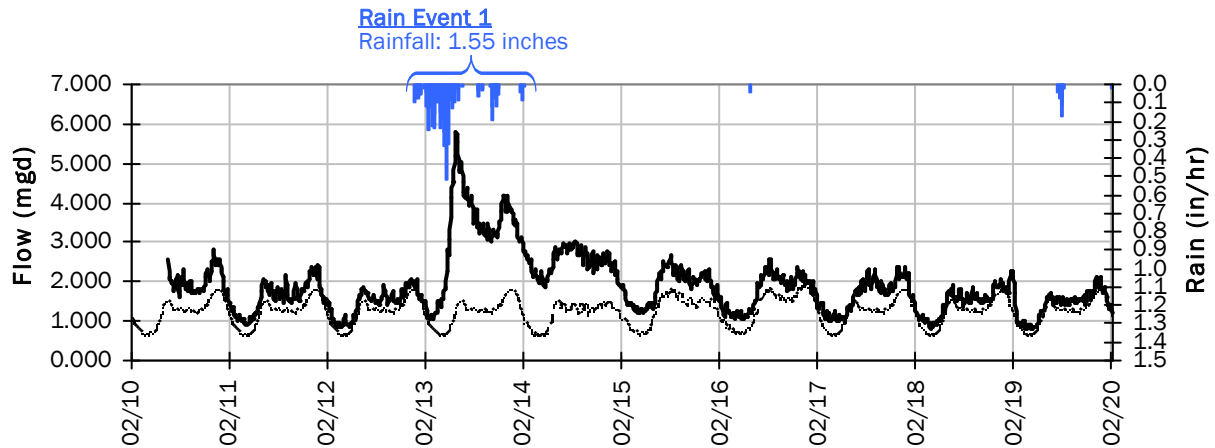
4/7/2025 to 4/14/2025



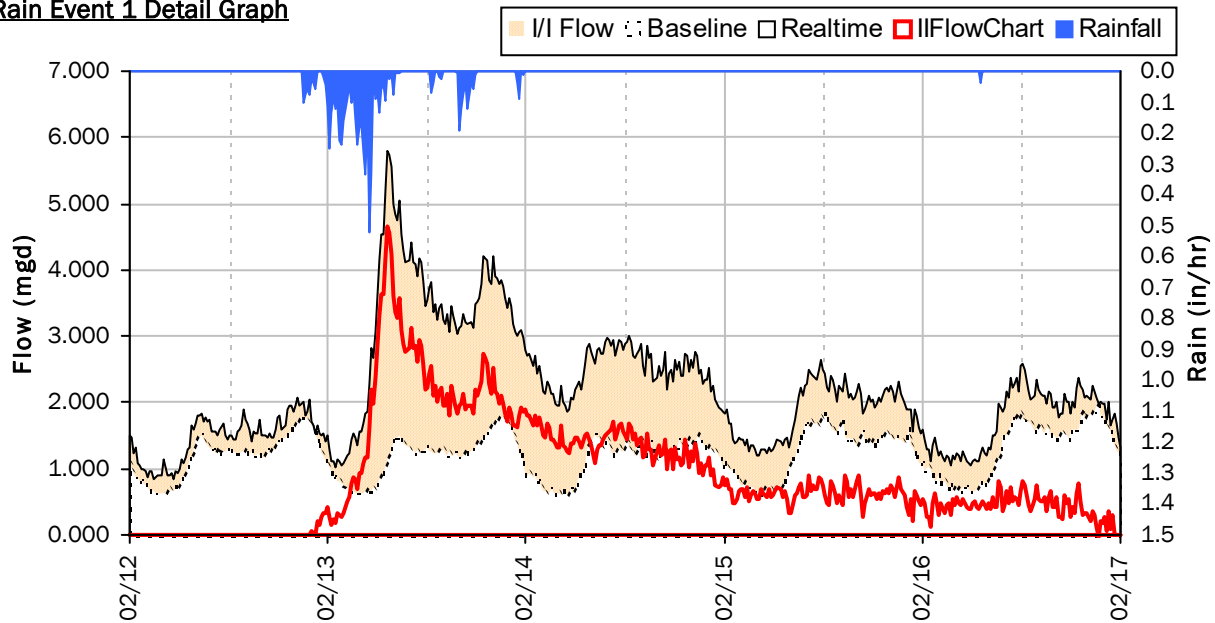
SITE 06

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.55 inches)

Capacity

Peak Flow: 5.795 mgd
PF: 4.80
Peak Level: 11.43 in
d/D Ratio: 0.32

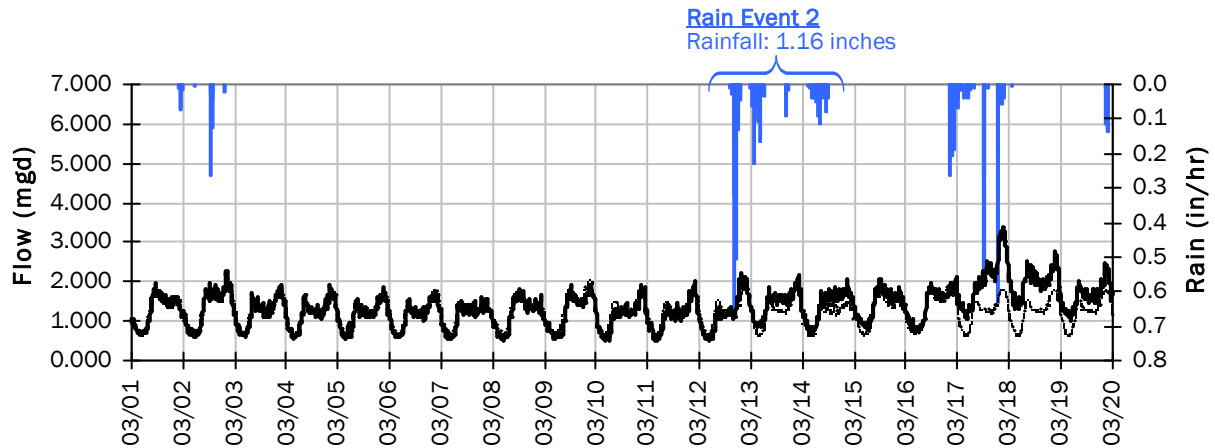
Inflow / Infiltration

Peak I/I Rate: 4.651 mgd
Total I/I: 4,482,000 gallons

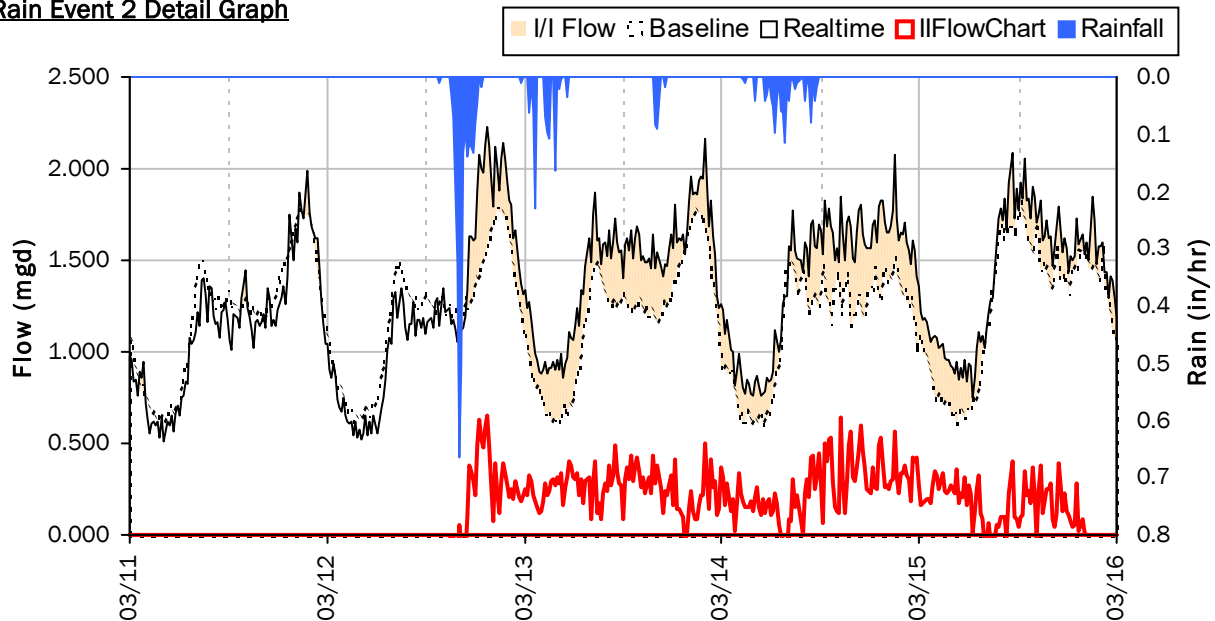
SITE 06

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.16 inches)

Capacity

Peak Flow: 2.231 mgd
PF: 1.85

Peak Level: 7.24 in
d/D Ratio: 0.20

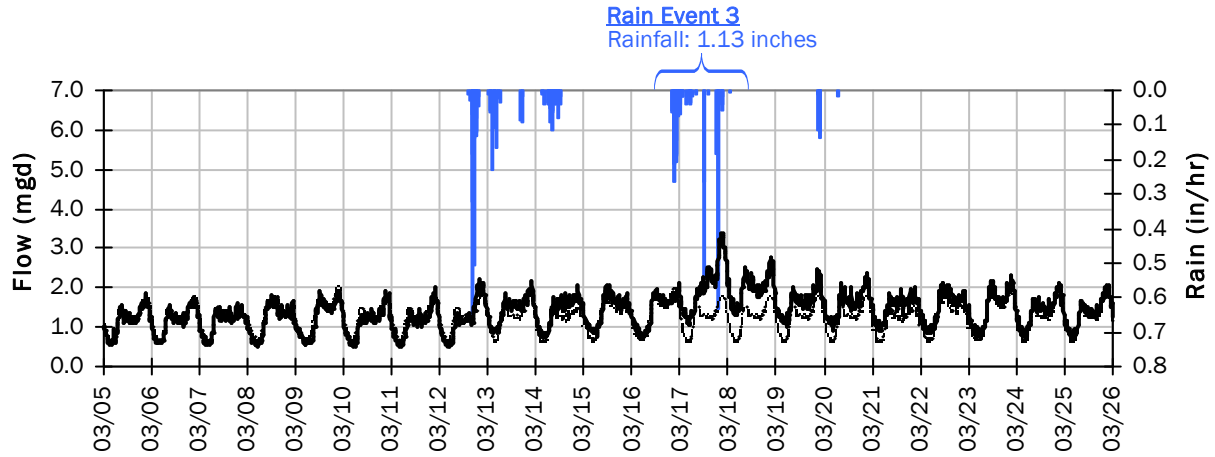
Inflow / Infiltration

Peak I/I Rate: 0.651 mgd
Total I/I: 750,000 gallons

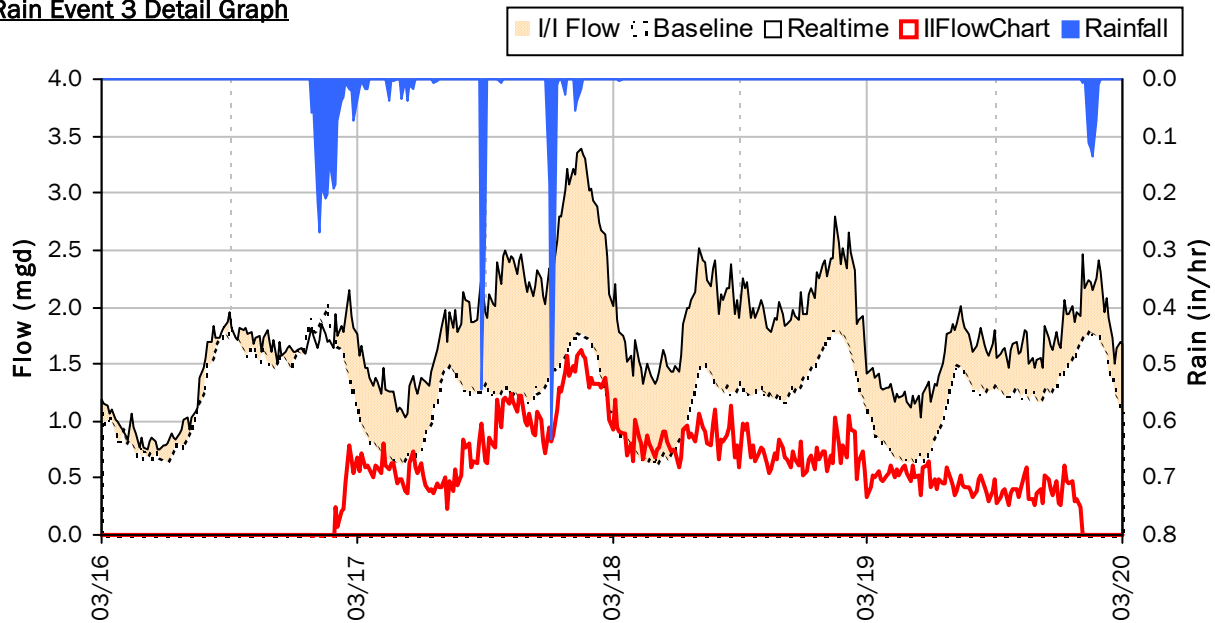
SITE 06

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.13 inches)

Capacity

Peak Flow: 3.39 mgd
PF: 2.81
Peak Level: 8.88 in
d/D Ratio: 0.25

Inflow / Infiltration

Peak I/I Rate: 1.63 mgd
Total I/I: 2,033,000 gallons

Monitoring Site: Site 07

Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: 2325 E Joiner Pkwy at loop near Wilson Park Playground,
Lincoln, CA

Data Summary Report



Vicinity Map: Site 07

SITE 07

Site Information

MH ID: S14089

Location: 2325 E Joiner Pkwy at loop near
Wilson Park Playground,
Lincoln, CA

Coordinates: 121.2872° W, 38.8458° N

Rim Elevation: 147 feet

Expected Pipe Diameter: 15 inches

Measured Pipe Diameter: 15 inches

ADWF: 0.361 mgd

Peak Measured Flow: 0.799 mgd

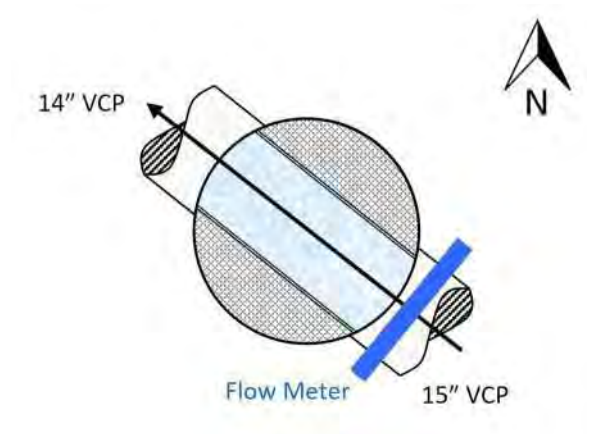
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View

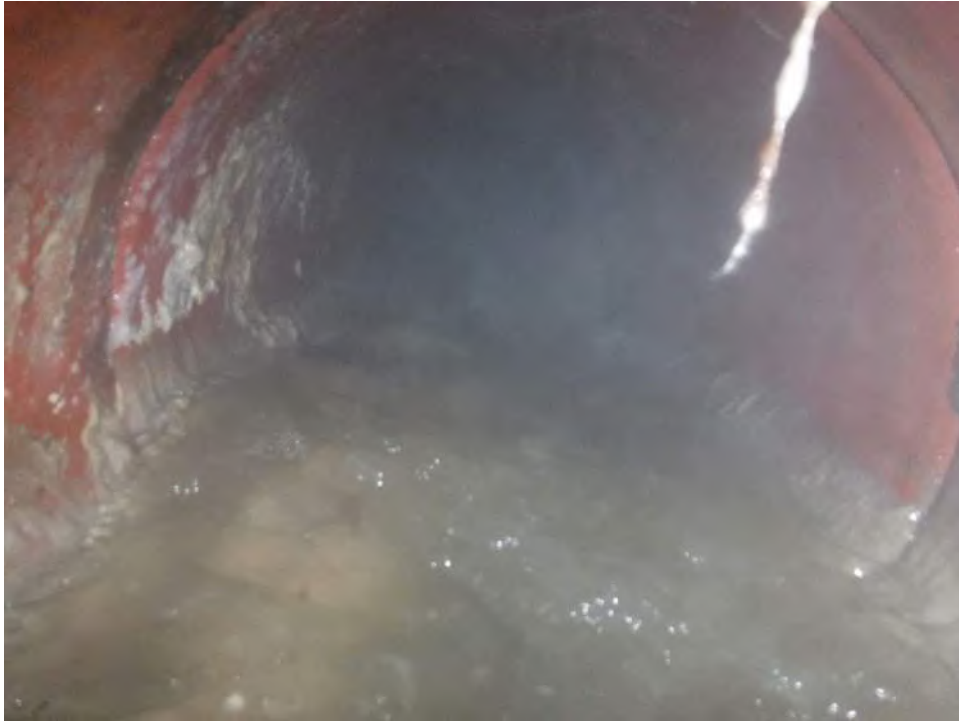


Plan View

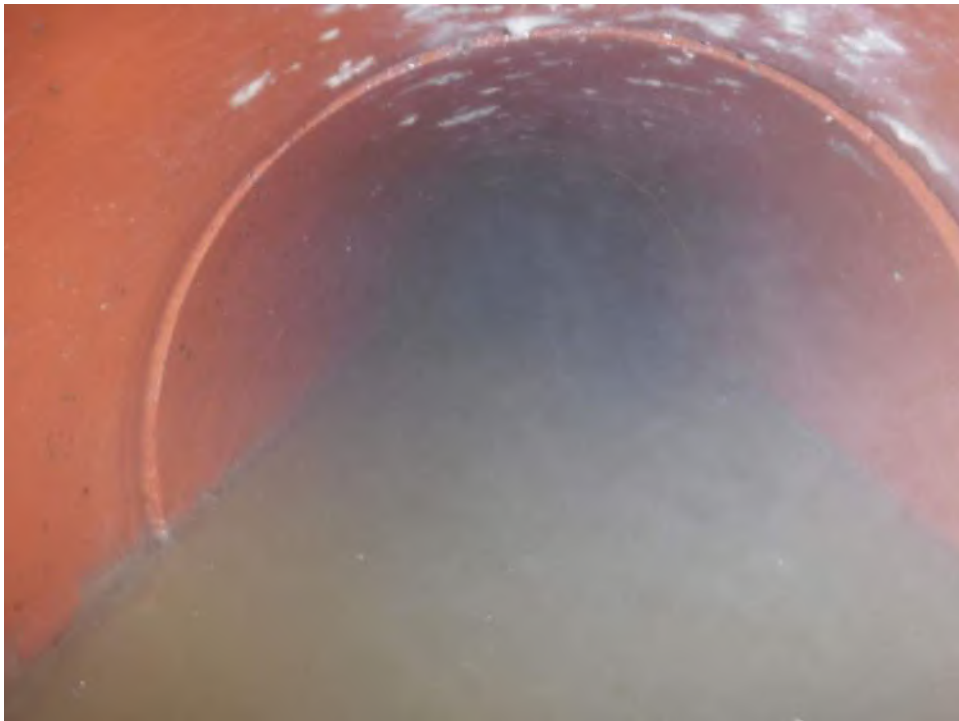
SITE 07

Additional Site Photos

Northwest Effluent Pipe



Monitored Southeast Influent Pipe

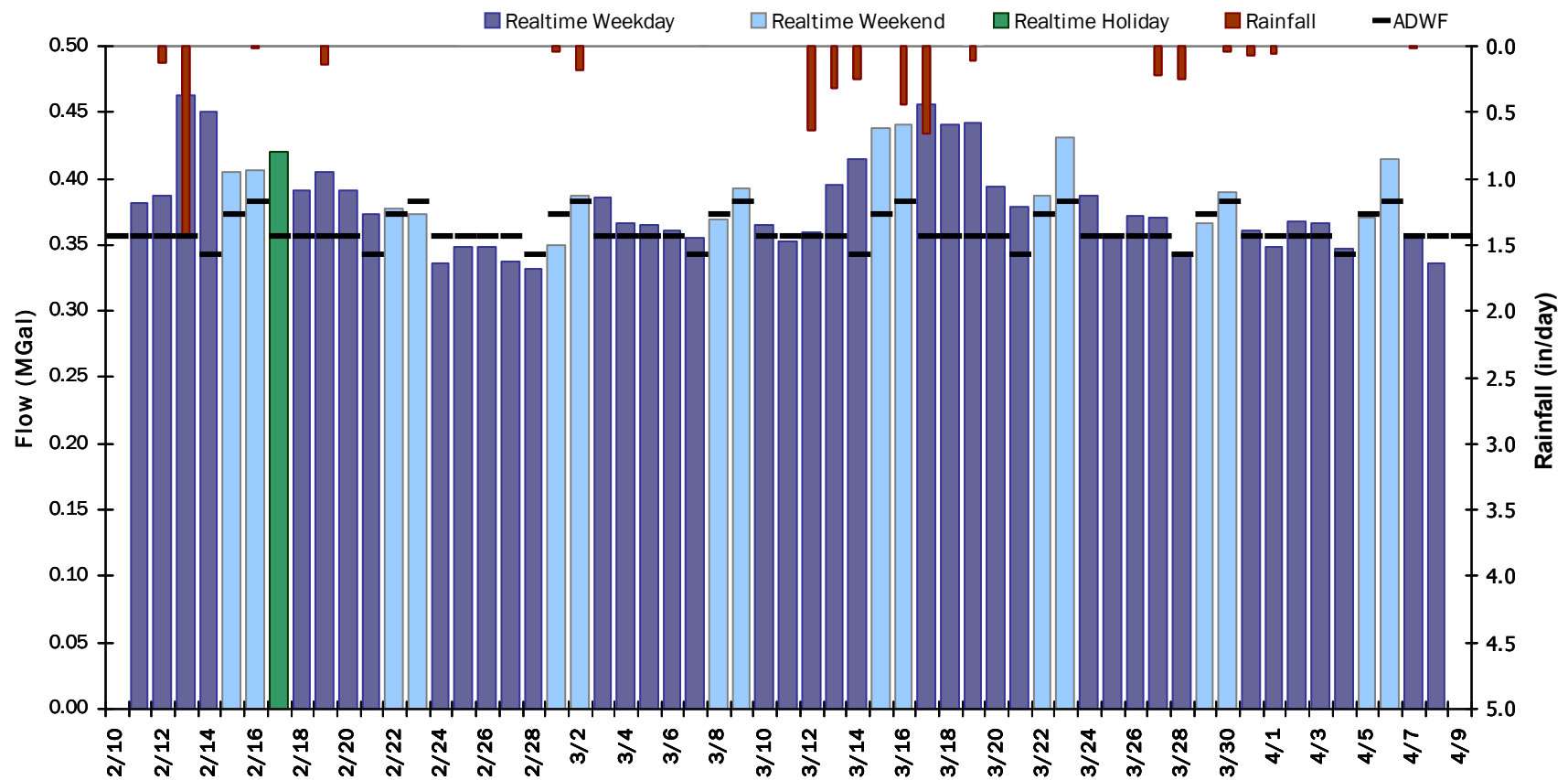


SITE 07

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.381 MGal Peak Daily Flow: 0.491 MGal Min Daily Flow: 0.192 MGal

Total Rainfall: 4.98 inches



SITE 07

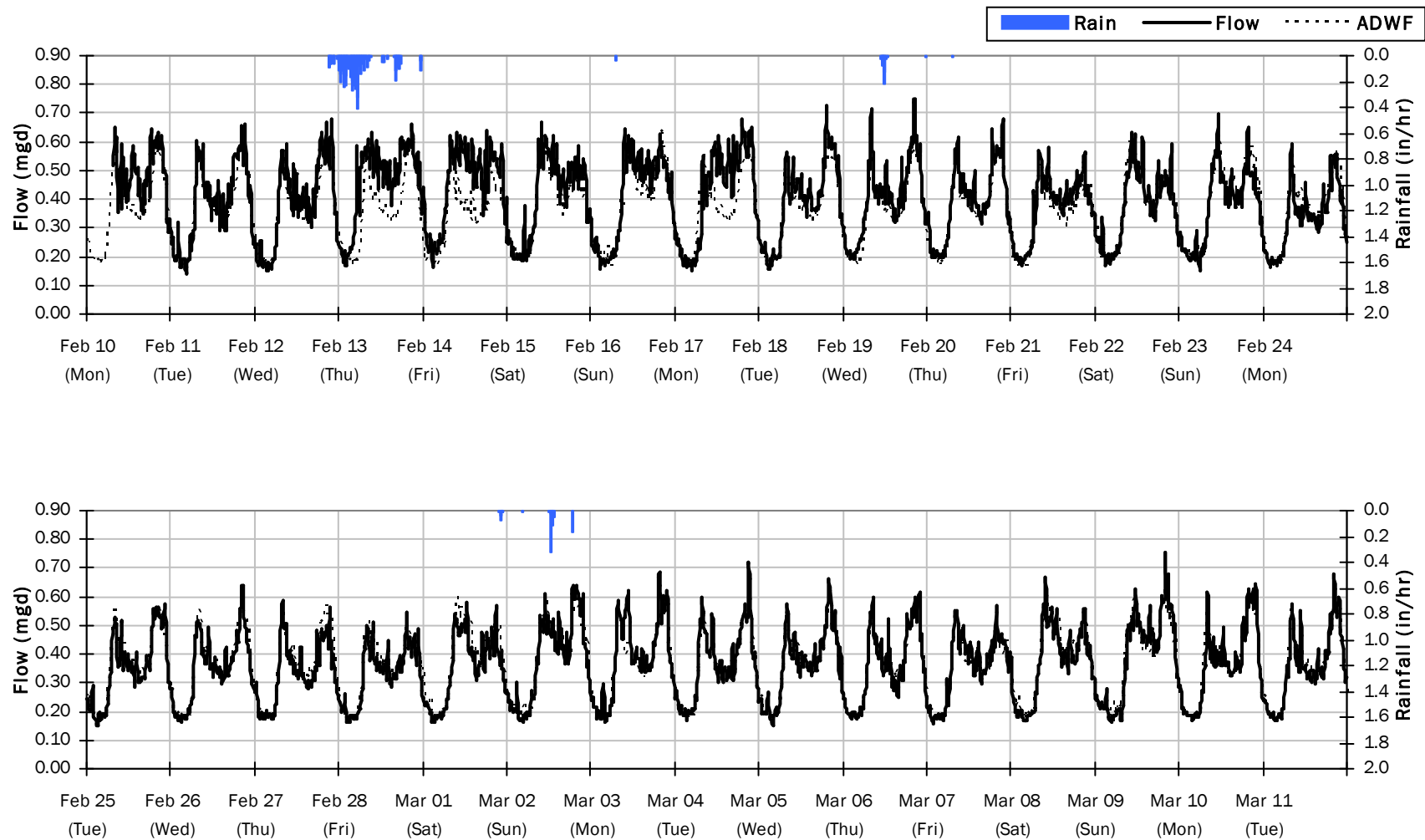
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.92 inches

Period Avg Flow: 0.381 mgd

Period Peak Flow: 0.756 mgd

Period Min Flow: 0.138 mgd



SITE 07

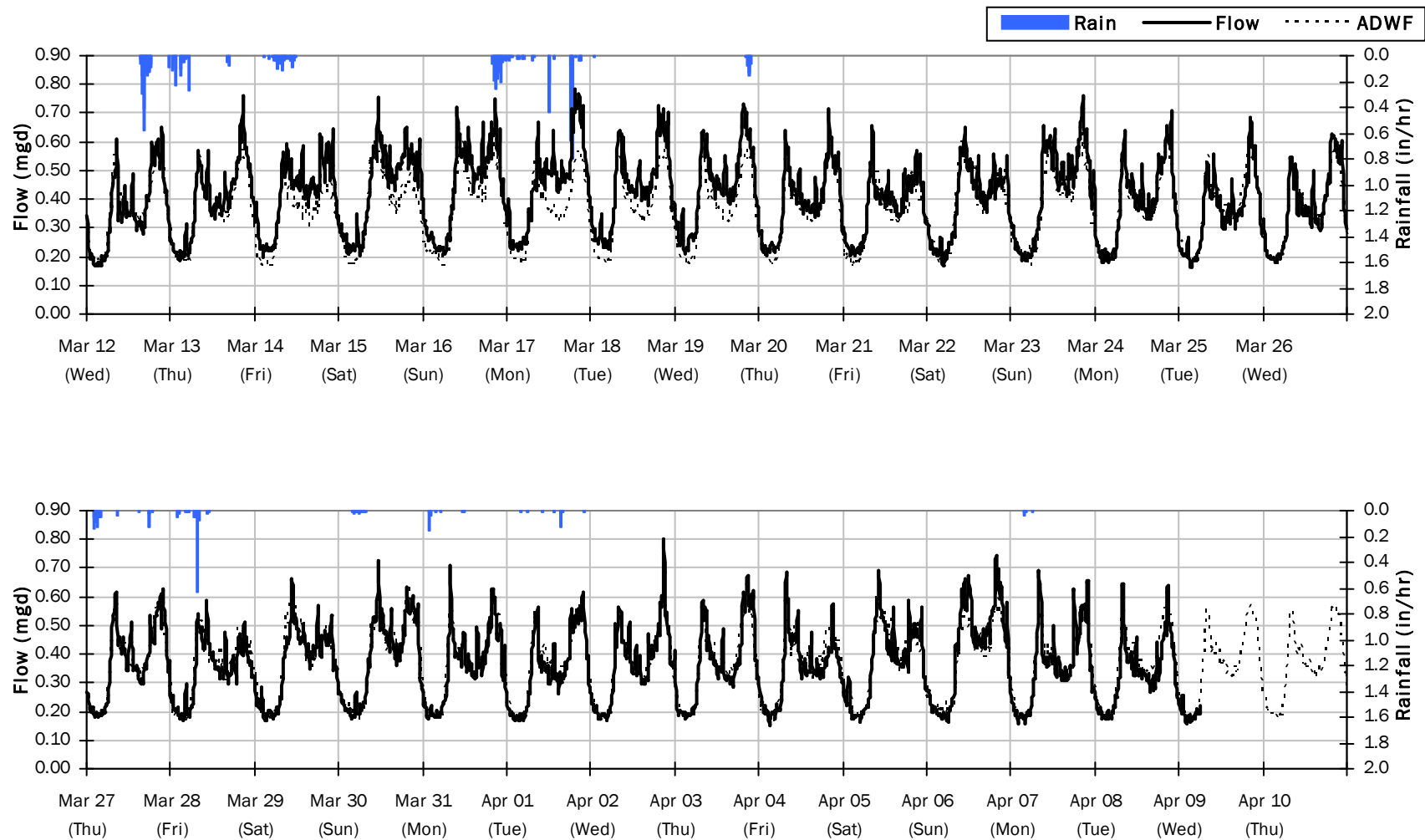
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.06 inches

Period Avg Flow: 0.385 mgd

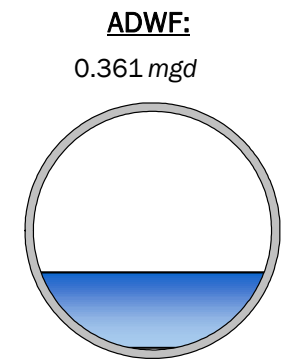
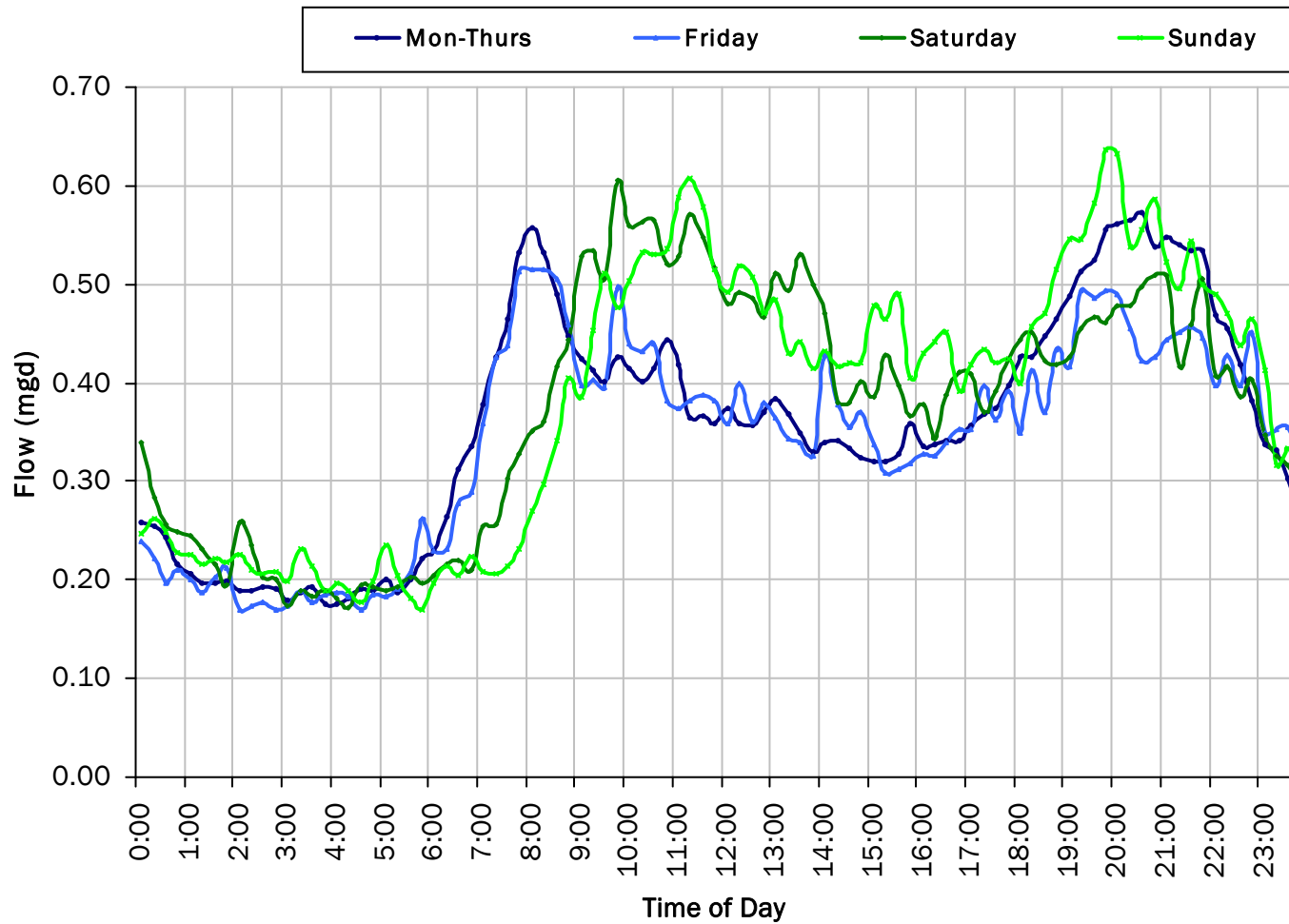
Period Peak Flow: 0.799 mgd

Period Min Flow: 0.152 mgd



SITE 07

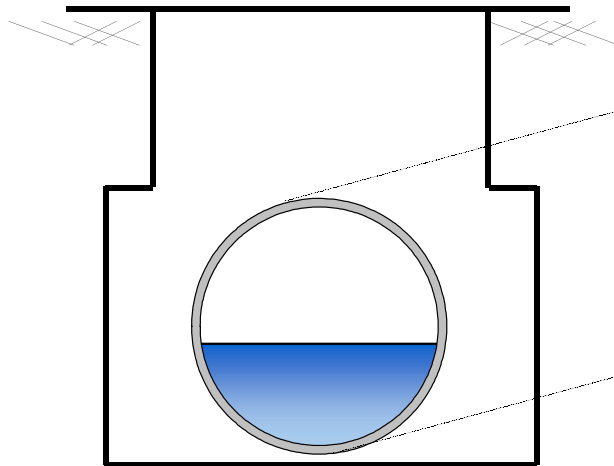
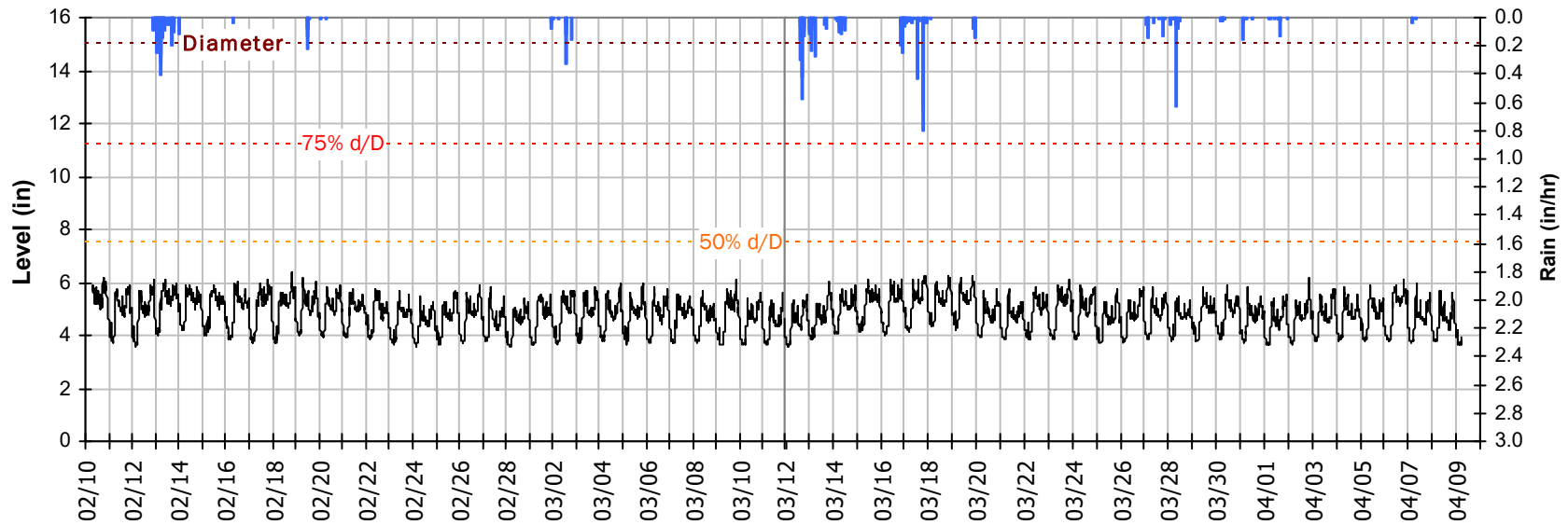
Average Dry Weather Flow Hydrographs



SITE 07

Site Capacity and Surge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period

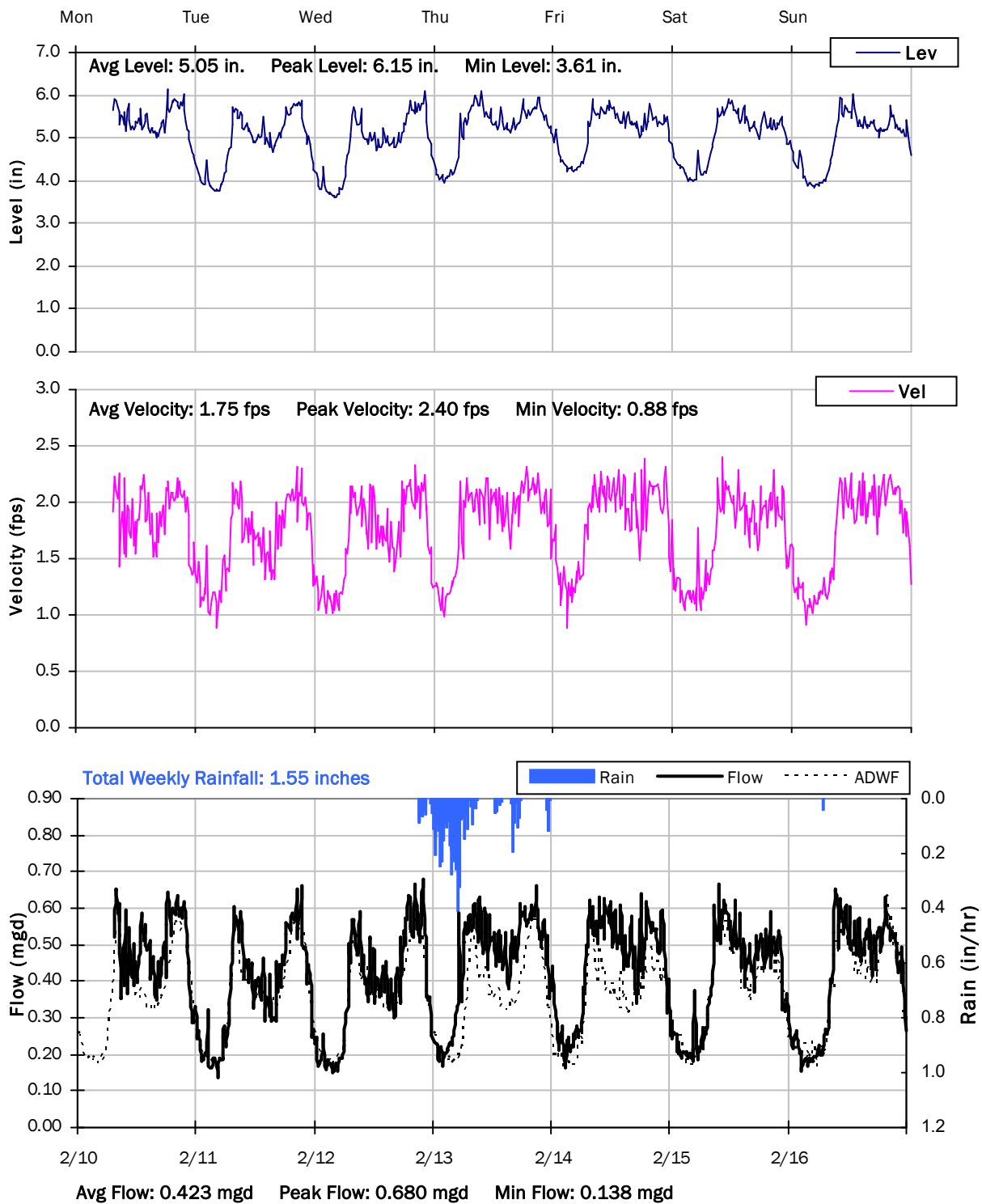


Pipe Diameter: 15 inches
Peak Measured Level: 6.4 inches
Peak d/D Ratio: 0.43

SITE 07

Weekly Level, Velocity and Flow Hydrographs

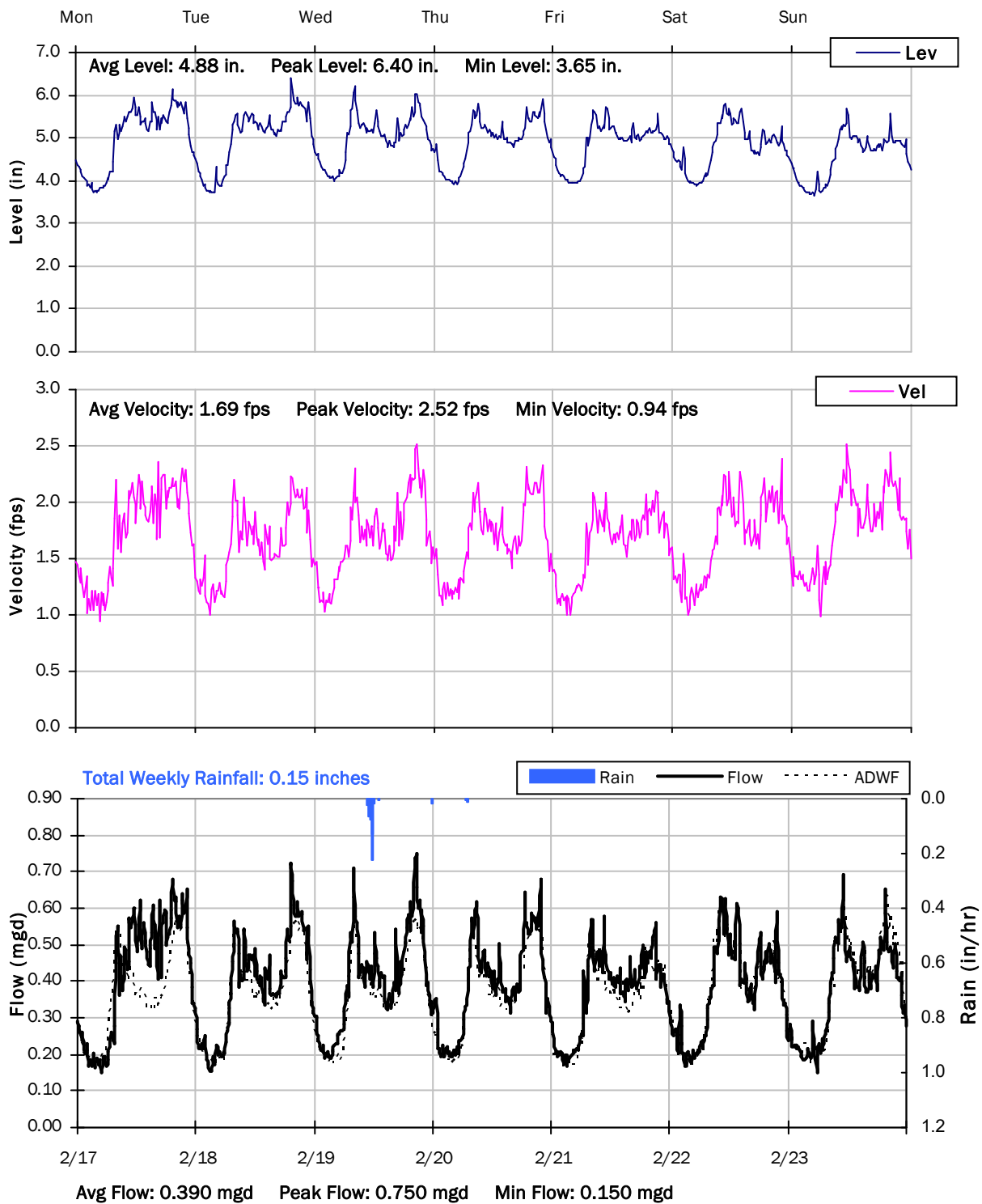
2/10/2025 to 2/17/2025



SITE 07

Weekly Level, Velocity and Flow Hydrographs

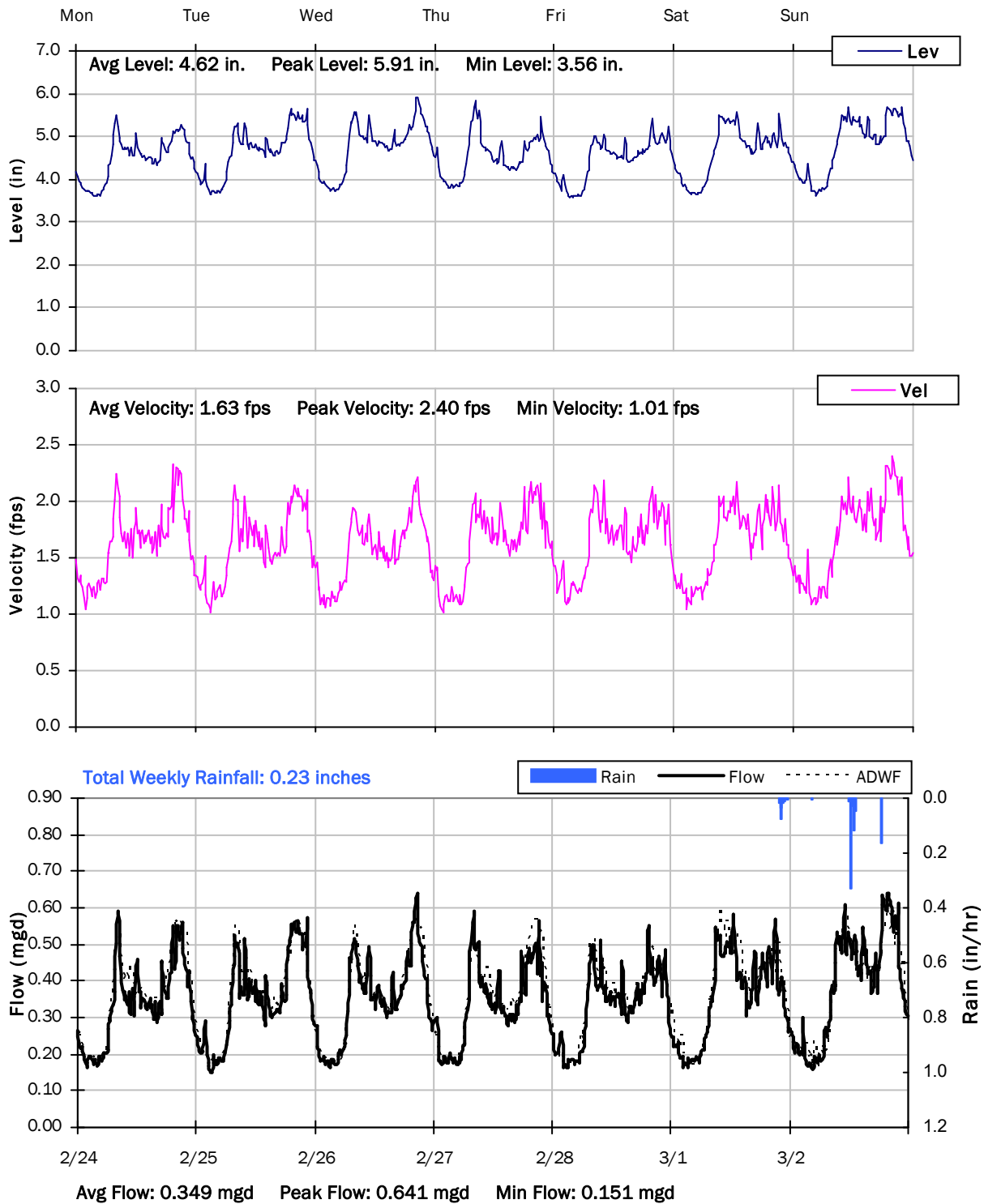
2/17/2025 to 2/24/2025



SITE 07

Weekly Level, Velocity and Flow Hydrographs

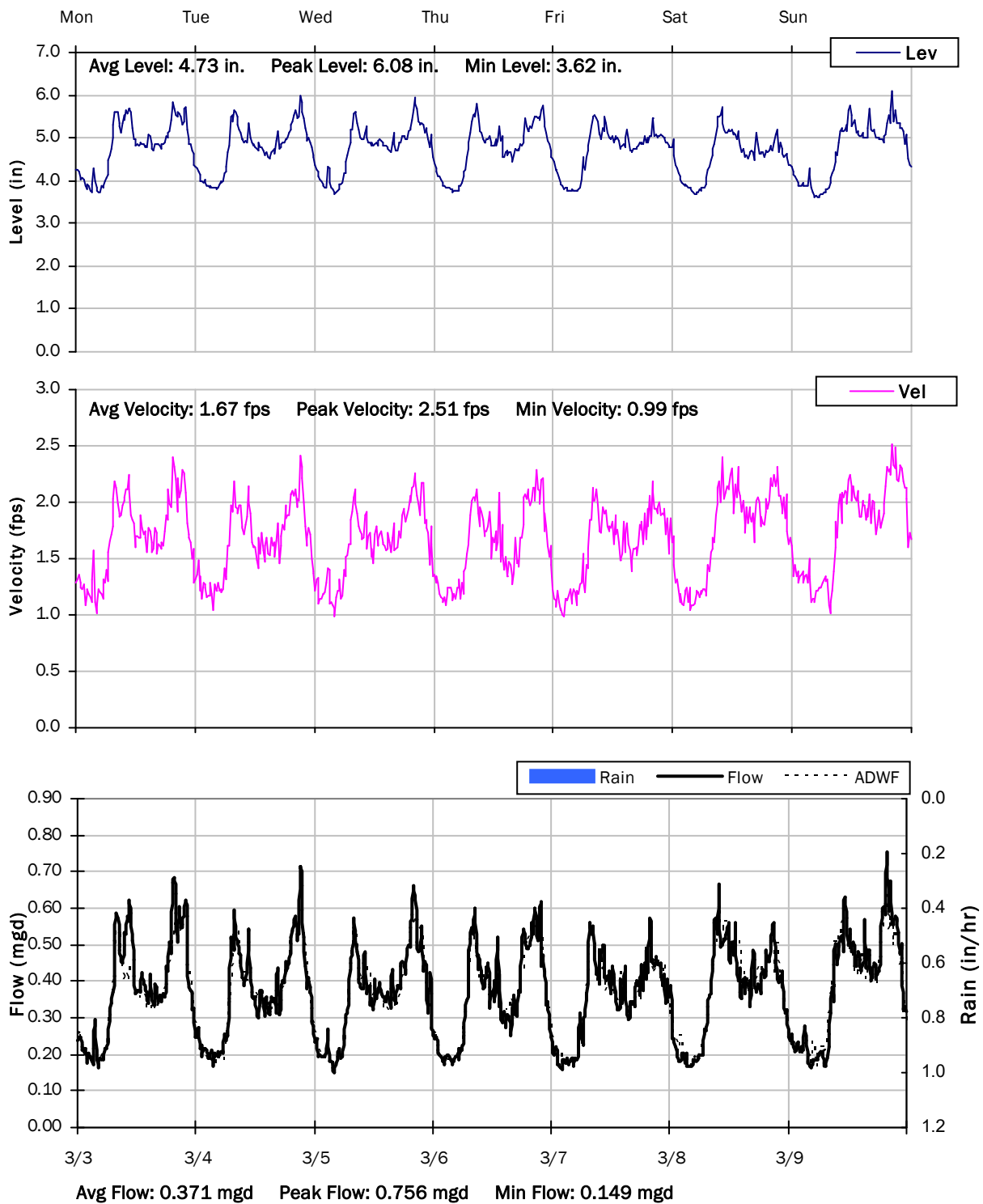
2/24/2025 to 3/3/2025



SITE 07

Weekly Level, Velocity and Flow Hydrographs

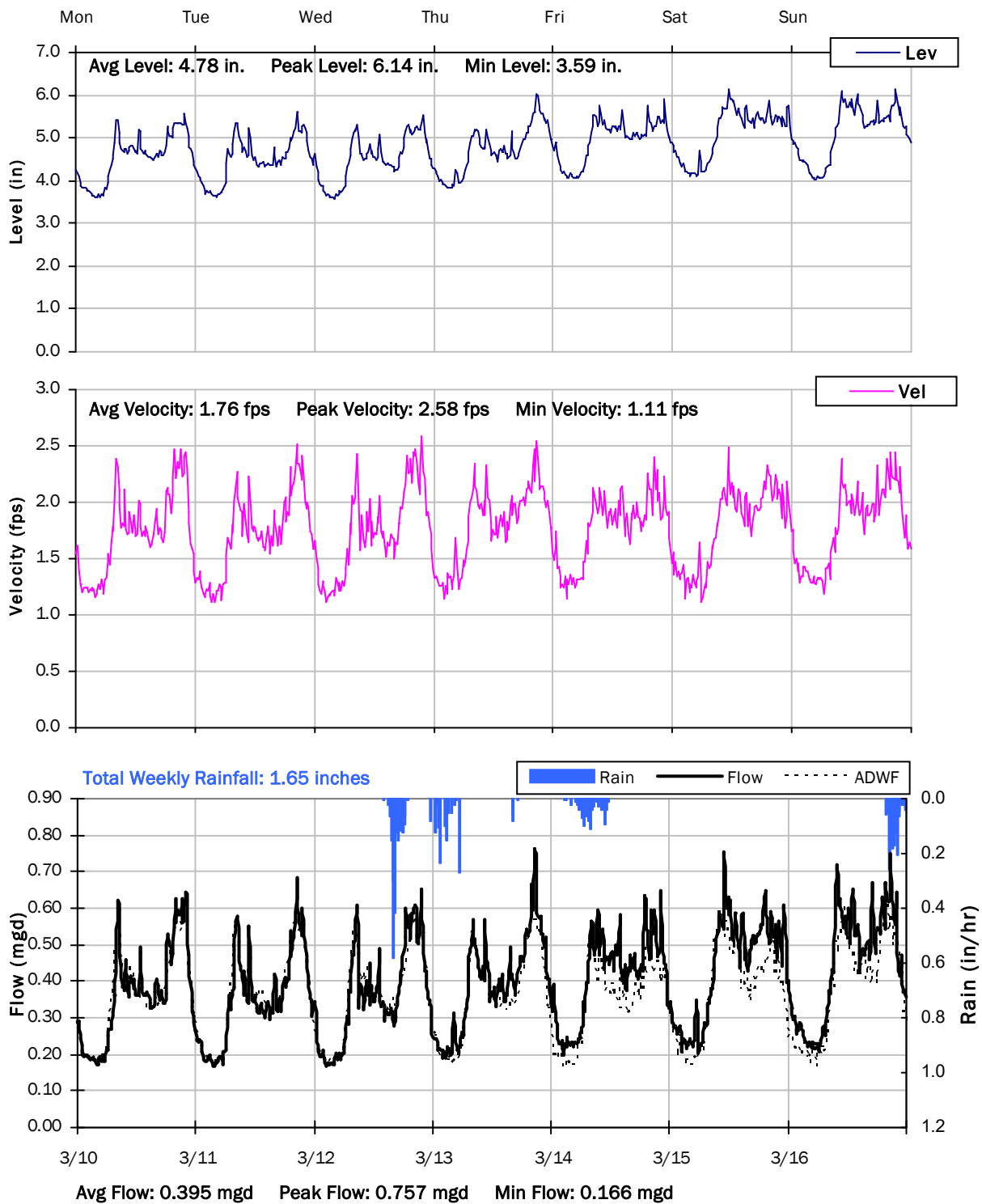
3/3/2025 to 3/10/2025



SITE 07

Weekly Level, Velocity and Flow Hydrographs

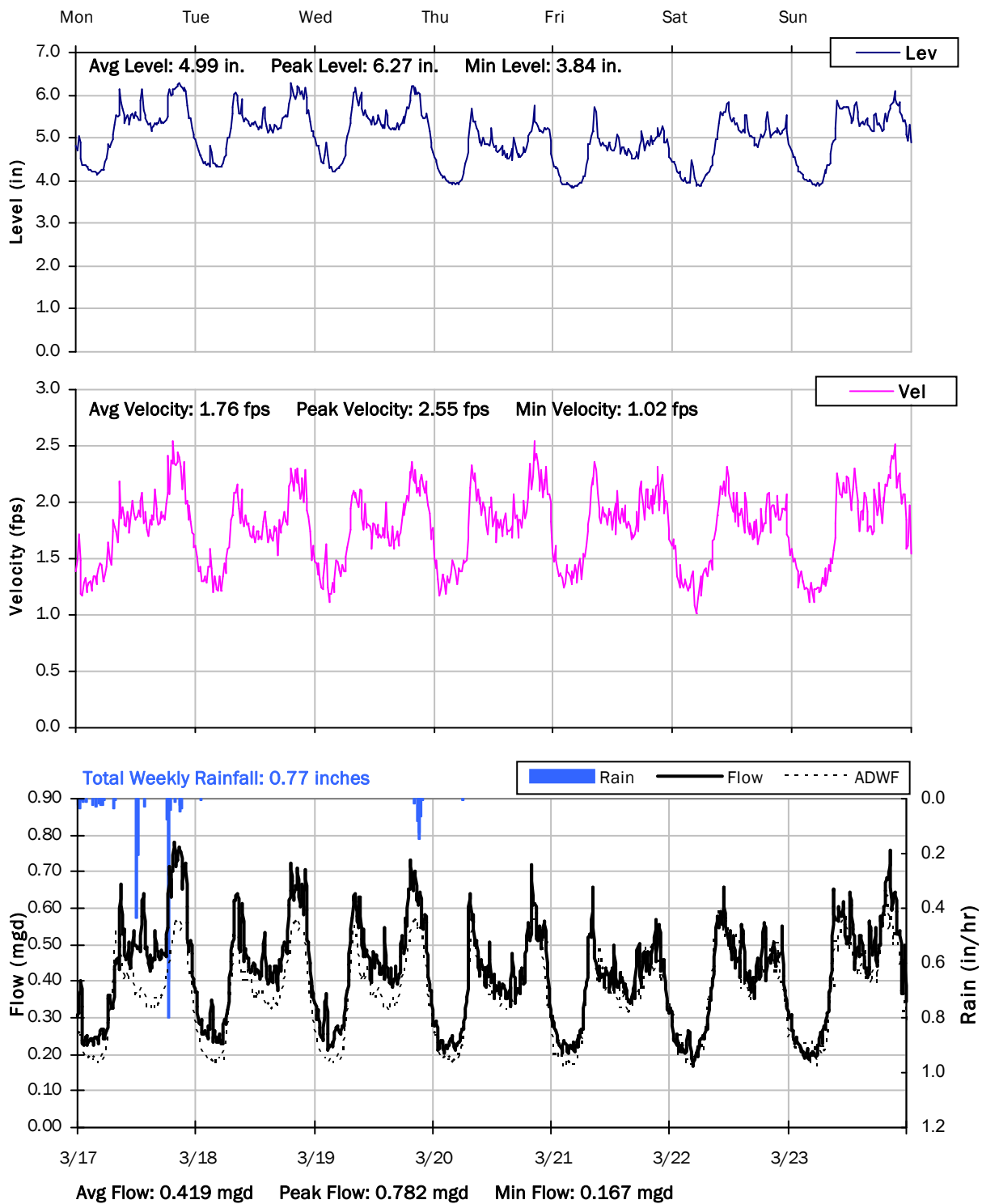
3/10/2025 to 3/17/2025



SITE 07

Weekly Level, Velocity and Flow Hydrographs

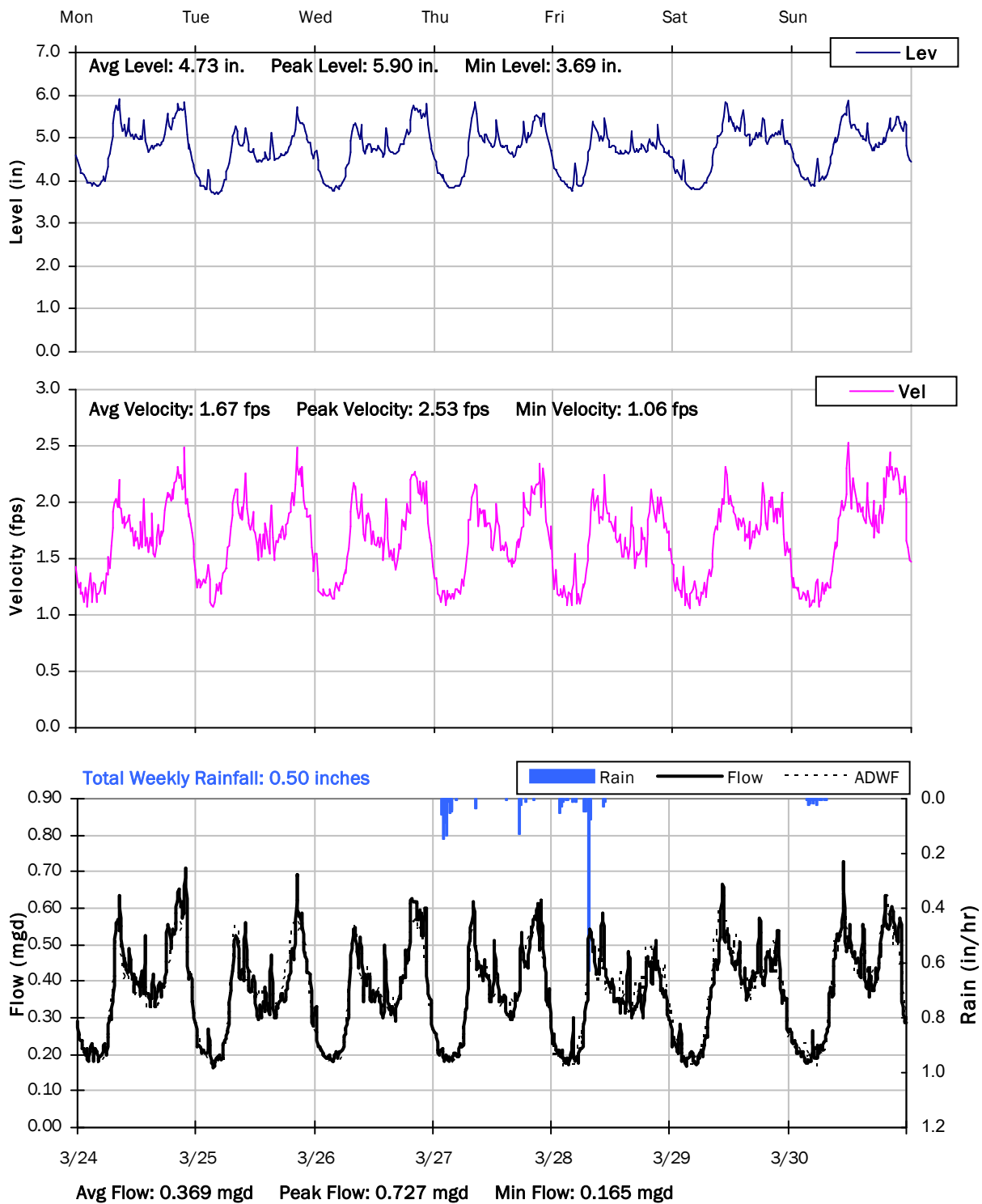
3/17/2025 to 3/24/2025



SITE 07

Weekly Level, Velocity and Flow Hydrographs

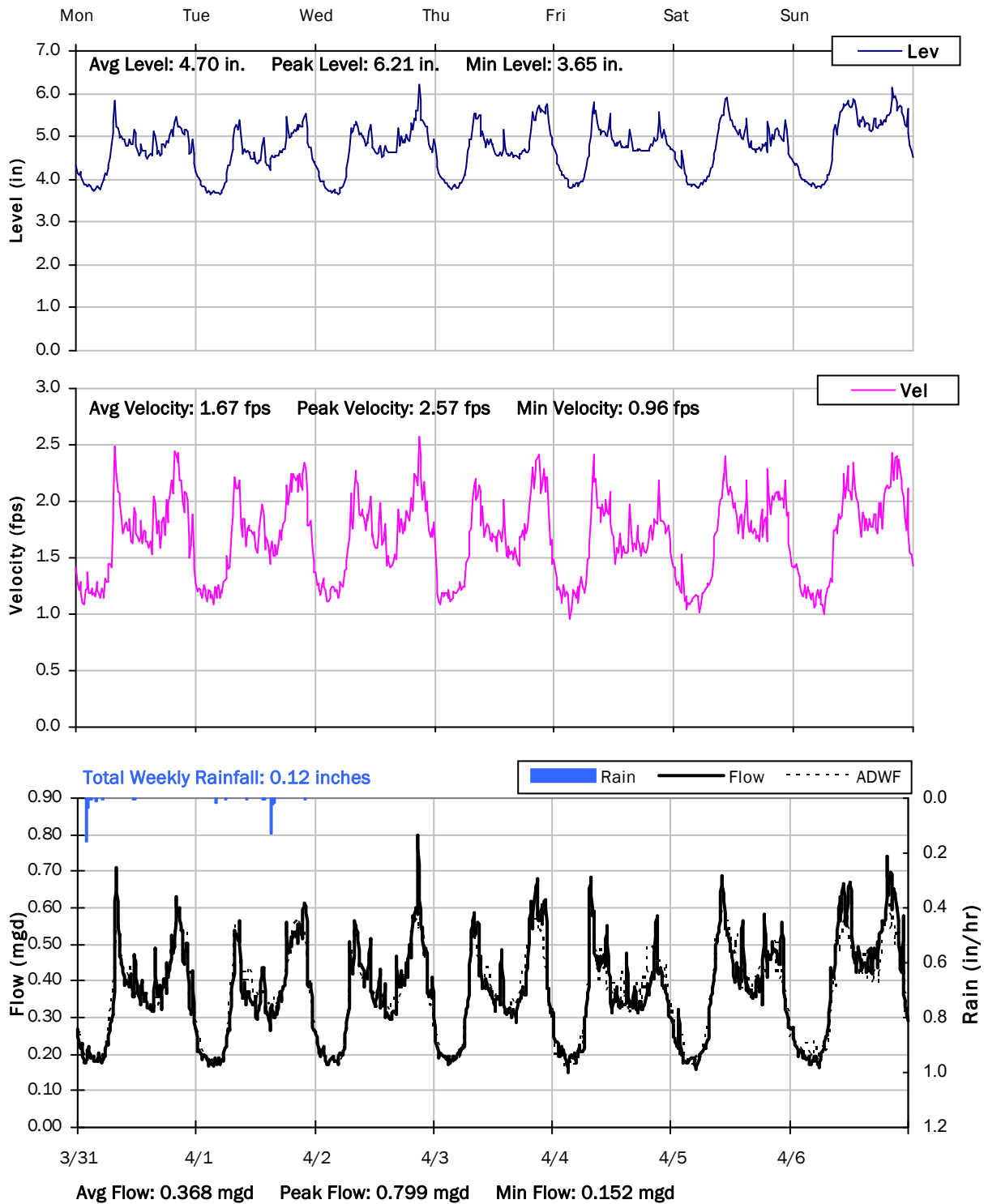
3/24/2025 to 3/31/2025



SITE 07

Weekly Level, Velocity and Flow Hydrographs

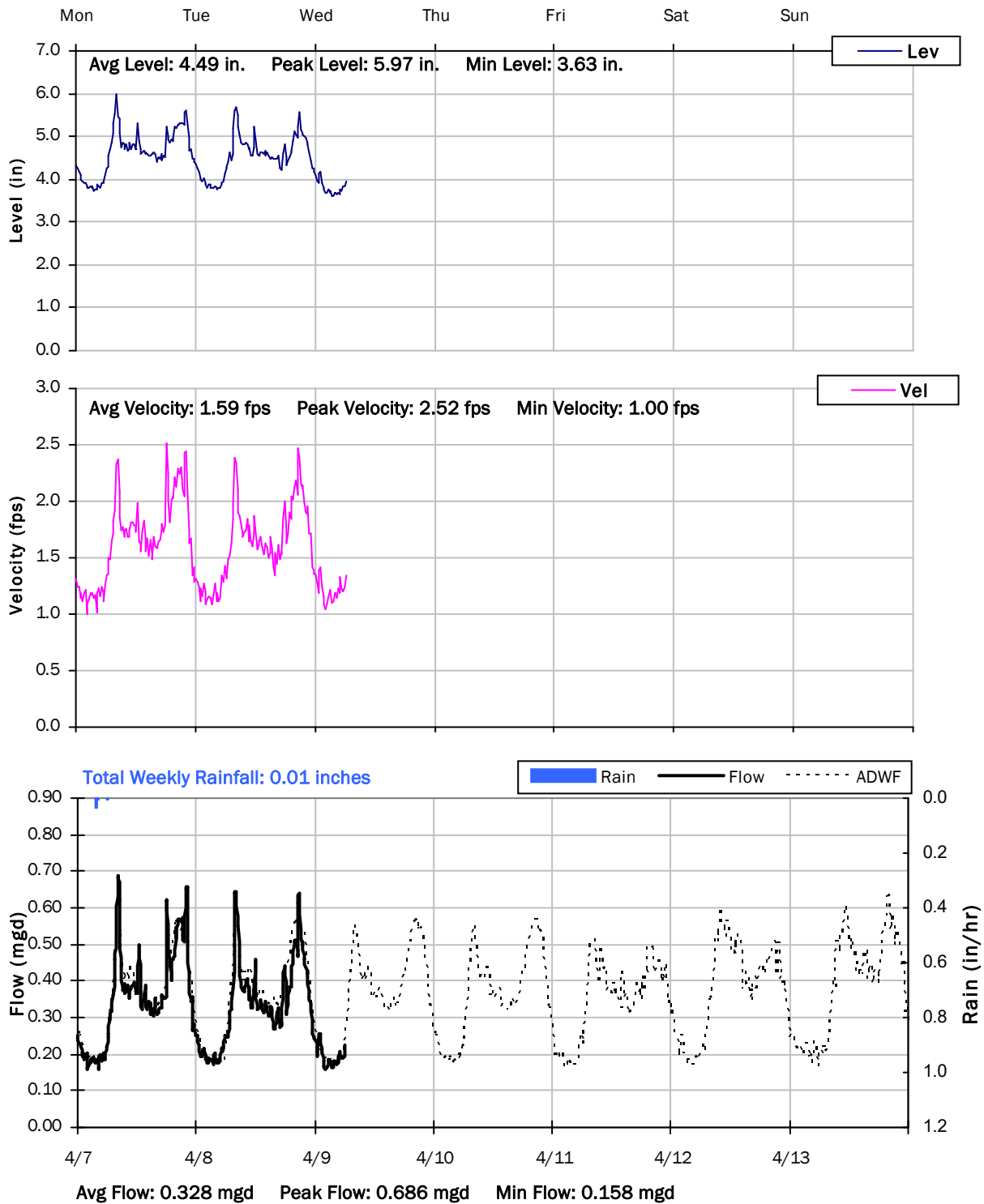
3/31/2025 to 4/7/2025



SITE 07

Weekly Level, Velocity and Flow Hydrographs

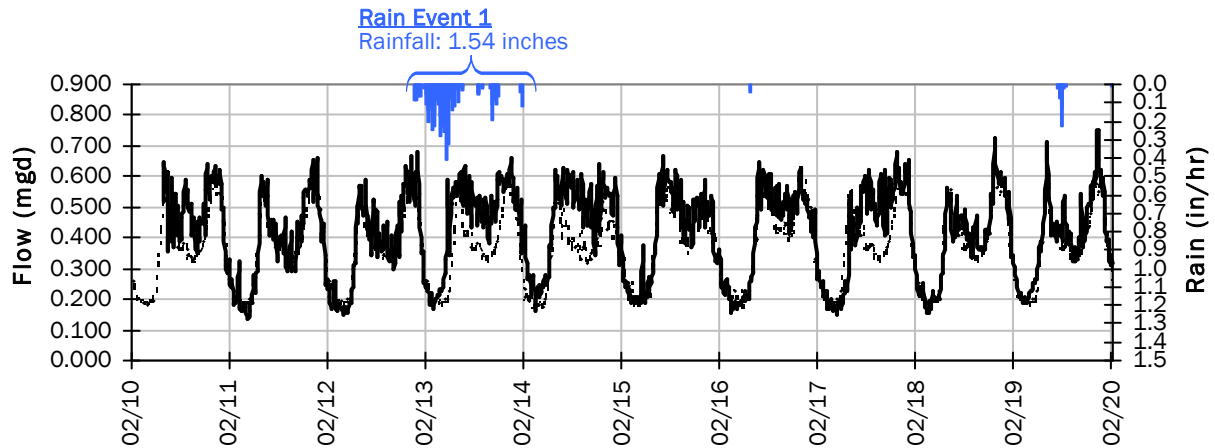
4/7/2025 to 4/14/2025



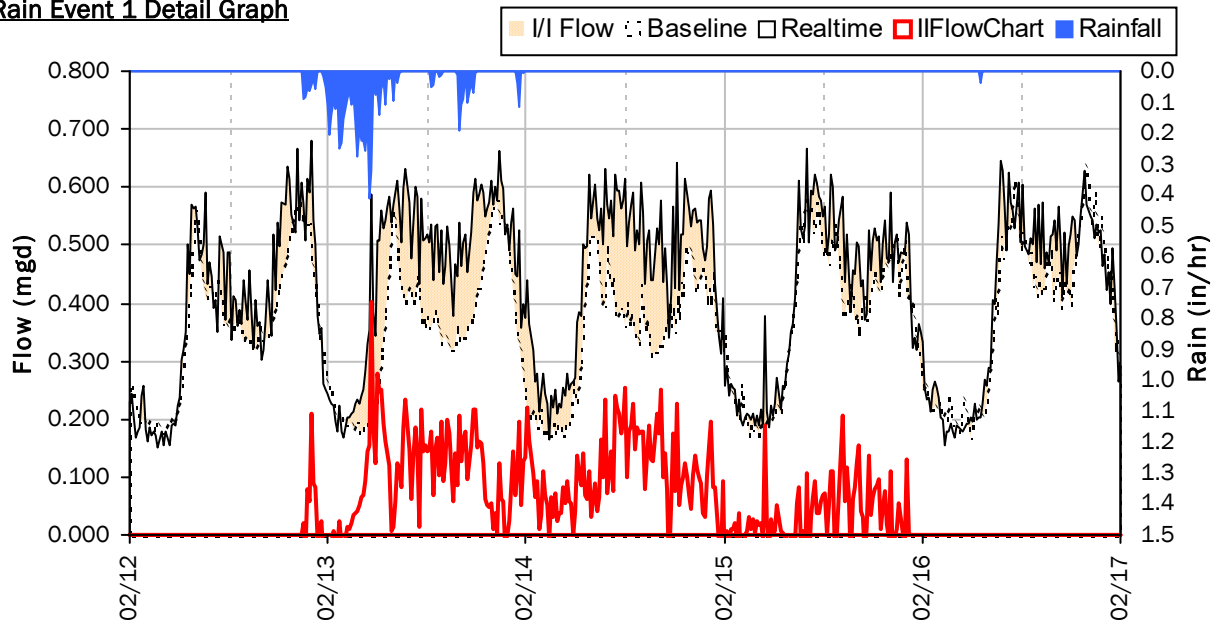
SITE 07

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.54 inches)

Capacity

Peak Flow: 0.680 *mgd*
PF: 1.88

Peak Level: 6.09 *in*
d/D Ratio: 0.41

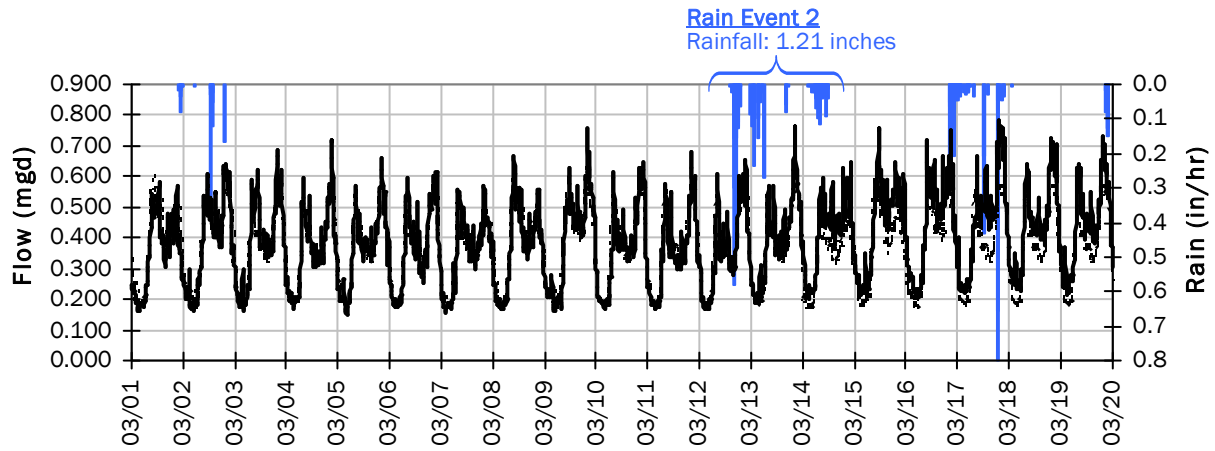
Inflow / Infiltration

Peak I/I Rate: 0.401 *mgd*
Total I/I: 249,000 *gallons*

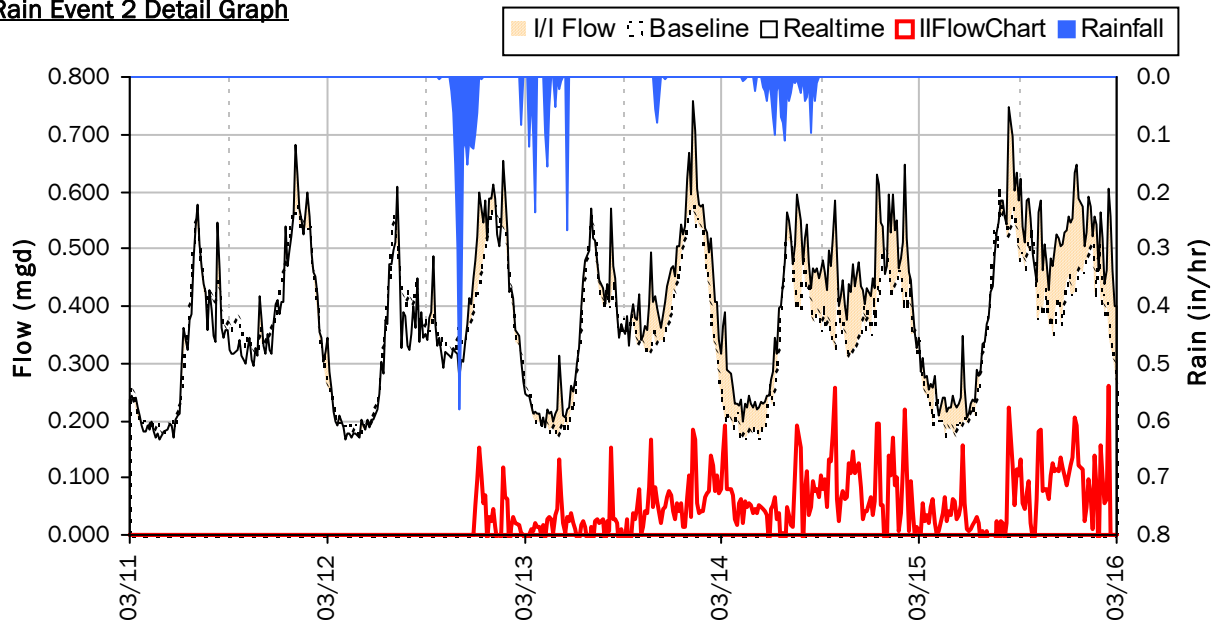
SITE 07

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.21 inches)

Capacity

Peak Flow: 0.757 mgd
PF: 2.10
Peak Level: 6.14 in
d/D Ratio: 0.41

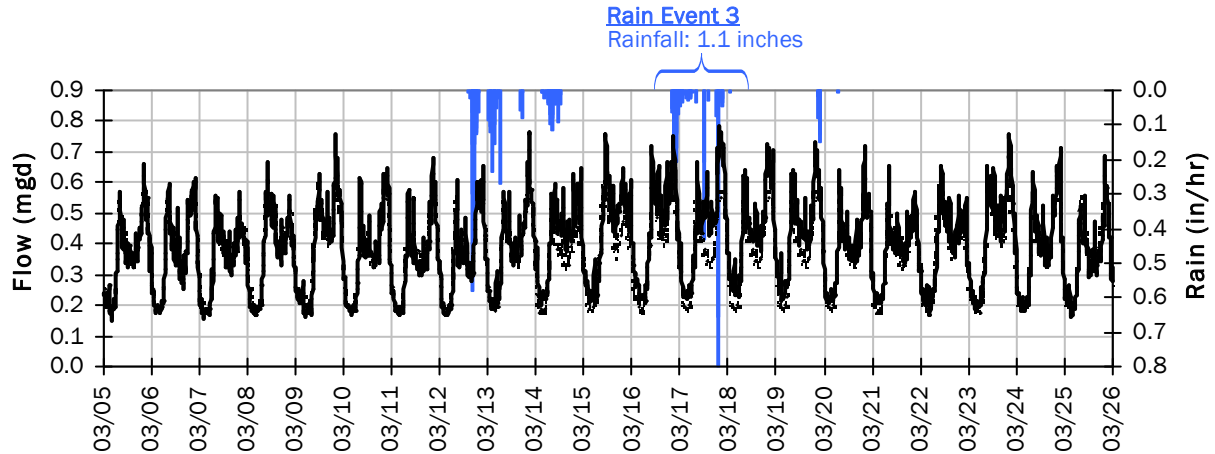
Inflow / Infiltration

Peak I/I Rate: 0.260 mgd
Total I/I: 178,000 gallons

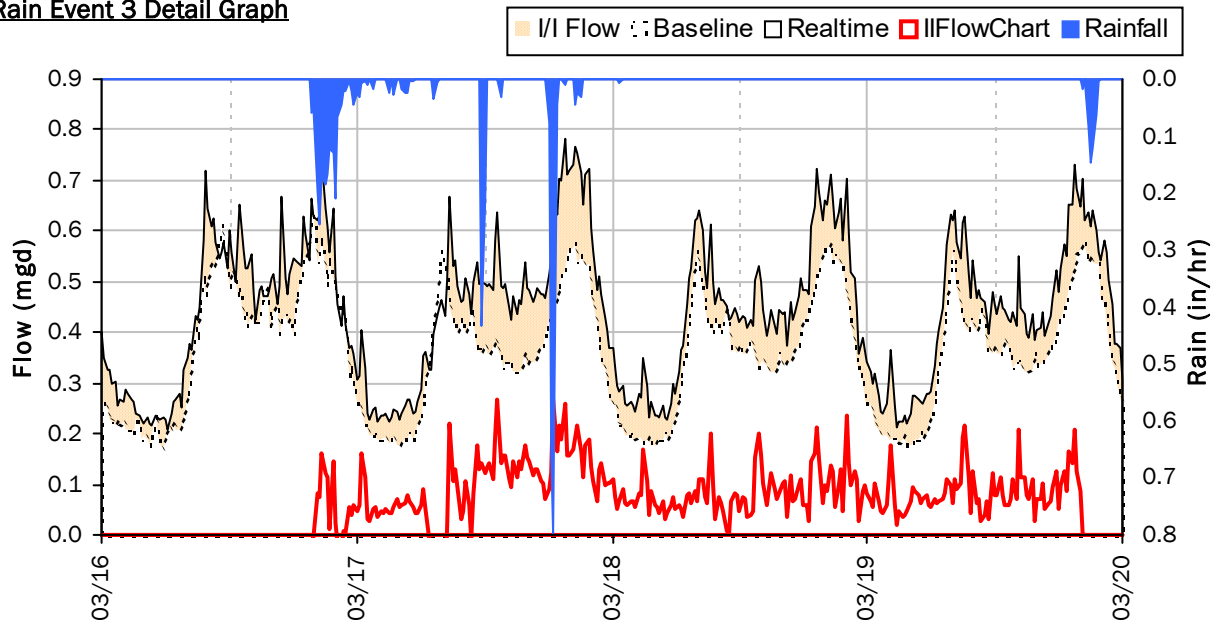
SITE 07

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.10 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.78 mgd	Peak I/I Rate:	0.27 mgd
PF:	2.17	Total I/I:	265,000 gallons
Peak Level:	6.27 in		
d/D Ratio:	0.42		

Monitoring Site: Site 08

Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: Parking lot behind Raley's, 39 Lincoln Blvd, Lincoln, CA

Data Summary Report



Vicinity Map: Site 08

SITE 08

Site Information

MH ID: SE461SS09

Location: Parking lot behind Raley's, 39
Lincoln Blvd, Lincoln, CA

Coordinates: 121.2961° W, 38.8728° N

Rim Elevation: 154 feet

Expected Pipe Diameter: 24 inches

Measured Pipe Diameter: 24 inches

ADWF: 1.468 mgd

Peak Measured Flow: 3.101 mgd

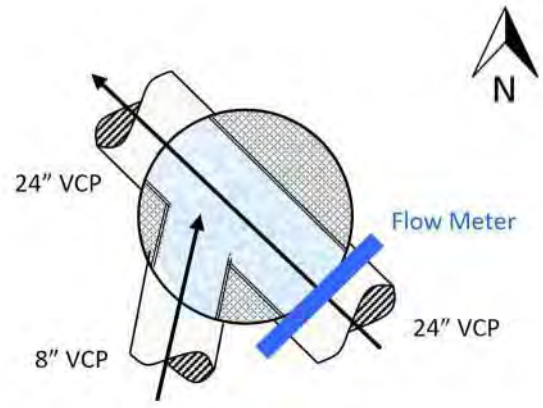
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View

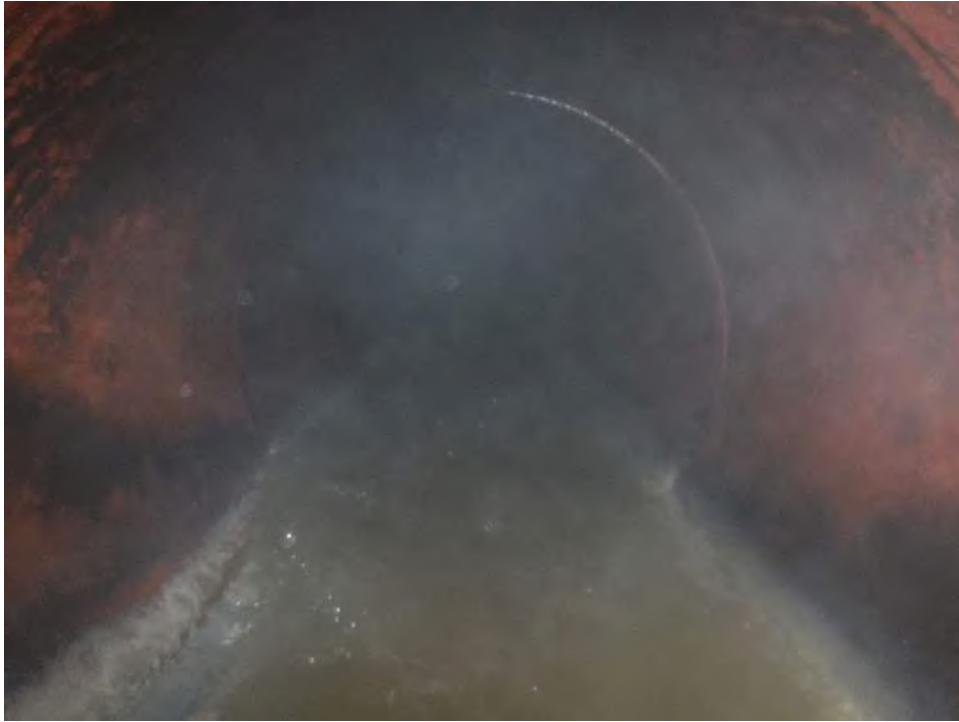


Plan View

SITE 08

Additional Site Photos

Northwest Effluent Pipe



Monitored Southeast Influent Pipe



SITE 08

Additional Site Photos

Southwest Influent Pipe

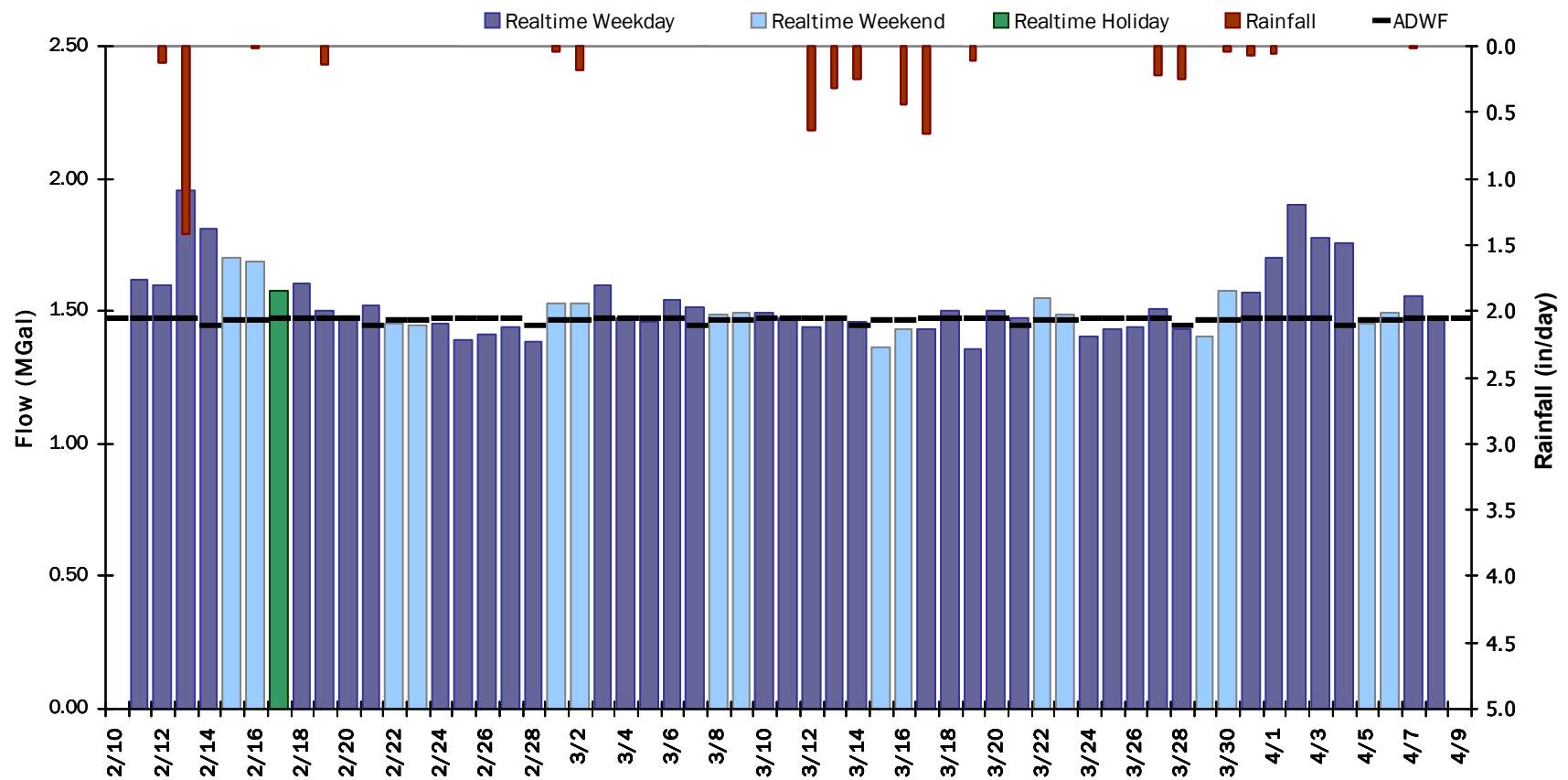


SITE 08

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 1.521 MGal Peak Daily Flow: 1.954 MGal Min Daily Flow: 0.905 MGal

Total Rainfall: 4.98 inches



SITE 08

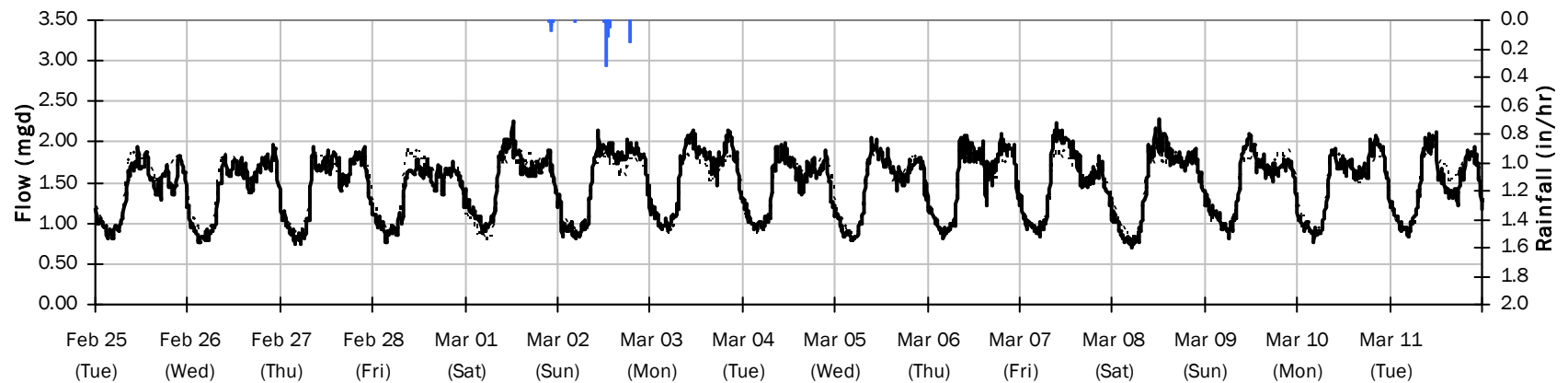
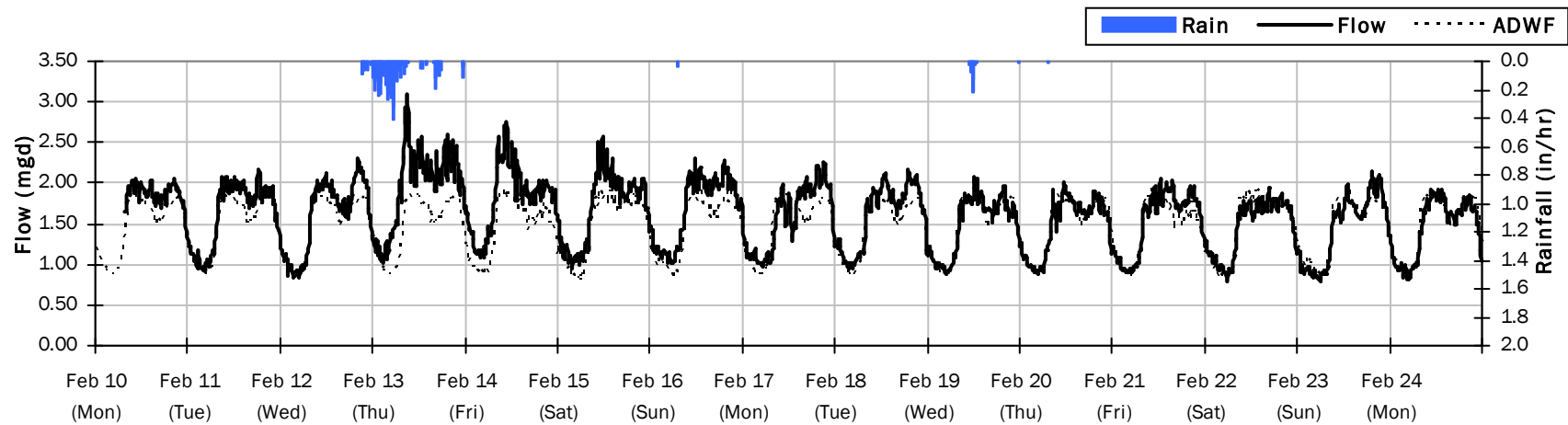
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.92 inches

Period Avg Flow: 1.546 mgd

Period Peak Flow: 3.101 mgd

Period Min Flow: 0.706 mgd



SITE 08

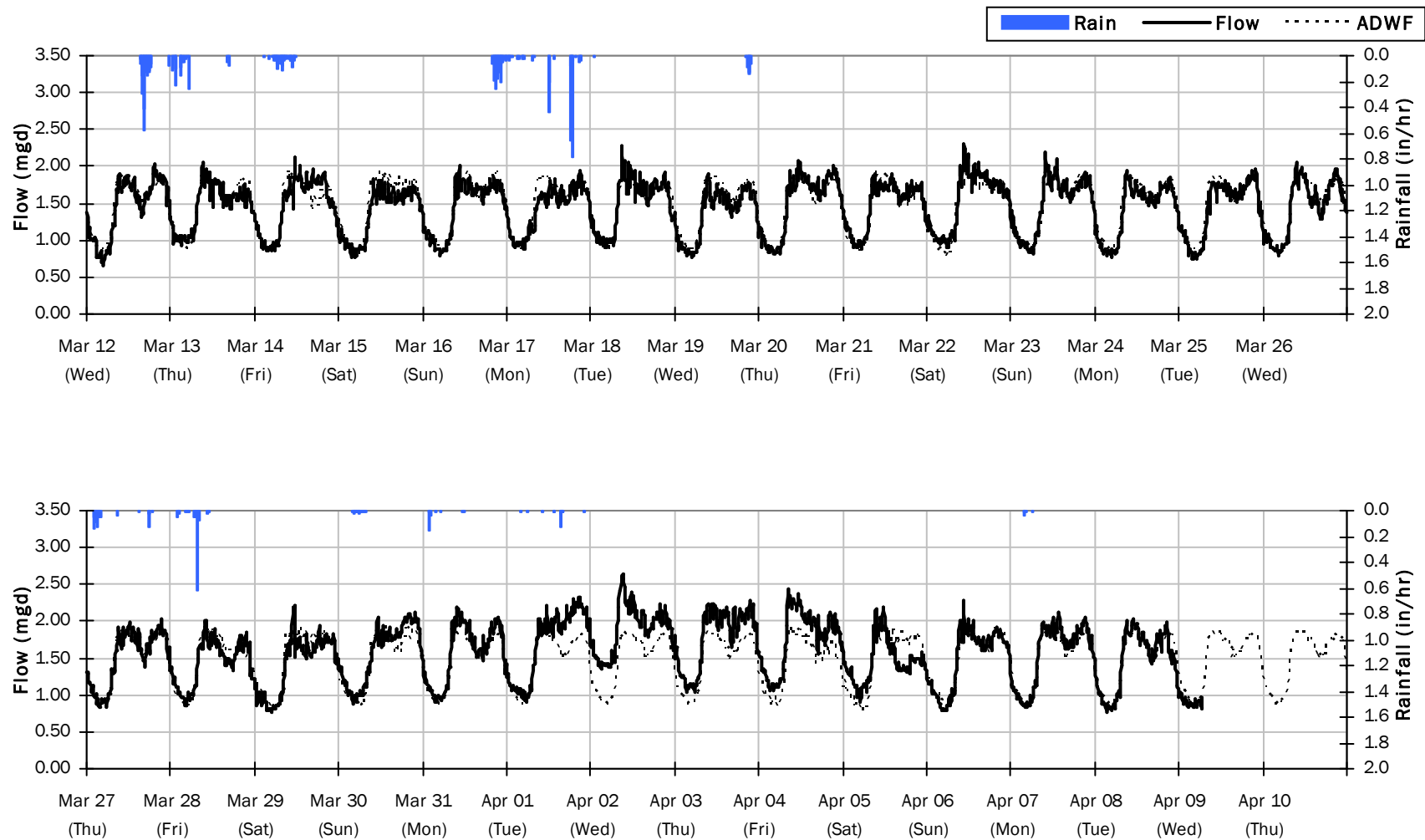
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.06 inches

Period Avg Flow: 1.506 mgd

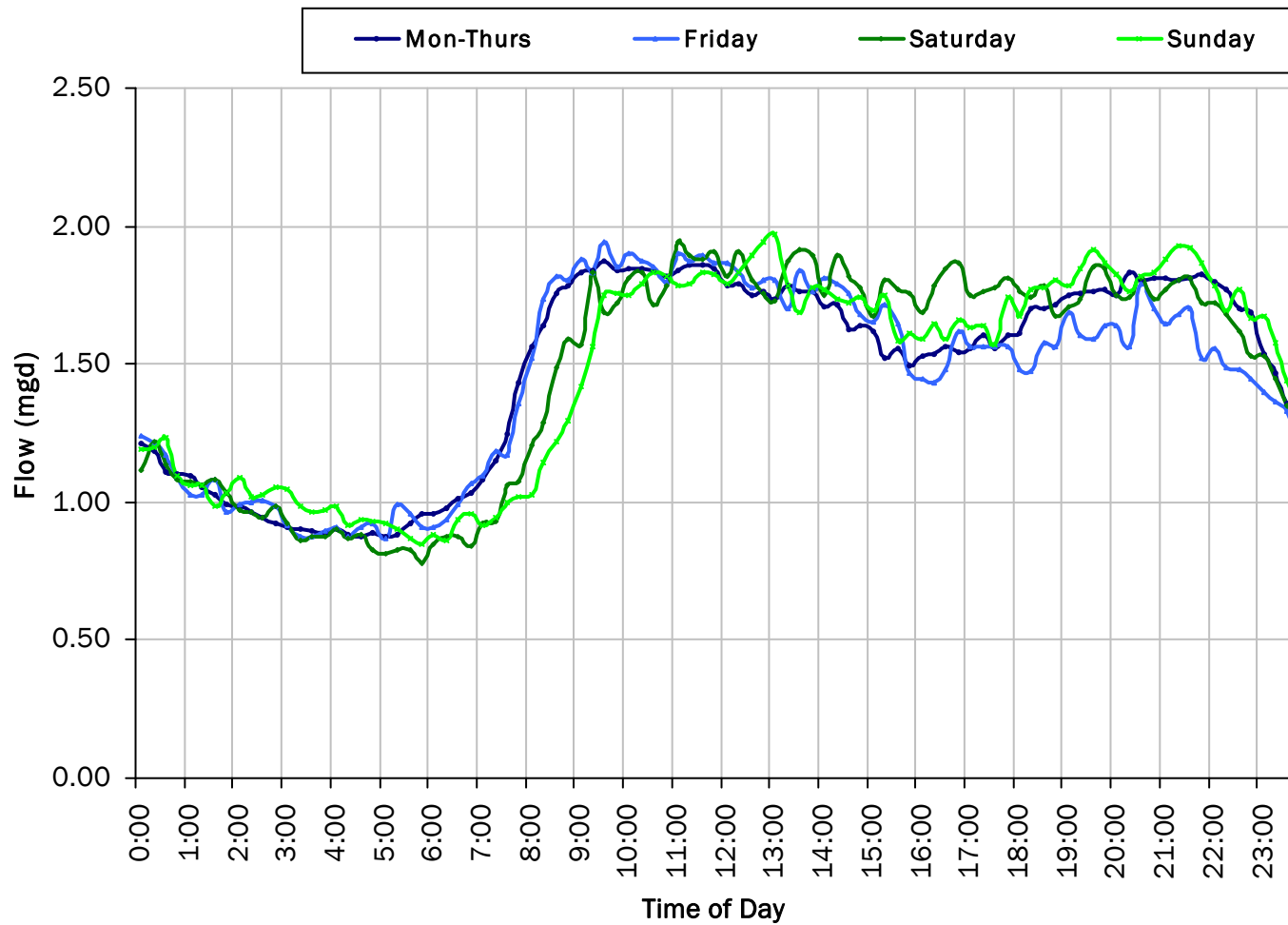
Period Peak Flow: 2.634 mgd

Period Min Flow: 0.661 mgd

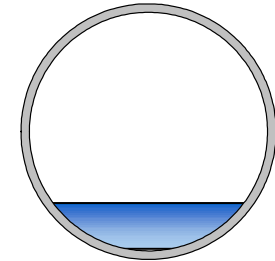


SITE 08

Average Dry Weather Flow Hydrographs

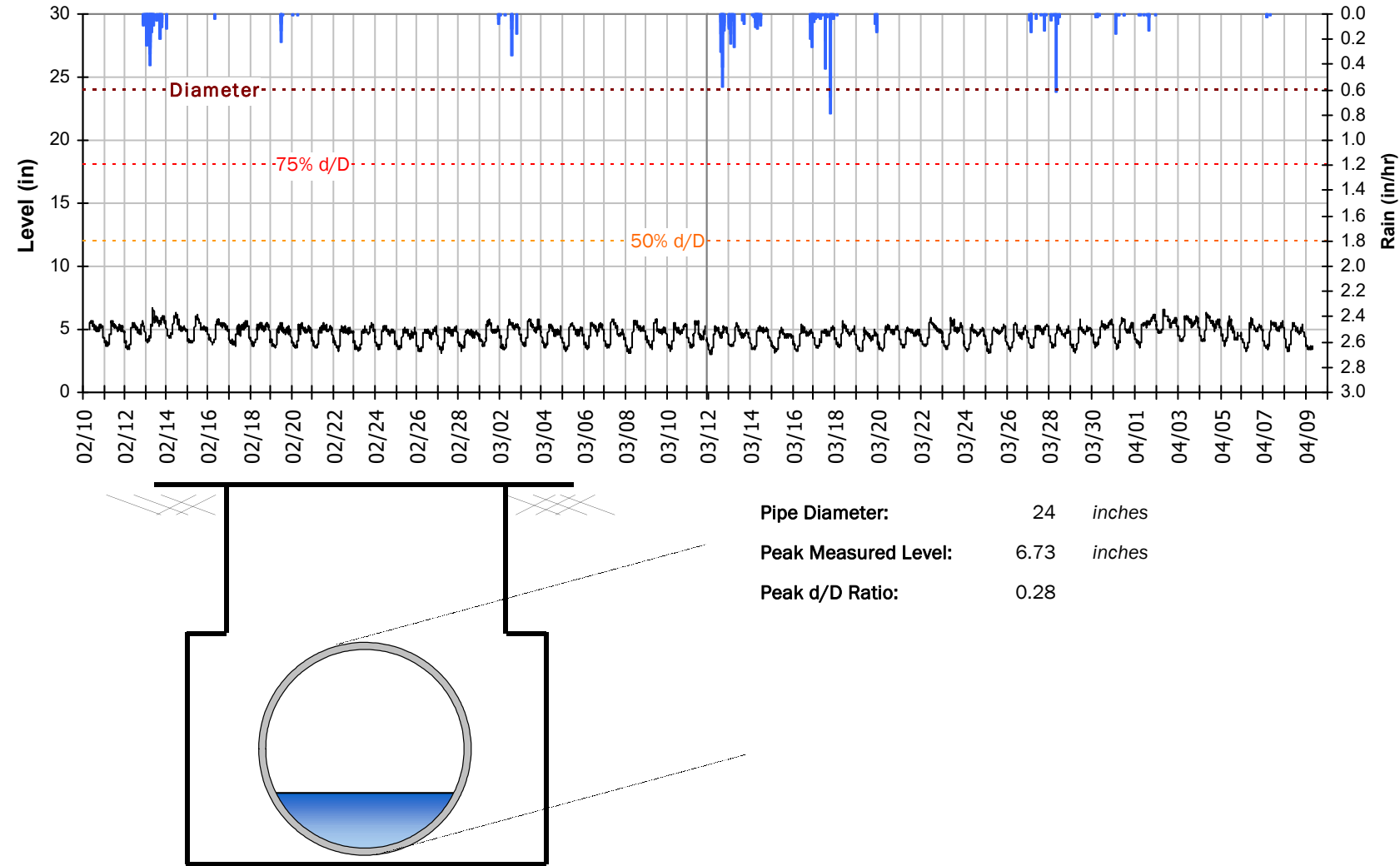


ADWF:
1.468 mgd



SITE 08
Site Capacity and Surge Summary

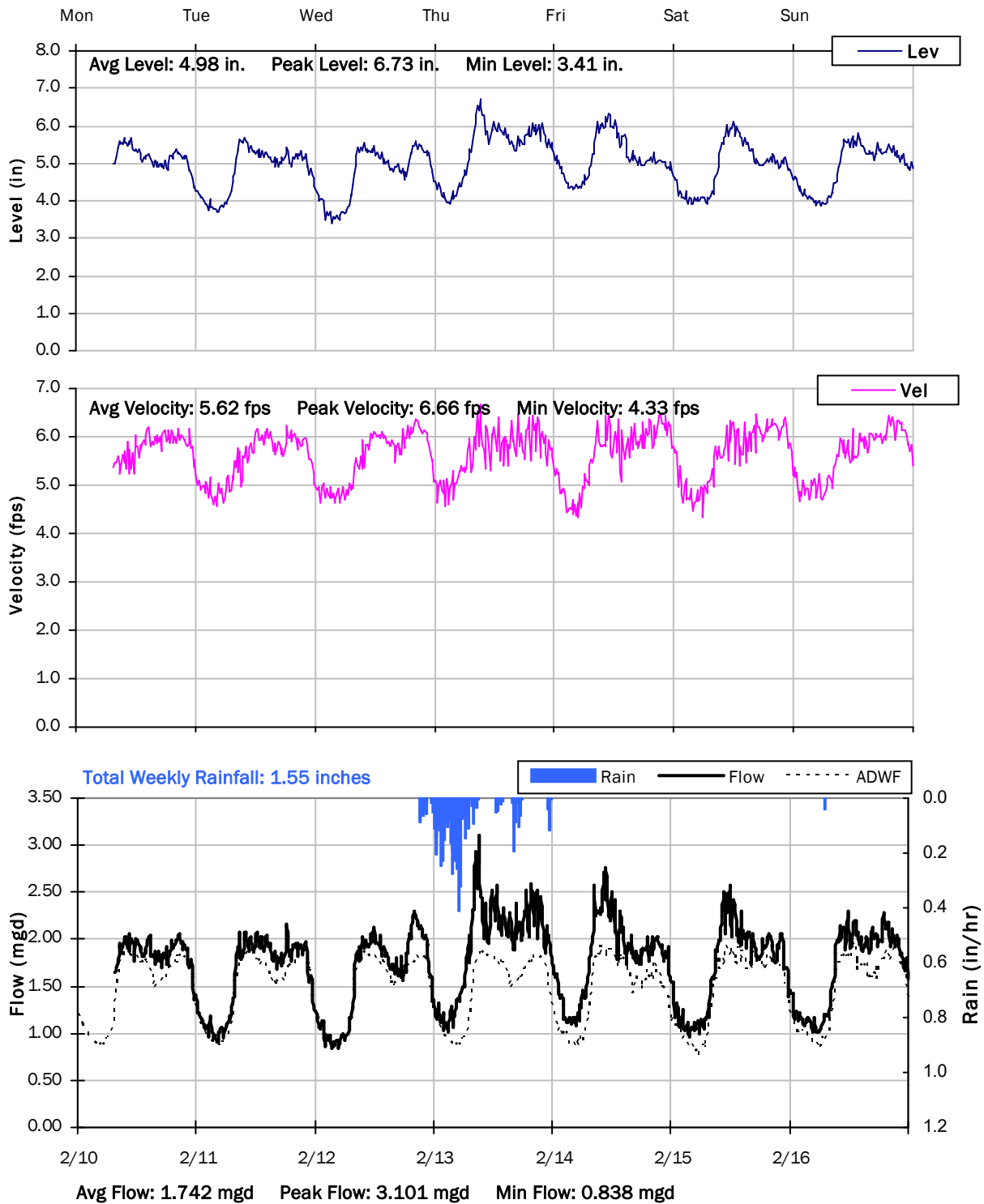
Realtime Flow Levels with Rainfall Data over Peak Level Period



SITE 08

Weekly Level, Velocity and Flow Hydrographs

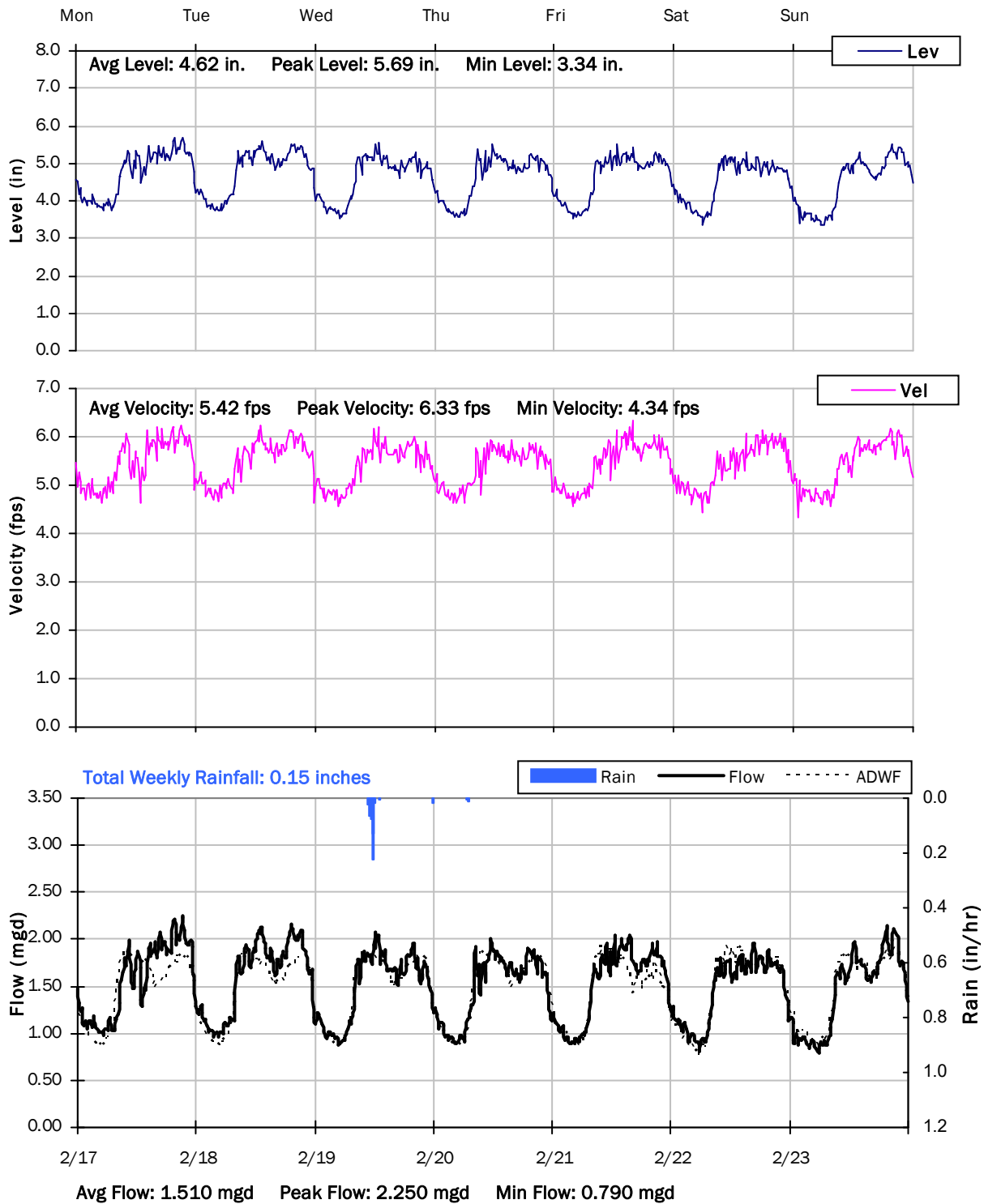
2/10/2025 to 2/17/2025



SITE 08

Weekly Level, Velocity and Flow Hydrographs

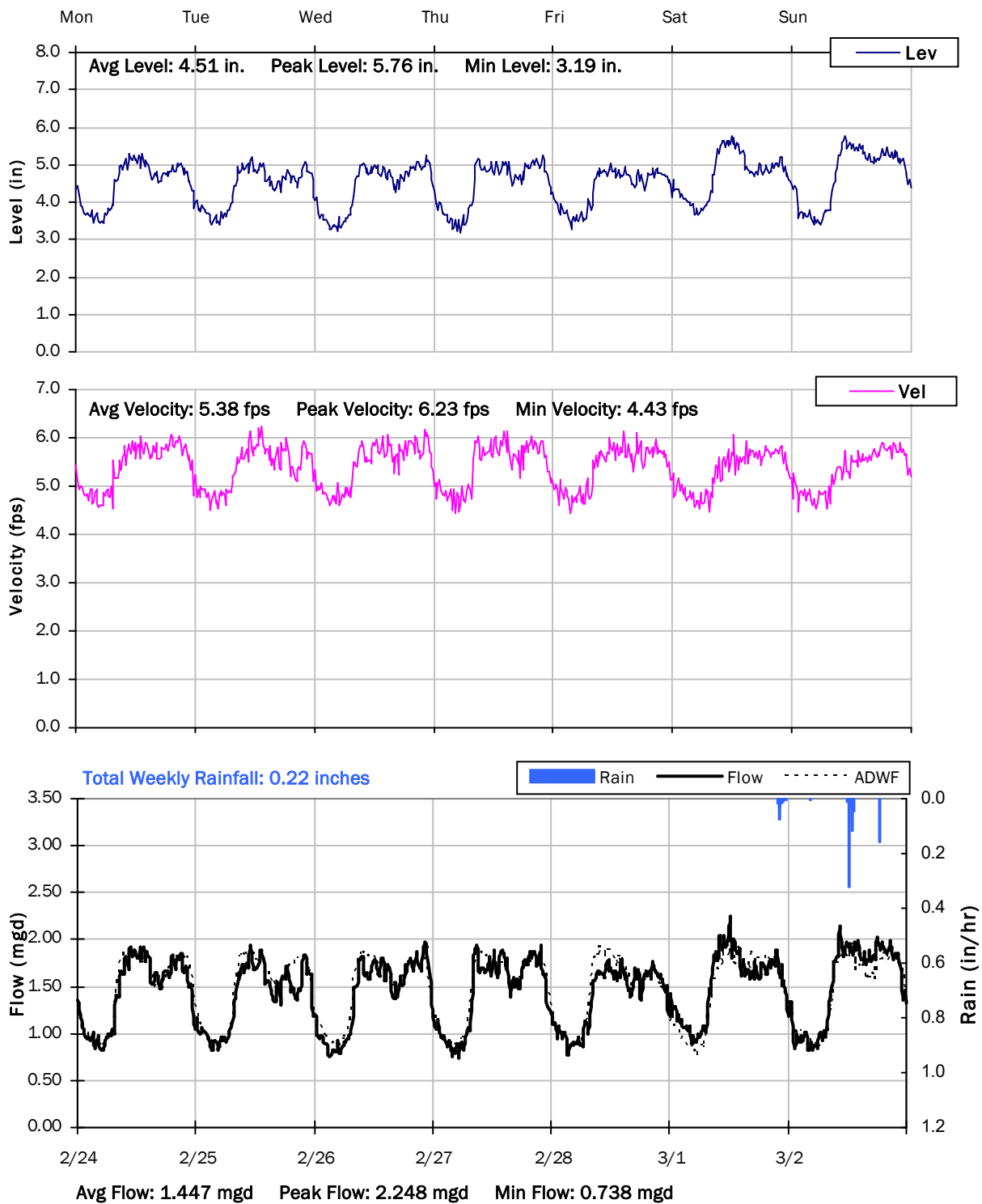
2/17/2025 to 2/24/2025



SITE 08

Weekly Level, Velocity and Flow Hydrographs

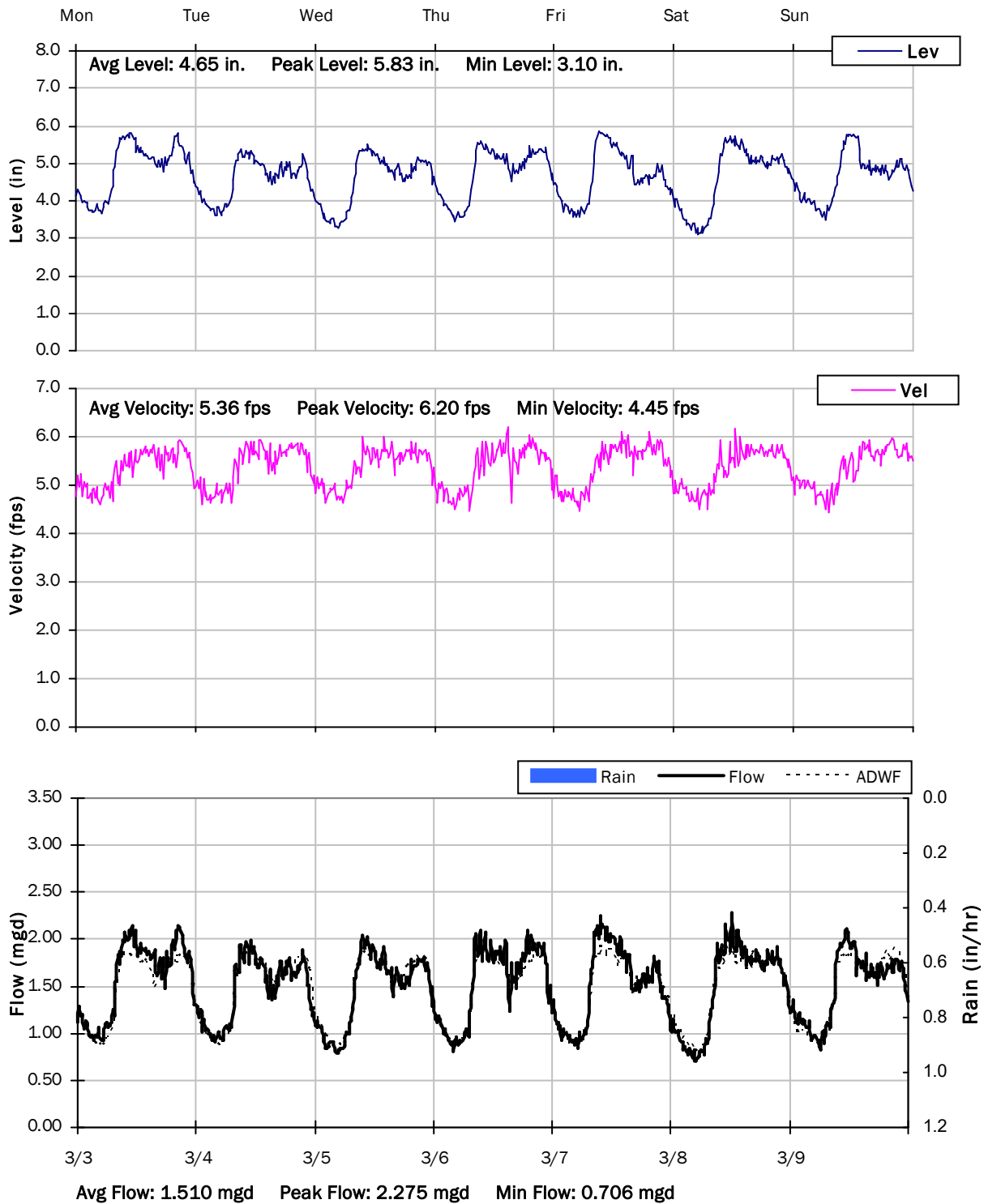
2/24/2025 to 3/3/2025



SITE 08

Weekly Level, Velocity and Flow Hydrographs

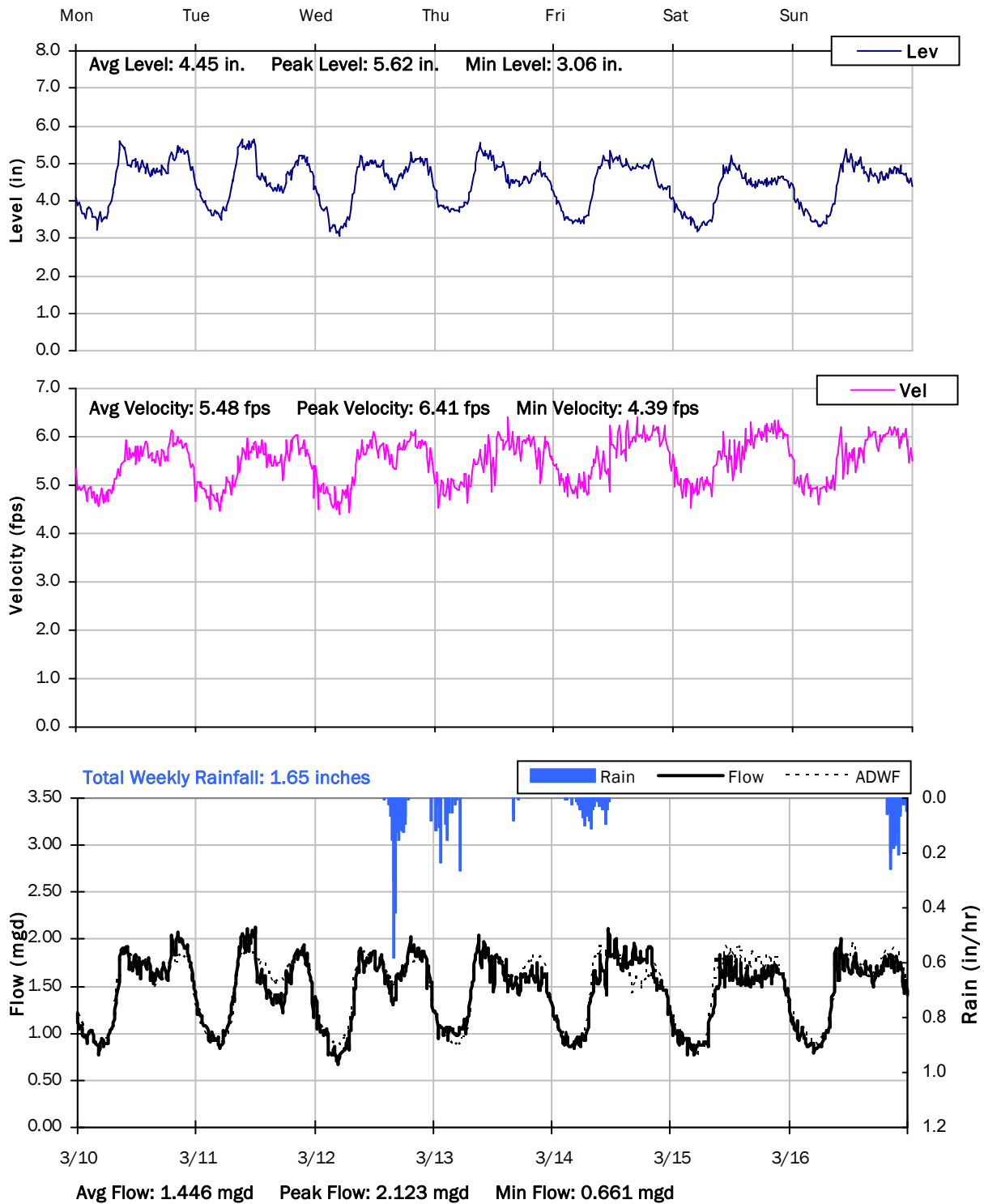
3/3/2025 to 3/10/2025



SITE 08

Weekly Level, Velocity and Flow Hydrographs

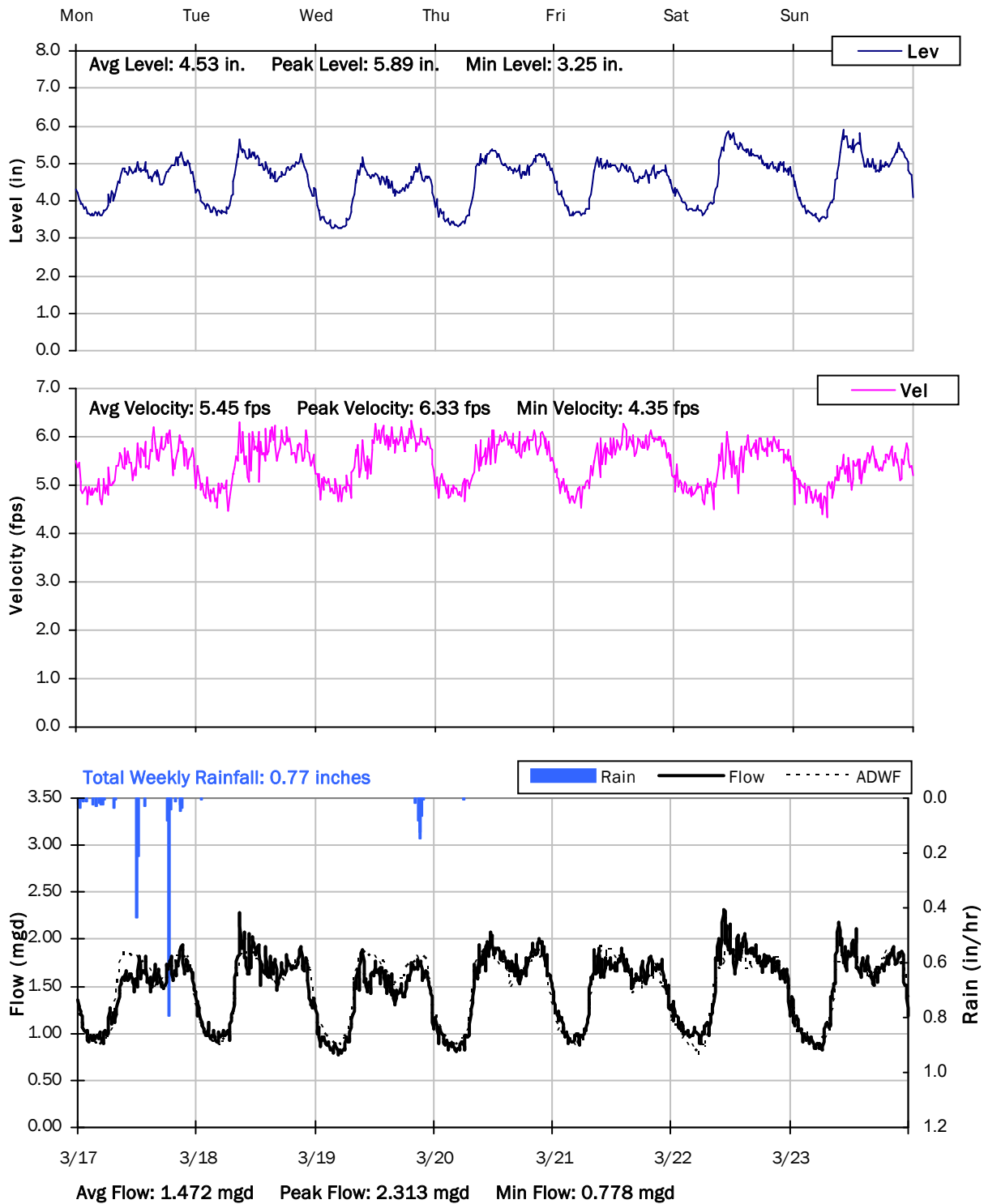
3/10/2025 to 3/17/2025



SITE 08

Weekly Level, Velocity and Flow Hydrographs

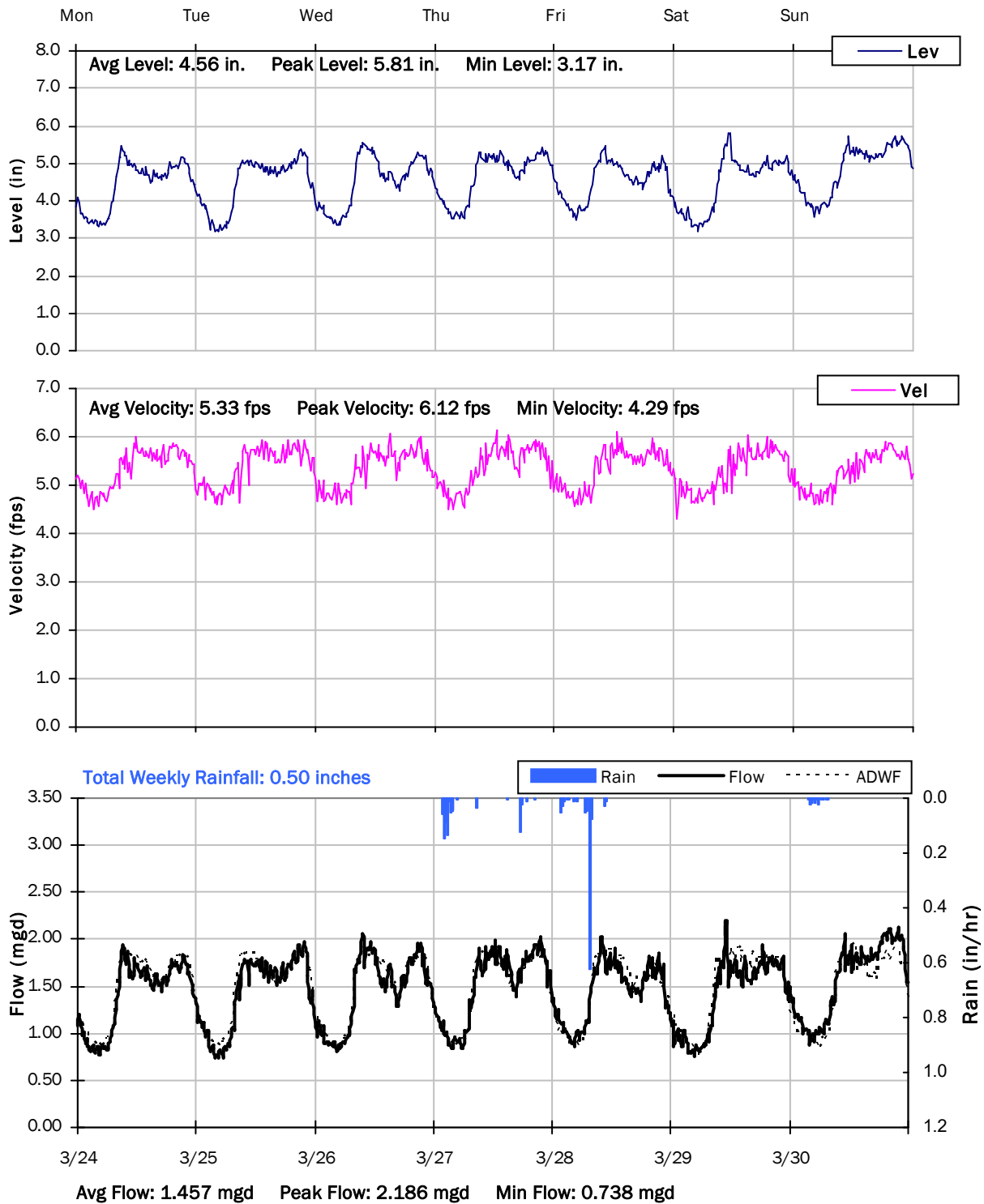
3/17/2025 to 3/24/2025



SITE 08

Weekly Level, Velocity and Flow Hydrographs

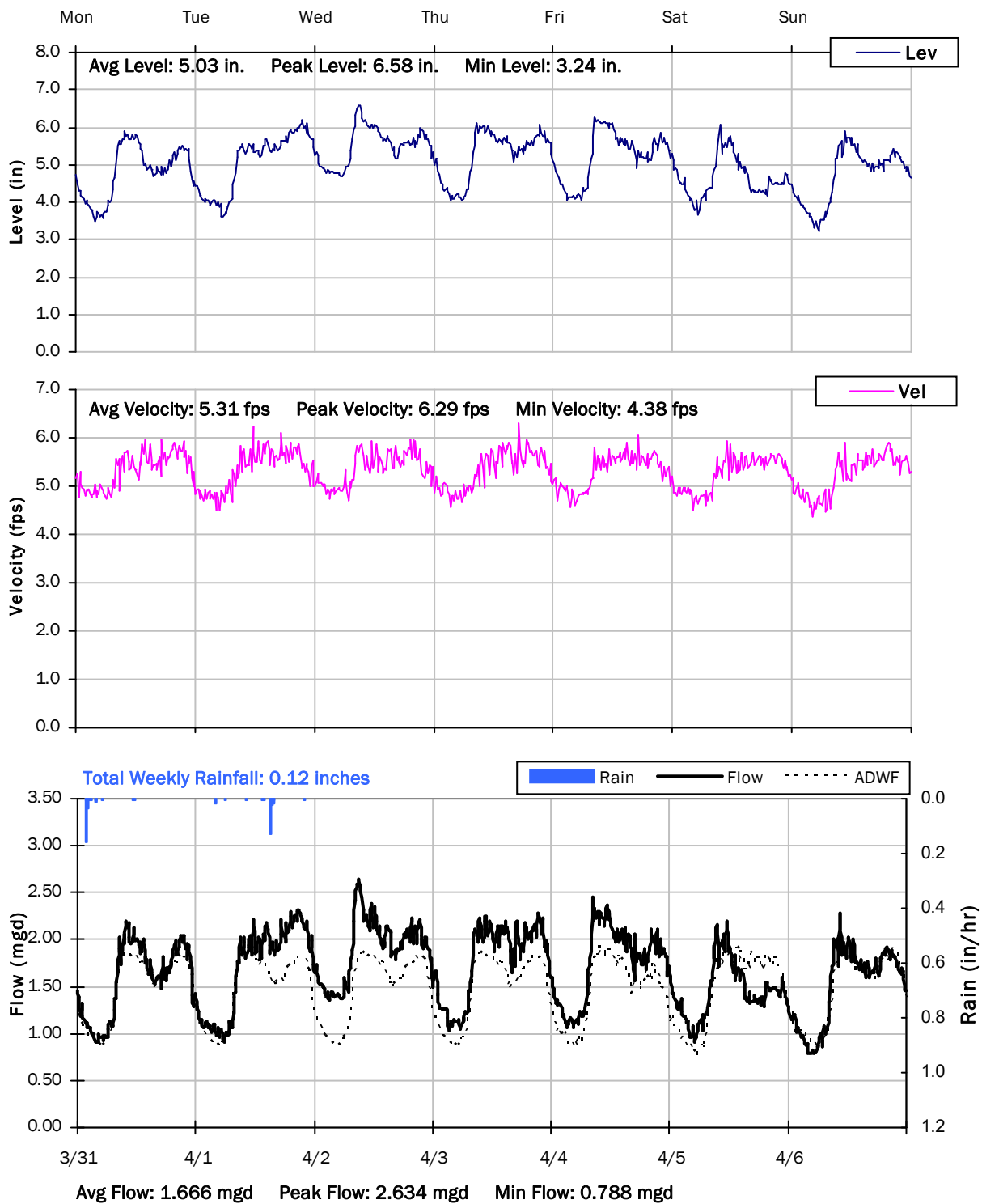
3/24/2025 to 3/31/2025



SITE 08

Weekly Level, Velocity and Flow Hydrographs

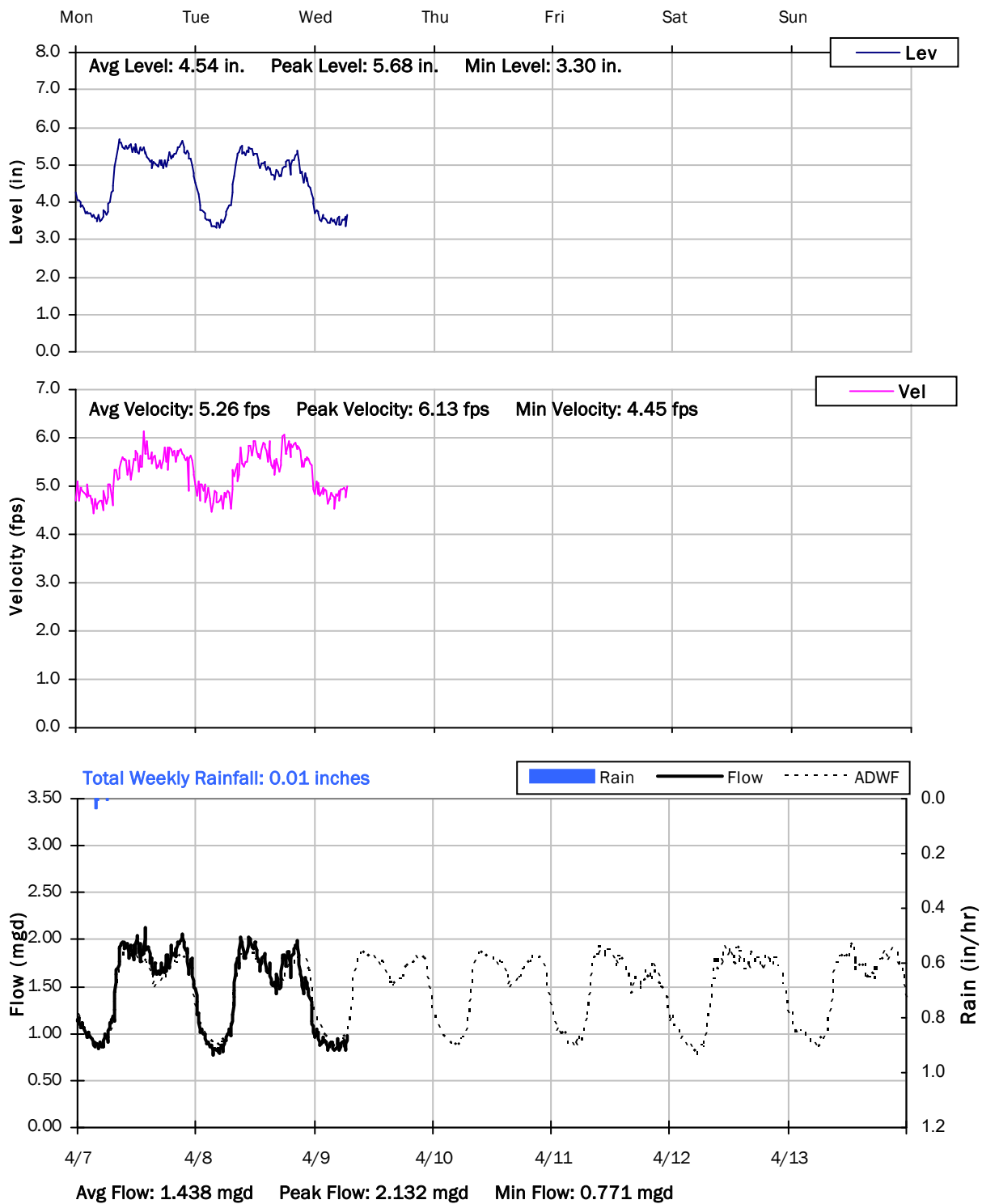
3/31/2025 to 4/7/2025



SITE 08

Weekly Level, Velocity and Flow Hydrographs

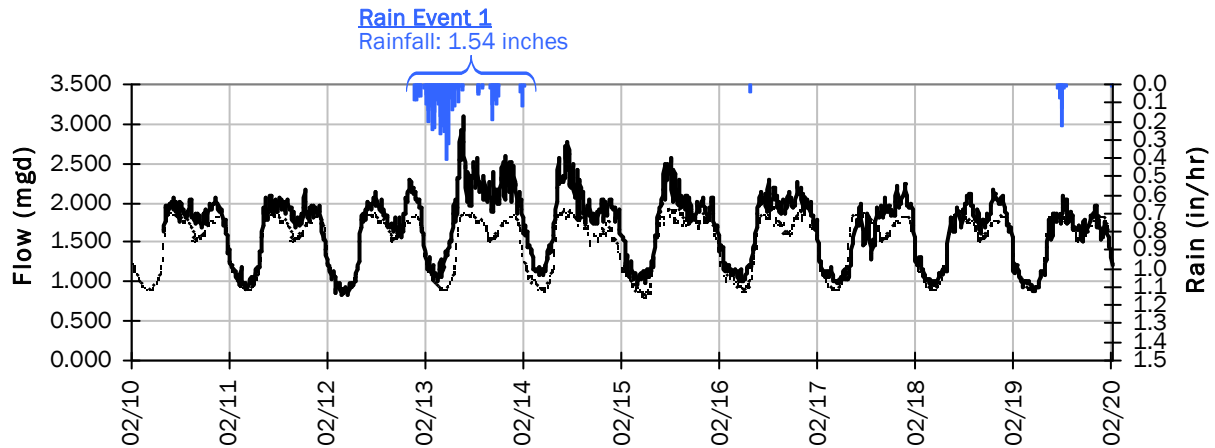
4/7/2025 to 4/14/2025



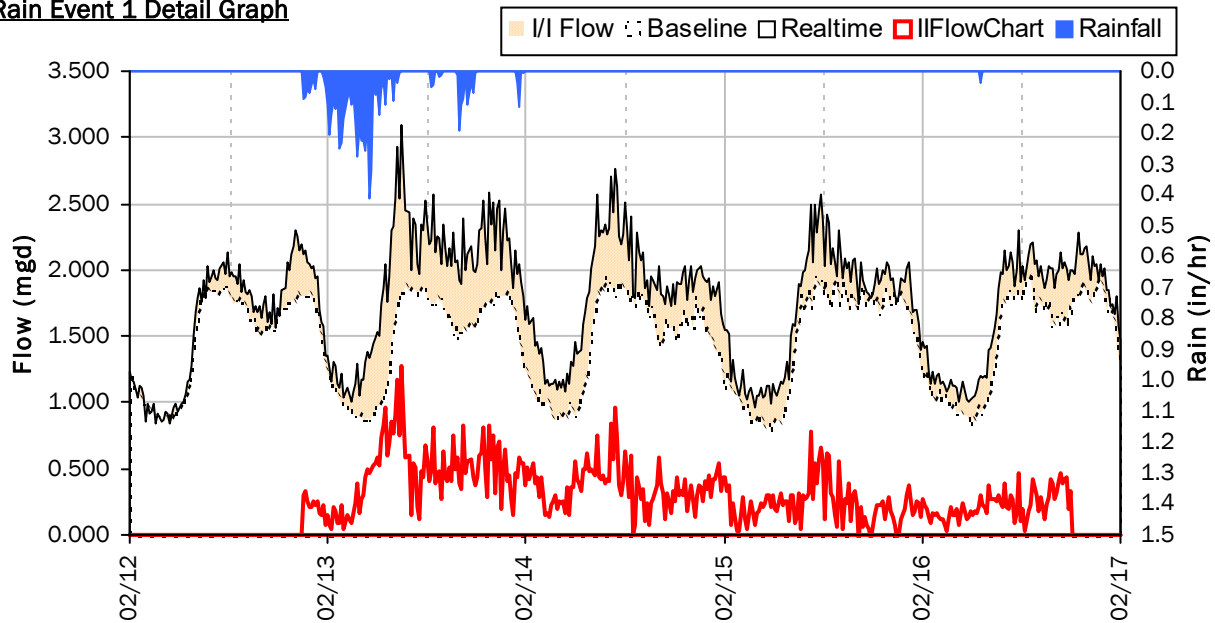
SITE 08

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.54 inches)

Capacity

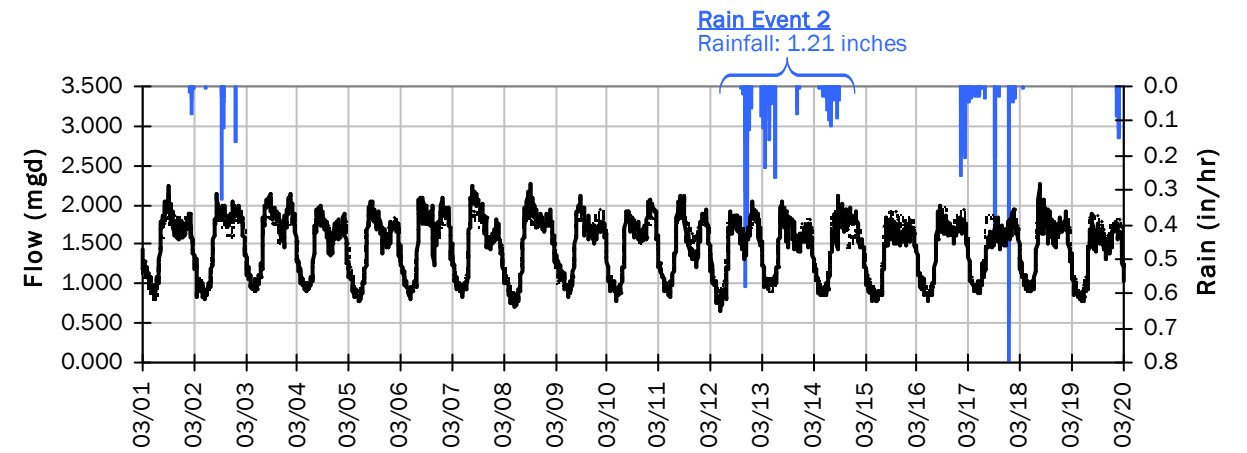
Peak Flow: 3.101 mgd
PF: 2.11
Peak Level: 6.73 in
d/D Ratio: 0.28

Inflow / Infiltration

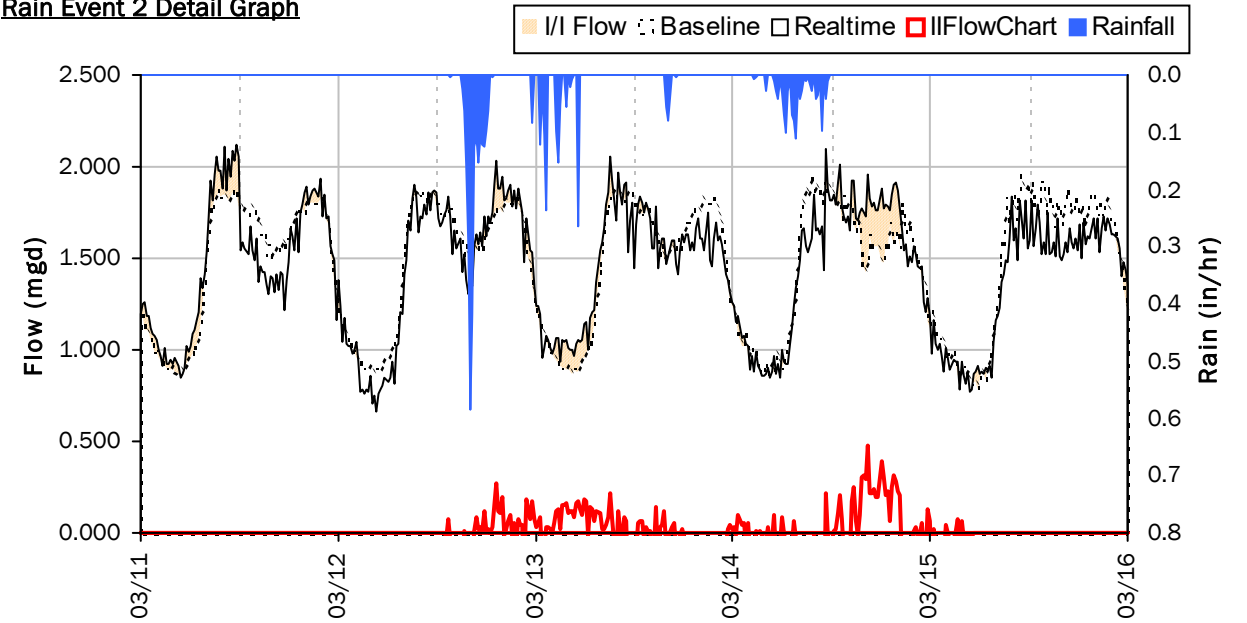
Peak I/I Rate: 1.271 mgd
Total I/I: 1,278,000 gallons

SITE 08
I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



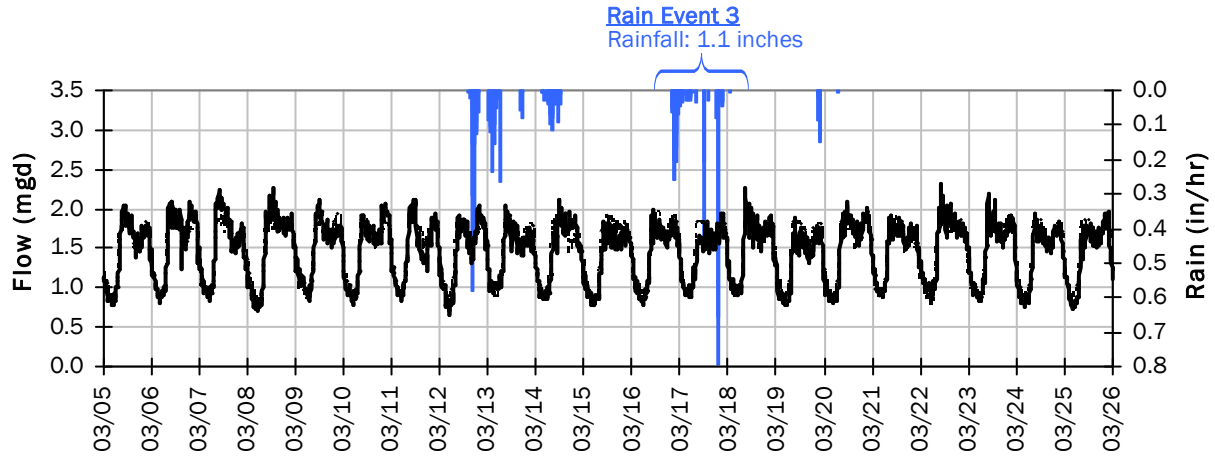
Storm Event I/I Analysis (Rain = 1.21 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	2.093 mgd	Peak I/I Rate:	0.475 mgd
PF:	1.43	Total I/I:	4,000 gallons
Peak Level:	5.57 in		
d/D Ratio:	0.23		

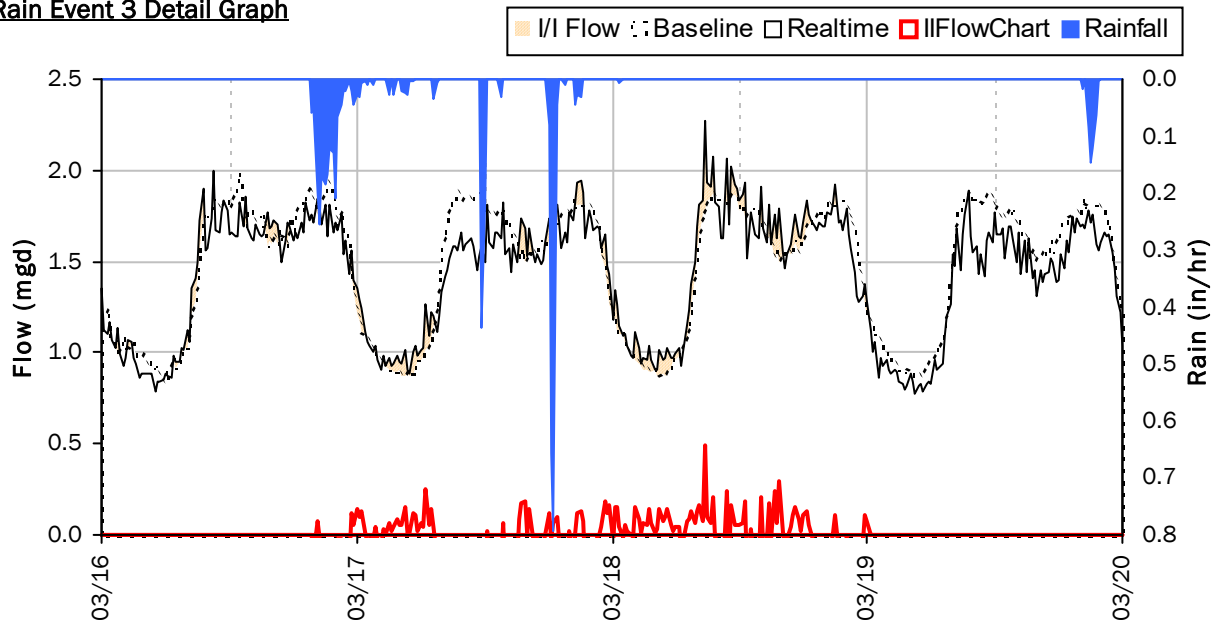
SITE 08

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.10 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	2.27 mgd	Peak I/I Rate:	0.49 mgd
PF:	1.55	Total I/I:	-24,000 gallons
Peak Level:	5.62 in		
d/D Ratio:	0.23		

Monitoring Site: Site 09A

Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: In roundabout at Fieldstone Dr and E Joiner Pkwy, Lincoln, CA

Data Summary Report



Vicinity Map: Site 09A

SITE 09A

Site Information

MH ID: SE502SS10

Location: In roundabout at Fieldstone Dr and E Joiner Pkwy, Lincoln, CA

Coordinates: 121.2866° W, 38.8476° N

Rim Elevation: 147 feet

Expected Pipe Diameter: 15 inches

Measured Pipe Diameter: 16 inches

ADWF: 0.244 mgd

Peak Measured Flow: 0.522 mgd

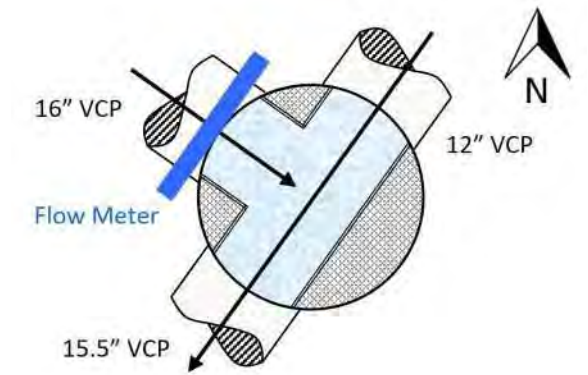
Sediment: 0.5 inches



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 09A

Additional Site Photos

Southwest Effluent Pipe



Monitored Northwest Influent Pipe



SITE 09A

Additional Site Photos

Northeast Influent Pipe

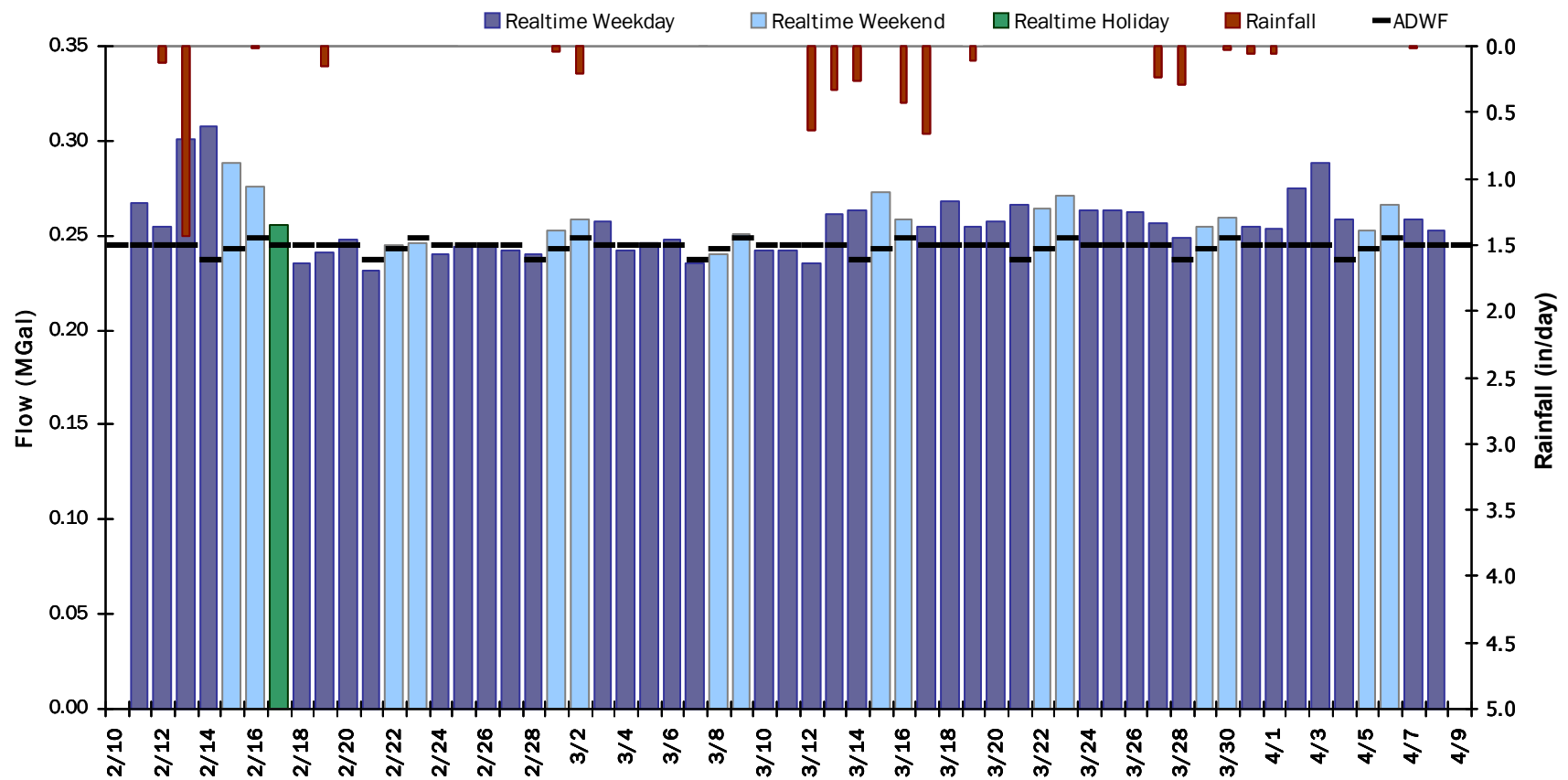


SITE 09A

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.255 MGal Peak Daily Flow: 0.315 MGal Min Daily Flow: 0.138 MGal

Total Rainfall: 5.07 inches



SITE 09A

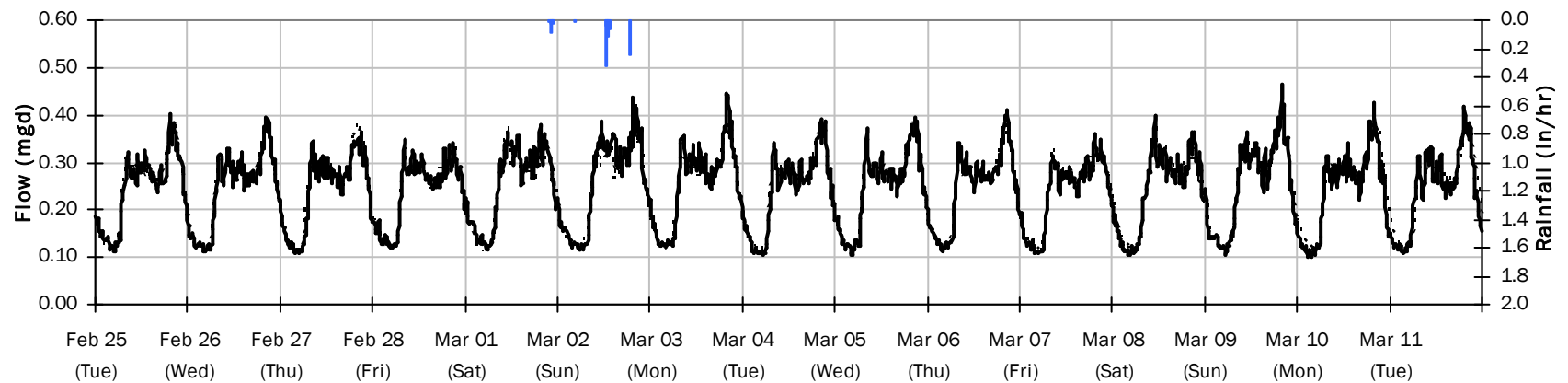
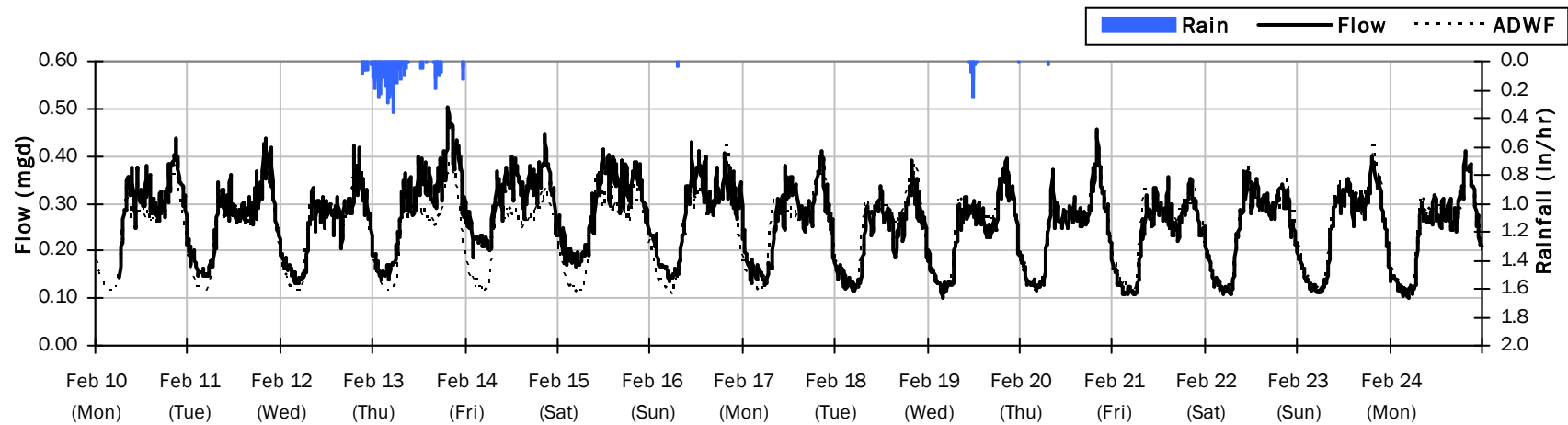
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.96 inches

Period Avg Flow: 0.254 mgd

Period Peak Flow: 0.504 mgd

Period Min Flow: 0.101 mgd



SITE 09A

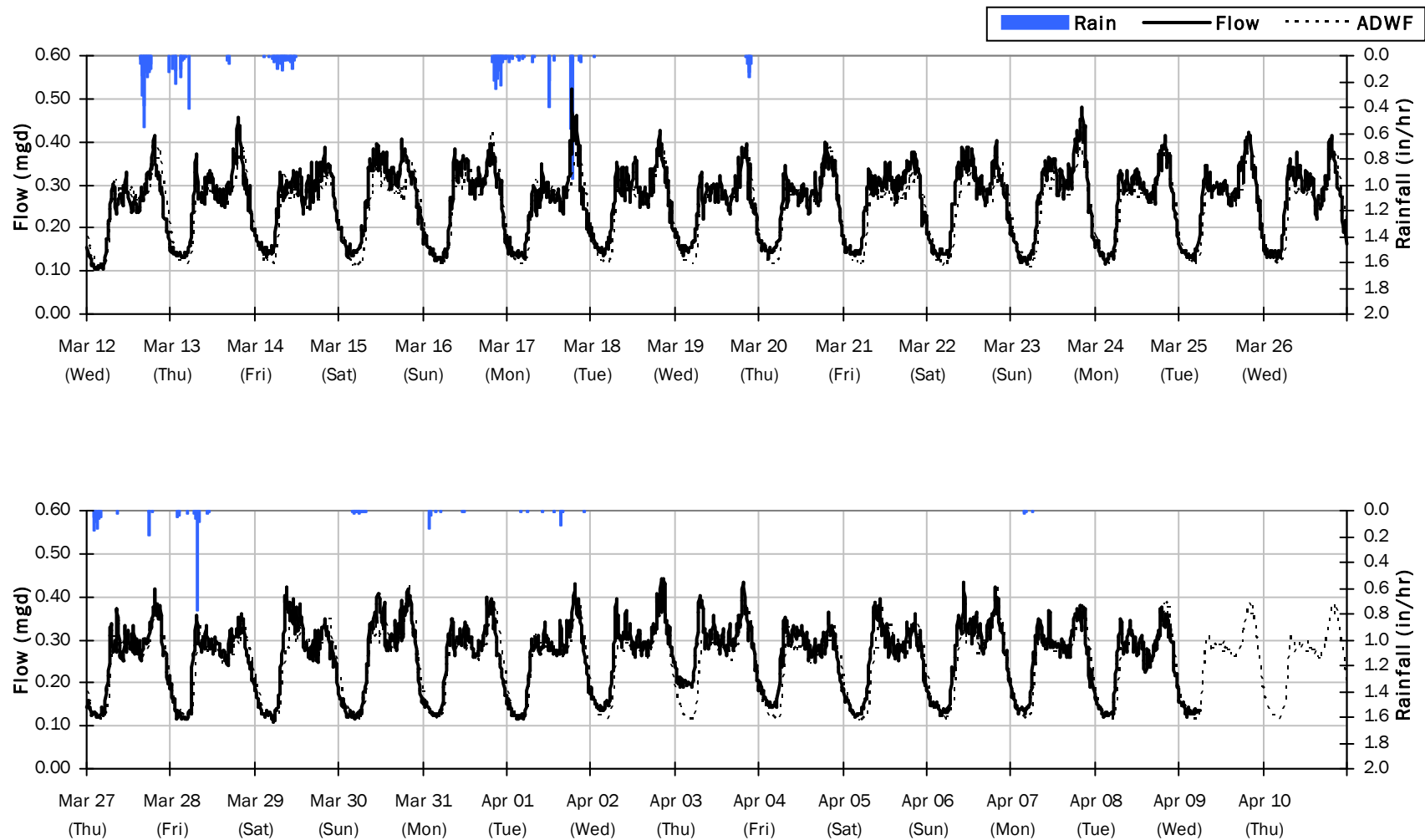
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.11 inches

Period Avg Flow: 0.259 mgd

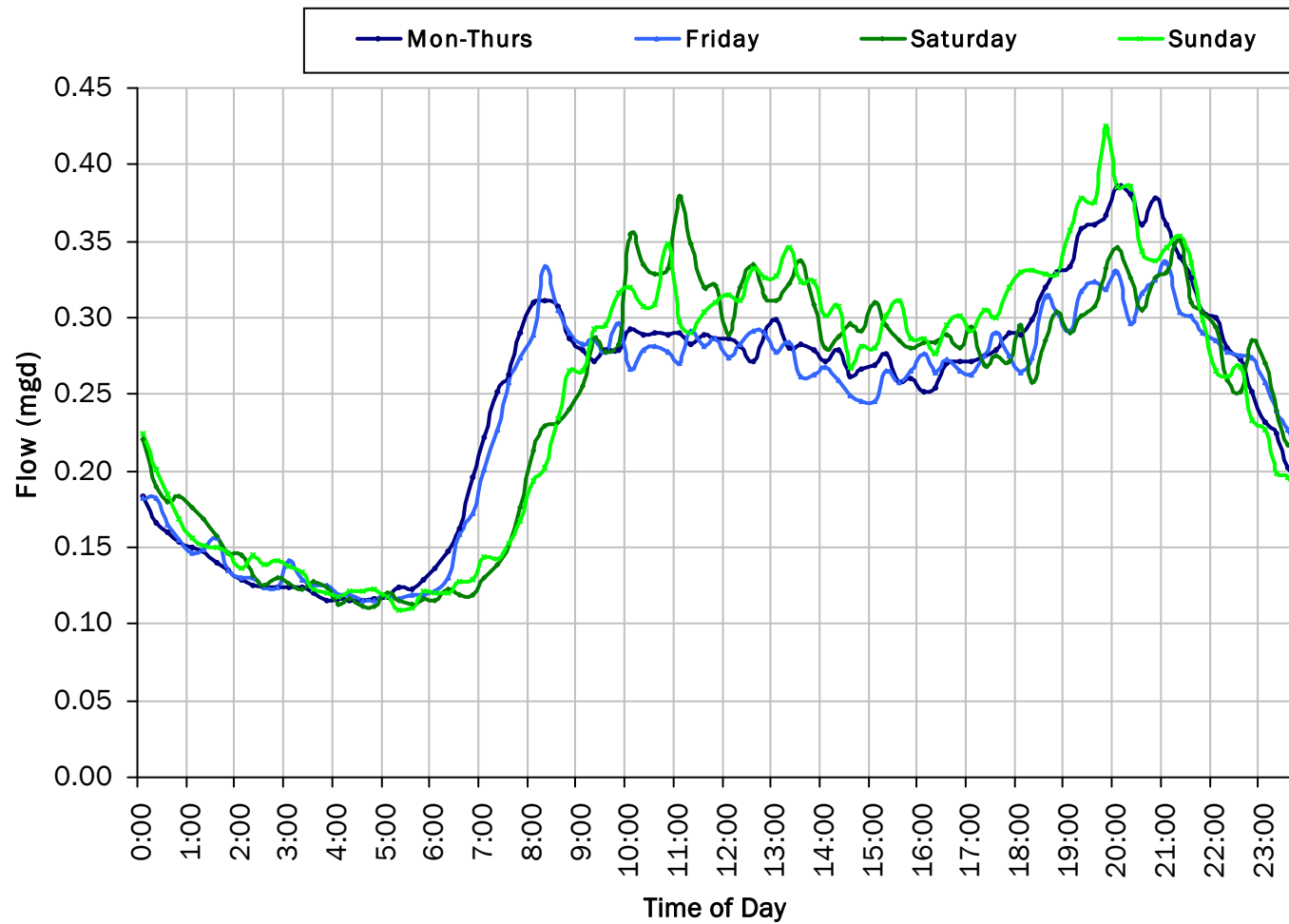
Period Peak Flow: 0.522 mgd

Period Min Flow: 0.105 mgd

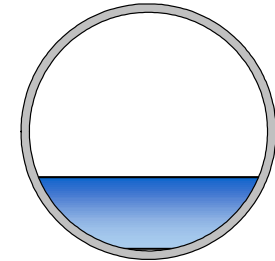


SITE 09A

Average Dry Weather Flow Hydrographs



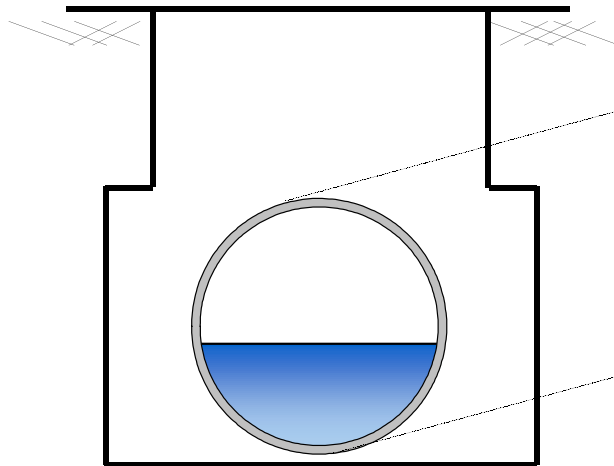
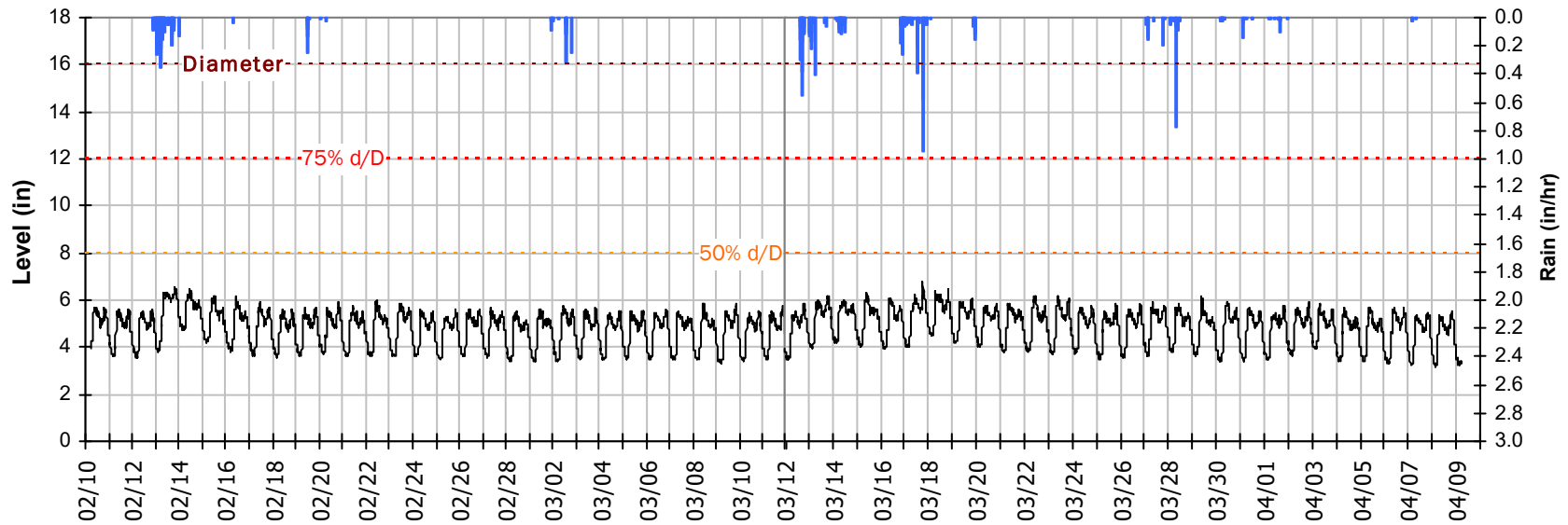
ADWF:
0.244 mgd



SITE 09A

Site Capacity and Surge Summary

Realtime Flow Levels with Rainfall Data over Peak Level Period

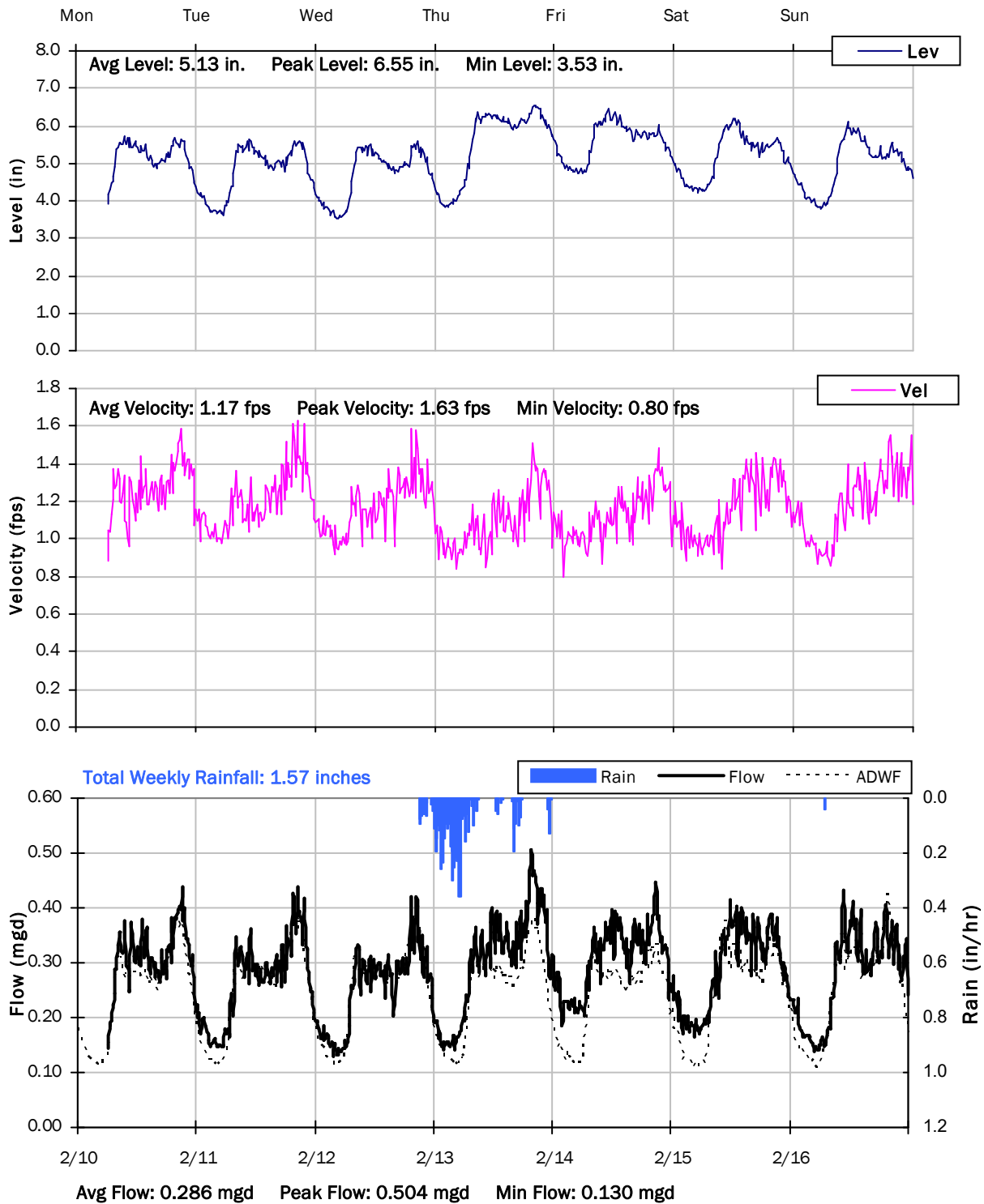


Pipe Diameter: 16 inches
Peak Measured Level: 6.77 inches
Peak d/D Ratio: 0.42

SITE 09A

Weekly Level, Velocity and Flow Hydrographs

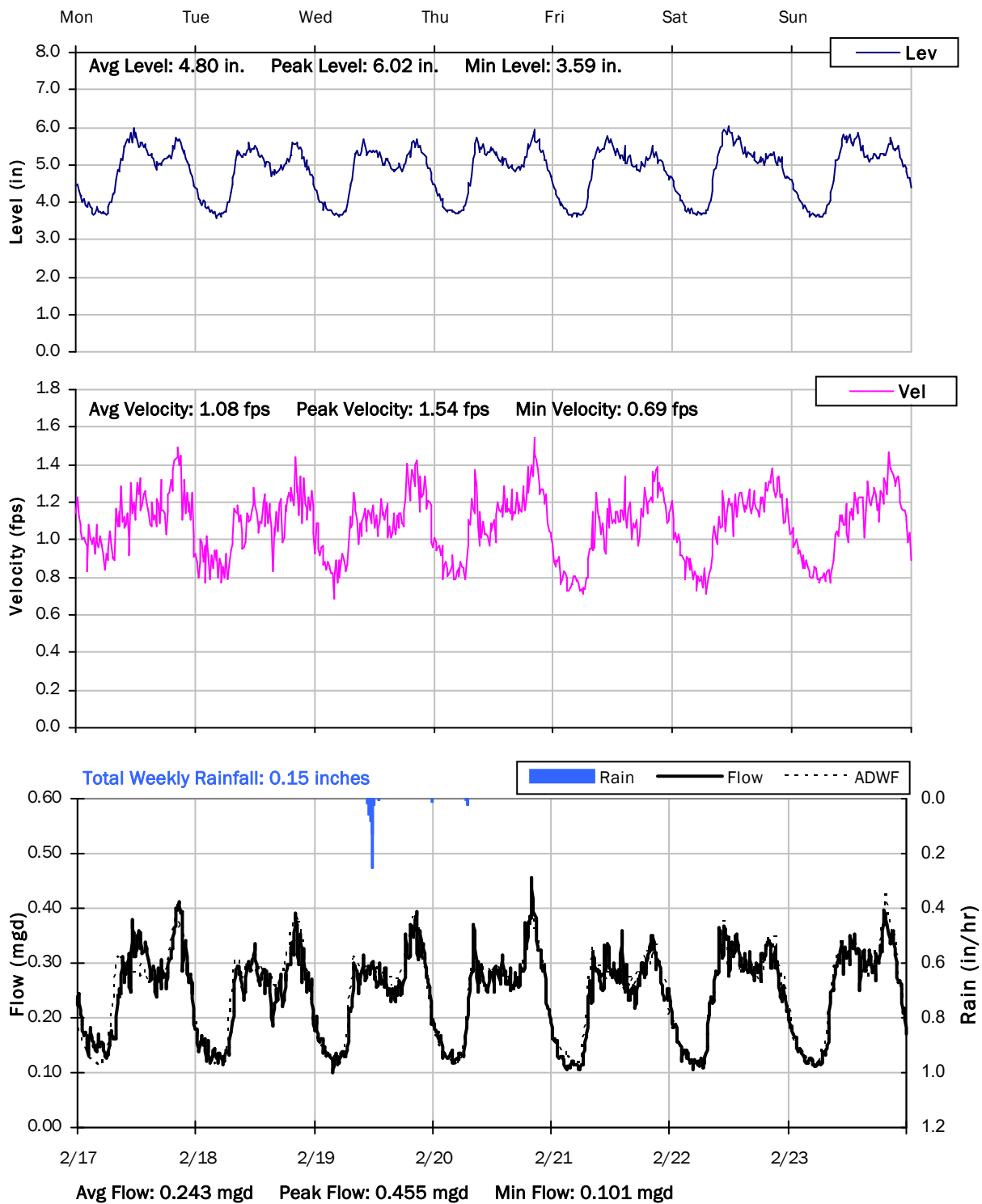
2/10/2025 to 2/17/2025



SITE 09A

Weekly Level, Velocity and Flow Hydrographs

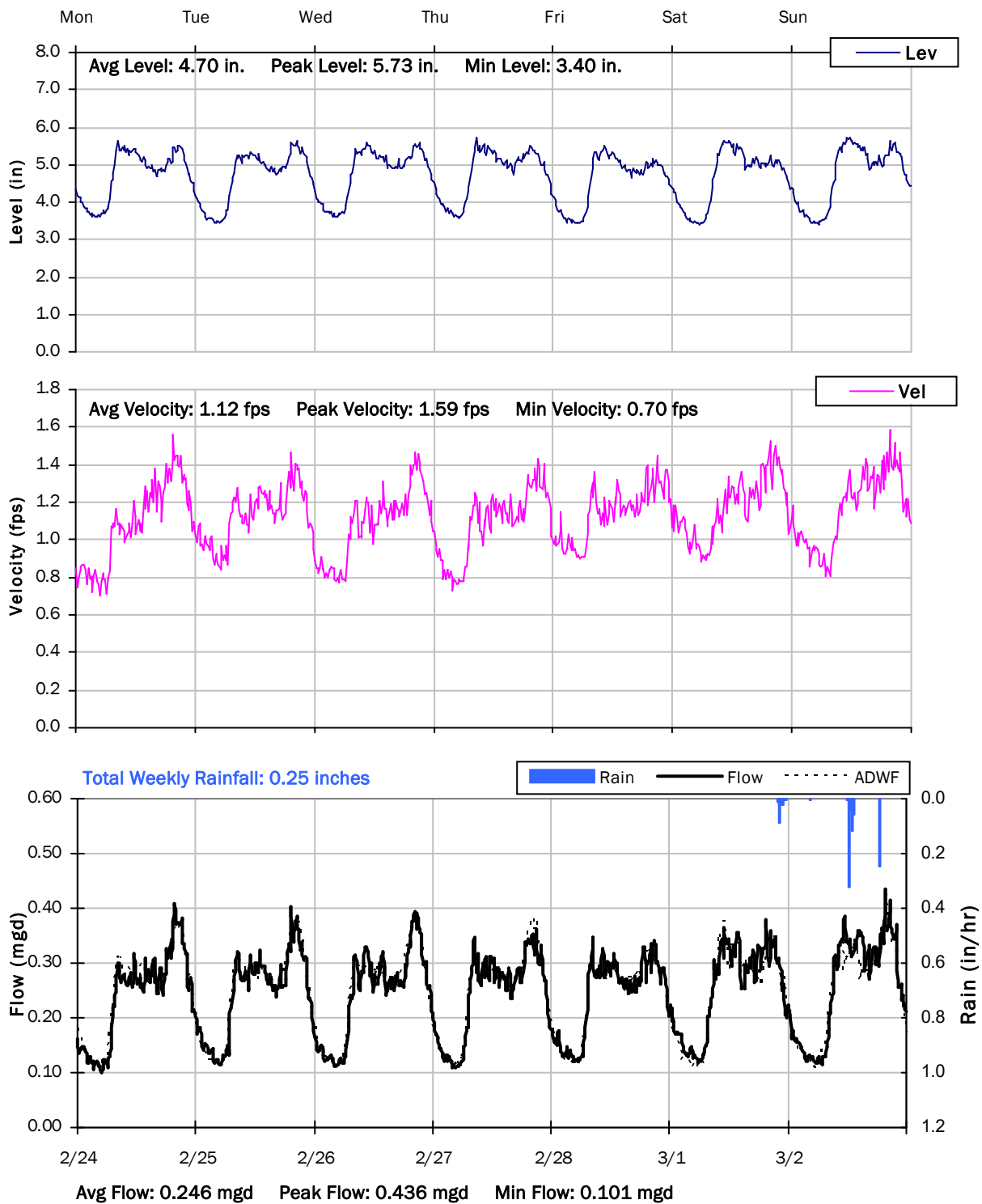
2/17/2025 to 2/24/2025



SITE 09A

Weekly Level, Velocity and Flow Hydrographs

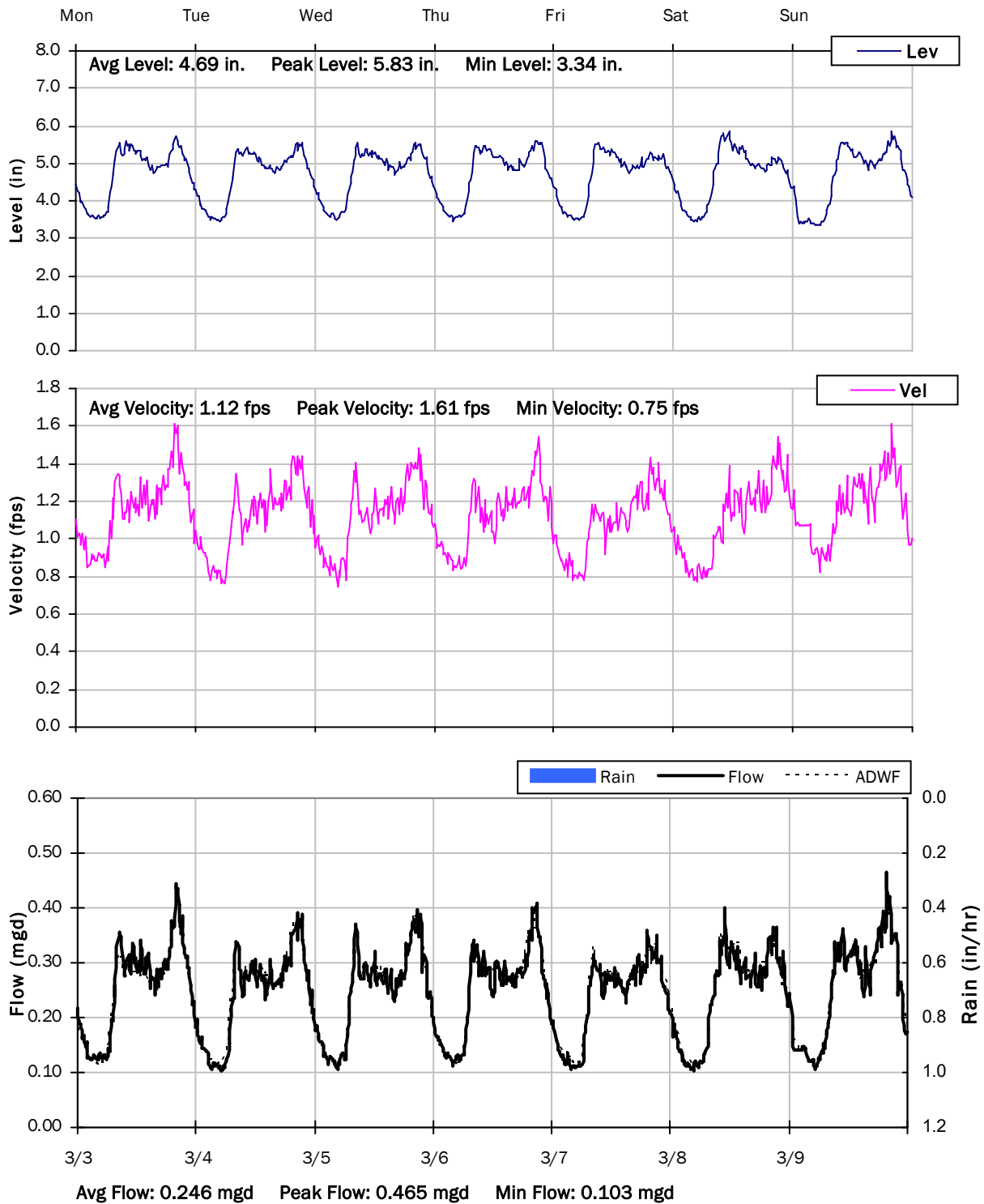
2/24/2025 to 3/3/2025



SITE 09A

Weekly Level, Velocity and Flow Hydrographs

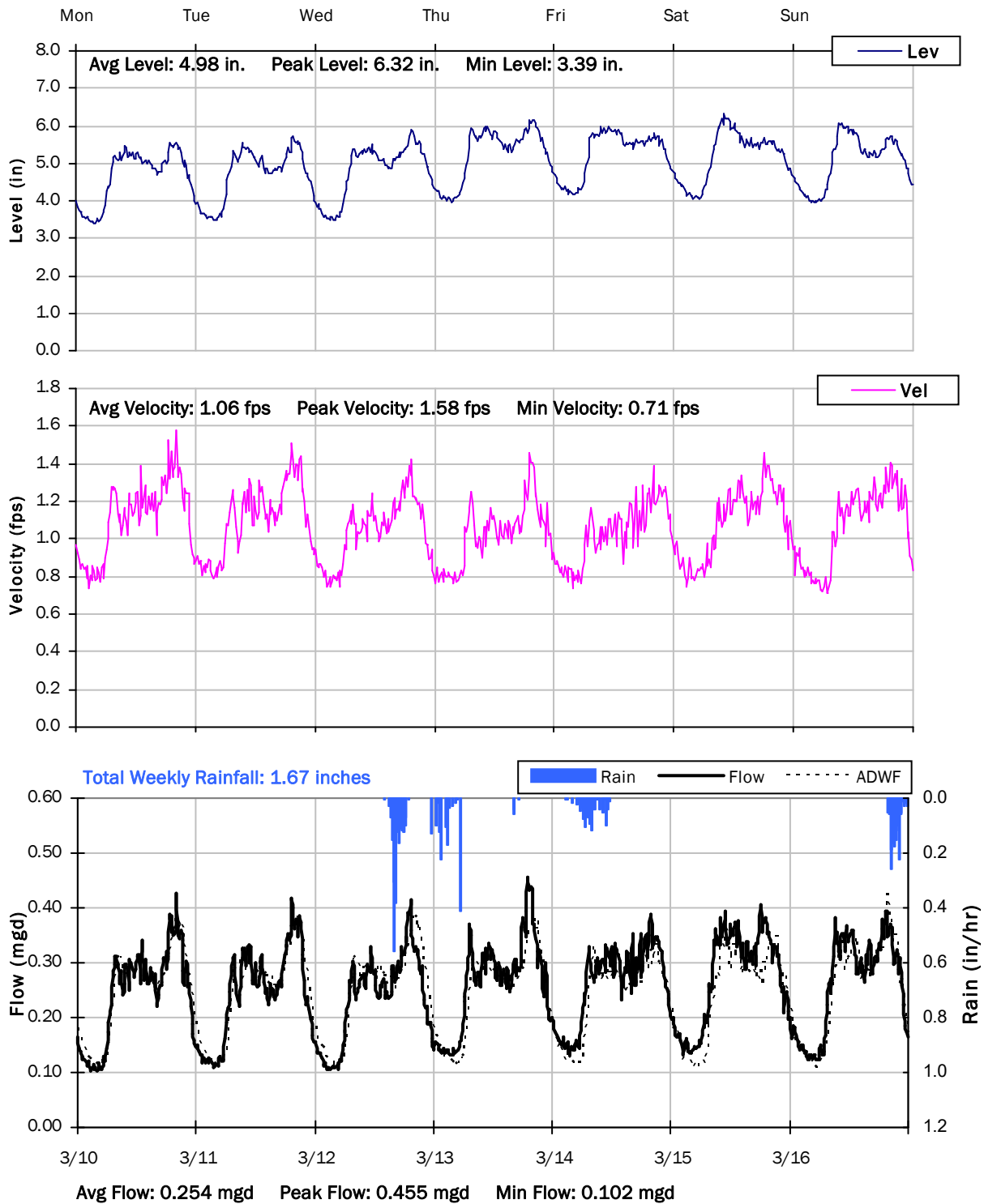
3/3/2025 to 3/10/2025



SITE 09A

Weekly Level, Velocity and Flow Hydrographs

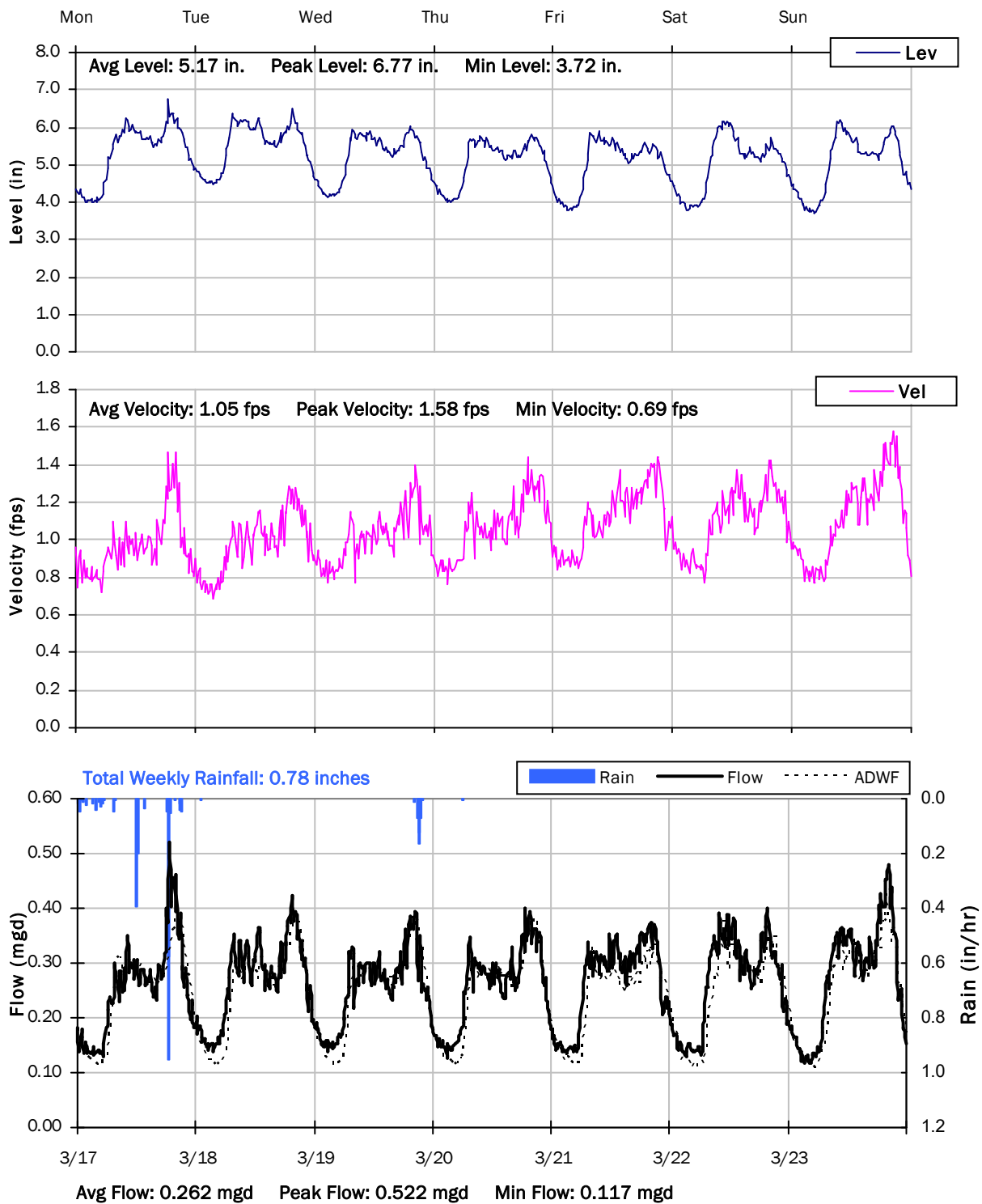
3/10/2025 to 3/17/2025



SITE 09A

Weekly Level, Velocity and Flow Hydrographs

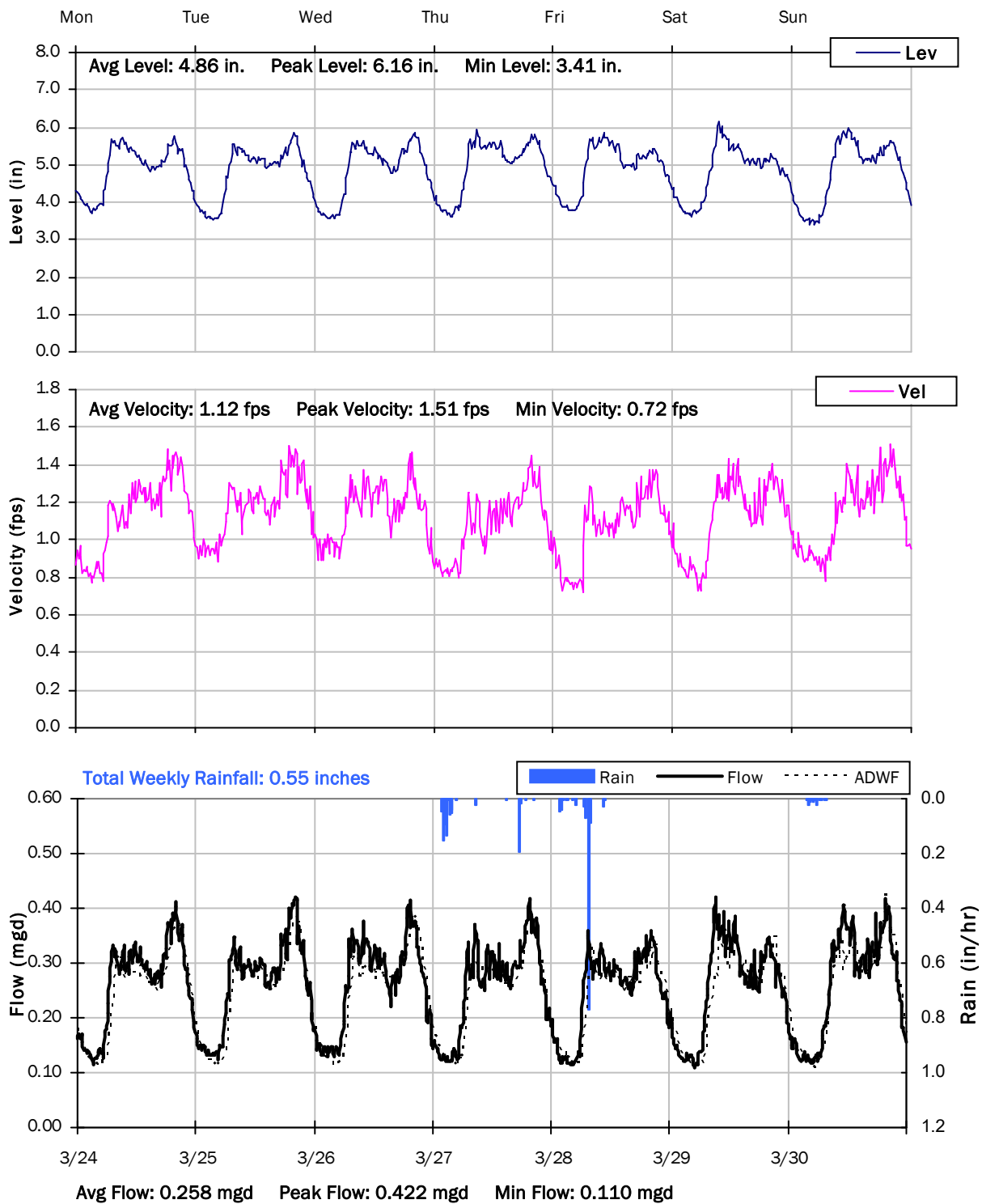
3/17/2025 to 3/24/2025



SITE 09A

Weekly Level, Velocity and Flow Hydrographs

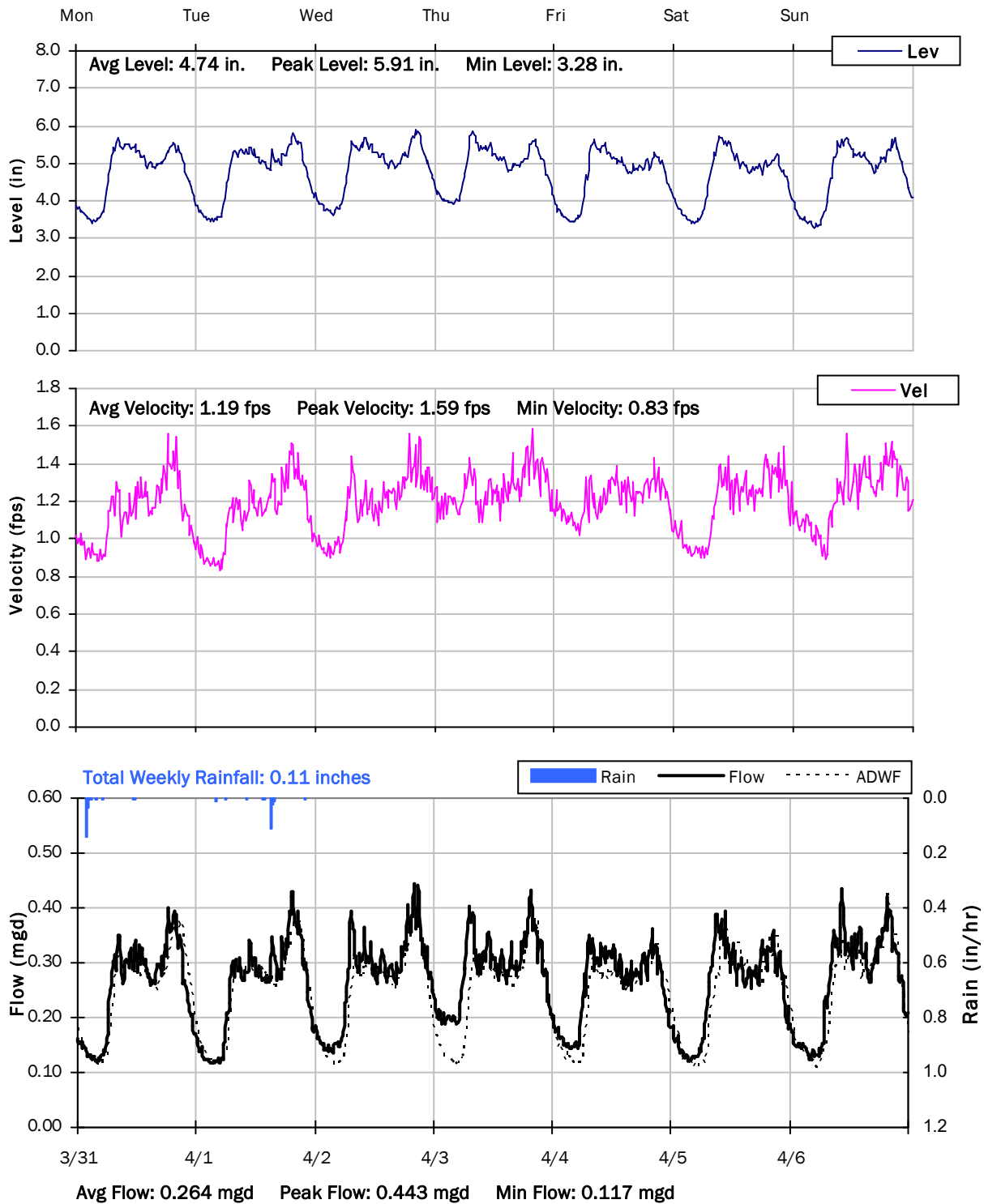
3/24/2025 to 3/31/2025



SITE 09A

Weekly Level, Velocity and Flow Hydrographs

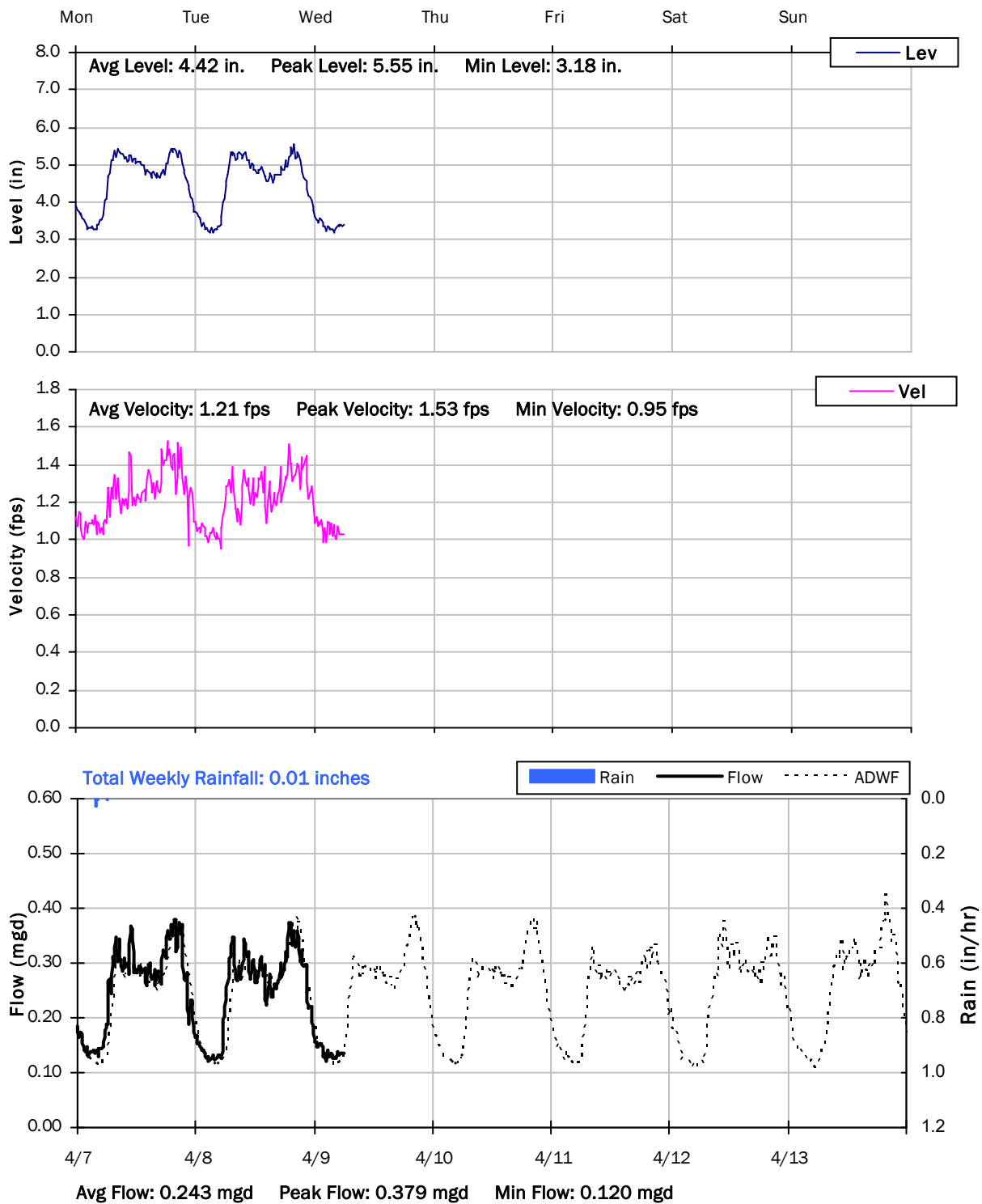
3/31/2025 to 4/7/2025



SITE 09A

Weekly Level, Velocity and Flow Hydrographs

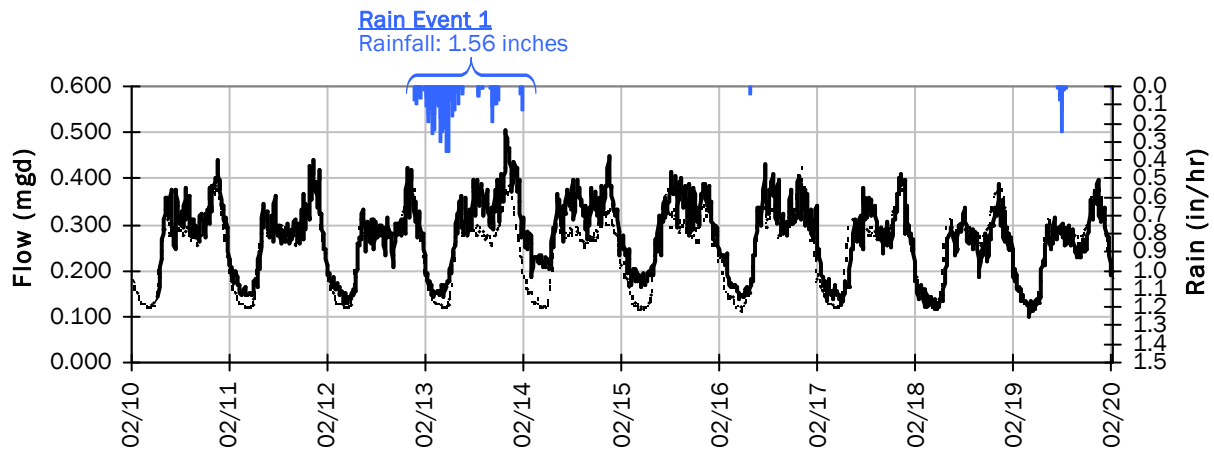
4/7/2025 to 4/14/2025



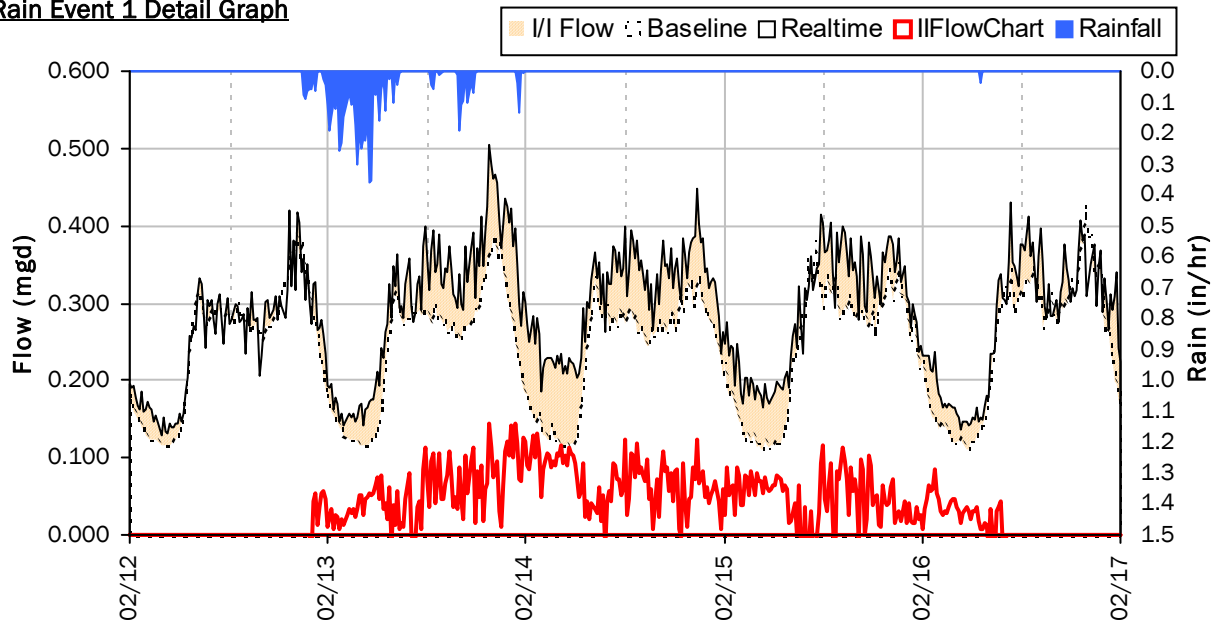
SITE 09A

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.56 inches)

Capacity

Peak Flow: 0.504 mgd
PF: 2.07

Peak Level: 6.55 in
d/D Ratio: 0.41

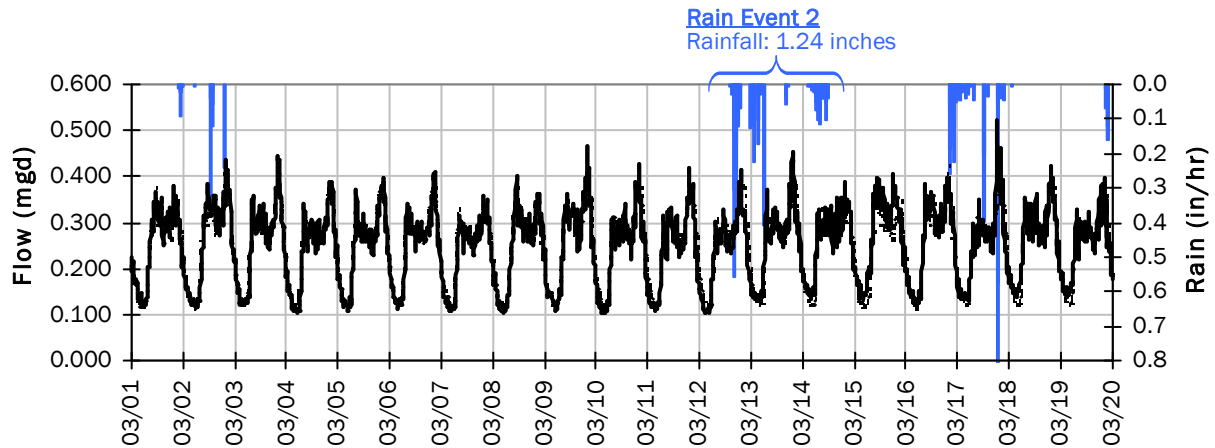
Inflow / Infiltration

Peak I/I Rate: 0.145 mgd
Total I/I: 187,000 gallons

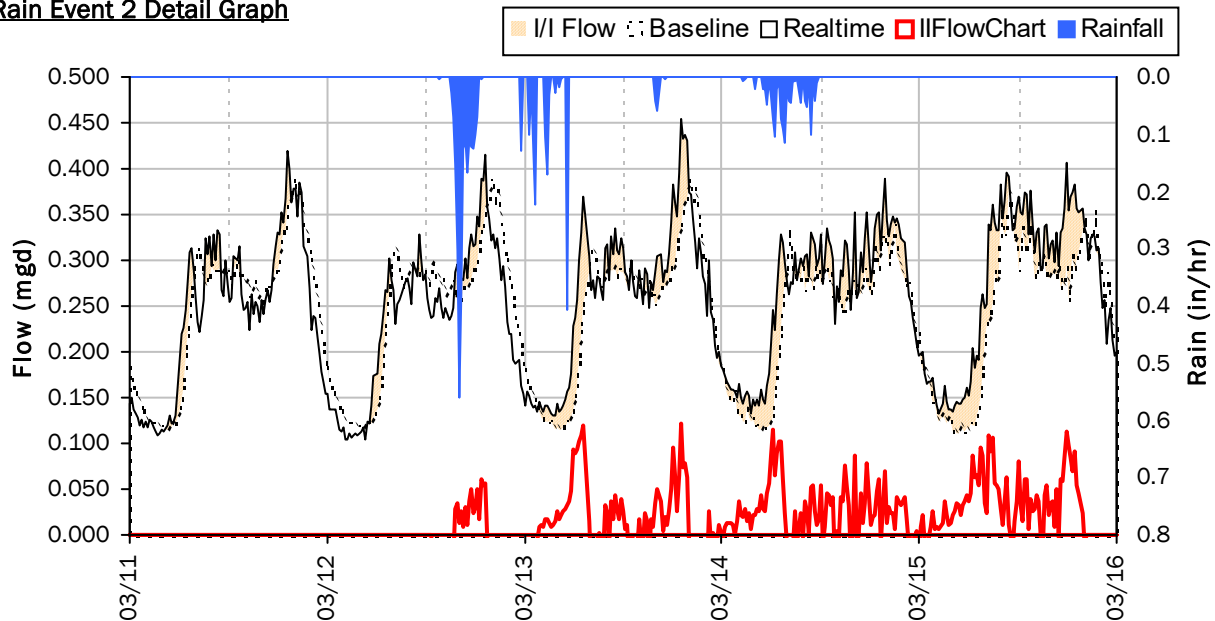
SITE 09A

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.24 inches)

Capacity

Peak Flow: 0.455 mgd
PF: 1.87

Peak Level: 6.32 in
d/D Ratio: 0.40

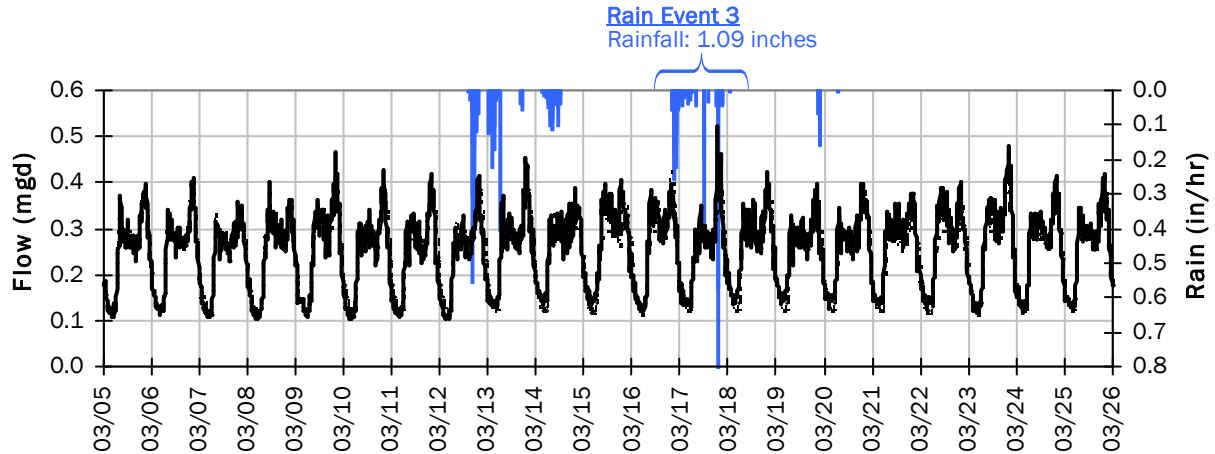
Inflow / Infiltration

Peak I/I Rate: 0.122 mgd
Total I/I: 68,000 gallons

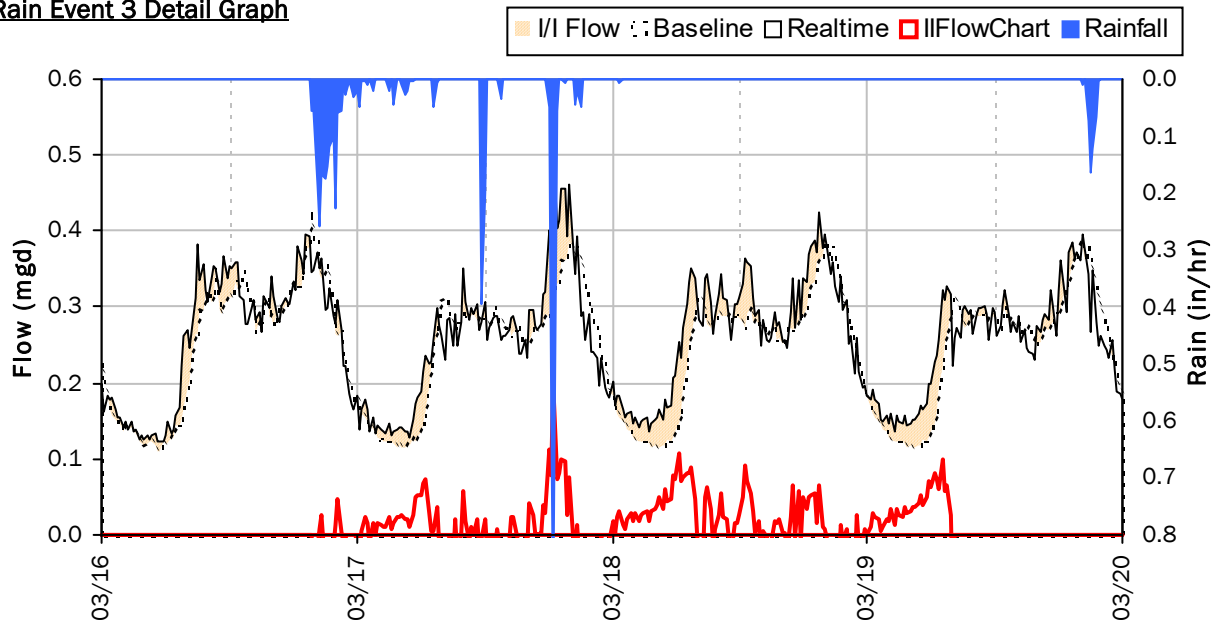
SITE 09A

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.09 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.52 mgd	Peak I/I Rate:	0.20 mgd
PF:	2.14	Total I/I:	43,000 gallons
Peak Level:	6.77 in		
d/D Ratio:	0.42		

Monitoring Site: Site 09B

Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: In roundabout at Fieldstone Dr and E Joiner Pkwy, Lincoln, CA

Data Summary Report



Vicinity Map: Site 09B

SITE 09B

Site Information

MH ID: SE502SS10

Location: In roundabout at Fieldstone Dr and E Joiner Pkwy, Lincoln, CA

Coordinates: 121.2866° W, 38.8476° N

Rim Elevation: 147 feet

Expected Pipe Diameter: 12 inches

Measured Pipe Diameter: 12 inches

ADWF: 0.261 mgd

Peak Measured Flow: 0.981 mgd

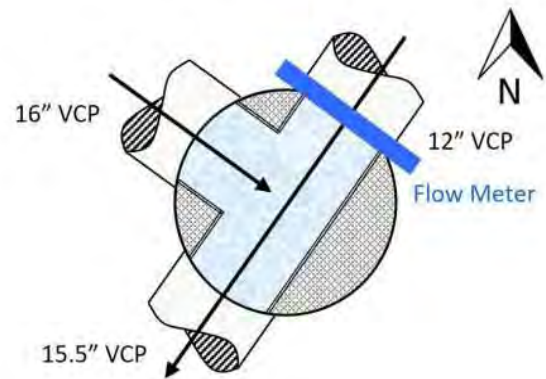
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 09B

Additional Site Photos

Southwest Effluent Pipe



Northwest Influent Pipe



SITE 09B

Additional Site Photos

Monitored Northeast Influent Pipe

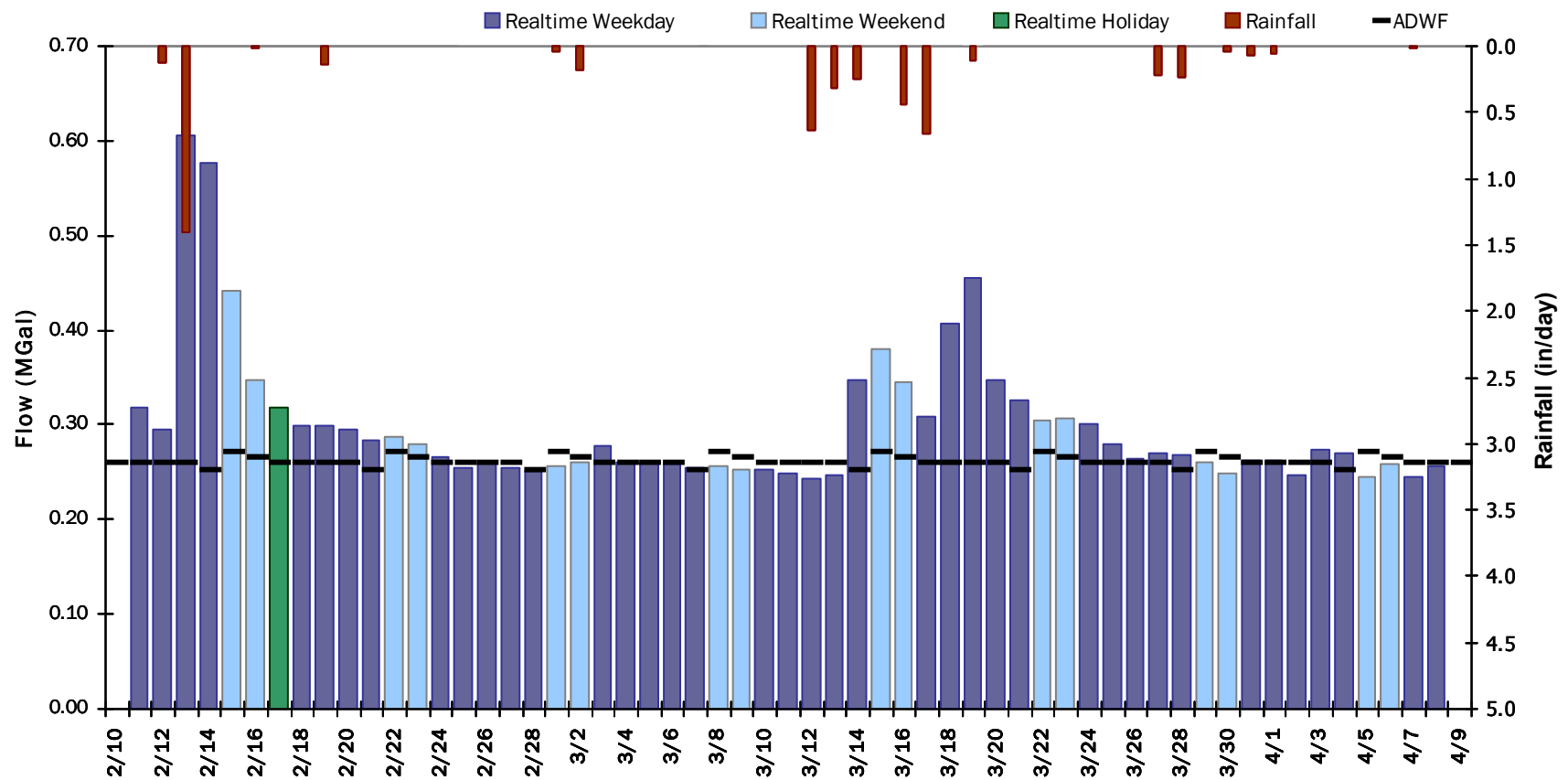


SITE 09B

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.297 MGal Peak Daily Flow: 0.605 MGal Min Daily Flow: 0.113 MGal

Total Rainfall: 4.97 inches



SITE 09B

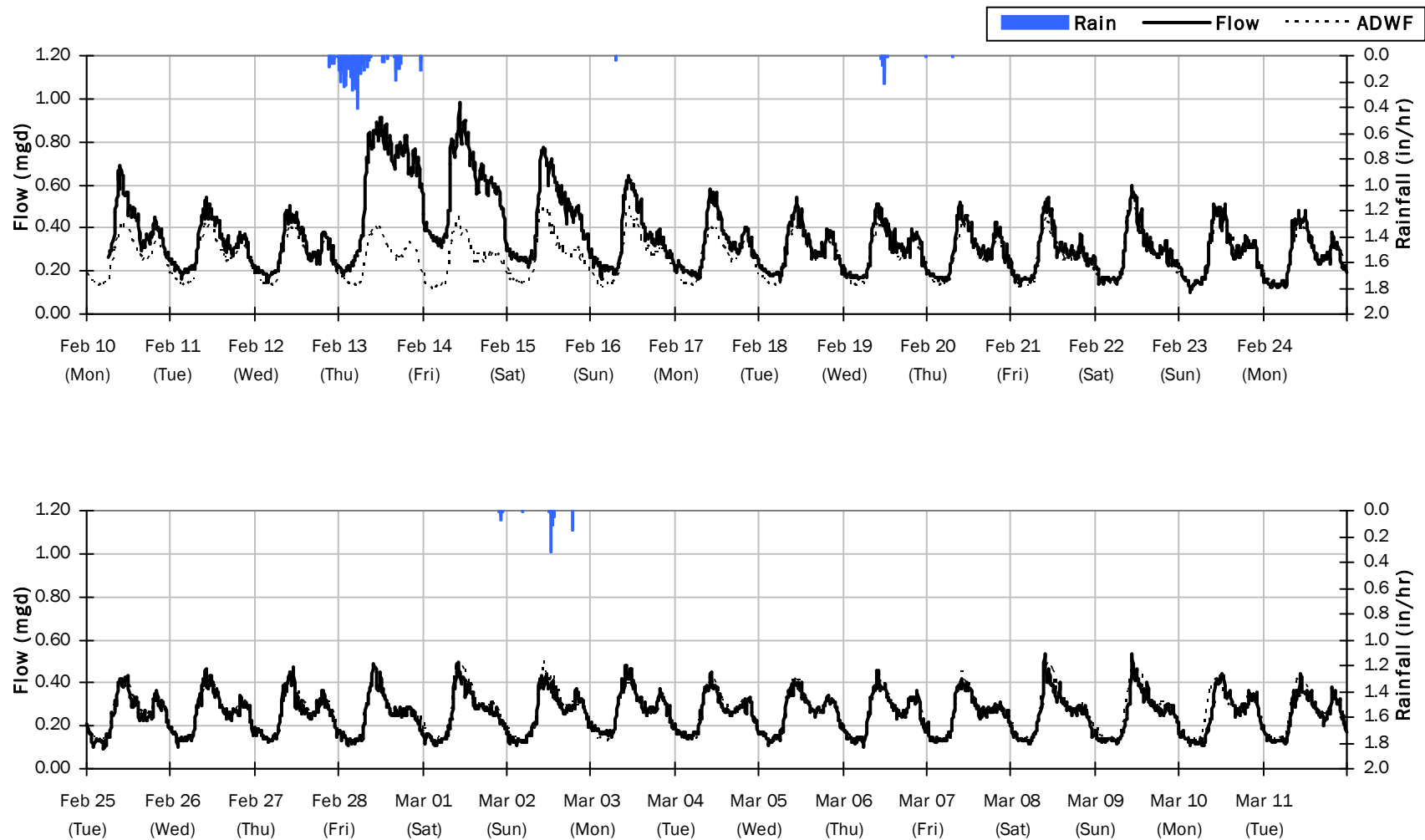
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.91 inches

Period Avg Flow: 0.305 mgd

Period Peak Flow: 0.981 mgd

Period Min Flow: 0.091 mgd



SITE 09B

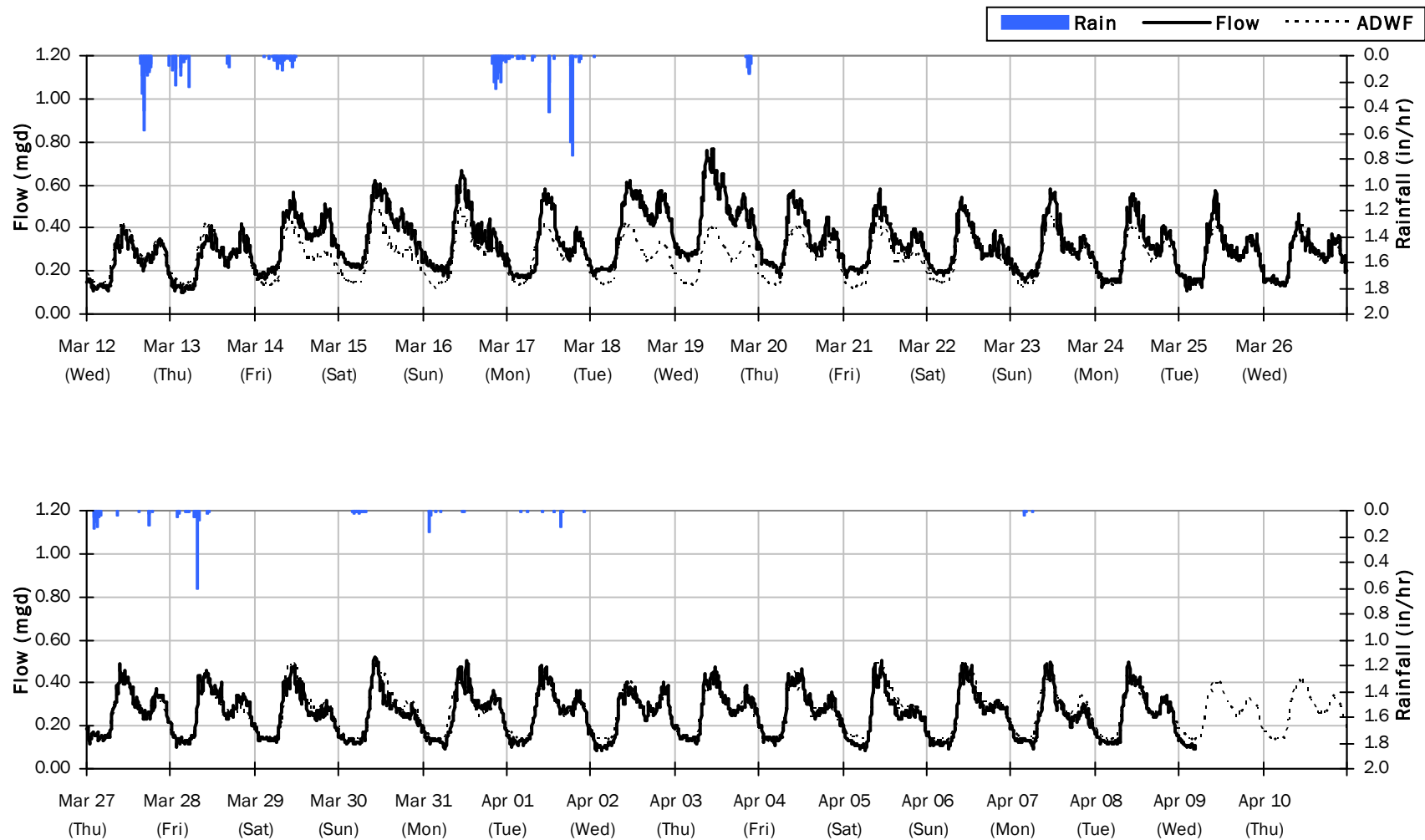
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.06 inches

Period Avg Flow: 0.293 mgd

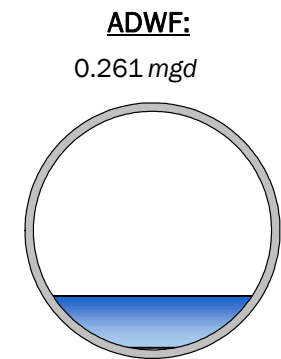
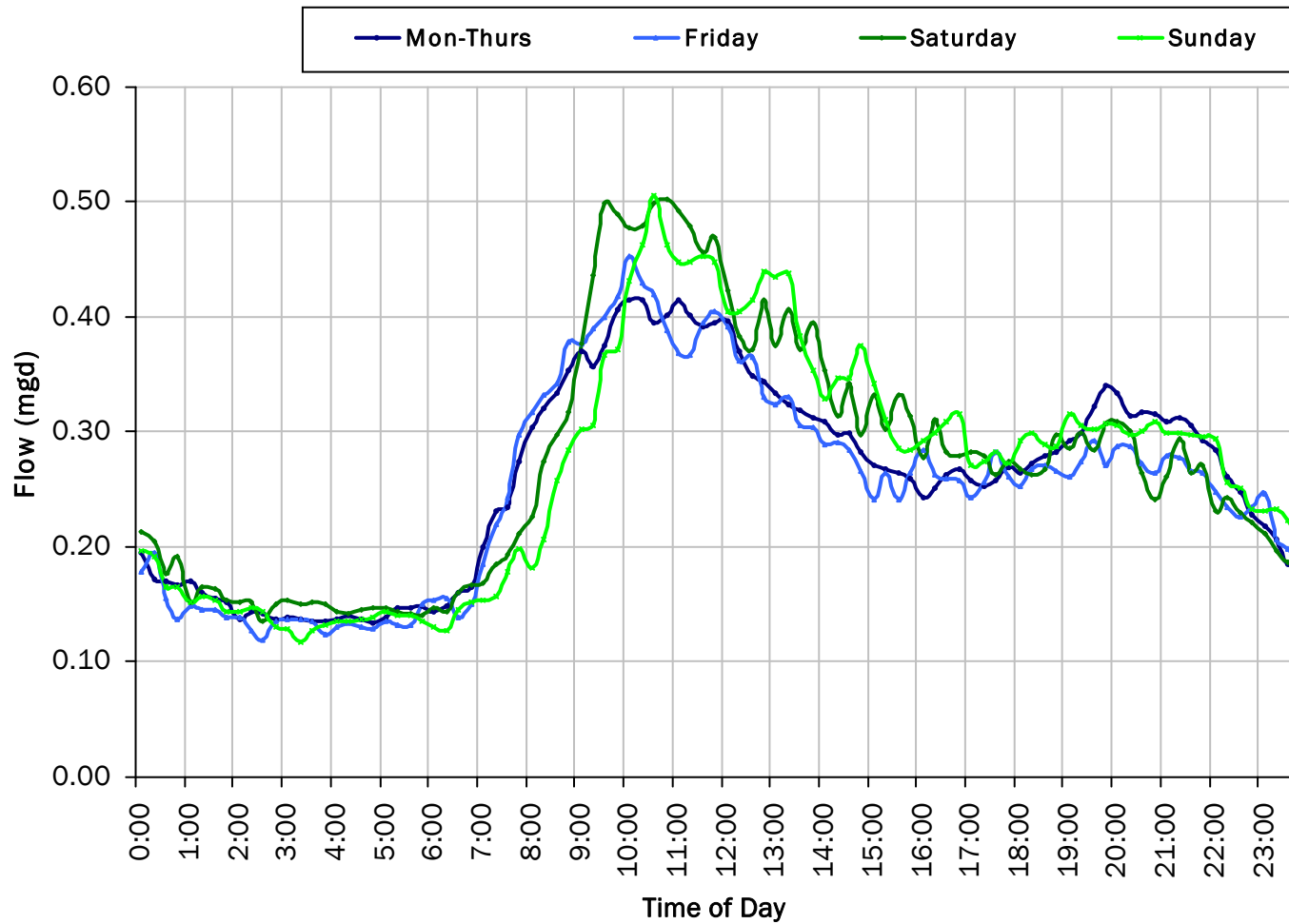
Period Peak Flow: 0.767 mgd

Period Min Flow: 0.085 mgd



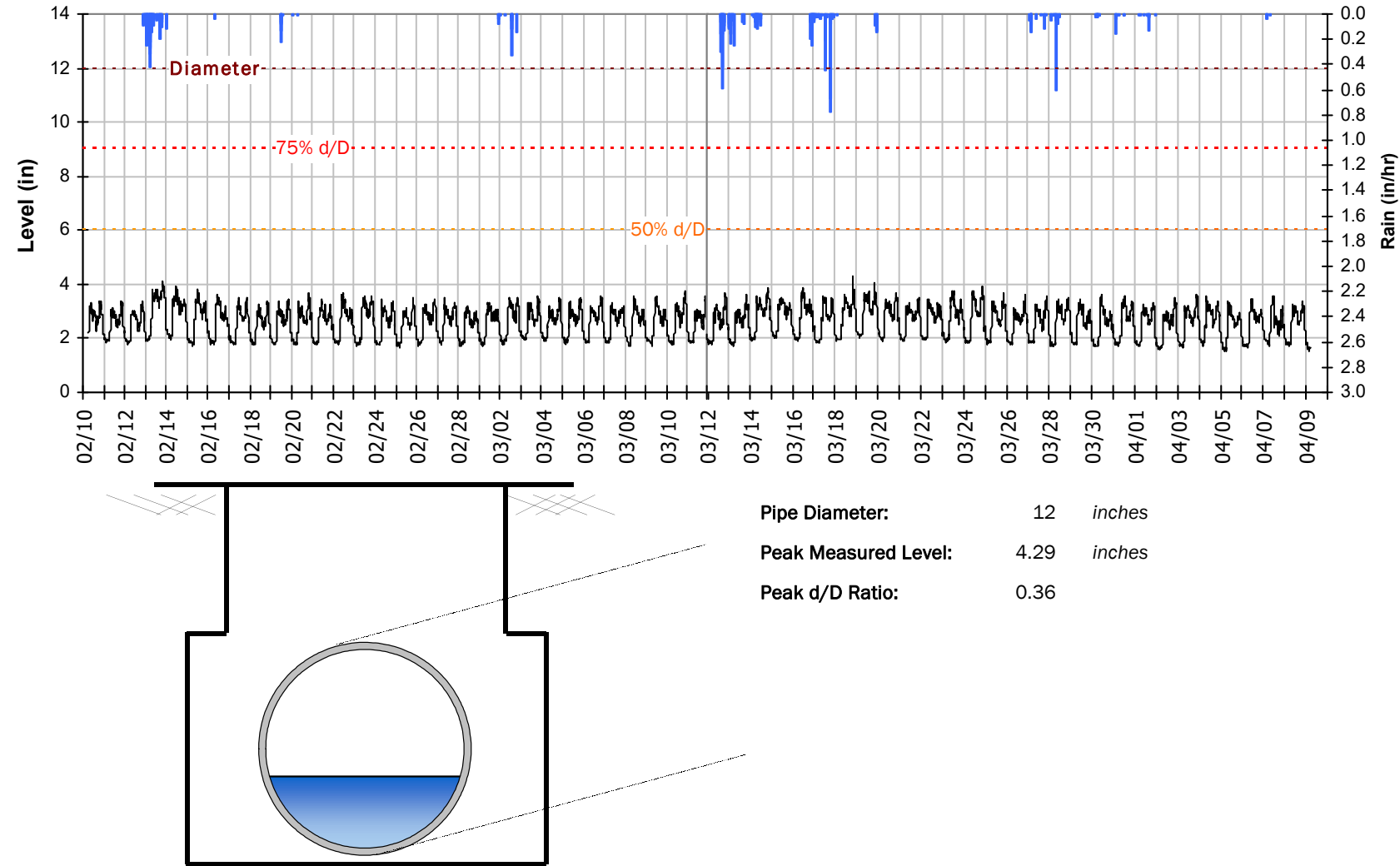
SITE 09B

Average Dry Weather Flow Hydrographs



SITE 09B
Site Capacity and Surge Summary

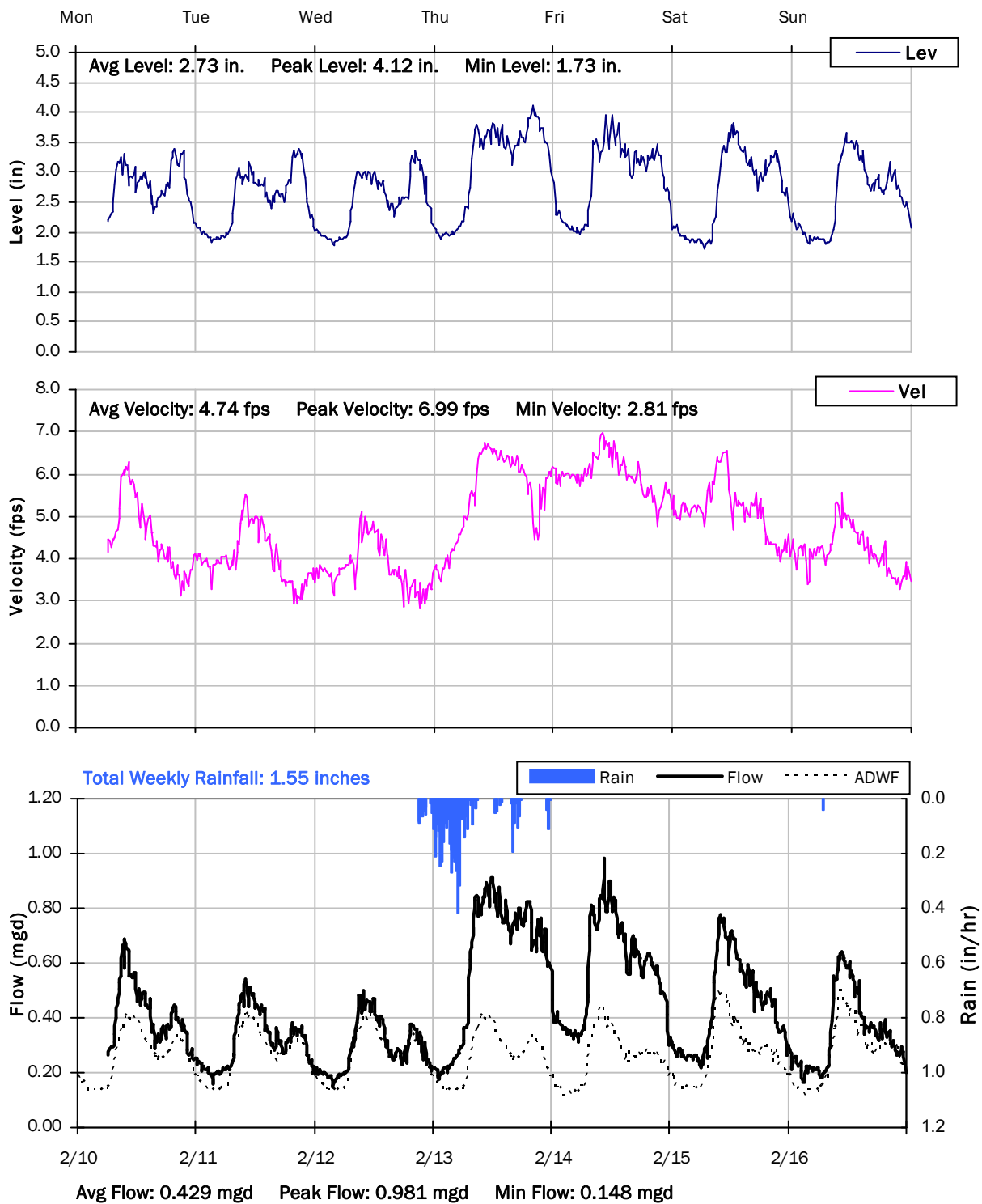
Realtime Flow Levels with Rainfall Data over Peak Level Period



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

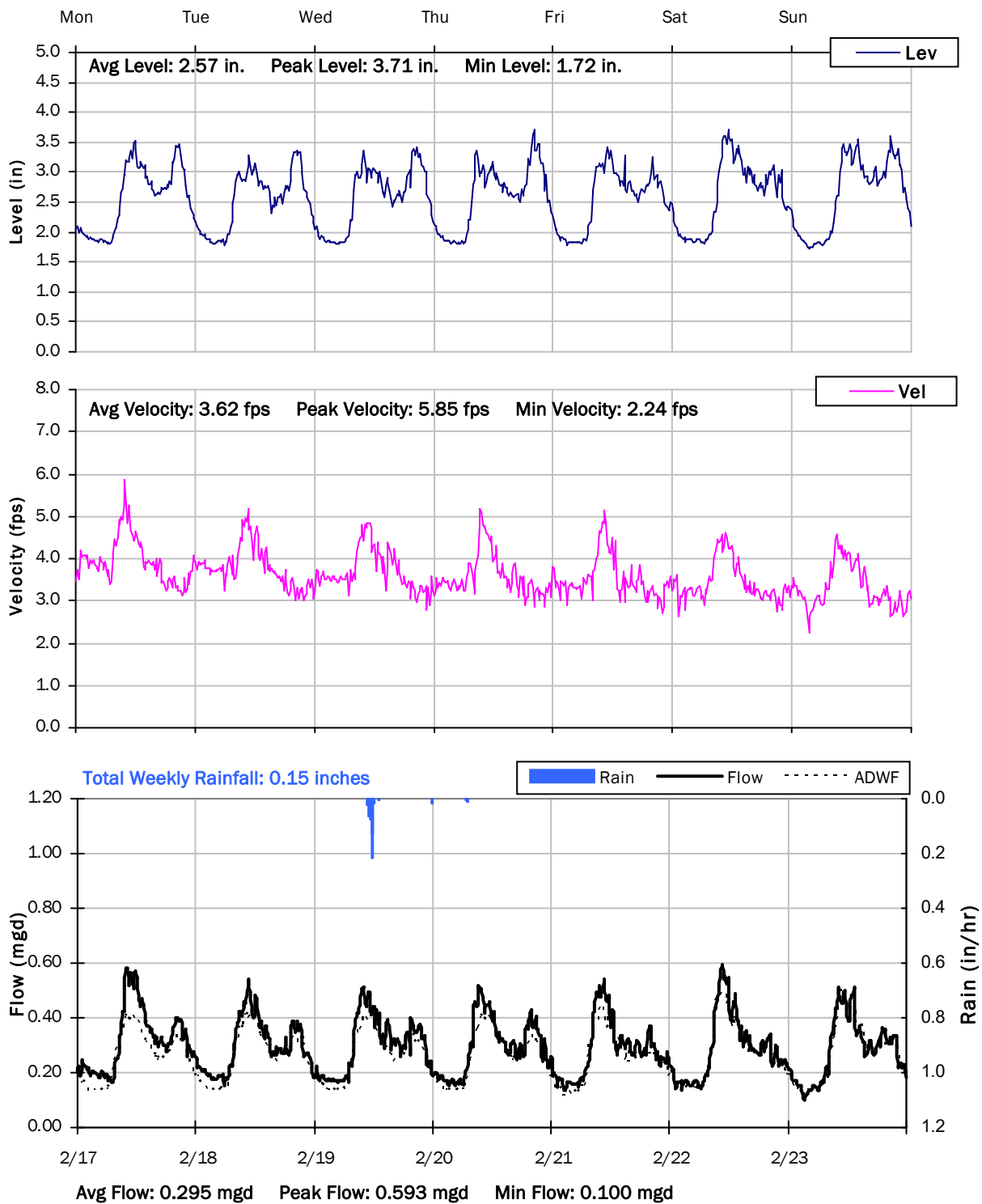
2/10/2025 to 2/17/2025



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

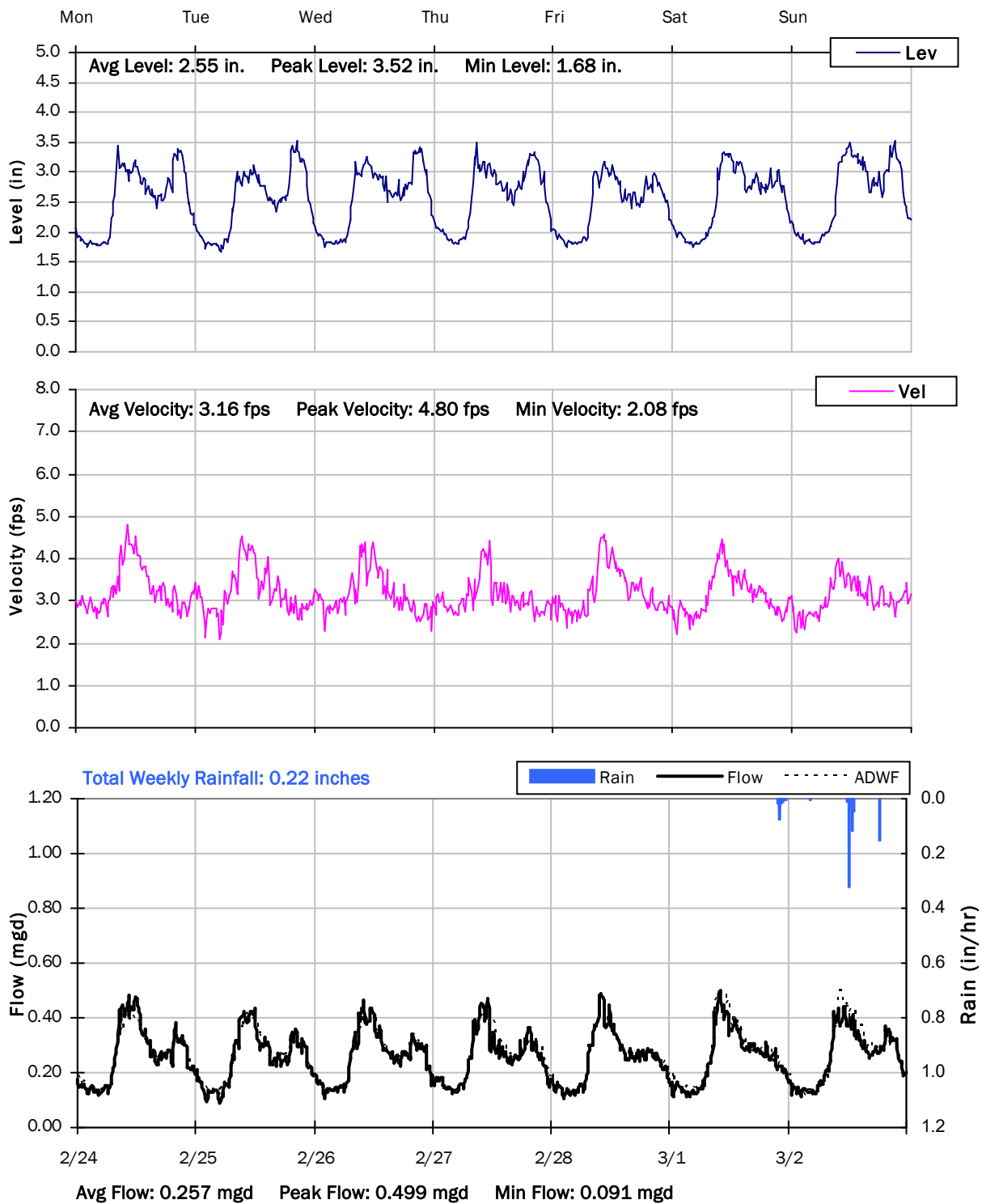
2/17/2025 to 2/24/2025



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

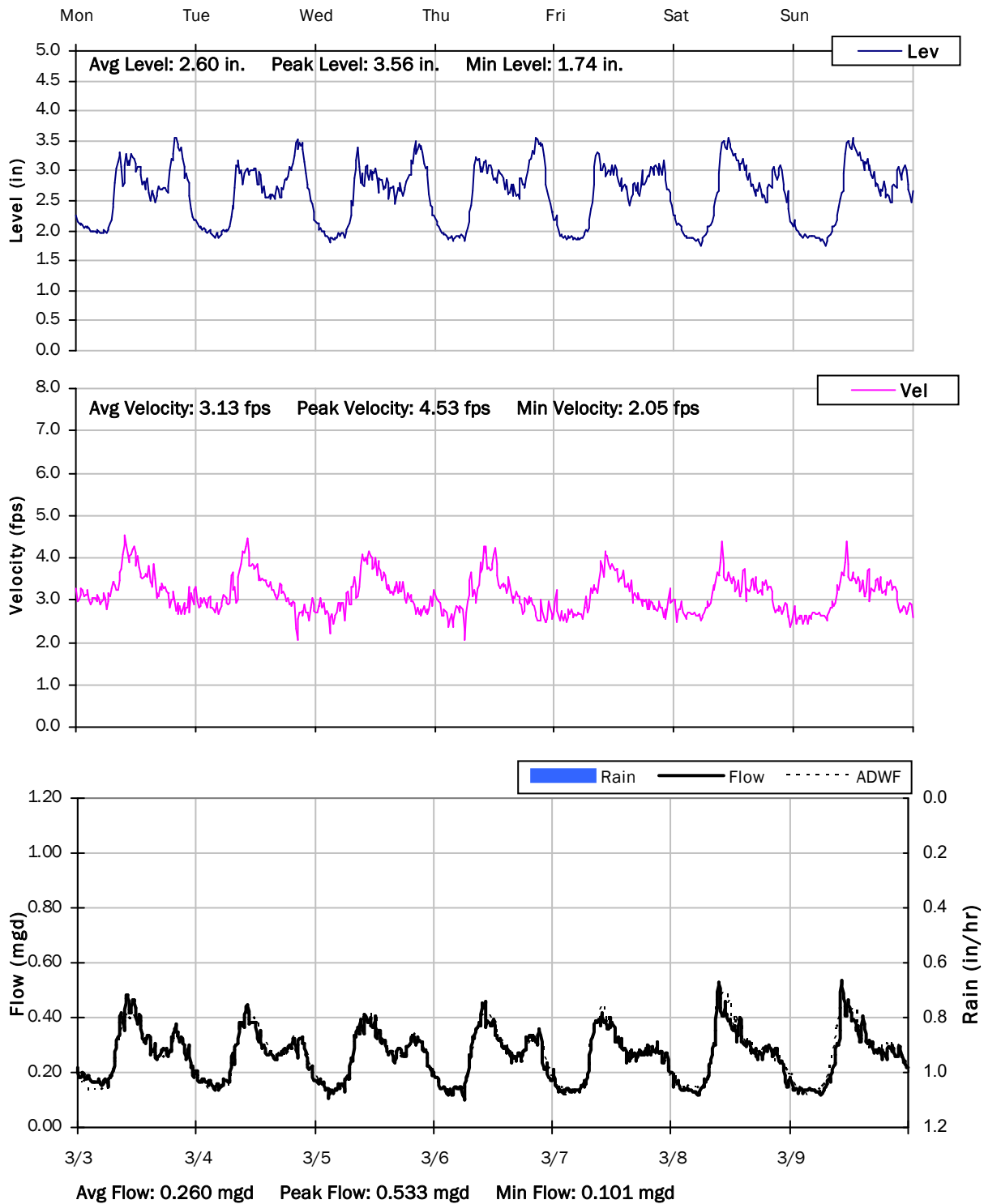
2/24/2025 to 3/3/2025



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

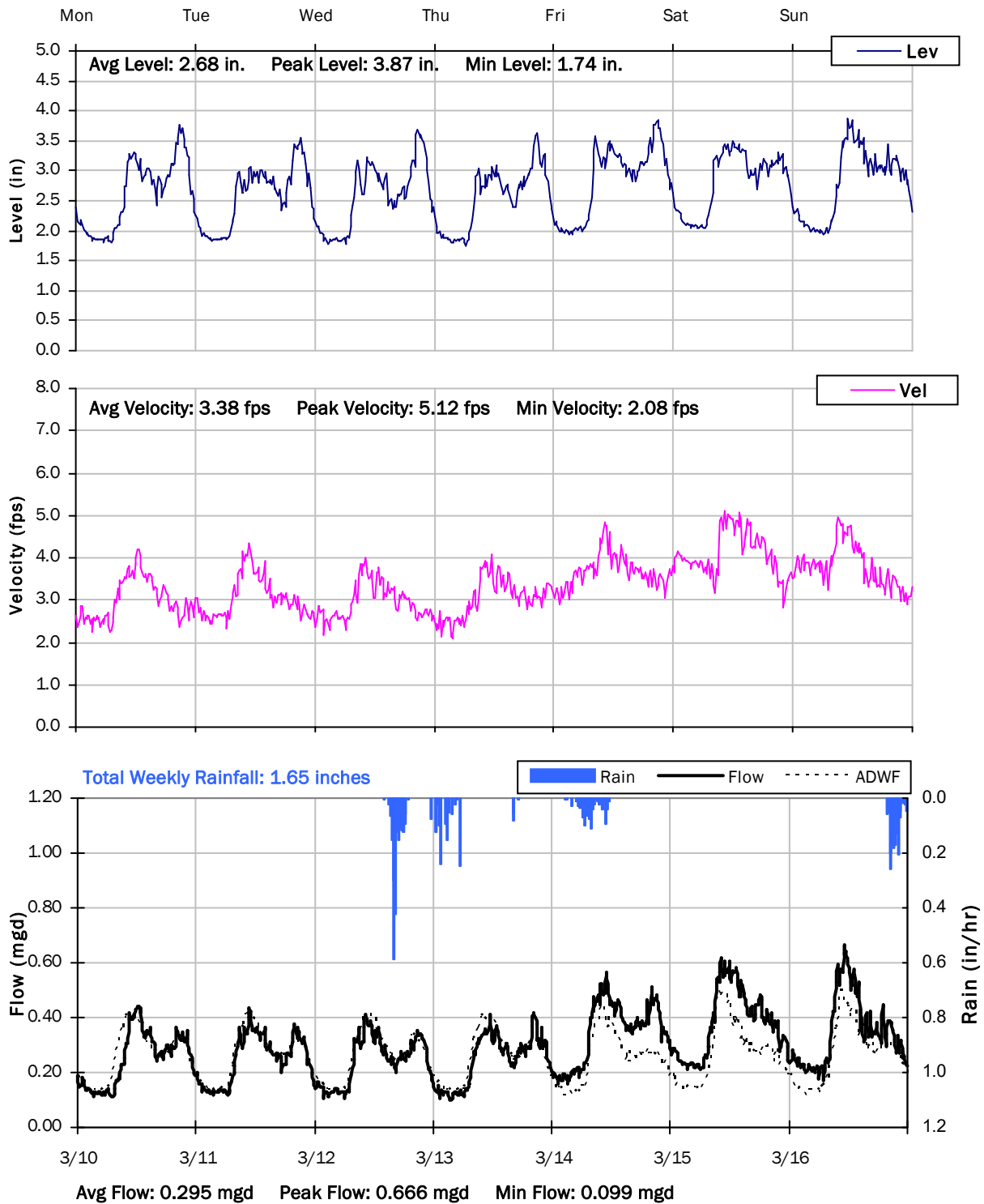
3/3/2025 to 3/10/2025



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

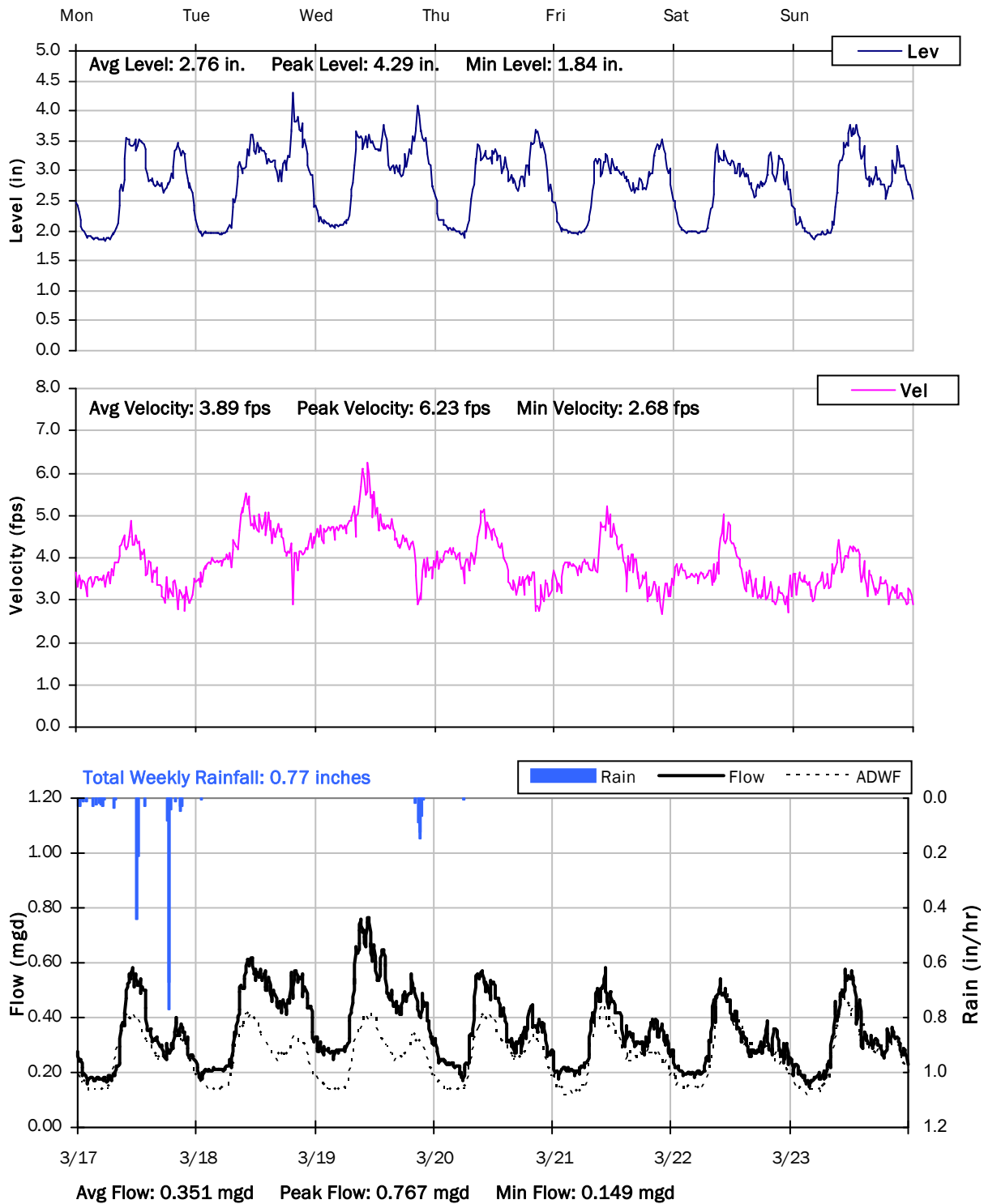
3/10/2025 to 3/17/2025



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

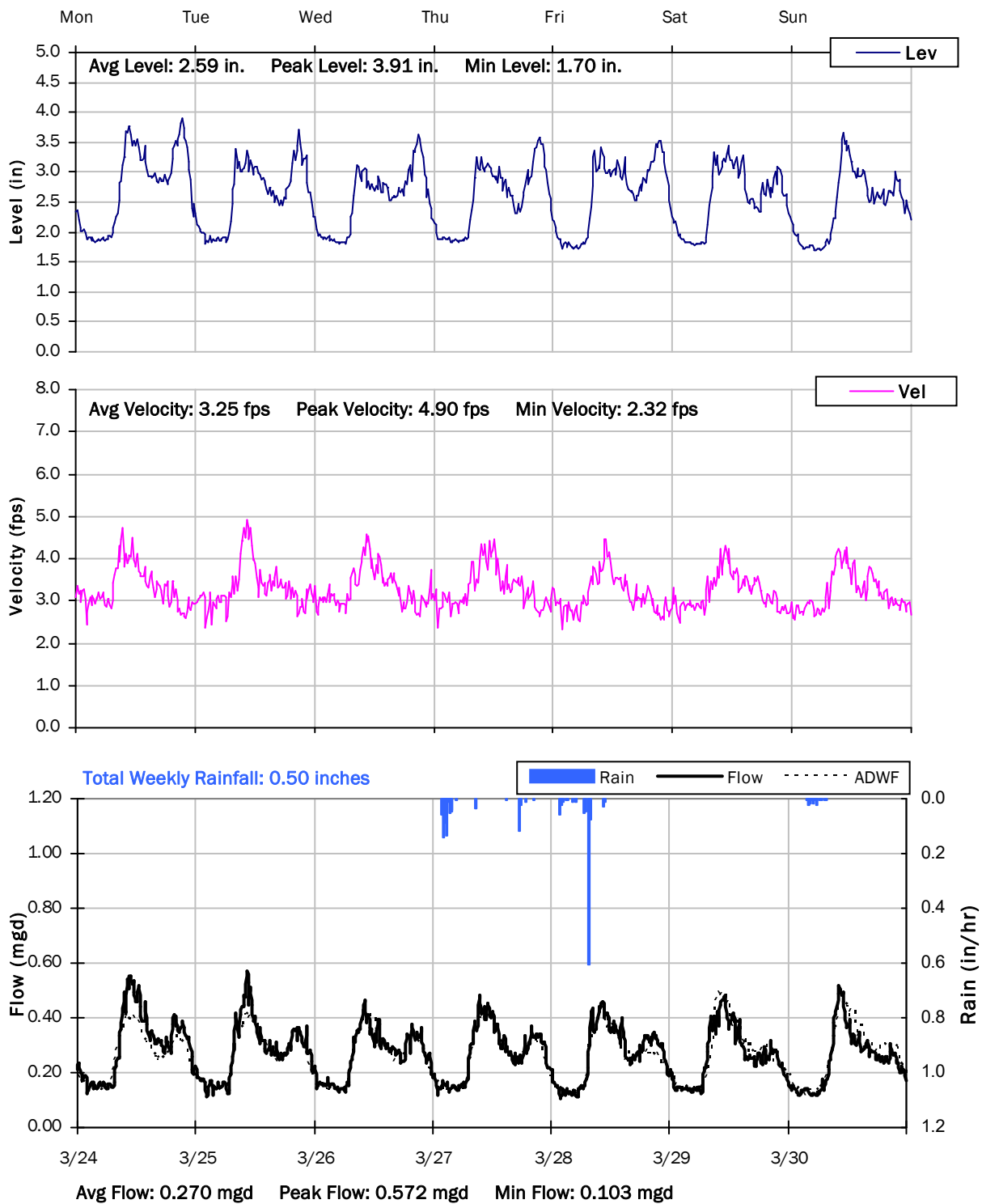
3/17/2025 to 3/24/2025



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

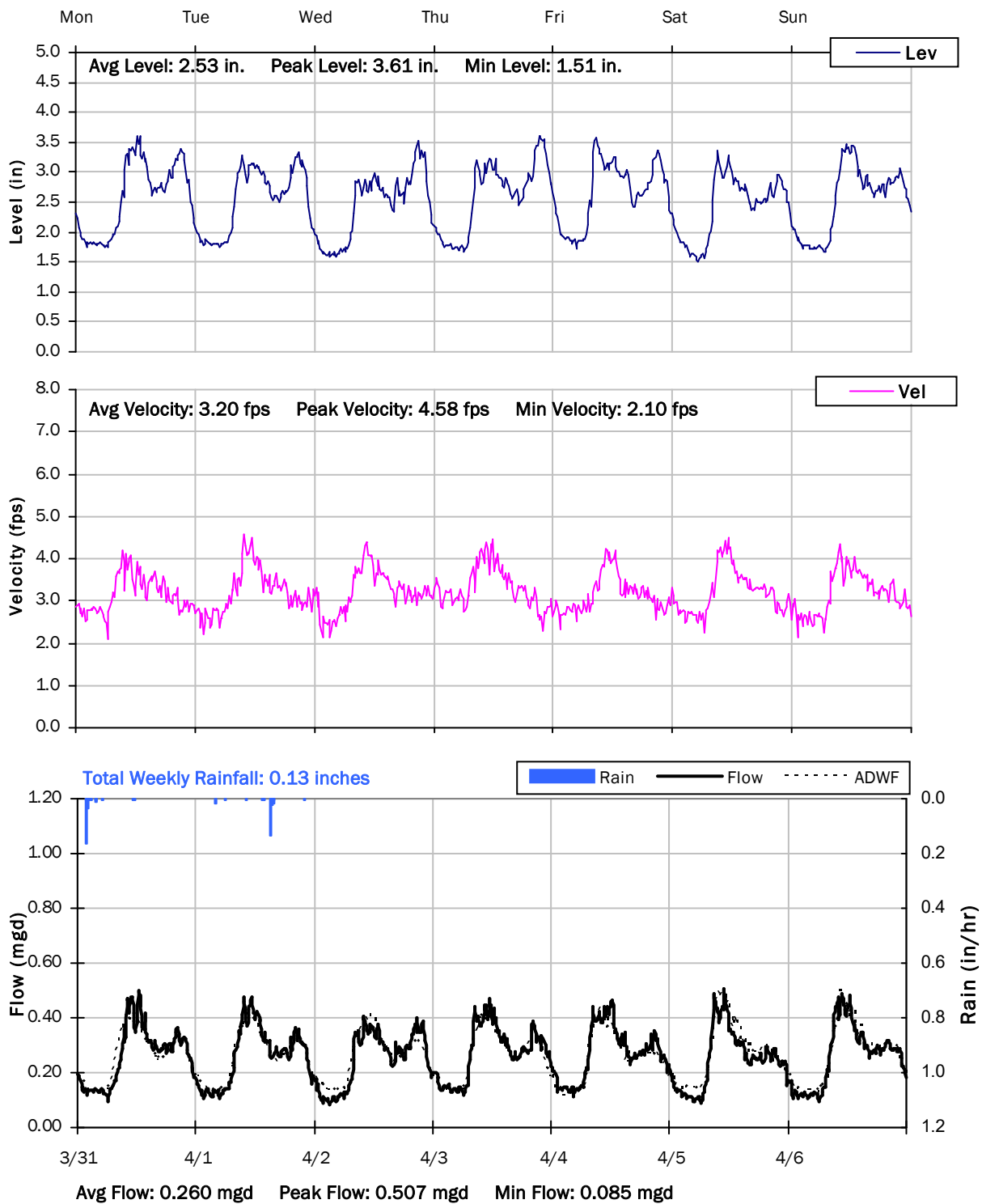
3/24/2025 to 3/31/2025



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

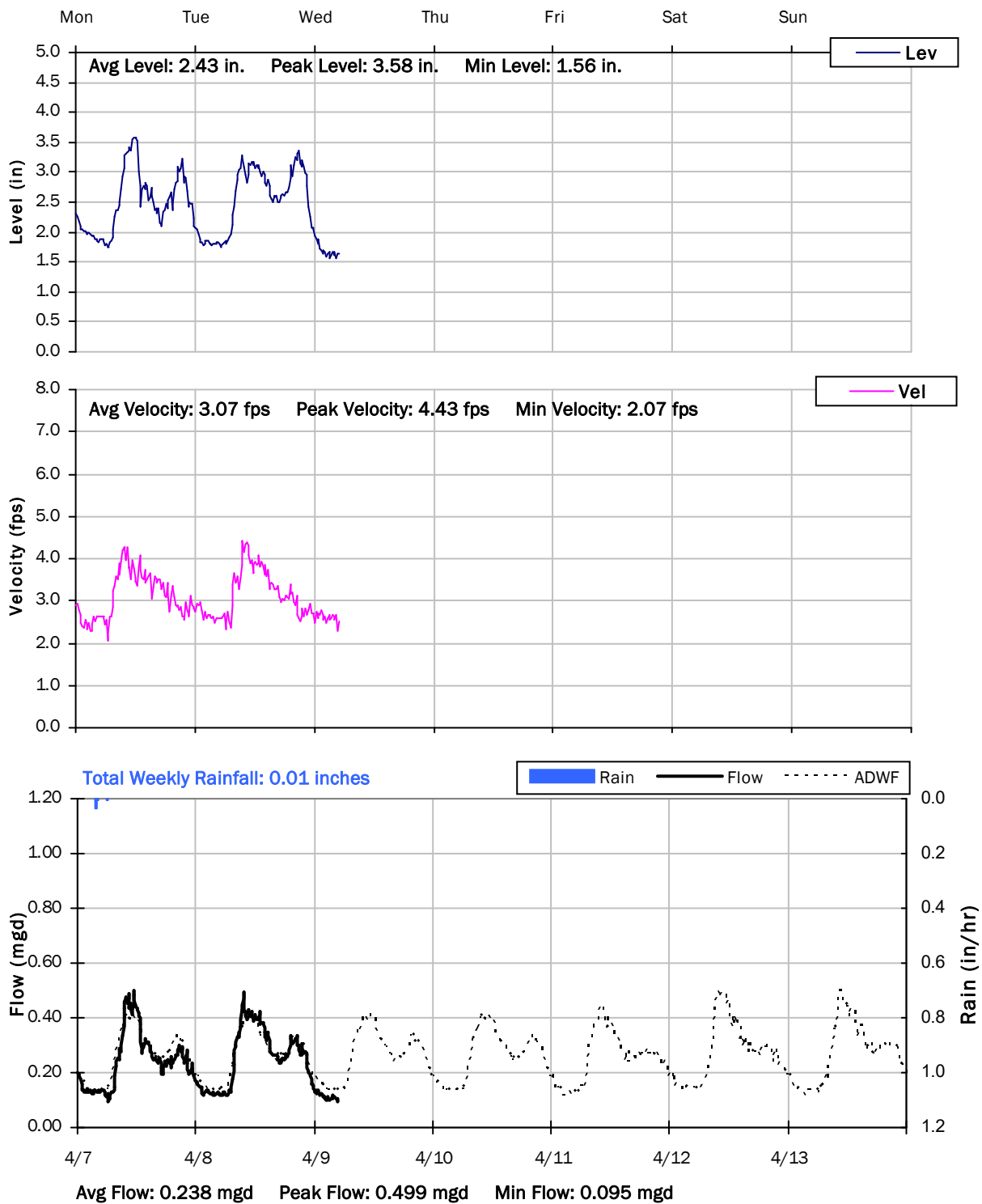
3/31/2025 to 4/7/2025



SITE 09B

Weekly Level, Velocity and Flow Hydrographs

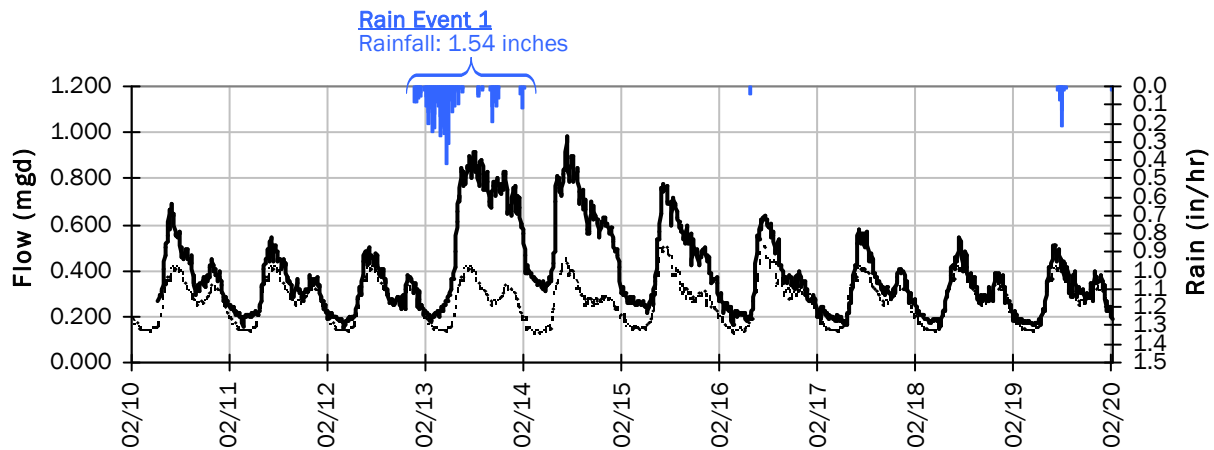
4/7/2025 to 4/14/2025



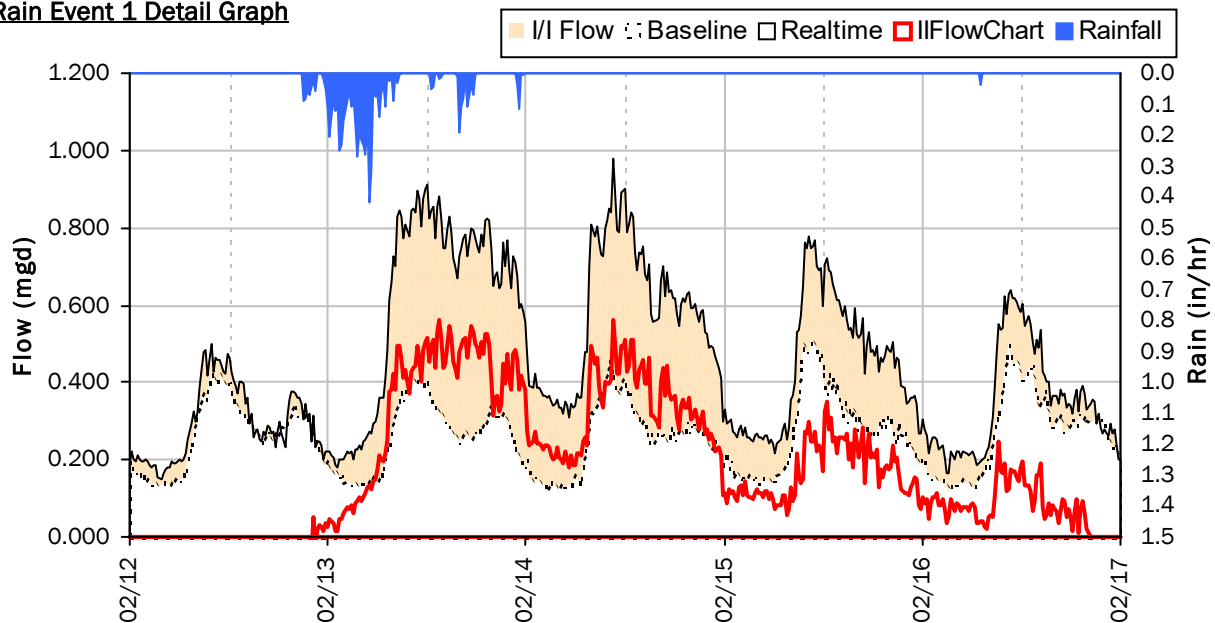
SITE 09B

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.54 inches)

Capacity

Peak Flow: 0.981 mgd
PF: 3.75

Peak Level: 4.12 in
d/D Ratio: 0.34

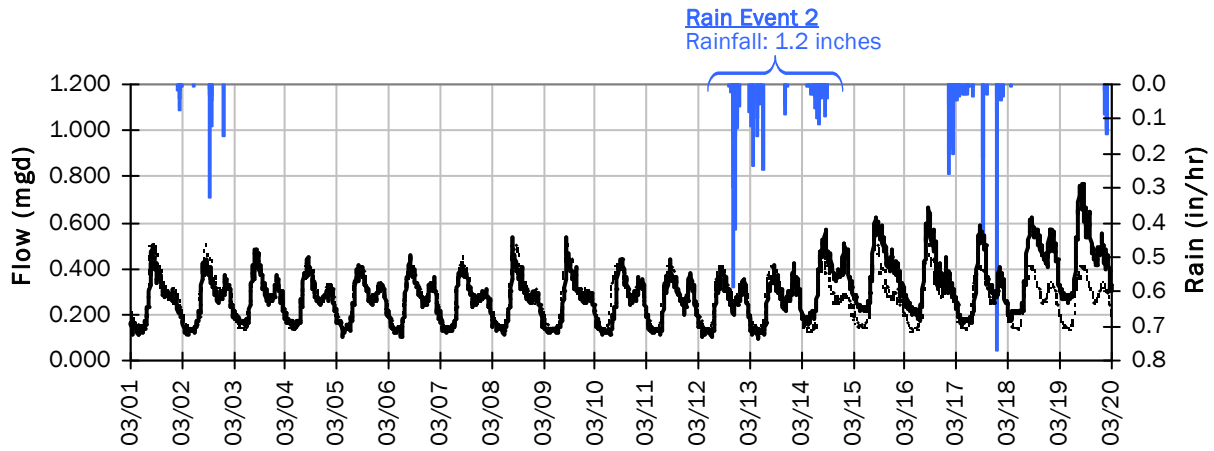
Inflow / Infiltration

Peak I/I Rate: 0.561 mgd
Total I/I: 919,000 gallons

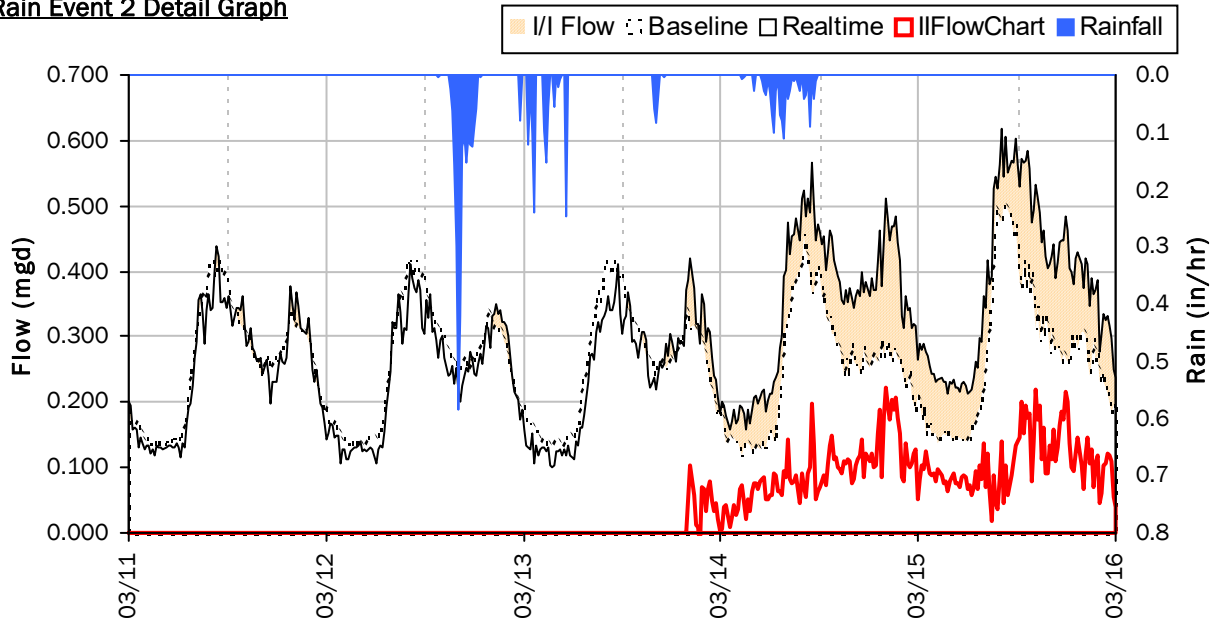
SITE 09B

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



Storm Event I/I Analysis (Rain = 1.20 inches)

Capacity

Peak Flow: 0.618 mgd
PF: 2.36
Peak Level: 3.85 in
d/D Ratio: 0.32

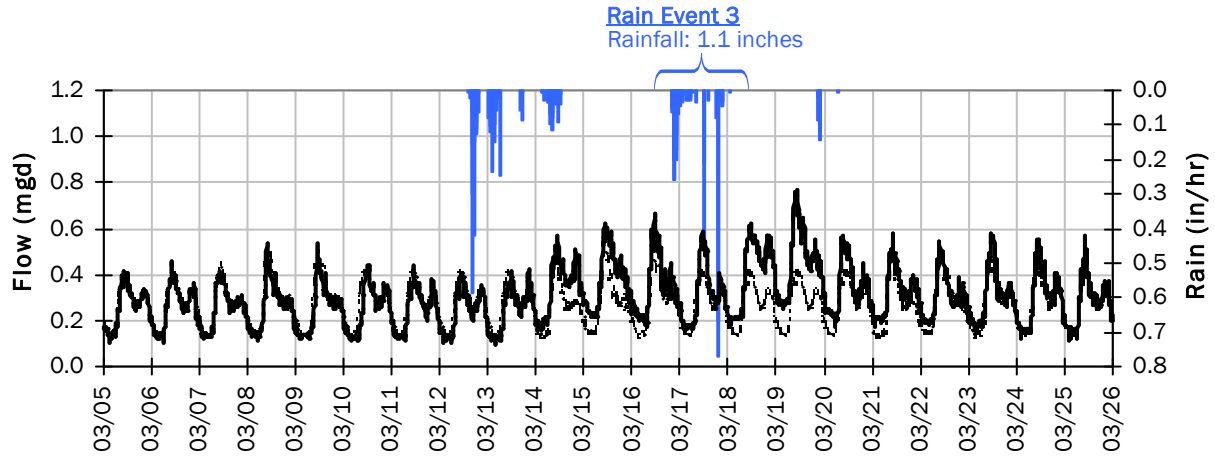
Inflow / Infiltration

Peak I/I Rate: 0.222 mgd
Total I/I: 211,000 gallons

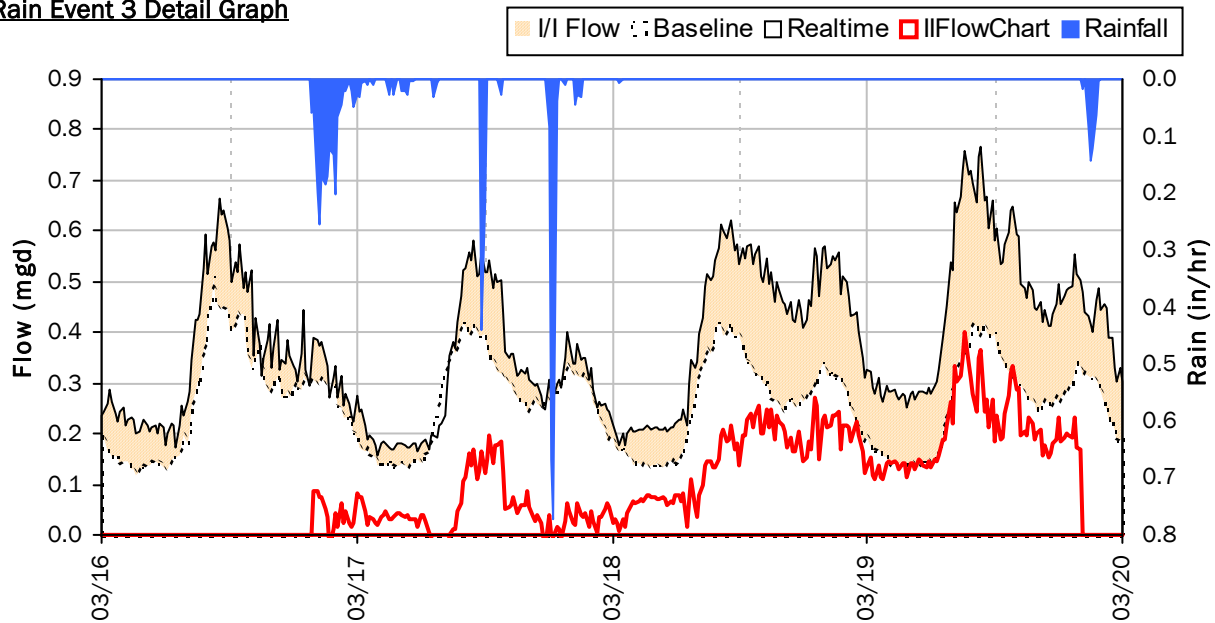
SITE 09B

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.10 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.77 mgd	Peak I/I Rate:	0.40 mgd
PF:	2.93	Total I/I:	374,000 gallons
Peak Level:	4.29 in		
d/D Ratio:	0.36		

Monitoring Site: Site 10

Stantec | Lincoln, California

Sanitary Sewer Flow Monitoring

February 10, 2025 - April 09, 2025

Location: E Joiner Pkwy, across from the lift station, Lincoln, CA

Data Summary Report



Vicinity Map: Site 10

SITE 10

Site Information

MH ID: SE502SS11

Location: E Joiner Pkwy, across from the lift station, Lincoln, CA

Coordinates: 121.2871° W, 38.8473° N

Rim Elevation: 145 feet

Expected Pipe Diameter: 15 inches

Measured Pipe Diameter: 15 inches

ADWF: 0.471 mgd

Peak Measured Flow: 1.044 mgd

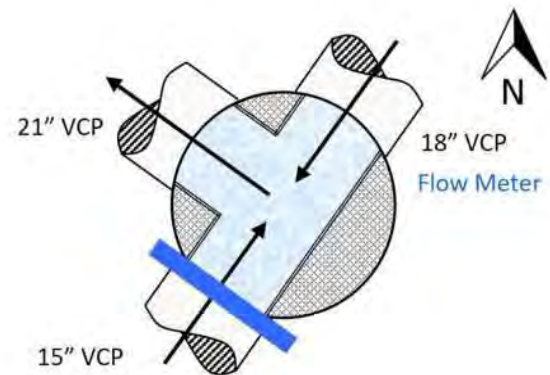
Sediment: None



Satellite Map



Sanitary Map



Flow Sketch



Street View



Plan View

SITE 10

Additional Site Photos

Northwest Effluent Pipe



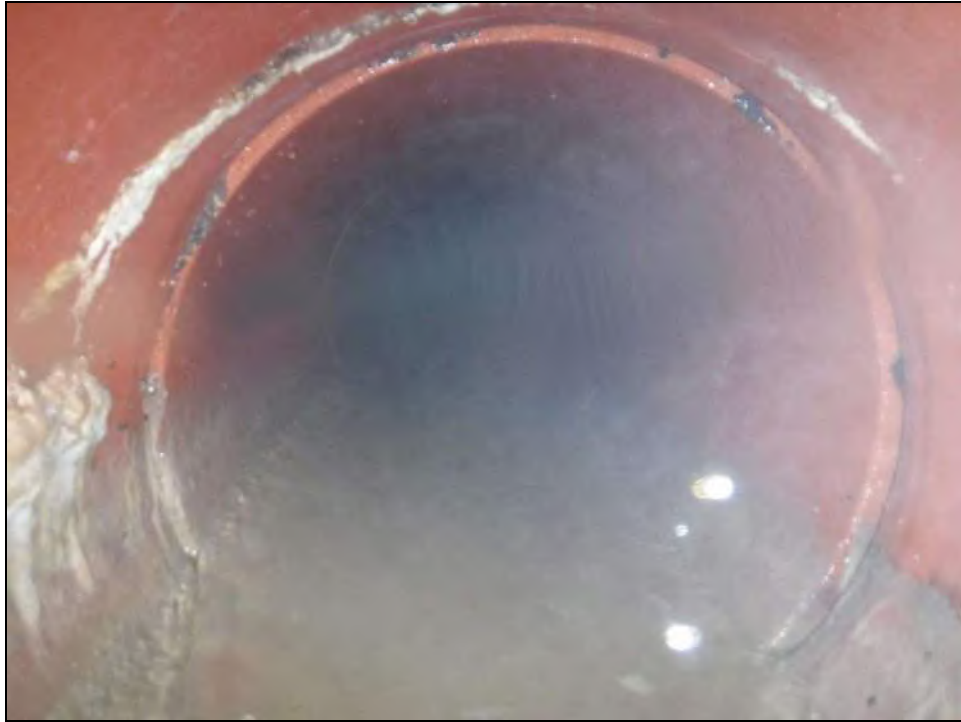
Northeast Influent Pipe



SITE 10

Additional Site Photos

Monitored Southwest Influent Pipe

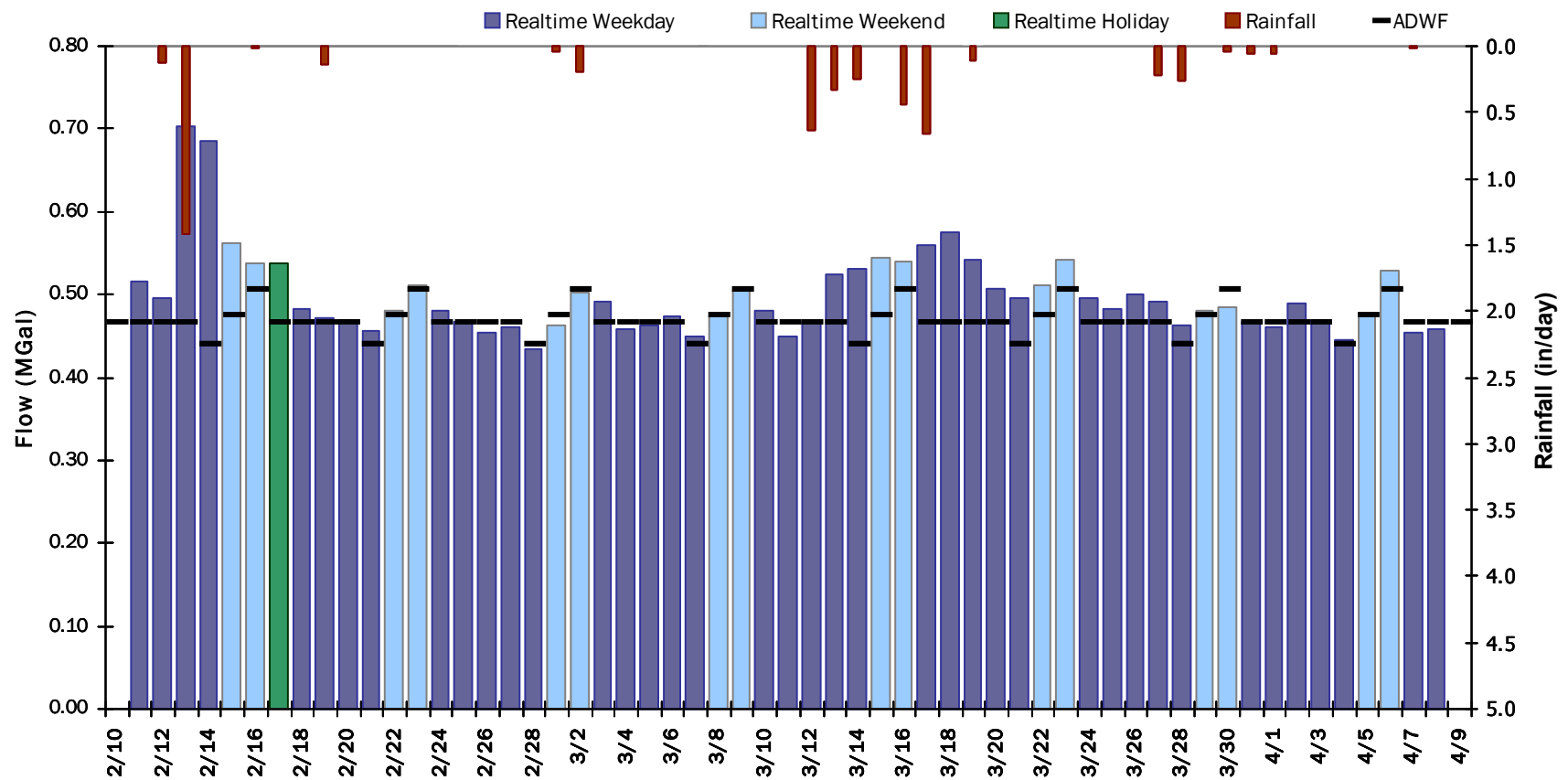


SITE 10

Period Flow Summary: Daily Flow Totals

Avg Daily Flow: 0.497 MGal Peak Daily Flow: 0.702 MGal Min Daily Flow: 0.211 MGal

Total Rainfall: 5.00 inches



SITE 10

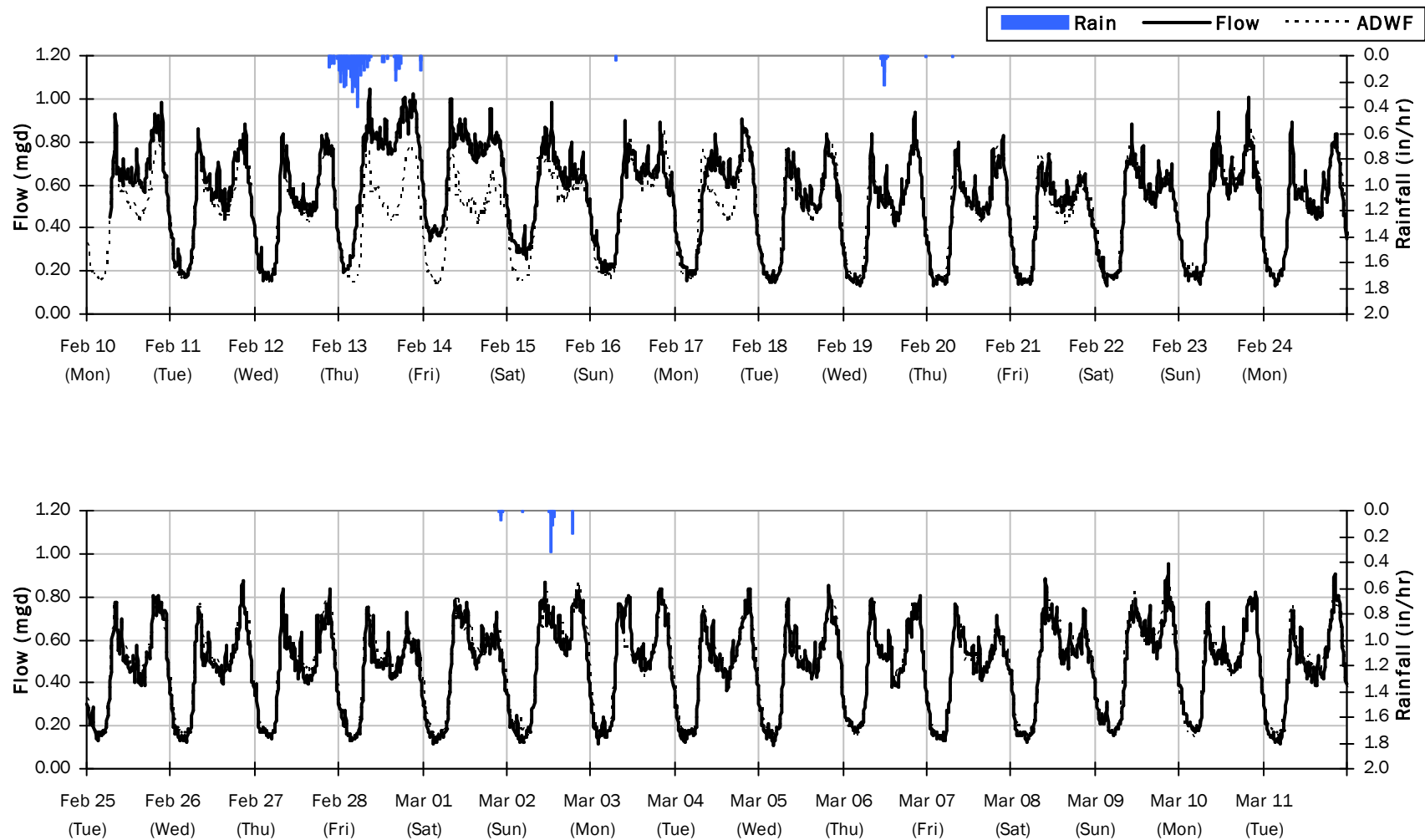
Flow Summary: 2/10/2025 to 3/11/2025

Period Rainfall: 1.93 inches

Period Avg Flow: 0.502 mgd

Period Peak Flow: 1.044 mgd

Period Min Flow: 0.107 mgd



SITE 10

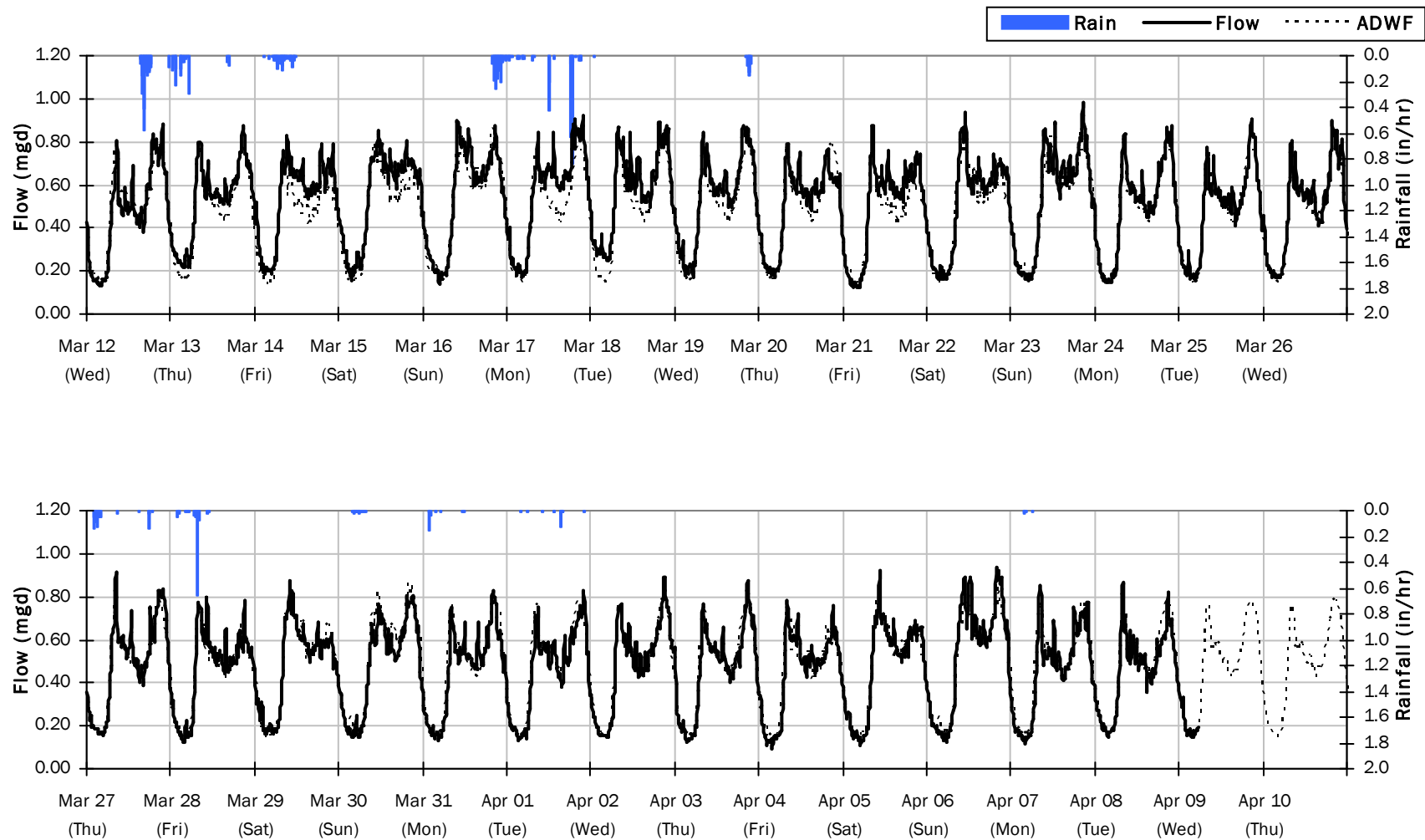
Flow Summary: 3/12/2025 to 4/10/2025

Period Rainfall: 3.07 inches

Period Avg Flow: 0.497 mgd

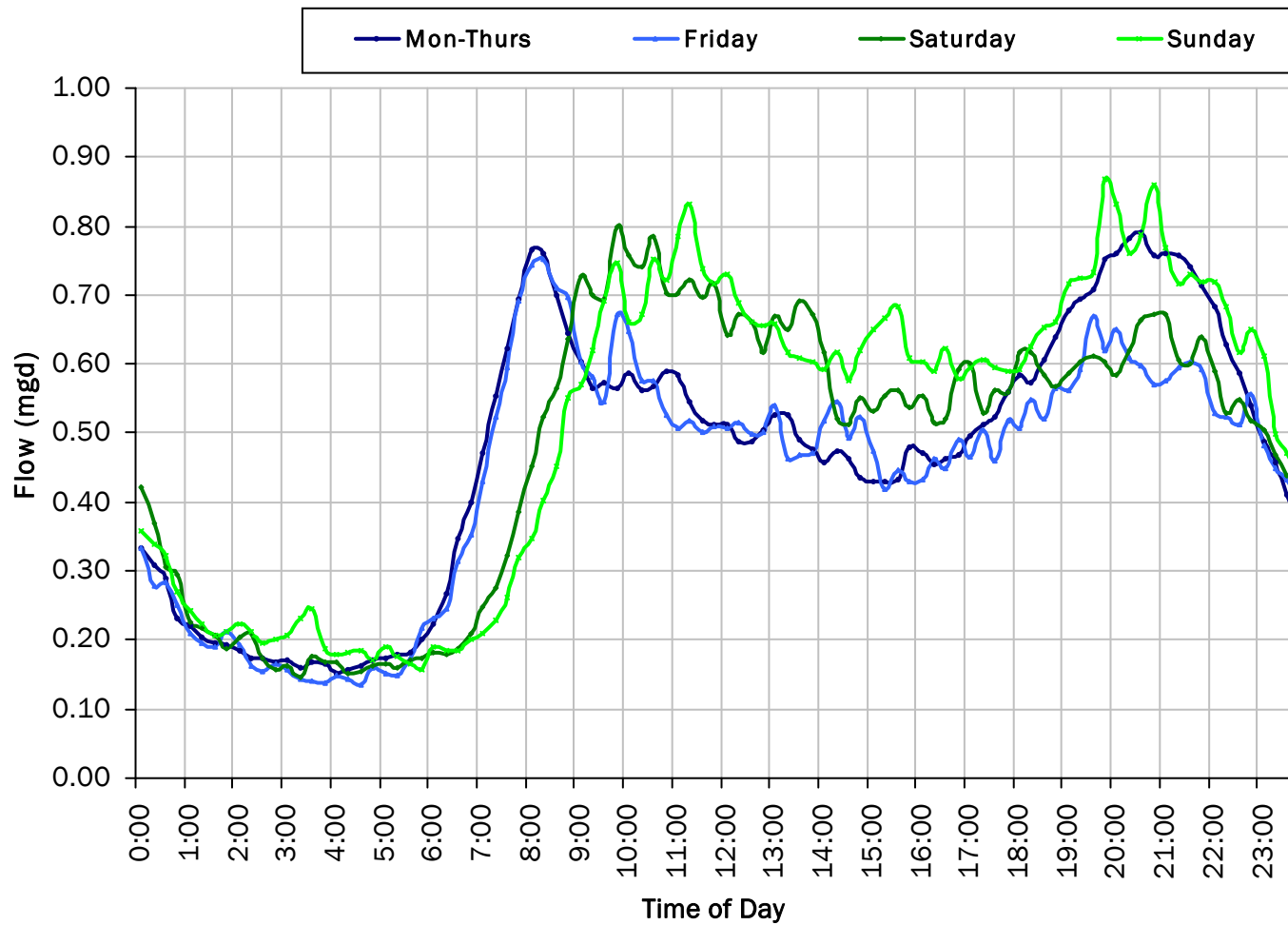
Period Peak Flow: 0.985 mgd

Period Min Flow: 0.096 mgd

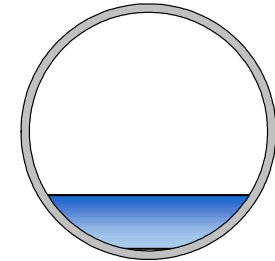


SITE 10

Average Dry Weather Flow Hydrographs

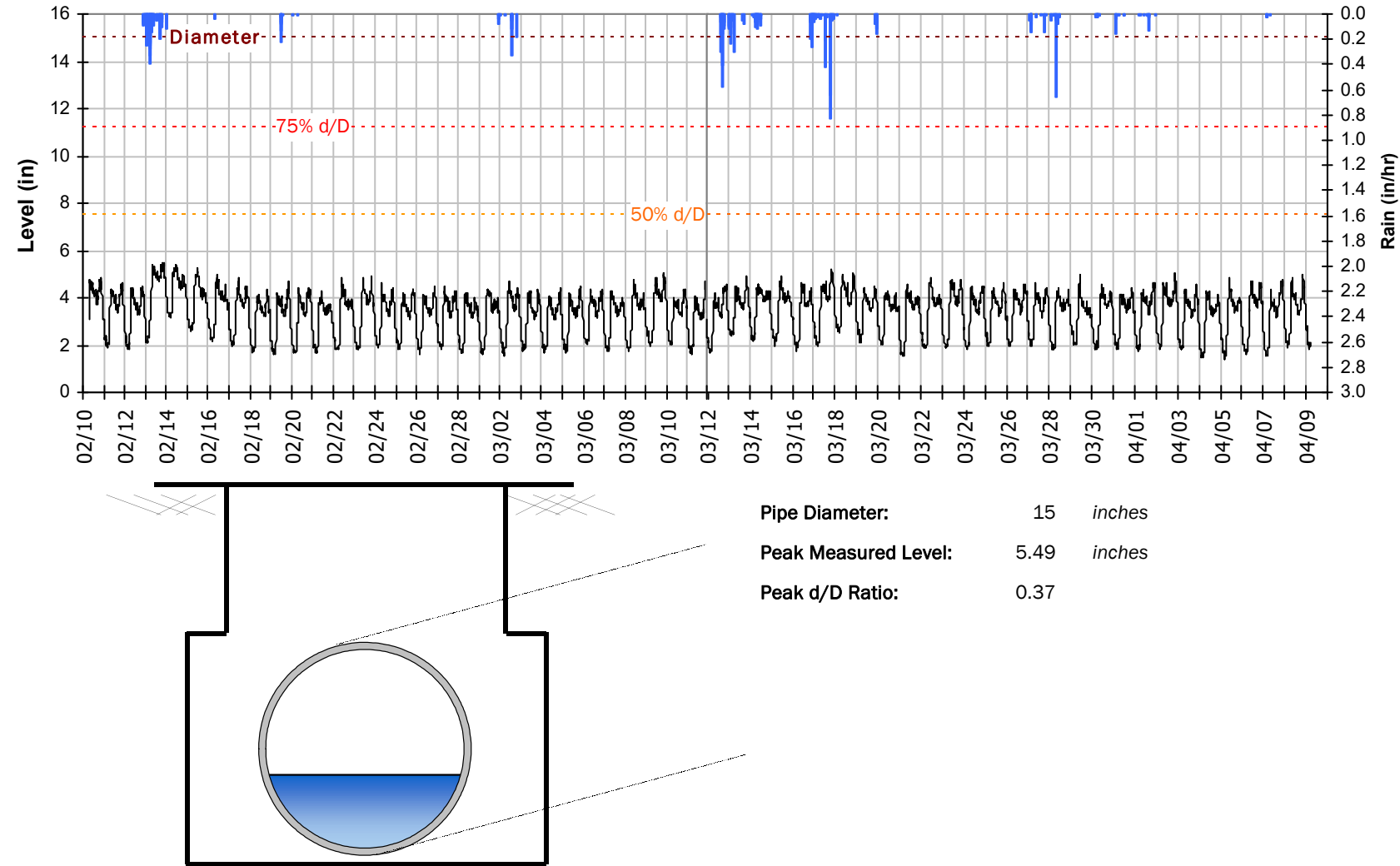


ADWF:
0.471 mgd



SITE 10
Site Capacity and Surge Summary

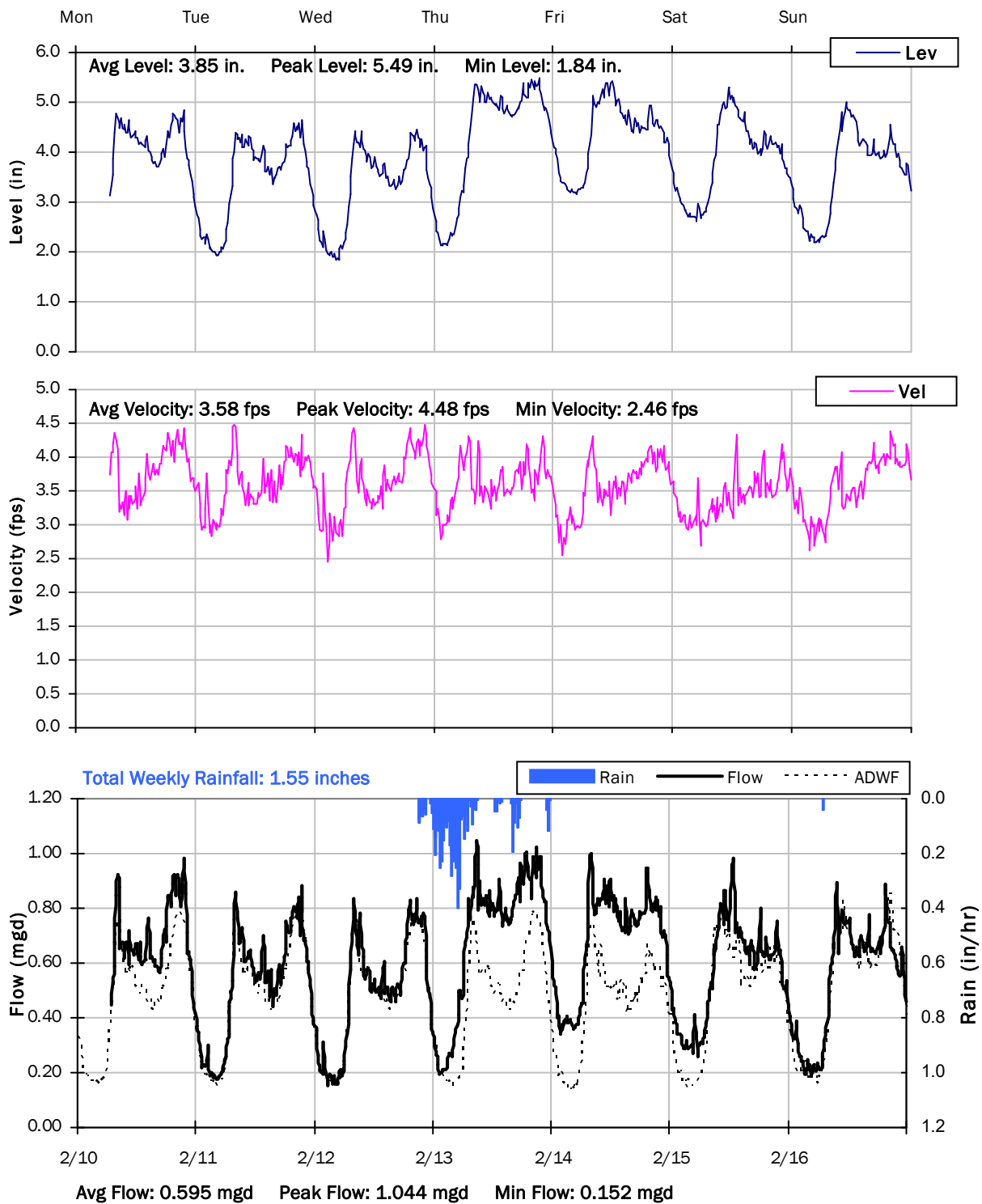
Realtime Flow Levels with Rainfall Data over Peak Level Period



SITE 10

Weekly Level, Velocity and Flow Hydrographs

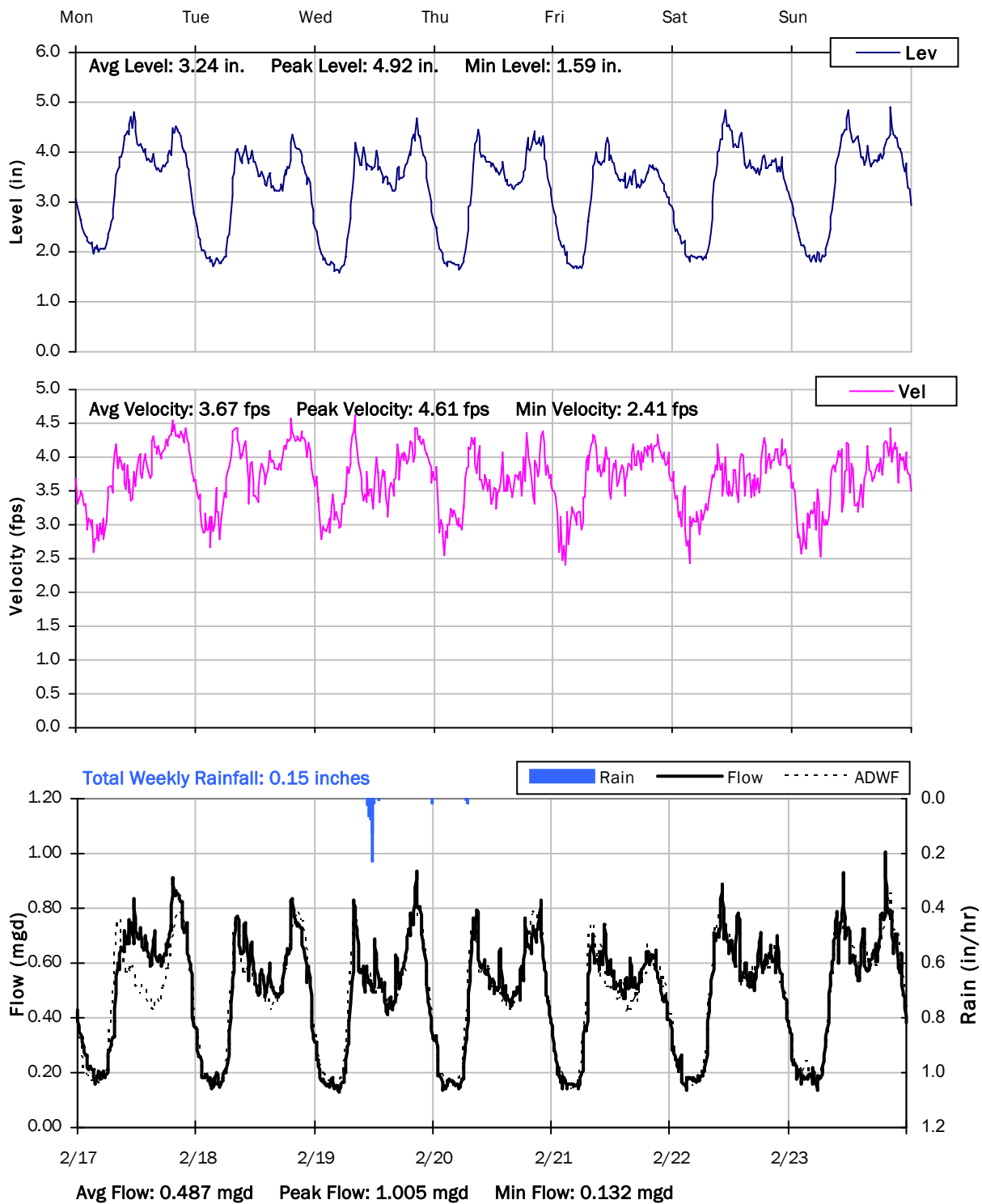
2/10/2025 to 2/17/2025



SITE 10

Weekly Level, Velocity and Flow Hydrographs

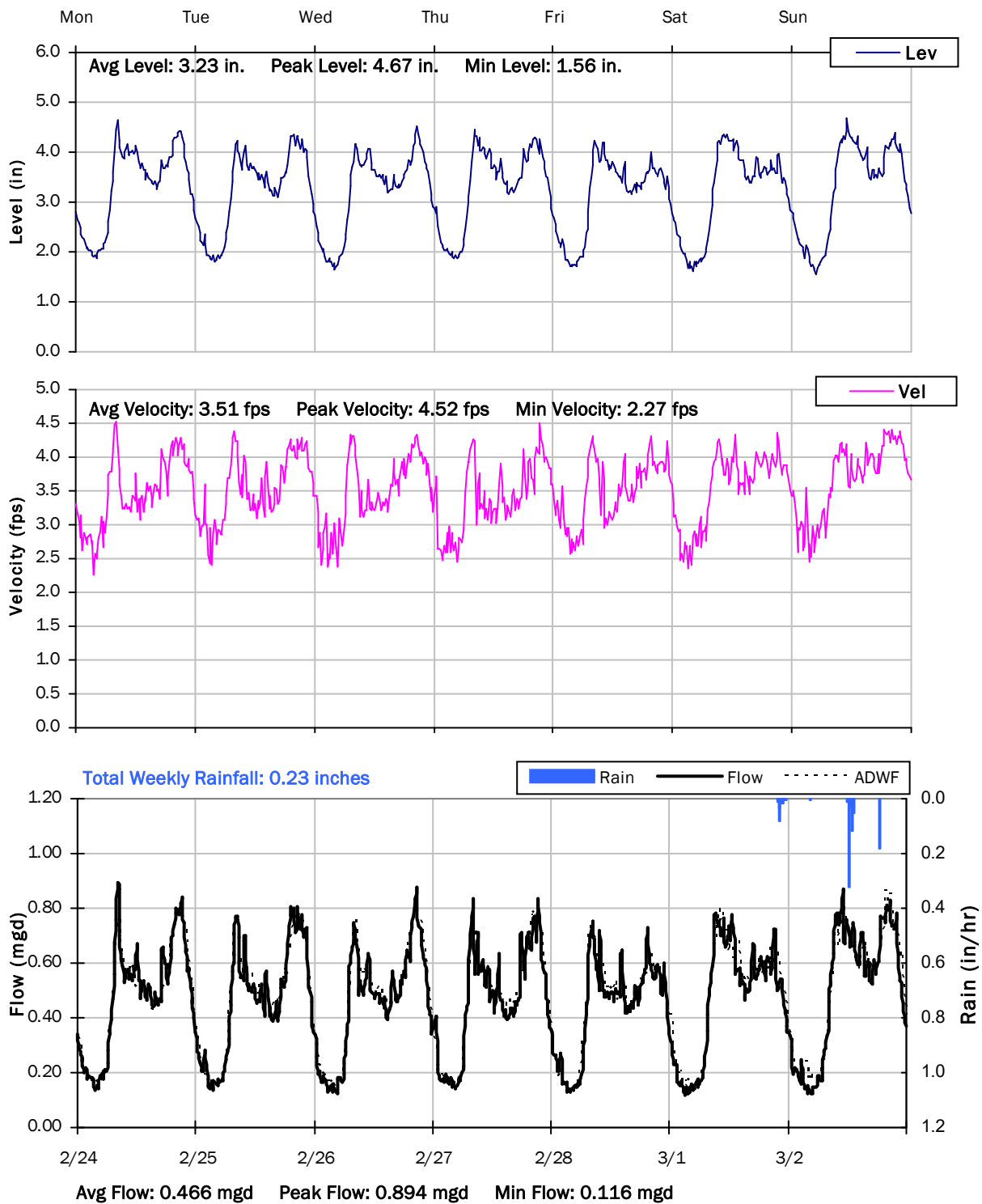
2/17/2025 to 2/24/2025



SITE 10

Weekly Level, Velocity and Flow Hydrographs

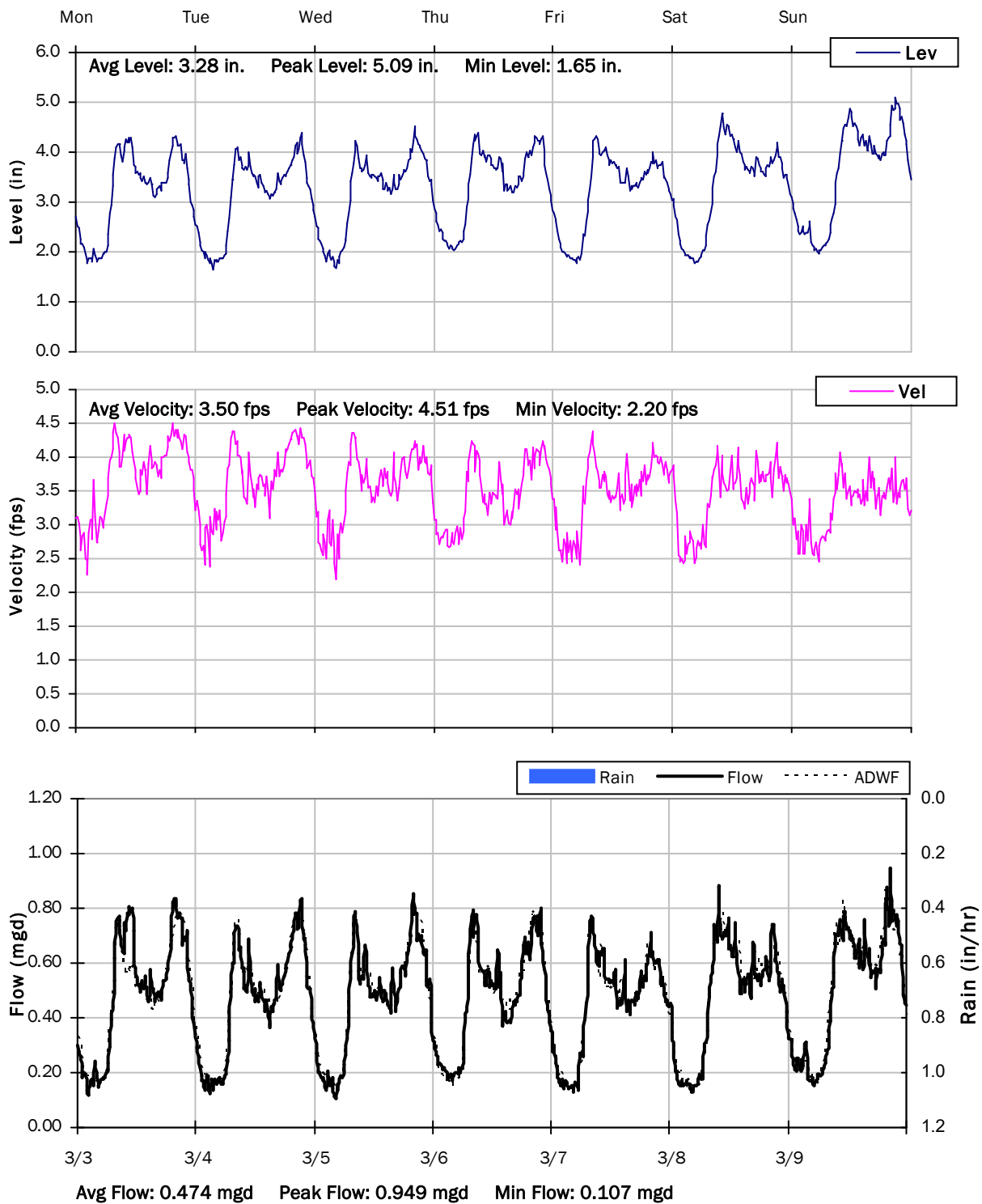
2/24/2025 to 3/3/2025



SITE 10

Weekly Level, Velocity and Flow Hydrographs

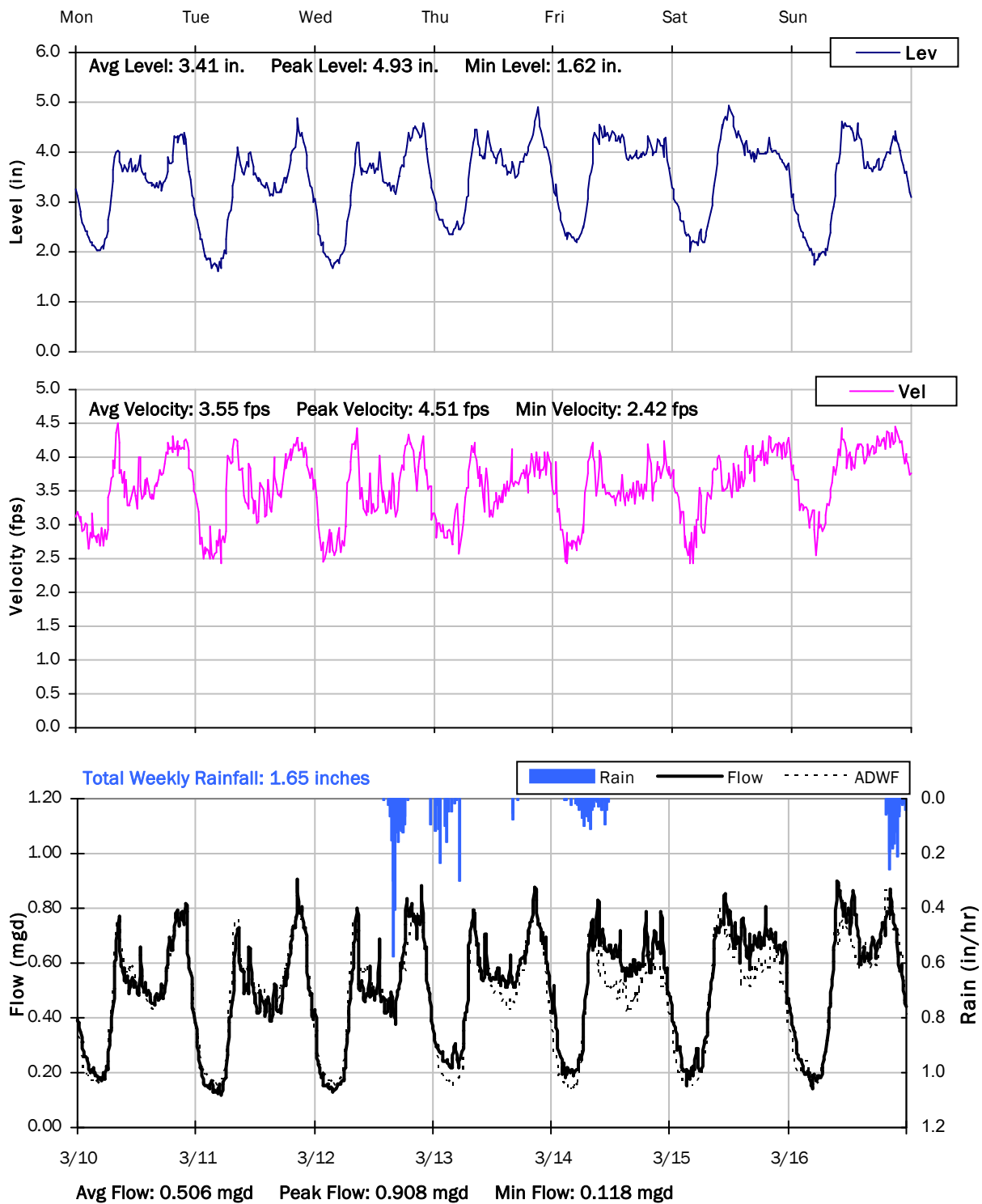
3/3/2025 to 3/10/2025



SITE 10

Weekly Level, Velocity and Flow Hydrographs

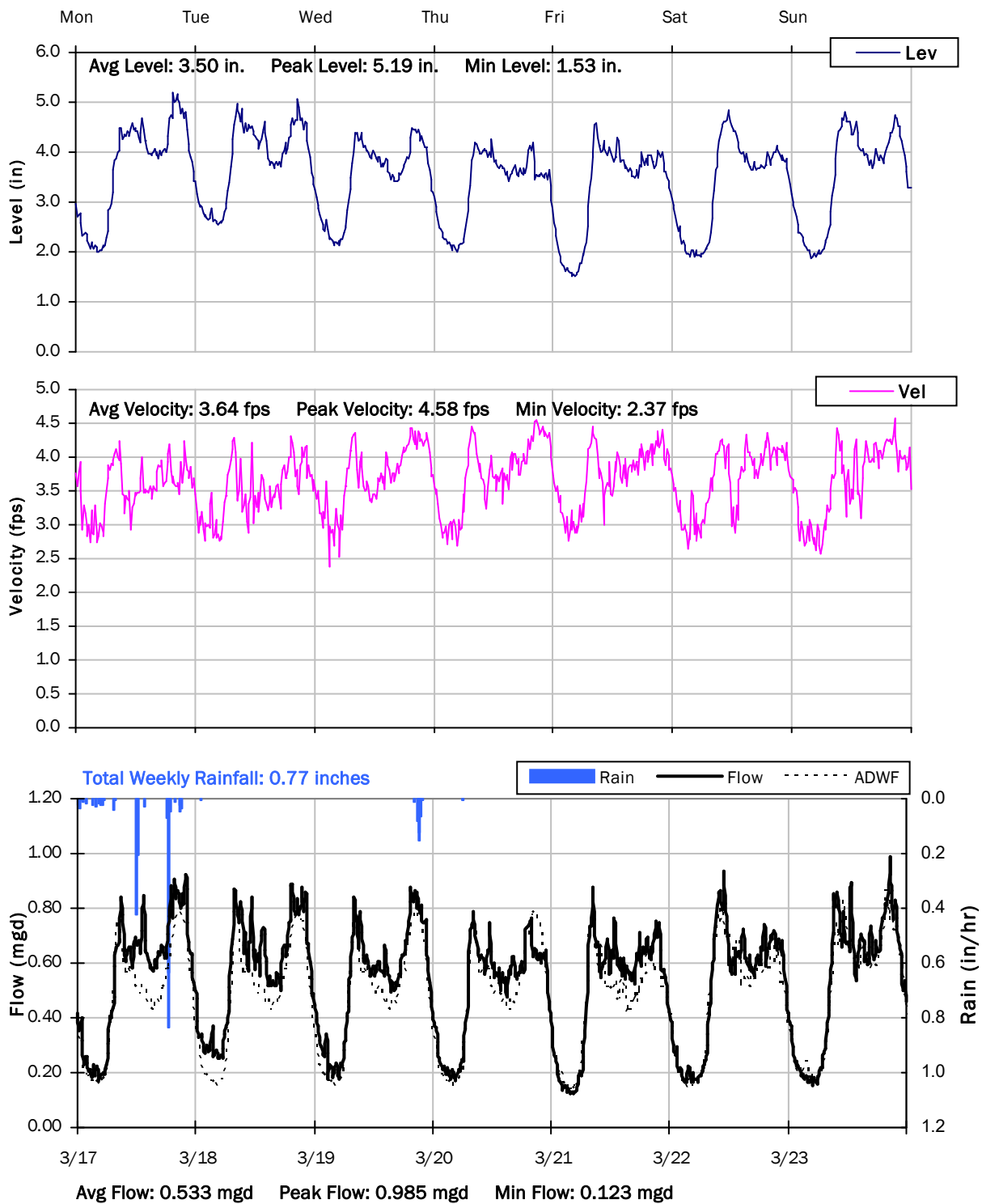
3/10/2025 to 3/17/2025



SITE 10

Weekly Level, Velocity and Flow Hydrographs

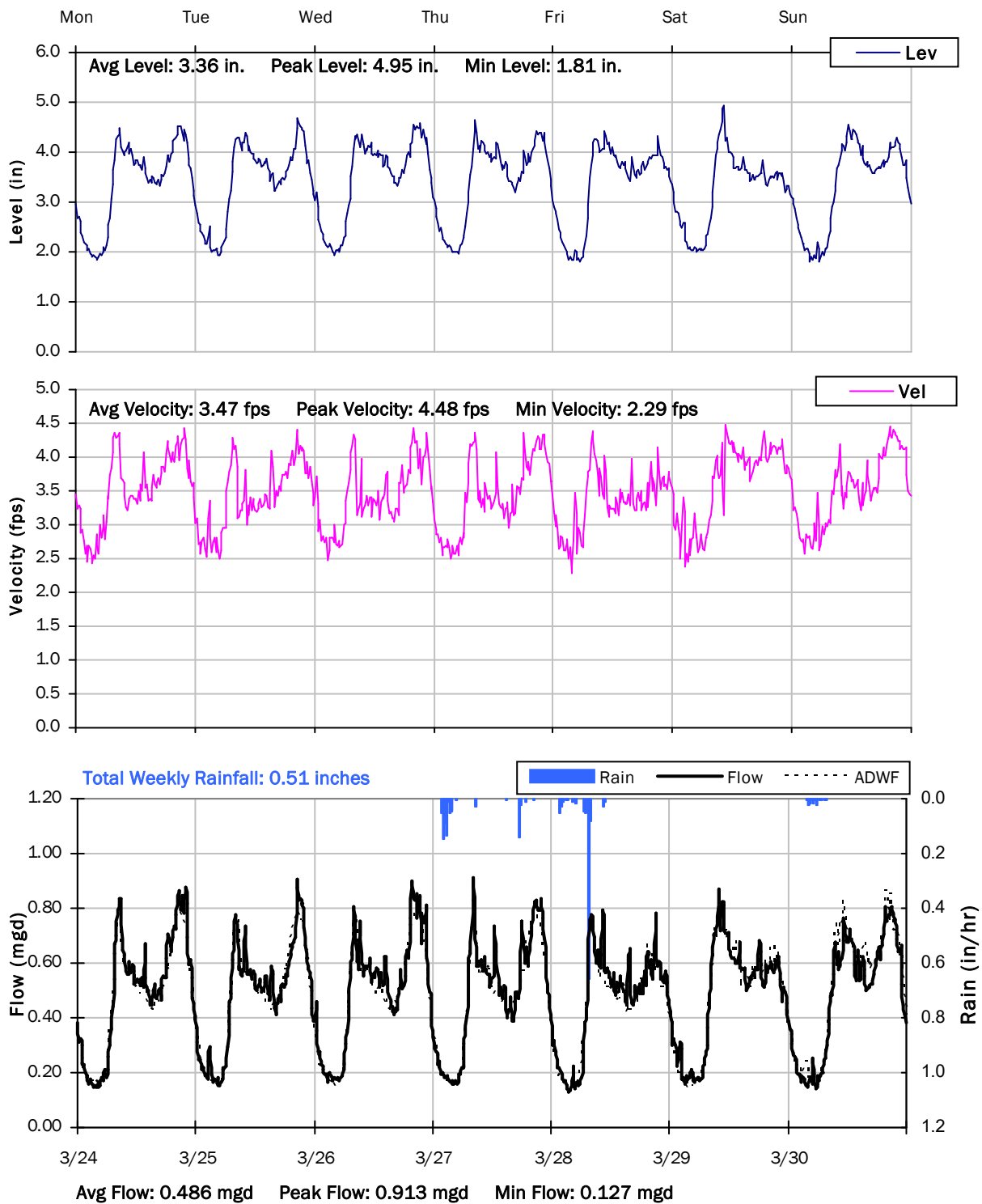
3/17/2025 to 3/24/2025



SITE 10

Weekly Level, Velocity and Flow Hydrographs

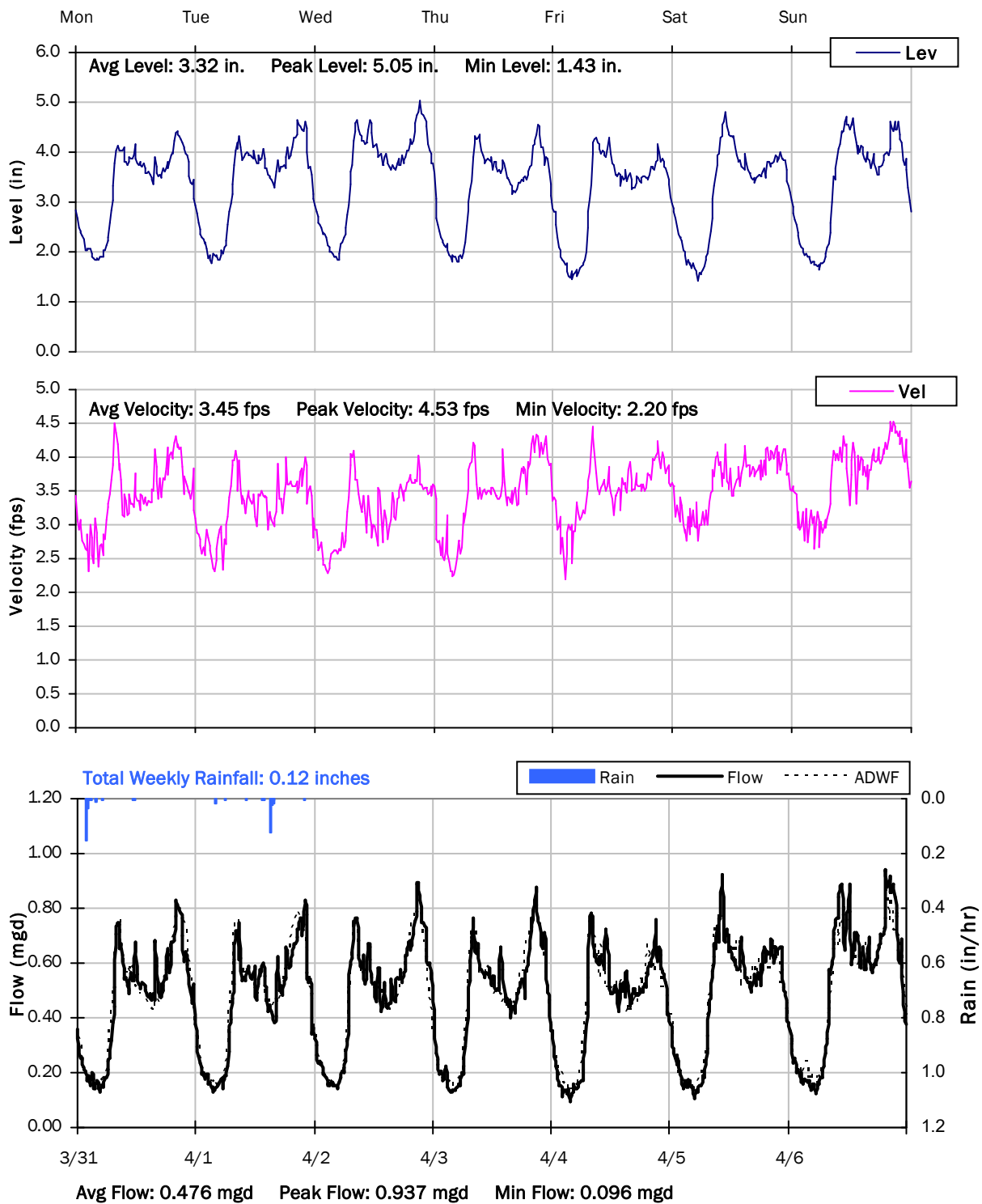
3/24/2025 to 3/31/2025



SITE 10

Weekly Level, Velocity and Flow Hydrographs

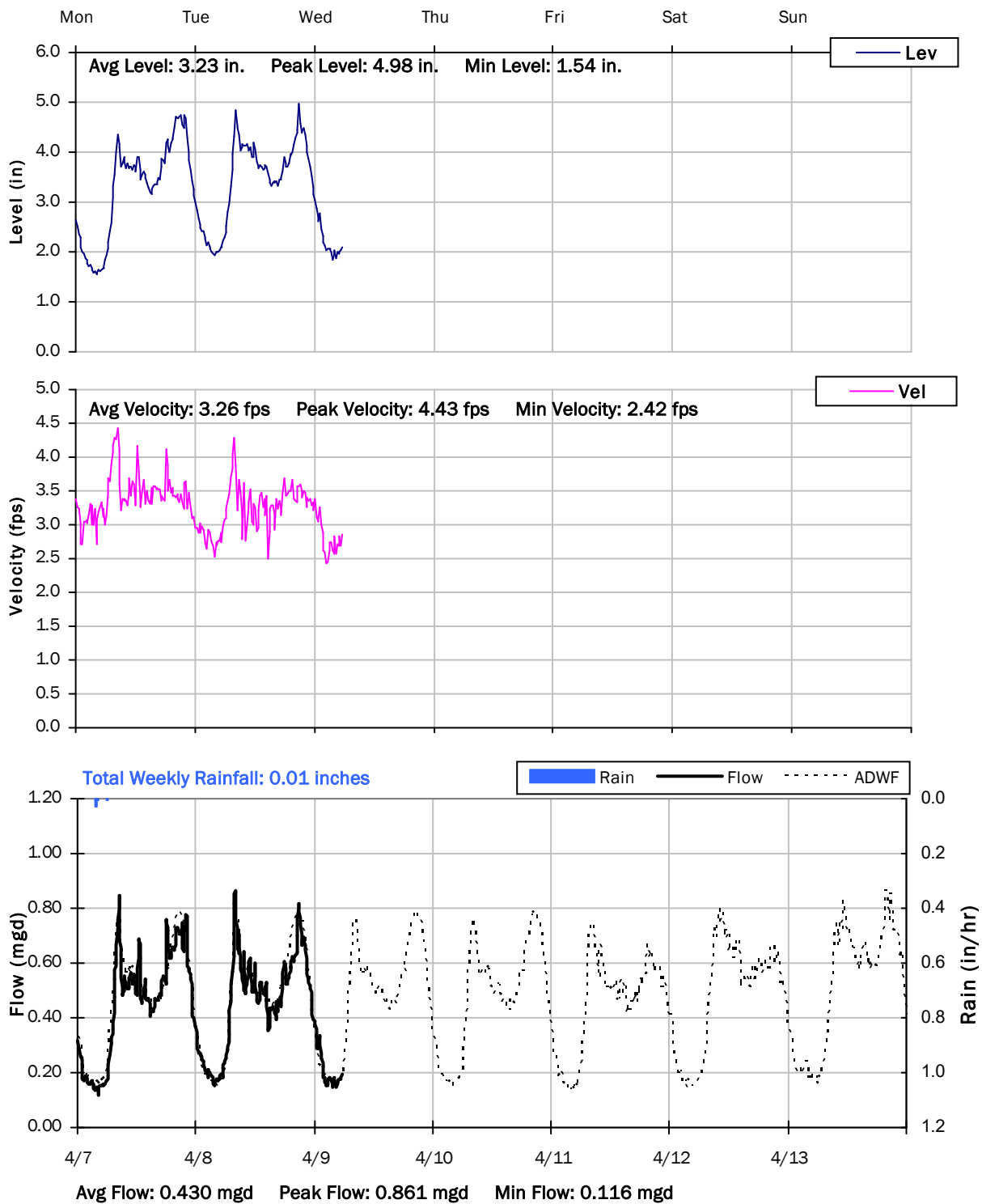
3/31/2025 to 4/7/2025



SITE 10

Weekly Level, Velocity and Flow Hydrographs

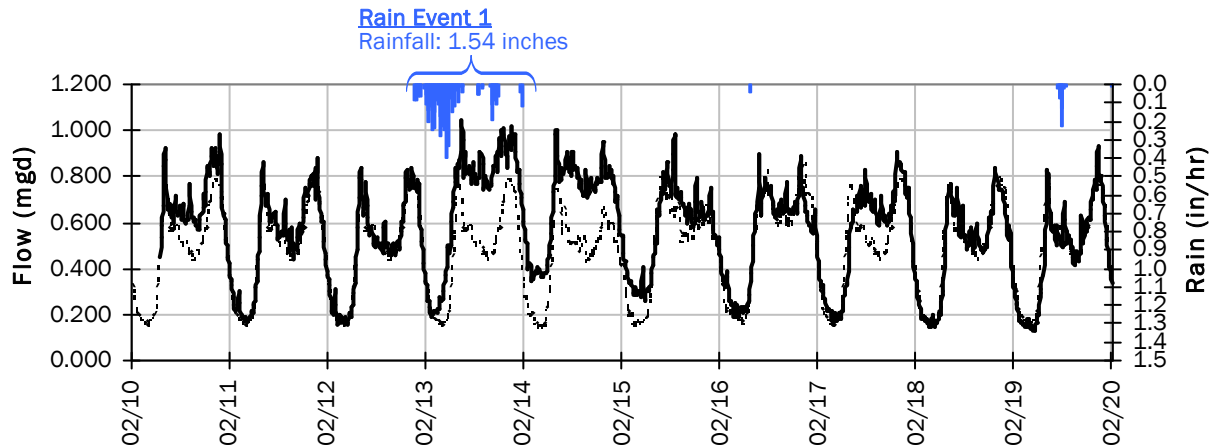
4/7/2025 to 4/14/2025



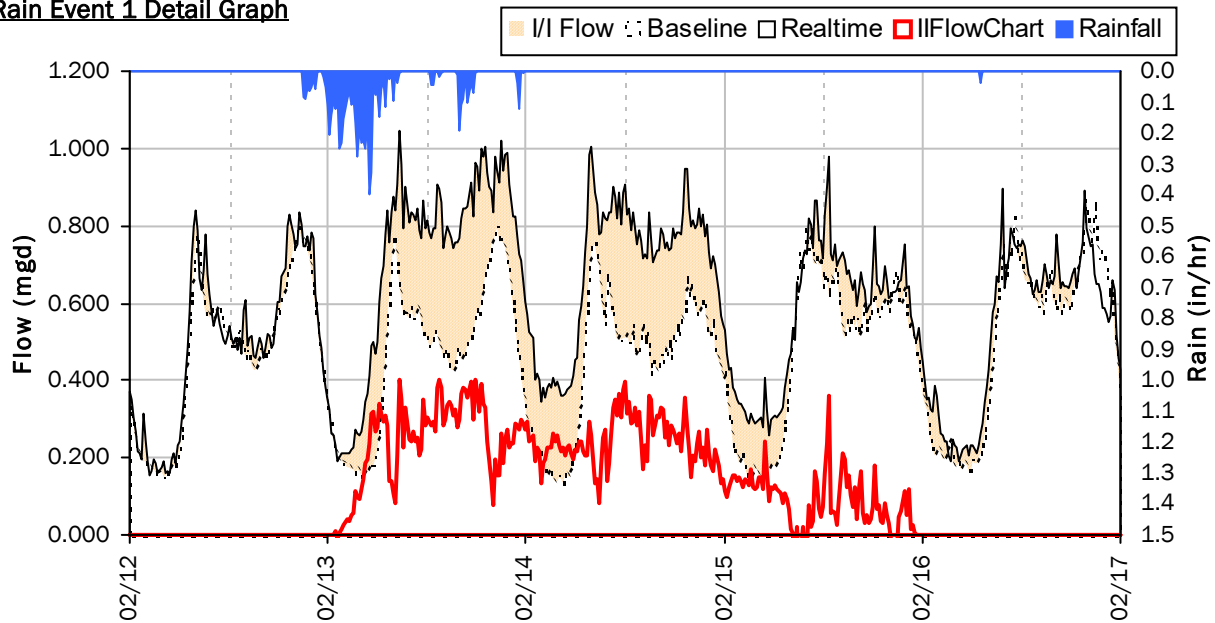
SITE 10

I/I Summary: Rain Event 1

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 1 Detail Graph



Storm Event I/I Analysis (Rain = 1.54 inches)

Capacity

Peak Flow: 1.044 mgd
PF: 2.22

Peak Level: 5.49 in
d/D Ratio: 0.37

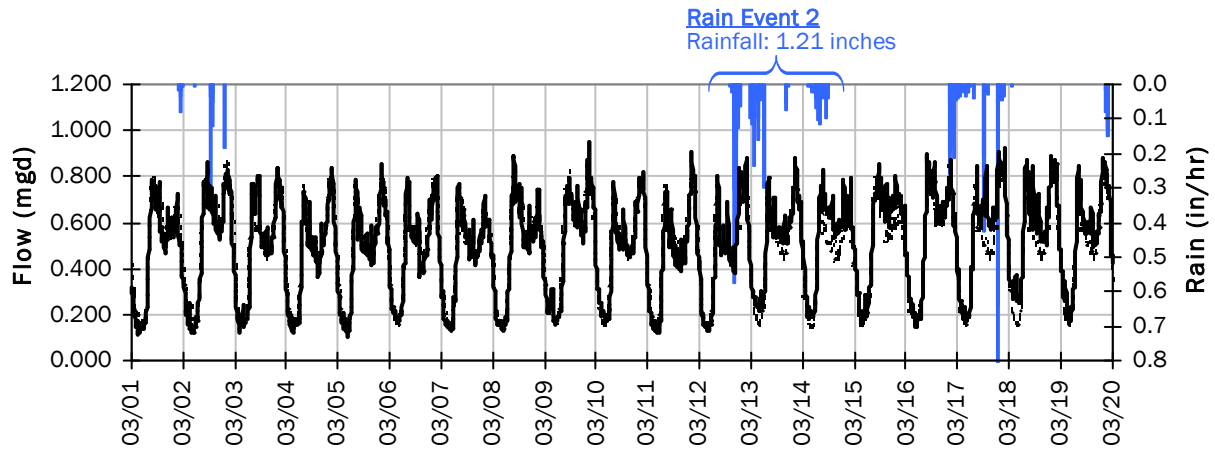
Inflow / Infiltration

Peak I/I Rate: 0.404 mgd
Total I/I: 561,000 gallons

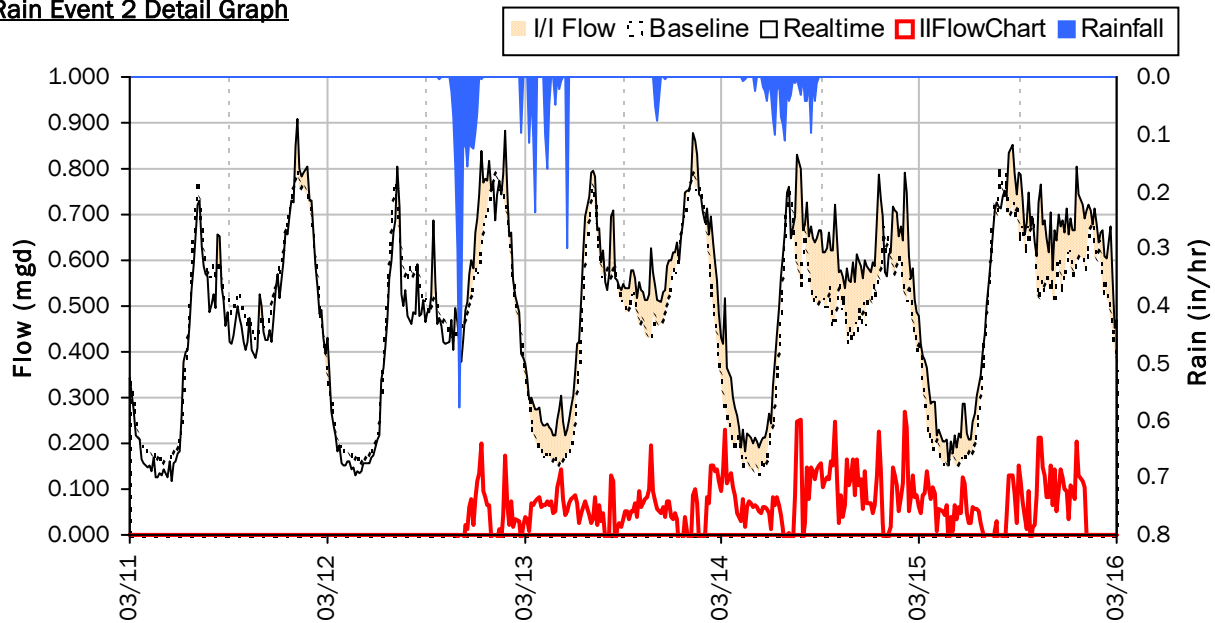
SITE 10

I/I Summary: Rain Event 2

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 2 Detail Graph



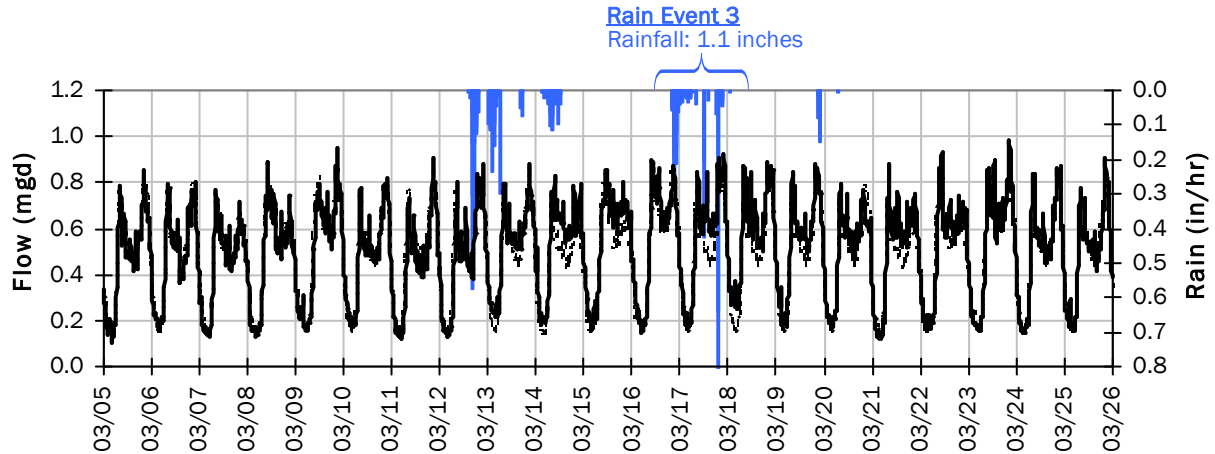
Storm Event I/I Analysis (Rain = 1.21 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.885 mgd	Peak I/I Rate:	0.268 mgd
PF:	1.88	Total I/I:	215,000 gallons
Peak Level:	4.93 in		
d/D Ratio:	0.33		

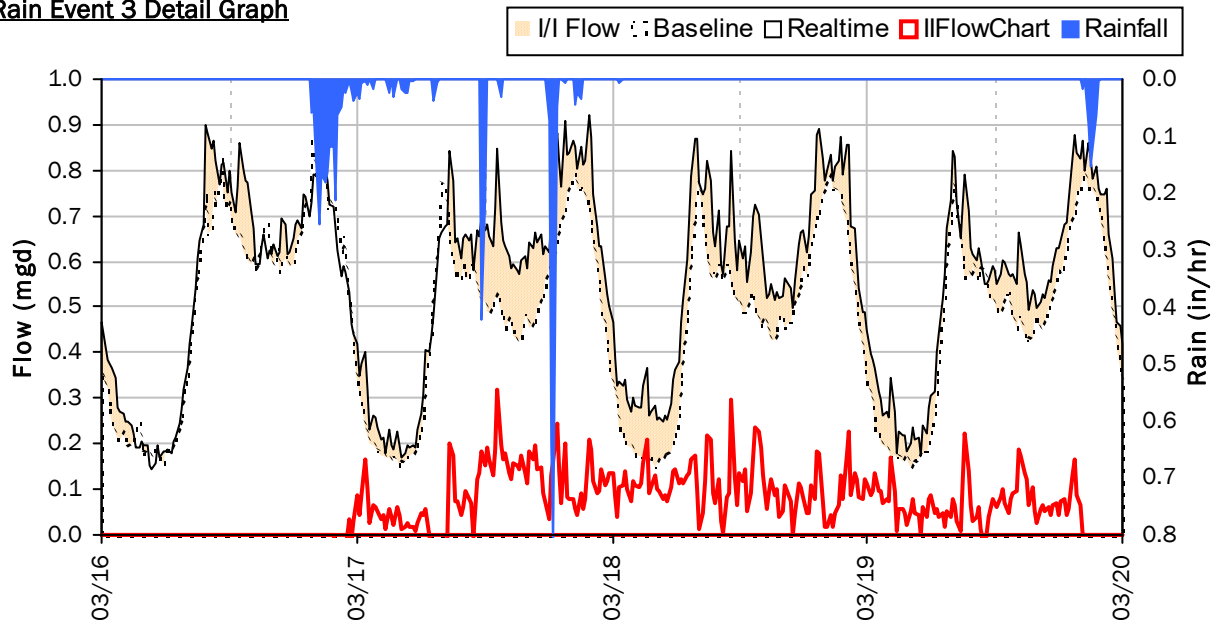
SITE 10

I/I Summary: Rain Event 3

Baseline and Realtime Flows with Rainfall Data over Monitoring Period



Rain Event 3 Detail Graph



Storm Event I/I Analysis (Rain = 1.10 inches)

Capacity		Inflow / Infiltration	
Peak Flow:	0.92 mgd	Peak I/I Rate:	0.32 mgd
PF:	1.95	Total I/I:	257,000 gallons
Peak Level:	5.19 in		
d/D Ratio:	0.35		

V&A Project No. 24-0304, Rev01



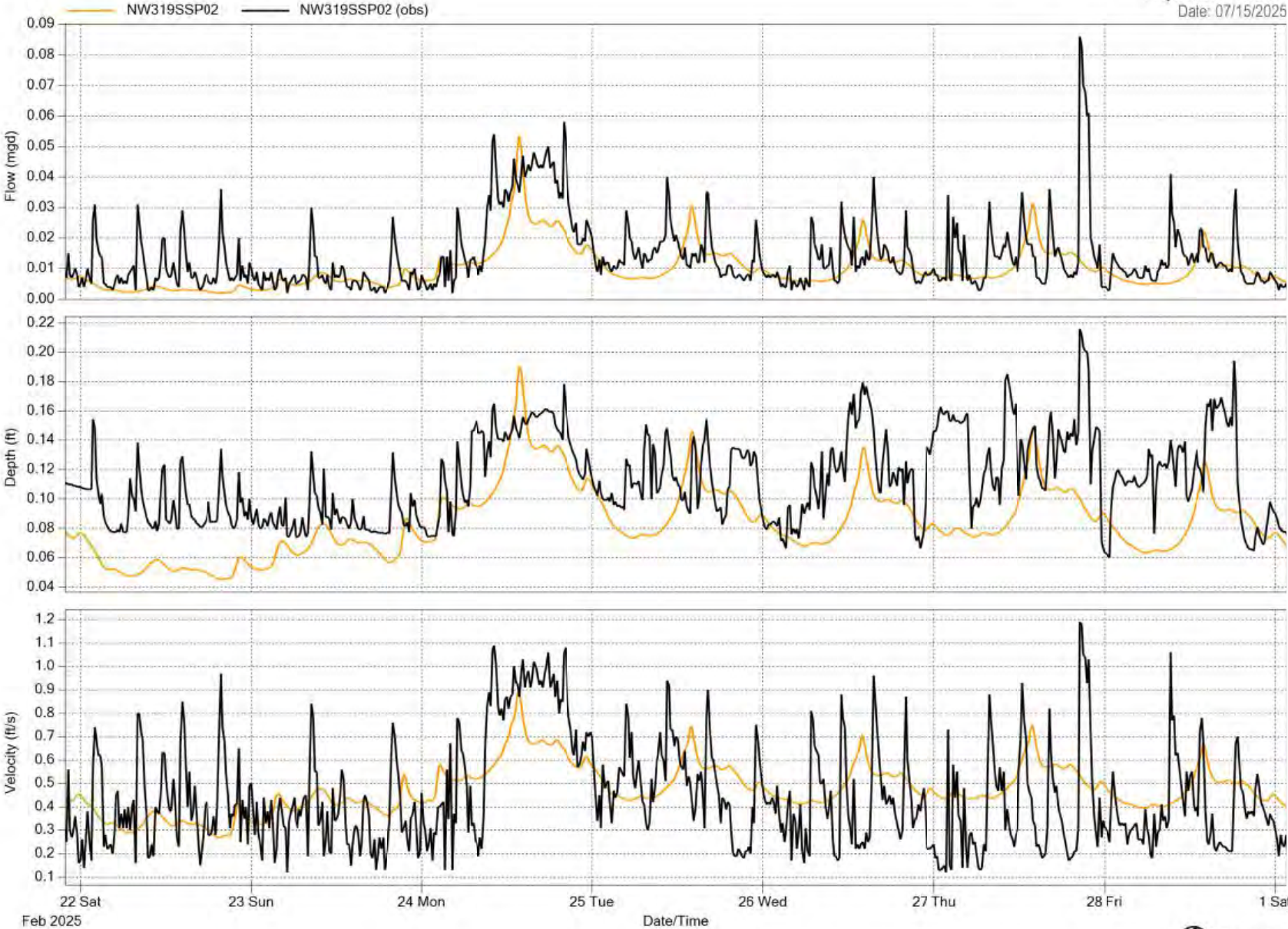

consulting engineers
1000 Broadway
Suite 320
Oakland, CA 94607
510.903.6600
510.903.6601, Fax

Reference: Collection System Model Update and Calibration

Attachment 2: Hydraulic Model Calibration Graphs

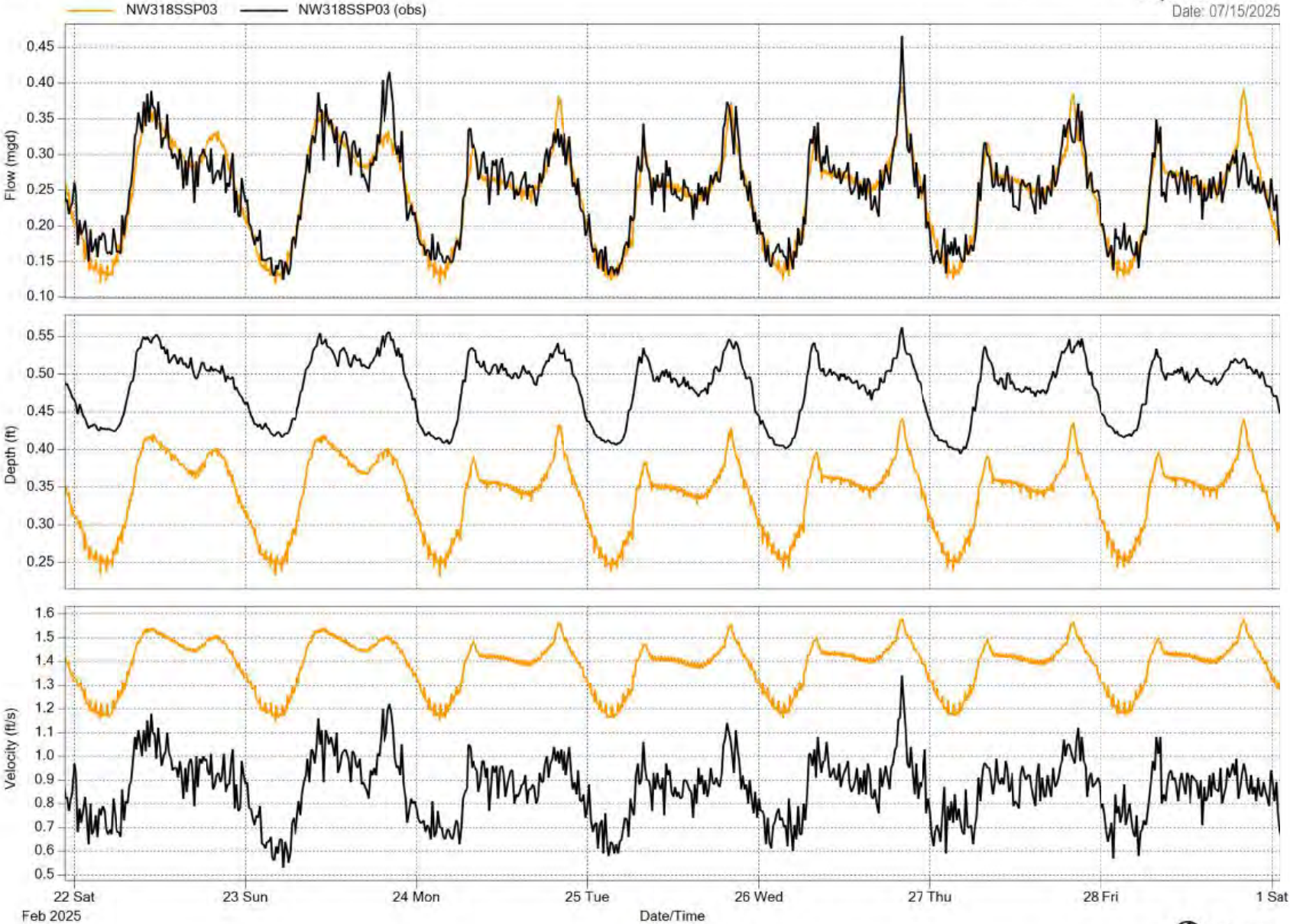
Site 1A - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update
Project No. 184032446
Date: 07/15/2025



Site 1B - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update
Project No. 184032446
Date: 07/15/2025

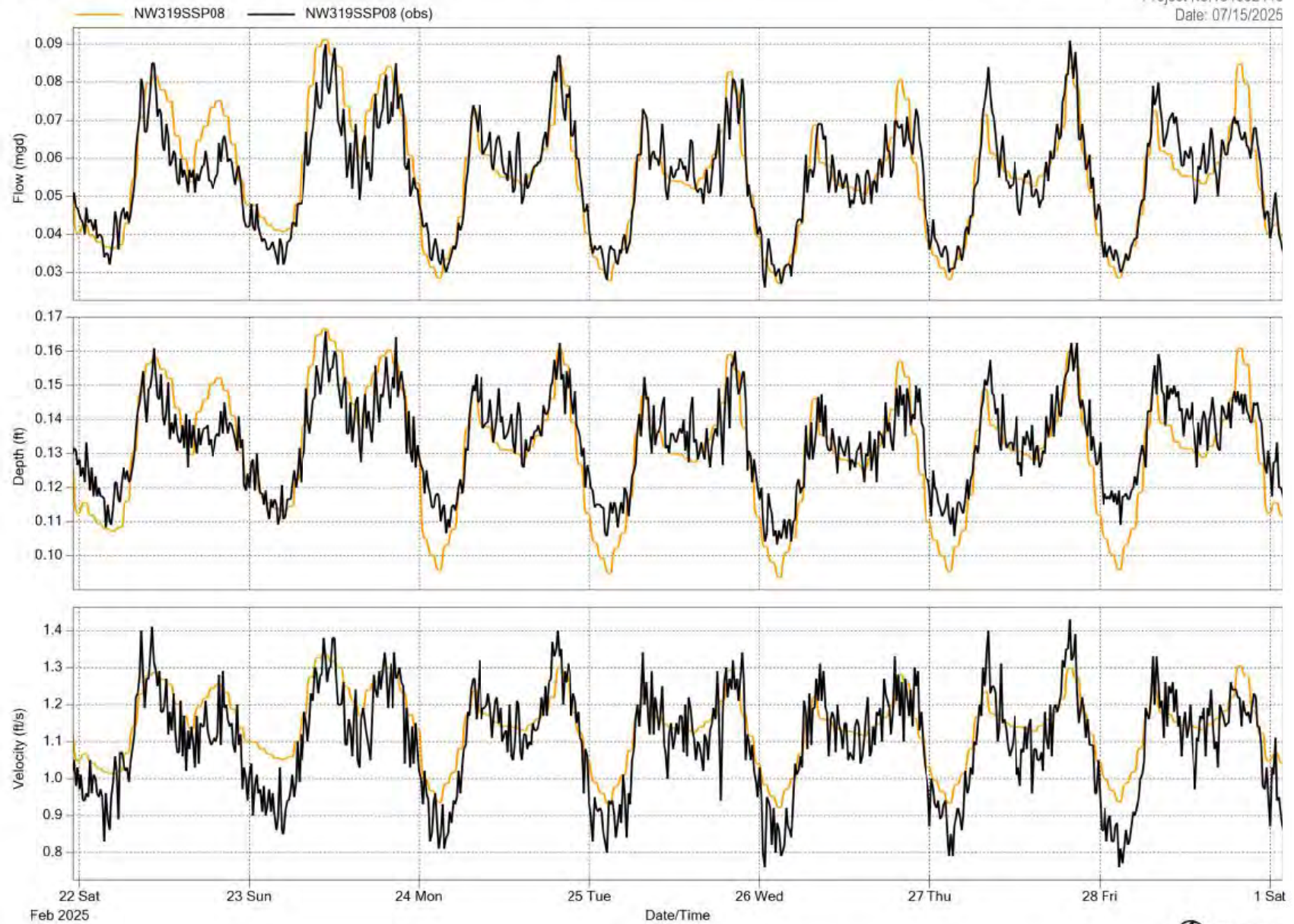


Site 2 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

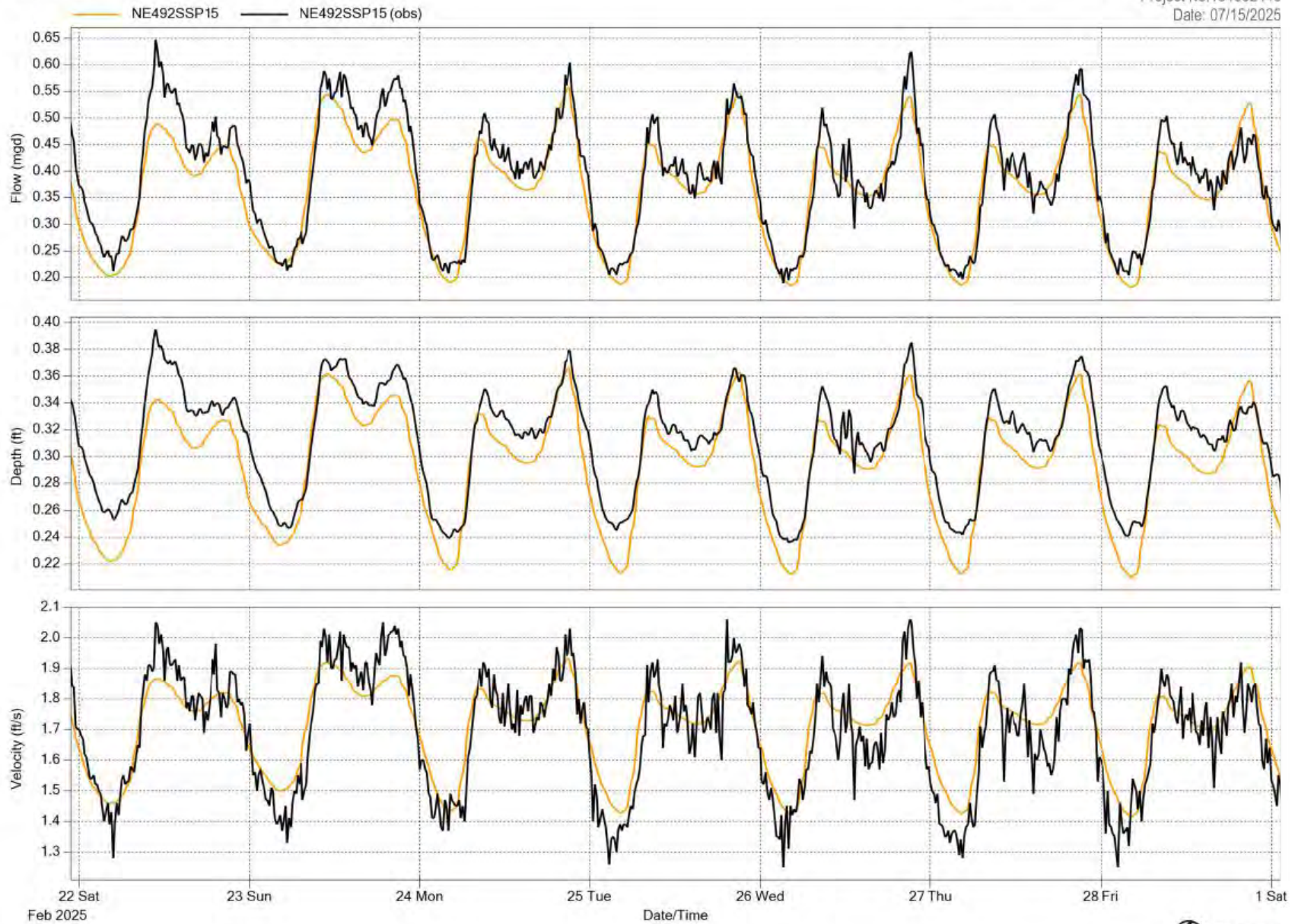


Site 3 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

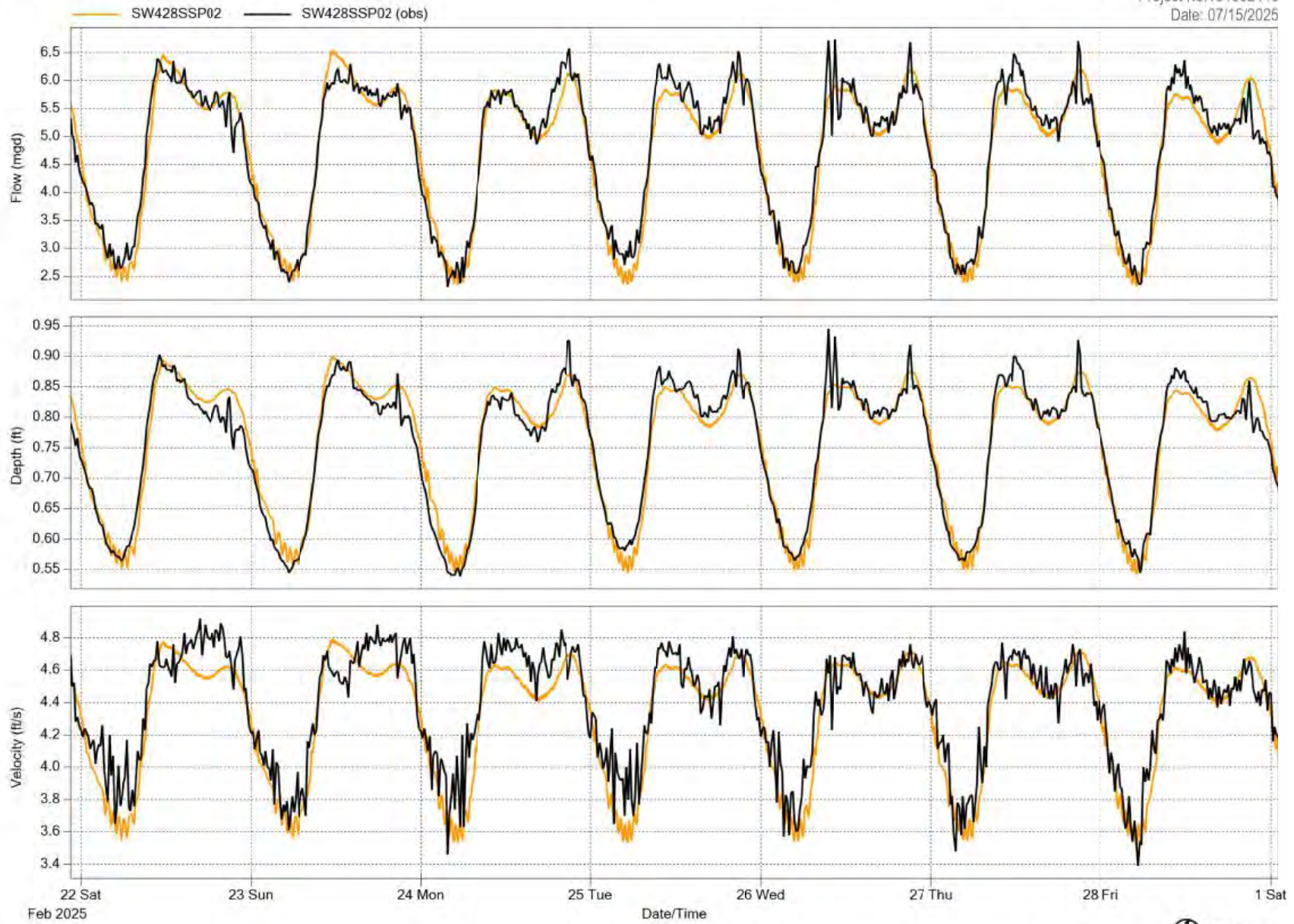


Site 4 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

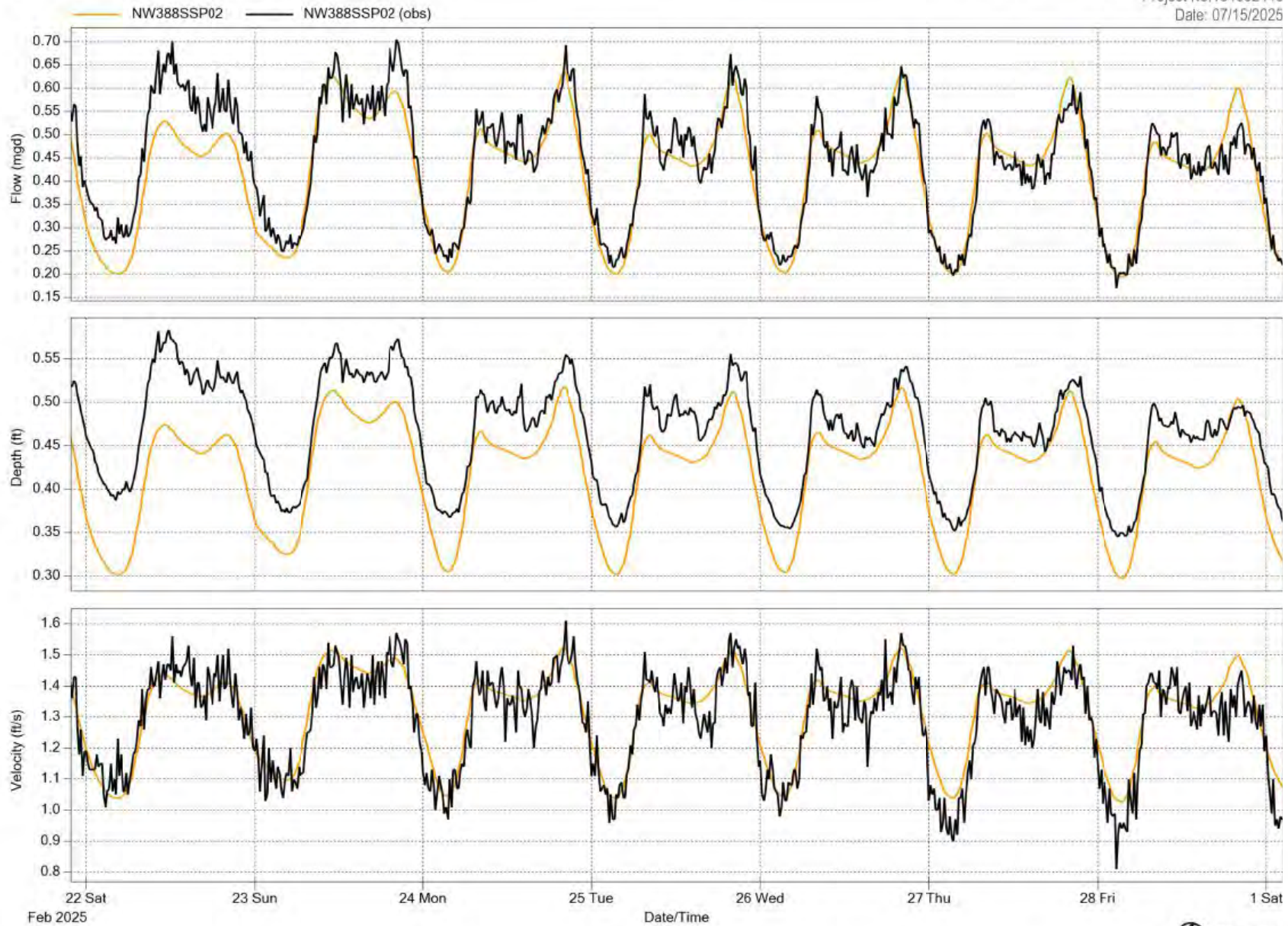


Site 5 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

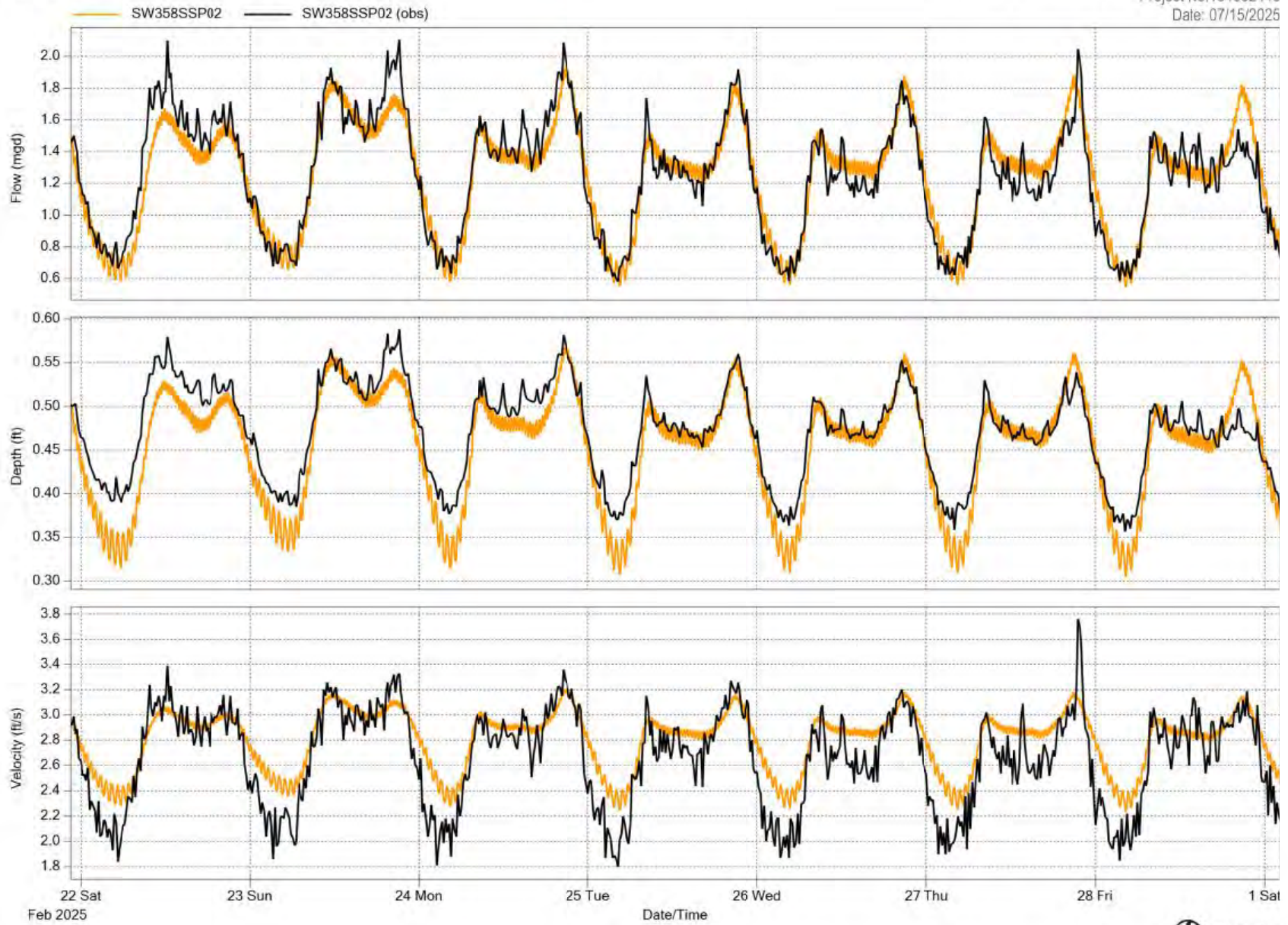


Site 6 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

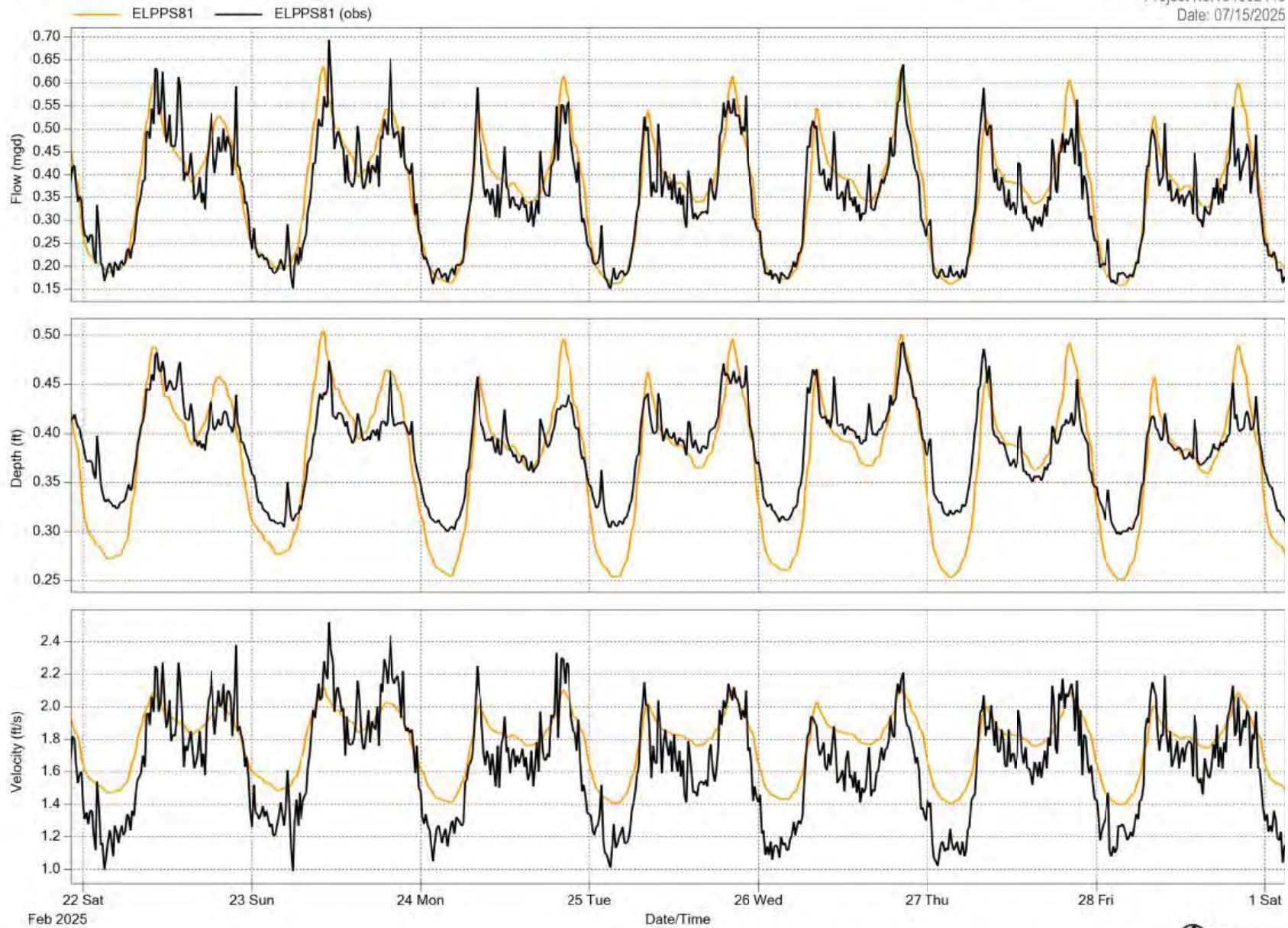


Site 7 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

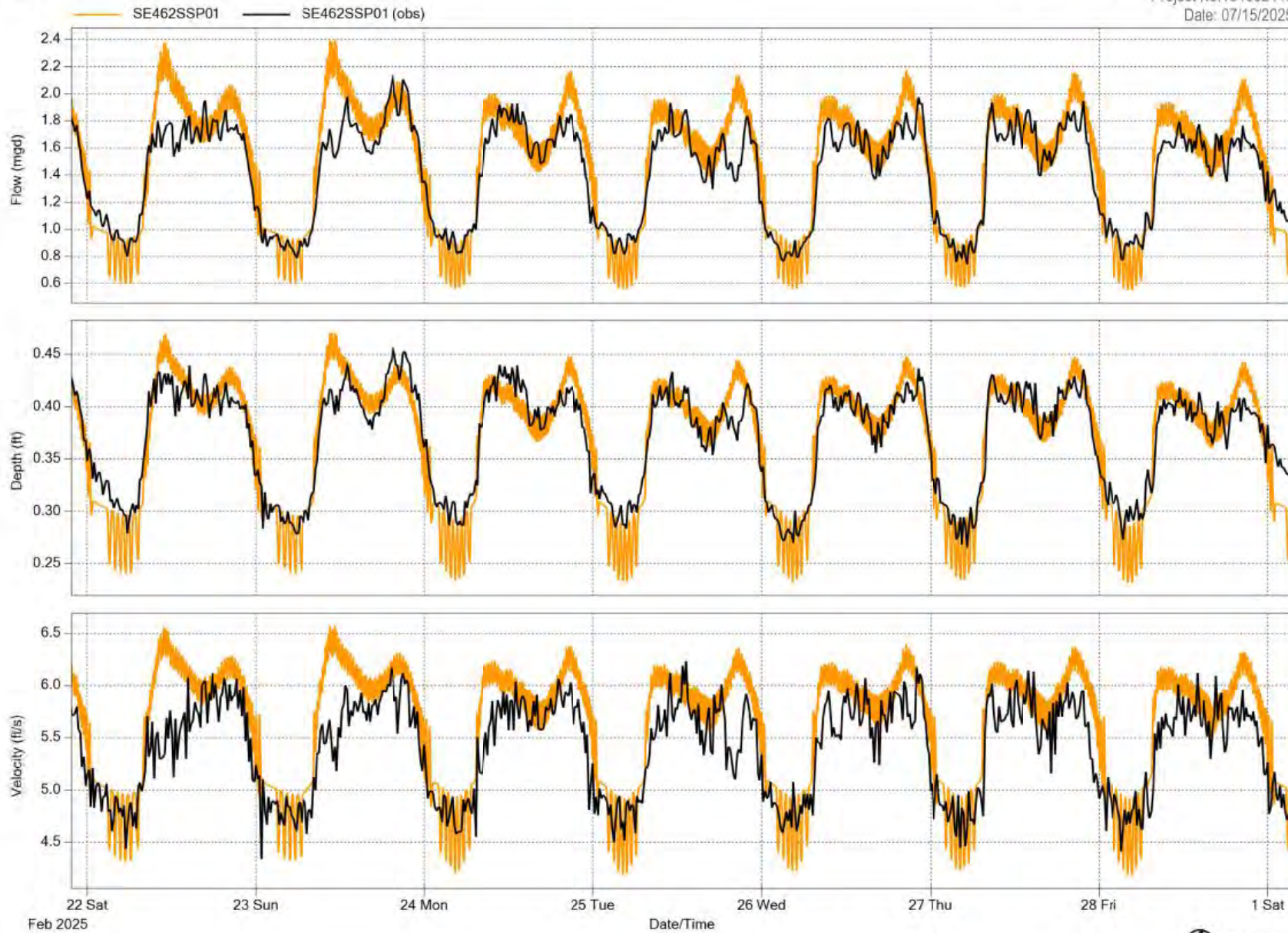


Site 8 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

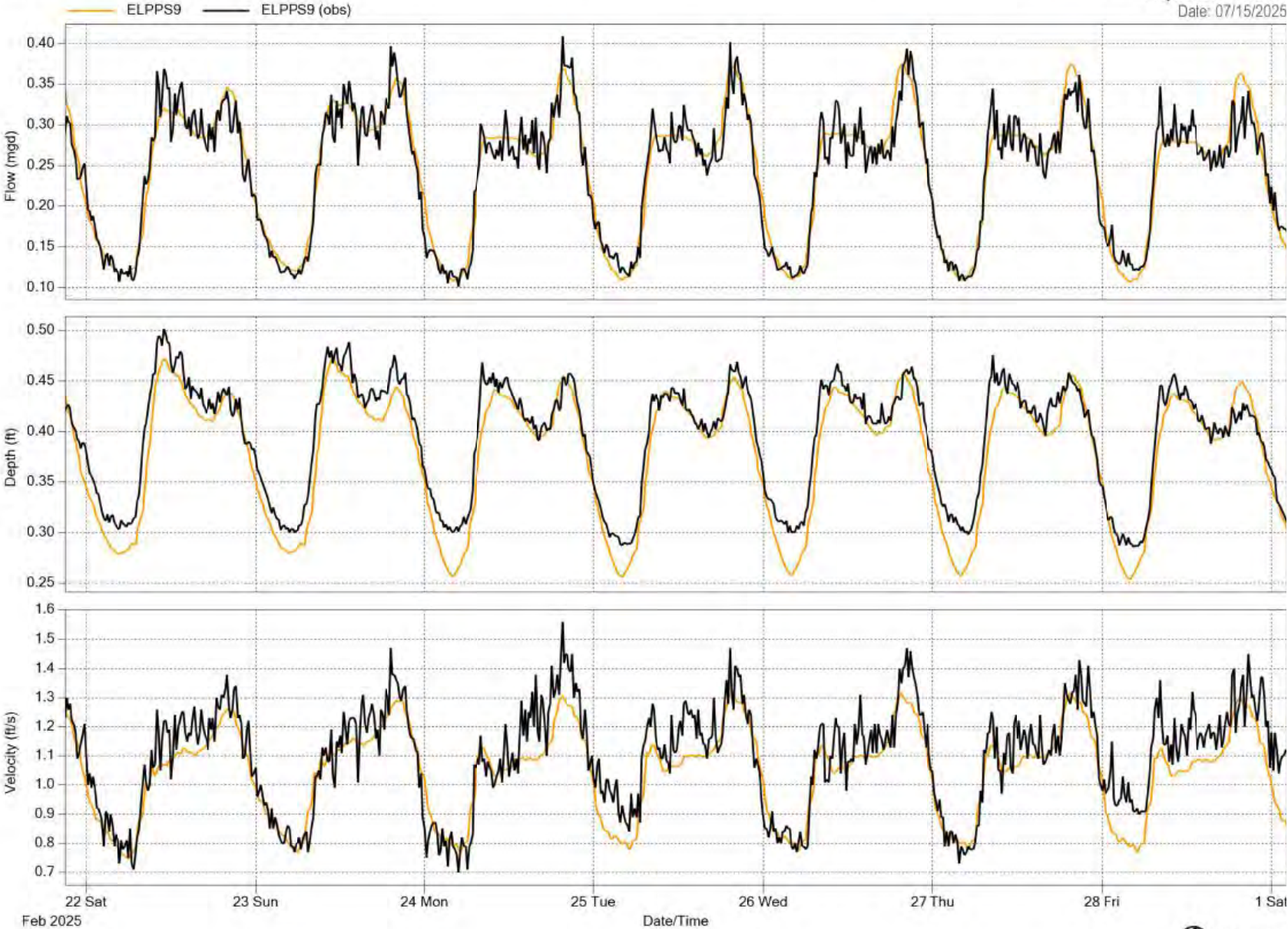
Project No. 184032446

Date: 07/15/2025



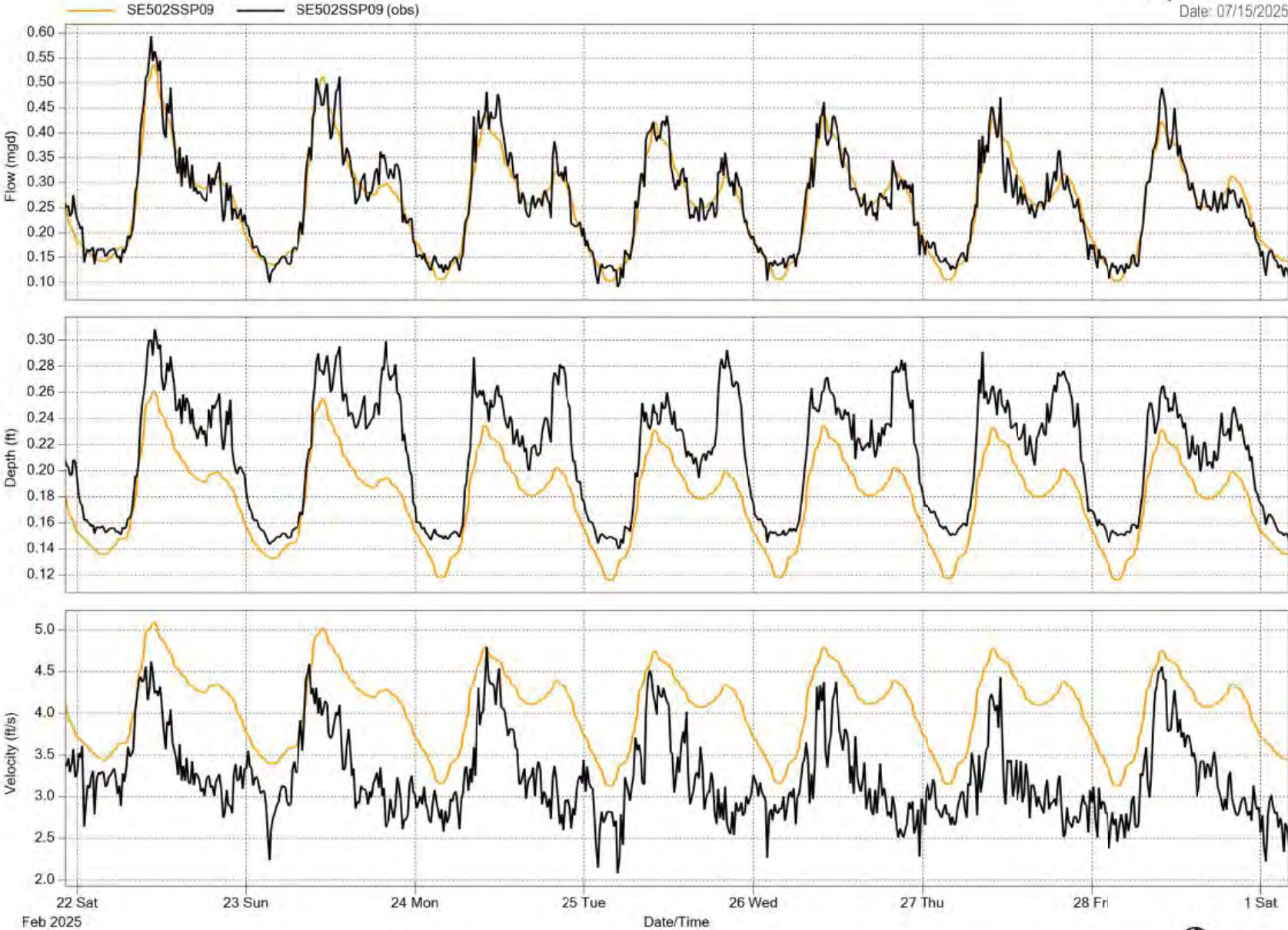
Site 9A - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update
Project No.184032446
Date: 07/15/2025



Site 9B - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update
Project No. 184032446
Date: 07/15/2025

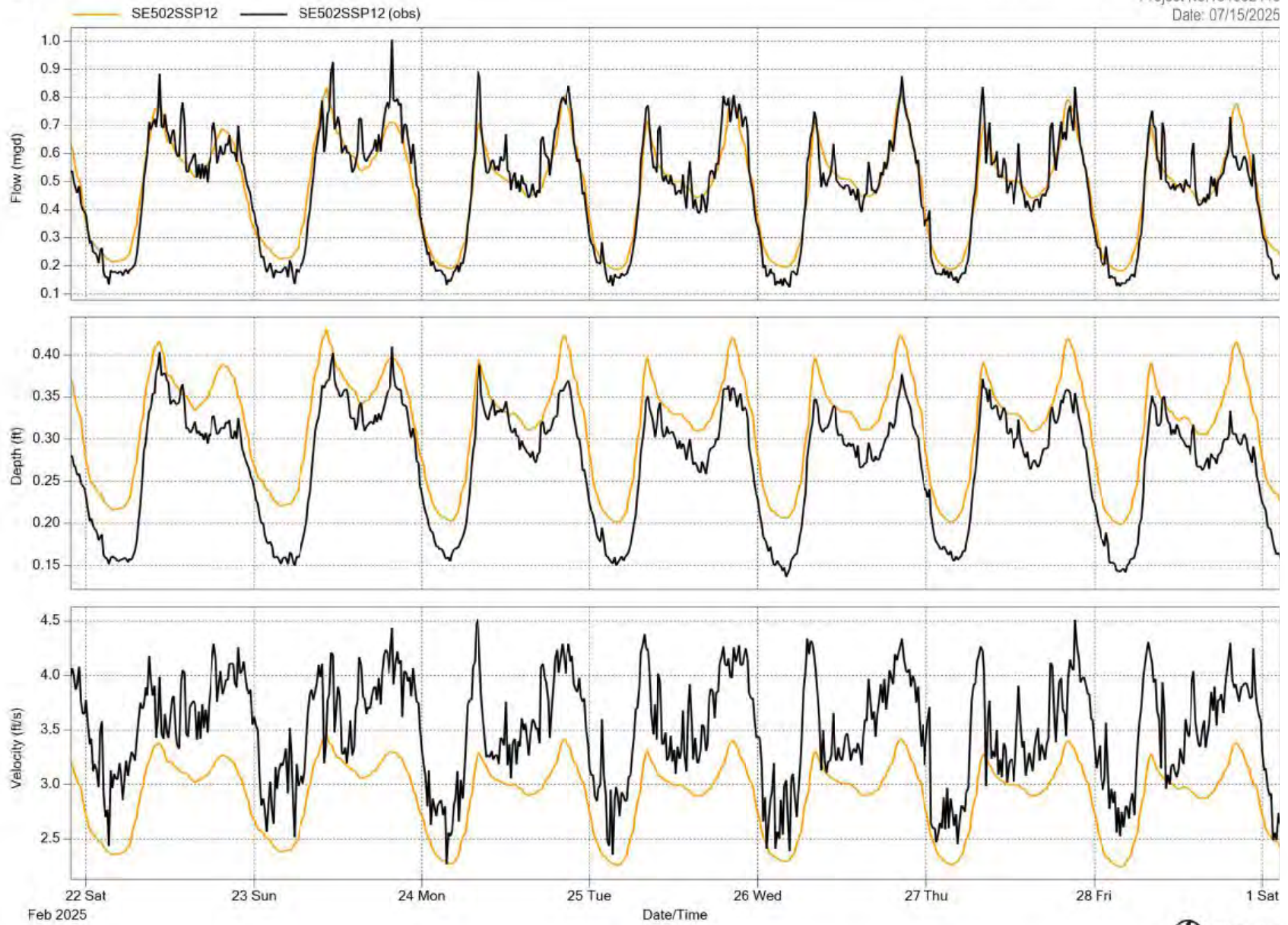


Site 10 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

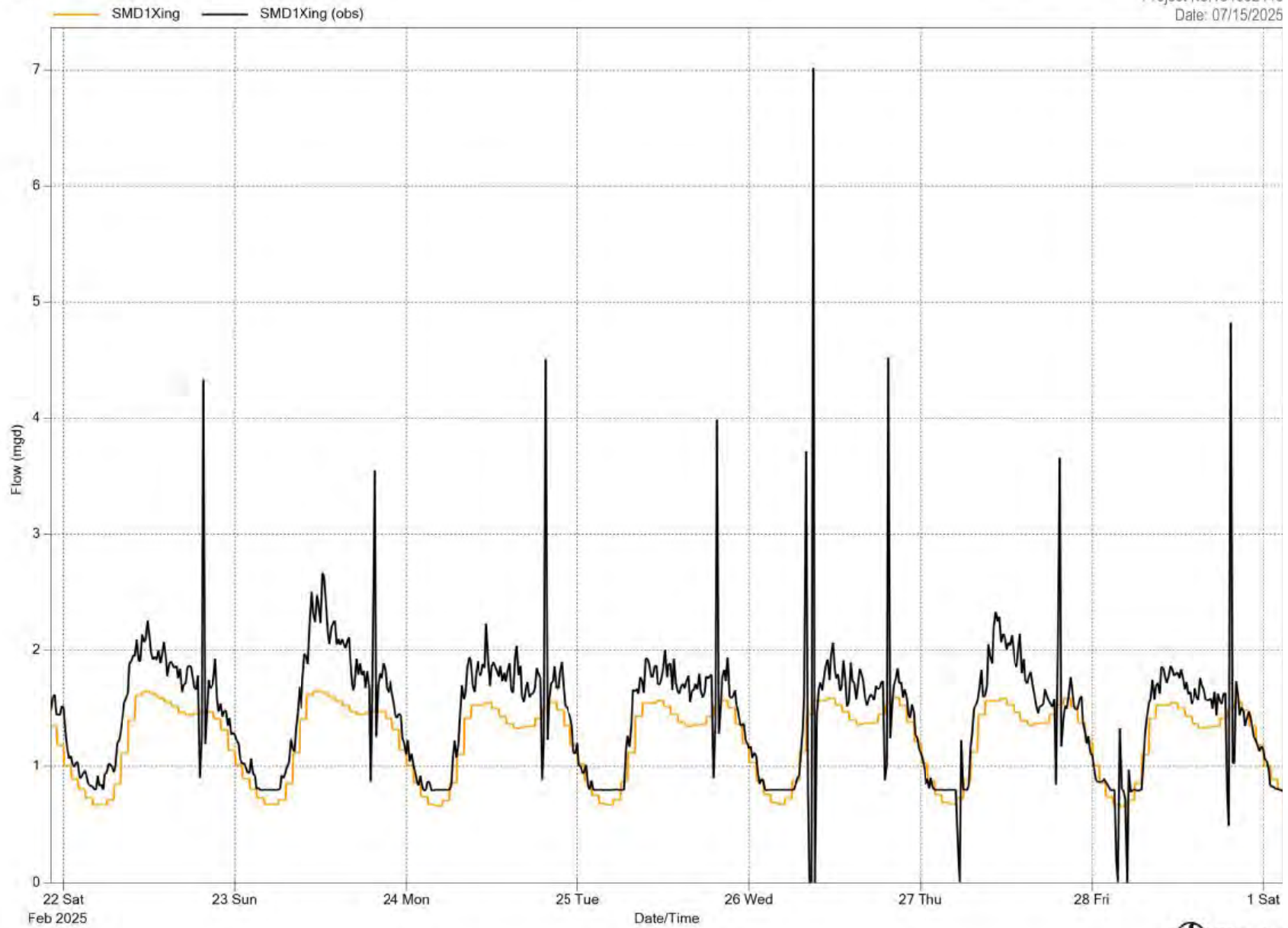


SMD1 - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

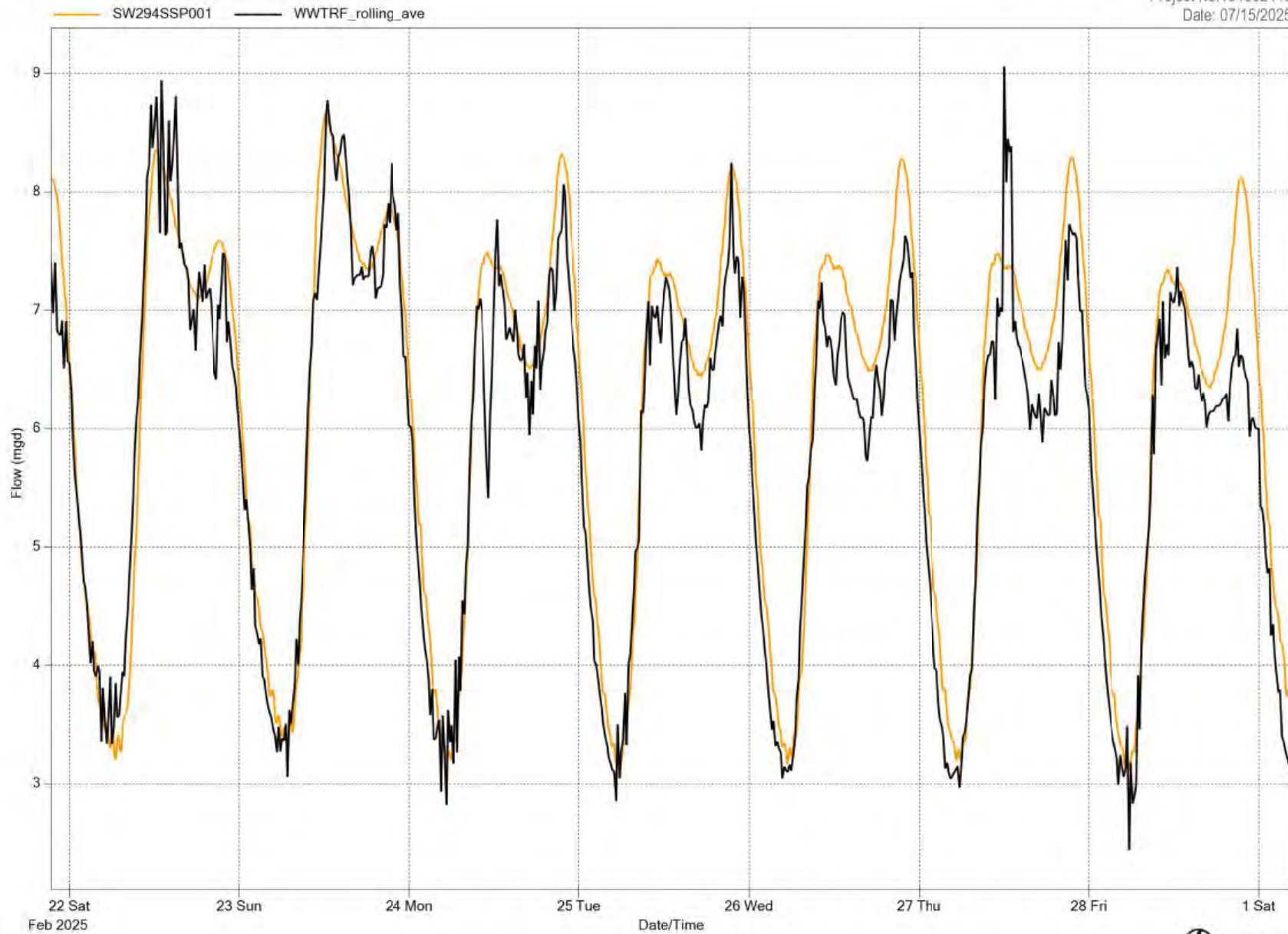


WWTRF - DWF Calibration Period 1

City of Lincoln - 2025 Sewer Master Plan Update

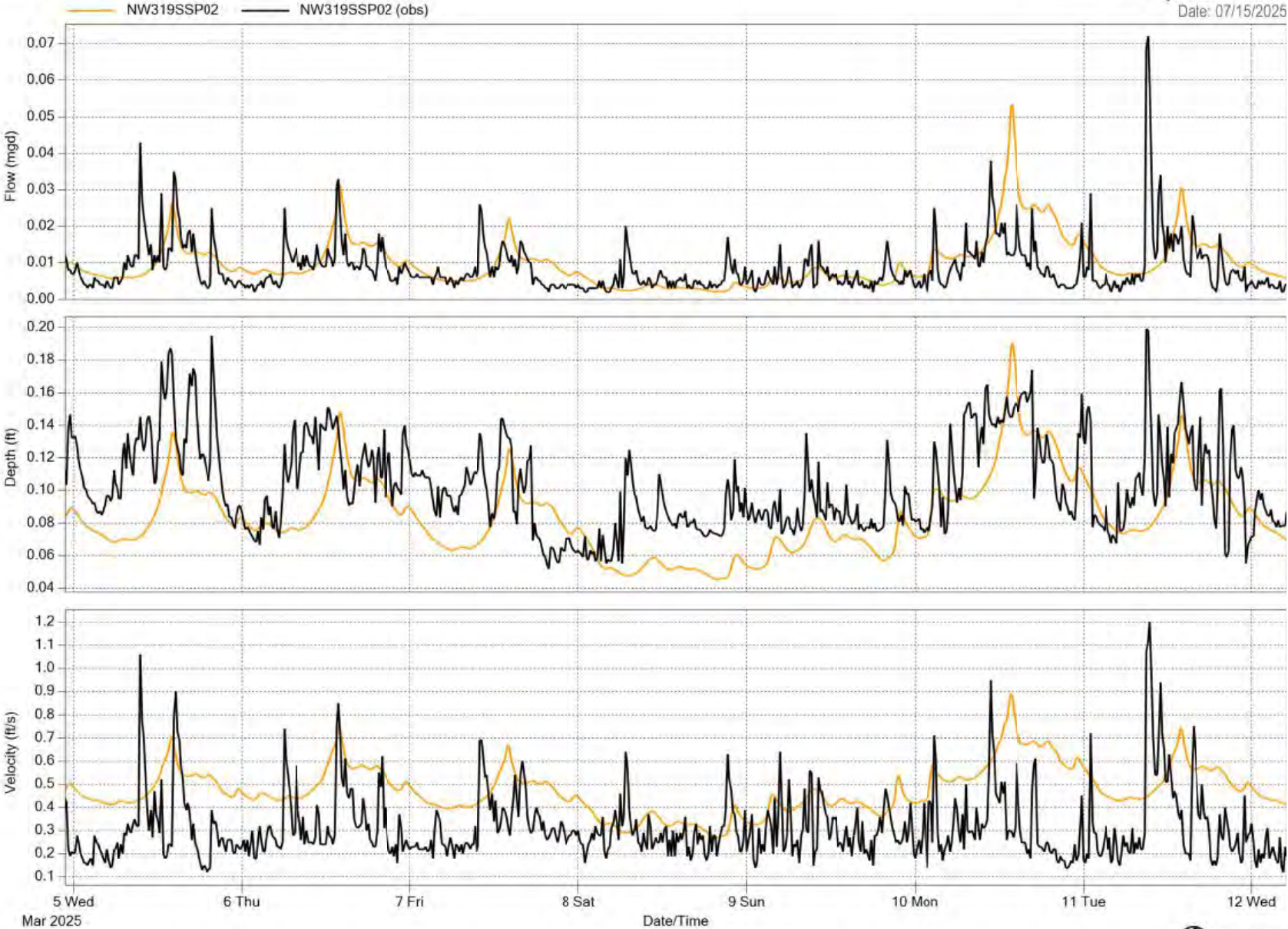
Project No. 184032446

Date: 07/15/2025



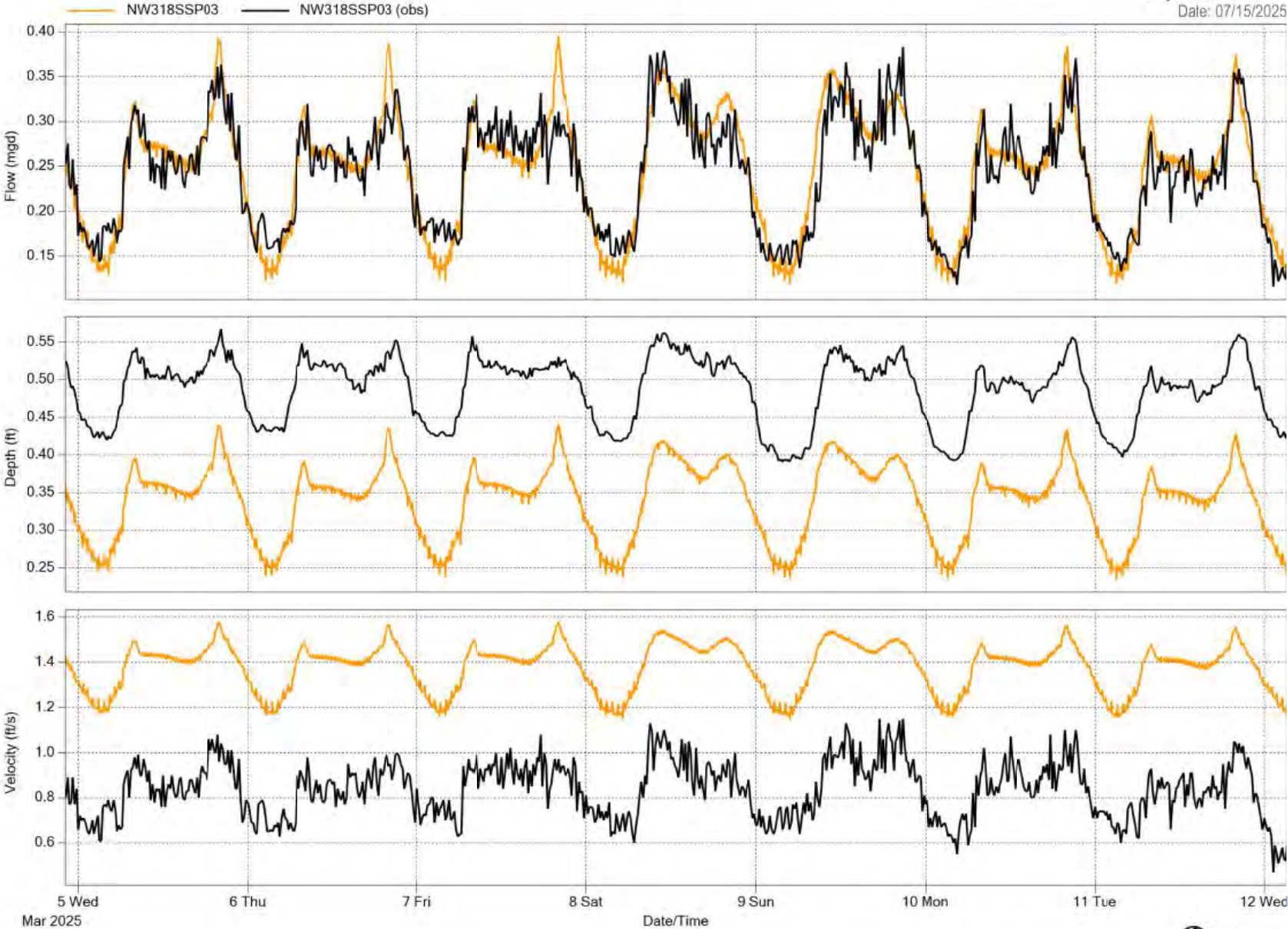
Site 1A - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update
Project No.184032446
Date: 07/15/2025



Site 1B - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update
Project No.184032446
Date: 07/15/2025

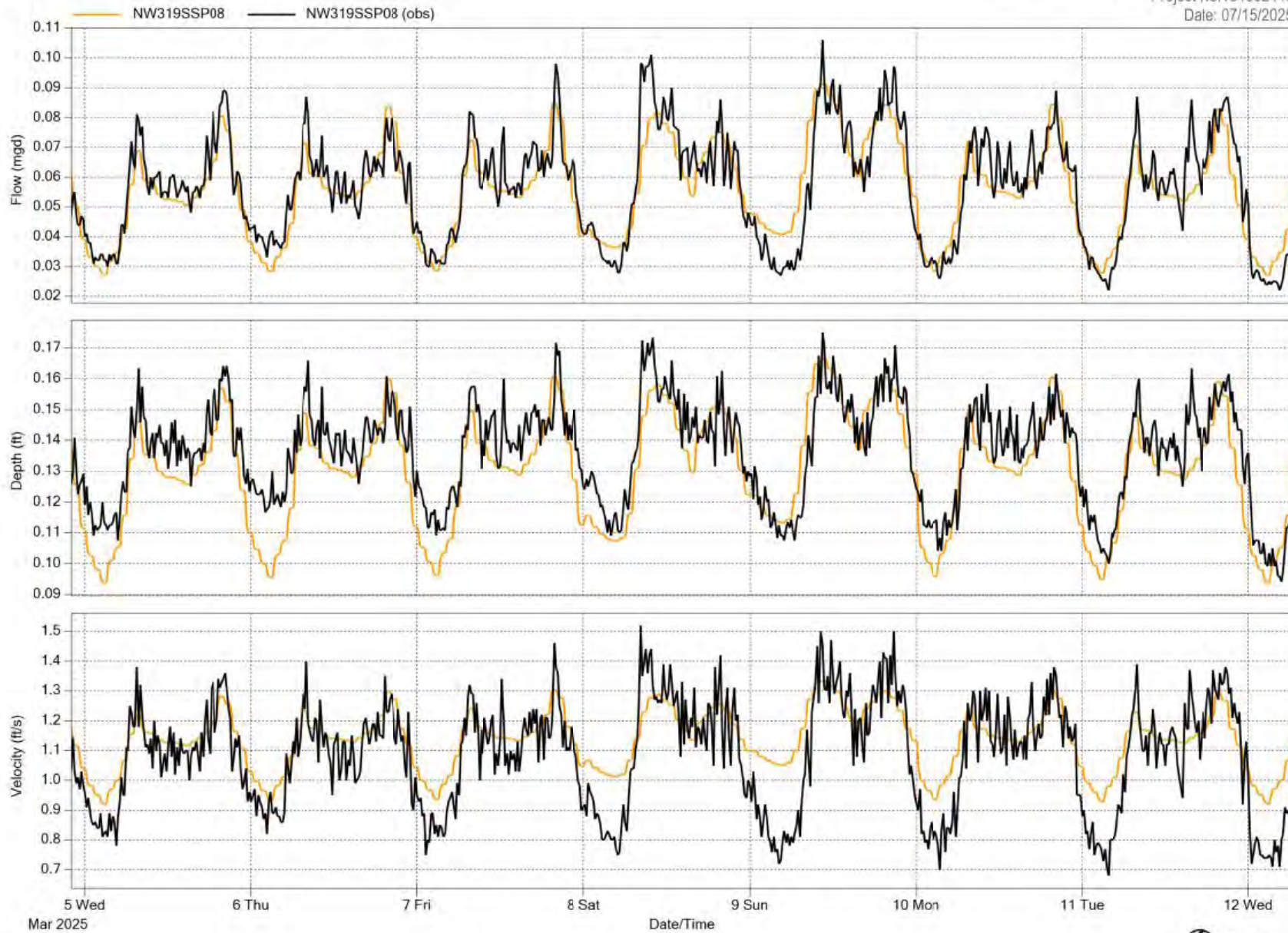


Site 2 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

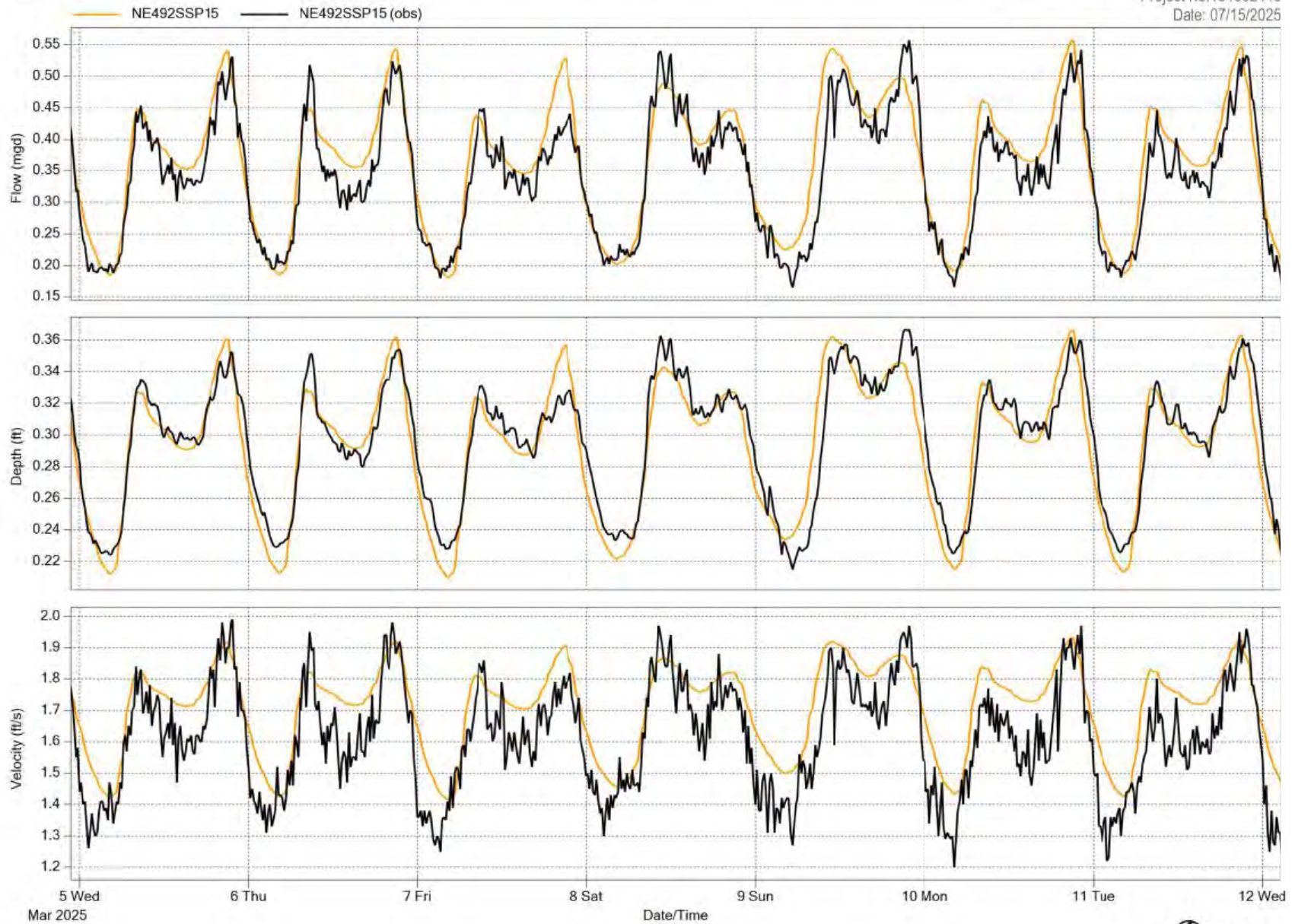


Site 3 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

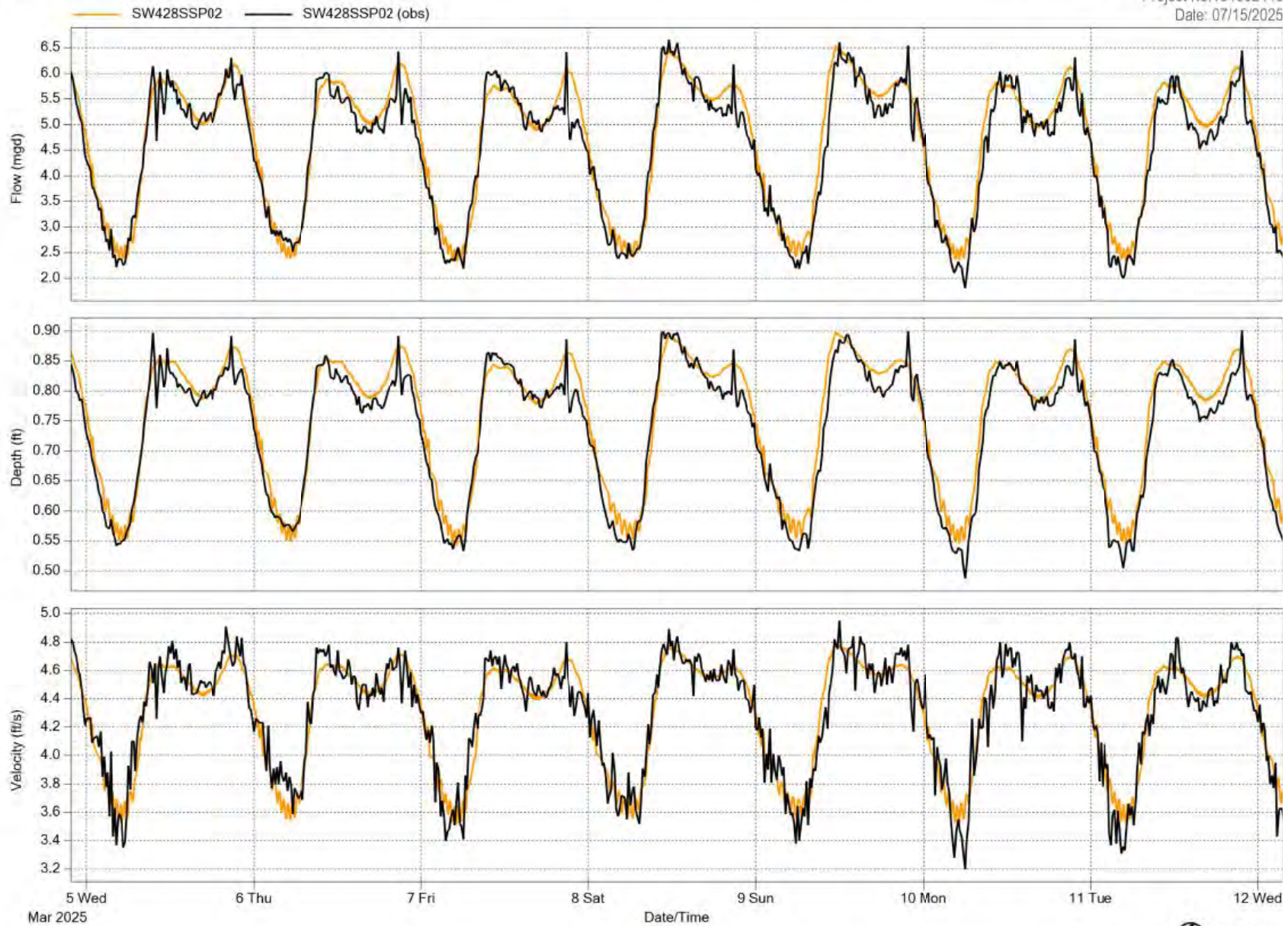


Site 4 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

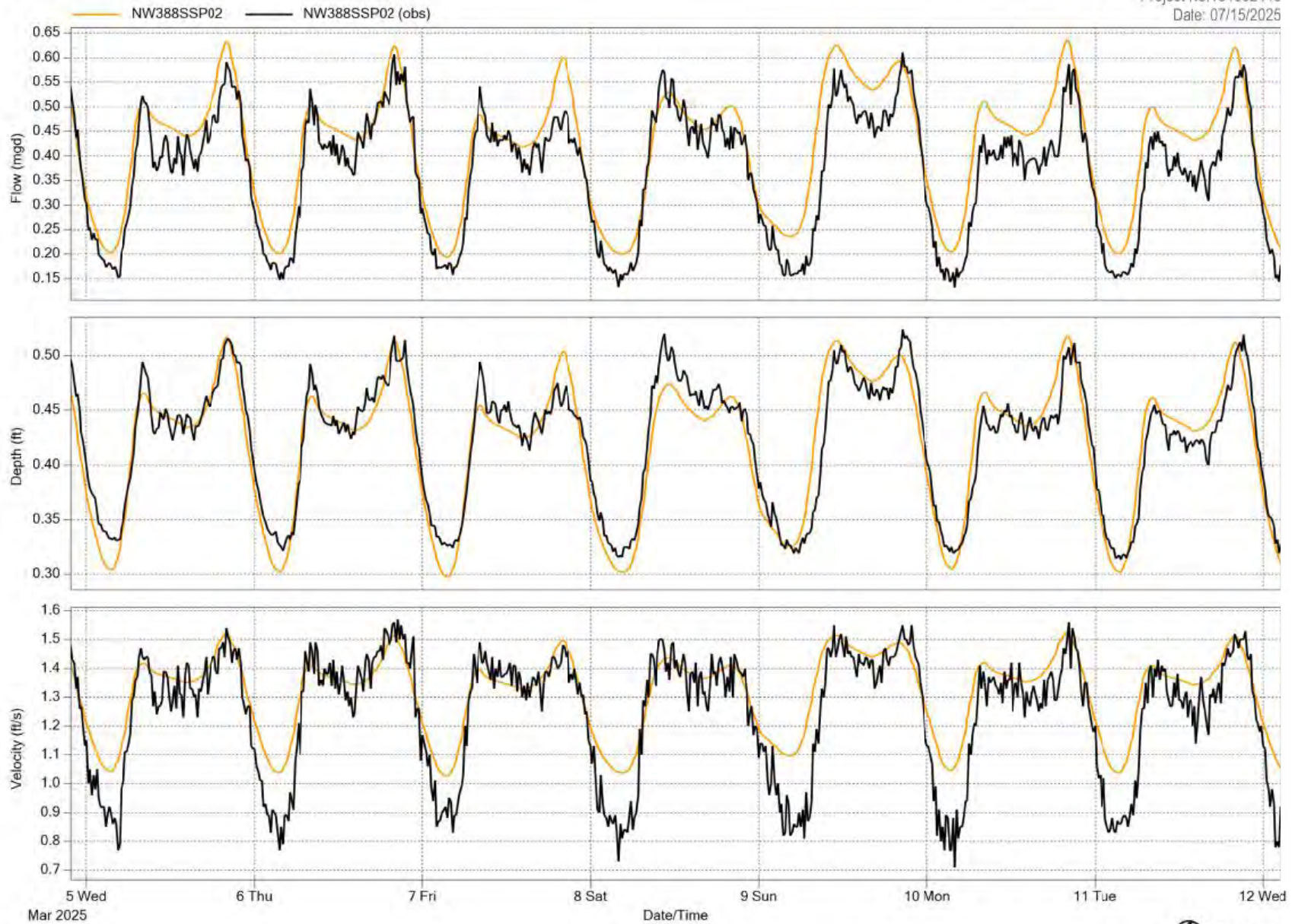


Site 5 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

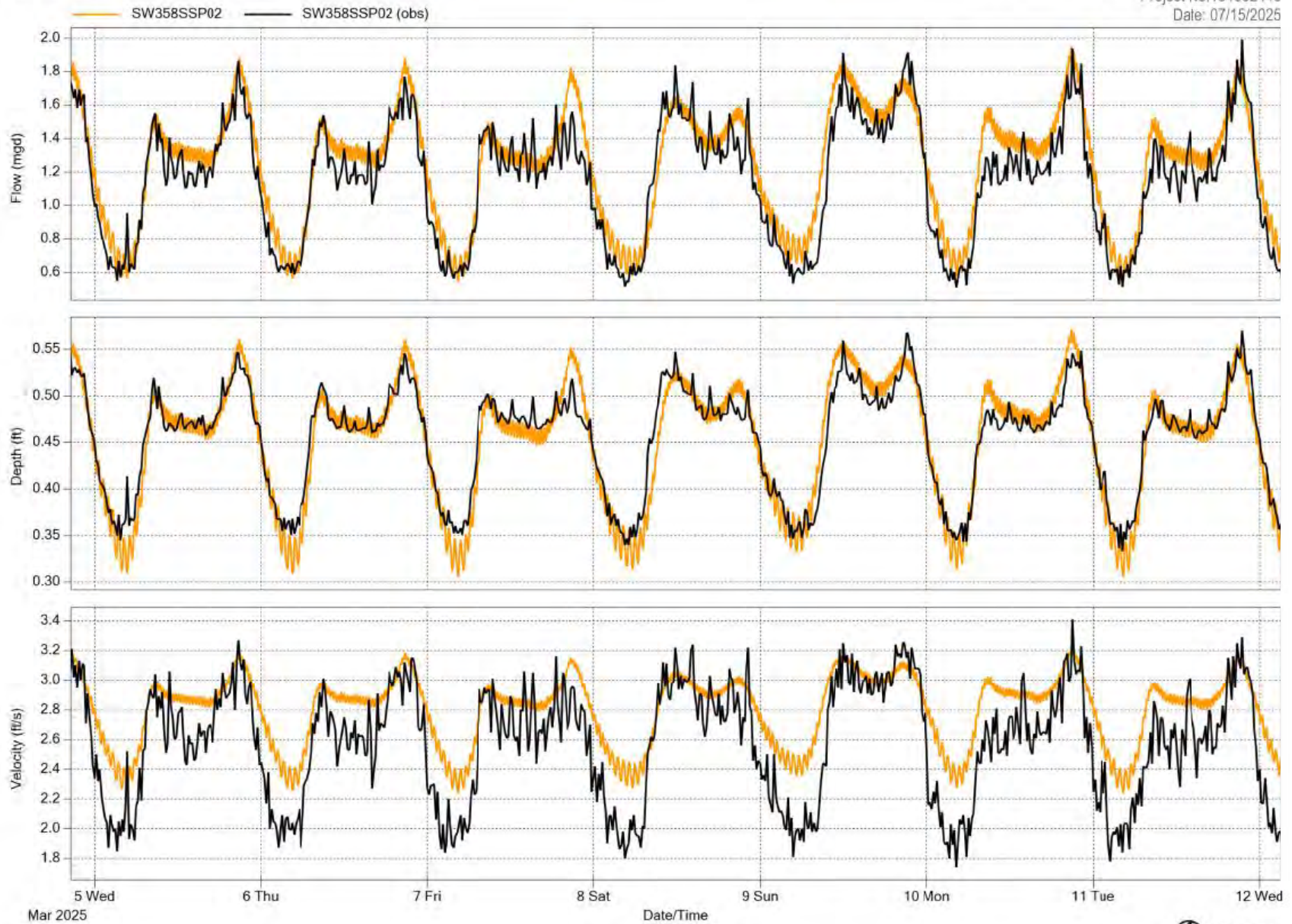


Site 6 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

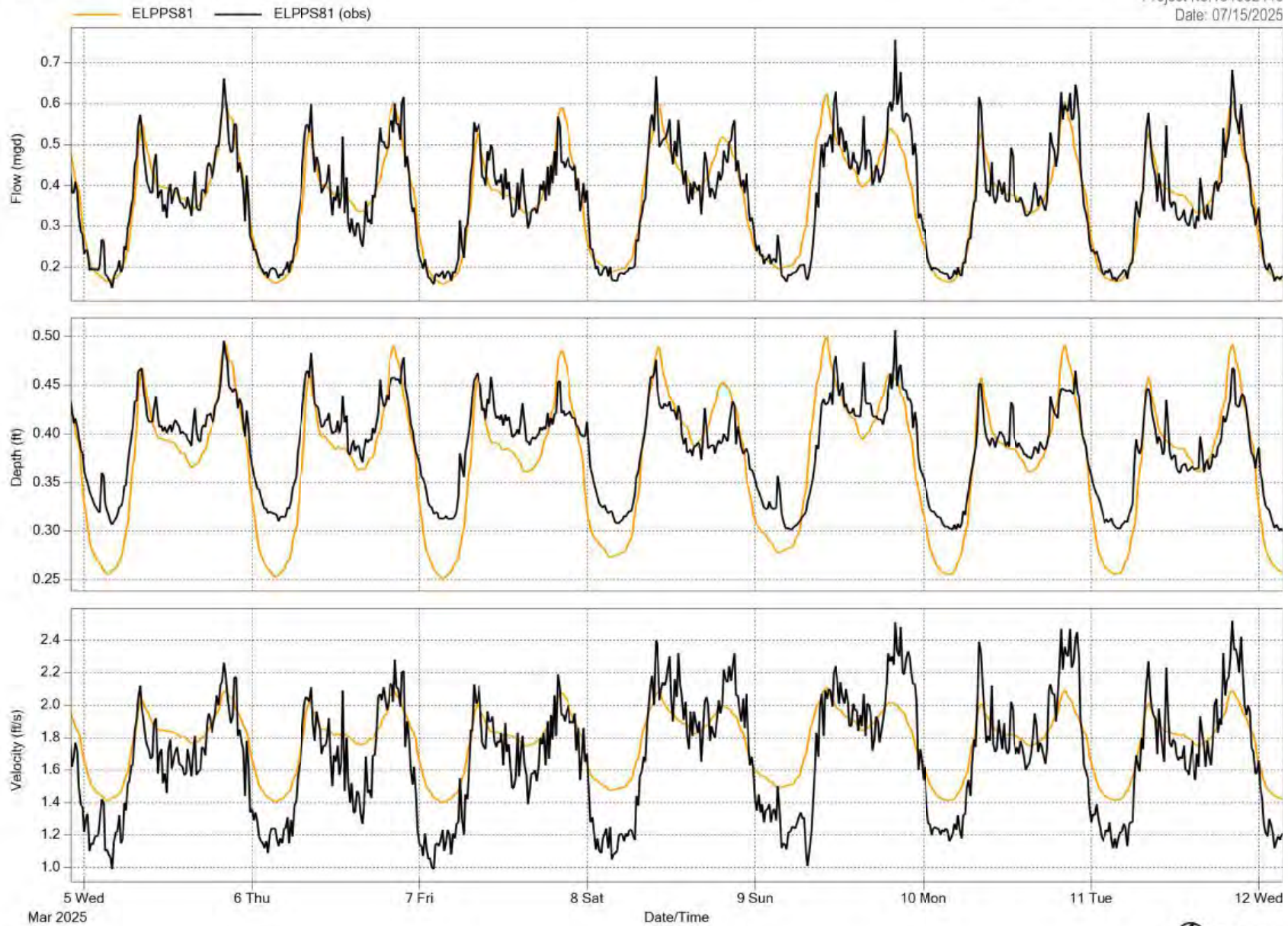


Site 7 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

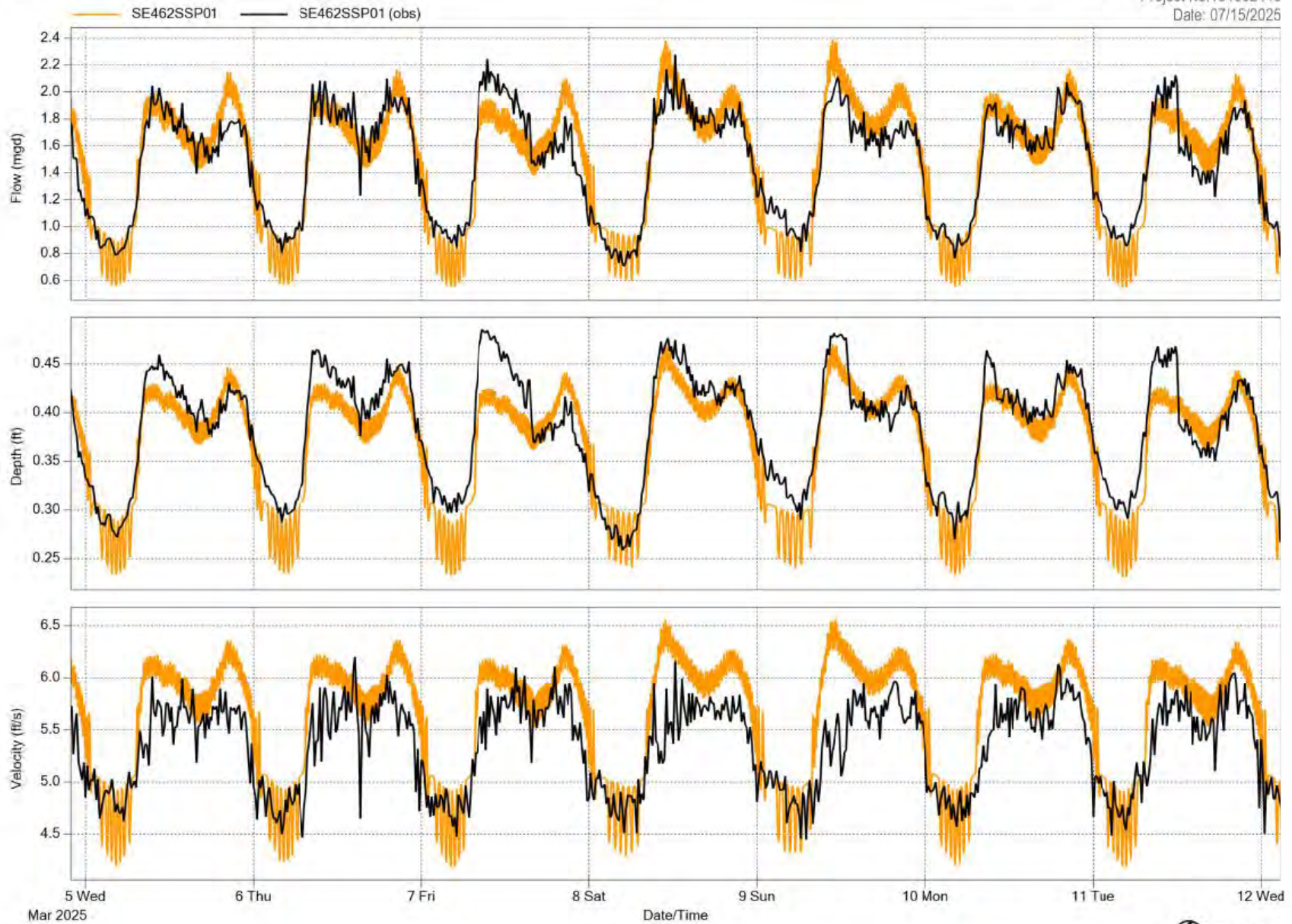


Site 8 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

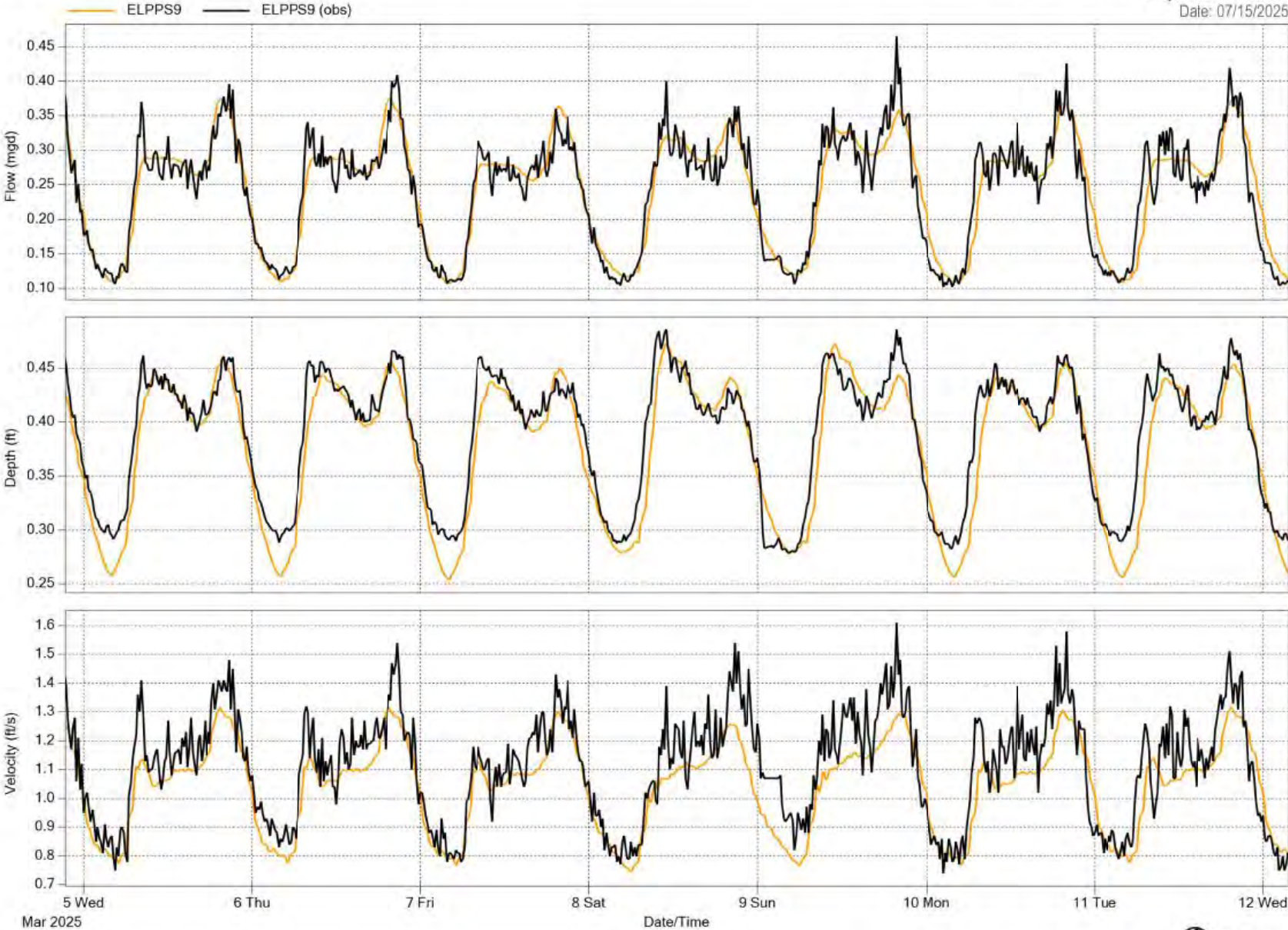
Project No.184032446

Date: 07/15/2025



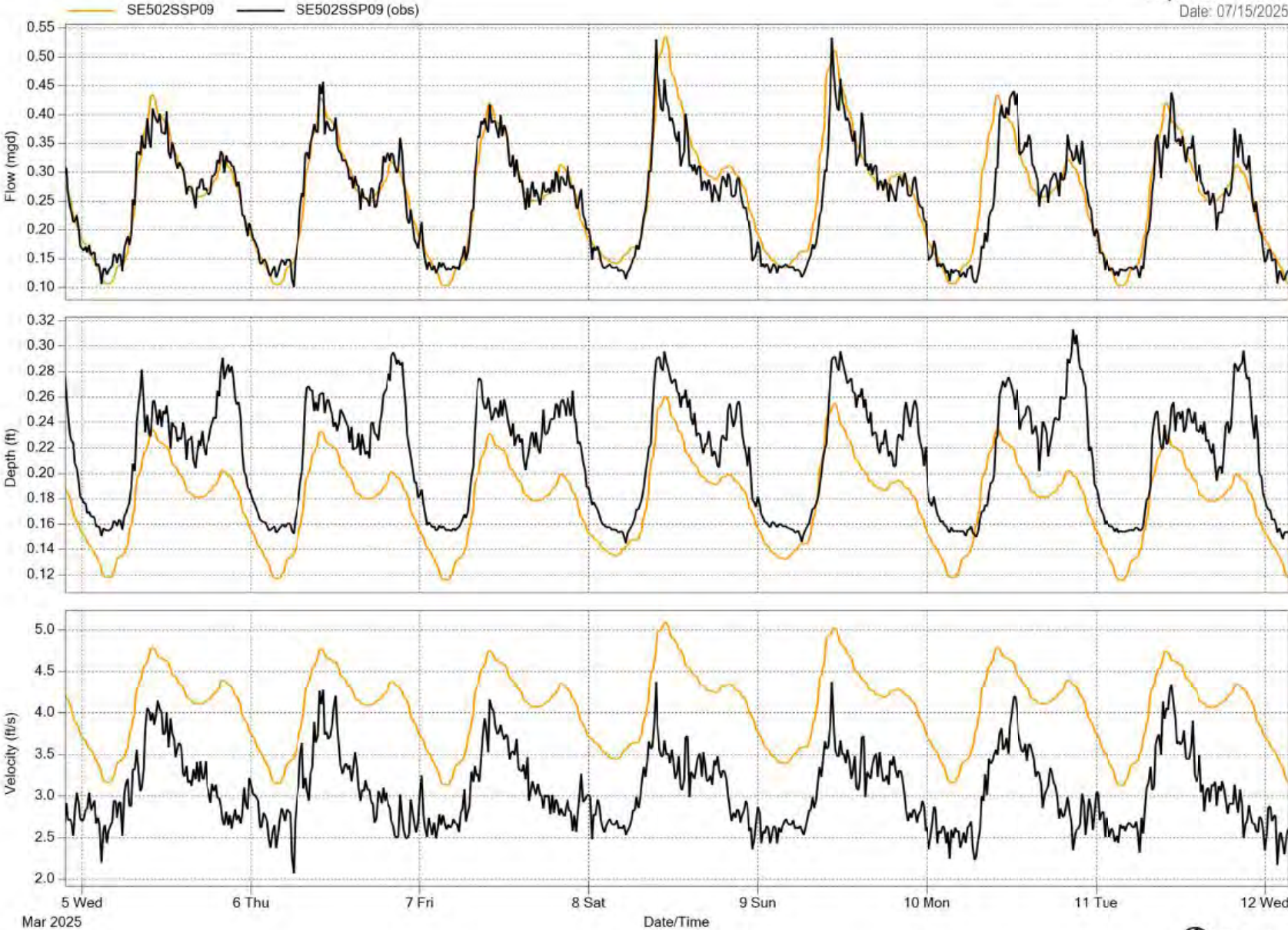
Site 9A - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update
Project No.184032446
Date: 07/15/2025



Site 9B - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update
Project No.184032446
Date: 07/15/2025

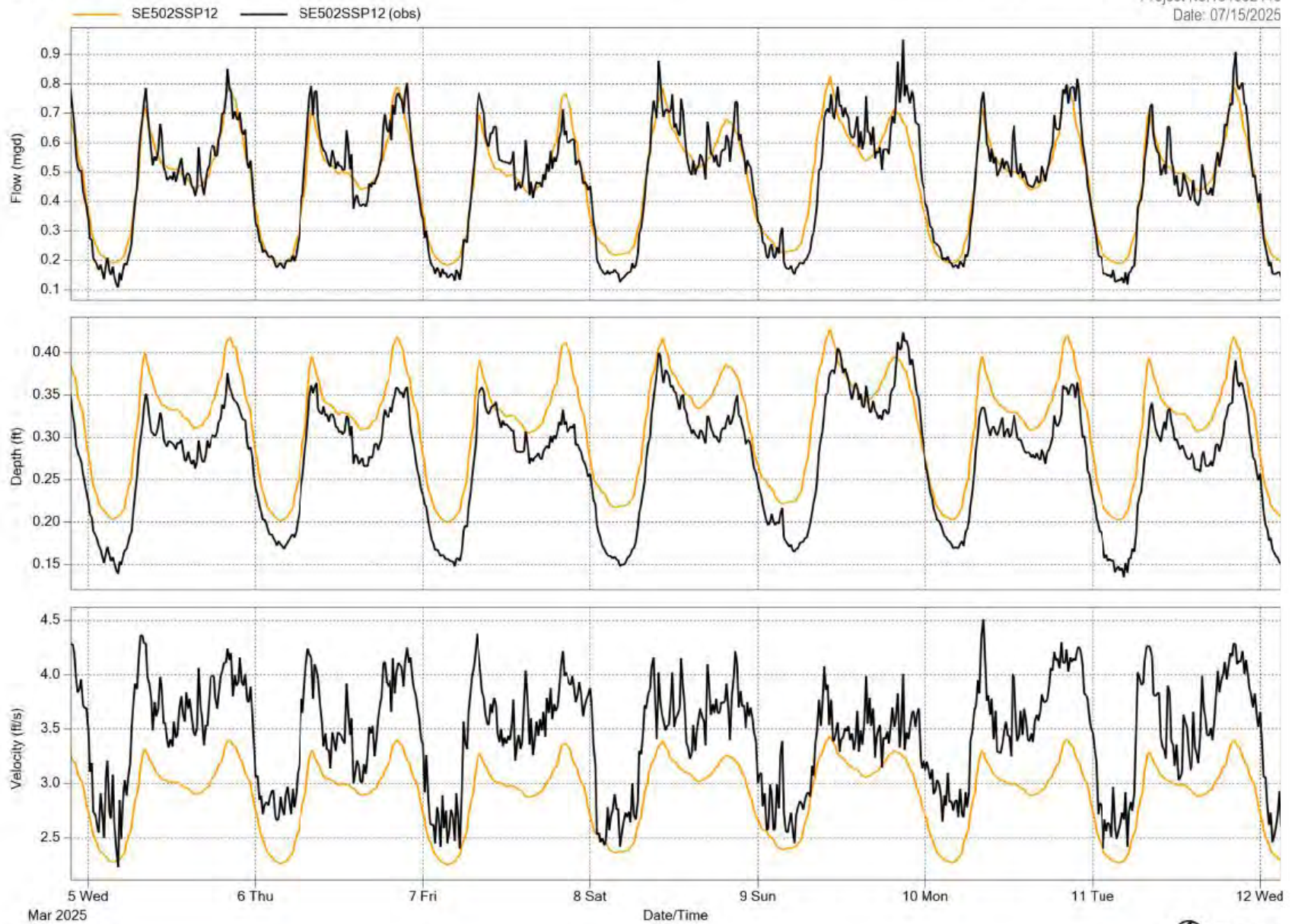


Site 10 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

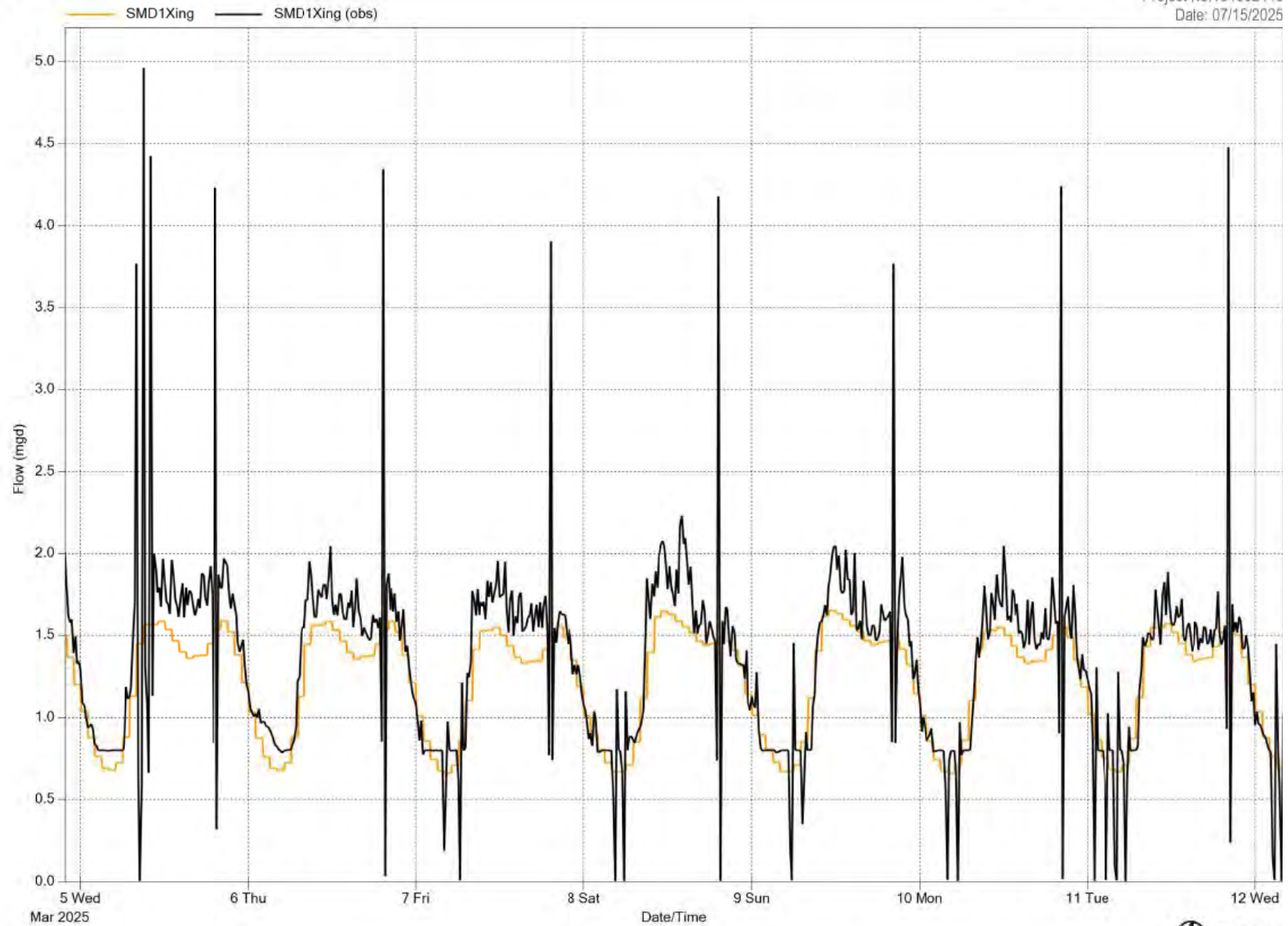


SMD1 - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

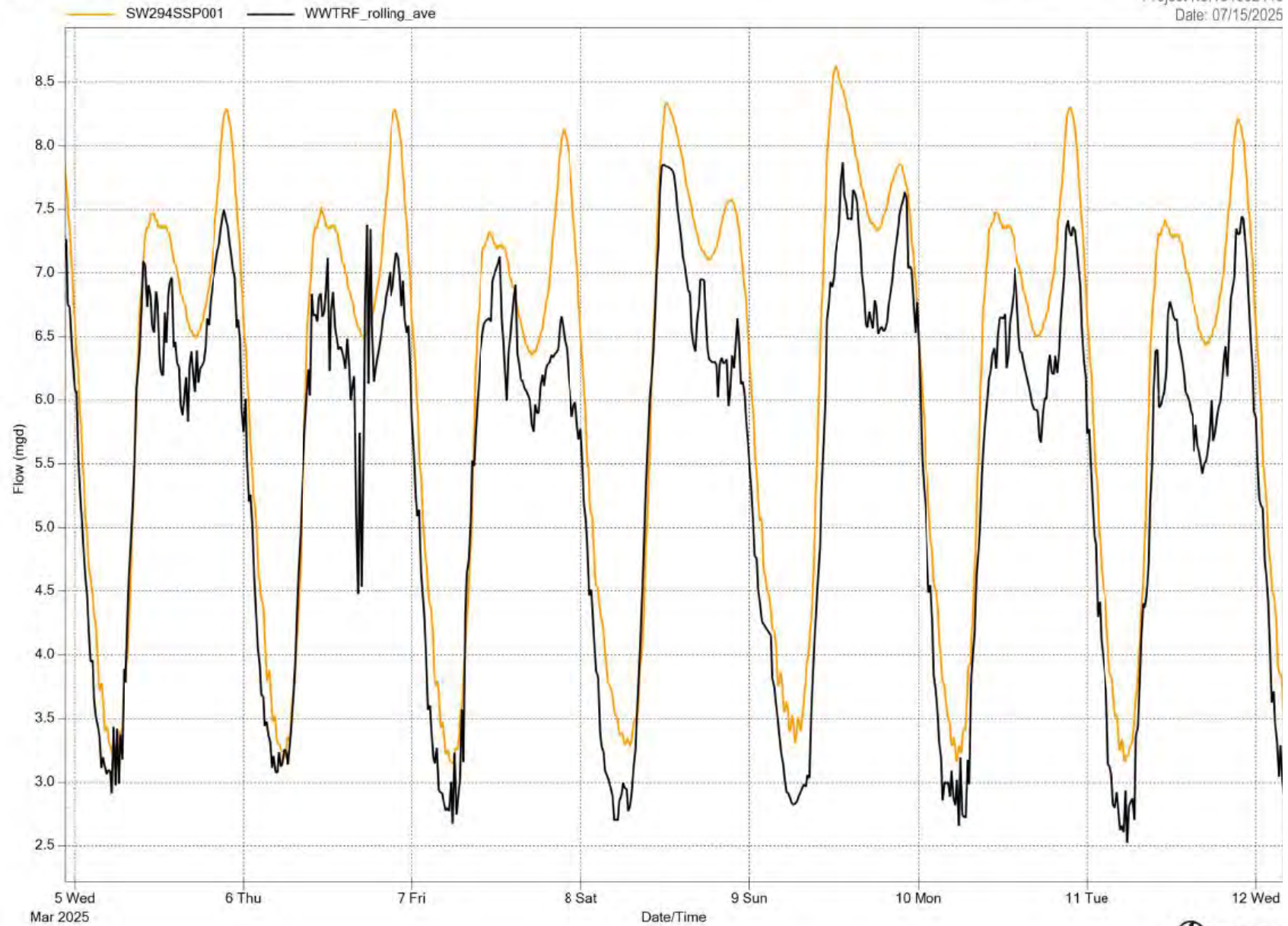


WWTRF - DWF Calibration Period 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

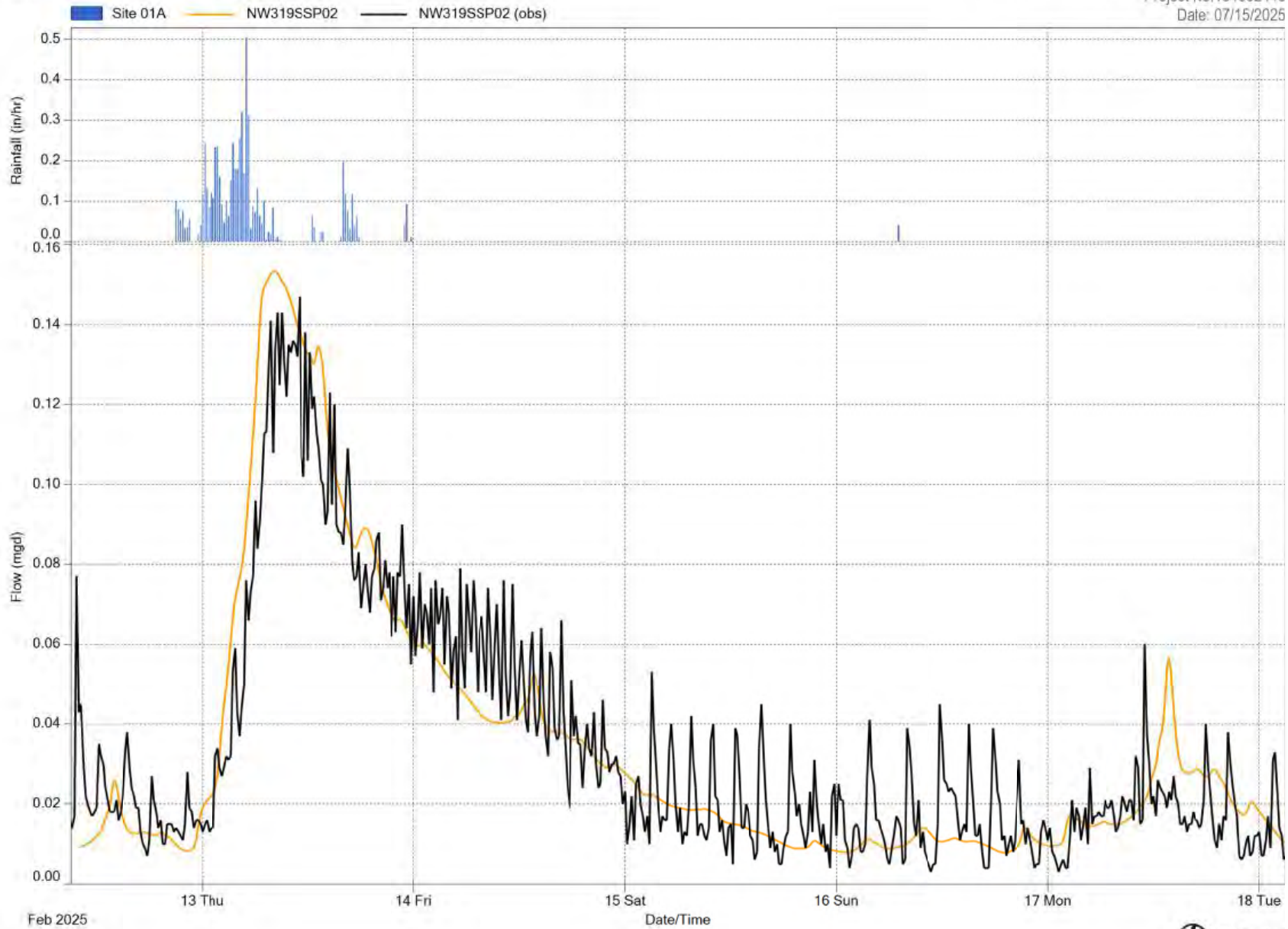


Site 1A - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

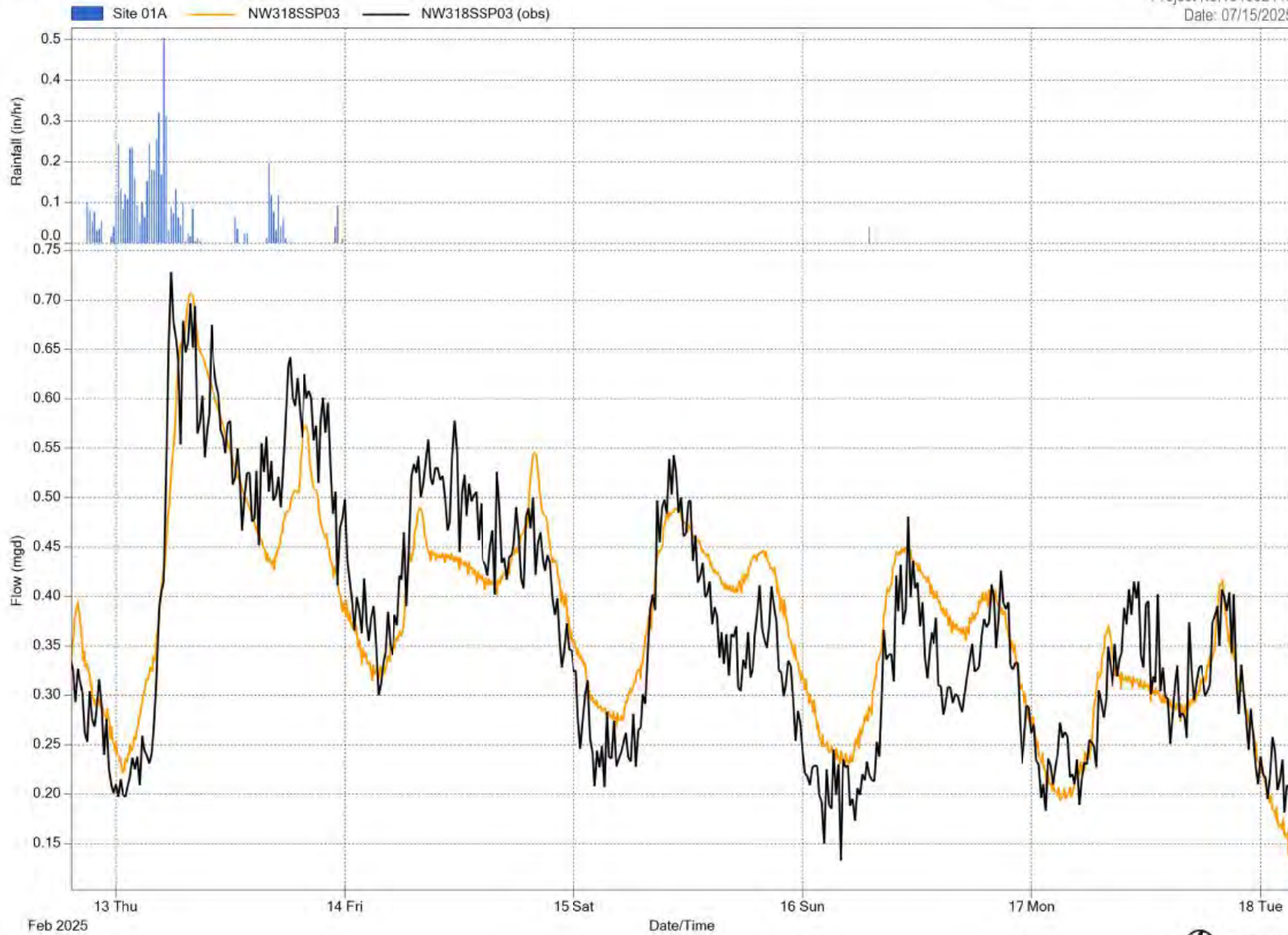


Site 1B - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

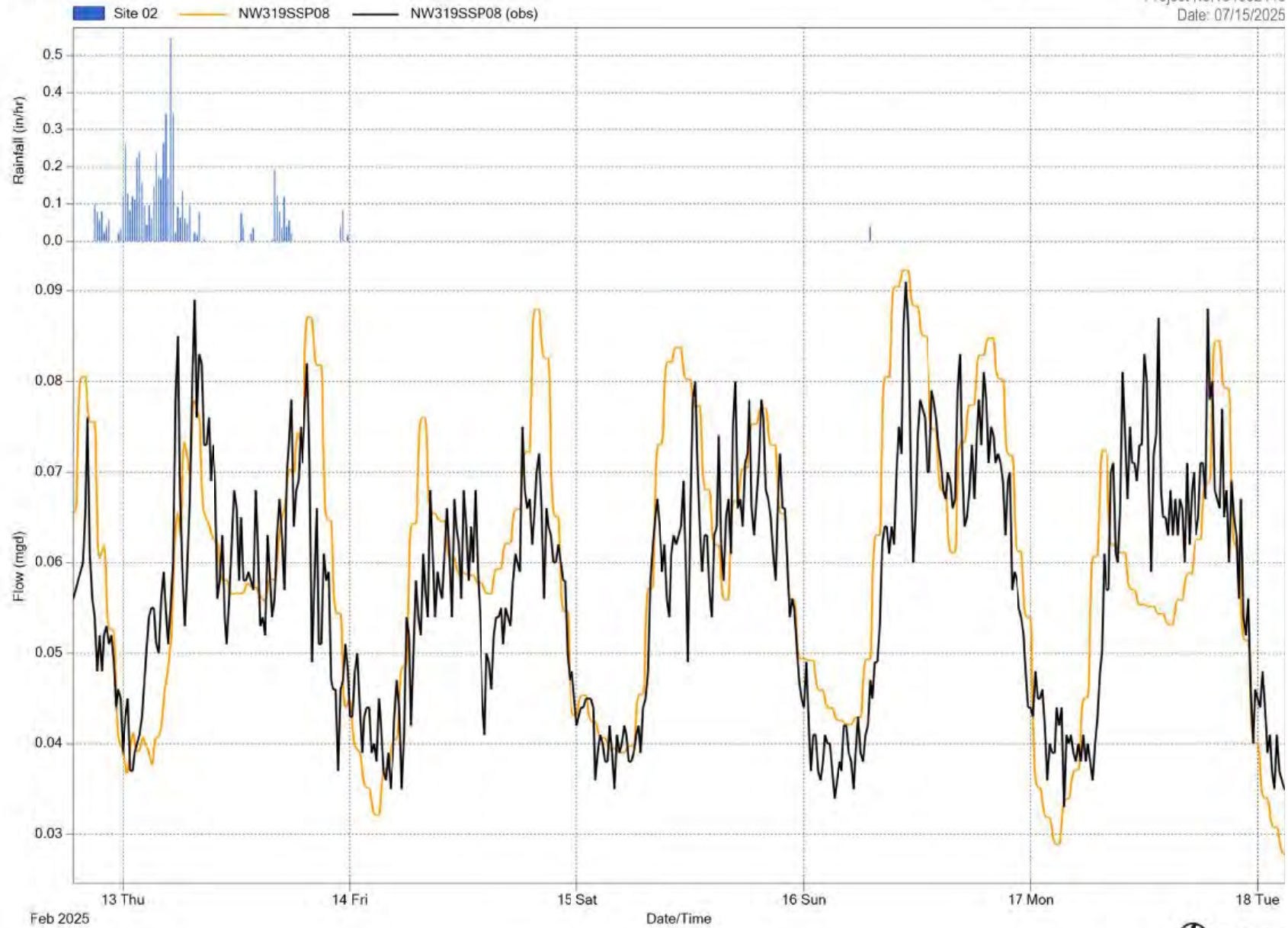


Site 2 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

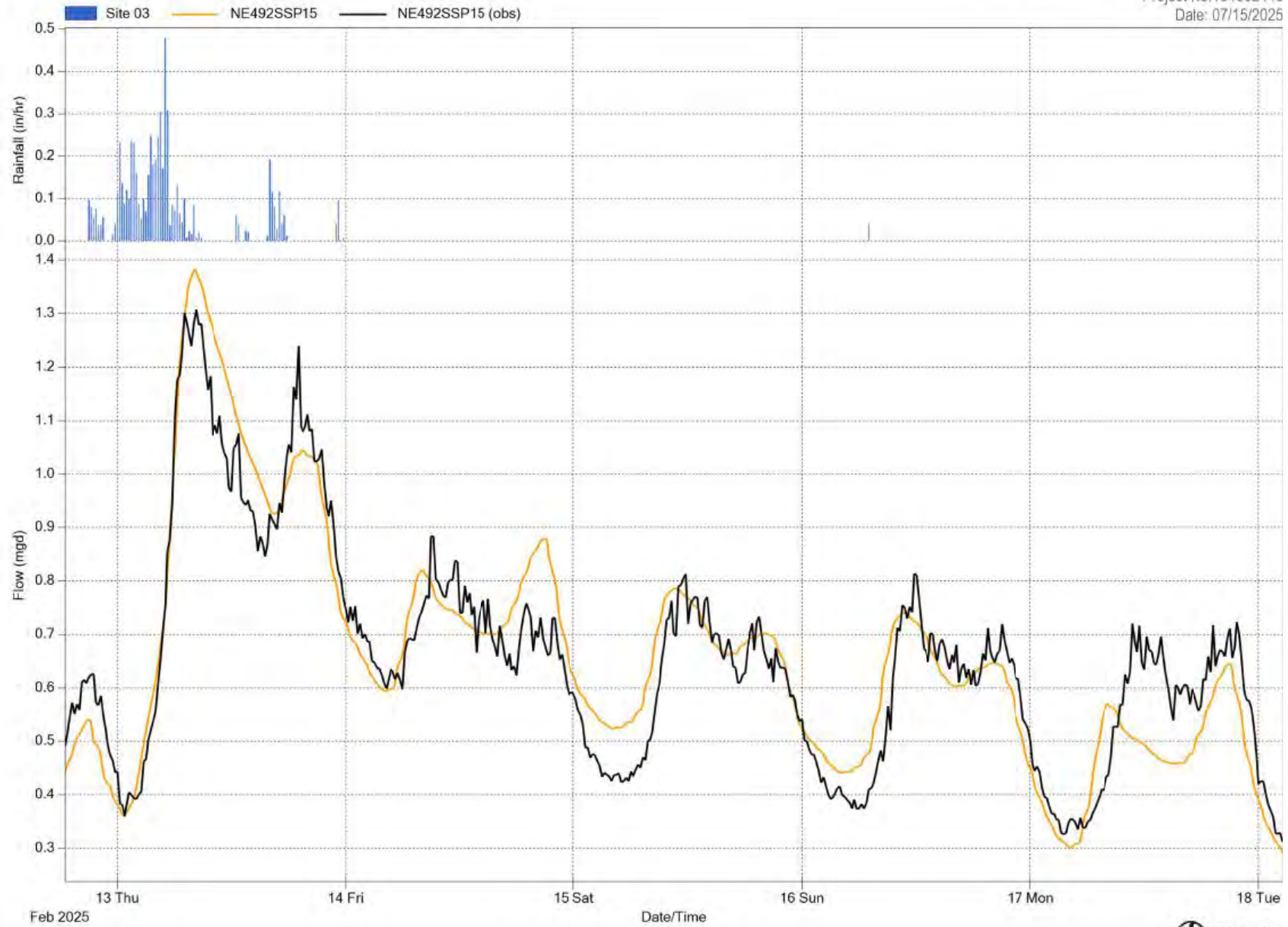


Site 3 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

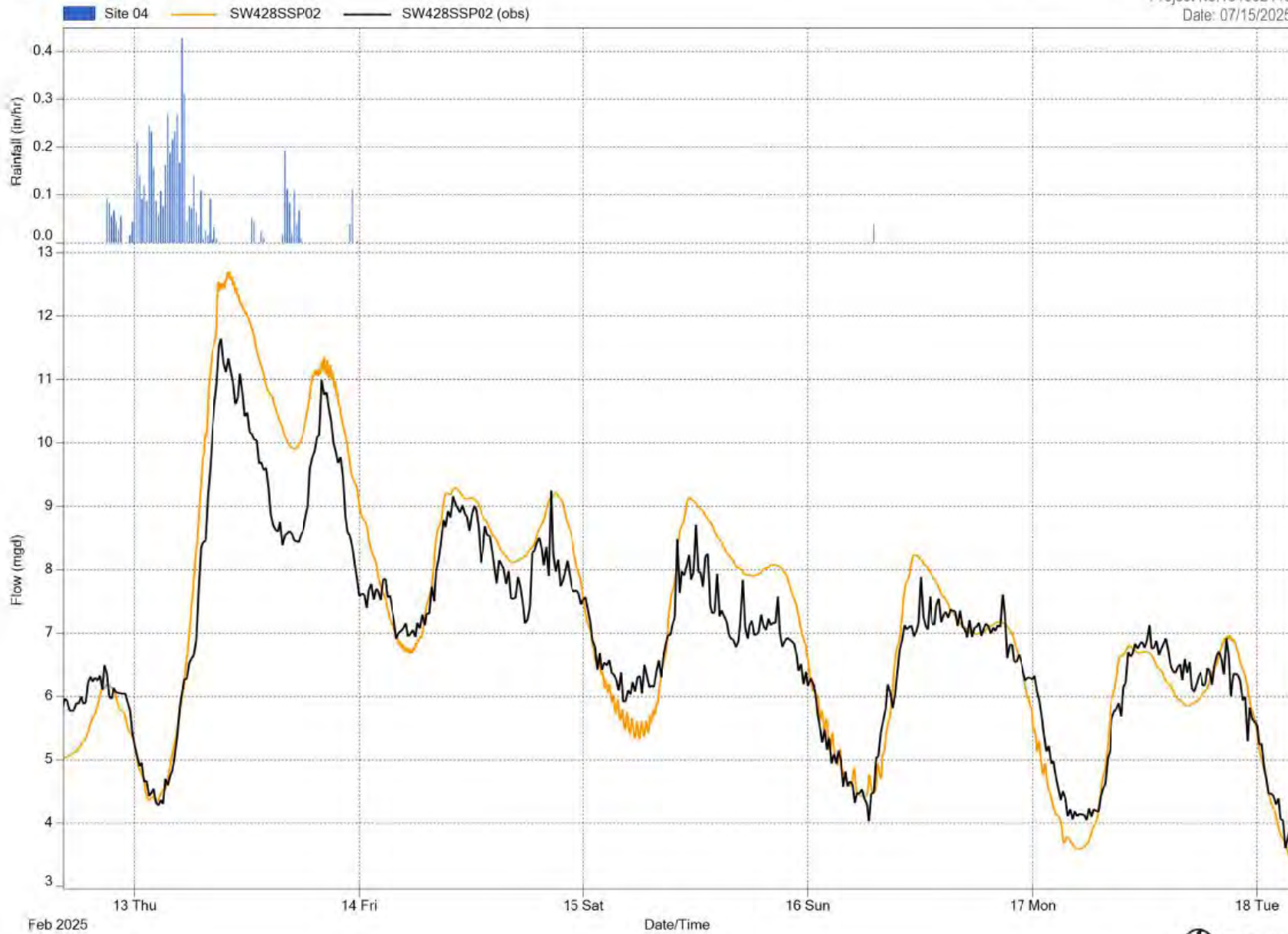


Site 4 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

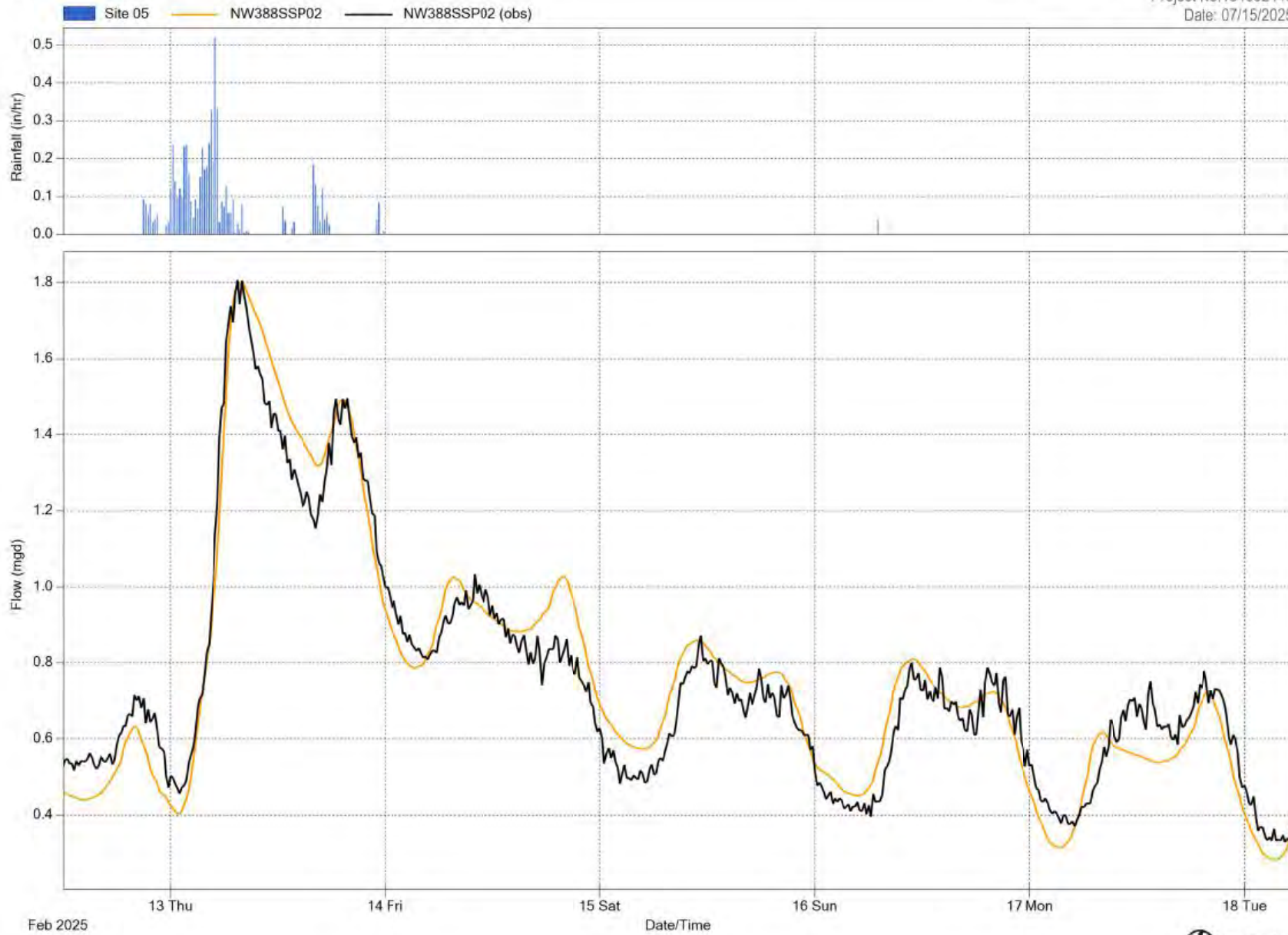


Site 5 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

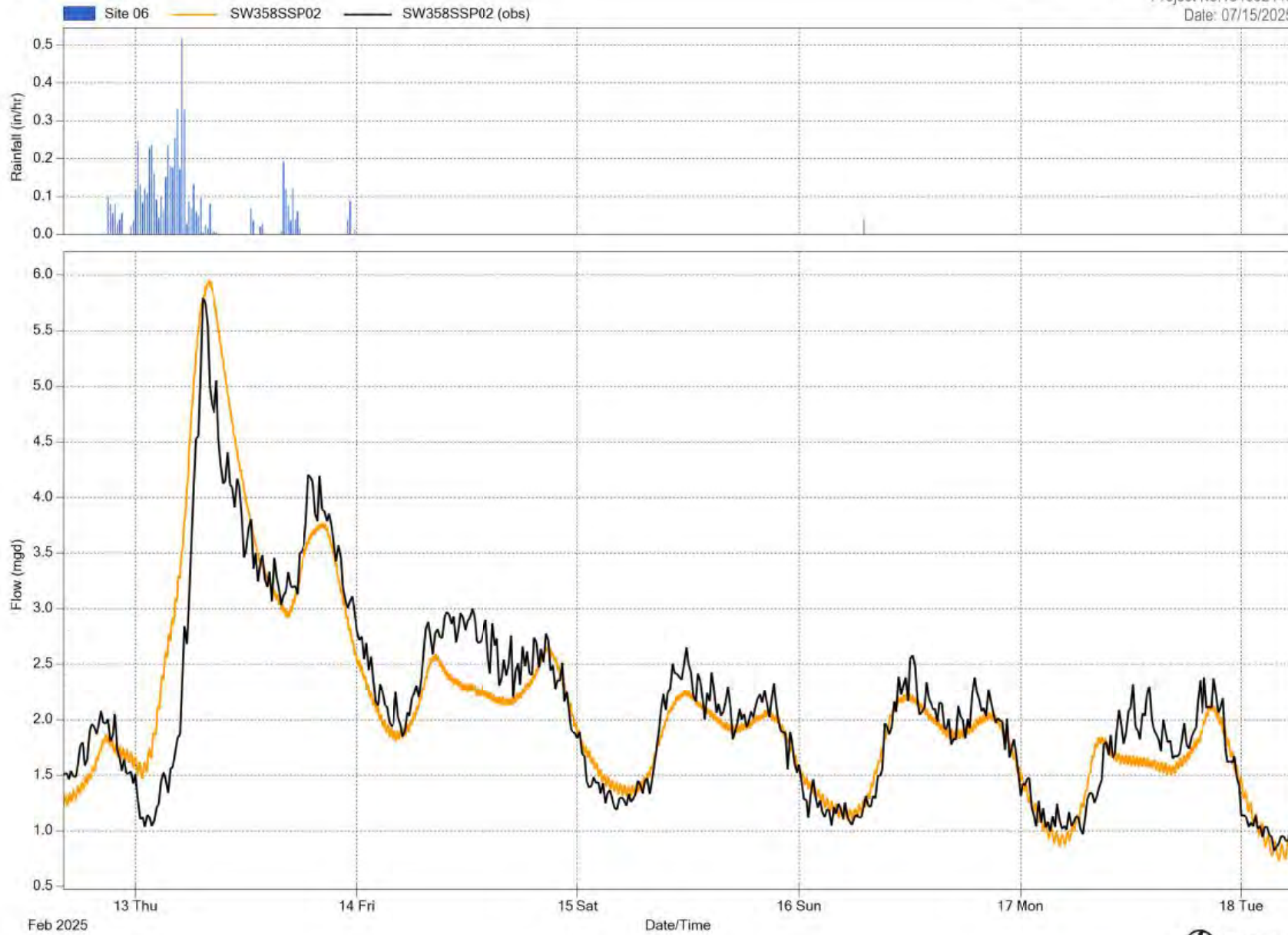


Site 6 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

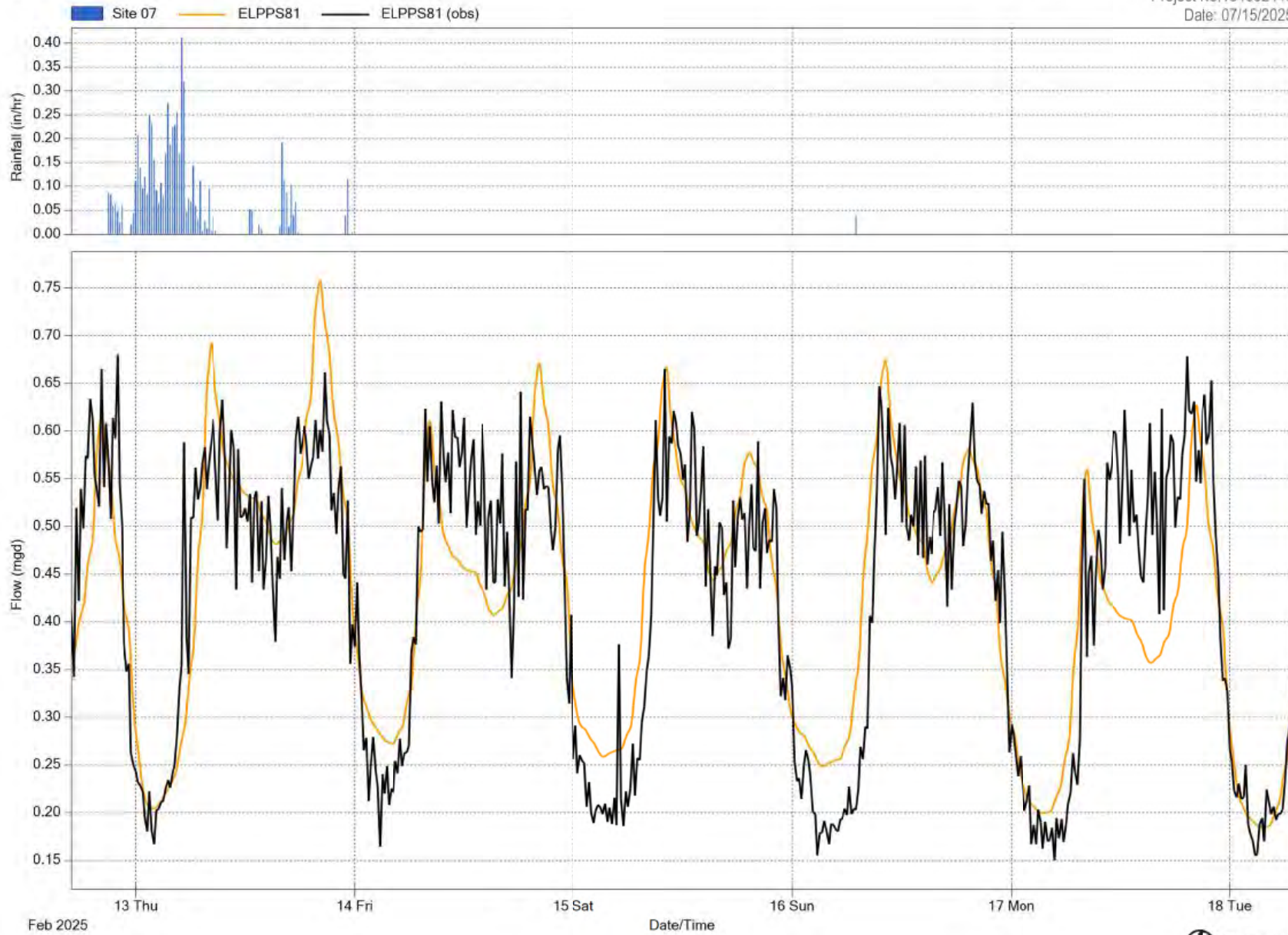


Site 7 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

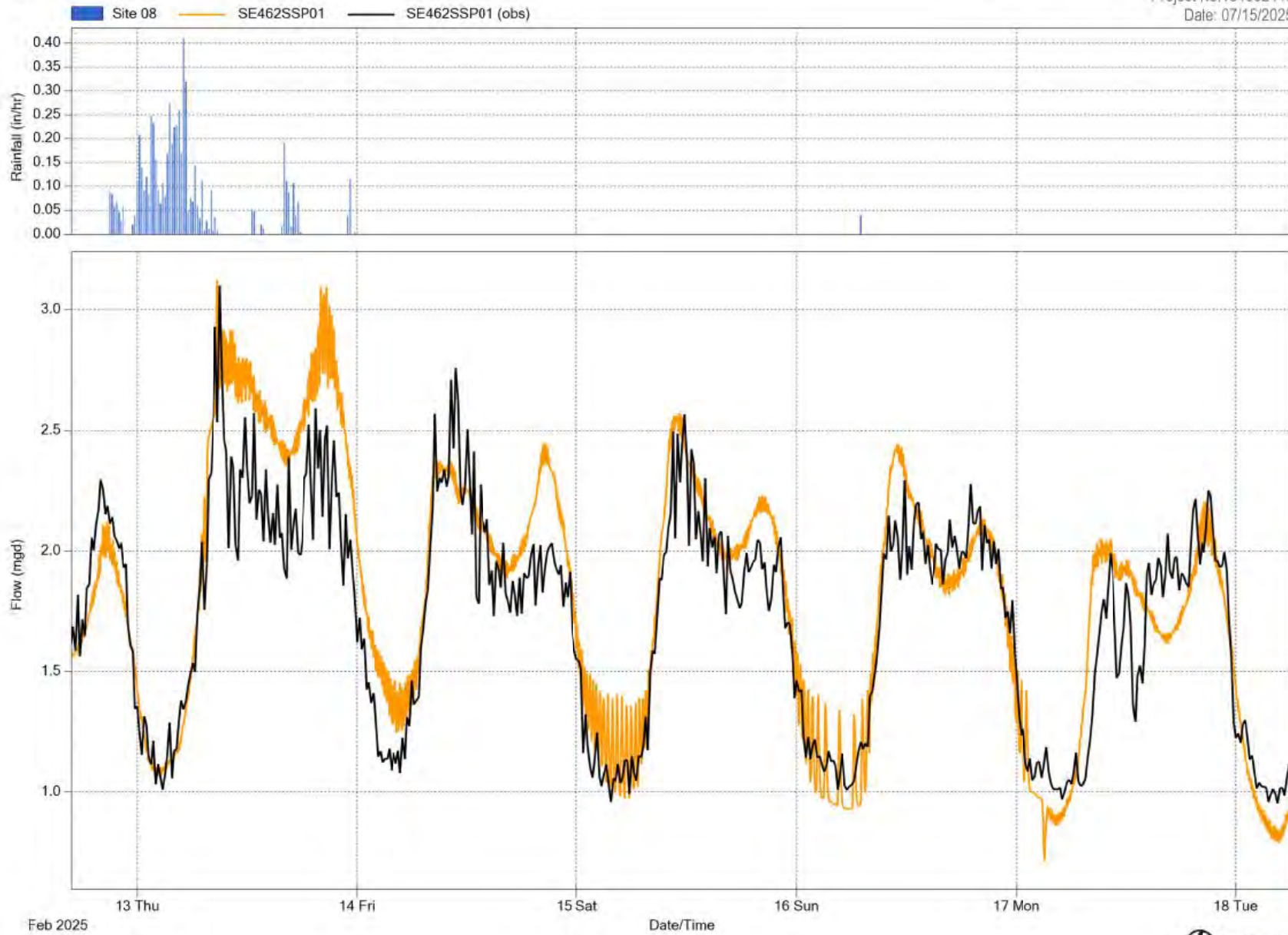


Site 8 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

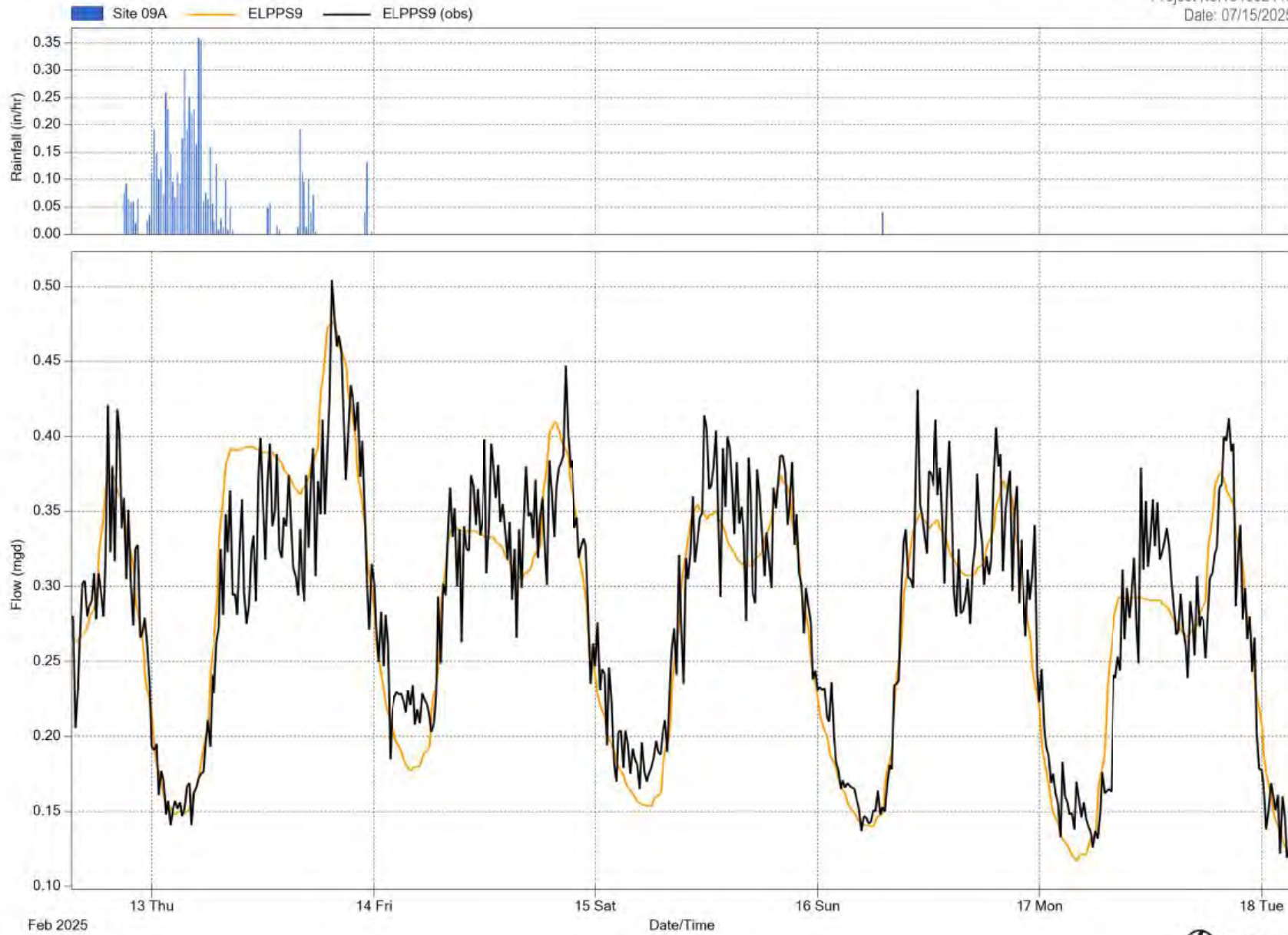


Site 9A - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

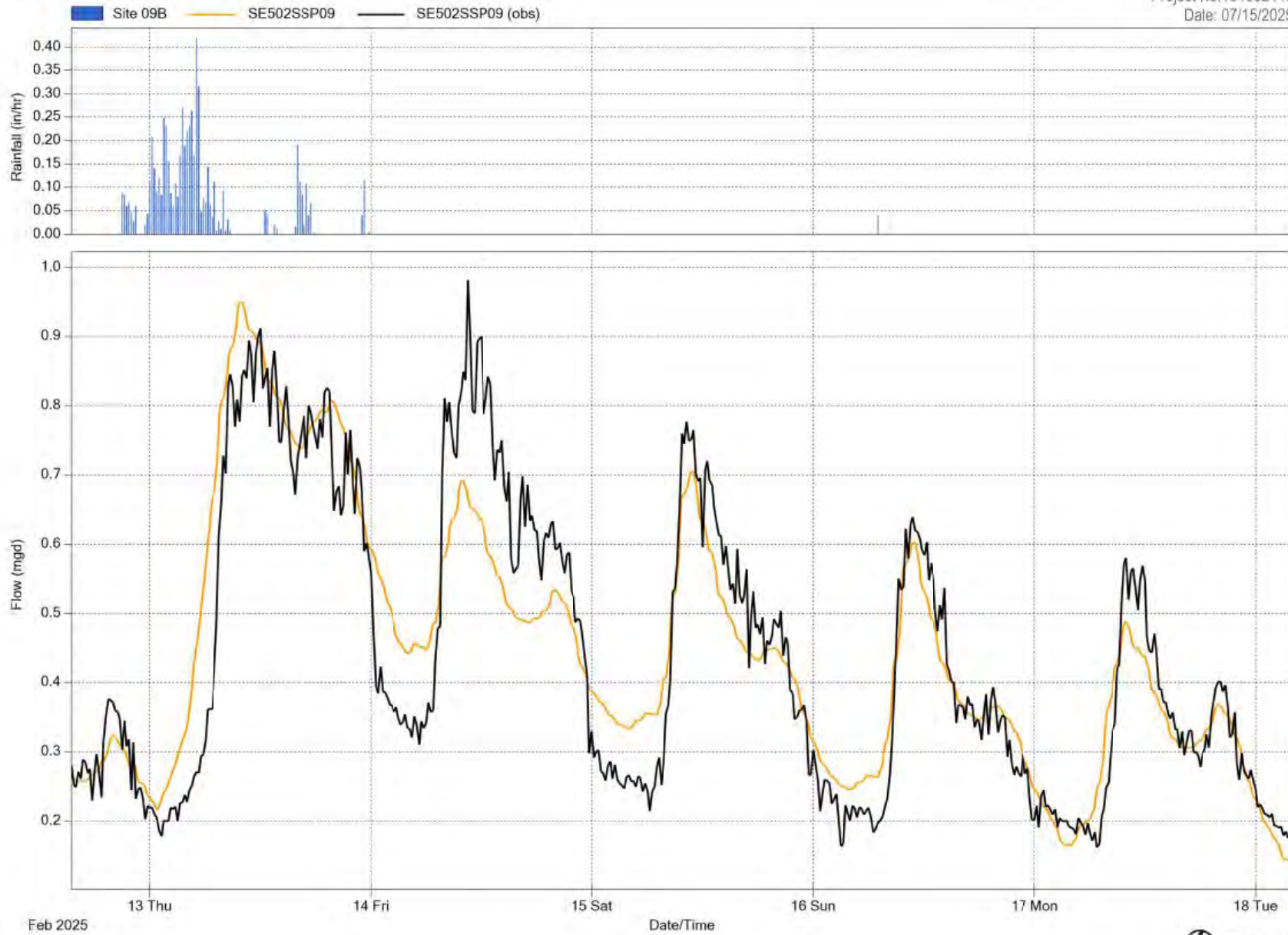


Site 9B - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

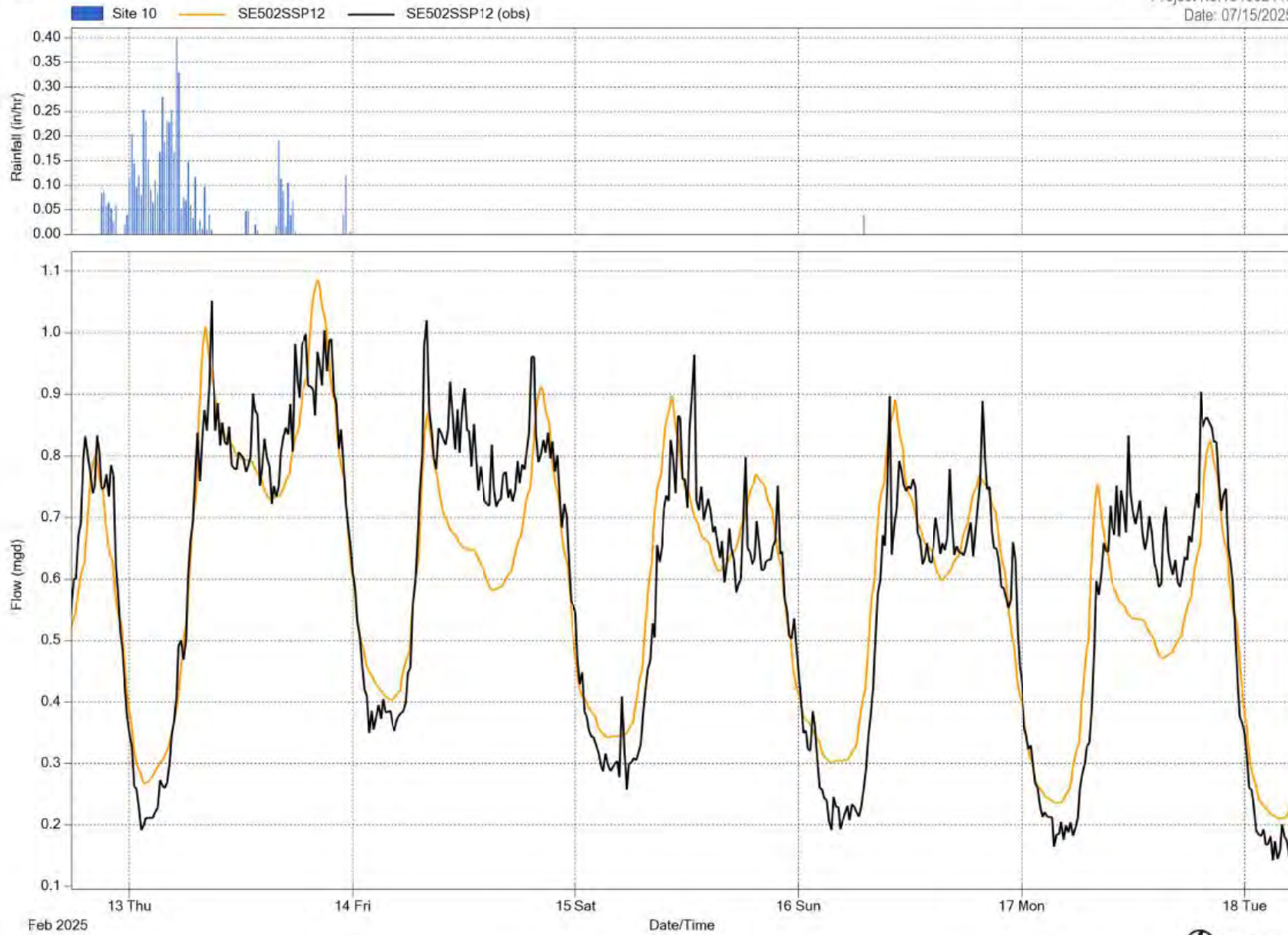


Site 10 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

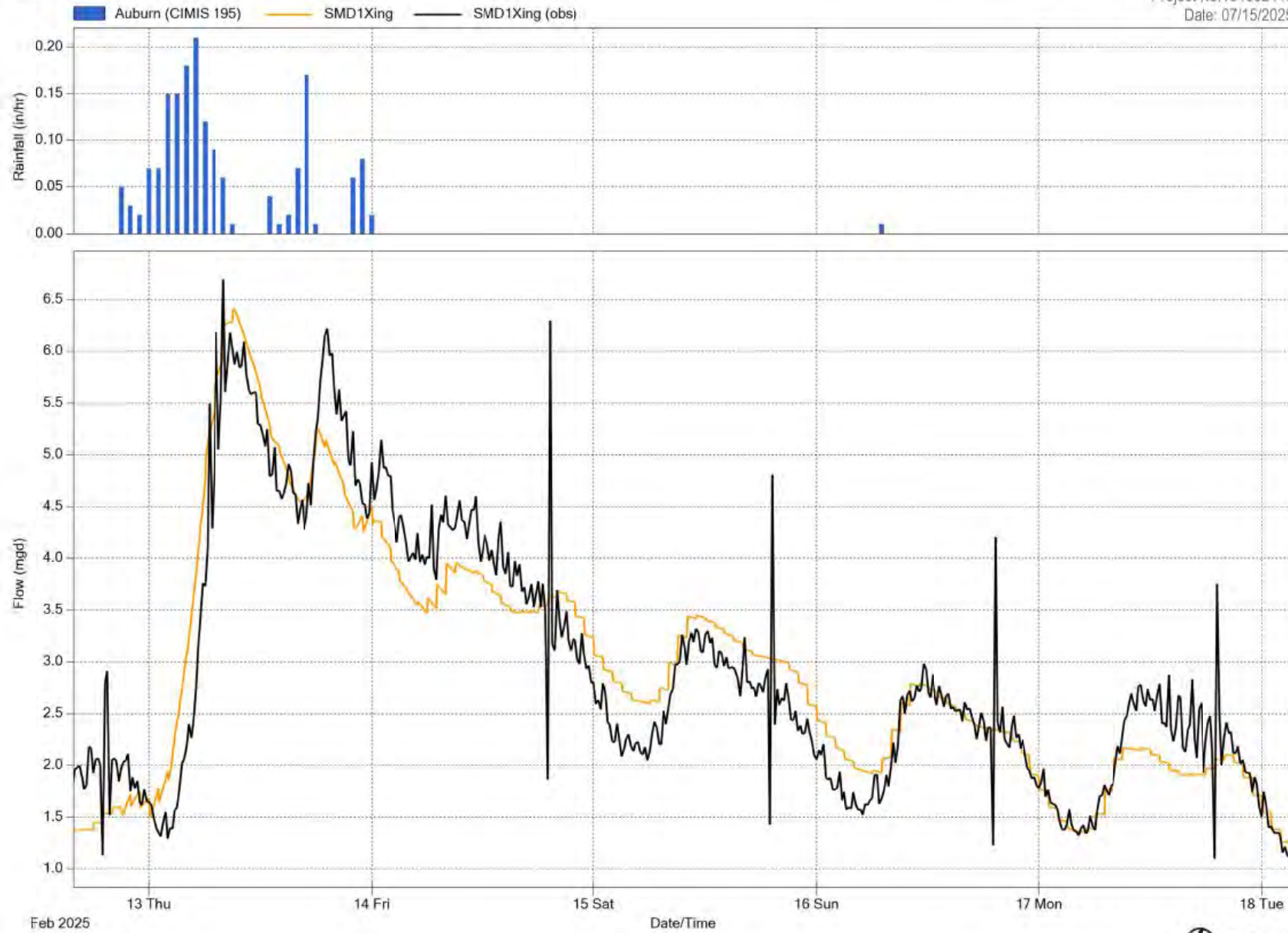


SMD1 - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

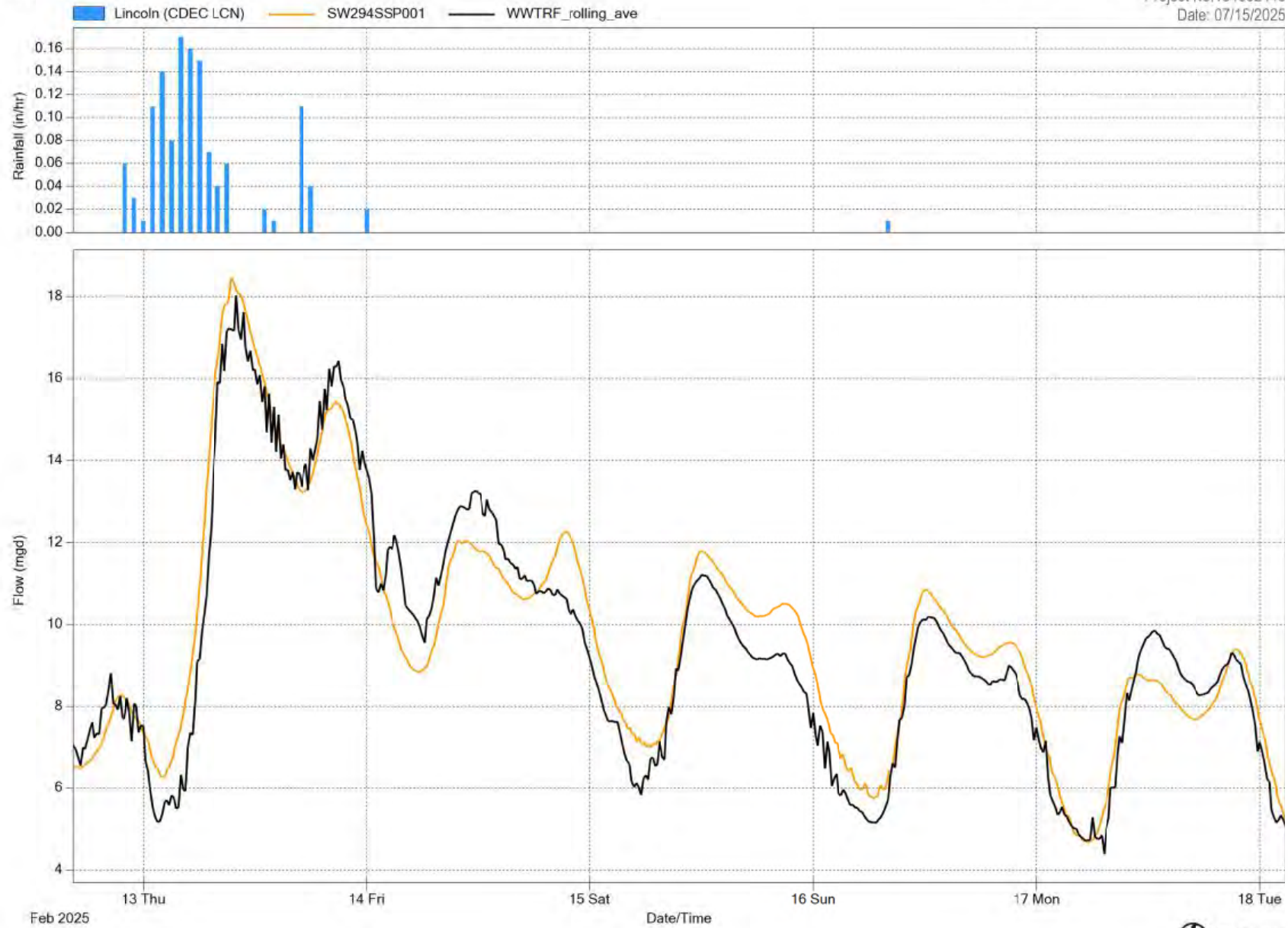


WWTRF - WWF Calibration Event 1

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

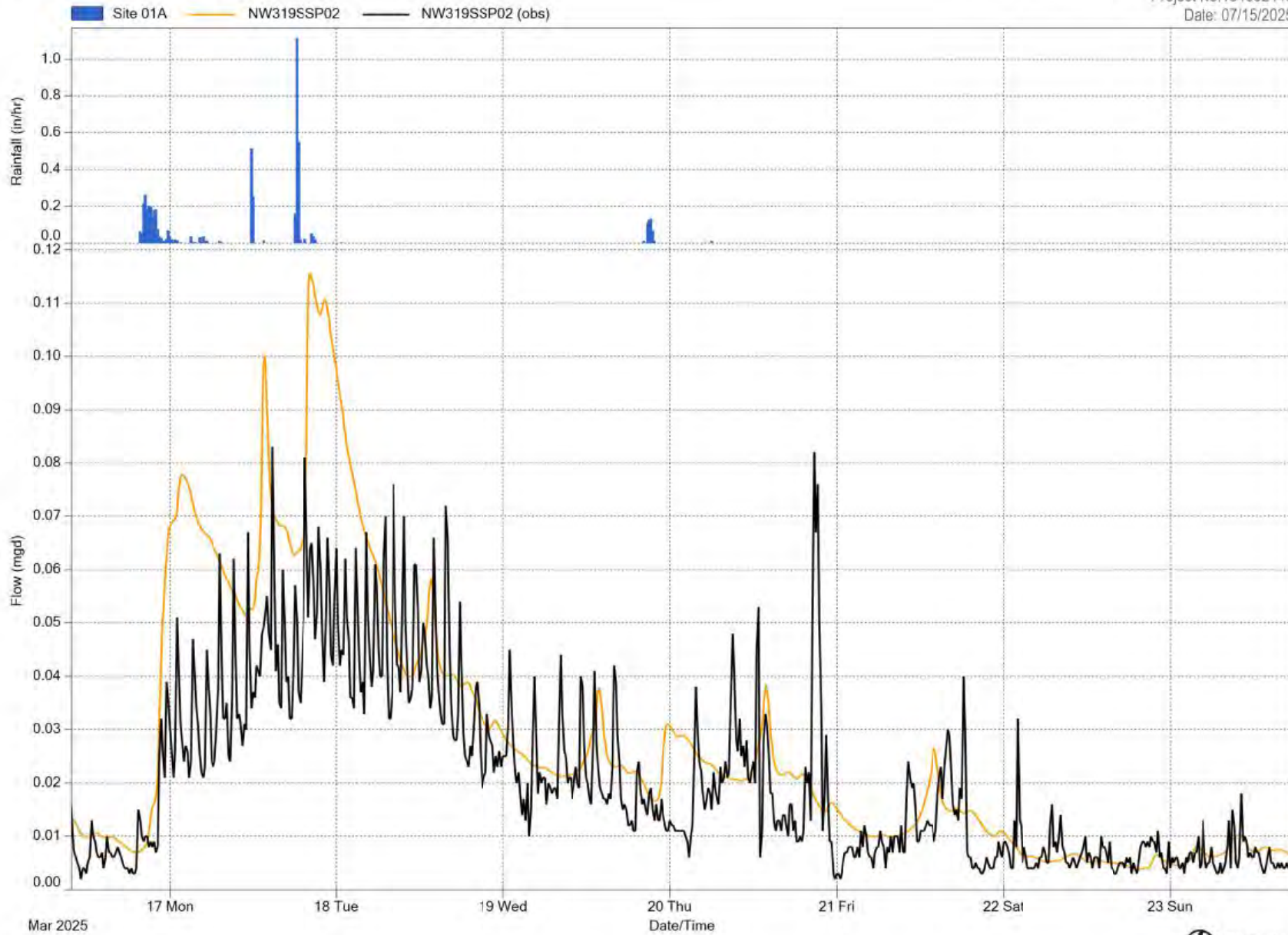


Site 1A - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025



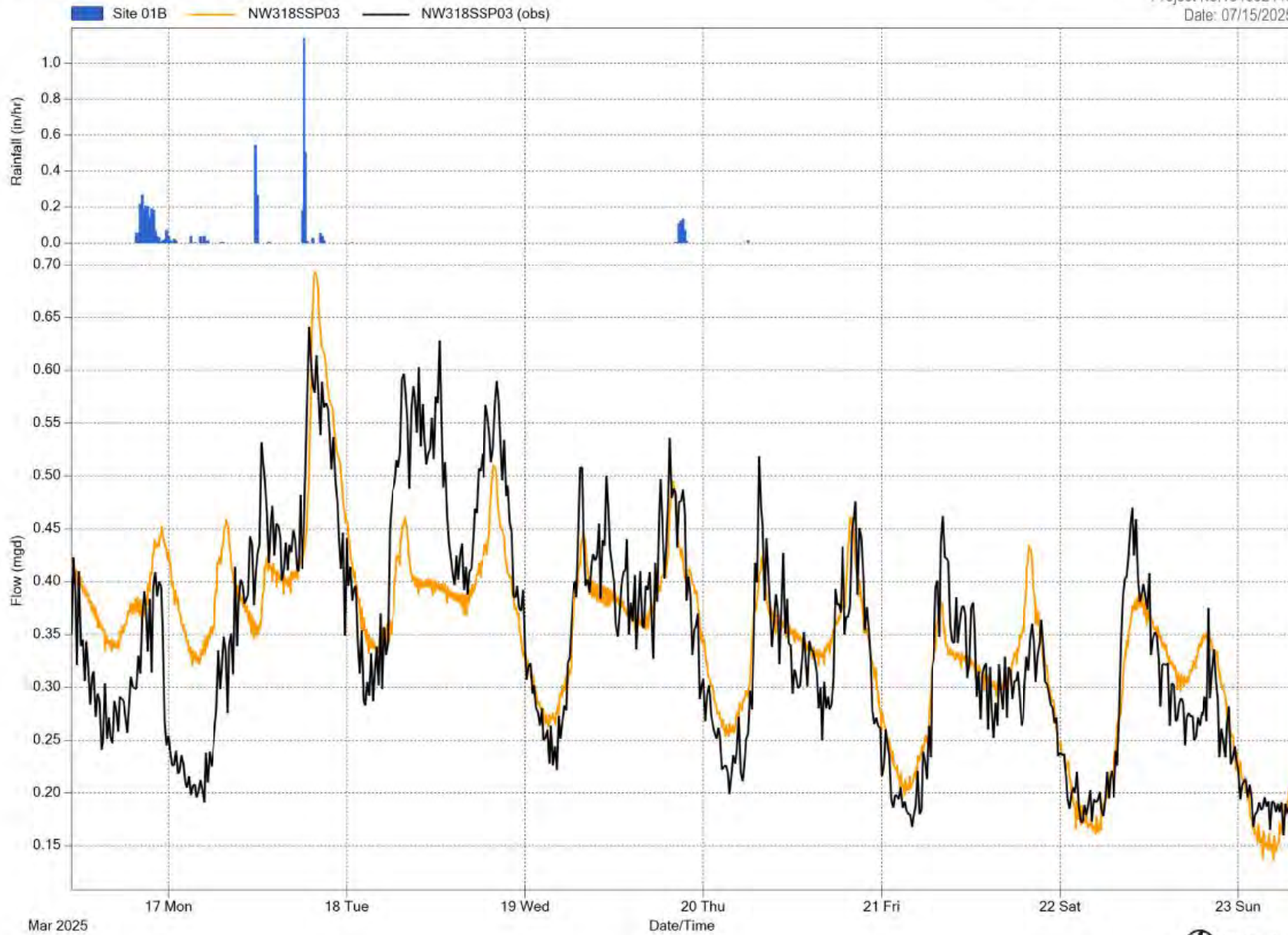
Mar 2025

Site 1B - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

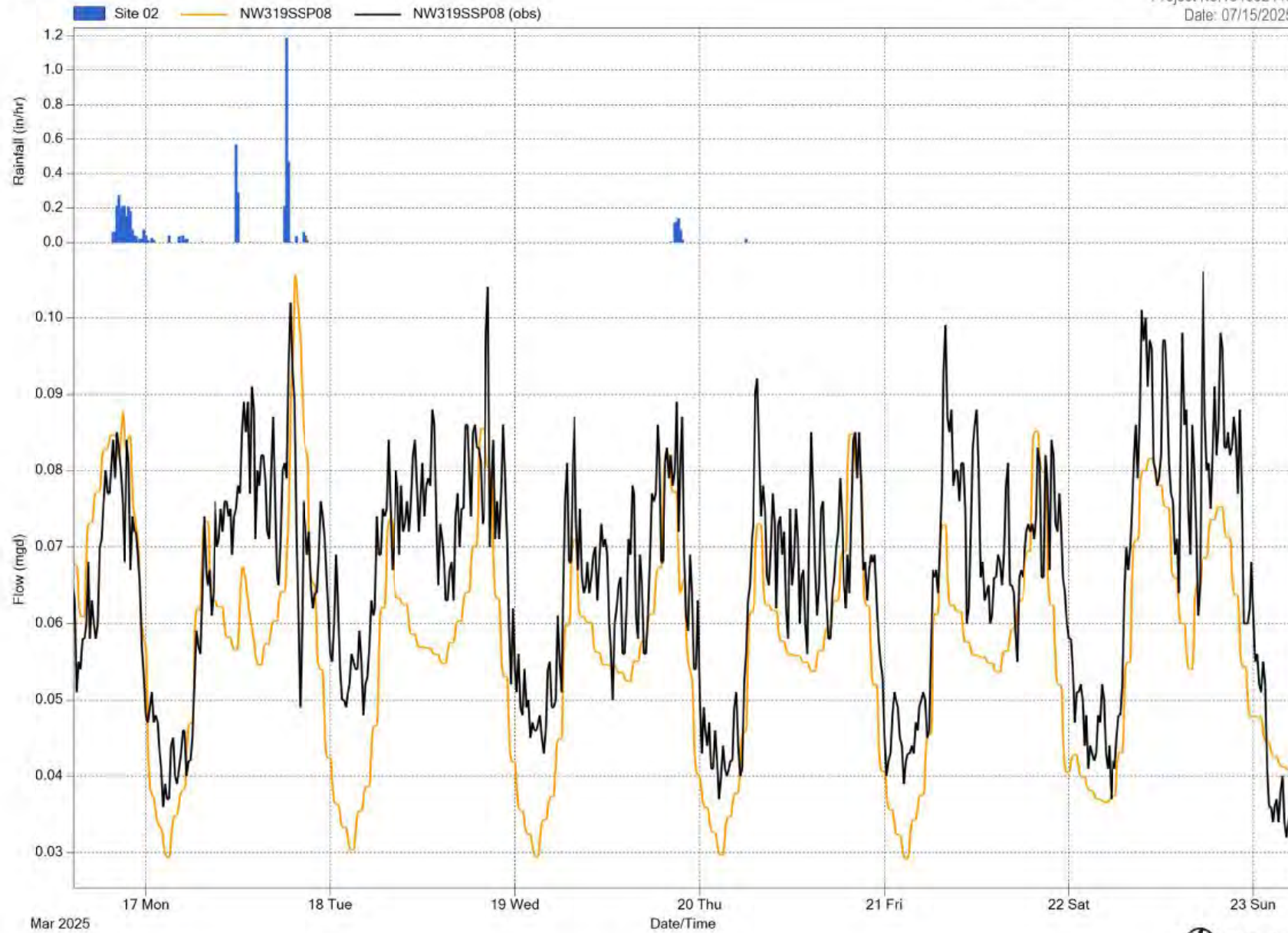


Site 2 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

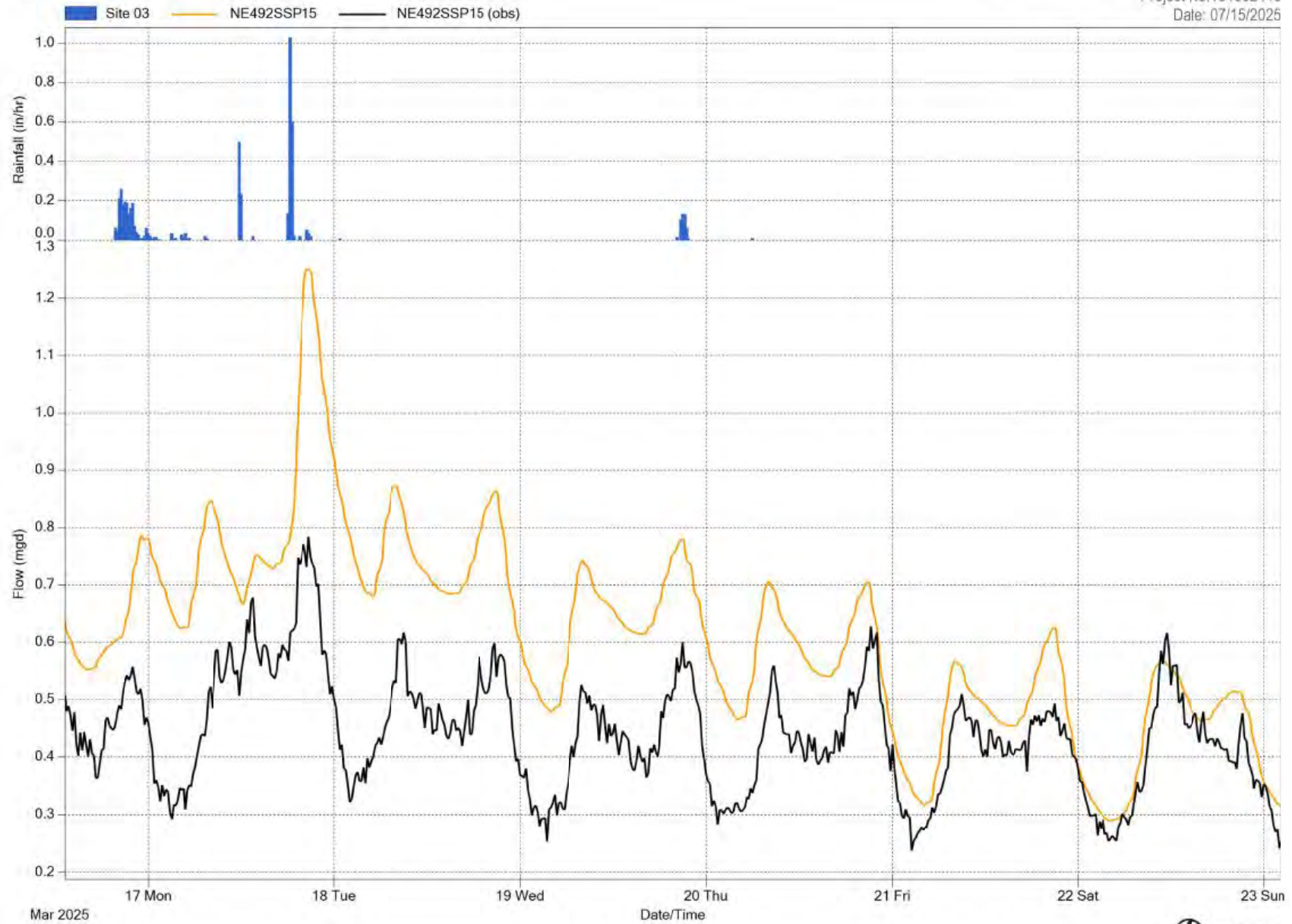


Site 3 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

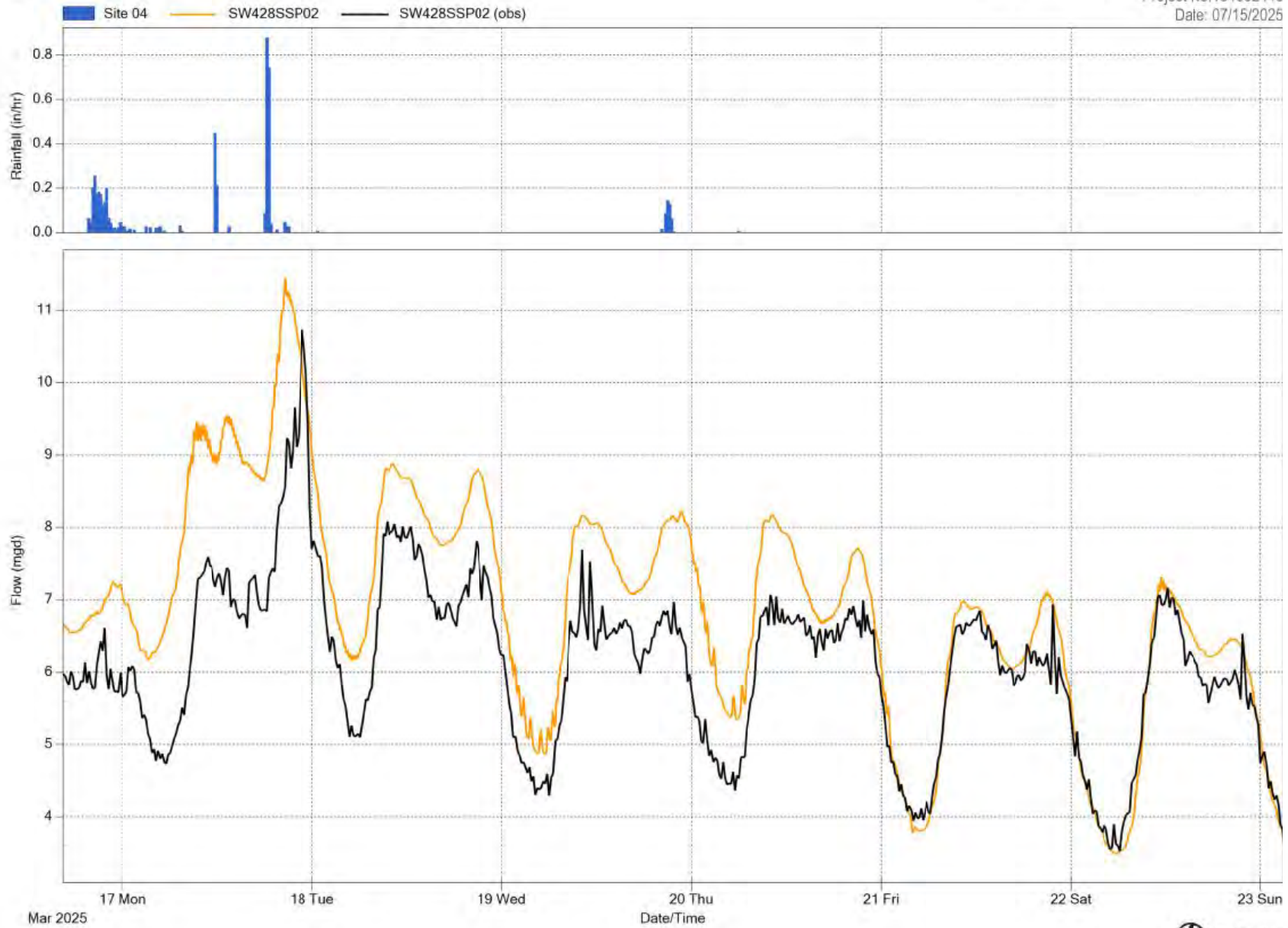


Site 4 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

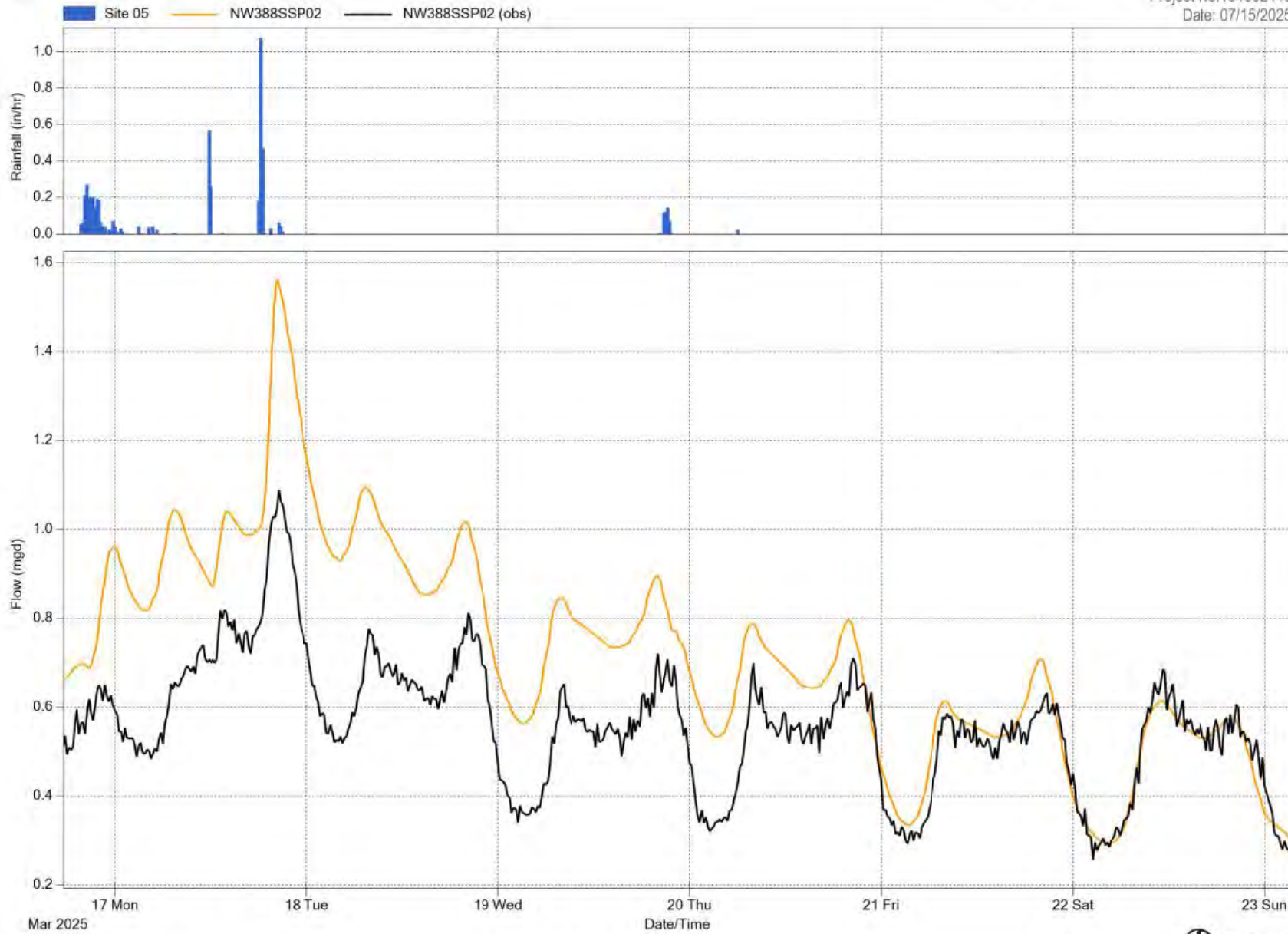


Site 5 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

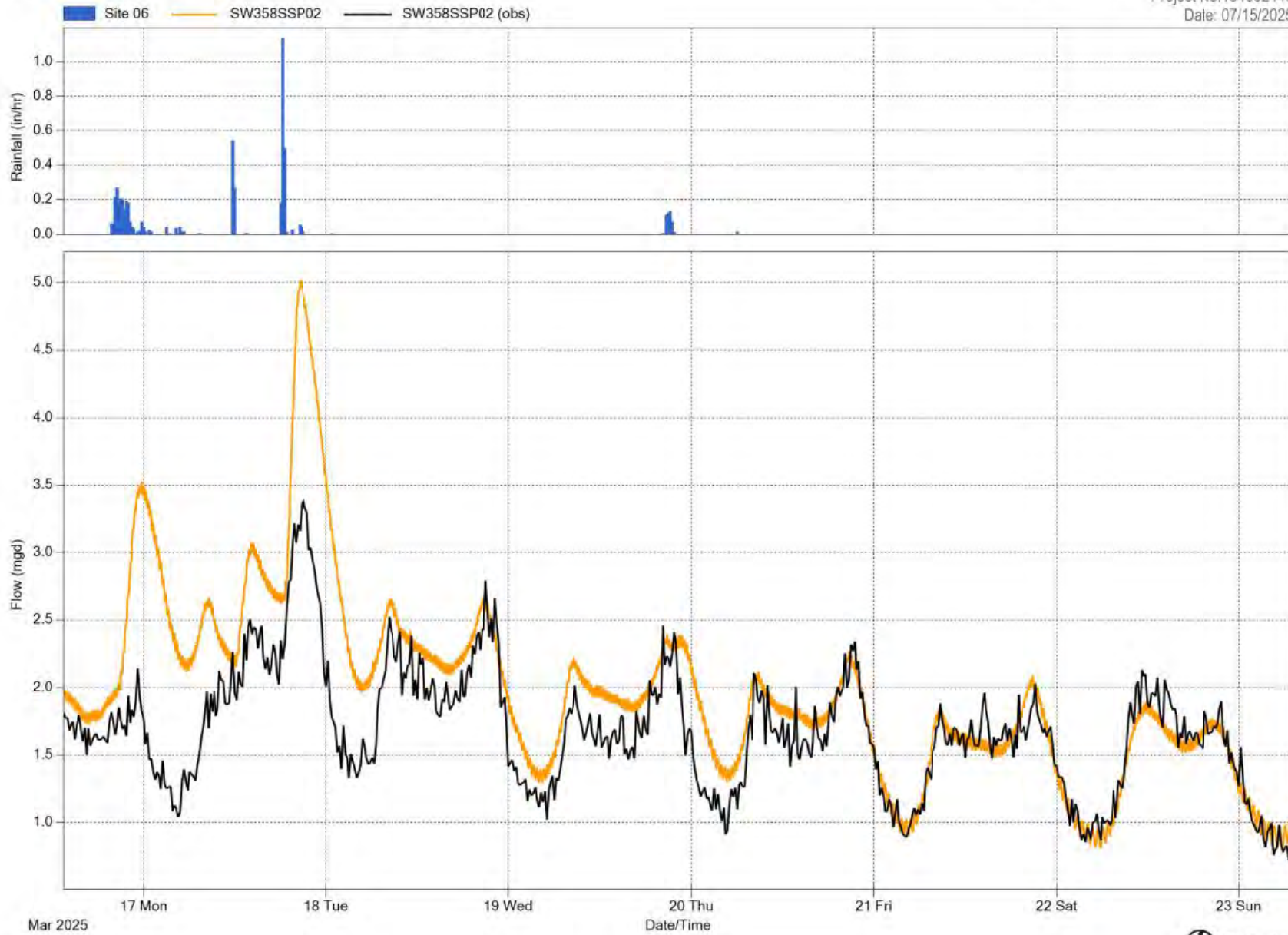


Site 6 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

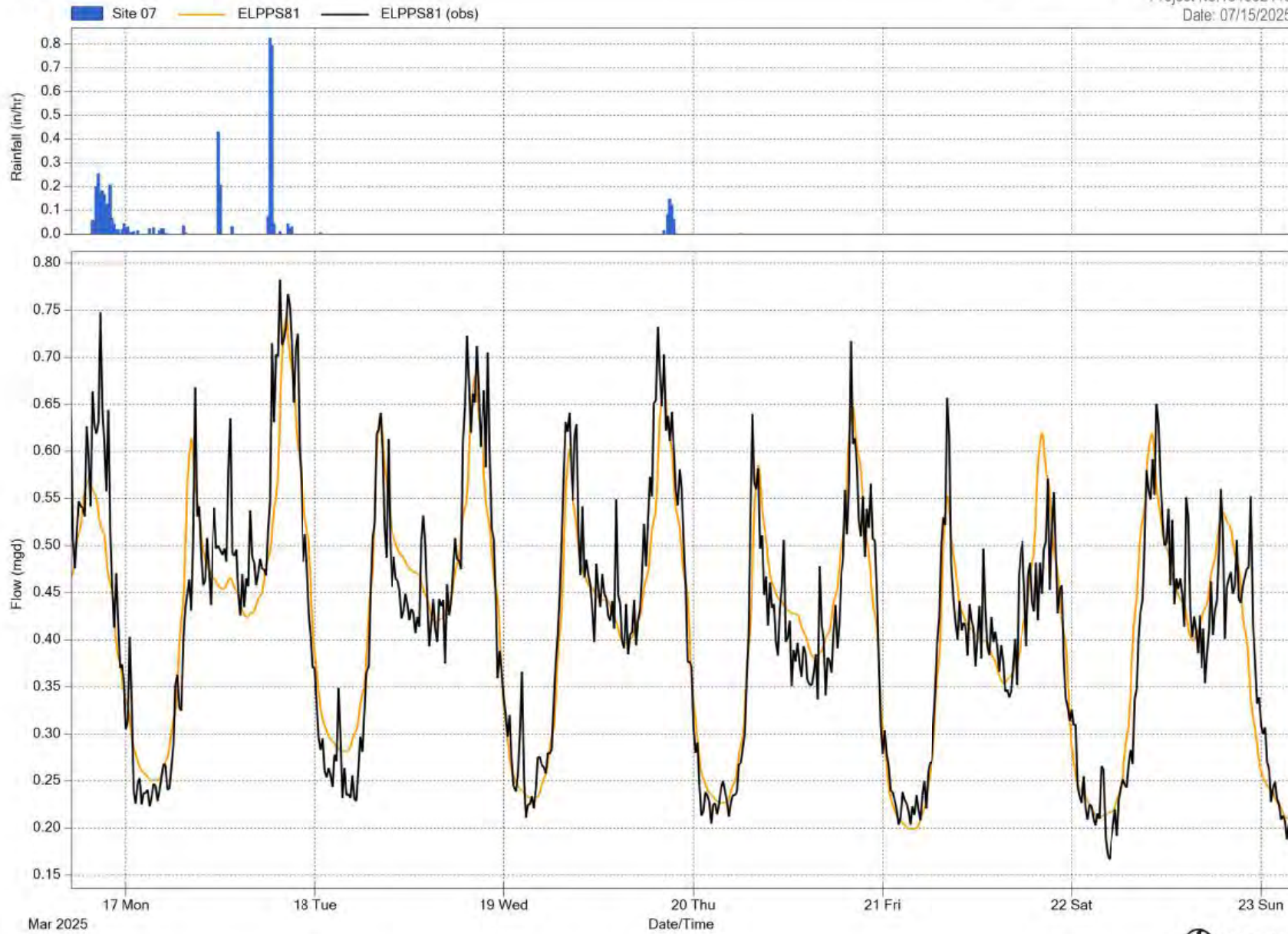


Site 7 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

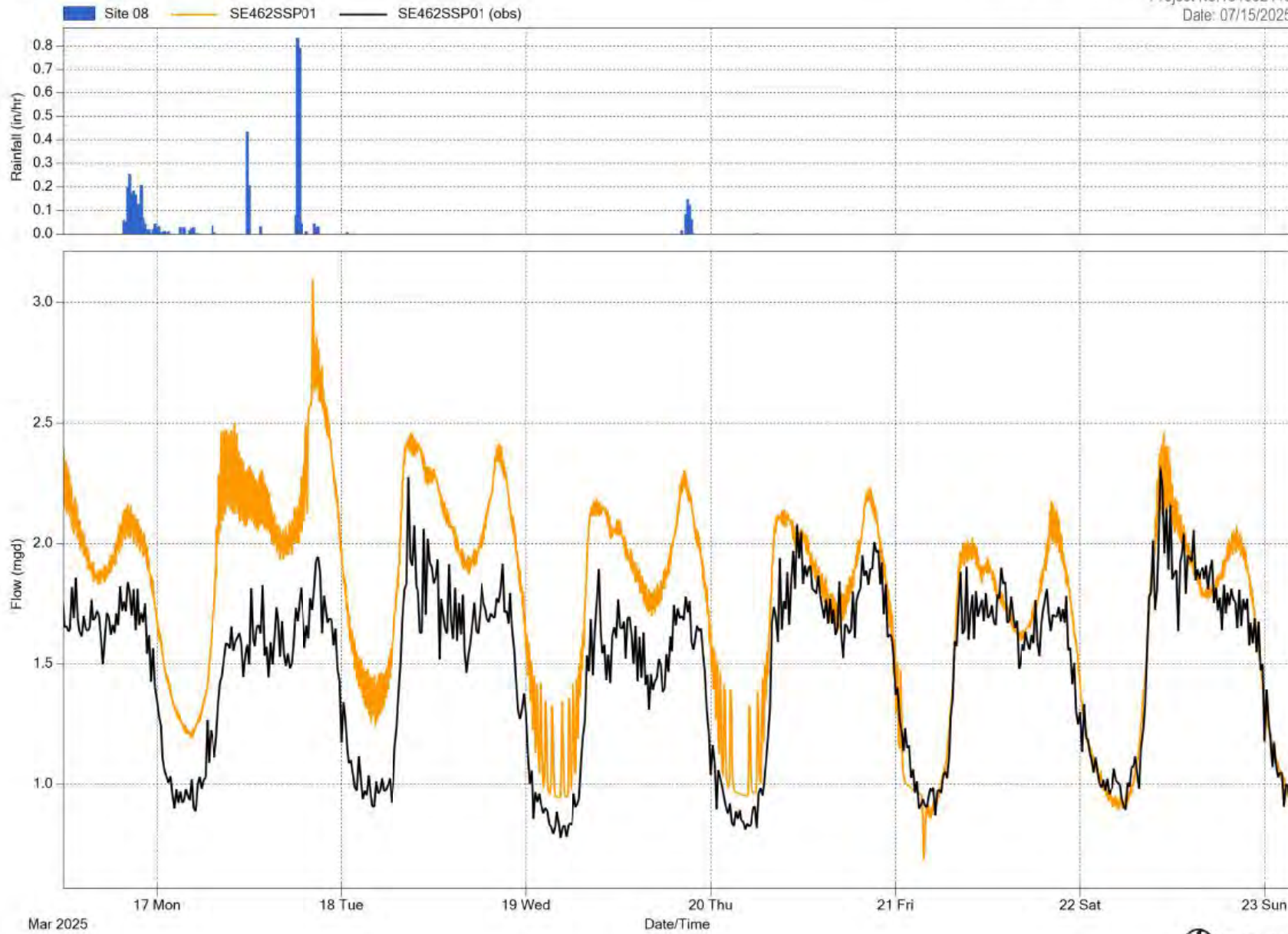


Site 8 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025



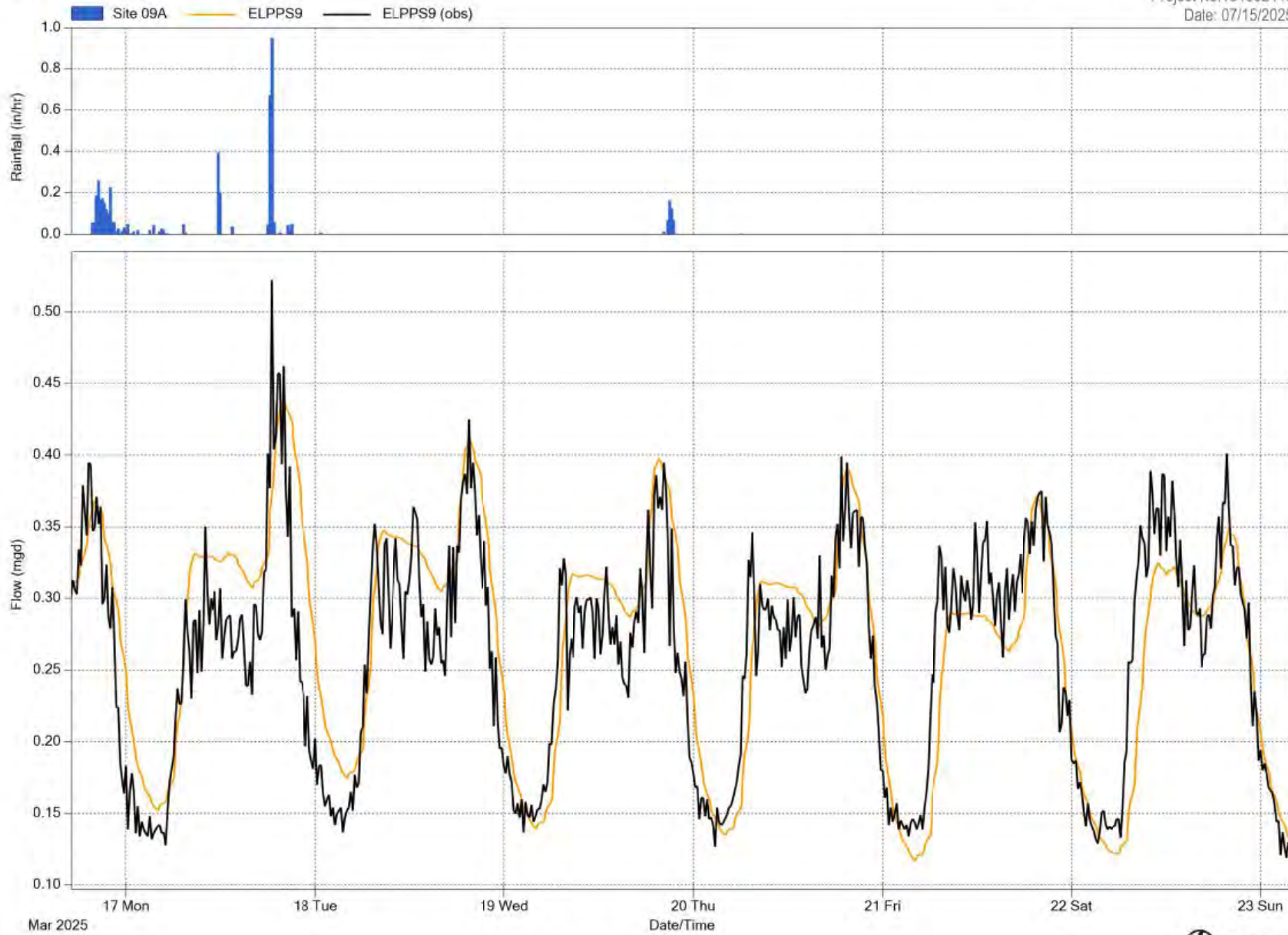
Mar 2025

Site 9A - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

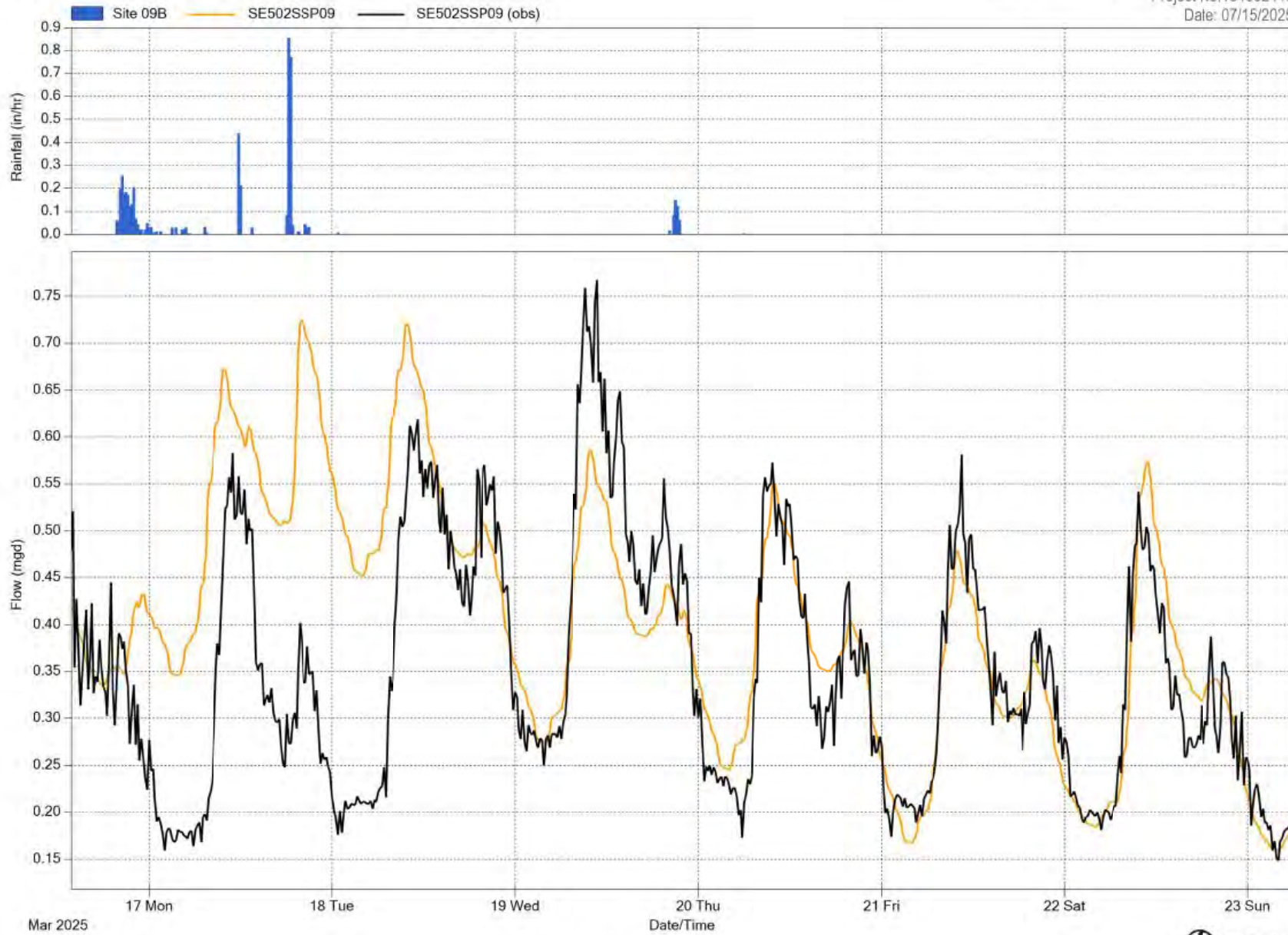


Site 9B - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No. 184032446

Date: 07/15/2025

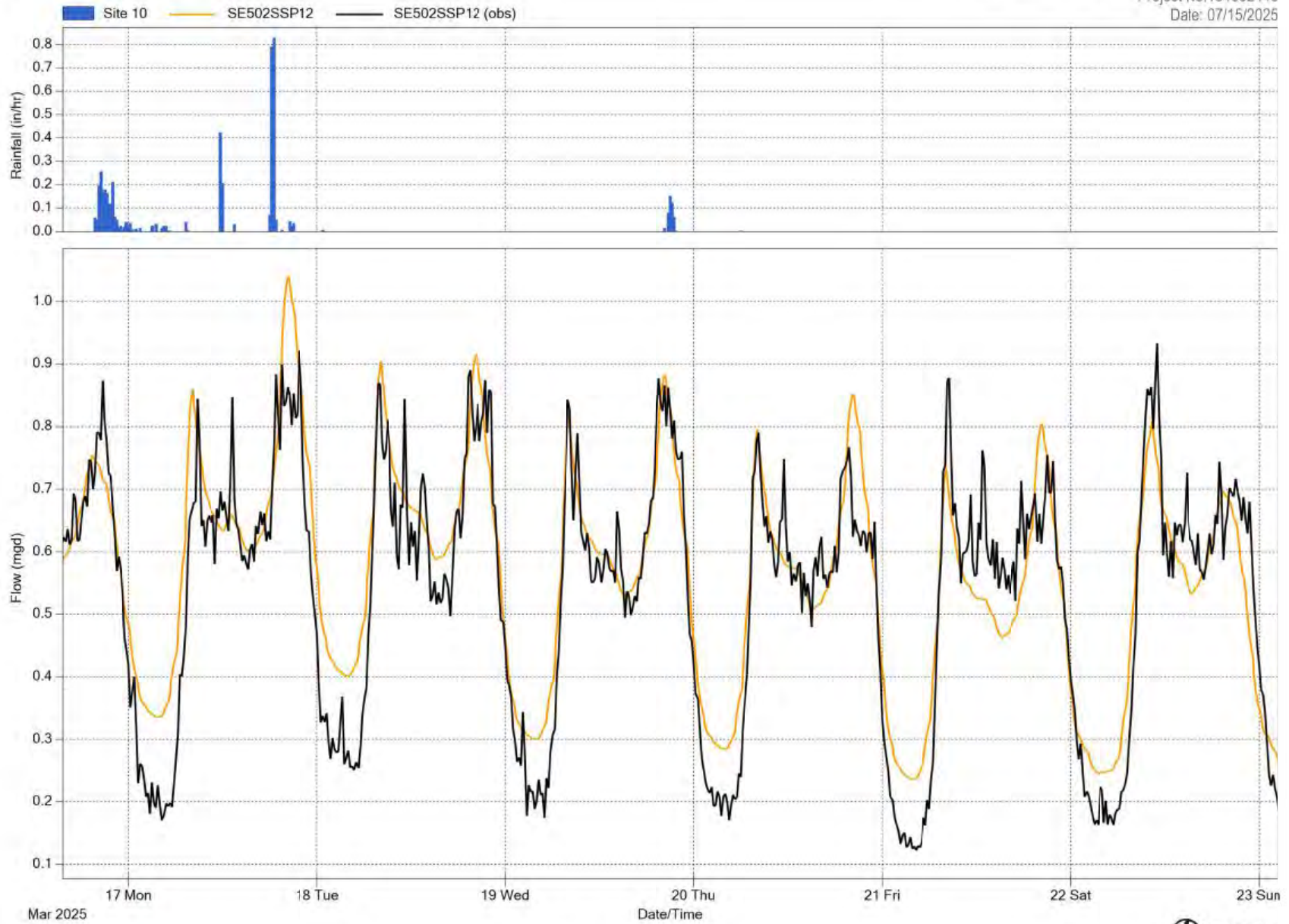


Site 10 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

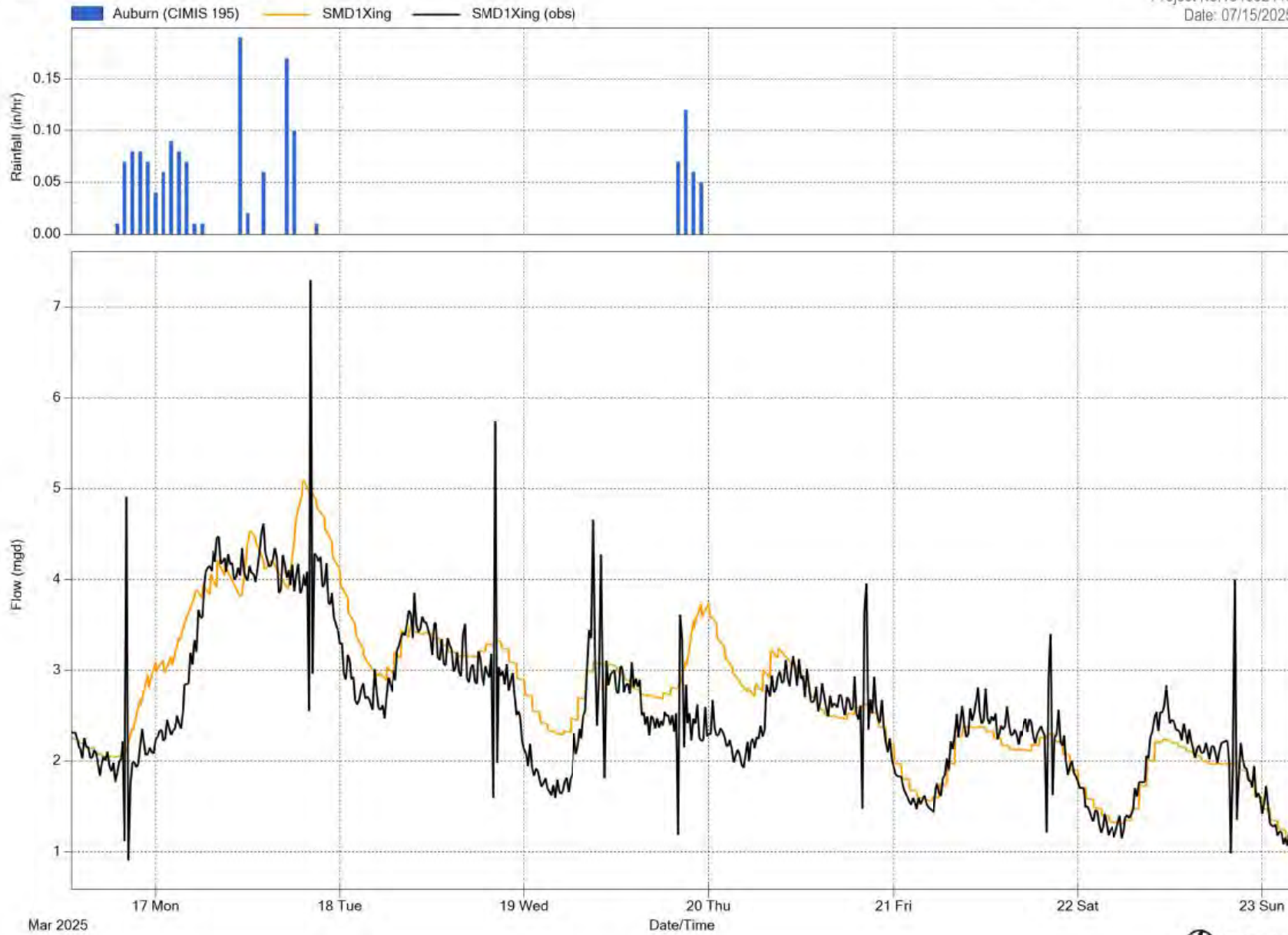


SMD1 - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025

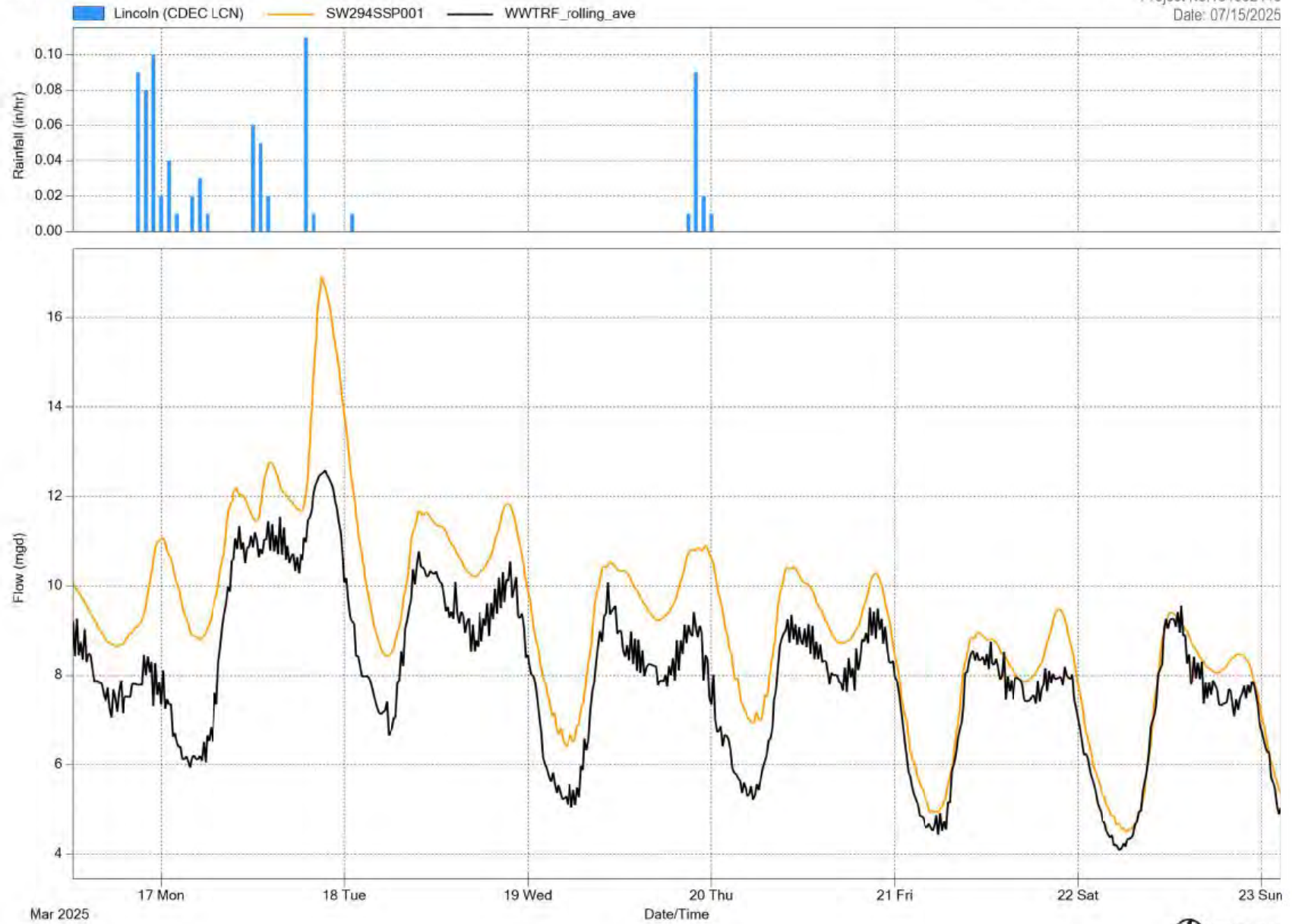


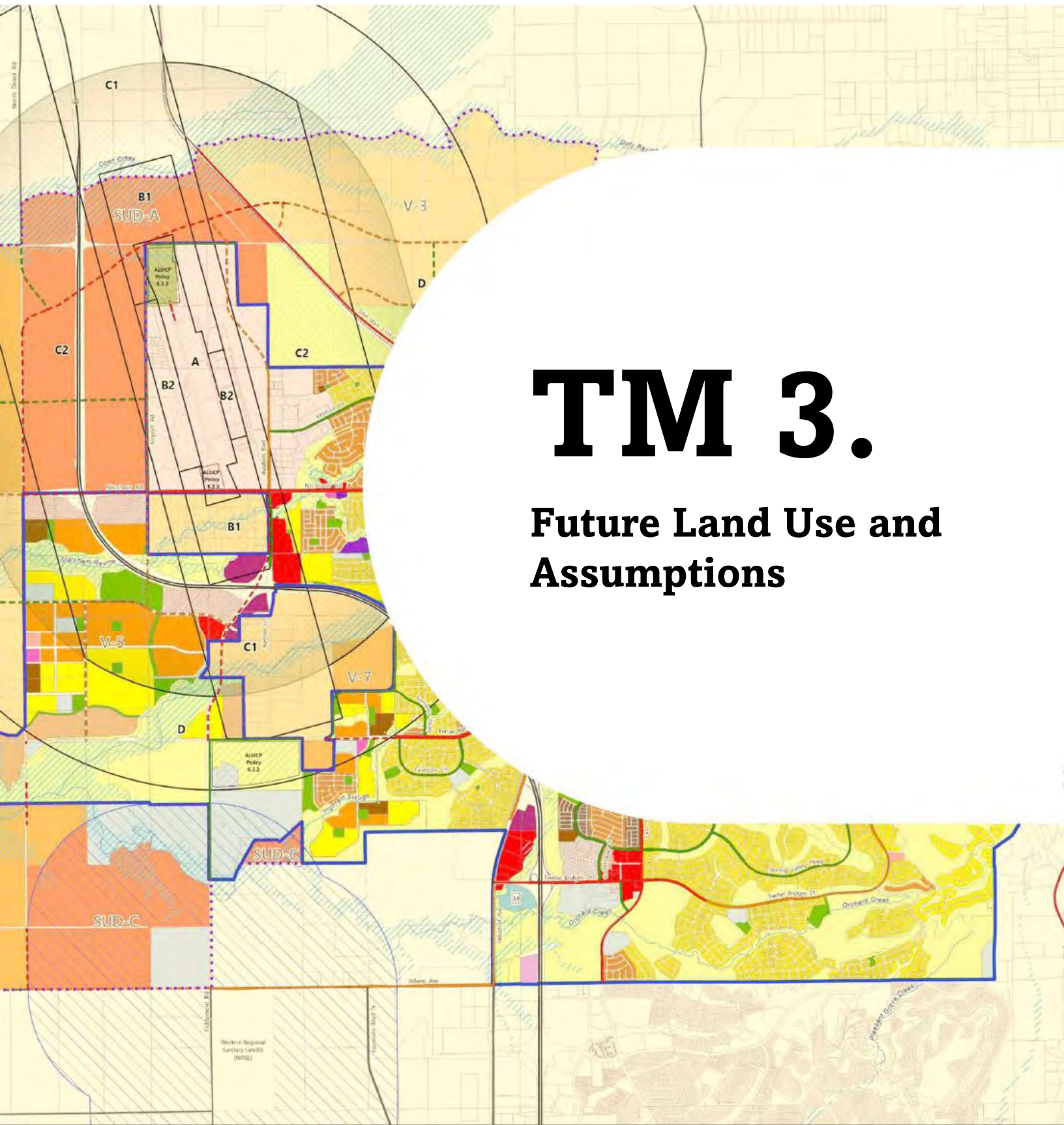
WWTRF - WWF Calibration Event 2

City of Lincoln - 2025 Sewer Master Plan Update

Project No.184032446

Date: 07/15/2025





TM 3.

Future Land Use and Assumptions

To:	Araceli Cazarez	From:	Breanna Webb
	City of Lincoln		Roseville
Project/File:	2026 Sewer Master Plan Update	Date:	August 4, 2025

TECHNICAL MEMORANDUM NO. 3 – FUTURE LAND USE AND ASSUMPTIONS

The purpose of this Technical Memorandum (TM) is to present the overall 2025 future development assumptions to be used in development of the City of Lincoln (City) Sewer Master Plan Update to project wastewater flow from future development. The assumptions used in The City of Lincoln Wastewater Collection System Master Plan (2018 Master Plan) are still applicable based on discussions with City staff.

This TM is divided into the following sections:

- Flow Projection Parameters & Assumptions
- Future Development Areas
- Summary

1 Flow Projection Parameters & Assumptions

The 2018 Master Plan used the following methods to estimate wastewater flow from future development within the City and its planning area. Land uses within City Limits and within the sphere of influence (SOI) are established in the City's General Plan and serve as the basis to estimate future wastewater flow rates for each planning scenario evaluated. The parameters used to determine wastewater flow for each land use and development area are described below.

1.1 Unit Rate (gpd/EDU)

The unit wastewater generation rate is the projected wastewater flow per equivalent dwelling unit (EDU). As part of the 2018 Master Plan effort the City's Design Standard of 250 gpd/EDU was used to estimate flow from new developments. This value is higher than what has been calculated using the City's sewer service billing records, population, and the average dry weather flow (ADWF) recorded for the City at the Wastewater Treatment and Reclamation Facility (WWTRF). The average wastewater generation rate per EDU from 2005 to 2015 was 161 gpd/EDU, under dry weather conditions. Drought conditions and water use restrictions were in effect from 2011 to 2015, producing a declining trend in wastewater generation rates during this period. Data from 2016 to 2023 was provided by the City for use in this Master Plan Update, the data shows that the average flow per residential EDU ranges between approximately 130 to 150 gpd/EDU.

Reference: Future Land Use and Assumptions

While use of the City Standard 250 gpd/EDU may appear conservative in the establishment of the base flow rate for new communities, the 2018 Master Plan also used peak wet weather flow (PWWF) factors from the City's Design Standards, which appear low when compared to observed peaks, especially as facilities age. These peaking factors will be applicable to this update and therefore, a unit rate of 250 gpd/EDU is used for purposes of this Master Plan Update.

1.2 Land Use Based Rates (gpd/acre)

Land use data is correlated with wastewater generation unit rates to project average wastewater flows for future developments where specific estimates are not provided. The wastewater generation rates used in the 2018 Master Plan are shown in **Table 1-1**. For residential land uses, the density of development is a major variable in the estimation of per acre wastewater generation. Unit density used for residential land uses, based on direction from City staff, was the midpoint of the density range presented in the City's General Plan. It was assumed that Open Space and Agricultural land uses would not contribute flow to the collection system or would contribute only negligible flow not material to sizing sewers for this Master Plan. For purposes of this Master Plan Update, these values are assumed to stay the same.

The non-residential wastewater generation rates were back calculated to equivalent EDU densities for use in this Master Plan Update using the wastewater unit rate used in the 2018 Master Plan (250 gpd/EDU) for consistency. For example, the industrial wastewater generation rate of 2,500 gpd/acre divided by the unit rate, 250 gpd/EDU gives a density equivalent of 10 EDU/acre.

Reference: Future Land Use and Assumptions

Table 1-1. Land Use Based Wastewater Generation Rates

Land Use Designation	Code	Category	Unit Density & Wastewater Generation Rate	
Rural Residential	RR	Residential	0.50 EDU/Acre	250 gpd/EDU
Country Estates	CE		2.00 EDU/Acre	
Low Density Residential	LDR		4.45 EDU/Acre	
Medium Density Residential	MDR		9.45 EDU/Acre	
High Density Residential	HDR		16.50 EDU/Acre	
Special Use District	SUD	SUD	Refer to SUD Land Use Information	
Village	V	Village	Refer to Village Land Use Information	
Mixed Use	MU	NA	NA	
Neighborhood Commercial	NC	Commercial	1,600 gpd/Acre = 6.40 EDU/Acre	
Community Commercial	CC			
Regional Commercial	RC			
Business and Professional	BP			
Employment Center	EC			
Light Industrial	LI	Industrial	2,500 gpd/Acre = 10.00 EDU/Acre	
Industrial Planned Development	IPD			
Industrial	I			
Airport Zone B ⁽¹⁾	AB	Airport	25 gpd/Acre	
Airport Zone C ⁽¹⁾	AC	Airport	125 gpd/Acre	
Parks and Recreation	PR	Parks	20 gpd/Acre = 0.08 EDU/Acre	
Public Facilities	PF	Public	1,000 gpd/Acre = 4.00 EDU/Acre	
Medical Center	MC			
Open Space	OS	No Flow Contribution	NA	
Agriculture	AG			

(1) The land use notes map provided by the City indicates no future airport development, therefore the airport zones will not be incorporated into the future land use and wastewater flow calculations.

The City's Zoning and Land Use parcel data were used to identify vacant parcels within City Limits. The zoning code associated with vacant parcels was used to identify the equivalent development density of each parcel and estimate total EDUs and ultimately wastewater flow. Some of the zoning codes specify the development density. Those that did not specify density or match land uses from the 2018 Master Plan, were either sorted into the land use categories shown in **Table 1-1**, or had a residential village land use designation. The densities assigned to village residential zoning codes were assumed to equate to the average of the residential intensity (DU/acre) for the equivalent land use listed in *Table 4-3. Village Land Use Designations and Development Standards* of the City's General Plan. The land use zoning and density assumptions associated with the infill development identified within City Limits are summarized in **Table 1-2**.

Reference: Future Land Use and Assumptions

Table 1-2. Zoning Density and Wastewater Generation Rates

Zoning	Description	Category ⁽¹⁾	Equivalent Density (EDU/Acre)	Wastewater Generation Rate ⁽²⁾ (gpd/acre)
VPR	Village Park	Parks	0.08	20
LD-E	Estate Residential - 20,000 sq. ft. minimum	Residential - CE	2.00	500
VCE	Village Country Estates	Village Residential	2.00	500
LDR-3.5	Low Density Residential - 3.5 units per acre	Residential - Specified Density	3.50	875
VPF	Village Public Facility	Public	4.00	1,000
R-1	Single Family Residential	Residential - LDR	4.45	1,113
VLDR	Village Low Density Residential	Village Residential	4.50	1,125
RD-5	Residential - 5 Units per Acre	Residential - Specified Density	5.00	1,250
PD-C	Planned Development - Commercial	Commercial	6.40	1,600
VC	Village Center	Commercial	6.40	1,600
VMDR	Village Medium Density Residential	Village Residential	8.00	2,000
R-2	Duplex Residential	Residential - MDR	9.45	2,363
LLI	Limited Use Light Industrial	Industrial	10.00	2,500
MI	Medium and Service Industrial	Industrial	10.00	2,500
RD-14.8	Residential - 14.8 Units per Acre	Residential - Specified Density	14.80	3,700
VHDR	Village High Density Residential	Village Residential	16.00	4,000
VMU	Village Mixed Use	Village Residential	16.00	4,000
R-3	Multiple Residential	Residential - HDR	16.50	4,125
RD-3.4	Residential - 3.4 Units per Acre	Residential - Specified Density	3.40	850
RD-18	Residential - 18 Units per Acre	Residential - Specified Density	18.00	4,500
RD-20	Residential - 20 Units per Acre	Residential - Specified Density	20.00	5,000
PD-MDR	Planned Development - Medium Density Residential	Independence at Lincoln	Lot Count (1 EDU/Lot) ⁽³⁾	250 gpd/EDU

- (1) The densities assigned to village residential zoning codes were assumed to equate to the average of the residential intensity (DU/acre) for the equivalent land use listed in *Table 4-3. Village Land Use Designations and Development Standards* of the City's General Plan.
- (2) This wastewater generation rate is calculated based on a unit wastewater generation rate of 250 gpd/EDU.
- (3) The number of remaining vacant lots was counted for the Independence at Lincoln Development, as opposed to using a land use-based calculation.

Reference: Future Land Use and Assumptions

2 Future Development Areas

The areas of future development are divided into three primary areas: developments within city limits, unannexed lands around city limits, and the remaining SOI villages and special use districts (SUDs). This section outlines the data and assumptions used to project wastewater flow from these areas.

2.1 City Limits Development

The City provided the following land use shapefiles for the use in development of the future land use planning assumptions for the Master Plan Update.

- Zoning_Land_Use.shp
- Development_Activity.shp
- Parcel - City Limits.shp

Vacant parcels within City Limits were identified from the City's zoning land use file. Other vacant areas and specific developments were identified using the Development Activity shapefile. The City also provided a map with future development assumptions from the development of the Water Master Plan. This map identified the time period of development (5-years, 10-years, etc.) and EDUs associated with some future development areas.

The total EDUs from each future development area was determined by one of the following methods:

- Those specified in the provided land use notes map;
- Those specified in the Development Activity shapefile;
- The number of vacant lots in a partially developed subdivision (assigned one EDU per parcel);
- Using the zoning identified from the Zoning and Land Use shapefile and the corresponding density shown in **Table 1-2**.

The vacant parcels without a specific development title were classified as "infill" and zoning-based land use designations were used to estimate the total number of EDUs associated with each parcel. The zoning and calculated EDUs from infill development areas is summarized in **Table 2-1**.

Since the development of the 2018 Master Plan, the City has annexed the following areas into city limits: SUD-B, the majority of Villages 1 and 7, as well as a portion of Village 5. Village 1 and 7 have already partially been developed, the zoning codes assigned to the remaining vacant portions of these villages were used to identify their density and wastewater generation rates. Land use for the middle part of Village 5 has changed and is referred to now as Village 5A. The developments identified through this effort and the total number of EDUs associated with each are summarized in **Table 2-2**.

The development phasing or time of development as was available from the land use assumptions map is also summarized in **Table 2-2**.

Future development areas within city limits are shown on **Figure 2-1**.

Reference: Future Land Use and Assumptions

Table 2-1. Infill Development Zoning, Area, and EDU Totals

Zoning	Description	Area (Acres)	EDU
LD-E	Estate Residential - 20,000 sq. ft. minimum	34.49	69
VC	Village Center	4.90	31
C	Commercial	18.34	117
NC	Neighborhood Commercial	4.82	31
RD-3.4	Residential - 3.4 Units per Acre	0.29	1
RD-5	Residential - 5 Units per Acre	4.97	25
BP	Business and Professional	4.08	26
LDR	Low Density Residential	35.70	159
R-1	Single Family Residential	25.02	111
LLI	Limited Use Light Industrial	50.32	503
R-3	Multiple Residential	3.85	64
LDR-3.5	Low Density Residential - 3.5 units per acre	26.39	92
RD-14.8	Residential - 14.8 Units per Acre	5.52	82
RD-18	Residential - 18 Units per Acre	2.39	43
NC/BP	Neighborhood Commercial/Business Professional	7.23	46
RD-20	Residential - 20 Units per Acre	4.97	99
MI	Medium and Service Industrial	36.56	366
R-2	Duplex Residential	4.33	41
I	Industrial	42.77	428
VLDR	Village Low Density Residential	11.63	52
VCE	Village Country Estates	6.89	14
VMDR	Village Medium Density Residential	10.11	81
MDR	Medium Density Residential	0.21	2
PD-MDR	Planned Development - Medium Density Residential	5.37	58
PD-C	Planned Development - Commercial	2.66	17
	Total:	353.80	2,558

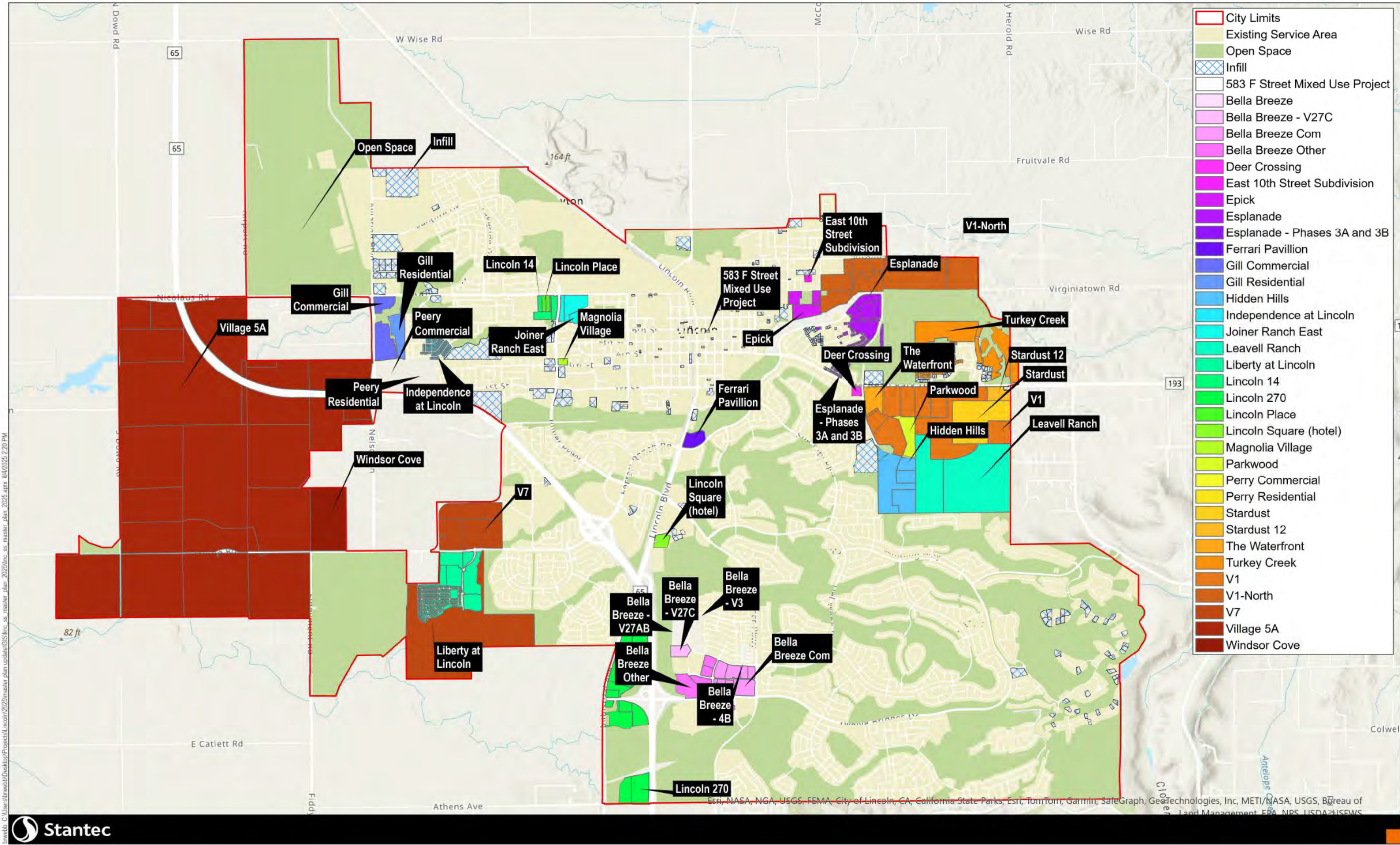
Reference: Future Land Use and Assumptions

Table 2-2. Future City Limits Developments and Projected EDUs

Development	Phasing /Timing	Land Use	EDUs	Area (Acres)	Data Source	Notes
Ferrari Pavillion	5-year	C	73	11.4	Land Use	Zoning Shapefile
Lincoln Square (hotel)	5-year	C	47	7.3	Land Use	Zoning Shapefile
Bella Breeze Com	10-year	C	272	42.6	Land Use	Zoning Shapefile
Lincoln 270	10-year	C/I	1,029	142.8	Land Use	Zoning Shapefile
Gill Commercial	10-year	C	235	36.7	Land Use	Zoning Shapefile
Peery Commercial	5-year	C	228	35.6	Land Use	Zoning Shapefile
Bella Breeze Other	20-year	C	259	40.5	Land Use	Zoning Shapefile
Bella Breeze - 4B	5-year	Res	94	5.0	Lot Count	Updated Per City Comments
Bella Breeze - V27AB	5-year	Res	71	12.7	Permits to be issued	Updated Per City Comments
Bella Breeze - V3	5-year	Res	120	9.4	Permits to be issued	Updated Per City Comments
Liberty at Lincoln	5-year	Res	565	103.2	Provided EDUs	Village 7 Specific Plan Area (Phase 1), Development Activity Shapefile
Joiner Ranch East	5-year	Res	198	25.5	Provided EDUs	Development Activity Shapefile
Lincoln 14	10-year	Res	55	14.4	Provided EDUs	Development Activity Shapefile
Lincoln Place	10-year	Res	21	5.0	Provided EDUs	Development Activity Shapefile
Magnolia Village	5-year	Res	32	2.4	Provided EDUs	Units listed in Development Activity Shapefile
East 10th Street Subdivision	5-year	Res	10	2.1	Provided EDUs	Units listed in Development Activity Shapefile
Deer Crossing	5-year	C	5	3.5	Provided EDUs	Units listed in Development Activity Shapefile
Esplanade - Phases 3A and 3B	5-year	Res	82	9.2	Lot Count	Number of Vacant Lots Zoning Shapefile
583 F Street Mixed Use Project	5-year	Res	7	0.2	Provided EDUs	Units listed in Development Activity Shapefile
Independence at Lincoln	5-year	Res	142	15.0	Permits to be issued	Updated Per City Comments

Reference: Future Land Use and Assumptions

Development	Phasing /Timing	Land Use	EDUs	Area (Acres)	Data Source	Notes
Bella Breeze - V27C	5-year	Res	189	8.4	Provided EDUs	Units listed in Development Activity Shapefile
Leavell Ranch	5-year	Res	1,050	240.4	Provided EDUs	Updated Per City Comments
The Waterfront	10-year	Res	271	17.9	Provided EDUs	Units listed in Development Activity Shapefile
Stardust 12	5-year	Res	86	12.0	Provided EDUs	Units listed in Development Activity Shapefile
Stardust	5-year	Res	302	78.0	Provided EDUs	Units listed in Development Activity Shapefile
Parkwood	5-year	Res	122	19.8	Provided EDUs	Units listed in Development Activity Shapefile
Peery Residential	5-year	Res	325	40.2	Provided EDUs	Updated Per City Comments
Windsor Cove	5-year	Res	172	89.5	Provided EDUs	Updated Per City Comments
Gill Residential	10-year	Res	104	21.5	Provided EDUs	Updated Per City Comments
Esplanade	5-year	VLDR	254	56.4	Land Use	Remaining Vacant Areas Zoning Shapefile
Epick	5-year	VLDR	144	25.2	Provided EDUs	Updated Per City Comments
Hidden Hills	5-year	VLDR	235	87.8	Provided EDUs	Updated Per City Comments
Turkey Creek	5-year	VLDR/ VCE	473	134.3	Land Use	Remaining Vacant Areas Zoning Shapefile
V1-North	15-year	Village Land Use	312	202.5	Land Use	Zoning Shapefile, (North of Ravine, East of Epick)
V1	10-year	Village Land Use	1,581	221.5	Provided EDUs	Updated Per City Comments (excludes existing development and specific developments)
V7	10-year/ 15-year	Village Land Use	1,905	384.1	Provided EDUs	Updated Per City Comments (excludes Liberty at Lincoln)
Village 5A	5-year/ 15-year	Specific Plan	6,795	2,484.7	Provided EDUs	Updated Per City Comments, 1,500 EDUs added to account for commercial and schools (less Windsor Cove EDUs)
Infill	5-year	Various	2,558	353.8	Land Use/Lot Count	See Table 2-1 for a breakdown of land uses.
Total:			20,423	5,002		



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FIGURE 2-1
CITY LIMITS DEVELOPMENT AREAS
CITY OF LINCOLN - SEWER MASTER PLAN UPDATE

Reference: Future Land Use and Assumptions

2.2 Unannexed Lands

Portions of the SOI surrounding the city limits consisting of unannexed portions of partially annexed villages and an industrial area referred to as “other” in the 2018 Master Plan. Land uses for these areas were provided in the shapefile *Unannexed_Land_Use.shp*. Land use assumptions are summarized in **Table 2-3**.

Table 2-3. Unannexed Land Uses and Assumptions

Land Use	Description	Category	Density (EDU/Acre)	Area (Acres)				
				Other	Village 1	Village 5	Village 7	WWTRF ⁽²⁾
VHDR	Village High Density Residential	Village Residential	16.00	0.0	0.0	31.1	0.0	0.0
I	Industrial	Industrial	10.00	415.5	0.0	0.0	0.0	0.0
VMDR	Village Medium Density Residential	Village Residential	8.00	0.0	0.0	15.8	29.1	0.0
VBP	Village Business and Professional	Commercial	6.40	0.0	0.0	45.8	0.0	0.0
VOC	Village Office/Commercial	Commercial	6.40	0.0	0.0	93.9	0.0	0.0
VC	Village Center	Commercial	6.40	0.0	0.0	4.6	0.0	0.0
VLDR	Village Low Density Residential	Village Residential	4.50	0.0	0.0	228.5	80.2	0.0
PQP-HS	High School	Public	4.00	0.0	0.0	48.6	0.0	0.0
PQP-ES	Elementary School	Public	4.00	0.0	0.0	12.0	0.0	0.0
PF	Public Facilities	Public	4.00	0.0	0.0	0.0	0.0	286.4
PQP	Public/Quasi-Public	Public	4.00	0.0	0.0	5.2	0.0	0.0
VCE	Village Country Estates Residential	Village Residential	2.00	0.0	70.9	277.4	0.0	0.0
VRR	Village Rural Residential	Village Residential	0.50	0.0	0.0	494.4	0.0	0.0
VPARK	Village Park	Parks	0.08	0.0	0.0	32.9	0.0	0.0
VLP	Village Linear Park	Parks	0.08	0.0	0.0	1.4	0.0	0.0
VPR	Village Park	Parks	0.08	0.0	1.0	0.0	13.5	0.0
VOS/LP	Linear Parkways	Parks	0.08	0.0	0.0	0.0	9.9	0.0
OS	Open Space ⁽¹⁾	Open Space	0.00	508.6	43.1	699.7	54.4	0.0
Total Area:				924	115	1,991	187	286
Total EDUs:				4,155	142	3,644	595	0

(1) Including Village Natural Open Space, Village Open Space Preserve, Village Ag/Preserve, Village Open Space, Open Space, and Future Right of Way.

(2) The WWTRF and Open Spaces are excluded from modeling as they will not produce any additional flow to the collection system.

Reference: Future Land Use and Assumptions

The timing of development for these areas was shown on the land use assumptions map and summarized in **Table 2-4**.

Table 2-4. Unannexed Area Development Phasing

Unannexed Area	Phasing/Time of Development
Other	Buildout
Village 1	15-year, Buildout
Village 5	20-year
Village 7	10-year
WWTRF	NA

2.3 SOI Development

For use in the 2018 Master Plan, the City provided land use and EDU information for villages and SUDs in the SOI where specific plan information was not available. As previously discussed, Village 1, Village 5, Village 7, and SUDB have been annexed into city limits or are now accounted for in the unannexed areas described in the previous section. The remaining villages and SUDs and the assumptions from the 2018 Master Plan are summarized below in **Table 2-5** and assumed to remain the same as part of this Master Plan Update. The remaining areas were identified as being included in the buildout development phase.

Table 2-5. Remaining SOI Development Areas

Village/SUD	EDU ⁽¹⁾	Commercial Area (Acres)	Industrial Area (Acres)	Public Area (Acres)	Park Area (Acres)	Total Equivalent EDUs	Total Area (Acres) ⁽²⁾
V-2	4,209	7	44	34	0	4,830	1,626
V-3	4,843	70	0	0	0	5,291	2,021
V-4	5,421	12	0	0	0	5,498	2,567
V-6	5,083	12	0	0	0	5,160	2,514
SUD-A	1,623	1,170	142	0	0	10,531	1,809
SUD-C	0	644	0	0	0	4,122	1,080
Total:	21,179	1,915	186	34	0	35,431	11,617

Reference: Future Land Use and Assumptions

3 Summary

The table below summarizes the total development area, equivalent EDUs, and projected flow from within City Limits, unannexed areas, and the SOI Villages and SUDs. The projected flow assumes a wastewater unit rate of 250 gpd/EDU.

Table 3-1. Summary of Development Areas, EDUs, and Flow Projections

Areas	Area (Acres)	EDUs	Flow (MGD)
City Limits	5,002	20,423	5.11
Unannexed	1,912	8,536	2.13
V2	1,626	4,830	1.21
V3	2,021	5,291	1.32
V4	2,567	5,498	1.37
V6	2,514	5,160	1.29
SUDA	1,809	10,531	2.63
SUDC	1,080	4,122	1.03
Total:	18,531	64,389	16.10

The phasing of the future development areas are shown in **Figure 3-1**.

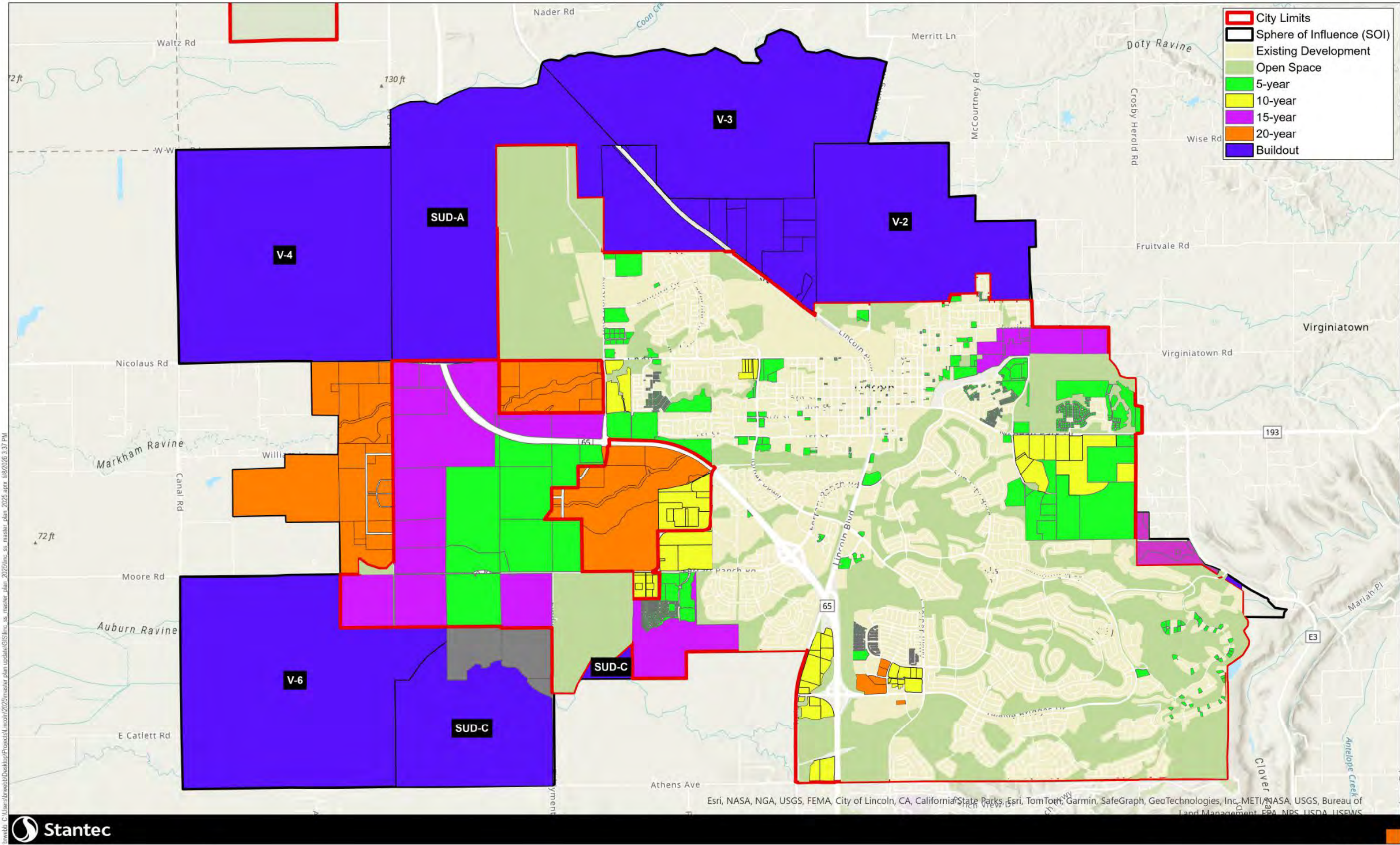


FIGURE 3-1
FUTURE DEVELOPMENT AREA PHASING
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The background image shows an outdoor lift station. In the foreground, there is a circular concrete structure with a metal arm extending upwards. The arm has a small light fixture at the top. The ground is made of concrete slabs. In the background, there are some trees and a clear blue sky. A large white circle is overlaid on the right side of the image, containing the title text.

TM 4.

Condition Assessment of Lift Stations

TECHNICAL MEMORANDUM NO. 4 – CONDITION ASSESSMENT OF LIFT STATIONS

Prepared By: Mitchell Padilla

Reviewed By: Breanna Webb, Steve Beck, P.E.

Date: March 26, 2026

1.0 INTRODUCTION

The purpose of this Technical Memorandum No. 4 (TM 4) is to document the condition assessment of the nine existing sewer lift stations owned and operated by the City of Lincoln (City).

The results of this condition assessment will be used to identify projects that will be included in the City's capital improvement plan (CIP) as part of the Sewer Master Plan Update. The CIP will include a list of priority and strategic sewer lift station projects that will allow the City to continue operating the wastewater facilities efficiently and reliably.

1.1 OBJECTIVES

The objectives of the condition assessment of existing lift stations are to:

- Perform site inspections, record data, and assess the condition of the existing sewer lift stations.
- Assign Probability of Failure and Consequences of Failure ratings.
- Provide improvement recommendations and alternatives, where applicable.

1.2 LIMITATIONS

The condition assessment of the sewage lift stations presented herein includes the following limitations:

- Specific field testing was excluded.
- Only visible on-site inspections, from various disciplines, were performed.
- The list of assets evaluated was limited to visible items, such as piping, valves, wet well/dry well structures, civil and site drainage, electrical and instrumentation equipment.
- Site inspections included accessible infrastructure (no buried pipes, confined spaces, etc.). If accessible inspections suggest that additional investigations should be completed, Stantec will bring this to the City's attention for input.
- Pump inspections were not performed by Stantec. Unless noted otherwise, pumps and auxiliary equipment are assumed to be in working condition and do not require extensive rehabilitation or replacement.



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- Lift station record drawings or inspection forms were not reviewed.

1.3 METHODOLOGY AND PROCESS

A site visit by discipline experts was performed to assess the condition of structures and equipment. An operation and maintenance employee was present during the assessments to capture institutional knowledge related to process, function and areas of concern.

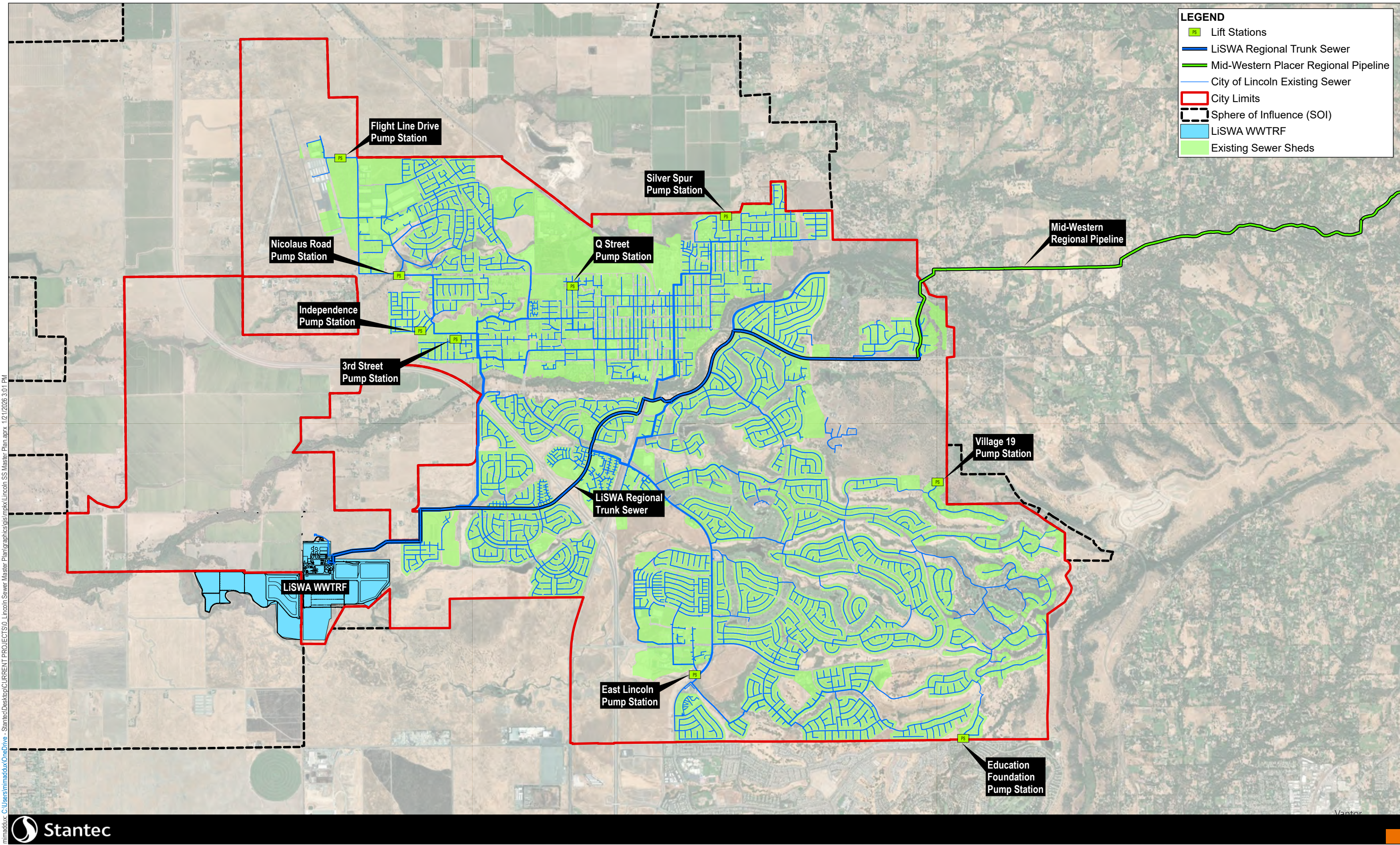
1.4 SUMMARY OF EXISTING SEWER LIFT STATIONS

The City's existing wastewater collection system has nine lift stations, addressed in this TM.

The existing sewer lift stations are listed in **Table 1-1** and locations are shown in **Figure 1-1**.

Table 1-1. Existing Sewer Lift Stations

Name	Address	Year of Construction
3 rd Street	2470 3 rd Street, Lincoln, CA 95648	2001
East Joiner	2425 East Joiner Parkway, Lincoln, CA 95648	2001
Education	124 Nisenan Valley Drive, Lincoln, CA 95648	2022
Flightline	Aviation Boulevard, Lincoln, CA 95648	1985
Independence	2873 Delegate Drive, Lincoln, CA 95648	2023
Nicolaus	2885 Nicolaus Road, Lincoln, CA 95648	1985
Q Street	8 th Street and Zoe Ann Drive, Lincoln, CA 95648	1989
Silver Spur	Silver Spur Circle, Lincoln, CA 95648	1989
Village 19	3679 Camino Cielo, Lincoln, CA 95648	2005



2.0 ASSESSMENT OF EXISTING SEWER LIFT STATIONS

On August 7, 2025, Stantec staff conducted a site visit to each sewer lift station to assess the condition of structures and equipment.

Stantec developed a “Lincoln Lift Station Condition Field Assessment Form” and used it for each lift station. The Assessment Form is divided into the following major areas of inspection, which are further divided into sub-areas in assessing the lift stations. The major areas of evaluation are:

- Pumps, Valves and Piping – includes evaluation for the wet/dry well suction/discharge piping, valves, pumps, motors, odor control, auxiliary equipment, safety issues and other O&M concerns.
- Wet Well – includes evaluation for top slab, wet/dry well interior walls and access hatch conditions.
- Above-Ground/Vault Piping – includes evaluation of piping and valves located above-ground or inside vaults adjacent to a lift station.
- Electrical and Instrumentation Equipment – includes evaluation of the motor control center (MCC), control panel, exposed conduits, generator, and PG&E service meter.
- Site Security – includes evaluation for site access, fencing, chemical/odor exposure and equipment clearance.
- Site Civil – includes evaluation for site paving, drainage and accessibility.

Each assessed lift station is given Probability of Failure Rating and Consequence of Failure Rating. The Probability of Failure Ratings and Consequence of Failure Ratings are determined based on each “Lincoln Lift Station Condition Field Assessment Form”, closely working with the City staff and institutional knowledge of our team.

During the site visit, close inspection of submersible pumps was not performed by Stantec. According to City Staff, inspection and maintenance of each lift station is performed biannually. City Staff did not relay any concerns or problems with the operation and mechanics of the pumps. Therefore, Stantec’s condition assessment of submersible pumps and auxiliary equipment is solely based on the year of installation of the pump compared to a life expectancy of twenty-five (25) years. City has variable speed drives at all but two lift stations (Flightline and Silver Spur).

Sections below provide a summary of the findings and recommendations resulting from the assessment.

2.1 3RD STREET LIFT STATION ASSESSMENT

Background

3rd Street Lift Station is located at 2470 3rd Street, Lincoln, CA 95648 in the southeast corner of Scheiber Park and near the intersection of 3rd Street and St. Croix Court. Scheiber Park is located within a subdivision in western Lincoln with light traffic conditions. The lift station consists of wetwell and valve pit located in a paved and enclosed area of the park. The lift station was constructed in 2001 and has a rated capacity of approximately 600 gpm with two (2) 5HP Flygt submersible pumps. The lift station has

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previously been evaluated for elimination with construction of a gravity sewer to the Chambers Drive sewer. A project is currently underway for SCADA upgrades and integration.

Below photographs present the wet well access hatch and the interior of the wet well.



Access Hatch



Wet Well Piping and Coating

Pumps, Valves and Piping

Discharge piping within the wet well is coated and in good condition.

The two submersible pumps were installed in 2013 and 2019 and are therefore still within the expected lifecycle of 25 years. City Staff did not express any concerns with the two submersible pumps or auxiliary equipment.

Wet Well

The access hatch of the wet well is in good condition. The access hatch has a latch and spring for accessibility.

The wet well is not ventilated, which will increase the rate of corrosion but corrosion presently does not appear to be an issue.

Above Ground/Vault Piping

A vault located in the pavement next to the wet well allows access to a pair of valves. The discharge valves and piping within the vault are in good condition.



Above Ground Vault Piping

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located adjacent to the wet well in the enclosed area and were found to be in decent condition. The motor control panel services (2) 5HP pumps and operate on variable frequency drives (VFD). An upgrade project is planned to add a new automatic transfer switch (ATS) for back-up power.

The level control instruments were found to be in decent condition and no issues were observed with controls or instrumentation.

It is recommended to add an arc flash hazard label warning to the control panel doors in accordance with NEC 110.16(A).

Site Security/Site Civil

3rd Street Lift Station is located in a paved area and enclosed by masonry walls and aluminum fencing. The pavement, masonry walls and aluminum fencing are in good condition. There is no fall protection in the wet well, but all access hatches and electrical panels are locked. The aluminum wet well access hatch is only rated for pedestrian loading, but there are bollards to restrict vehicular access to the lift station site. There is adequate room on the paved area for truck access from the road. There are no security cameras but there is adequate lighting.

Recommendations

The following is a list of recommendations for 3rd Street Lift Station:

- Continue to monitor the pumps under the City's ongoing maintenance program.

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- Add fall protection to the wetwell.
- Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A).
- Complete the planned project to add a new ATS for back-up power

Risk Ratings

The given Probability of Failure Rating is 2 since the wet well, discharge piping and valves are in good condition.

The Consequence of Failure Rating is 3 due to the relatively low flow but being located next to a public park and private residences.

2.2 EAST JOINER LIFT STATION ASSESSMENT

Background

East Joiner Lift Station is located at 2425 East Joiner Parkway in an enclosed area near the intersection of East Joiner Parkway and Fieldstone Drive. The lift station consists of two wetwells and has electrical equipment housed in a masonry building. It was constructed in 2001 and has a rated capacity of 5.7 million gallons per day (Mgal/d) with three 85HP Flygt submersible pumps.

The below photographs present the corroded access hatch and the interior of the wet well.



Access Hatch



Wet Well, Piping and Valve Coating

Pumps, Valves and Piping

Discharge piping within the wet well is in good condition but the coating is peeling. The wet well is ventilated. Discharge piping and valves in the valve vault were in good condition.

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The three submersible pumps were replaced in 2025 and City Staff did not express any concerns with the pumps or auxiliary equipment.

Wet Well

The top slab of the wet well and the access hatches are in good condition. The interior walls of the wet wells are coated and in good condition.

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located within a masonry building within the enclosed area near the wetwells and were found to be in good condition. A recent upgrade project has been completed. The motor control panel services (3) 85HP pumps and operate on VFDs. There is a standby generator and ATS onsite for back-up power.

The level control instruments were found to be in decent condition and no issues were observed with controls or instrumentation. All seals were found to be intact on conduits.

It is recommended to add an arc flash hazard label warning to the control panel doors in accordance with NEC 110.16(A).

Site Security/Site Civil

East Joiner Lift Station is located within a masonry-walled area with locked gates near the intersection of East Joiner Parkway and Fieldstone Drive in a field with access from the road. The masonry walls and gates are in good condition. The access hatches are locked and have fall protection. The pumps are lifted for service by use of davit cranes. The site has security cameras and sufficient lighting.

Recommendations

The following is a list of recommendations for East Joiner Lift Station:

- Replace or coat discharge piping within the wet well.
- Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A).

Risk Rating

The given Probability of Failure Rating is 2 since the site and equipment are in good condition and with sufficient site security. Discharge piping in the wetwell has peeled coating.

The Consequence of Failure Rating is 5 due to the high flow capacity.

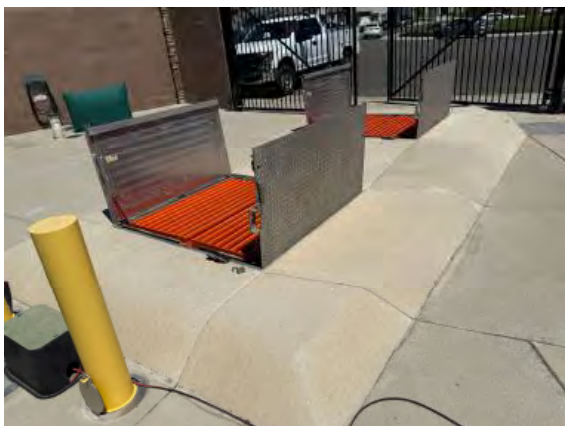
2.3 EDUCATION LIFT STATION ASSESSMENT

Background

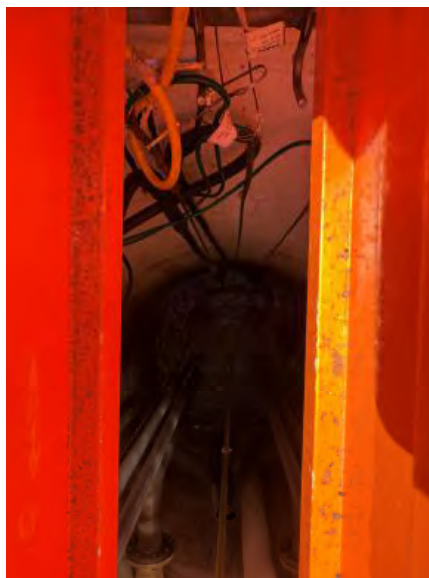
Education Lift Station is located at 124 Nisenan Valley Drive in an enclosed area in a residential subdivision. The lift station consists of a circular wet well and adjacent valve vault. The lift station was constructed in 2020 and has a rated capacity of 202 gpm with two (2) 23HP Flygt solids handling submersible pumps.



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Site and Access Hatches



Wet Well

Pumps, Valves and Piping

Discharge piping within the wet well is in good condition. The wet well is not ventilated, which may increase the rate of corrosion. Discharge piping and valves in the valve vault were in good condition.

The two submersible pumps were installed in 2020 and City Staff did not express any concerns with the pumps or auxiliary equipment.

Wet Well

The top slab and access hatch of the wet well are in good condition. The interior of the wet well is coated, and the few visible areas appear to be in good condition.

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located adjacent to the wetwell in an enclosed area and were found to be in good condition. The motor control panel services (2) 23HP pumps and operate on VFDs. There is a standby generator and ATS onsite for back-up power. The generator was recently repaired to address intermittent trouble in starting. The generator still hard starts due to being a natural gas supplied unit.

The level control instruments were found to be in decent condition and no issues were observed with controls or instrumentation. All seals were found to be intact on conduits.

It is recommended to add an arc flash hazard label warning to the control panel doors in accordance with NEC 110.16(A).

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Site Security/Site Civil

The lift station is located within a masonry-walled area within a residential subdivision on Nisenan Valley Drive. Access is from the road through a locked gate. There is fall protection in the wet well and valve vault. There are no security cameras but there is sufficient lighting.



General Site Layout

Recommendations

The following is a list of recommendations for Education Lift Station:

- Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A).

Risk Rating

The given Probability of Failure Rating is 1 since the site was constructed within five years and is in good condition.

The Consequence of Failure Rating is 2 due to the low flow capacity.

2.4 FLIGHTLINE LIFT STATION ASSESSMENT

Background

Flightline Lift Station is located at the northern termination of Aviation Drive. The lift station consists of a circular wet well constructed in 1985 and has two (2) 60HP submersible pumps with an unknown capacity.



General Site Layout



Wet Well and Piping

Pumps, Valves and Piping

The discharge piping within the wet well is coated and in good condition.

The pumps were installed in 1985 but City Staff did not express any concerns with the pumps or auxiliary equipment.

Wet Well

The asphalt paving around the wet well is in good condition. The interior wall of the wet well is coated and in good condition. The access hatch is in good condition but the underside has rust.

Above Ground/Vault Piping

A valve vault located next to the wet well allows access to discharge valves. The valves and piping within the vault are coated and in good condition.



Above Grade Vault

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located adjacent to the wetwell in the enclosed area and are at approaching the end of service life. Replacement parts may be difficult to procure. The motor control panel services (2) 60HP pumps and do not operate on VFDs. There is a standby generator and ATS onsite for back-up power.

The level control instruments were found to be in decent condition but staff reported the autodialer and water supply solenoid controls may not be functioning properly. Additionally, seals were found to be missing on conduits into the control panels.

It is recommended to add an arc flash hazard label warning to the control panel doors in accordance with NEC 110.16(A).

Site Security/Site Civil

The lift station is located within a paved and fenced area about 100 yards from the northern termination of Aviation Boulevard. The lift station is surrounded by open field. There is no fall protection in the wet well. The pumps are lifted for service by use of a boom truck and there is adequate room within the fence for truck access. The pavement appears to be in good condition with adequate drainage.

Recommendations

The following is a list of recommendations for Flightline Lift Station:

- Replace submersible pumps. Could wait until failure due to low flows.
- Replace motor control panels. Recommended to replace with the pumps.

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- Add fall protection to the wetwell.
- Investigate potential issues with the autodialer and water supply solenoid control systems.
- Add seals to conduits entering the control panels
- Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A).

Risk Rating

The given Probability of Failure Rating is 4 since the pumps are approximately 40 years old.

The Consequence of Failure Rating is 2 due to the relatively low flow capacity and isolated location.

2.5 INDEPENDENCE LIFT STATION ASSESSMENT

Background

Independence Lift Station is located at 2873 Delegate Drive in a residential subdivision. The lift station consists of a circular wet well in a paved and walled area with an adjacent valve vault. The lift station was constructed in 2020 and has a rated capacity of 485 gpm with two (2) 15HP Flygt submersible pumps.



Site



Wetwell

Pumps, Valves and Piping

The discharge piping within the wet well is coated and in good condition.

The pumps were installed in 2020 and City Staff did not express any concerns with the pumps or auxiliary equipment.

Wet Well

The concrete slab around the wet well is in good condition. The interior wall of the wet well is coated and in good condition. The access hatch is in good condition and has fall protection.

Above Ground/Vault Piping

A valve vault located next to the wet well allows access to discharge valves. The valves and piping within the vault are coated and in good condition with fall protection under the access hatch.

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located adjacent to the wetwell in the enclosed area and are in good condition. The motor control panel services (2) 15HP pumps and operate on VFDs. There is a standby generator and ATS onsite for back-up power.

The level control instruments were found to be in decent condition but staff reported intermittent radio communication interference and intermittent false high water level readings.

Site Security/Site Civil

Wet well access is through one of two locked gates into a masonry-walled area from a residential street. The area has sufficient lighting and security cameras. There is fall protection in the wet well. The pumps are lifted for service by use of a boom truck and there is more than adequate room for truck access.

Recommendations

The following is a list of recommendations for Independence Lift Station:

- Investigate issues of intermittent radio communication interference and intermittent high water level readings

Risk Rating

The given Probability of Failure Rating is 1 due to the recent construction and good condition.

The Consequence of Failure Rating is 2 due to the relatively low flow capacity.

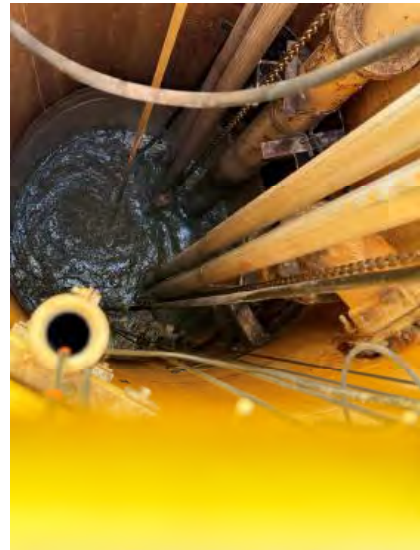
2.6 NICOLAUS ROAD LIFT STATION ASSESSMENT

Background

Nicolaus Road Lift Station is located at 2885 Nicolaus Road in a fenced area on the shoulder of the road. The lift station consists of two circular wet wells and above ground discharge piping. The lift station was constructed in 1985 and has a rated capacity of 2,340 gpm with two (2) 60HP Flygt submersible pumps in the large wet well and one (1) 20HP Flygt submersible pump in the small wetwell. The small wet well is used as a standby backup.



Site Layout



Large Wet Well

Pumps, Valves and Piping

Discharge piping within the large wet well is coated but rusting in areas. Discharge piping within the small wet well is rusted. The wet well is not ventilated and there is a connected odor control system but it has not been in use, which has likely increased the rate of piping corrosion.

The pumps were replaced in 2016 and City Staff did not express any concerns with the pumps or auxiliary equipment.

Wet Well

The top slab and access hatch of the wet wells are in good condition. The interior walls of the wet wells are coated and in good condition.

Above Ground/Vault Piping

Discharge piping and valves located above ground are coated and in good condition. A valve vault contains flow meters and associated valves that are coated and in good condition.



Above Ground Piping



Valve Vault

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located adjacent to the wetwell in the enclosed area and are in decent condition. The motor control panel services (2) 60HP pumps and (1) 20HP pump, and operate on VFDs. There is a standby generator and ATS onsite for back-up power. The stand-by generator makes access to some of the electrical panels difficult.

The level control instruments were found to be in decent condition and no issues were observed with controls or instrumentation. All seals were found to be intact on conduits.

It is recommended to add an arc flash hazard label warning to the control panel doors in accordance with NEC 110.16(A).

Site Security/Site Civil

The lift station is located within a fenced area in the shoulder of Nicolaus Road. Nicolaus Road is relatively busy and cars travel at a high rate of speed. The pumps are lifted for service by use of a boom truck and there is adequate room in the site but the road needs to be closed when accessing with large trucks. The generator needs to be moved to have more than a couple feet of clearance for one of the electrical panels. There is fall protection in both wet wells. There are no security cameras but there is sufficient lighting.

Recommendations

The following is recommended:

- Re-coat discharge piping within the wet wells.
- Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A).

Risk Rating

The given Probability of Failure Rating is 2 since the wet wells, piping and valves are in good condition except for some rusting on the discharge piping within the wet wells. The pumps have also been replaced within ten years.

The Consequence of Failure Rating is 4 due to the relatively high flow capacity and location between a busy road and ravine.

2.7 Q STREET LIFT STATION ASSESSMENT

Background

Q Street Lift Station is located under Q Street between 8th Street and Zoe Ann Drive in a residential subdivision. The lift station consists of a circular wet well accessible by an access hatch and discharge piping vault accessible by a manhole in the road. It was constructed in 1989 and has a rated capacity of 500 gpm with two (2) 5HP Flygt submersible pumps. A project to rehabilitate the existing lift station is planned by the City. The planned project includes a new discharge piping, new valve vault, new flow meter vault and a masonry-walled area with a gravel access road to house a new standby generator and all electrical/control panels. Construction is anticipated to begin in the spring or summer of 2026.



Valve Vault



Wet Well Hatch

Pumps, Valves and Piping

The discharge piping within the wet well is not coated and is corroded. The wet well is not ventilated and has no odor control system, which has likely increased the rate of piping corrosion. The valves and discharge piping in the valve vault are significantly corroded and in need of replacement.

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The pumps were replaced in 2016 and 2019, and City Staff did not express any concerns with the pumps or auxiliary equipment.

Wet Well

The top slab and the access hatch are in good condition. The interior wall of the wet well is coated but has some corrosion.

Above Ground/Vault Piping

A valve vault located next to the wet well allows access to discharge valves through an unlocked manhole. The valves and piping within the vault are in very poor condition and in need of replacement.

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located just off of the sidewalk along Q Street with no protection from the roadway. The panels are in decent condition. The motor control panel services (2) 5HP pumps and operate on VFDs. There is no standby generator onsite for back-up power.

The level control instruments were found to be in decent condition but there are no functional alarms.

As discussed, there is a project planned to address these issues.

It is recommended to add an arc flash hazard label warning to the control panel doors in accordance with NEC 110.16(A).

Site Security/Site Civil

The lift station is located in the road of a residential subdivision. There is fall protection in the wet well but the valve vault is accessible by an unlocked manhole. The pumps are lifted for service by use of a boom truck and there is adequate room although traffic control is required.

Recommendations

The following is recommended:

- Replace discharge piping within the wet well.
- Replace piping and valves within the vault.
- Replace electrical panels in an enclosed area.
- Install a standby generator for back-up power.
- Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A).

All the listed recommendations are planned to be addressed under the ongoing Q Street CIP project.

Risk Rating

The given Probability of Failure Rating is 4 since the discharge piping and valves are in poor condition and rusted. Additionally, the electrical panels are exposed on the side of the road.



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The Consequence of Failure Rating is 3 due to the relatively low flow but the wet well is located in the middle of a road.

2.8 SILVER SPUR LIFT STATION ASSESSMENT

Background

Silver Spur Lift Station is located at the north end of Silver Spur Circle between two residential houses. The lift station consists of a circular wet well in a fenced area and discharge piping vault in the road. It was constructed in 1989 and has a rated capacity of 260 gpm with two (2) 4HP Flygt submersible pumps.



Access Hatch



Wet Well

Pumps, Valves and Piping

The discharge piping within the wet well is coated and in fair condition. The wet well is not ventilated and has no odor control system, which has likely increased the rate of piping corrosion.

The pumps were replaced in 2016 and City Staff did not express any concerns with the pumps or auxiliary equipment.

Wet Well

The top slab and access hatch are in good condition. The interior wall of the wet well is in good condition but is not coated.

Above Ground/Vault Piping

A vault located in the road near the lift station allows access to discharge valves. The valves and piping within the vault are coated and in good condition. The vault itself is in good condition but there is no drainage to the wet well.

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located adjacent to the wetwell in the enclosed area and are in decent condition. The motor control panel services (2) 40HP pumps and do not operate on VFDs. There is a manual ATS installed and a stand-by generator needs to be wheeled onsite for back-up power during an outage. There is no room at the site for a permanent generator.

The level control instruments were found to be in decent condition but staff reported intermittent communications problems. A reset pushbutton is missing on the motor control panel. All seals were found to be intact on conduits.

Site Security/Site Civil

The lift station is located on a concrete pad with fencing on the side of the road and between two residences. There is fall protection in the wet well and the access hatches are locked. The pumps are lifted for service by use of a boom truck and minor traffic control is required for maintenance access. It is a tight space in the fenced area with the wet well access hatch and electrical panels. The neighbors complained during a recent construction project at the site but otherwise have not had issues.

Recommendations

The following is recommended:

- Replace missing reset pushbutton on the motor control panel.
- Investigate intermittent communications problems.

Risk Rating

The given Probability of Failure Rating is 2 since discharge piping and valves are in good condition and the pumps were replaced within ten years.

The Consequence of Failure Rating is 3 due to the relatively low flow capacity but location near private residences.

2.9 VILLAGE 19 LIFT STATION ASSESSMENT

Background

Village 19 Lift Station is located at 3679 Camino Cielo at the end of the road. The lift station consists of a circular wet well and discharge piping vault. It was constructed in 2005 and has two (2) 4HP Flygt submersible pumps.



General Site Layout



Wet Well

Pumps, Valves and Piping

The discharge piping within the wet well is coated and in good condition. The wet well has an odor control system but it has not been in recent use.

The pumps were replaced in 2019 and City Staff did not express any concerns with the pumps or auxiliary equipment.

Wet Well

The top slab and access hatch are in good condition. The interior wall of the wet well is lined and in good condition.

Above Ground/Vault Piping

A vault located next to the wet well allows access to discharge valves that are coated and in good condition.



Discharge Piping Vault

Electrical Instrumentation/Equipment

The electrical panels for the lift station are located adjacent to the wetwell in the enclosed area and are in decent condition. The motor control panel services (2) 4HP pumps and operate on VFDs. There is a stand-by generator and ATS onsite back-up power.

The level control instruments were found to be in decent condition and no issues were observed with controls or instrumentation. Staff reported a SCADA upgrade project is planned. All seals were found to be intact on conduits.

Site Security/Site Civil

The wet well is located in a fenced area with plenty of space in a remote area although there is a residence nearby. There is no fall protection in the wet well, but access hatches and the fencing is locked. The pumps are lifted for service by use of a boom truck and traffic control is not required for maintenance access.

Recommendations

The following is recommended:

- Add fall protection to the wetwell.

Risk Rating

The given Probability of Failure Rating is 2 since discharge piping and valves are in good condition and the pumps were replaced within ten years.

The Consequence of Failure Rating is 2 due to the relatively low flow capacity and remote location.

3.0 SUMMARY OF CRITICAL FINDINGS AND RECOMMENDATIONS

3.1 CONDITION ASSESSMENT SUMMARY

Table 3-2 summarizes the most critical condition assessment findings of the existing lift stations.

Table 3-2. Condition Assessment Summary

Lift Station	Critical Findings
3 rd Street	No fall protection in the wetwell
East Joiner	Discharge piping coating is peeling
Education	Intermittent trouble in starting the standby generator
Flightline	- Pumps have exceeded expected service life - No fall protection in the wetwell - Electrical panels are approaching expected service life - Autodialer may not be functioning properly - Water supply solenoid controls may not be functioning properly - Seals missing on conduits entering the electrical panels
Independence	- Intermittent radio communication interference - Intermittent false high water level readings
Nicolaus	- Discharge piping in wetwell has some rust - Standby generator slightly impedes access to some electrical panels
Q Street	- Discharge piping is corroded - Discharge valves are corroded - Electrical panels are exposed and unprotected from the public - No functioning alarms - No back-up power onsite
Silver Spur	- There is no room for a standby generator onsite. Must be wheeled in during an outage. - Intermittent communications problems. - Reset pushbutton is missing on the motor control panel.
Village 19	No fall protection in the wetwell

3.2 RECOMMENDATIONS SUMMARY

Table 3-3 summarizes recommendations for each sewer lift station. Infrastructure Repair and Replacement (R&R) funds should be included in the CIP. The listed recommendations for each sewer lift station are sorted into O&M or CIP project categories. A recommended CIP project is defined as having costs estimated to be greater than \$75,000.

Additionally, it is recommended that every five years, City staff review the existing CIP list and consult with operation and maintenance staff on their assessment of what requires attention, with inspections as required and a focus on re-assessing the most critical pending CIP projects. The results could be adjustments to the priority or budgets of existing CIPs and/or the addition of new CIP projects. This project is not to necessarily provide a complete condition assessment, but to update the condition

**CITY OF LINCOLN SEWER MASTER PLAN UPDATE
TECHNICAL MEMORANDUM NO. 4 – CONDITION ASSESSMENT OF LIFT STATIONS**

assessment from the previous five-year cycle. An ongoing condition assessment CIP project is included in the proposed CIP.

Table 3-3. Recommendations Summary

Lift Station	Category	Recommendations
3 rd Street	O&M	- Add fall protection to the wetwell - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A) - Complete the planned project to add a new ATS for back-up power system
East Joiner	O&M	- Replace or coat discharge piping within the wetwell - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Education	O&M	Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Flightline	CIP	- Replace submersible pumps - Replace motor control panels. Recommended to replace with the pumps. - Add fall protection to the wetwell - Investigate potential issues with the autodialer and water supply solenoid control systems - Add seals to conduits entering the electrical panels - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Independence	O&M	Investigate issues of intermittent radio communication interference and intermittent high water level readings
Nicolaus	O&M	- Re-coat discharge piping within the wetwell - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Q Street	CIP (Addressed under current CIP project)	- Replace discharge piping within the wetwell - Replace piping and valves within the valve vault - Replace electrical panels in an enclosed area - Install a standby generator for back-up power - Add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
Silver Spur	O&M	- Replace missing reset pushbutton on the motor control panel - Investigate intermittent communications problems
Village 19	O&M	Add fall protection to the wetwell

ATTACHMENT 1: LIFT STATION FIELD ASSESSMENT FORMS

Lincoln Lift Station Condition Field Assessment Form



Pump Station: 3 rd Street	
Pump Station Address: 2470 3 rd Street, Lincoln, CA 95648	
Discipline:	Inspection Time: 10:45am
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	2001
Original Useful life	
Pump capacity/size	

COMMENTS/SUGGESTIONS:
Functioning properly; site looks good; age warrants condition assessment by discipline expert. Possible improvement may include eliminating the station with the construction of a gravity sewer to the Chambers Drive sewer. This has been previously evaluated.

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	2013	5	Flygt	3102.095.0092	464	06/01/25
Pump 2	2019	5	Flygt	3102.070.0033	463	06/01/25
Spare	2005	5	Flygt	3102.070.1910045	468	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: 3rd Street

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☒ Yes ☐ No ☐ N/A	
3. Excessive vibration?	☐ Yes ☒ No ☐ N/A	
4. Excessive noise?	☐ Yes ☒ No ☐ N/A	
5. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☒ No ☐ N/A	
9. Coating Damage	☐ Yes ☒ No ☐ N/A	
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☐ Yes ☒ No ☐ N/A	Odors not observed with hatch closed

Wet Well:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
14. Interior wall condition?	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	
17. Wet Well Fall Protection	☐ Yes ☒ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: 3rd Street

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☐ Yes ☐ No ☒ N/A	
19. Hoists arrangement and location sufficient for required maintenance	☐ Yes ☐ No ☒ N/A	
20. Wetwell &/or Drywell ventilated	☐ Yes ☒ No ☐ N/A	
21. Crane condition and accessibility	☐ Yes ☐ No ☒ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☐ No ☒ N/A	
23. Excessive leaks?	☐ Yes ☐ No ☒ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☐ No ☒ N/A	
26. Pipe supports are free of damage or corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☒ Yes ☐ No ☐ N/A	
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: 3rd Street

30. Instrumentation functioning?	☒ Yes ☐ No ☐ N/A	
31. Alarms functioning?	☒ Yes ☐ No ☐ N/A	
32. Correct electrical classification?	☒ Yes ☐ No ☐ N/A	
33. Sensors reliable?	☒ Yes ☐ No ☐ N/A	
34. Safe (arc flash, etc.)?	☐ Yes ☐ No ☒ N/A	Recommend to add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
35. Suitable lighting for electrical classification	☒ Yes ☐ No ☐ N/A	
36. Level Controls condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☒ Yes ☐ No ☐ N/A	
38. Back-Up Power	☒ Yes ☐ No ☐ N/A	Upgrade project in the works to add a new ATS for back up power.
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
39. Sound?	☒ Yes ☐ No ☐ N/A	
40. Pitting?	☐ Yes ☒ No ☐ N/A	
41. Spalling?	☐ Yes ☒ No ☐ N/A	
42. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☒ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: 3rd Street

Masonry Walls (Buildings):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
44. Sound?	☐ Yes ☐ No ☒ N/A	
45. Deterioration?	☐ Yes ☐ No ☒ N/A	
46. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
47. Reinforcing Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☐ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☐ No ☒ N/A	
50. Water Staining?	☐ Yes ☐ No ☒ N/A	
51. Water Damage?	☐ Yes ☐ No ☒ N/A	
52. Deterioration?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Security

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: 3rd Street

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☒ Yes ☐ No ☐ N/A	Masonry walls, covered in ivy-like plant
54. Access Points Secure?	☒ Yes ☐ No ☐ N/A	
55. Surveillance System Operational?	☐ Yes ☐ No ☒ N/A	Lighting, no cameras
56. Bollard protection of critical structures	☐ Yes ☒ No ☐ N/A	
57. Chemical or H2S Exposure	☐ Yes ☒ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	
59. Stairs/ladder are secure and in good condition?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Civil Condition

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☐ Yes ☒ No ☐ N/A	minor
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	Side of road
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: 3rd Street

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☒ Local Disruption	
	☐ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	No complaints from nearby residences
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☐ Very low	
	☒ Low	
	☐ Moderate	
	☐ High	
	☐ Very High	

Redundant Unit

☐ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: 3rd Street

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation - North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation - West	☐
General Site	☒
Foundation	☐
Wetwell	☒
Top Slab	☒
MCCs	☐
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒



Pump Station Name: 3rd Street

Additional Findings Unique to Facility

Occasional pump ragging but no major maintenance issues

Lincoln Lift Station Condition Field Assessment Form



Pump Station: Education Foundation	
Pump Station Address: 124 Nisenan Valley Drive, Lincoln, CA 95648	
Discipline:	Inspection Time: 12:05pm
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	2020/2021
Original Useful life	
Pump capacity/size	0.15 MGD (Reliable)

COMMENTS/SUGGESTIONS:
Due to recent construction, only a cursory condition assessment is warranted.
2 Pumps – 101 gpm @ 171' TDH each. Pump Data below listed for “Creekside” Lift Station

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	2020	23	Flygt	3153.095.0156	275sh	06/01/25
Pump 2	2020	23	Flygt	3153.095.0156	275sh	06/01/25

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Education Foundation

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☒ Yes ☐ No ☐ N/A	
3. Excessive vibration?	☐ Yes ☐ No ☐ N/A	
4. Excessive noise?	☐ Yes ☒ No ☐ N/A	
5. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☒ No ☐ N/A	
9. Coating Damage	☐ Yes ☒ No ☐ N/A	
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☐ Yes ☒ No ☐ N/A	No odors observed with hatch closed

Wet Well:

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
14. Interior wall condition?	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	
17. Wet Well Fall Protection	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Education Foundation

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☐ Yes ☐ No ☒ N/A	
19. Hoists arrangement and location sufficient for required maintenance	☐ Yes ☐ No ☒ N/A	
20. Wetwell &/or Drywell ventilated	☐ Yes ☐ No ☒ N/A	
21. Crane condition and accessibility	☐ Yes ☐ No ☒ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☐ No ☒ N/A	
23. Excessive leaks?	☐ Yes ☐ No ☒ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☐ No ☒ N/A	
26. Pipe supports are free of damage or corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☒ Yes ☐ No ☐ N/A	
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Education Foundation

30. Instrumentation functioning?	☒ Yes ☐ No ☐ N/A	
31. Alarms functioning?	☒ Yes ☐ No ☐ N/A	
32. Correct electrical classification?	☒ Yes ☐ No ☐ N/A	
33. Sensors reliable?	☒ Yes ☐ No ☐ N/A	
34. Safe (arc flash, etc.)?	☐ Yes ☐ No ☒ N/A	Recommend to add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
35. Suitable lighting for electrical classification	☒ Yes ☐ No ☐ N/A	
36. Level Controls condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☒ Yes ☐ No ☐ N/A	
38. Back-Up Power	☒ Yes ☐ No ☐ N/A	Standby generator has intermittent trouble in starting (natural gas supplied unit)
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
39. Sound?	☒ Yes ☐ No ☐ N/A	
40. Pitting?	☐ Yes ☒ No ☐ N/A	
41. Spalling?	☐ Yes ☒ No ☐ N/A	
42. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☒ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Education Foundation

Other?		
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Masonry Walls (Buildings):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
44. Sound?	☐ Yes ☐ No ☒ N/A	
45. Deterioration?	☐ Yes ☐ No ☒ N/A	
46. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
47. Reinforcing Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☐ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☐ No ☒ N/A	
50. Water Staining?	☐ Yes ☐ No ☒ N/A	
51. Water Damage?	☐ Yes ☐ No ☒ N/A	
52. Deterioration?	☐ Yes ☐ No ☒ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Education Foundation

Site Security

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☒ Yes ☐ No ☐ N/A	Masonry walls
54. Access Points Secure?	☒ Yes ☐ No ☐ N/A	
55. Surveillance System Operational?	☐ Yes ☐ No ☒ N/A	
56. Bollard protection of critical structures	☒ Yes ☐ No ☐ N/A	
57. Chemical or H2S Exposure	☐ Yes ☒ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	
59. Stairs/ladder are secure and in good condition?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Civil Condition

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☐ Yes ☐ No ☒ N/A	
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Education Foundation

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☒ Local Disruption	
	☐ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☒ Very low	
	☐ Low	
	☐ Moderate	
	☐ High	
	☐ Very High	

Redundant Unit

☐ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Education Foundation

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation - North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation - West	☐
General Site	☒
Foundation	☐
Wetwell	☒
Top Slab	☒
MCCs	☒
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒

Lincoln Lift Station Condition Field Assessment Form



Pump Station: East Joiner (East Lincoln Parkway Pump Station)	
Pump Station Address: 2425 East Joiner Parkway, Lincoln, CA 95648	
Discipline:	Inspection Time: 12:30pm
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	2001
Original Useful life	
Pump capacity/size	5.7 MGD (Reliable)

COMMENTS/SUGGESTIONS:
Functioning properly; site looks good. Improvements recently completed to provide new pumps, electrical and pipe improvements. cursory condition assessment warranted of non-improved items.
1 Pump – 1,510 gpm @ 83’ TDH, 2 Pumps – 3,940 gpm @ 111’ TDH, 3 Pumps – 5,120 gpm @ 128’ TDH.

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	2025	85	Flygt	3301.095-5104	464	06/01/25
Pump 2	2025	85	Flygt	3301.095-5104	464	06/01/25
Pump 3	2025	85	Flygt	3301.095-5104	464	06/01/25
Spare 1	2020	60	Flygt	3202.095.0090	458	06/01/25
Spare 2	2019	60	Flygt	3202.095.0090	458	06/01/25

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: East Joiner (East Lincoln Parkway Pump Station)

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☐ 1 ☒ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A Pumps – 2, Wetwell discharge piping - 3

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☒ Yes ☐ No ☐ N/A	
3. Excessive vibration?	☐ Yes ☒ No ☐ N/A	
4. Excessive noise?	☐ Yes ☒ No ☐ N/A	
5. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☒ No ☐ N/A	
9. Coating Damage	☐ Yes ☒ No ☐ N/A	Except for discharge piping in wetwell, coating is peeling off.
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☐ Yes ☒ No ☐ N/A	

Wet Well:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
14. Interior wall condition?	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	
17. Wet Well Fall Protection	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: East Joiner (East Lincoln Parkway Pump Station)

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☒ Yes ☐ No ☐ N/A	New installation
19. Hoists arrangement and location sufficient for required maintenance	☒ Yes ☐ No ☐ N/A	
20. Wetwell &/or Drywell ventilated	☒ Yes ☐ No ☐ N/A	Vent pipe, not powered.
21. Crane condition and accessibility	☒ Yes ☐ No ☐ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☐ No ☒ N/A	
23. Excessive leaks?	☐ Yes ☐ No ☒ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☐ No ☒ N/A	
26. Pipe supports are free of damage or corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☒ Yes ☐ No ☐ N/A	Recent upgrade work.
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: East Joiner (East Lincoln Parkway Pump Station)

30. Instrumentation functioning?	☒ Yes ☐ No ☐ N/A	
31. Alarms functioning?	☒ Yes ☐ No ☐ N/A	
32. Correct electrical classification?	☒ Yes ☐ No ☐ N/A	Seals installed on conduits.
33. Sensors reliable?	☒ Yes ☐ No ☐ N/A	
34. Safe (arc flash, etc.)?	☒ Yes ☐ No ☒ N/A	Recommend to add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
35. Suitable lighting for electrical classification	☒ Yes ☐ No ☐ N/A	
36. Level Controls condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☒ Yes ☐ No ☐ N/A	
38. Back-Up Power	☒ Yes ☐ No ☐ N/A	Standby generator and ATS.
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
39. Sound?	☒ Yes ☐ No ☐ N/A	
40. Pitting?	☐ Yes ☒ No ☐ N/A	Very minor
41. Spalling?	☐ Yes ☒ No ☐ N/A	
42. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☒ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: East Joiner (East Lincoln Parkway Pump Station)

Masonry Walls (Buildings):

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
44. Sound?	☒ Yes ☐ No ☐ N/A	Perimeter wall
45. Deterioration?	☐ Yes ☒ No ☐ N/A	
46. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
47. Reinforcing Corrosion?	☐ Yes ☒ No ☐ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☒ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☒ No ☐ N/A	
50. Water Staining?	☐ Yes ☒ No ☐ N/A	minor
51. Water Damage?	☐ Yes ☒ No ☐ N/A	
52. Deterioration?	☐ Yes ☒ No ☐ N/A	
Other?		

Site Security

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: East Joiner (East Lincoln Parkway Pump Station)

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☒ Yes ☐ No ☐ N/A	Masonry wall
54. Access Points Secure?	☒ Yes ☐ No ☐ N/A	
55. Surveillance System Operational?	☒ Yes ☐ No ☐ N/A	
56. Bollard protection of critical structures	☐ Yes ☐ No ☒ N/A	
57. Chemical or H2S Exposure	☐ Yes ☒ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	
59. Stairs/ladder are secure and in good condition?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Civil Condition

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☐ Yes ☐ No ☒ N/A	
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☒ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: East Joiner (East Lincoln Parkway Pump Station)

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☒ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☐ Local Disruption	
	☒ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☐ Very low	
	☒ Low	
	☐ Moderate	
	☐ High	
	☐ Very High	

Redundant Unit

☐ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: East Joiner (East Lincoln Parkway Pump Station)

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation – North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation – West	☐
General Site	☒
Foundation	☒
Wetwell	☒
Top Slab	☒
MCCs	☒
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: East Joiner (East Lincoln Parkway Pump Station)

Additional Findings Unique to Facility

Lots of debris/ragging maintenance
Grease trap

Lincoln Lift Station Condition Field Assessment Form



Pump Station: Flight Line	
Pump Station Address: North End of Aviation Blvd., Lincoln, CA 95648 (500yds West at end of Culdesac)	
Discipline:	Inspection Time: 9:30am
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	1985
Original Useful life	
Pump capacity/size	

COMMENTS/SUGGESTIONS:
Known site and drainage issues from airport. Age warrants condition assessment by discipline expert.
Low flow from airport and corp yard

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	1985	60				
Pump 2	1985	60				

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Flight Line

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☐ Yes ☐ No ☐ N/A	Unknown what the pumps are. Flygt won't service.
3. Excessive vibration?	☐ Yes ☒ No ☐ N/A	
4. Excessive noise?	☐ Yes ☒ No ☐ N/A	
5. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☐ No ☐ N/A	Unknown but they operate
9. Coating Damage	☐ Yes ☒ No ☐ N/A	
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☐ Yes ☒ No ☐ N/A	

Wet Well:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
14. Interior wall condition?	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	
17. Wet Well Fall Protection	☐ Yes ☒ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Flight Line

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☐ Yes ☐ No ☒ N/A	
19. Hoists arrangement and location sufficient for required maintenance	☐ Yes ☐ No ☒ N/A	
20. Wetwell &/or Drywell ventilated	☐ Yes ☐ No ☒ N/A	
21. Crane condition and accessibility	☐ Yes ☐ No ☒ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☐ No ☒ N/A	
23. Excessive leaks?	☐ Yes ☐ No ☒ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☐ No ☒ N/A	
26. Pipe supports are free of damage or corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☐ Yes ☐ No ☒ N/A	
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☐ Yes ☒ No ☐ N/A	Control panel is reaching end of service life, replacement parts may be hard to

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Flight Line

30. Instrumentation functioning?	☐ Yes ☒ No ☐ N/A	Water solenoid controls on control panel may not be functioning properly.
31. Alarms functioning?	☐ Yes ☒ No ☐ N/A	Autodialer may not be functioning properly.
32. Correct electrical classification?	☐ Yes ☒ No ☐ N/A	Seals missing on conduits to control panel
33. Sensors reliable?	☐ Yes ☐ No ☒ N/A	
34. Safe (arc flash, etc.)?	☐ Yes ☐ No ☒ N/A	Recommend to add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
35. Suitable lighting for electrical classification	☐ Yes ☐ No ☒ N/A	
36. Level Controls condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☐ Yes ☐ No ☒ N/A	
38. Back-Up Power	☒ Yes ☐ No ☐ N/A	
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
39. Sound?	☒ Yes ☐ No ☐ N/A	
40. Pitting?	☐ Yes ☒ No ☐ N/A	
41. Spalling?	☐ Yes ☒ No ☐ N/A	
42. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☒ No ☐ N/A	
Other?		

Masonry Walls (Buildings):

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Flight Line

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
44. Sound?	☐ Yes ☐ No ☒ N/A	
45. Deterioration?	☐ Yes ☐ No ☒ N/A	
46. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
47. Reinforcing Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☐ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☐ No ☒ N/A	
50. Water Staining?	☐ Yes ☐ No ☒ N/A	
51. Water Damage?	☐ Yes ☐ No ☒ N/A	
52. Deterioration?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Security

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Flight Line

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☒ Yes ☐ No ☐ N/A	
54. Access Points Secure?	☒ Yes ☐ No ☐ N/A	
55. Surveillance System Operational?	☐ Yes ☐ No ☒ N/A	
56. Bollard protection of critical structures	☒ Yes ☐ No ☐ N/A	
57. Chemical or H2S Exposure	☐ Yes ☐ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	
59. Stairs/ladder are secure and in good condition?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Civil Condition

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☐ Yes ☒ No ☐ N/A	
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Flight Line

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☒ Local Disruption	
	☐ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☐ 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☐ Very low	Pump condition unknown. Don't perform maintenance. Very old. Everything else in good condition.
	☐ Low	
	☐ Moderate	
	☒ High	
	☐ Very High	

Redundant Unit

☐ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Flight Line

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation – North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation – West	☐
General Site	☒
Foundation	☐
Wetwell	☒
Top Slab	☒
MCCs	☐
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Flight Line

Additional Findings Unique to Facility

Very low flow
Pumps never maintained. Flygt said they aren't theirs and won't perform maintenance. Pump data is unknown.
Backflow device under green cover.
Often smells like grease from airplane lubricants washdown. Could be helping condition of wetwell that is quite old. Not a lot of sanitary sewer flow.
Very few objects in flow but there is grit accumulation that must be occasionally pumped out.
Sand-oil separator installed on wash bays.

Lincoln Lift Station Condition Field Assessment Form



Pump Station: Independence	
Pump Station Address: 2873 Delegate Drive, Lincoln, CA 95648	
Discipline:	Inspection Time: 10:20am
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	2022
Original Useful life	
Pump capacity/size	0.66 MGD (Reliable)

COMMENTS/SUGGESTIONS:
Due to recent construction, only a cursory condition assessment is warranted.
2 Pumps – 485 gpm @ 67.4' TDH each.

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	2020	15	Flygt	3153.095.0409	464	06/01/25
Pump 2	2020	15	Flygt	3153.095.0409	464	06/01/25

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Independence

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☒ Yes ☐ No ☐ N/A	
3. Excessive vibration?	☐ Yes ☒ No ☐ N/A	
4. Excessive noise?	☐ Yes ☒ No ☐ N/A	
5. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☒ No ☐ N/A	
9. Coating Damage	☐ Yes ☒ No ☐ N/A	
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☐ Yes ☒ No ☐ N/A	Pad for potential addition. No complaints yet.

Wet Well:

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
14. Interior wall condition?	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	
17. Wet Well Fall Protection	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Independence

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☐ Yes ☐ No ☒ N/A	
19. Hoists arrangement and location sufficient for required maintenance	☐ Yes ☐ No ☒ N/A	
20. Wetwell &/or Drywell ventilated	☐ Yes ☐ No ☒ N/A	
21. Crane condition and accessibility	☐ Yes ☐ No ☒ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☐ No ☒ N/A	
23. Excessive leaks?	☐ Yes ☐ No ☒ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☐ No ☒ N/A	
26. Pipe supports are free of damage or corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☒ Yes ☐ No ☐ N/A	
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Independence

30. Instrumentation functioning?	☒ Yes ☐ No ☐ N/A	Intermittent false high readings.
31. Alarms functioning?	☒ Yes ☐ No ☐ N/A	Intermittent radio communication interference.
32. Correct electrical classification?	☒ Yes ☐ No ☐ N/A	
33. Sensors reliable?	☒ Yes ☐ No ☐ N/A	
34. Safe (arc flash, etc.)?	☒ Yes ☐ No ☐ N/A	
35. Suitable lighting for electrical classification	☒ Yes ☐ No ☐ N/A	
36. Level Controls condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☒ Yes ☐ No ☐ N/A	
38. Back-Up Power	☒ Yes ☐ No ☐ N/A	
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
39. Sound?	☒ Yes ☐ No ☐ N/A	
40. Pitting?	☐ Yes ☒ No ☐ N/A	
41. Spalling?	☐ Yes ☒ No ☐ N/A	
42. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☒ No ☐ N/A	
Other?		

Masonry Walls (Buildings):

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Independence

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
44. Sound?	☐ Yes ☐ No ☒ N/A	
45. Deterioration?	☐ Yes ☐ No ☒ N/A	
46. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
47. Reinforcing Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☐ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☐ No ☒ N/A	
50. Water Staining?	☐ Yes ☐ No ☒ N/A	
51. Water Damage?	☐ Yes ☐ No ☒ N/A	
52. Deterioration?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Security

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Independence

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☒ Yes ☐ No ☐ N/A	Masonry walls
54. Access Points Secure?	☒ Yes ☐ No ☐ N/A	
55. Surveillance System Operational?	☒ Yes ☐ No ☐ N/A	
56. Bollard protection of critical structures	☒ Yes ☐ No ☐ N/A	
57. Chemical or H2S Exposure	☐ Yes ☒ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	
59. Stairs/ladder are secure and in good condition?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Civil Condition

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☒ Yes ☐ No ☐ N/A	
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Independence

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☒ Local Disruption	
	☐ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☒ Very low	
	☐ Low	
	☐ Moderate	
	☐ High	
	☐ Very High	

Redundant Unit

☐ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Independence

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation – North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation – West	☐
General Site	☒
Foundation	☐
Wetwell	☒
Top Slab	☒
MCCs	☒
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Independence

Additional Findings Unique to Facility

Residences to be serviced not fully built-out yet
Wasps around communications tower

Lincoln Lift Station Condition Field Assessment Form



Pump Station: Nicolaus Road Pump Station (NRPS)	
Pump Station Address: 2885 Nicholas Road, Lincoln, CA 95648	
Discipline:	Inspection Time: 10:00am
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	1985
Original Useful life	
Pump capacity/size	3.4 MGD (Reliable)

COMMENTS/SUGGESTIONS:
Due to recent rehabilitation, only cursory condition assessment warranted. Reliable: 2,340 gpm @ 64' TDH.
Large Wet Well: 2 Pumps, 1970 gpm @ 55' TDH each, Small Wet Well: 1 Pump, 1,060 gpm @ 47' TDH.
Small Wet Well and associated pump is used as standby backup

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	2016	60	Flygt	3202.095.0016	640	06/01/25
Pump 2	2017	20	Flygt	3153.095.0606	435	06/01/25
Pump 3	2017	60	Flygt	3202.095.0016	640	06/01/25
Spare 1	2006	60	Flygt	3202.090.0740055	640	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Nicolaus Road Pump Station (NRPS)

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☒ Yes ☐ No ☐ N/A	
3. Excessive vibration?	☐ Yes ☒ No ☐ N/A	
4. Excessive noise?	☐ Yes ☒ No ☐ N/A	
5. Excessive corrosion?	☒ Yes ☒ No ☐ N/A	Small wetwell discharge pipe is rusted
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☒ No ☐ N/A	
9. Coating Damage	☒ Yes ☒ No ☐ N/A	Small wetwell discharge pipe is rusted
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☒ Yes ☐ No ☐ N/A	Not currently in use. Was installed for corrosion control, there aren't any nearby residences or odor issues.

Wet Well:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
14. Interior wall condition?	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	
17. Wet Well Fall Protection	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Nicolaus Road Pump Station (NRPS)

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☐ Yes ☐ No ☒ N/A	
19. Hoists arrangement and location sufficient for required maintenance	☐ Yes ☐ No ☒ N/A	
20. Wetwell &/or Drywell ventilated	☒ Yes ☐ No ☐ N/A	
21. Crane condition and accessibility	☐ Yes ☐ No ☒ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
23. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☒ No ☐ N/A	
26. Pipe supports are free of damage or corrosion?	☒ Yes ☐ No ☐ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☒ Yes ☐ No ☐ N/A	
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Nicolaus Road Pump Station (NRPS)

30. Instrumentation functioning?	☒ Yes ☐ No ☐ N/A	
31. Alarms functioning?	☒ Yes ☐ No ☐ N/A	
32. Correct electrical classification?	☒ Yes ☐ No ☐ N/A	Conduit seals installed
33. Sensors reliable?	☒ Yes ☐ No ☐ N/A	
34. Safe (arc flash, etc.)?	☐ Yes ☐ No ☒ N/A	Recommend to add arc flash hazard label warning to control panel doors in accordance with NEC 110.16(A)
35. Suitable lighting for electrical classification	☒ Yes ☐ No ☐ N/A	
36. Level Controls condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☒ Yes ☐ No ☐ N/A	
38. Back-Up Power	☒ Yes ☐ No ☐ N/A	Standby generator on site
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
39. Sound?	☒ Yes ☐ No ☐ N/A	
40. Pitting?	☒ Yes ☐ No ☐ N/A	Very minor in wetwell
41. Spalling?	☐ Yes ☒ No ☐ N/A	
42. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☒ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Nicolaus Road Pump Station (NRPS)

Masonry Walls (Buildings):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
44. Sound?	☐ Yes ☐ No ☒ N/A	
45. Deterioration?	☐ Yes ☐ No ☒ N/A	
46. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
47. Reinforcing Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☐ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☐ No ☒ N/A	
50. Water Staining?	☐ Yes ☐ No ☒ N/A	
51. Water Damage?	☐ Yes ☐ No ☒ N/A	
52. Deterioration?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Security

General Condition Rating: ☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Nicolaus Road Pump Station (NRPS)

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☒ Yes ☐ No ☐ N/A	High fence
54. Access Points Secure?	☒ Yes ☐ No ☐ N/A	
55. Surveillance System Operational?	☒ Yes ☐ No ☐ N/A	
56. Bollard protection of critical structures	☒ Yes ☐ No ☐ N/A	
57. Chemical or H2S Exposure	☐ Yes ☒ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	Need to move generator to have more than a couple feet clearance for one panel
59. Stairs/ladder are secure and in good condition?	☒ Yes ☐ No ☐ N/A	Wood stairs up to large wetwell hatch
Other?		

Site Civil Condition

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☒ Yes ☐ No ☐ N/A	minor
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	Adequate but very close to main road
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☐ N/A	Could be a little tricky
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Nicolaus Road Pump Station (NRPS)

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☐ Local Disruption	
	☒ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☐ Very low	
	☒ Low	
	☐ Moderate	
	☐ High	
	☐ Very High	

Redundant Unit

☒ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Nicolaus Road Pump Station (NRPS)

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation – North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation – West	☐
General Site	☒
Foundation	☐
Wetwell	☒
Top Slab	☒
MCCs	☐
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Nicolaus Road Pump Station (NRPS)

Additional Findings Unique to Facility

Biggest maintenance issue is that influent pipe is at bottom of the wetwell and the upstream manhole collects lots of debris to be periodically cleaned out

Lincoln Lift Station Condition Field Assessment Form



Pump Station: Q Street	
Pump Station Address: Q Street between 8 th Street and Zoe Ann Drive, Coordinates: 38.895684, -121306195	
Discipline:	Inspection Time: 11:00am
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	1989
Original Useful life	
Pump capacity/size	0.4 MGD (Reliable)

COMMENTS/SUGGESTIONS:
Known site issues with station in roadway and control panel. Functioning properly; age warrants condition assessment by discipline expert. Possible improvement may include eliminating the station with the construction of a gravity sewer to Joiner Road.
2 Pumps – 250 gpm @ 21' TDH each

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	2016	5	Flygt	3102.095.0064	463	06/01/25
Pump 2	2019	5	Flygt	3102.070.2080092	462	06/01/25
Spare	2019	5	Flygt	3102.070.1970038		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Q Street

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☒ Yes ☐ No ☐ N/A	
3. Excessive vibration?	☐ Yes ☒ No ☐ N/A	
4. Excessive noise?	☐ Yes ☐ No ☐ N/A	
5. Excessive corrosion?	☒ Yes ☐ No ☐ N/A	
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☒ No ☐ N/A	
9. Coating Damage	☒ Yes ☐ No ☐ N/A	
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☐ Yes ☒ No ☐ N/A	

Wet Well:

General Condition Rating: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
14. Interior wall condition?	☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	In road
17. Wet Well Fall Protection	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Q Street

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☐ Yes ☐ No ☒ N/A	
19. Hoists arrangement and location sufficient for required maintenance	☐ Yes ☐ No ☒ N/A	
20. Wetwell &/or Drywell ventilated	☐ Yes ☒ No ☐ N/A	
21. Crane condition and accessibility	☐ Yes ☐ No ☒ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☐ No ☒ N/A	
23. Excessive leaks?	☐ Yes ☐ No ☒ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☐ No ☒ N/A	
26. Pipe supports are free of damage or corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☒ Yes ☐ No ☐ N/A	
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☐ Yes ☒ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Q Street

30. Instrumentation functioning?	☐ Yes ☐ No ☐ N/A	
31. Alarms functioning?	☐ Yes ☒ No ☐ N/A	
32. Correct electrical classification?	☐ Yes ☐ No ☐ N/A	
33. Sensors reliable?	☒ Yes ☐ No ☐ N/A	
34. Safe (arc flash, etc.)?	☐ Yes ☒ No ☐ N/A	
35. Suitable lighting for electrical classification	☒ Yes ☐ No ☐ N/A	
36. Level Controls condition	☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☒ Yes ☐ No ☐ N/A	
38. Back-Up Power	☐ Yes ☒ No ☐ N/A	
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
39. Sound?	☐ Yes ☐ No ☒ N/A	
40. Pitting?	☐ Yes ☐ No ☒ N/A	
41. Spalling?	☐ Yes ☐ No ☒ N/A	
42. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Masonry Walls (Buildings):

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Q Street

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
44. Sound?	☐ Yes ☐ No ☒ N/A	
45. Deterioration?	☐ Yes ☐ No ☒ N/A	
46. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
47. Reinforcing Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☐ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☐ No ☒ N/A	
50. Water Staining?	☐ Yes ☐ No ☒ N/A	
51. Water Damage?	☐ Yes ☐ No ☒ N/A	
52. Deterioration?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Security

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Q Street

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☐ Yes ☐ No ☒ N/A	Wetwell in road. Panels on side of road not fenced off. Project planned to add generator and panels in fence.
54. Access Points Secure?	☐ Yes ☐ No ☒ N/A	
55. Surveillance System Operational?	☐ Yes ☐ No ☒ N/A	
56. Bollard protection of critical structures	☐ Yes ☒ No ☐ N/A	
57. Chemical or H2S Exposure	☐ Yes ☒ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	
59. Stairs/ladder are secure and in good condition?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Civil Condition

General Condition Rating: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☐ Yes ☒ No ☐ N/A	In road
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Q Street

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☒ Local Disruption	
	☐ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☐ 1 ☐ 2 ☐ 3 ☒ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☐ Very low	Discharge piping and valves highly corroded. Control panel not protected.
	☐ Low	
	☐ Moderate	
	☒ High	
	☐ Very High	

Redundant Unit

☐ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Q Street

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation – North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation – West	☐
General Site	☒
Foundation	☐
Wetwell	☒
Top Slab	☐
MCCs	☐
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒



Pump Station Name: Q Street

Additional Findings Unique to Facility

Pumps, discharge piping and control panels planned to be replaced. Electrical/controls and new generator would be fenced off.

Lincoln Lift Station Condition Field Assessment Form



Pump Station: Silver Spur	
Pump Station Address: North end of Silver Spur Circle, Coordinates: 38.904190, -121281891	
Discipline:	Inspection Time: 11:20am
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	1989
Original Useful life	
Pump capacity/size	0.19 MGD (Reliable)

COMMENTS/SUGGESTIONS:
Due to recent rehabilitation, only a cursory condition assessment is warranted.
2 Pumps – 130 gpm @ 21' TDH each, may have been replaced in 2020.
Recent upgrades

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	2016	3.9	Flygt	3102.095.0068		06/01/25
Pump 2	2016	3.9	Flygt	3102.095.0068		06/01/25
Spare	2016	3.9	Flygt	3102.095.0068		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Silver Spur

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☒ Yes ☐ No ☐ N/A	
3. Excessive vibration?	☐ Yes ☒ No ☐ N/A	
4. Excessive noise?	☐ Yes ☒ No ☐ N/A	Noisy bubbling but only with hatch open
5. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☒ No ☐ N/A	
9. Coating Damage	☐ Yes ☒ No ☐ N/A	
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☐ Yes ☒ No ☐ N/A	

Wet Well:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☒ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
14. Interior wall condition?	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	Tight space w/ fence and panels but accessible
17. Wet Well Fall Protection	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Silver Spur

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☐ Yes ☐ No ☒ N/A	
19. Hoists arrangement and location sufficient for required maintenance	☐ Yes ☐ No ☒ N/A	
20. Wetwell &/or Drywell ventilated	☐ Yes ☒ No ☐ N/A	
21. Crane condition and accessibility	☐ Yes ☐ No ☒ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☐ No ☒ N/A	
23. Excessive leaks?	☐ Yes ☐ No ☒ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☐ No ☒ N/A	
26. Pipe supports are free of damage or corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☒ Yes ☐ No ☐ N/A	
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☒ Yes ☐ No ☐ N/A	Replace missing reset button on control panel

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Silver Spur

30. Instrumentation functioning?	☒ Yes ☐ No ☐ N/A	
31. Alarms functioning?	☒ Yes ☐ No ☐ N/A	Intermittent communications problems
32. Correct electrical classification?	☒ Yes ☐ No ☐ N/A	Seals visible on conduits.
33. Sensors reliable?	☒ Yes ☐ No ☐ N/A	
34. Safe (arc flash, etc.)?	☒ Yes ☐ No ☐ N/A	
35. Suitable lighting for electrical classification	☒ Yes ☐ No ☐ N/A	
36. Level Controls condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☐ Yes ☐ No ☒ N/A	
38. Back-Up Power	☐ Yes ☒ No ☐ N/A	Manual transfer switch installed, standby generator needs to be wheeled in during outages.
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
39. Sound?	☒ Yes ☐ No ☐ N/A	
40. Pitting?	☐ Yes ☒ No ☐ N/A	
41. Spalling?	☐ Yes ☒ No ☐ N/A	
42. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☒ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Silver Spur

Masonry Walls (Buildings):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
44. Sound?	☐ Yes ☐ No ☒ N/A	
45. Deterioration?	☐ Yes ☐ No ☒ N/A	
46. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
47. Reinforcing Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☐ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☐ No ☒ N/A	
50. Water Staining?	☐ Yes ☐ No ☒ N/A	
51. Water Damage?	☐ Yes ☐ No ☒ N/A	
52. Deterioration?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Security

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Silver Spur

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☒ Yes ☐ No ☐ N/A	Wood fence between private residences
54. Access Points Secure?	☒ Yes ☐ No ☐ N/A	
55. Surveillance System Operational?	☐ Yes ☐ No ☒ N/A	
56. Bollard protection of critical structures	☐ Yes ☐ No ☒ N/A	
57. Chemical or H2S Exposure	☐ Yes ☒ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	Tight space but panels have access clearance with hatch closed
59. Stairs/ladder are secure and in good condition?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Civil Condition

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☐ Yes ☐ No ☒ N/A	
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	Tight space for hatch and panels. Valve vault in road.
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Silver Spur

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☐ 2 ☒ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☒ Local Disruption	
	☐ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☐ Very low	
	☒ Low	
	☐ Moderate	
	☐ High	
	☐ Very High	

Redundant Unit

☐ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Silver Spur

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation – North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation – West	☐
General Site	☒
Foundation	☐
Wetwell	☒
Top Slab	☒
MCCs	☐
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Silver Spur

Additional Findings Unique to Facility

During recent construction, adjacent residence started giving complaints. Resolved with City.

Lincoln Lift Station Condition Field Assessment Form



Pump Station: Village 19	
Pump Station Address: 3679 Camino Cielo, Lincoln, CA 95648	
Discipline:	Inspection Time: 11:45am
City Staff: Travis Espinoza	Inspection Date: 8/7/25

Rating Criteria (1 best to 5 worst)

General Condition Rating:

1. Very good condition
2. Well maintained, minor defects.
3. Visible degradation. Maintenance to return to acceptable level.
4. Required rehabilitation.
5. Possible imminent failure.

Annual Maintenance Cost	
Construction/Installation Year	2005
Original Useful life	
Pump capacity/size	

COMMENTS/SUGGESTIONS:
Functioning properly; age warrants condition assessment inspections by discipline expert.
Plan to add flow meter

Pump Data

Pump	Install Year	HP	Make	Model	Impeller	Last Inspection
Pump 1	2019	4	Flygt	3085.891.0274	259	06/01/25
Pump 2	2019	4	Flygt	3085.891.0274	259	06/01/25
Spare	2005	3.9	Flygt	3085.891.0570009	258	06/01/25

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Village 19

Mechanical Equipment

Pumps, Valves & Piping:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
1. Adequate for intended service?	☒ Yes ☐ No ☐ N/A	
2. Parts for maintenance available?	☒ Yes ☐ No ☐ N/A	
3. Excessive vibration?	☐ Yes ☒ No ☐ N/A	
4. Excessive noise?	☐ Yes ☒ No ☐ N/A	
5. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
6. Excessive leaks?	☐ Yes ☒ No ☐ N/A	
7. Running hot?	☐ Yes ☒ No ☐ N/A	
8. Equipment or parts missing?	☐ Yes ☒ No ☐ N/A	
9. Coating Damage	☐ Yes ☒ No ☐ N/A	
10. Seals (& seal water) functional	☐ Yes ☐ No ☒ N/A	
11. Pump damage or pipe blockage due to lack of screening	☐ Yes ☒ No ☐ N/A	
12. Odors & Odor Control Facility	☒ Yes ☐ No ☐ N/A	Siemens unit – but not currently used. Didn't observe any odors with hatch closed.

Wet Well:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
13. Top slab condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
14. Interior wall condition?	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
15. Hatchway condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
16. Hatchway accessible	☒ Yes ☐ No ☐ N/A	
17. Wet Well Fall Protection	☐ Yes ☒ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Village 19

Auxiliary Equipment – Hoists/Crane:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
18. Hoist load tested within 10 years	☐ Yes ☒ No ☐ N/A	
19. Hoists arrangement and location sufficient for required maintenance	☒ Yes ☐ No ☐ N/A	
20. Wetwell &/or Drywell ventilated	☒ Yes ☐ No ☐ N/A	
21. Crane condition and accessibility	☒ Yes ☐ No ☐ N/A	

Above-Ground Piping:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
22. Excessive corrosion?	☐ Yes ☐ No ☒ N/A	
23. Excessive leaks?	☐ Yes ☐ No ☒ N/A	
24. Insulation damaged?	☐ Yes ☐ No ☒ N/A	
25. Coating damaged?	☐ Yes ☐ No ☒ N/A	
26. Pipe supports are free of damage or corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Electrical and Instrumentation Equipment

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
27. MCC/VFD in good condition?	☒ Yes ☐ No ☐ N/A	
28. Excessive corrosion?	☐ Yes ☒ No ☐ N/A	
29. Parts available?	☒ Yes ☐ No ☐ N/A	

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Village 19

30. Instrumentation functioning?	☒ Yes ☐ No ☐ N/A	
31. Alarms functioning?	☒ Yes ☐ No ☐ N/A	SCADA upgrade project in the works.
32. Correct electrical classification?	☒ Yes ☐ No ☐ N/A	
33. Sensors reliable?	☒ Yes ☐ No ☐ N/A	
34. Safe (arc flash, etc.)?	☒ Yes ☐ No ☐ N/A	
35. Suitable lighting for electrical classification	☒ Yes ☐ No ☐ N/A	
36. Level Controls condition	☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A	
37. VFDs	☒ Yes ☐ No ☐ N/A	
38. Back-Up Power	☒ Yes ☐ No ☐ N/A	
Other?		

Structural

Concrete Walls or Mats:

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
39. Sound?	☒ Yes ☐ No ☐ N/A	
40. Pitting?	☐ Yes ☒ No ☐ N/A	Wetwell - very minimal
41. Spalling?	☐ Yes ☒ No ☐ N/A	
42. Reinforcing Exposure?	☐ Yes ☒ No ☐ N/A	
43. Reinforcing/Conc Corrosion?	☐ Yes ☒ No ☐ N/A	
Other?		

Masonry Walls (Buildings):

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Village 19

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
44. Sound?	☐ Yes ☐ No ☒ N/A	
45. Deterioration?	☐ Yes ☐ No ☒ N/A	
46. Reinforcing Exposure?	☐ Yes ☐ No ☒ N/A	
47. Reinforcing Corrosion?	☐ Yes ☐ No ☒ N/A	
Other?		

Foundations Systems:

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
48. Signs of Settlement (i.e. cracking and /or displacement)?	☐ Yes ☐ No ☒ N/A	

Roof System (Building):

General Condition Rating: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A

Assessment Item	Checklist	Comments
49. Sagging?	☐ Yes ☐ No ☒ N/A	
50. Water Staining?	☐ Yes ☐ No ☒ N/A	
51. Water Damage?	☐ Yes ☐ No ☒ N/A	
52. Deterioration?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Security

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Village 19

Assessment Item	Checklist	Comments
53. Fence/Perimeter Intact?	☒ Yes ☐ No ☐ N/A	
54. Access Points Secure?	☒ Yes ☐ No ☐ N/A	
55. Surveillance System Operational?	☐ Yes ☐ No ☒ N/A	Lightning only
56. Bollard protection of critical structures	☒ Yes ☐ No ☐ N/A	
57. Chemical or H2S Exposure	☐ Yes ☒ No ☐ N/A	
58. Equipment Working Clearance	☒ Yes ☐ No ☐ N/A	
59. Stairs/ladder are secure and in good condition?	☐ Yes ☐ No ☒ N/A	
Other?		

Site Civil Condition

General Condition Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
60. Paving free of cracks?	☐ Yes ☐ No ☒ N/A	
61. Adequate drainage?	☒ Yes ☐ No ☐ N/A	
62. Adequate site accessibility?	☒ Yes ☐ No ☐ N/A	
63. Soil/embankment erosion condition	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☒ N/A	
64. Station accessible by boom truck	☒ Yes ☐ No ☐ N/A	
Other?		

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Village 19

Consequence of Failure (CoF)

Consequence of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Assessment Item	Checklist	Comments
65. Public health and safety	☐ No injuries	
	☐ Minor injury – No lost time	
	☐ Injury – Lost time	
	☐ Multiple person injury	
66. Reduced level of service	☒ Local Disruption	
	☐ Major Disruption	
	☐ N/A	
67. Cost of repair	☐ Less than \$25K	
	☐ Between \$25K and \$150K	
	☐ Between \$150K and \$250K	
	☐ More than \$250K	
68. Regulatory compliance	☒ No violations	
	☐ Odor or loss of efficiency	
	☐ Single violation	
	☐ Multiple violations	
Other?		
Other?		

Probability of Failure (PoF)

Probability of Failure Rating: ☐ 1 ☒ 2 ☐ 3 ☐ 4 ☐ 5 ☐ N/A

Checklist		Comments
69. Probability of Failure	☐ Very low	
	☒ Low	
	☐ Moderate	
	☐ High	
	☐ Very High	

Redundant Unit

☐ Yes ☐ NO

Lincoln Lift Station Condition Field Assessment Form



Pump Station Name: Village 19

Photograph Checklist

Checklist	
Equipment Tags	☐
Pump Station Elevation – North	☐
Pump Station Elevation – South	☐
Pump Station Elevation – East	☐
Pump Station Elevation – West	☐
General Site	☒
Foundation	☐
Wetwell	☒
Top Slab	☒
MCCs	☐
Drives/VFDs	☒
Control Panels	☒
Pumps	☒
Piping	☒

Lincoln Lift Station Condition Field Assessment Form



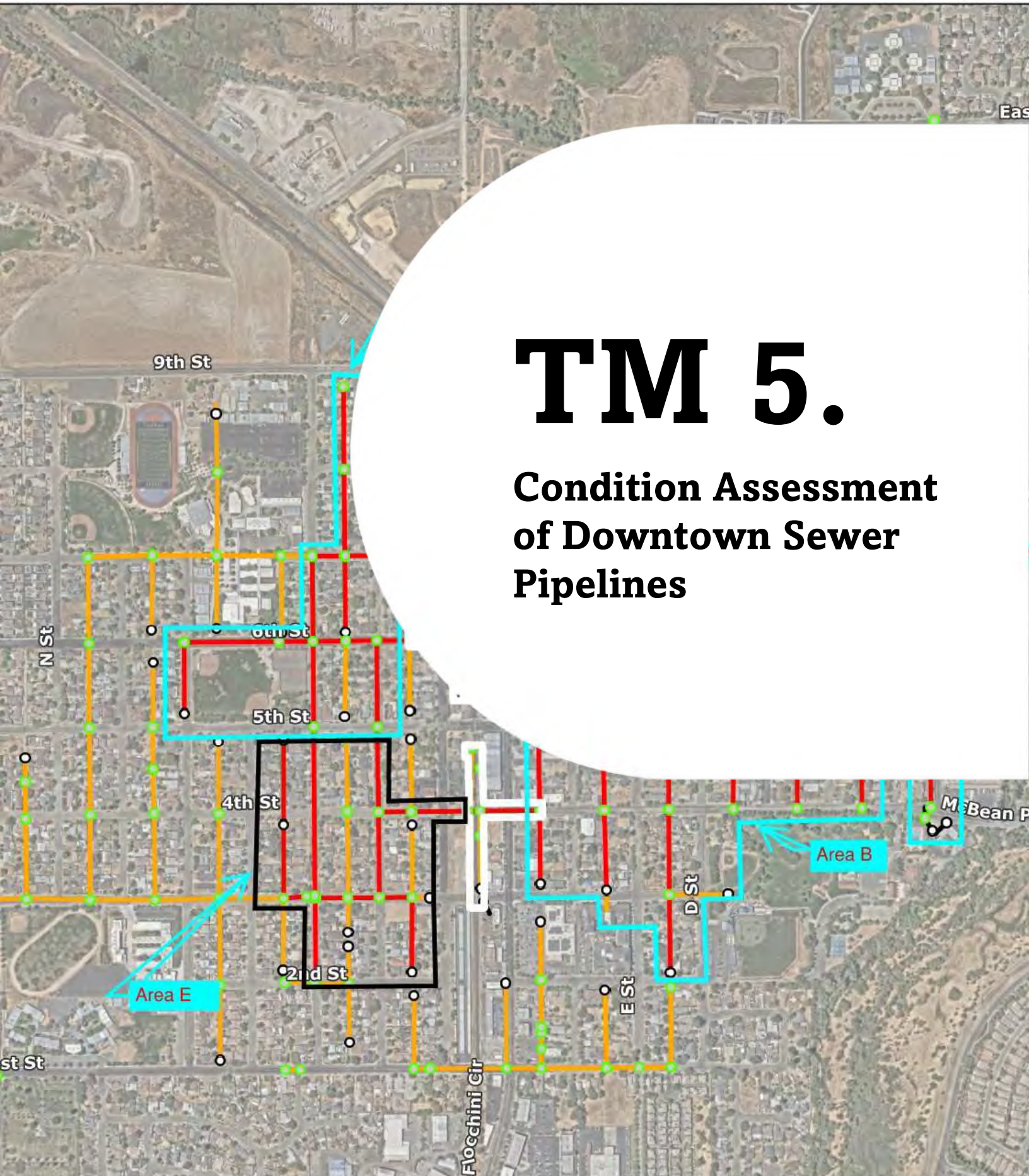
Pump Station Name: Village 19

Additional Findings Unique to Facility

Low flow
Some debris accumulation in wetwell but otherwise no major issues
Being integrated into SCADA soon, will also add flow meter

TM 5.

Condition Assessment of Downtown Sewer Pipelines



TECHNICAL MEMORANDUM NO. 5 – CONDITION ASSESSMENT OF DOWNTOWN SEWER PIPELINES

Prepared By: Breanna Webb

Reviewed By: Steve Beck, P.E.

Date: May 20, 2026

1.0 INTRODUCTION

The purpose of this Technical Memorandum No. 5 (TM 5) is to document the condition assessment completed for selected downtown sewer pipelines within the City of Lincoln (City) wastewater collection system. The condition assessment was completed as part of the Sewer Master Plan Update to identify sewer mains with elevated structural and/or operation and maintenance deficiencies, support prioritization of future rehabilitation needs, and provide planning-level recommendations for incorporation into the City's capital improvement program (CIP).

Closed-circuit television inspections were completed by a CCTV subcontractor and documented using Pipeline Assessment Certification Program, or PACP, Version 7.0 inspection and scoring terminology. PACP stands for Pipeline Assessment Certification Program, a National Association of Sewer Service Companies (NASSCO) standard used to code sewer CCTV observations in a consistent way. The subcontractor provided CCTV inspection reports, pipe ratings, defect observations, and supporting image references for each inspected pipe segment. The PACP summary data were subsequently compiled into a database containing pipe segment references, surveyed lengths, materials, diameters, structural ratings, operation and maintenance ratings, quick ratings, and overall pipe rating indexes.

This TM summarizes the available CCTV and PACP scoring data, describes the rating methodology used to interpret the results, identifies pipe segments with elevated condition concerns, and provides planning-level recommendations for rehabilitation, replacement, maintenance, and additional review.

This TM is divided into the following major sections:

- Introduction
- CCTV Inspection Program
- Assessment of Downtown Sewer Pipelines
- Rehabilitation and Maintenance Considerations
- Summary of Findings and Recommendations

1.1 OBJECTIVES

The wastewater collection system serves a critical role in conveying flows from residential, commercial, industrial, and institutional users to downstream wastewater treatment facilities. As sewer infrastructure ages, pipelines may experience structural deterioration, infiltration and inflow, root intrusion, sediment

CITY OF LINCOLN SEWER MASTER PLAN UPDATE
TECHNICAL MEMORANDUM NO. 5 – CONDITION ASSESSMENT OF DOWNTOWN SEWER PIPELINES

accumulation, joint defects, corrosion, deformation, and other conditions that can reduce hydraulic capacity, increase maintenance needs, or contribute to sanitary sewer overflows.

The objectives of this condition assessment are to:

- Summarize CCTV inspection coverage completed for the Master Plan Update.
- Document the condition rating methodology used by the CCTV subcontractor.
- Identify pipelines with observed structural or operational defects.
- Classify pipelines by relative condition severity.
- Support prioritization of rehabilitation and replacement projects.
- Provide recommendations for future inspection, maintenance, and asset management activities.

The results presented in this memorandum are intended for master planning and capital improvement planning purposes. Additional field verification, design-level review, and coordination with City operations staff may be required before implementation of specific rehabilitation or replacement projects.

1.2 LIMITATIONS

The condition assessment presented in this TM is based on the CCTV inspection reports provided by the subcontractor reflecting CCTV data collected between April 1 and April 8, 2025. A database summarizing the inspections was also provided, several inconsistencies were found between the PDF reports and the database. It is assumed that the data contained in the PDF reports is accurate and Stantec corrected the database to be consistent with the data found in the provided reports and linked it to the City's GIS database for spatial reference. The updated database is included as **Attachment 1** and the provided PDF reports are included as **Attachment 2**.

For the planning-level summaries presented in this TM, one record was retained for each pipe segment reference. Where duplicate records were present, the record with the highest overall pipe rating index was retained to provide a conservative prioritization approach. This approach is consistent with the intent of master planning, where potentially higher-risk assets should be retained for further review rather than screened out prematurely. Before final rehabilitation recommendations are implemented, duplicate records should be manually reviewed against the CCTV videos and GIS pipe inventory. This review should confirm whether duplicate records represent re-inspections, partial inspections, reverse-direction inspections, different portions of the same GIS pipe, or data extraction inconsistencies.

The CCTV inspection provides a visual assessment of internal pipe conditions at the time of inspection. CCTV does not directly evaluate external pipe bedding, soil conditions surrounding the pipe, external loading, or remaining structural capacity unless those conditions are visible from inside the pipe, such as through holes, broken pipe, or visible soil/voids. Conditions may also change after inspection because of continued deterioration, root intrusion, cleaning, repair work, groundwater infiltration, or debris accumulation.

The recommendations presented herein are intended for master planning and capital improvement planning purposes. Prior to implementing specific rehabilitation or replacement projects, the City should confirm pipe segment limits, review the most current CCTV videos, verify field conditions, and complete design-level evaluation of rehabilitation alternatives.

1.3 STUDY AREA – DOWNTOWN PIPELINES

The downtown CCTV inspection program focused on selected older gravity sewer mains within the City's collection system. The corrected PACP database includes ratings for approximately 27,064 linear feet (LF), or approximately 5.13 miles, of sewer main. The inspected pipelines consist primarily of vitrified clay pipe, or VCP. Pipe diameters range from 6 inches to 12 inches. A summary of the pipelines for which ratings were provided is shown in **Table 1-1**. The table reflects the total pipe length as opposed to the actual inspection lengths.

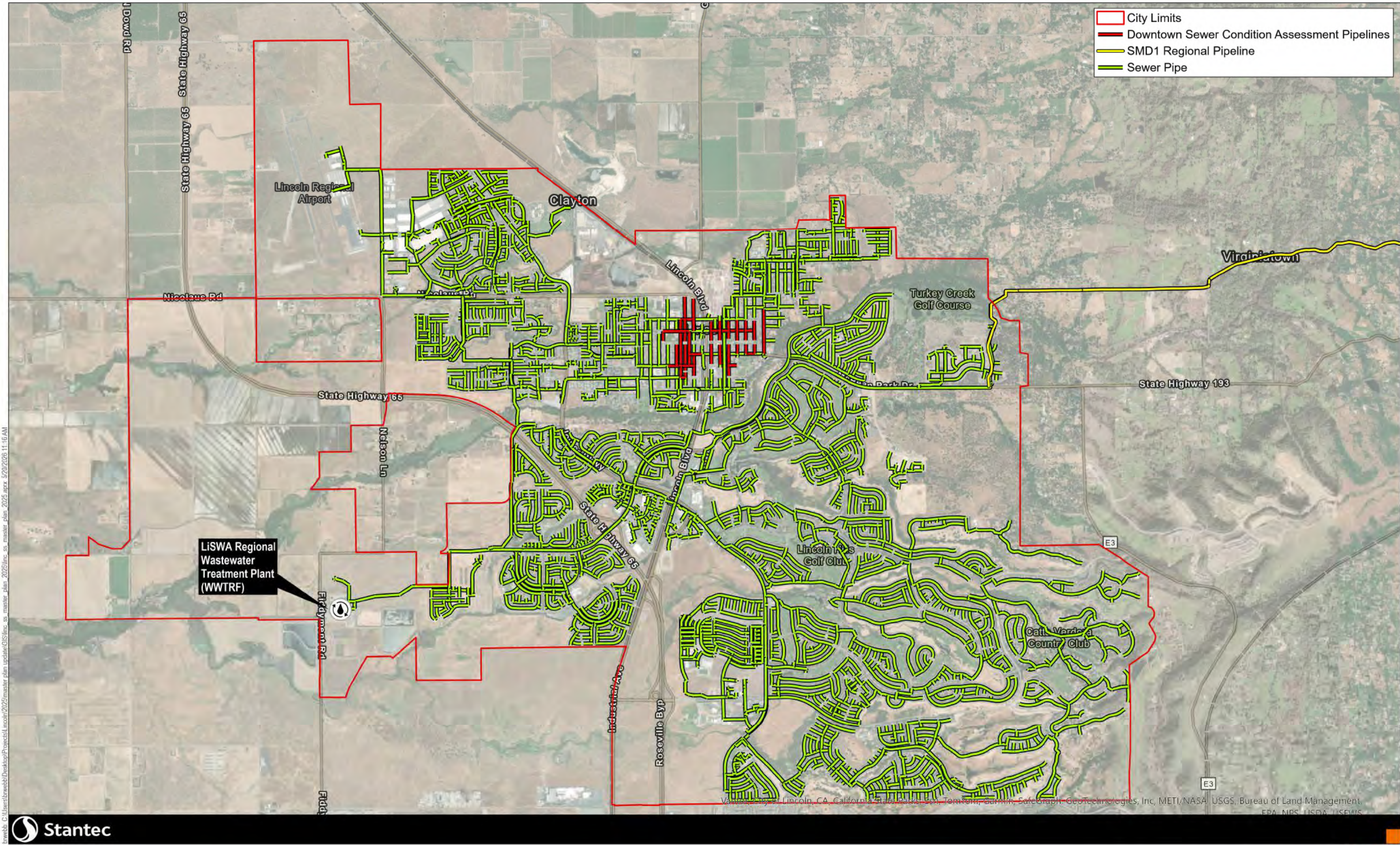
Table 1-1. Summary of Inspected Downtown Sewer Pipelines

Diameter	Number of Segments	Total Pipe Length, LF	Total Pipe Length, Miles
6-inch	46	17,320	3.28
8-inch	18	5,930	1.12
10-inch	8	3,277	0.62
12-inch	3	536	0.10
Total	75	27,064	5.13

The CCTV inspection data generally included the following information for each inspected pipe segment:

- Upstream and downstream manhole identifiers.
- Pipe diameter.
- Pipe material, where available.
- Segment length.
- Direction of inspection.
- Observed structural defects.
- Observed operation and maintenance defects.
- General pipe condition rating.
- Defect descriptions, locations, and severity.
- Still photographs or video references for notable observations.

For the purposes of this memorandum, the CCTV data were reviewed and summarized to characterize the relative condition of inspected pipe segments and identify pipelines that may warrant rehabilitation, replacement, cleaning, root control, or additional investigation. Study area pipelines included in the CCTV inspections and condition assessment are shown on **Figure 1-1**.



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2.0 CCTV INSPECTION PROGRAM

The CCTV inspections were performed by NorCal Pipeline Services (NorCal) in early April 2025. NorCal used a remotely operated CCTV camera system to inspect the interior of the selected sewer mains and document observed defects. Inspection deliverables included video files, inspection logs, still images, and pipe condition ratings for the inspected segments.

2.1 PACP CONDITION RATING METHODOLOGY

The CCTV inspection results were documented using Pipeline Assessment Certification Program (PACP) Version 7.0 inspection and scoring terminology. PACP provides a standardized method for coding observed defects in gravity sewer pipelines and assigning condition grades based on defect type, severity, and extent. The subcontractor's PACP reports include pipe segment information, defect observations, structural and operation and maintenance ratings, quick ratings, pipe rating indexes, and supporting image references.

PACP defect codes are generally grouped into structural defects and operation and maintenance defects. Structural defects include conditions that may affect the physical integrity or remaining service life of the pipe, such as fractures, broken pipe, holes, deformation, surface damage, and joint defects. Operation and maintenance defects include conditions that may affect hydraulic performance or maintenance frequency, such as roots, deposits, infiltration, obstructions, grease, and other flow restrictions.

Each coded defect is assigned a condition grade from 1 to 5. A Grade 1 defect represents a minor defect, while a Grade 5 defect represents the most significant defect. Grade 4 and Grade 5 defects are generally the primary indicators for potential rehabilitation, repair, or additional review, while lower-grade defects may be addressed through monitoring or routine maintenance depending on defect type, extent, and location.

PACP quick ratings provide a compact summary of the most severe defects within a pipe segment. The quick rating identifies the two highest defect grades observed and the number of occurrences associated with each grade. For example, a quick rating of 5100 indicates one Grade 5 defect and no second defect grade group, while a quick rating of 4133 indicates one Grade 4 defect and three Grade 3 defects. Where more than nine occurrences are present, letters may be used in place of numbers; for example, A represents 10 to 14 occurrences and B represents 15 to 19 occurrences.

The corrected PACP summary database includes separate structural and O&M ratings, as well as an overall pipe rating index. Structural ratings were used to identify pipe segments with potential rehabilitation or replacement needs, while O&M ratings were used to identify pipe segments that may warrant cleaning, root treatment, obstruction removal, or additional inspection. The overall pipe rating index was used as the base planning-level screening metric to compare relative condition severity across the inspected pipe segments.

The overall pipe rating index should not be used as the sole basis for project prioritization. A pipe segment with a single Grade 5 defect can receive a high index, while another pipe segment with many lower-grade defects may have a lower index but still represent a significant maintenance or rehabilitation concern. Therefore, prioritization also includes adds for structural and O&M indices and hydraulic capacity.

2.2 OVERALL CONDITION RATING SUMMARY

Using one record per unique pipe segment reference, the corrected PACP summary database includes four pipe segments with an overall pipe rating index of 5.0, eight pipe segments with an index between 4.0 and 4.9, 48 pipe segments with an index between 3.0 and 3.9, 11 pipe segments with an index between 2.0 and 2.9, and four pipe segments with no coded defects reflected in the overall rating index. A summary of the overall condition rating of the downtown pipelines is provided in **Table 2-1**.

Table 2-1. Overall Condition Rating Summary

Overall Pipe Rating Index	Planning-Level Interpretation	Number of Segments	Approximate Length, LF
5.0	Highest priority review	4	1,390
4.0–4.9	Elevated condition concern	8	2,238
3.0–3.9	Moderate condition concern	48	18,318
2.0–2.9	Lower to moderate concern	11	3,983
No coded defects in overall index	Routine monitoring	4	1135
Total		75	27,064

The majority of inspected downtown sewer mains fall within the 3.0 to 3.9 overall pipe rating index range, indicating moderate structural and/or operational deficiencies. At this condition level, defects are generally not indicative of imminent failure; however, continued deterioration can be expected, and these assets should be incorporated into planned maintenance and medium-term rehabilitation programs.

Pipes with ratings in the 4.0 to 5.0 range represent a relatively small but critical portion of the system and are considered higher risk assets. These segments may exhibit significant defects that could impair hydraulic performance or structural integrity and should be prioritized for further evaluation, condition verification, and rehabilitation planning.

Segments rated below 3.0, as well as those with no coded defects, are generally considered to be in fair to good condition and are appropriate for routine inspection and asset management tracking.

Overall, the system is characterized by predominantly moderate condition, with targeted near-term attention recommended for higher-rated segments to mitigate risk, support proactive capital planning, and extend asset service life.

2.3 STRUCTURAL CONDITION RATING SUMMARY

Structural defects remain the primary driver of elevated condition scores in the inspected downtown sewer pipelines. Based on the dataset, three segments have a structural pipe rating index of 5.0, nine segments have a structural pipe rating index between 4.0 and 4.9, 46 segments fall within the 3.0 to 3.9 range, 12 segments are rated between 2.0 and 2.9, and five segments have no coded structural defects reflected in the structural rating index.

The PACP inspection reports include structural defect codes such as fractures, broken pipe, holes, visible soil or voids, deformation, repairs/patches, and joint defects. These defect types are critical indicators of reduced pipe integrity, potential soil loss, and an increased risk of structural failure if left unaddressed.

Pipe segments with structural quick ratings beginning with Grade 5 or Grade 4 should be considered higher priority candidates for detailed CCTV review. In particular, segments with quick ratings such as 5100, 5141, 5142, 5741, or other high-grade structural scores warrant further evaluation to determine whether defects are localized (point or spot repairs) or indicative of broader deterioration requiring rehabilitation measures such as sectional repairs or cured-in-place pipe (CIPP) lining.

Overall, the structural condition distribution indicates that while most assets fall within the moderate condition range, a subset of pipes exhibits advanced structural deterioration and should be prioritized for follow-up investigation and rehabilitation planning to mitigate the potential for future failure.

2.4 OPERATION AND MAINTENANCE CONDITION RATING SUMMARY

O&M defects were less widespread than structural defects in the PACP summary results. Based on the updated dataset, this distribution appears to reflect actual observed conditions more consistently, although documentation variability may still influence reported results. Using one record per pipe segment reference, 50 segments had no coded O&M defects reflected in the O&M pipe rating index, 12 segments had O&M pipe rating indexes between 2.0 and 2.9, seven segments had indexes between 3.0 and 3.9, four segments had indexes between 4.0 and 4.9, and two segments had O&M pipe rating indexes of 5.0.

The PACP reports include O&M-related observations such as roots, deposits, debris, water level conditions, survey limitations, and other features that may affect maintenance requirements and hydraulic performance. While these defects may not directly indicate structural failure, they can contribute to capacity restrictions, surcharge conditions, and increased maintenance frequency.

Pipe segments with elevated O&M ratings should generally be considered for maintenance-focused actions, including cleaning, root removal, debris clearing, and/or follow-up CCTV inspection prior to finalizing structural rehabilitation recommendations. In some cases, O&M defects may obscure underlying structural defects; therefore, cleaning and reinspection are recommended where visibility was limited or where inspections were incomplete or terminated prior to reaching the downstream manhole.

Overall, the relatively low number of segments with elevated O&M ratings suggests that system performance issues are more localized, and that targeted maintenance activities can be used to restore capacity and improve inspection reliability in advance of rehabilitation planning.

3.0 ASSESSMENT OF DOWNTOWN SEWER PIPELINES

A priority scoring system was developed to create an objective ranking system in identifying pipelines for capital improvement planning.

3.1 OVERLAP WITH HYDRAULIC ASSESSMENT

The 10- to 12-inch pipelines along J Street and Third Street overlap with sewers previously identified for further evaluation in the hydraulic model capacity assessment. As such, these pipelines are considered higher priority assets due to the combined influence of capacity constraints and observed condition deficiencies.

Updated PACP data indicate that these pipelines generally fall within the moderate condition range, with localized defects contributing to elevated ratings. Given their importance within the system and their hydraulic significance, these segments should be prioritized for coordinated condition verification and capacity-related evaluation to support rehabilitation decision-making. These segments are flagged in the database and prioritization methodologies.

3.2 PRIORITIZATION SCORING

The Overall Pipe Rating Index (OV Index) serves as the primary indicator of pipe condition and is scaled to a normalized score using the formula: $\text{Base Score} = \text{OV Index} \times 20$. For example, a pipe with OV Index of 4.5 receives a Base Score of 90, indicating critical condition requiring immediate attention. This linear transformation preserves the relative severity relationships established in the PACP grading system while enabling integration with other quantitative risk factors.

Three adjustment factors refine base condition scoring: structural pipe rating index (ST Index), O&M pipe rating index (OM Index), and modeled capacity (from the hydraulic model assessment). ST Index accounts for reduced integrity (ST Index ≥ 4.0 = +10 points; 3.0–3.9 = +5 points; < 3.0 = 0 points). OM Index addresses operational deficiencies using identical thresholds (OM Index ≥ 4.0 = +10 points; 3.0–3.9 = +5 points; < 3.0 = 0 points). Hydraulic Capacity serves as a consequence-of-failure override: capacity-constrained pipes receive +10 points regardless of condition. These factors collectively add up to 30 potential points, ensuring assets with critical structural issues, high operational burden, or capacity constraints receive elevated priority.

The final priority score uses an additive model combining the base score with all adjustment factors. This approach ensures individual risk factors compound appropriately, elevating pipes with multiple concurrent deficiencies.

$\text{Priority Score} = \text{Base Score} + \text{ST Index Adjustment} + \text{OM Index Adjustment} + \text{Capacity Adjustment}$

The base score from the OV Index provides the foundation (0-100 points). ST adjustment adds up to 10 points for structural deficiencies. OM adjustment contributes up to 10 points for serviceability concerns. Capacity constraint adjustment adds up to 10 points for hydraulic limitations.

Example Calculation: A pipe with OV Index 4.5 (Base Score 90), ST Index 4.2 (+10 points), OM Index 3.5 (+5 points), and capacity constraint (+10 points) achieves a Final Priority Score of 115. The scoring system can theoretically reach 130 points (OV 5.0 = 100, ST +10, OM +10, Capacity +10), though practical maximum observed scores were 110-115. The minimum score is 0 points for pipes with no identified defects.

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Pipe segments were grouped into the planning categories shown in **Table 3-1** based on final Priority Score ranges, providing a structured approach to capital planning and rehabilitation scheduling over the 20-year planning horizon.

Table 3-1. Planning Categories

Category	Score Range	Planning Interpretation
0–5 Years	≥ 90	Critical condition and/or hydraulic constraint; near-term rehabilitation
6–10 Years	70–89	Elevated condition; proactive rehabilitation recommended
11–20 Years	50–69	Moderate condition; planned rehabilitation
Monitor	< 50	Acceptable condition; routine maintenance

3.3 PRIORITIZATION RESULTS

The prioritization results are summarized by length and diameter in **Table 3-2**. A total 3,628 LF of scored higher than 90 in the prioritization ranking representing critical infrastructure requiring immediate attention. A much larger portion of the area reviewed, 13,805 LF fell into the 6-10 year category with elevated scores of 70-89, indicating proactive rehabilitation is recommended before further deterioration.

To even out this distribution the City may choose to push the capacity limited pipelines (which mainly fell into the 6-10 year category based on scoring) into the 0-5 year category, along with the remaining larger diameter lines that are more critical to the overall system.

Table 3-2. Prioritization Results by Diameter and Category

Diameter	Category Total Length (LF)				Total
	0–5 Years	6–10 Years	11–20 Years	Monitor	
6-inch	3,471	7,496	5,958	394	17,320
8-inch	108	3,431	1,698	694	5,930
10-inch	49	2,389	839	0	3,277
12-inch	0	489	0	47	536
Total	3,628	13,805	8,495	1,135	27,064

Figure 3-1 depicts each priority category and highlights the pipelines identified in the hydraulic model capacity assessment as potential capacity limited segments. Each pipeline is labeled by the GIS ID shown in the table in **Attachment 1**.

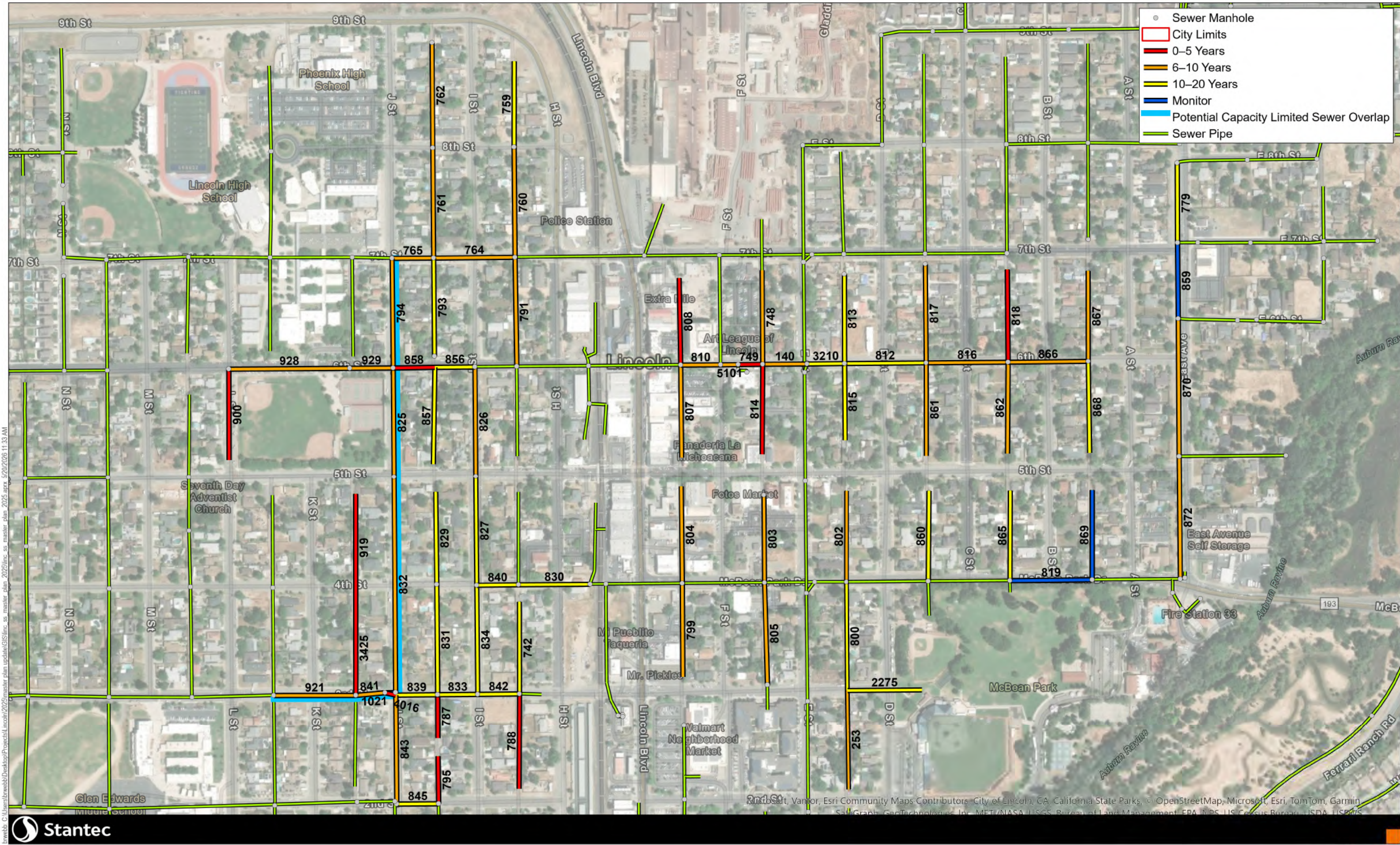


FIGURE 3-1
CONDITION ASSESSMENT PIPELINE PRIORITY CATEGORY
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4.0 REHABILITATION AND MAINTENANCE CONSIDERATIONS

The appropriate rehabilitation or maintenance response depends on the type, severity, and extent of observed defects. The following planning-level responses are recommended for consideration during detailed project development.

4.1 POINT REPAIR OR OPEN-CUT REPAIR

Point repair or open-cut replacement should be considered where defects are localized and cannot be adequately addressed using trenchless methods. Examples include severe joint offsets, broken pipe, holes with soil visible, localized collapse, significant deformation, or locations where the CCTV camera could not pass because of pipe condition.

4.2 CURED-IN-PLACE PIPE LINING

Cured-in-place pipe, or CIPP, lining should be considered where structural defects extend over a longer length of pipe or where multiple defects are present within the same segment. CIPP may be appropriate for repeated fractures, longitudinal or circumferential cracking, joint defects, or other distributed structural deterioration where the host pipe remains suitable for trenchless rehabilitation.

4.3 CLEANING AND ROOT TREATMENT

Cleaning and root treatment should be considered for pipe segments with elevated O&M ratings, roots, debris, deposits, grease, or other restrictions. Root intrusion can reduce hydraulic capacity, increase blockage risk, and contribute to accumulation of fats, oils, grease, and debris.

4.4 FOLLOW-UP CCTV INSPECTION

Follow-up CCTV inspection should be considered where the original inspection was incomplete, where visibility was limited by water level or debris, where cleaning was not completed before inspection, or where duplicate records indicate inconsistent results. Follow-up CCTV should also be completed after cleaning or root removal to confirm whether structural defects are present behind deposits, roots, or debris.

5.0 SUMMARY OF FINDINGS AND CIP RECOMMENDATIONS

A robust Repair and Replacement (R&R) program is a fundamental component of a well-managed public infrastructure system and should continue alongside major capacity improvement projects. The City's R&R program includes an annual \$3 million investment dedicated to the systematic replacement of aging and deteriorating infrastructure from which the prioritized improvements identified in this TM are assumed to be funded.

Planning level cost estimates have been developed for the pipelines included in this condition assessment. These costs are presented by planning horizon category in **Table 5-1**. Planning-level rehabilitation costs use representative unit rates by pipe diameter for cured-in-place pipe (CIPP) lining of all the downtown sewer pipes included in the condition assessment. The unit cost for CIPP lining includes bypass pumping, sewer cleaning and CCTV, traffic control, and connects to service laterals and manholes. Planning level opinion of probable cost estimates are summarized for each identified planning category.

The associated costs identified herein are presented in April 2026 dollars (Engineering News Record Construction Cost Index [ENRCCI] of 14,158) and should be reviewed and updated on an annual basis using the ENRCCI or another recognized index. The project cost estimates include base construction costs and soft costs. The engineering opinion of probable costs for the wastewater collection system falls under Classification 5 (as defined by Association for the Advancement of Cost Engineering, AACE) with an expected accuracy range of -50% to +100%.

Soft costs include a 35% mark-up for construction cost estimating and a 30% mark-up of the total construction cost for engineering, construction management and administration, which includes engineering design and engineering services during construction, construction administration, construction inspection services, and general administration costs by City.

Table 5-1. Prioritization Results by Diameter and Category

Item	0–5 Years	6–10 Years	11–20 Years
CIPP Lining (6-inch to 8-inch)	\$429,510	\$1,311,275	\$918,698
CIPP Lining (10-inch to 12-inch)	\$7,808	\$460,470	\$134,312
Construction Costs:	\$437,000	\$1,772,000	\$1,053,000
Construction Estimating Contingency (35%)	\$153,000	\$620,000	\$369,000
Total Construction Costs:	\$590,000	\$2,392,000	\$1,422,000
Engineering, CM, and Admin (30%)	\$177,000	\$718,000	\$427,000
Total Project Costs:	\$767,000	\$3,110,000	\$1,849,000

1. ENRCCI = 14,158, April 2026

The condition assessment results should be used as a planning-level screening tool to support CIP development. Final rehabilitation recommendations should be based on confirmation of the corrected database, review of the CCTV videos, verification of pipe segment limits, and coordination with hydraulic capacity findings from the Master Plan Update. Although CIPP lining is used as a budgetary tool herein, specific projects should be developed for each project considering the information presented in **Section 4.0** of this TM.

ATTACHMENT 1: CCTV DATABASE TABLE

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GIS ID	PACP Report Info Page(s)	Pipe Segment Reference	Diameter, in.	Pipe Length, LF	Structural Pipe Rating	Structural Quick Rating	Structural Pipe Rating Index	O&M Pipe Rating	O&M Quick Rating	O&M Pipe Rating Index	Overall Pipe Rating	Overall Pipe Rating Index	Priority Score	Priority Category
788	325	J12045-J12023	6	418.2	0.0	0000	0.0	5.0	5100	5.0	5.0	5.0	110	0–5 Years
808	187, 75	I12024-J12027	6	382.0	5.0	5100	5.0	0.0	0000	0.0	5.0	5.0	110	0–5 Years
818	17	I13005-J13009	6	406.8	5.0	5100	5.0	0.0	0000	0.0	5.0	5.0	110	0–5 Years
858	175	J12017-J12002	6	183.1	5.0	5100	5.0	0.0	0000	0.0	5.0	5.0	110	0–5 Years
749	62, 64	J12030-J12080	8	107.8	9.0	5141	4.5	0.0	0000	0.0	9.0	4.5	100	0–5 Years
795	349	J12038-K12020	6	208.8	8.0	5131	4.0	8.0	5131	4.0	16.0	4.0	100	0–5 Years
3425	266, 269	J12062-J12071	6	413.7	13.0	5142	4.3	0.0	0000	0.0	13.0	4.3	96	0–5 Years
919	262	J12036-J12062	6	472.0	15.0	4331	3.8	5.0	5100	5.0	20.0	4.0	95	0–5 Years
900	122	J12034-J12005	6	399.3	46.0	5741	4.2	0.0	0000	0.0	46.0	4.2	94	0–5 Years
787	335	J12039-J12019	6	192.4	4.0	4100	4.0	0.0	0000	0.0	4.0	4.0	90	0–5 Years
814	59	J12006-J12030	6	395.1	8.0	4200	4.0	0.0	0000	0.0	8.0	4.0	90	0–5 Years
4016	282	J12001-J12070	10	48.8	4.0	4100	4.0	0.0	0000	0.0	4.0	4.0	90	0–5 Years
929	119	J12004-J12017	6	190.6	144.0	4F00	4.0	2.0	2100	2.0	146.0	4.0	89	6–10 Years
791	180	I12012-J12018	8	479.3	10.0	4221	3.3	4.0	4100	4.0	14.0	3.5	85	6–10 Years
841	280	J12070-J12071	12	128.5	7.0	4131	3.5	0.0	0000	0.0	7.0	3.5	85	6–10 Years
921	276	J12071-J12072	12	360.5	46.0	4834	3.5	0.0	0000	0.0	46.0	3.5	85	6–10 Years
825	156, 148	J12017-J12016	10	479.1	48.0	4638	3.4	0.0	0000	0.0	48.0	3.4	83	6–10 Years
843	343	J12001-K12075	10	480.2	303.0	4M35	3.9	0.0	0000	0.0	303.0	3.9	83	6–10 Years
764	100	I12012-I12015	8	357.5	16.0	5232	4.0	2.0	2100	2.0	18.0	3.6	82	6–10 Years
748	53	I12006-J12030	6	413.1	71.0	544A	3.9	4.0	2200	2.0	75.0	3.8	81	6–10 Years
760	142	I12013-I12012	6	485.8	57.0	5347	3.8	0.0	0000	0.0	57.0	3.8	81	6–10 Years
807	77, 191	J12048-J12027	6	405.4	11.0	4231	3.3	4.0	4100	4.0	11.0	3.3	81	6–10 Years
870	87	I13011-J13030	8	605.2	19.0	5142	3.8	0.0	0000	0.0	19.0	3.8	81	6–10 Years
816	15	J13009-J13003	6	360.5	11.0	5132	3.7	0.0	0000	0.0	11.0	3.7	79	6–10 Years
862	21	J13014-J13009	6	400.8	33.0	5242	3.7	0.0	0000	0.0	33.0	3.7	79	6–10 Years
765	103, 106	I12015-I12009	8	183.0	18.0	5141	3.6	0.0	0000	0.0	18.0	3.6	77	6–10 Years
866	12	J13007-J13009	6	352.1	29.0	5241	3.6	0.0	0000	0.0	29.0	3.6	77	6–10 Years
928	113	J12005-J12004	8	531.9	69.0	5248	3.6	0.0	0000	0.0	69.0	3.6	77	6–10 Years
761	131	I12011-I12015	6	485.1	81.0	534A	3.5	0.0	0000	0.0	81.0	3.5	75	6–10 Years
762	127	I12010-I12011	6	461.6	7.0	4131	3.5	0.0	0000	0.0	7.0	3.5	75	6–10 Years
832	284	J12016-J12069	10	948.6	253.0	453N	3.0	0.0	0000	0.0	253.0	3.0	75	6–10 Years
861	29	J13001-J13003	6	407.9	19.0	5233	3.8	2.0	2100	2.0	21.0	3.5	75	6–10 Years
867	1	I13029-J13007	6	397.0	45.0	5144	3.5	0.0	0000	0.0	45.0	3.5	75	6–10 Years
802	210	J12052-J12032	6	400.7	20.0	4234	3.3	9.0	3300	3.0	29.0	3.2	74.4	6–10 Years
872	93	J13030-J13005	8	540.3	31.0	4139	3.1	14.0	4321	3.5	45.0	3.2	74	6–10 Years
253	248	K12040-J12026	6	435.8	106.0	5944	3.4	0.0	0000	0.0	106.0	3.4	73.4	6–10 Years
817	33	I13001-J13003	6	433.5	35.0	4535	3.5	2.0	2100	2.0	37.0	3.4	73	6–10 Years
794	109	I12009-J12017	10	481.0	24.0	5135	3.0	2.0	2100	2.0	26.0	2.9	72.8	6–10 Years

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GIS ID	PACP Report Info Page(s)	Pipe Segment Reference	Diameter, in.	Pipe Length, LF	Structural Pipe Rating	Structural Quick Rating	Structural Pipe Rating Index	O&M Pipe Rating	O&M Quick Rating	O&M Pipe Rating Index	Overall Pipe Rating	Overall Pipe Rating Index	Priority Score	Priority Category
140	50	J12053-J12030	6	194.6	13.0	4133	3.3	0.0	0000	0.0	13.0	3.3	71	6–10 Years
799	233	J12050-J12028	6	411.0	23.0	5241	3.3	0.0	0000	0.0	23.0	3.3	71	6–10 Years
810	69, 72	J12014-J12027	8	176.0	13.0	4133	3.3	0.0	0000	0.0	13.0	3.3	71	6–10 Years
826	153, 150	J12011-J12020	8	481.1	10.0	4132	3.3	0.0	0000	0.0	10.0	3.3	71	6–10 Years
5101	66	J12080-J12014	8	76.8	20.0	5141	3.3	0.0	0000	0.0	20.0	3.3	71	6–10 Years
803	217	J12024-J12029	6	385.1	9.0	4131	3.0	3.0	3100	3.0	12.0	3.0	70	6–10 Years
804	229	J12049-J12028	6	425.9	2.0	2100	2.0	4.0	4100	4.0	6.0	3.0	70	6–10 Years
805	223	J12025-J12029	6	449.7	2.0	2100	2.0	11.0	5132	3.7	13.0	3.3	70	6–10 Years
815	42	J12010-J12031	6	336.3	35.0	4337	3.2	0.0	0000	0.0	35.0	3.2	69	11–20 Years
831	298	J12012-J12019	6	484.5	29.0	4335	3.2	0.0	0000	0.0	29.0	3.2	69	11–20 Years
759	138	I12017-I12013	6	376.4	3.0	3100	3.0	0.0	0000	0.0	3.0	3.0	65	11–20 Years
779	79	I13010-I13012	8	352.1	15.0	4133	3.0	0.0	0000	0.0	15.0	3.0	65	11–20 Years
793	159	J12015-I12015	6	431.1	28.0	4432	3.1	2.0	2100	2.0	30.0	3.0	65	11–20 Years
812	26	J13003-J12031	6	360.6	13.0	4133	3.3	2.0	2100	2.0	15.0	3.0	65	11–20 Years
813	37	I12008-J12031	6	391.7	18.0	4134	3.0	0.0	0000	0.0	18.0	3.0	65	11–20 Years
829	289	J12041-J12012	6	407.1	40.0	4338	3.1	2.0	2100	2.0	42.0	3.0	65	11–20 Years
833	321	J12009-J12019	10	175.8	18.0	4232	3.0	0.0	0000	0.0	18.0	3.0	65	11–20 Years
840	315	J12022-J12021	8	183.8	12.0	4132	3.0	0.0	0000	0.0	12.0	3.0	65	11–20 Years
842	318	J12023-J12009	8	183.8	12.0	4222	3.0	0.0	0000	0.0	12.0	3.0	65	11–20 Years
845	340	K12020-K12075	8	184.0	9.0	3300	3.0	0.0	0000	0.0	9.0	3.0	65	11–20 Years
865	201	J13011-J13006	6	395.5	9.0	4131	3.0	0.0	0000	0.0	9.0	3.0	65	11–20 Years
868	7	J13015-J13007	6	401.9	10.0	4132	3.3	2.0	2100	2.0	12.0	3.0	65	11–20 Years
2275	259	J13018-J12026	6	328.9	7.0	4131	3.5	2.0	2100	2.0	9.0	3.0	65	11–20 Years
857	167	J12040-J12002	6	425.1	37.0	5143	2.8	3.0	3100	3.0	40.0	2.9	63	11–20 Years
827	305	J12020-J12021	8	479.7	20.0	4232	2.9	0.0	0000	0.0	20.0	2.9	58	11–20 Years
839	323	J12019-J12001	10	184.2	26.0	4332	2.9	0.0	0000	0.0	26.0	2.9	58	11–20 Years
742	330	J12046-J12023	6	404.2	32.0	5141	2.5	9.0	4131	3.0	41.0	2.6	56.2	11–20 Years
800	241	J12026-J12032	6	476.7	31.0	4137	2.8	0.0	0000	0.0	31.0	2.8	56	11–20 Years
3210	47	J12031-J12053	6	165.0	11.0	4131	2.8	0.0	0000	0.0	11.0	2.8	56	11–20 Years
860	205	J13010-J13002	6	397.0	2.0	2100	2.0	3.0	3100	3.0	5.0	2.5	55	11–20 Years
856	177	J12002-J12011	6	176.0	16.0	4224	2.7	0.0	0000	0.0	16.0	2.7	54	11–20 Years
834	309	J12021-J12009	10	479.5	21.0	4134	2.6	0.0	0000	0.0	21.0	2.6	52	11–20 Years
830	312	J12013-J12022	8	314.5	8.0	4122	2.7	2.0	2100	2.0	10.0	2.5	50	11–20 Years
1021	347	J12069-J12070	12	47.1	0.0	0000	0.0	0.0	0000	0.0	0.0	0.0	10	Monitor
819	0	J13008-J13006	8	361.2	0.0	0000	0.0	0.0	0000	0.0	0.0	0.0	0	Monitor
859	84	I13012-I13011	8	332.5	0.0	0000	0.0	0.0	0000	0.0	0.0	0.0	0	Monitor
869	194	J13016-J13008	6	394.3	0.0	0000	0.0	0.0	0000	0.0	0.0	0.0	0	Monitor

ATTACHMENT 2: CCTV PACP PDF REPORTS



CUES, Inc.
3600 Rio Vista Avenue
Orlando, FL 32805
Phone: 407-849-0190
Fax: 407-425-1569

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250317 08:01
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13007 TO I13029		Street: 6TH ST
City: LINCOLN		Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: AC	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 402.800 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I13029	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13007	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:		GPS accuracy:			

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	45	5144	3.5	0	0	0	0000	0.0	45	3.5	5.1	0.0
2	0	0				0	0							
3	8	24				0	0							
4	4	16				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:37	AMH					☐	/			J13007-I13029_3172025	J13007
											-	0811_AMH_0_U_12730_1.jpg
0.0 ft.	00:00:52	MWL				5	☐	/			J13007-I13029_3172025	
											-	0811_MWL_0_U_25915_1.jpg
28.8 ft.	00:02:49	BSV					☒	1 / 5		5	J13007-I13029_3172025	
											-	0813_BSV_28.8_U_35463_1.jpg
47.2 ft.	00:04:00	FS					☐	10 / 4		3	J13007-I13029_3172025	
											-	0814_FS_47.2_U_16588_1.jpg
50.7 ft.	00:04:41	FS					☐	3 / 7		3	J13007-I13029_3172025	
											-	0815_FS_50.7_U_49564_1.jpg
56.8 ft.	00:05:24	TBC				4.000	☐	3 /			J13007-I13029_3172025	
											-	0815_TBC_56.8_U_32249_1.jpg

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
58.9 ft.	00:05:43	TF		4.000			☐	9 /			J13007-I13029_3172025 - 0816_TF_58. 9_U_29401_1.jpg	
60.9 ft.	00:06:35	FM					☐	9 / 2		4	J13007-I13029_3172025 - 0816_FM_60. 9_U_5727_1.jpg	
84.5 ft.	00:07:57	FS					☐	5 / 7		3	J13007-I13029_3172025 - 0818_FS_84. 5_U_23084_1.jpg	
87.6 ft.	00:08:26	TB		4.000			☐	3 /			J13007-I13029_3172025 - 0818_TB_87. 6_U_3763_1.jpg	
108.1 ft.	00:09:33	TBC		4.000			☐	3 /			J13007-I13029_3172025 - 0819_TBC_108. 1_U_14920_1.jpg	
110.6 ft.	00:09:53	TBC		4.000			☐	9 /			J13007-I13029_3172025 - 0820_TBC_110. 6_U_36810_1.jpg	
130.7 ft.	00:10:41	MWLS				45	☐	/		3	J13007-I13029_3172025 - 0821_MWLS_130. 7_U_41382_1.jpg	
142.2 ft.	00:11:24	TB		4.000			☐	3 /			J13007-I13029_3172025 - 0821_TB_142. 2_U_4353_1.jpg	
160.4 ft.	00:12:13	TBC		4.000			☐	3 /			J13007-I13029_3172025 - 0822_TBC_160. 4_U_17468_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
162.7 ft. 00:12:44		TFC		4.000			☐	9 /			J13007-I13029_3172025 - 0823_TFC_162. 7_U_23909_1.jpg	
173.6 ft. 00:13:26		TB		4.000			☐	9 /			J13007-I13029_3172025 - 0823_TB_173. 6_U_14292_1.jpg	
186.6 ft. 00:14:33		B					☐	11 / 4		4	J13007-I13029_3172025 - 0824_B_186. 6_U_18917_1.jpg	
186.6 ft. 00:15:02		TB		4.000			☐	3 /			J13007-I13029_3172025 - 0825_TB_186. 6_U_33844_1.jpg	
210.1 ft. 00:16:04		TBC		4.000			☐	3 /			J13007-I13029_3172025 - 0826_TBC_210. 1_U_41396_1.jpg	
212.4 ft. 00:16:32		TBC		4.000			☐	9 /			J13007-I13029_3172025 - 0826_TBC_212. 4_U_25412_1.jpg	
215.1 ft. 00:17:34		TB		4.000			☐	3 /			J13007-I13029_3172025 - 0827_TB_215. 1_U_38314_1.jpg	
218.3 ft. 00:18:42		TB		4.000			☐	9 /			J13007-I13029_3172025 - 0829_TB_218. 3_U_40862_1.jpg	
257.6 ft. 00:20:11		TF		4.000			☐	9 /			J13007-I13029_3172025 - 0830_TF_257. 6_U_19012_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
260.5 ft.	00:20:41	TFC		4.000			☐	3 /			J13007-I13029_3172025 - 0831_TFC_260. 5_U_12352_1.jpg	
261.0 ft.	00:21:03	FM					☐	12 / 12		4	J13007-I13029_3172025 - 0831_FM_261_U_33607 _1.jpg	
262.3 ft.	00:21:28	TFC		4.000			☐	9 /			J13007-I13029_3172025 - 0831_TFC_262. 3_U_46745_1.jpg	
273.5 ft.	00:22:21	TB		4.000			☐	3 /			J13007-I13029_3172025 - 0832_TB_273. 5_U_9466_1.jpg	
298.6 ft.	00:23:36	FS					☐	4 / 7		3	J13007-I13029_3172025 - 0833_FS_298. 6_U_32131_1.jpg	
308.7 ft.	00:24:19	TB		4.000			☐	3 /			J13007-I13029_3172025 - 0834_TB_308. 7_U_44404_1.jpg	
315.1 ft.	00:24:53	FS					☐	5 / 7		3	J13007-I13029_3172025 - 0835_FS_315. 1_U_10253_1.jpg	
318.3 ft.	00:25:22	TFC		4.000			☐	3 /			J13007-I13029_3172025 - 0835_TFC_318. 3_U_15120_1.jpg	
332.9 ft.	00:26:05	TF		4.000			☐	9 /			J13007-I13029_3172025 - 0836_TF_332. 9_U_15753_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
346.1 ft.	00:26:58	FS					☐	5	7	3	J13007-I13029_3172025 - 0837_FS_346. 1_U_34351_1.jpg	
352.1 ft.	00:27:42	FS					☐	9	3	3	J13007-I13029_3172025 - 0838_FS_352. 1_U_6973_1.jpg	
352.8 ft.	00:28:04	TB		4.000			☐	3	/		J13007-I13029_3172025 - 0838_TB_352. 8_U_36654_1.jpg	
361.9 ft.	00:28:53	TFC		4.000			☐	3	/		J13007-I13029_3172025 - 0839_TFC_361. 9_U_47661_1.jpg	
364.0 ft.	00:29:16	TFC		4.000			☐	9	/		J13007-I13029_3172025 - 0839_TFC_364_U_5960 _1.jpg	
373.3 ft.	00:30:19	B					☒	12	6	4	J13007-I13029_3172025 - 0840_B_373. 3_U_47146_1.jpg	
399.1 ft.	00:31:44	TF		4.000			☐	3	/		J13007-I13029_3172025 - 0842_TF_399. 1_U_29084_1.jpg	
401.0 ft.	00:32:12	TF		4.000			☐	9	/		J13007-I13029_3172025 - 0842_TF_401_U_3995_ 1.jpg	
402.8 ft.	00:32:53	ACOM					☐	/			J13007-I13029_3172025 I13029 - 0843_ACOM_402. 8_U_34940_1.jpg	

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250317 08:43
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13007 TO J13015	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: AC	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 405.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13015	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13007	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	10	4132	3.3	0	0	2	2100	2.0	12	3.0	4.1	0.0
2	0	0				1	2							
3	2	6				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:37	AMH					☐	/			J13007- J13015_3172025- 0907_AMH_0_U_25395_1.jpg	J13007
0.0 ft.	00:00:53	MWL				5	☐	/			J13007- J13015_3172025- 0908_MWL_0_U_44103_1.jpg	
26.6 ft.	00:02:35	FM					☐	12 / 12		4	J13007- J13015_3172025- 0909_FM_26.6_U_40189_1.jpg	
46.3 ft.	00:03:39	TFC			4.000		☐	3 /			J13007- J13015_3172025- 0910_TFC_46.3_U_20783_1.jpg	
48.3 ft.	00:04:01	TFC			4.000		☐	10 /			J13007- J13015_3172025- 0911_TFC_48.3_U_13926_1.jpg	
87.5 ft.	00:05:30	TB			4.000		☐	9 /			J13007- J13015_3172025- 0912_TB_87.5_U_5267_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
98.2 ft.	00:06:13	TB		4.000			☐	3	/		J13007- J13015_3172025- 0913_TB_98. 2_U_13349_1.jpg	
100.1 ft.	00:06:37	TFC		4.000			☐	9	/		J13007- J13015_3172025- 0913_TFC_100. 1_U_41888_1.jpg	
147.9 ft.	00:08:21	TF		4.000			☐	3	/		J13007- J13015_3172025- 0915_TF_147. 9_U_37941_1.jpg	
149.8 ft.	00:08:35	TF		4.000			☐	9	/		J13007- J13015_3172025- 0915_TF_149. 8_U_38745_1.jpg	
163.0 ft.	00:09:20	TB		4.000			☐	9	/		J13007- J13015_3172025- 0916_TB_163_U_8317_ 1.jpg	
165.0 ft.	00:09:45	TBA		4.000			☐	3	/		J13007- J13015_3172025- 0917_TBA_165_U_2179 2_1.jpg	
195.4 ft.	00:11:02	TB		4.000			☐	8	/		J13007- J13015_3172025- 0918_TB_195. 4_U_19613_1.jpg	
199.5 ft.	00:11:25	TF		4.000			☐	3	/		J13007- J13015_3172025- 0918_TF_199. 5_U_46870_1.jpg	
201.6 ft.	00:11:53	TFC		4.000			☐	9	/		J13007- J13015_3172025- 0919_TFC_201. 6_U_4625_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
238.0 ft. 00:13:17		FS					☐	5	7	3	J13007- J13015_3172025- 0920_FS_238_U_7797_ 1.jpg	
238.9 ft. 00:13:41		TB		4.000			☐	12	/		J13007- J13015_3172025- 0920_TB_238. 9_U_28846_1.jpg	
249.5 ft. 00:14:30		TFC		4.000			☐	3	/		J13007- J13015_3172025- 0921_TFC_249. 5_U_7058_1.jpg	
251.3 ft. 00:14:59		TFC		4.000			☐	9	/		J13007- J13015_3172025- 0922_TFC_251. 3_U_44483_1.jpg	
264.2 ft. 00:15:42		TF		4.000			☐	3	/		J13007- J13015_3172025- 0922_TF_264. 2_U_13217_1.jpg	
274.4 ft. 00:16:23		TB		4.000			☐	10	/		J13007- J13015_3172025- 0923_TB_274. 4_U_4015_1.jpg	
288.3 ft. 00:17:47		FL	S01				☐	6	/	3	J13007- J13015_3172025- 0925_FL_288. 3_U_23335_1.jpg	
293.9 ft. 00:19:00		FL	F01				☐	6	/	3	J13007- J13015_3172025- 0926_FL_293. 9_U_17084_1.jpg	
298.2 ft. 00:19:51		RTJ				10	☒	12	12	2	J13007- J13015_3172025- 0927_RTJ_298. 2_U_41087_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
301.4 ft.	00:20:38	TF		4.000			☐	3	/		J13007- J13015_3172025- 0927_TF_301. 4_U_18980_1.jpg	FILLED WITH ROOTBALL
303.4 ft.	00:20:57	TF		4.000			☐	3	/		J13007- J13015_3172025- 0928_TF_303. 4_U_15059_1.jpg	
345.5 ft.	00:22:47	TB		4.000			☐	9	/		J13007- J13015_3172025- 0930_TB_345. 5_U_8637_1.jpg	
353.1 ft.	00:23:12	TF		4.000			☐	3	/		J13007- J13015_3172025- 0930_TF_353. 1_U_29891_1.jpg	
355.2 ft.	00:23:33	TF		4.000			☐	9	/		J13007- J13015_3172025- 0930_TF_355. 2_U_25341_1.jpg	
401.0 ft.	00:25:41	TFC		4.000			☐	3	/		J13007- J13015_3172025- 0932_TFC_401_U_4009 _1.jpg	
405.3 ft.	00:27:34	ACOM					☐		/		J13007- J13015_3172025- 0934_ACOM_405. 3_U_43837_1.jpg	J13015

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250317 09:43	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13007 TO J13009	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 355.900 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13007	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	29	5241	3.6	0	0	0	0000	0.0	29	3.6	5.2	0.0
2	0	0				0	0							
3	5	15				0	0							
4	1	4				0	0							
5	2	10				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:35	AMH					☐	/			J13007- J13009_3172025- 0945_AMH_0_D_21476 _1.jpg	J13007
0.0 ft.	00:00:50	MWL				5	☐	/			J13007- J13009_3172025- 0946_MWL_0_D_24894 _1.jpg	
56.2 ft.	00:03:55	FS					☐	10 / 3		3	J13007- J13009_3172025- 0949_FS_56. 2_D_44635_1.jpg	
71.6 ft.	00:04:58	H					☐	11 / 12		4	J13007- J13009_3172025- 0950_H_71. 6_D_14607_1.jpg	
74.3 ft.	00:05:32	HSV					☐	10 / 12		5	J13007- J13009_3172025- 0950_HSV_74. 3_D_23680_1.jpg	
108.0 ft.	00:07:33	FS					☐	11 / 4		3	J13007- J13009_3172025- 0952_FS_108_D_49152 _1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
116.2 ft.	00:08:14	FS					☐	9	2	3	J13007- J13009_3172025- 0953_FS_116. 2_D_2219_1.jpg	
121.9 ft.	00:08:44	FS					☐	9	5	3	J13007- J13009_3172025- 0953_FS_121. 9_D_2116_1.jpg	
156.2 ft.	00:10:47	H					☐	11	1	5	J13007- J13009_3172025- 0956_H_156. 2_D_10481_1.jpg	
159.5 ft.	00:11:22	FS					☐	8	3	3	J13007- J13009_3172025- 0956_FS_159. 5_D_1781_1.jpg	
355.9 ft.	00:17:50	AMH					☐	/			J13007- J13009_3172025- 1003_AMH_355. 9_D_24671_1.jpg	J13009

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250317 10:12
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13009 TO J1303	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 364.400 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J1303	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	11	5132	3.7	0	0	0	0000	0.0	11	3.7	5.1	0.0
2	0	0				0	0							
3	2	6				0	0							
4	0	0				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:39	AMH					☐	/			J13009-J1303_3172025-1018_AMH_0_D_15338_1.jpg	J13009
0.0 ft.	00:00:54	MWL				5	☐	/			J13009-J1303_3172025-1018_MWL_0_D_46842_1.jpg	
58.2 ft.	00:03:48	FS					☐	9 / 3		3	J13009-J1303_3172025-1021_FS_58.2_D_22657_1.jpg	
123.6 ft.	00:06:34	FS					☐	10 / 3		3	J13009-J1303_3172025-1024_FS_123.6_D_45421_1.jpg	
163.8 ft.	00:08:28	MWL				50	☐	/			J13009-J1303_3172025-1026_MWL_163.8_D_43750_1.jpg	
184.3 ft.	00:09:33	MWL				5	☐	/			J13009-J1303_3172025-1027_MWL_184.3_D_43577_1.jpg	
194.1 ft.	00:10:31	HVV					☐	11 / 12		5	J13009-J1303_3172025-1028_HVV_194.1_D_16382_1.jpg	
364.4 ft.	00:17:50	AMH					☐	/			J13009-J1303_3172025-1035_AMH_364.4_D_1783_1.jpg	J1303

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250317 10:45	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13009 TO I13005	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 402.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I13005	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	5	5100	5.0	0	0	0	0000	0.0	5	5.0	5.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:40	AMH					☐	/			J13009-I13005_3172025	J13009
											- 1047_AMH_0_U_41143_1.jpg	
0.0 ft.	00:00:58	MWL				5	☐	/			J13009-I13005_3172025	
											- 1048_MWL_0_U_33396_1.jpg	
46.2 ft.	00:03:24	TFC			4.000		☐	3 /			J13009-I13005_3172025	
											- 1050_TFC_46.2_U_34955_1.jpg	
48.2 ft.	00:03:48	TFC			4.000		☐	9 /			J13009-I13005_3172025	
											- 1051_TFC_48.2_U_596_1.jpg	
97.6 ft.	00:05:37	TF			4.000		☐	3 /			J13009-I13005_3172025	
											- 1052_TF_97.6_U_4949_1.jpg	
99.8 ft.	00:05:55	TF			4.000		☐	9 /			J13009-I13005_3172025	
											- 1053_TF_99.8_U_39620_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
149.3 ft.	00:07:44	TFC		4.000			☐	3	/		J13009-I13005_3172025 - 1055_TFC_149. 3_U_47097_1.jpg	
151.3 ft.	00:08:00	TF		4.000			☐	9	/		J13009-I13005_3172025 - 1055_TF_151. 3_U_33007_1.jpg	
168.1 ft.	00:09:01	TB		4.000			☐	1	/		J13009-I13005_3172025 - 1056_TB_168. 1_U_13313_1.jpg	
200.9 ft.	00:10:34	TF		4.000			☐	3	/		J13009-I13005_3172025 - 1057_TF_200. 9_U_35666_1.jpg	
223.4 ft.	00:11:45	TF		4.000			☐	9	/		J13009-I13005_3172025 - 1059_TF_223. 4_U_29862_1.jpg	
242.6 ft.	00:12:54	TB		4.000			☐	3	/		J13009-I13005_3172025 - 1100_TB_242. 6_U_42383_1.jpg	
250.3 ft.	00:13:28	TF		4.000			☐	3	/		J13009-I13005_3172025 - 1100_TF_250. 3_U_38275_1.jpg	
252.4 ft.	00:13:44	TF		4.000			☐	9	/		J13009-I13005_3172025 - 1101_TF_252. 4_U_33552_1.jpg	
303.8 ft.	00:15:27	TF		4.000			☐	9	/		J13009-I13005_3172025 - 1102_TF_303. 8_U_6757_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
314.3 ft. 00:16:02		TF		4.000			☐	3 /			J13009-I13005_3172025 - 1103_TF_314. 3_U_587_1.jpg	
352.9 ft. 00:17:36		TF		4.000			☐	3 /			J13009-I13005_3172025 - 1104_TF_352. 9_U_13754_1.jpg	
359.7 ft. 00:19:07		TF		4.000			☐	9 /			J13009-I13005_3172025 - 1140_TF_359. 7_U_42881_1.jpg	
394.4 ft. 00:25:26		HSV					☐	10 / 12		5	J13009-I13005_3172025 - 1146_HSV_394. 4_U_39201_1.jpg	
398.3 ft. 00:28:55		TF		4.000			☐	3 /			J13009-I13005_3172025 - 1149_TF_398. 3_U_37781_1.jpg	
402.3 ft. 00:30:06		ACOM					☐	/			J13009-I13005_3172025 I13005 - 1151_ACOM_402. 3_U_15238_1.jpg	

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250317 12:03
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13009 TO J13014	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 383.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13014	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	33	5242	3.7	0	0	0	0000	0.0	33	3.7	5.2	0.0
2	0	0				0	0							
3	5	15				0	0							
4	2	8				0	0							
5	2	10				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:42	AMH					☐	/			J13009- J13014_3172025- 1205_AMH_0_U_9735_1.jpg	J13009
0.0 ft.	00:01:08	MWL				5	☐	/			J13009- J13014_3172025- 1205_MWL_0_U_18593_1.jpg	
45.5 ft.	00:03:34	MWL				50	☐	/			J13009- J13014_3172025- 1207_MWL_45.5_U_41384_1.jpg	
46.0 ft.	00:03:47	TF			4.000		☐	3 /			J13009- J13014_3172025- 1208_TF_46_U_3439_1.jpg	
47.7 ft.	00:04:07	TF			4.000		☐	9 /			J13009- J13014_3172025- 1208_TF_47.7_U_46209_1.jpg	
63.7 ft.	00:05:12	HSV					☐	11 / 12		5	J13009- J13014_3172025- 1209_HSV_63.7_U_33533_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
75.4 ft.	00:05:56	FS					☐	4	/ 7	3	J13009- J13014_3172025- 1210_FS_75. 4_U_38607_1.jpg	
97.2 ft.	00:06:43	TFC		4.000			☐	3	/		J13009- J13014_3172025- 1211_TFC_97. 2_U_24042_1.jpg	
99.2 ft.	00:06:57	TF		4.000			☐	9	/		J13009- J13014_3172025- 1211_TF_99. 2_U_4479_1.jpg	
109.8 ft.	00:07:42	FS					☐	3	/ 7	3	J13009- J13014_3172025- 1212_FS_109. 8_U_24289_1.jpg	
146.4 ft.	00:09:34	TFC		4.000			☐	3	/		J13009- J13014_3172025- 1214_TFC_146. 4_U_36163_1.jpg	
148.5 ft.	00:09:53	TFC		4.000			☐	9	/		J13009- J13014_3172025- 1214_TFC_148. 5_U_42275_1.jpg	
152.3 ft.	00:10:15	MWLS				50	☐	/		3	J13009- J13014_3172025- 1214_MWLS_152. 3_U_20325_1.jpg	
197.7 ft.	00:12:01	TF		4.000			☐	3	/		J13009- J13014_3172025- 1216_TF_197. 7_U_8941_1.jpg	
199.9 ft.	00:12:18	TF		4.000			☐	9	/		J13009- J13014_3172025- 1216_TF_199. 9_U_27717_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
201.9 ft.	00:12:45	H					☐	11	12	4	J13009-J13014_3172025-1217_H_201.9_U_21030_1.jpg	
235.5 ft.	00:14:14	MWLS				50	☐	/		3	J13009-J13014_3172025-1218_MWLS_235.5_U_7928_1.jpg	
245.2 ft.	00:14:54	TFC		4.000			☐	3	/		J13009-J13014_3172025-1219_TFC_245.2_U_30999_1.jpg	
247.3 ft.	00:15:20	TFC		4.000			☐	9	/		J13009-J13014_3172025-1219_TFC_247.3_U_46297_1.jpg	
251.0 ft.	00:15:52	TB		4.000			☐	9	/		J13009-J13014_3172025-1220_TB_251_U_21049_1.jpg	
252.3 ft.	00:16:23	TB		4.000			☐	12	/		J13009-J13014_3172025-1220_TB_252.3_U_44690_1.jpg	
263.8 ft.	00:17:03	TB		4.000			☐	4	/		J13009-J13014_3172025-1221_TB_263.8_U_45182_1.jpg	
269.1 ft.	00:17:31	MWLS				50	☐	/		3	J13009-J13014_3172025-1221_MWLS_269.1_U_42924_1.jpg	
291.0 ft.	00:18:42	HSV					☐	10	12	5	J13009-J13014_3172025-1223_HSV_291_U_25535_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
299.0 ft.	00:19:20	TFC		4.000			☐	3	/		J13009- J13014_3172025- 1223_TFC_299_U_2204 2_1.jpg	
300.9 ft.	00:19:39	TF		4.000			☐	9	/		J13009- J13014_3172025- 1224_TF_300. 9_U_11590_1.jpg	
349.9 ft.	00:21:24	TF		4.000			☐	3	/		J13009- J13014_3172025- 1225_TF_349. 9_U_31990_1.jpg	
352.3 ft.	00:21:42	TF		4.000			☐	9	/		J13009- J13014_3172025- 1226_TF_352. 3_U_31519_1.jpg	
366.2 ft.	00:22:26	TF		4.000			☐	3	/		J13009- J13014_3172025- 1226_TF_366. 2_U_30477_1.jpg	
379.2 ft.	00:23:17	TFC		4.000			☐	3	/		J13009- J13014_3172025- 1227_TFC_379. 2_U_33492_1.jpg	
380.7 ft.	00:23:51	TF		4.000			☐	9	/		J13009- J13014_3172025- 1228_TF_380. 7_U_8175_1.jpg	
383.0 ft.	00:24:52	B					☐	12	/ 12	4	J13009- J13014_3172025- 1229_B_383_U_27750_ 1.jpg	
383.2 ft.	00:25:32	MSA					☐	/			J13009- J13014_3172025- 1229_MSA_383. 2_U_33067_1.jpg	CAMERA WILL NOT MAKE IT PASSED OFFSET

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250317 12:50
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13003 TO J12031	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 364.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13003	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12031	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	13	4133	3.3	0	0	2	2100	2.0	15	3.0	4.1	0.0
2	0	0				1	2							
3	3	9				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:38	AMH					☐	/			J13003-J12031_3172025-1254_AMH_0_D_34703_1.jpg	J13003
0.0 ft.	00:00:59	MWL				5	☐	/			J13003-J12031_3172025-1254_MWL_0_D_27361_1.jpg	
4.7 ft.	00:02:13	FM					☐	12 / 12		4	J13003-J12031_3172025-1255_FM_4.7_D_42762_1.jpg	
21.9 ft.	00:03:14	DAGS				5	☐	3 / 9		2	J13003-J12031_3172025-1259_DAGS_21.9_D_31796_1.jpg	
230.3 ft.	00:14:20	FS					☐	3 / 9		3	J13003-J12031_3172025-1312_FS_230.3_D_32365_1.jpg	
304.6 ft.	00:19:43	FS					☐	10 / 5		3	J13003-J12031_3172025-1326_FS_304.6_D_48738_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
359.5 ft.	00:22:15	FL					☐	12	/	3	J13003- J12031_3172025- 1328_FL_359. 5_D_28109_1.jpg	
364.2 ft.	00:22:47	AMH					☐		/		J13003- J12031_3172025- 1329_AMH_364. 2_D_14191_1.jpg	J12031

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250317 13:36
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13001 TO J13003	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 381.500 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13001	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13003	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	19	5233	3.8	0	0	2	2100	2.0	21	3.5	5.2	0.0
2	0	0				1	2							
3	3	9				0	0							
4	0	0				0	0							
5	2	10				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:39	AMH					☐	/			J13001- J13003_3172025- 1338_AMH_0_D_29808_1.jpg	J13003
0.0 ft.	00:00:56	MWL				50	☐	/			J13001- J13003_3172025- 1338_MWL_0_D_23972_1.jpg	
18.3 ft.	00:02:31	FS					☐	5 / 7		3	J13001- J13003_3172025- 1339_FS_18.3_D_9345_1.jpg	
47.6 ft.	00:04:29	TF			4.000		☐	3 /			J13001- J13003_3172025- 1341_TF_47.6_D_47191_1.jpg	
47.7 ft.	00:04:17	TF			4.000		☐	9 /			J13001- J13003_3172025- 1341_TF_47.7_D_7232_1.jpg	
48.9 ft.	00:03:43	MMC					☐	/			J13001- J13003_3172025- 1341 MMC_48.9_D_44334_1.jpg	PVC

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
97.9 ft.	00:06:20	TF		4.000			☐	3 /			J13001-J13003_3172025-1343_TF_97.9_D_49607_1.jpg	
99.4 ft.	00:06:39	TF		4.000			☐	9 /			J13001-J13003_3172025-1344_TF_99.4_D_46186_1.jpg	
145.7 ft.	00:08:30	TF		4.000			☐	3 /			J13001-J13003_3172025-1345_TF_145.7_D_44663_1.jpg	
148.2 ft.	00:08:55	TB		4.000			☐	9 /			J13001-J13003_3172025-1346_TB_148.2_D_27788_1.jpg	
200.6 ft.	00:11:01	MWLS				50	☐	/		3	J13001-J13003_3172025-1348_MWLS_200.6_D_31016_1.jpg	
200.6 ft.	00:11:14	TF		4.000			☐	3 /			J13001-J13003_3172025-1348_TF_200.6_D_6930_1.jpg	
203.9 ft.	00:11:34	TF		4.000			☐	9 /			J13001-J13003_3172025-1349_TF_203.9_D_14322_1.jpg	
215.1 ft.	00:13:36	DAZ				5	☒	10 / 11		2	J13001-J13003_3172025-1351_DAZ_215.1_D_2476_1.jpg	CONCRETE
217.1 ft.	00:15:34	HSV					☐	2 / 6		5	J13001-J13003_3172025-1353_HSV_217.1_D_47110_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
225.8 ft.	00:16:24	HSV					☐	11	12	5	J13001- J13003_3172025- 1353_HSV_225. 8_D_45385_1.jpg	
251.4 ft.	00:17:28	TFC		4.000			☐	3	/		J13001- J13003_3172025- 1354_TFC_251. 4_D_42490_1.jpg	
253.4 ft.	00:17:44	TF		4.000			☐	9	/		J13001- J13003_3172025- 1355_TF_253. 4_D_28771_1.jpg	
300.6 ft.	00:19:27	TF		4.000			☐	3	/		J13001- J13003_3172025- 1356_TF_300. 6_D_2252_1.jpg	
302.9 ft.	00:19:59	TFC		4.000			☐	9	/		J13001- J13003_3172025- 1357_TFC_302. 9_D_19785_1.jpg	
352.2 ft.	00:22:13	TF		4.000			☐	3	/		J13001- J13003_3172025- 1359_TF_352. 2_D_45068_1.jpg	
354.3 ft.	00:22:43	TF		4.000			☐	9	/		J13001- J13003_3172025- 1400_TF_354. 3_D_19006_1.jpg	
366.8 ft.	00:23:46	FS					☐	5	7	3	J13001- J13003_3172025- 1401_FS_366. 8_D_34762_1.jpg	
381.5 ft.	00:24:47	AMH					☐	/			J13001- J13003_3172025- 1402_AMH_381. 5_D_10504_1.jpg	J13001

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250317 14:06
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13003 TO I13001	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 220.700 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I13001	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13003	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	35	4535	3.5	0	0	2	2100	2.0	37	3.4	4.5	0.0
2	0	0				1	2							
3	5	15				0	0							
4	5	20				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:41	AMH					☐	/			J13003-I13001_3172025	J13003
											- 1411_AMH_0_U_18544_1.jpg	
0.0 ft.	00:00:57	MWL				5	☐	/			J13003-I13001_3172025	
											- 1412_MWL_0_U_24277_1.jpg	
34.4 ft.	00:03:51	RTJ				5	☒	2 / 6		2	J13003-I13001_3172025	
											- 1415_RTJ_34.4_U_16137_1.jpg	
67.7 ft.	00:07:10	TF			4.000		☐	3 /			J13003-I13001_3172025	
											- 1425_TF_67.7_U_23884_1.jpg	
67.7 ft.	00:07:27	FM					☐	12 / 12		4	J13003-I13001_3172025	
											- 1425_FM_67.7_U_19179_1.jpg	
69.6 ft.	00:07:55	TF			4.000		☐	9 /			J13003-I13001_3172025	
											- 1426_TF_69.6_U_28430_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
91.0 ft.	00:09:17	TB		4.000			☐	9 /			J13003-I13001_3172025 - 1427_TB_91_U_36550_1.jpg	
94.0 ft.	00:10:19	FL					☐	8 /		3	J13003-I13001_3172025 - 1428_FL_94_U_37495_1.jpg	
100.6 ft.	00:11:05	FS					☐	9 / 3		3	J13003-I13001_3172025 - 1429_FS_100.6_U_27926_1.jpg	
112.3 ft.	00:12:25	FS					☐	1 / 3		3	J13003-I13001_3172025 - 1430_FS_112.3_U_35468_1.jpg	
115.1 ft.	00:12:57	FS					☐	3 / 9		3	J13003-I13001_3172025 - 1431_FS_115.1_U_33813_1.jpg	
117.6 ft.	00:13:37	FS					☐	9 / 12		3	J13003-I13001_3172025 - 1432_FS_117.6_U_45780_1.jpg	
119.0 ft.	00:13:51	TF		4.000			☐	3 /			J13003-I13001_3172025 - 1432_TF_119_U_44577_1.jpg	
120.9 ft.	00:14:48	TF		4.000			☐	9 /			J13003-I13001_3172025 - 1433_TF_120.9_U_33617_1.jpg	
122.8 ft.	00:14:20	B					☐	5 / 6		4	J13003-I13001_3172025 - 1432_B_122.8_U_26649_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
137.2 ft. 00:15:49		H					☐	11	12	4	J13003-I13001_3172025 - 1434_H_137. 2_U_38580_1.jpg	
149.3 ft. 00:17:10		H					☐	11	12	4	J13003-I13001_3172025 - 1435_H_149. 3_U_45421_1.jpg	
150.0 ft. 00:17:33		FH4	S01				☐	12	12	4	J13003-I13001_3172025 - 1436_FH4_150_U_2701 8_1.jpg	
154.9 ft. 00:18:06		FH4	F01				☐	12	12	4	J13003-I13001_3172025 - 1436_FH4_154. 9_U_19607_1.jpg	
170.4 ft. 00:18:54		TF		4.000			☐	3	/		J13003-I13001_3172025 - 1437_TF_170. 4_U_14921_1.jpg	
172.4 ft. 00:19:12		TFC		4.000			☐	9	/		J13003-I13001_3172025 - 1437_TFC_172. 4_U_43323_1.jpg	
206.9 ft. 00:20:32		TF		4.000			☐	9	/		J13003-I13001_3172025 - 1439_TF_206. 9_U_12092_1.jpg	
219.5 ft. 00:21:24		TF		4.000			☐	3	/		J13003-I13001_3172025 - 1439_TF_219. 5_U_37207_1.jpg	
220.7 ft. 00:24:18		MSA					☐	/			J13003-I13001_3172025 - 1448_MSA_220. 7_U_12025_1.jpg	CAMERA WILL NOT MAKE IT PASSED OFFSET

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 06:56
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12031 TO I12008	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 405.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12008	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12031	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	18	4134	3.0	0	0	0	0000	0.0	18	3.0	4.1	0.0
2	1	2				0	0							
3	4	12				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:42	AMH					☐	/			J12031-I12008_3182025	J12031 - 0718_AMH_0_U_22064_1.jpg
0.0 ft.	00:00:58	MWL				5	☐	/			J12031-I12008_3182025	- 0719_MWL_0_U_35395_1.jpg
3.0 ft.	00:01:23	MWL				20	☐	/			J12031-I12008_3182025	- 0719_MWL_3_U_45919_1.jpg
18.6 ft.	00:04:24	FS					☐	7 / 5		3	J12031-I12008_3182025	- 0730_FS_18.6_U_22597_1.jpg
36.1 ft.	00:05:57	H					☐	3 / 4		4	J12031-I12008_3182025	- 0731_H_36.1_U_44067_1.jpg
47.3 ft.	00:07:01	FS					☐	5 / 9		3	J12031-I12008_3182025	- 0732_FS_47.3_U_18627_1.jpg

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
49.1 ft.	00:07:36	FL					☐	4 /		3	J12031-I12008_3182025 - 0733_FL_49. 1_U_4305_1.jpg	
50.6 ft.	00:08:03	TFC		4.000			☐	3 /			J12031-I12008_3182025 - 0733_TFC_50. 6_U_16913_1.jpg	
52.8 ft.	00:08:22	TF		4.000			☐	9 /			J12031-I12008_3182025 - 0733_TF_52. 8_U_5742_1.jpg	
54.4 ft.	00:09:00	FL					☐	9 /		3	J12031-I12008_3182025 - 0734_FL_54. 4_U_29884_1.jpg	
72.7 ft.	00:10:44	TBA		6.000			☐	12 /			J12031-I12008_3182025 - 0736_TBA_72. 7_U_10640_1.jpg	
99.9 ft.	00:12:53	TF		4.000			☐	3 /			J12031-I12008_3182025 - 0738_TF_99. 9_U_7733_1.jpg	
128.9 ft.	00:15:07	TFC		4.000			☐	9 /			J12031-I12008_3182025 - 0740_TFC_128. 9_U_1666_1.jpg	
149.3 ft.	00:16:36	TF		4.000			☐	9 /			J12031-I12008_3182025 - 0742_TF_149. 3_U_42577_1.jpg	
151.1 ft.	00:17:04	TFC		4.000			☐	4 /			J12031-I12008_3182025 - 0742_TFC_151. 1_U_29282_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
196.4 ft.	00:20:03	TFC		4.000			☐	3	/		J12031-I12008_3182025 - 0745_TFC_196. 4_U_49776_1.jpg	
198.4 ft.	00:20:20	TF		4.000			☐	9	/		J12031-I12008_3182025 - 0745_TF_198. 4_U_29414_1.jpg	
231.8 ft.	00:22:05	TB		4.000			☐	12	/		J12031-I12008_3182025 - 0747_TB_231. 8_U_27089_1.jpg	
248.0 ft.	00:23:24	TFC		4.000			☐	3	/		J12031-I12008_3182025 - 0749_TFC_248_U_3438 3_1.jpg	
250.2 ft.	00:24:00	TF		4.000			☐	9	/		J12031-I12008_3182025 - 0749_TF_250. 2_U_35958_1.jpg	
303.5 ft.	00:26:38	TFC		4.000			☐	3	/		J12031-I12008_3182025 - 0752_TFC_303. 5_U_11489_1.jpg	
304.4 ft.	00:27:17	TF		4.000			☐	9	/		J12031-I12008_3182025 - 0752_TF_304. 4_U_20952_1.jpg	
324.7 ft.	00:28:54	TB		4.000			☐	2	/		J12031-I12008_3182025 - 0754_TB_324. 7_U_25046_1.jpg	
348.5 ft.	00:30:32	FC					☐	11	/ 6	2	J12031-I12008_3182025 - 0756_FC_348. 5_U_31568_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
351.4 ft.	00:30:50	TF		4.000			☐	3	/		J12031-I12008_3182025 - 0756_TF_351. 4_U_39558_1.jpg	
353.6 ft.	00:31:05	TF		4.000			☐	9	/		J12031-I12008_3182025 - 0756_TF_353. 6_U_14777_1.jpg	
403.2 ft.	00:33:29	TFC		4.000			☐	3	/		J12031-I12008_3182025 - 0759_TFC_403. 2_U_32856_1.jpg	
405.3 ft.	00:39:39	ACOM					☐		/		J12031-I12008_3182025 I12008 - 0805_ACOM_405. 3_U_33523_1.jpg	

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250318 09:16	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12031 TO J12010	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 378.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12010	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12031	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	35	4337	3.2	0	0	0	0000	0.0	35	3.2	4.3	0.0
2	1	2				0	0							
3	7	21				0	0							
4	3	12				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:41	AMH					☐	/			J12031- J12010_3182025- 0922_AMH_0_U_42543_1.jpg	J12031
0.0 ft.	00:00:56	MWL				5	☐	/			J12031- J12010_3182025- 0922_MWL_0_U_30874_1.jpg	
10.4 ft.	00:01:46	MWL				45	☐	/			J12031- J12010_3182025- 0923_MWL_10.4_U_8635_1.jpg	
25.0 ft.	00:03:41	FL					☐	12 /		3	J12031- J12010_3182025- 0925_FL_25_U_41503_1.jpg	
26.3 ft.	00:03:13	FS					☐	12 / 12		3	J12031- J12010_3182025- 0924_FS_26.3_U_27218_1.jpg	
46.3 ft.	00:04:46	TF				4.000	☐	3 /			J12031- J12010_3182025- 0926_TF_46.3_U_25363_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
48.3 ft.	00:05:00	TF		4.000			☐	9 /			J12031-J12010_3182025-0926_TF_48.3_U_19241_1.jpg	
59.5 ft.	00:05:48	FS					☐	5 / 7		3	J12031-J12010_3182025-0927_FS_59.5_U_45643_1.jpg	
95.6 ft.	00:07:15	TF		4.000			☐	3 /			J12031-J12010_3182025-0928_TF_95.6_U_12668_1.jpg	
97.7 ft.	00:07:35	TFC		4.000			☐	9 /			J12031-J12010_3182025-0929_TFC_97.7_U_16941_1.jpg	
147.4 ft.	00:09:38	TB		4.000			☐	3 /			J12031-J12010_3182025-0931_TB_147.4_U_41531_1.jpg	
149.3 ft.	00:09:55	TF		4.000			☐	9 /			J12031-J12010_3182025-0931_TF_149.3_U_35986_1.jpg	
152.9 ft.	00:10:31	FL					☐	9 /		3	J12031-J12010_3182025-0932_FL_152.9_U_16490_1.jpg	
196.5 ft.	00:12:28	TF		4.000			☐	3 /			J12031-J12010_3182025-0934_TF_196.5_U_5443_1.jpg	
198.7 ft.	00:12:45	TF		4.000			☐	9 /			J12031-J12010_3182025-0934_TF_198.7_U_13976_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
229.4 ft.	00:14:12	TF		4.000			☐	3	/		J12031-J12010_3182025-0935_TF_229.4_U_3908_1.jpg	
229.4 ft.	00:14:32	MWLS				50	☐	/		3	J12031-J12010_3182025-0936_MWLS_229.4_U_9081_1.jpg	
230.2 ft.	00:14:55	JOM					☐	/		3	J12031-J12010_3182025-0936_JOM_230.2_U_28306_1.jpg	
236.5 ft.	00:15:37	B					☒	12	/ 6	4	J12031-J12010_3182025-0937_B_236.5_U_42781_1.jpg	
239.3 ft.	00:16:17	FC					☐	12	/ 12	2	J12031-J12010_3182025-0937_FC_239.3_U_43610_1.jpg	
243.0 ft.	00:16:50	FS					☐	5	/ 8	3	J12031-J12010_3182025-0938_FS_243_U_38636_1.jpg	
250.6 ft.	00:17:18	TF		4.000			☐	3	/		J12031-J12010_3182025-0938_TF_250.6_U_21086_1.jpg	
252.7 ft.	00:17:48	TB		4.000			☐	9	/		J12031-J12010_3182025-0939_TB_252.7_U_21073_1.jpg	
287.5 ft.	00:19:19	TF		4.000			☐	3	/		J12031-J12010_3182025-0940_TF_287.5_U_12496_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
303.9 ft.	00:20:21	TB		4.000			☐	9 /			J12031- J12010_3182025- 0941_TB_303. 9_U_23173_1.jpg	
304.6 ft.	00:20:48	TB		4.000			☐	2 /			J12031- J12010_3182025- 0942_TB_304. 6_U_21180_1.jpg	
307.9 ft.	00:21:20	H					☐	11 / 12		4	J12031- J12010_3182025- 0942_H_307. 9_U_33696_1.jpg	
308.6 ft.	00:21:41	TB		4.000			☐	3 /			J12031- J12010_3182025- 0943_TB_308. 6_U_13373_1.jpg	
311.9 ft.	00:22:08	H					☐	11 / 12		4	J12031- J12010_3182025- 0943_H_311. 9_U_19889_1.jpg	
328.6 ft.	00:22:59	TF		4.000			☐	3 /			J12031- J12010_3182025- 0944_TF_328. 6_U_4561_1.jpg	
357.7 ft.	00:24:33	TFC		4.000			☐	3 /			J12031- J12010_3182025- 0946_TFC_357. 7_U_22789_1.jpg	
373.6 ft.	00:25:30	TF		4.000			☐	9 /			J12031- J12010_3182025- 0947_TF_373. 6_U_1181_1.jpg	
378.0 ft.	00:26:55	ACOM					☐	/			J12031- J12010_3182025- 0948_ACOM_378_U_37 811_1.jpg	J12010

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 10:01
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12031 TO J12053	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 166.400 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12031	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12053	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	11	4131	2.8	0	0	0	0000	0.0	11	2.8	4.1	0.0
2	2	4				0	0							
3	1	3				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:36	AMH					☐	/			J12031-J12053_3182025-1005_AMH_0_D_33953_1.jpg	J12031
0.0 ft.	00:00:51	MWL				5	☐	/			J12031-J12053_3182025-1005_MWL_0_D_45221_1.jpg	
69.9 ft.	00:04:03	MWL				45	☐	/			J12031-J12053_3182025-1009_MWL_69.9_D_28315_1.jpg	
132.2 ft.	00:06:39	FC					☐	6 / 12		2	J12031-J12053_3182025-1011_FC_132.2_D_27431_1.jpg	
133.1 ft.	00:07:05	H					☐	11 / 12		4	J12031-J12053_3182025-1012_H_133.1_D_454_1.jpg	
136.5 ft.	00:07:42	FS					☐	6 / 2		3	J12031-J12053_3182025-1012_FS_136.5_D_36085_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
160.5 ft.	00:08:54	FC					☐	12	/ 12	2	J12031- J12053_3182025- 1013_FC_160. 5_D_46616_1.jpg	
164.2 ft.	00:09:27	MMC					☐		/		J12031- J12053_3182025- 1014_MMC_164. 2_D_25881_1.jpg	PVC
166.4 ft.	00:09:58	AMH					☐		/		J12031- J12053_3182025- 1014_AMH_166. 4_D_32580_1.jpg	J12053

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 10:31
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12030 TO J12053	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 193.500 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12053	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12030	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	13	4133	3.3	0	0	0	0000	0.0	13	3.3	4.1	0.0
2	0	0				0	0							
3	3	9				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:44	AMH					☐	/			J12030- J12053_3182025- 1035_AMH_0_U_41342_1.jpg	J12030
0.0 ft.	00:01:01	MWL				5	☐	/			J12030- J12053_3182025- 1035_MWL_0_U_47016_1.jpg	
1.1 ft.	00:01:29	FL					☐	2 /		3	J12030- J12053_3182025- 1036_FL_1.1_U_11642_1.jpg	
36.7 ft.	00:04:07	FS					☐	7 / 3		3	J12030- J12053_3182025- 1039_FS_36.7_U_42608_1.jpg	
110.5 ft.	00:07:28	RPP					☐	10 / 3			J12030- J12053_3182025- 1042_RPP_110.5_U_14398_1.jpg	BROKEN PIPE
161.4 ft.	00:09:15	H					☐	11 / 12		4	J12030- J12053_3182025- 1044_H_161.4_U_10916_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
189.0 ft.	00:10:35	FS					☐	3 / 7		3	J12030- J12053_3182025- 1045_FS_189_U_46108 _1.jpg	
193.5 ft.	00:11:11	AMH					☐	/			J12030- J12053_3182025- 1046_AMH_193. 5_U_30362_1.jpg	J12053

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 10:50
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12030 TO I12006	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 396.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12006	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12030	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	71	544A	3.9	0	0	4	2200	2.0	75	3.8	5.4	0.0
2	1	2				2	4							
3	3	9				0	0							
4	10	40				0	0							
5	4	20				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:40	AMH					☐	/			J12030-I12006_3182025	J12030
											- 1052_AMH_0_U_1237_1.jpg	
0.0 ft.	00:00:54	MWL				5	☐	/			J12030-I12006_3182025	
											- 1052_MWL_0_U_25220_1.jpg	
0.0 ft.	00:01:17	FC					☐	12 / 12		2	J12030-I12006_3182025	
											- 1053_FC_0_U_46612_1.jpg	
24.0 ft.	00:03:05	HSV					☐	11 / 12		5	J12030-I12006_3182025	
											- 1055_HSV_24_U_3629_1.jpg	
27.8 ft.	00:04:09	FH2					☐	6 / 9		3	J12030-I12006_3182025	
											- 1057_FH2_27.8_U_27328_1.jpg	
48.1 ft.	00:05:24	HSV					☐	12 /		5	J12030-I12006_3182025	
											- 1058_HSV_48.1_U_34446_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
50.3 ft.	00:06:04	TFC		4.000			☐	3	/		J12030-I12006_3182025 - 1058_TFC_50. 3_U_38434_1.jpg	
52.3 ft.	00:06:27	TFC		4.000			☐	9	/		J12030-I12006_3182025 - 1059_TFC_52. 3_U_36208_1.jpg	
104.3 ft.	00:08:35	TF		4.000			☐	3	/		J12030-I12006_3182025 - 1101_TF_104. 3_U_2363_1.jpg	
106.6 ft.	00:08:58	FL					☐	3	/	3	J12030-I12006_3182025 - 1101_FL_106. 6_U_33122_1.jpg	
107.5 ft.	00:09:52	TF		4.000			☐	9	/		J12030-I12006_3182025 - 1102_TF_107. 5_U_29011_1.jpg	
128.5 ft.	00:11:00	TF		4.000			☐	3	/		J12030-I12006_3182025 - 1103_TF_128. 5_U_11292_1.jpg	
142.8 ft.	00:11:43	MWL				45	☐		/		J12030-I12006_3182025 - 1104_MWL_142. 8_U_49901_1.jpg	
160.4 ft.	00:13:04	TFC		4.000			☐	10	/		J12030-I12006_3182025 - 1105_TFC_160. 4_U_4891_1.jpg	
162.7 ft.	00:13:26	H					☐	12	/	4	J12030-I12006_3182025 - 1106_H_162. 7_U_11192_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
172.7 ft. 00:14:09		H					☐	12 /		4	J12030-I12006_3182025 - 1107_H_172. 7_U_38483_1.jpg	
176.3 ft. 00:14:31		TF		4.000			☐	3 /			J12030-I12006_3182025 - 1107_TF_176. 3_U_21107_1.jpg	
189.6 ft. 00:15:43		H					☐	12 /		4	J12030-I12006_3182025 - 1108_H_189. 6_U_36947_1.jpg	
203.9 ft. 00:16:52		HSV					☐	12 /		5	J12030-I12006_3182025 - 1109_HSV_203. 9_U_11873_1.jpg	
209.8 ft. 00:17:31		TFC		4.000			☐	3 /			J12030-I12006_3182025 - 1110_TFC_209. 8_U_37837_1.jpg	
211.8 ft. 00:18:00		TFC		4.000			☐	9 /			J12030-I12006_3182025 - 1110_TFC_211. 8_U_329_1.jpg	
230.9 ft. 00:20:30		FS					☐	8 / 3		3	J12030-I12006_3182025 - 1113_FS_230. 9_U_48854_1.jpg	
257.1 ft. 00:21:52		H					☐	12 /		4	J12030-I12006_3182025 - 1114_H_257. 1_U_5985_1.jpg	
261.2 ft. 00:22:13		TF		4.000			☐	3 /			J12030-I12006_3182025 - 1115_TF_261. 2_U_45989_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
266.0 ft.	00:22:40	TF		4.000			☐	9 /			J12030-I12006_3182025 - 1115_TF_266_U_18615_1.jpg	
287.0 ft.	00:24:08	HSV					☐	12 /		5	J12030-I12006_3182025 - 1117_HSV_287_U_34244_1.jpg	
300.1 ft.	00:24:52	TF		4.000			☐	3 /			J12030-I12006_3182025 - 1117_TF_300.1_U_2744_1.jpg	
301.7 ft.	00:25:18	H					☐	12 /		4	J12030-I12006_3182025 - 1118_H_301.7_U_3742_1.jpg	
302.4 ft.	00:25:32	TF		4.000			☐	9 /			J12030-I12006_3182025 - 1118_TF_302.4_U_43978_1.jpg	
314.8 ft.	00:26:40	H					☐	12 /		4	J12030-I12006_3182025 - 1119_H_314.8_U_1393_1.jpg	
325.1 ft.	00:27:28	H					☐	12 /		4	J12030-I12006_3182025 - 1120_H_325.1_U_4725_1.jpg	
336.6 ft.	00:28:26	RTJ				10	☒	2 / 4		2	J12030-I12006_3182025 - 1121_RTJ_336.6_U_23482_1.jpg	
342.4 ft.	00:29:06	RTJ				10	☒	3 / 9		2	J12030-I12006_3182025 - 1122_RTJ_342.4_U_1604_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
352.0 ft.	00:29:56	TFC		4.000			☐	3 /			J12030-I12006_3182025 - 1122_TFC_352_U_4728 4_1.jpg	
354.2 ft.	00:30:23	TFC		4.000			☐	9 /			J12030-I12006_3182025 - 1123_TFC_354. 2_U_3746_1.jpg	
366.9 ft.	00:31:07	H					☐	12 /		4	J12030-I12006_3182025 - 1124_H_366. 9_U_48244_1.jpg	
368.4 ft.	00:31:29	H					☐	12 /		4	J12030-I12006_3182025 - 1124_H_368. 4_U_17630_1.jpg	
394.0 ft.	00:32:36	H					☐	12 /		4	J12030-I12006_3182025 - 1125_H_394_U_18602_ 1.jpg	
396.0 ft.	00:33:25	ACOM					☐	/			J12030-I12006_3182025 I12006 - 1127_ACOM_396_U_55 61_1.jpg	

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 11:39
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12030 TO J12006	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 19.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12006	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12030	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	8	4200	4.0	0	0	0	0000	0.0	8	4.0	4.2	0.0
2	0	0				0	0							
3	0	0				0	0							
4	2	8				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:43	AMH					☐	/			J12030-J12006_3182025-1140_AMH_0_U_44329_1.jpg	J12030
0.0 ft.	00:00:58	MWL				5	☐	/			J12030-J12006_3182025-1140_MWL_0_U_48938_1.jpg	
4.0 ft.	00:01:45	MMC					☐	/			J12030-J12006_3182025-1141_MMC_4_U_6899_1.jpg	PVC
9.0 ft.	00:02:26	MMC					☐	/			J12030-J12006_3182025-1142_MMC_9_U_34995_1.jpg	VCP
18.0 ft.	00:03:04	JOL					☐	/		4	J12030-J12006_3182025-1142_JOL_18_U_40612_1.jpg	
19.0 ft.	00:03:38	B					☐	12 / 12		4	J12030-J12006_3182025-1143_B_19_U_34450_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
19.0 ft.	00:04:07	MSA					☐	/			J12030- J12006_3182025- 1143_MSA_19_U_2948_ 1.jpg	CAMERA WILL NOT MAKE IT PASSED JOINT OFFSET LARGE AND BROKEN PIPE

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 11:45
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12030 TO J12080	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 16.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12030	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12080	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	9	5141	4.5	0	0	0	0000	0.0	9	4.5	5.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	1	4				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:36	AMH					☐	/			J12030- J12080_3182025- 1148_AMH_0_D_10606_1.jpg	J12030
0.0 ft.	00:00:52	MWL				5	☐	/			J12030- J12080_3182025- 1149_MWL_0_D_43518_1.jpg	
13.7 ft.	00:02:14	B					☐	12 / 12		4	J12030- J12080_3182025- 1150_B_13.7_D_10990_1.jpg	
15.0 ft.	00:02:56	HVV					☐	10 / 12		5	J12030- J12080_3182025- 1151_HVV_15_D_27950_1.jpg	
16.2 ft.	00:04:16	MSA					☐	/			J12030- J12080_3182025- 1152_MSA_16.2_D_2355_1.jpg	CAMERA WILL NOT MAKE IT PASSED BROKEN PIPE WILL FINISH FROM OTHER SIDE

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 11:57
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12080 TO J12030	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 106.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12030	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12080	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	13	5142	4.3	0	0	0	0000	0.0	13	4.3	5.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	2	8				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:33	AMH					☐	/			J12080- J12030_3182025- 1205_AMH_0_U_12514_1.jpg	J12080
0.0 ft.	00:00:48	MWL				5	☐	/			J12080- J12030_3182025- 1205_MWL_0_U_28767_1.jpg	
89.7 ft.	00:04:05	B					☐	12 / 12		4	J12080- J12030_3182025- 1208_B_89.7_U_5137_1.jpg	
89.8 ft.	00:04:38	HSV					☐	10 / 2		5	J12080- J12030_3182025- 1209_HSV_89.8_U_5504_1.jpg	
89.9 ft.	00:04:58	JOL					☐	/		4	J12080- J12030_3182025- 1209_JOL_89.9_U_16168_1.jpg	
106.2 ft.	00:06:11	AMH					☐	/			J12080- J12030_3182025- 1210_AMH_106.2_U_25564_1.jpg	J12030

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 12:14
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: C
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12080 TO J12014	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 75.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12080	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12014	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	20	5141	3.3	0	0	0	0000	0.0	20	3.3	5.1	0.0
2	1	2				0	0							
3	3	9				0	0							
4	1	4				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:41	AMH					☐	/			J12080- J12014_3182025- 1216_AMH_0_D_27664_1.jpg	J12080
0.0 ft.	00:00:54	MWL				5	☐	/			J12080- J12014_3182025- 1216_MWL_0_D_28473_1.jpg	
31.5 ft.	00:02:43	FM					☐	12 / 12		4	J12080- J12014_3182025- 1218_FM_31.5_D_47368_1.jpg	
34.0 ft.	00:03:21	FH2					☐	6 / 12		3	J12080- J12014_3182025- 1218_FH2_34_D_14141_1.jpg	
44.3 ft.	00:04:05	FS					☐	9 / 6		3	J12080- J12014_3182025- 1219_FS_44.3_D_28118_1.jpg	
55.0 ft.	00:04:37	MMC					☐	/			J12080- J12014_3182025- 1220 MMC_55_D_5377_1.jpg	PVC

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
68.2 ft.	00:05:27	MMC					☐	/			J12080- J12014_3182025- 1221_MMC_68. 2_D_23057_1.jpg	VCP
70.9 ft.	00:06:07	FS					☐	9 / 3		3	J12080- J12014_3182025- 1221_FS_70. 9_D_14937_1.jpg	
70.9 ft.	00:06:30	HVV					☐	2 / 4		5	J12080- J12014_3182025- 1222_HVV_70. 9_D_10519_1.jpg	
73.1 ft.	00:07:13	FC					☐	12 / 12		2	J12080- J12014_3182025- 1222_FC_73. 1_D_29195_1.jpg	
75.0 ft.	00:07:33	AMH					☐	/			J12080- J12014_3182025- 1223_AMH_75_D_9173 _1.jpg	J12014

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 12:24
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12014 TO J12027	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 119.900 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12014	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12027	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	13	4133	3.3	0	0	0	0000	0.0	13	3.3	4.1	0.0
2	0	0				0	0							
3	3	9				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:36	AMH					☐	/			J12014-J12027_3182025-1225_AMH_0_D_2898_1.jpg	J12014
0.0 ft.	00:00:51	MWL				5	☐	/			J12014-J12027_3182025-1225_MWL_0_D_14438_1.jpg	
8.1 ft.	00:01:55	FS					☐	8 / 3		3	J12014-J12027_3182025-1227_FS_8.1_D_27958_1.jpg	
35.9 ft.	00:03:34	FH2					☐	6 / 12		3	J12014-J12027_3182025-1228_FH2_35.9_D_40942_1.jpg	
38.6 ft.	00:04:16	FH4					☐	12 / 12		4	J12014-J12027_3182025-1229_FH4_38.6_D_40918_1.jpg	
88.2 ft.	00:06:42	FS					☐	9 / 3		3	J12014-J12027_3182025-1231_FS_88.2_D_5248_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
119.9 ft.	00:08:05	AMH					☐	/			J12014- J12027_3182025- 1233_AMH_119. 9_D_14215_1.jpg	J12027

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 13:28
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12027 TO J12014	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 177.600 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12014	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12027	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	10	4132	3.3	0	0	0	0000	0.0	10	3.3	4.1	0.0
2	0	0				0	0							
3	2	6				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:40	AMH					☐	/			J12027- J12014_3182025- 1330_AMH_0_U_32180_1.jpg	J12027
0.0 ft.	00:00:56	MWL				15	☐	/			J12027- J12014_3182025- 1330_MWL_0_U_38625_1.jpg	
56.6 ft.	00:03:54	MGO					☐	/			J12027- J12014_3182025- 1333_MGO_56.6_U_40113_1.jpg	UNKNOWN MANHOLE
135.9 ft.	00:06:16	FL					☐	12 /		3	J12027- J12014_3182025- 1336_FL_135.9_U_9989_1.jpg	
139.9 ft.	00:06:45	FH4					☐	12 / 12		4	J12027- J12014_3182025- 1336_FH4_139.9_U_12253_1.jpg	
168.5 ft.	00:07:58	FS					☐	9 / 6		3	J12027- J12014_3182025- 1337_FS_168.5_U_15166_1.jpg	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
177.6 ft.	00:08:30	AMH					☐	/			J12027- J12014_3182025- 1338_AMH_177. 6_U_21356_1.jpg	J12014

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250318 13:39	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12027 TO I12024	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 92.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12024	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12027	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	0	0000	0.0	0	0	0	0000	0.0	0	0.0	1.0	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:39	AMH					☐	/			J12027-I12024_3182025	J12027 - 1345_AMH_0_U_19531_1.jpg
0.0 ft.	00:00:55	MWL				10	☐	/			J12027-I12024_3182025	- 1345_MWL_0_U_42244_1.jpg
0.0 ft.	00:01:51	MMC					☐	/			J12027-I12024_3182025	PVC - 1351_MMC_0_U_41869_1.jpg
73.9 ft.	00:06:11	TF			4.000		☐	9	/		J12027-I12024_3182025	- 1410_TF_73.9_U_25610_1.jpg
86.3 ft.	00:07:41	MWL				50	☐	/			J12027-I12024_3182025	- 1412_MWL_86.3_U_23003_1.jpg
92.0 ft.	00:08:22	MSA					☐	/			J12027-I12024_3182025	CAMERA UNDER WATER - 1412_MSA_92_U_1554_1.jpg

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: Tarren Alexander	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: DVD	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250318 14:19
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12027 TO I12048	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length:	Length surveyed: 30.400 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12048	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12027	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	11	4231	3.7	0	0	0	0000	0.0	11	3.7	4.2	0.0
2	0	0				0	0							
3	1	3				0	0							
4	2	8				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:42	AMH					☐	/			J12027-I12048_3182025	J12027
											- 1422_AMH_0_U_9654_1.jpg	
0.0 ft.	00:00:56	MWL				5	☐	/			J12027-I12048_3182025	
											- 1422_MWL_0_U_13780_1.jpg	
10.4 ft.	00:02:51	FM					☐	12 / 12		4	J12027-I12048_3182025	
											- 1449_FM_10.4_U_23332_1.jpg	
18.8 ft.	00:03:34	H					☐	4 / 5		4	J12027-I12048_3182025	
											- 1449_H_18.8_U_9649_1.jpg	
21.9 ft.	00:04:26	FS					☐	7 / 11		3	J12027-I12048_3182025	
											- 1450_FS_21.9_U_49383_1.jpg	
30.4 ft.	00:05:10	MSA					☐	/			J12027-I12048_3182025	CAMERA UNDER WATER
											- 1451_MSA_30.4_U_15637_1.jpg	

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250319 09:01
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I13010-I13012	Street: EAST AVE
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 354.900 ft.	Length surveyed: 354.900 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I13010	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I13012	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	15	4133	3.0	0	0	0	0000	0.0	15	3.0	4.1	0.0
2	1	2				0	0							
3	3	9				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I13010
0.0 ft.	00:00:00	MWL				5	☐	/				
26.1 ft.	00:02:00	TFC		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TFC at 26.1 ft_1.JPG	
40.2 ft.	00:03:15	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TB at 40.2 ft_1.JPG	
72.1 ft.	00:04:16	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TF at 72.1 ft_1.JPG	
97.7 ft.	00:05:16	MWLS				40	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-MWLS at 97.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
101.8 ft.	00:05:28	TFC		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TFC at 101.8 ft_1.JPG	
102.1 ft.	00:05:50	FL					☐	2 /		3	LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-FL at 102.1 ft_1.JPG	
103.4 ft.	00:06:05	FS					☐	6 / 10		3	LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-FS at 103.4 ft_1.JPG	
112.5 ft.	00:06:44	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TF at 112.5 ft_1.JPG	
153.7 ft.	00:07:57	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TB at 153.7 ft_1.JPG	
154.0 ft.	00:08:18	FC					☐	2 / 5		2	LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-FC at 154.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
189.8 ft.	00:09:24	FM					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-FM at 189.8 ft_1.JPG	
191.3 ft.	00:10:07	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TF at 191.3 ft_1.JPG	
241.7 ft.	00:11:39	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TF at 241.7 ft_1.JPG	
273.9 ft.	00:12:48	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TB at 273.9 ft_1.JPG	
295.3 ft.	00:13:32	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TF at 295.3 ft_1.JPG	
322.1 ft.	00:14:31	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-TF at 322.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
354.9 ft.	00:15:32	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I13010'-AMH 'I13012'-AMH at 354.9 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250319 09:31	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV	Inspection status: CI	Consequence of failure: NONE	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: I13012-I13011	Street: EAST AVE
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 334.800 ft.	Length surveyed: 334.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I13012	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I13011	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	0	0000	0.0	0	0	0	0000	0.0	0	0.0	1.0	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I13012
0.0 ft.	00:00:00	MWL				25	☐	/				
49.3 ft.	00:01:32	MWL				50	☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I13012'-AMH 'I13011'-MWL at 49.3 ft_1.JPG	
125.1 ft.	00:04:26	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13012'-AMH 'I13011'-TF at 125.1 ft_1.JPG	
149.3 ft.	00:05:30	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I13012'-AMH 'I13011'-TF at 149.3 ft_1.JPG	
164.0 ft.	00:06:12	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13012'-AMH 'I13011'-TF at 164.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
215.9 ft.	00:08:01	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13012'-AMH 'I13011'-TF at 215.9 ft_1.JPG	
244.7 ft.	00:09:09	TF		4.000			☐	1	/		LINCOLN WASTEWATER CONDITION-AMH 'I13012'-AMH 'I13011'-TF at 244.7 ft_1.JPG	
312.6 ft.	00:11:25	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13012'-AMH 'I13011'-TF at 312.6 ft_1.JPG	
334.0 ft.	00:12:22	AMH					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'I13012'-AMH 'I13011'-AMH at 334.0 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250319 10:23
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I13011-J13030	Street: EAST AVE
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 609.500 ft.	Length surveyed: 608.700 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I13011	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13030	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	19	5142	3.8	0	0	0	0000	0.0	19	3.8	5.1	0.0
2	0	0				0	0							
3	2	6				0	0							
4	2	8				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I13011
0.0 ft.	00:00:00	MWL				15	☐	/				
33.5 ft.	00:01:53	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 33.5 ft_1.JPG	
51.6 ft.	00:02:38	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 51.6 ft_1.JPG	
80.9 ft.	00:03:29	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 80.9 ft_1.JPG	
133.2 ft.	00:04:51	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 133.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
133.2 ft.	00:05:05	MWL				45	☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-MWL at 133.2 ft_1.JPG	
149.0 ft.	00:05:47	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 149.0 ft_1.JPG	
149.6 ft.	00:06:06	MWLS				75	☐	/		4	LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-MWLS at 149.6 ft_1.JPG	
180.2 ft.	00:06:50	MGO					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-MGO at 180.2 ft_1.JPG	CAMERA UNDER WATER
214.9 ft.	00:07:56	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 214.9 ft_1.JPG	
216.8 ft.	00:08:28	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 216.8 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
233.3 ft.	00:09:46	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 233.3 ft_1.JPG	
235.5 ft.	00:10:18	HSV					☐	12	/	5	LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-HSV at 235.5 ft_1.JPG	
277.3 ft.	00:11:37	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 277.3 ft_1.JPG	
326.1 ft.	00:13:15	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 326.1 ft_1.JPG	
345.5 ft.	00:14:09	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 345.5 ft_1.JPG	
379.5 ft.	00:14:56	MWLS				50	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-MWLS at 379.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
391.5 ft.	00:15:25	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 391.5 ft_1.JPG	
397.2 ft.	00:16:46	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 397.2 ft_1.JPG	
417.7 ft.	00:17:46	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TFC at 417.7 ft_1.JPG	
419.1 ft.	00:18:18	FS					☐	10 / 1		3	LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-FS at 419.1 ft_1.JPG	
423.9 ft.	00:19:29	TFC		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TFC at 423.9 ft_1.JPG	
439.5 ft.	00:20:10	MWLS				75	☐	/		4	LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-MWLS at 439.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
450.5 ft.	00:21:21	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 450.5 ft_1.JPG	
480.3 ft.	00:23:18	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-TF at 480.3 ft_1.JPG	
608.7 ft.	00:31:36	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I13011'-AMH 'J13030'-AMH at 608.7 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250319 11:38	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV	Inspection status: CI	Consequence of failure: NONE	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: J13030-J13005	Street: EAST AVE
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 538.800 ft.	Length surveyed: 538.800 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13030	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13005	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	31	4139	3.1	0	0	14	4321	3.5	45	3.2	4.4	0.0
2	0	0				1	2							
3	9	27				0	0							
4	1	4				3	12							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J13030
0.0 ft.	00:00:00	MWL				15	☐	/				
24.9 ft.	00:01:14	MWLS				45	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-MWLS at 24.9 ft_1.JPG	
92.0 ft.	00:02:54	TFC		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TFC at 92.0 ft_1.JPG	
120.2 ft.	00:03:40	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 120.2 ft_1.JPG	
131.4 ft.	00:06:28	MWLS				50	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-MWLS at 131.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
145.5 ft.	00:07:00	TF		4.000			☐	1 /			LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 145.5 ft_1.JPG	
196.3 ft.	00:08:14	TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TB at 196.3 ft_1.JPG	
217.6 ft.	00:08:57	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 217.6 ft_1.JPG	
218.5 ft.	00:09:29	FS					☐	8 / 5		3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-FS at 218.5 ft_1.JPG	
219.1 ft.	00:09:46	RPP					☐	12 / 12			LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-RPP at 219.1 ft_1.JPG	SPOT REPAIR PATCH
229.5 ft.	00:10:20	FS					☐	7 / 11		3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-FS at 229.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
235.3 ft.	00:10:38	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 235.3 ft_1.JPG	
265.5 ft.	00:11:50	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 265.5 ft_1.JPG	
265.5 ft.	00:11:52	RBL				100	☐	3	/	4	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-RBL at 265.5 ft_1.JPG	
291.3 ft.	00:12:38	MWLS				50	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-MWLS at 291.3 ft_1.JPG	
296.7 ft.	00:12:53	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 296.7 ft_1.JPG	
296.7 ft.	00:12:54	RBL				100	☐	12	/	4	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-RBL at 296.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
299.6 ft.	00:13:11	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TB at 299.6 ft_1.JPG	
371.8 ft.	00:15:07	MWLS				50	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-MWLS at 371.8 ft_1.JPG	
375.9 ft.	00:15:43	FS					☐	3	/ 6	3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-FS at 375.9 ft_1.JPG	
390.8 ft.	00:16:44	RTJ				15	☒	9	/ 10	2	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-RTJ at 390.8 ft_1.JPG	
407.2 ft.	00:18:03	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 407.2 ft_1.JPG	
425.7 ft.	00:18:51	FM					☐	12	/ 12	4	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-FM at 425.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
427.4 ft.	00:19:19	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 427.4 ft_1.JPG	
427.4 ft.	00:19:20	RBL				100	☐	9 /		4	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-RBL at 427.4 ft_1.JPG	
435.4 ft.	00:19:58	FS					☐	12 /	5	3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-FS at 435.4 ft_1.JPG	
443.9 ft.	00:20:30	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TB at 443.9 ft_1.JPG	
452.1 ft.	00:21:10	TF		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 452.1 ft_1.JPG	
468.7 ft.	00:22:06	FS					☐	12 /	3	3	LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-FS at 468.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
510.0 ft.	00:24:30	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-TF at 510.0 ft_1.JPG	
538.8 ft.	00:25:14	AMH					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'J13030'-AMH 'J13005'-AMH at 538.8 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250319 13:15	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV	Inspection status: CI	Consequence of failure: NONE	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: I12012-I12015	Street: 7TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 356.900 ft.	Length surveyed: 356.900 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12012	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I12015	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	16	5232	4.0	0	0	2	2100	2.0	18	3.6	5.2	0.0
2	0	0				1	2							
3	2	6				0	0							
4	0	0				0	0							
5	2	10				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I12012
0.0 ft.	00:00:00	MWL				5	☐	/				
5.9 ft.	00:01:11	FS					☐	1 / 4		3	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'I12015'-FS at 5.9 ft_1.JPG	
155.3 ft.	00:04:33	JOM					☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'I12015'-JOM at 155.3 ft_1.JPG	
181.2 ft.	00:06:35	OBJ				10	☒	12 / 5		2	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'I12015'-OBJ at 181.2 ft_1.JPG	
212.7 ft.	00:07:13	MWL				40	☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'I12015'-MWL at 212.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
303.6 ft.	00:09:45	BVV					☐	6	9	5	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'I12015'-BVV at 303.6 ft_1.JPG	
353.9 ft.	00:11:25	BVV					☐	12	12	5	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'I12015'-BVV at 353.9 ft_1.JPG	
356.9 ft.	00:11:55	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'I12015'-AMH at 356.9 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250319 13:33	
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I12015-I12009	Street: 7TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 180.300 ft.	Length surveyed: 180.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12015	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I12009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	18	5141	3.6	0	0	0	0000	0.0	18	3.6	5.1	0.0
2	0	0				0	0							
3	3	9				0	0							
4	1	4				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I12015
0.0 ft.	00:00:00	MWL				5	☐	/				
19.9 ft.	00:00:44	MWL				40	☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-MWL at 19.9 ft_1.JPG	
50.7 ft.	00:01:39	FS					☐	10 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-FS at 50.7 ft_1.JPG	
141.9 ft.	00:05:11	FS					☐	10 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-FS at 141.9 ft_1.JPG	
157.2 ft.	00:06:16	FM					☐	8 / 10		4	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-FM at 157.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
158.4 ft.	00:06:31	HSV					☐	10	/	5	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-HSV at 158.4 ft_1.JPG	
175.4 ft.	00:07:25	FS					☐	9	/ 11	3	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-FS at 175.4 ft_1.JPG	
180.3 ft.	00:07:51	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-AMH at 180.3 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250319 13:33	
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control:	Purpose: F
Direction: D	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I12015-I12009	Street: 7TH ST
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 180.3 ft.	Length surveyed: 180.3 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: I12015	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I12009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	18	5141	3.60	0	0	0	0000	0.00	18	3.60		
2	0	0				0	0							
3	3	9				0	0							
4	1	4				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				I12015
0.0 ft.		MWL				5	☐	/				
19.9 ft.	00:00:44	MWL				40	☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-MWL at 19.9 ft.JPG	
50.7 ft.	00:01:39	FS					☐	10 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-FS at 50.7 ft.JPG	
141.9 ft.	00:05:11	FS					☐	10 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-FS at 141.9 ft.JPG	
157.2 ft.	00:06:16	FM					☐	8 / 10		4	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-FM at 157.2 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
158.4 ft.	00:06:31	HSV					☐	10	/	5	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-HSV at 158.4 ft.JPG	
175.4 ft.	00:07:25	FS					☐	9	/ 11	3	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-FS at 175.4 ft.JPG	
180.3 ft.	00:07:51	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'I12009'-AMH at 180.3 ft.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250319 14:06	
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control:	Purpose: F
Direction: D	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I12009-J12017	Street: J ST
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 479.4 ft.	Length surveyed: 479.4 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: I12009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12017	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	24	5135	3.00	0	0	2	2100	2.00	26	2.89		
2	2	4				1	2							
3	5	15				0	0							
4	0	0				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				I12009
0.0 ft.		MWL				10	☐	/				
16.7 ft.	00:01:10	B					☐	11 / 4		5	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-B at 16.7 ft.JPG	
82.8 ft.	00:02:57	TBI		4.000	1.000		☐	2 /		2	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-TBI at 82.8 ft.JPG	
96.9 ft.	00:03:42	FS					☐	9 / 6		3	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-FS at 96.9 ft.JPG	
103.5 ft.	00:04:22	FC					☐	6 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-FC at 103.5 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
136.4 ft.	00:05:27	FL					☐	10 /		3	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-FL at 136.4 ft.JPG	
143.6 ft.	00:05:50	FL					☐	2 /		3	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-FL at 143.6 ft.JPG	
267.2 ft.	00:09:43	FS					☐	12 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-FS at 267.2 ft.JPG	
296.3 ft.	00:10:42	FC					☐	11 / 1		2	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-FC at 296.3 ft.JPG	
305.4 ft.	00:11:06	TB		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-TB at 305.4 ft.JPG	
359.8 ft.	00:13:06	MWLS				50	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-MWLS at 359.8 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
374.5 ft.	00:14:15	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-TF at 374.5 ft.JPG	
479.4 ft.	00:27:33	AMH					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'I12009'-AMH 'J12017'-AMH at 479.4 ft.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250319 15:21
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12005-J12004	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 356.800 ft.	Length surveyed: 356.800 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12005	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12004	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	69	5248	3.6	0	0	0	0000	0.0	69	3.6	5.2	0.0
2	0	0				0	0							
3	9	27				0	0							
4	8	32				0	0							
5	2	10				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12005
0.0 ft.	00:00:00	MWL				10	☐	/				
2.4 ft.	00:00:28	FS					☐	9 / 12		3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FS at 2.4 ft_1.JPG	
20.4 ft.	00:01:08	FM					☐	9 / 3		4	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FM at 20.4 ft_1.JPG	
35.4 ft.	00:01:34	FS					☐	9 / 4		3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FS at 35.4 ft_1.JPG	
40.5 ft.	00:01:46	FS					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FS at 40.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
60.9 ft.	00:02:25	FS					☐	10	3	3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FS at 60.9 ft_1.JPG	
78.4 ft.	00:02:54	FS					☐	9	2	3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FS at 78.4 ft_1.JPG	
94.6 ft.	00:03:39	FS					☐	12	3	3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FS at 94.6 ft_1.JPG	
109.0 ft.	00:04:06	FM					☐	8	5	4	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FM at 109.0 ft_1.JPG	
111.6 ft.	00:04:23	FS					☐	12	3	3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FS at 111.6 ft_1.JPG	
114.6 ft.	00:04:47	FM					☐	9	3	4	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FM at 114.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
127.9 ft.	00:05:19	FM					☐	9	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FM at 127.9 ft_1.JPG	
151.7 ft.	00:06:39	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-TFC at 151.7 ft_1.JPG	
153.5 ft.	00:06:54	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-TFC at 153.5 ft_1.JPG	
193.9 ft.	00:08:07	FM					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FM at 193.9 ft_1.JPG	
216.5 ft.	00:08:37	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-TFC at 216.5 ft_1.JPG	
218.2 ft.	00:08:57	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-TFC at 218.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
224.9 ft.	00:09:24	FH4					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FH4 at 224.9 ft_1.JPG	
254.1 ft.	00:10:22	B					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-B at 254.1 ft_1.JPG	
257.0 ft.	00:10:33	HSV					☐	12	12	5	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-HSV at 257.0 ft_1.JPG	
258.1 ft.	00:10:50	FH4					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FH4 at 258.1 ft_1.JPG	
283.9 ft.	00:11:32	MWLS				40	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-MWLS at 283.9 ft_1.JPG	
344.8 ft.	00:14:00	FH2					☐	12	6	3	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-FH2 at 344.8 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
348.9 ft.	00:14:34	BSV					☐	12	/ 3	5	LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-BSV at 348.9 ft_1.JPG	
356.8 ft.	00:14:58	MSA					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'J12005'-AMH 'J12004'-MSA at 356.8 ft_1.JPG	CAMERA UNDER WATER

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250320 08:26	
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: D	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12004-J12017	Street: 6TH ST
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 187.6 ft.	Length surveyed: 187.6 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J12004	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12017	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	144	4F00	4.00	0	0	2	2100	2.00	146	3.95		
2	0	0				1	2							
3	0	0				0	0							
4	36	144				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12004
0.0 ft.		MWL				5	☐	/				
2.0 ft.	00:01:06	FM					☐	7 / 5		4	LINCOLN WASTEWATER CONDITION-AMH 'J12004'-AMH 'J12017'-FM at 2.0 ft.JPG	
10.2 ft.	00:01:36	FM	S01				☐	8 / 4		4	LINCOLN WASTEWATER CONDITION-AMH 'J12004'-AMH 'J12017'-FM at 10.2 ft.JPG	
107.3 ft.	00:06:03	TFD			4.000		☐	9 /		2	LINCOLN WASTEWATER CONDITION-AMH 'J12004'-AMH 'J12017'-TFD at 107.3 ft.JPG	BROKEN SOIL VISIBLE
187.0 ft.	00:08:07	FM	F01				☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12004'-AMH 'J12017'-FM at 187.0 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
187.6 ft.	00:08:44	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12004'-AMH 'J12017'-AMH at 187.6 ft.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250320 09:18
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12034-J12005	Street: L ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 271.100 ft.	Length surveyed: 270.900 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12034	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12005	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	46	5741	4.2	0	0	0	0000	0.0	46	4.2	5.7	0.0
2	2	4				0	0							
3	1	3				0	0							
4	1	4				0	0							
5	7	35				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12005
0.0 ft.	00:00:00	MWL				5	☐	/				
43.7 ft.	00:02:17	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TFC at 43.7 ft_1.JPG	
77.0 ft.	00:03:20	MWLS				50	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-MWLS at 77.0 ft_1.JPG	
90.2 ft.	00:04:08	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TB at 90.2 ft_1.JPG	
92.9 ft.	00:04:31	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TF at 92.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
95.0 ft.	00:04:46	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TF at 95.0 ft_1.JPG	
97.8 ft.	00:05:13	HSV					☐	12 /		5	LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-HSV at 97.8 ft_1.JPG	
118.0 ft.	00:06:42	HSV					☐	12 /		5	LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-HSV at 118.0 ft_1.JPG	
120.1 ft.	00:07:07	FC					☐	9 / 11		2	LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-FC at 120.1 ft_1.JPG	
130.0 ft.	00:07:50	HSV					☐	12 /		5	LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-HSV at 130.0 ft_1.JPG	
140.2 ft.	00:08:57	HSV					☐	12 /		5	LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-HSV at 140.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
143.8 ft.	00:09:19	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TFC at 143.8 ft_1.JPG	
147.4 ft.	00:09:39	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TF at 147.4 ft_1.JPG	
170.6 ft.	00:10:58	HSV					☐	12 /		5	LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-HSV at 170.6 ft_1.JPG	
190.9 ft.	00:12:02	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TFC at 190.9 ft_1.JPG	
195.2 ft.	00:12:22	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TF at 195.2 ft_1.JPG	
226.4 ft.	00:14:39	HSV					☐	12 /		5	LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-HSV at 226.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
238.4 ft. 00:15:19		TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TB at 238.4 ft_1.JPG	
242.1 ft. 00:16:04		TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TFC at 242.1 ft_1.JPG	
244.3 ft. 00:16:36		TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12034'-AMH 'J12005'-TFC at 244.3 ft_1.JPG	
250.6 ft. 00:17:12		HSV					☐	10 / 2		5		
261.7 ft. 00:18:15		FC					☐	9 / 5		2		
266.9 ft. 00:18:44		TFC		4.000			☐	9 /				
269.0 ft. 00:19:17		TFC		4.000			☐	3 /				
270.9 ft. 00:19:59		FM					☐	12 / 12		4		
270.9 ft. 00:20:01		ACOM					☐	/				END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250320 10:07
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I12010-I12011	Street: 8TH ST ALLEY
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 370.200 ft.	Length surveyed: 370.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12010	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I12011	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	7	4131	3.5	0	0	0	0000	0.0	7	3.5	4.1	0.0
2	0	0				0	0							
3	1	3				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I12011
0.0 ft.	00:00:00	MWL				5	☐	/				
48.3 ft.	00:02:10	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TB at 48.3 ft_1.JPG	
50.4 ft.	00:02:37	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TFC at 50.4 ft_1.JPG	
70.3 ft.	00:03:47	FL					☐	4 /		3	LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-FL at 70.3 ft_1.JPG	
82.4 ft.	00:04:23	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 82.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
92.8 ft.	00:05:07	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 92.8 ft_1.JPG	
112.8 ft.	00:05:54	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 112.8 ft_1.JPG	
170.4 ft.	00:07:40	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 170.4 ft_1.JPG	
206.8 ft.	00:09:11	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 206.8 ft_1.JPG	
217.8 ft.	00:10:01	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 217.8 ft_1.JPG	
269.6 ft.	00:12:01	TF		4.000			☐	11 /			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 269.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
297.1 ft.	00:13:04	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 297.1 ft_1.JPG	
320.0 ft.	00:14:05	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 320.0 ft_1.JPG	
354.9 ft.	00:16:24	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 354.9 ft_1.JPG	
365.4 ft.	00:16:57	JOL					☐	/		4	LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-JOL at 365.4 ft_1.JPG	
367.8 ft.	00:17:16	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-TF at 367.8 ft_1.JPG	
370.2 ft.	00:18:27	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12010'-AMH 'I12011'-MSA at 370.2 ft_1.JPG	CAMERA WILL NOT MAKE IT PASSED JOINT OFFSET LARGE

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250320 11:24
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I12011-I12015	Street: 8TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 486.500 ft.	Length surveyed: 486.500 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12011	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I12015	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	81	534A	3.5	0	0	0	0000	0.0	81	3.5	5.3	0.0
2	4	8				0	0							
3	6	18				0	0							
4	10	40				0	0							
5	3	15				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I12011
0.0 ft.	00:00:00	MWL				5	☐	/				
11.6 ft.	00:01:52	FM					☐	12 / 5		4	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-FM at 11.6 ft_1.JPG	
52.4 ft.	00:03:56	FC					☐	9 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-FC at 52.4 ft_1.JPG	
55.1 ft.	00:04:15	TF			4.000		☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 55.1 ft_1.JPG	
57.2 ft.	00:04:41	TF			4.000		☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 57.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
61.3 ft.	00:05:09	H					☐	1 /		4	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-H at 61.3 ft_1.JPG	
78.5 ft.	00:06:21	FL					☐	8 /		3	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-FL at 78.5 ft_1.JPG	
88.1 ft.	00:07:00	TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TB at 88.1 ft_1.JPG	
104.6 ft.	00:07:52	FS					☐	12 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-FS at 104.6 ft_1.JPG	
105.8 ft.	00:08:21	JOL					☐	/		4	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-JOL at 105.8 ft_1.JPG	
108.3 ft.	00:08:39	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 108.3 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
111.0 ft. 00:09:18		TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TB at 111.0 ft_1.JPG	
112.6 ft. 00:09:37		H					☐	11 / 1		5		
113.1 ft. 00:10:05		HSV					☐	10 / 11		5		
113.1 ft. 00:10:45		FM					☐	12 / 12		4		
114.2 ft. 00:14:22		TFC		4.000			☐	9 /				
116.5 ft. 00:14:45		TFC		4.000			☐	3 /				
118.5 ft. 00:15:02		H					☐	12 /		4		
119.1 ft. 00:15:28		FS					☐	10 / 3		3		
128.3 ft. 00:15:54		TB		4.000			☐	2 /				
149.7 ft. 00:16:49		FL					☐	2 /		3		
156.3 ft. 00:17:25		FC					☐	6 / 10		2		
166.0 ft. 00:18:09		FM					☐	3 / 5		4		
174.0 ft. 00:18:30		FM					☐	12 / 12		4		
176.2 ft. 00:18:42		TF		4.000			☐	9 /				
179.0 ft. 00:19:01		TF		4.000			☐	3 /				
192.6 ft. 00:19:52		TB		4.000			☐	9 /				
196.6 ft. 00:20:16		HSV					☐	12 /		5		
200.6 ft. 00:20:41		B					☐	12 / 12		4		
205.7 ft. 00:21:11		FC					☐	12 / 12		2		
211.6 ft. 00:21:41		FM					☐	2 / 6		4		

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
217.0 ft.	00:22:33	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TB at 217.0 ft_1.JPG	
217.4 ft.	00:22:47	FS					☐	2 / 6		3	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-FS at 217.4 ft_1.JPG	
221.2 ft.	00:23:07	FS					☐	9 / 1		3	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-FS at 221.2 ft_1.JPG	
225.3 ft.	00:23:26	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 225.3 ft_1.JPG	
227.7 ft.	00:23:47	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 227.7 ft_1.JPG	
235.9 ft.	00:24:24	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-FC at 235.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
239.8 ft.	00:24:41	FH4					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-FH4 at 239.8 ft_1.JPG	
244.7 ft.	00:24:53	MWL				40	☐		/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-MWL at 244.7 ft_1.JPG	
270.5 ft.	00:26:07	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TB at 270.5 ft_1.JPG	
276.4 ft.	00:26:28	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 276.4 ft_1.JPG	
293.8 ft.	00:27:11	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 293.8 ft_1.JPG	
321.0 ft.	00:28:24	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 321.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
363.7 ft.	00:29:58	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 363.7 ft_1.JPG	
365.8 ft.	00:30:14	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 365.8 ft_1.JPG	
402.4 ft.	00:31:55	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 402.4 ft_1.JPG	
439.8 ft.	00:33:27	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-TF at 439.8 ft_1.JPG	
486.5 ft.	00:35:41	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12011'-AMH 'I12015'-AMH at 486.5 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250320 12:30
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I12017-I12013	Street: 8TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 406.600 ft.	Length surveyed: 406.600 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12017	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I12013	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	3	3100	3.0	0	0	0	0000	0.0	3	3.0	3.1	0.0
2	0	0				0	0							
3	1	3				0	0							
4	0	0				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I12013
0.0 ft.	00:00:00	MWL				5	☐	/				
61.7 ft.	00:02:44	TF		4.000			☐	9	/			
63.1 ft.	00:03:05	TF		4.000			☐	3	/			
102.3 ft.	00:04:40	TF		4.000			☐	9	/			
104.9 ft.	00:04:57	TF		4.000			☐	3	/			
112.6 ft.	00:08:05	MWLS				50	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-MWLS at 112.6 ft_1.JPG	
140.8 ft.	00:09:37	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 140.8 ft_1.JPG	
178.2 ft.	00:11:02	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 178.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
185.4 ft.	00:11:26	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 185.4 ft_1.JPG	
212.1 ft.	00:12:26	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 212.1 ft_1.JPG	
258.9 ft.	00:13:54	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 258.9 ft_1.JPG	
283.2 ft.	00:14:49	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 283.2 ft_1.JPG	
300.0 ft.	00:17:01	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 300.0 ft_1.JPG	
350.1 ft.	00:25:51	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 350.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
404.9 ft.	00:32:10	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-TF at 404.9 ft_1.JPG	
406.6 ft.	00:32:27	ACOM					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'I12017'-AMH 'I12013'-ACOM at 406.6 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250320 13:27	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV	Inspection status: CI	Consequence of failure: NONE	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: I12013-I12012	Street: 8TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 330.600 ft.	Length surveyed: 330.500 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12013	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: I12012	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	57	5347	3.8	0	0	0	0000	0.0	57	3.8	5.3	0.0
2	1	2				0	0							
3	4	12				0	0							
4	7	28				0	0							
5	3	15				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I12013
0.0 ft.	00:00:00	MWL				5	☐	/				
30.1 ft.	00:01:25	FS					☐	12 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-FS at 30.1 ft_1.JPG	
40.3 ft.	00:01:56	TFC		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TFC at 40.3 ft_1.JPG	
47.4 ft.	00:02:36	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TF at 47.4 ft_1.JPG	
49.4 ft.	00:02:51	JOL					☐	/		4	LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-JOL at 49.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
50.9 ft.	00:03:03	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TF at 50.9 ft_1.JPG	
54.2 ft.	00:03:21	FS					☐	9 / 12		3	LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-FS at 54.2 ft_1.JPG	
59.4 ft.	00:04:02	FH2					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-FH2 at 59.4 ft_1.JPG	
61.9 ft.	00:04:14	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-FM at 61.9 ft_1.JPG	
62.4 ft.	00:04:29	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TF at 62.4 ft_1.JPG	
83.3 ft.	00:05:07	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TB at 83.3 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
88.0 ft.	00:05:40	FC					☐	9 / 5		2	LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-FC at 88.0 ft_1.JPG	
101.4 ft.	00:06:09	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TF at 101.4 ft_1.JPG	
103.3 ft.	00:06:25	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TF at 103.3 ft_1.JPG	
112.0 ft.	00:06:59	H					☐	12 /		4	LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-H at 112.0 ft_1.JPG	
114.1 ft.	00:07:46	H					☐	12 /		4	LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-H at 114.1 ft_1.JPG	
136.9 ft.	00:08:35	H					☐	12 /		4		
140.3 ft.	00:09:02	HSV					☐	11 / 1		5		
163.2 ft.	00:10:15	H					☐	12 /		4		
167.5 ft.	00:10:33	TFC		4.000			☐	9 /				
168.9 ft.	00:10:51	H					☐	11 / 1		5		
181.8 ft.	00:11:30	TF		4.000			☐	3 /				

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
182.7 ft.	00:11:51	BSV					☐	11 / 4		5		
205.7 ft.	00:12:37	FM					☐	9 / 3		4		
209.9 ft.	00:12:50	TFC		4.000			☐	2 /				
210.0 ft.	00:13:04	TF		4.000			☐	10 /				
254.4 ft.	00:14:26	TB		4.000			☐	2 /				
256.0 ft.	00:14:39	TF		4.000			☐	2 /				
258.1 ft.	00:14:52	MWLS				45	☐	/		3		
277.4 ft.	00:16:40	TFC		4.000			☐	9 /				
286.5 ft.	00:20:44	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TB at 286.5 ft_1.JPG	
319.0 ft.	00:20:44	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TFC at 319.0 ft_1.JPG	
325.6 ft.	00:20:44	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TF at 325.6 ft_1.JPG	
327.6 ft.	00:20:44	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-TF at 327.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
330.5 ft.	00:25:54	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12013'-AMH 'I12012'-MSA at 330.5 ft_1.JPG	CAMERA WILL NOT MAKE IT PASSED OFFSET

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250320 15:06
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12017-J12016	Street: J ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 17.600 ft.	Length surveyed: 17.600 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12017	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12016	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	0	0000	0.0	0	0	0	0000	0.0	0	0.0	1.0	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12017
0.0 ft.	00:00:00	MWL				15	☐	/				
17.6 ft.	00:02:25	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12017'-AMH 'J12016'-MSA at 17.6 ft_1.JPG	CAMERA WILL NOT TRAVEL THROUGH DEBRIS

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250320 15:20
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12011-J12020	Street: I ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 480.600 ft.	Length surveyed: 480.600 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12011	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12020	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	10	4132	3.3	0	0	0	0000	0.0	10	3.3	4.1	0.0
2	0	0				0	0							
3	2	6				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12011
0.0 ft.	00:00:00	MWL				10	☐	/				
67.1 ft.	00:02:26	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-TB at 67.1 ft_1.JPG	
311.6 ft.	00:10:13	FS					☐	10 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-FS at 311.6 ft_1.JPG	
340.9 ft.	00:11:29	FM					☐	9 / 3		4	LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-FM at 340.9 ft_1.JPG	
355.3 ft.	00:12:11	FS					☐	10 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-FS at 355.3 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
375.6 ft.	00:12:57	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-TB at 375.6 ft_1.JPG	
480.6 ft.	00:17:09	AMH					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-AMH at 480.6 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250320 15:20	
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control:	Purpose: F
Direction: D	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12011-J12020	Street: I ST
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 8 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 480.6 ft.	Length surveyed: 480.6 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J12011	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12020	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	10	4132	3.33	0	0	0	0000	0.00	10	3.33		
2	0	0				0	0							
3	2	6				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12011
0.0 ft.		MWL				10	☐	/				
67.1 ft.	00:02:26	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-TB at 67.1 ft.JPG	
311.6 ft.	00:10:13	FS					☐	10 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-FS at 311.6 ft.JPG	
340.9 ft.	00:11:29	FM					☐	9 / 3		4	LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-FM at 340.9 ft.JPG	
355.3 ft.	00:12:11	FS					☐	10 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-FS at 355.3 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
375.6 ft.	00:12:57	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-TB at 375.6 ft.JPG	
480.6 ft.	00:17:09	AMH					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'J12011'-AMH 'J12020'-AMH at 480.6 ft.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250331 08:28
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12017-J12016	Street: J ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 479.100 ft.	Length surveyed: 479.100 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12017	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12016	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	48	4638	3.4	0	0	0	0000	0.0	48	3.4	4.6	0.0
2	0	0				0	0							
3	8	24				0	0							
4	6	24				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12017
0.0 ft.	00:00:00	MWL				45	☐	/				
26.3 ft.	00:03:15	FH2					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12017'-AMH 'J12016'-FH2 at 26.3 ft_1.JPG	
64.6 ft.	00:04:24	FS					☐	12 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12017'-AMH 'J12016'-FS at 64.6 ft_1.JPG	
87.5 ft.	00:05:08	FM					☐	9 / 3		4	LINCOLN WASTEWATER CONDITION-AMH 'J12017'-AMH 'J12016'-FM at 87.5 ft_1.JPG	
113.3 ft.	00:06:22	FM					☐	12 / 3		4		
136.2 ft.	00:07:02	FS					☐	7 / 12		3		
172.8 ft.	00:07:54	FS					☐	12 / 5		3		
267.1 ft.	00:10:26	FH3					☐	9 / 3		4		

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
334.6 ft. 00:12:12		FS					☐	8 / 3		3		
352.6 ft. 00:12:54		FM					☐	12 / 12		4		
365.1 ft. 00:13:23		TB	6.000				☐	12 /				
367.7 ft. 00:15:58		FH3					☐	9 / 3		4		
385.4 ft. 00:17:03		FL					☐	2 /		3		
390.4 ft. 00:17:24		FS					☐	8 / 5		3		
418.7 ft. 00:18:28		FS					☐	10 / 2		3		
422.4 ft. 00:18:39		TB	6.000				☐	12 /				
433.3 ft. 00:20:24		FM					☐	9 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12017'-AMH 'J12016'-FM at 433.3 ft_1.JPG	
479.1 ft. 00:25:35		AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12017'-AMH 'J12016'-AMH at 479.1 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250331 10:26
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I12015-J12015	Street: 7TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 477.800 ft.	Length surveyed: 477.800 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12015	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12015	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	28	4432	3.1	0	0	2	2100	2.0	30	3.0	4.4	0.0
2	3	6				1	2							
3	2	6				0	0							
4	4	16				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I12015
0.0 ft.	00:00:00	MWL				5	☐	/				
43.4 ft.	00:02:29	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TFC at 43.4 ft_1.JPG	
44.2 ft.	00:02:51	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FM at 44.2 ft_1.JPG	
45.6 ft.	00:03:20	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 45.6 ft_1.JPG	
61.2 ft.	00:04:15	FM					☐	9 / 2		4	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FM at 61.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
64.0 ft.	00:04:30	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 64.0 ft_1.JPG	
64.7 ft.	00:04:56	FH4					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FH2 at 64.7 ft_1.JPG	
74.7 ft.	00:05:56	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FC at 74.7 ft_1.JPG	
79.8 ft.	00:06:17	MMC					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-MMC at 79.8 ft_1.JPG	PVC
90.8 ft.	00:06:47	MMC					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-MMC at 90.8 ft_1.JPG	VCP
95.2 ft.	00:07:05	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 95.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
97.1 ft.	00:07:21	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 97.1 ft_1.JPG	
103.7 ft.	00:07:52	FS					☐	6 / 9		3	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FS at 103.7 ft_1.JPG	
144.1 ft.	00:09:11	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 144.1 ft_1.JPG	
146.3 ft.	00:09:38	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 146.3 ft_1.JPG	
195.4 ft.	00:11:19	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TFC at 195.4 ft_1.JPG	
197.2 ft.	00:11:34	TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TB at 197.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
197.4 ft.	00:11:52	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 197.4 ft_1.JPG	
221.0 ft.	00:13:06	RTJ				5	☒	12 / 4		2	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-RTJ at 221.0 ft_1.JPG	
239.2 ft.	00:14:08	FC					☐	5 / 1		2	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FC at 239.2 ft_1.JPG	
246.6 ft.	00:14:29	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TFC at 246.6 ft_1.JPG	
248.6 ft.	00:14:47	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 248.6 ft_1.JPG	
271.8 ft.	00:15:41	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 271.8 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
295.8 ft.	00:16:38	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TFC at 295.8 ft_1.JPG	
298.0 ft.	00:16:56	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TFC at 298.0 ft_1.JPG	
306.5 ft.	00:17:28	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 306.5 ft_1.JPG	
365.7 ft.	00:19:36	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 365.7 ft_1.JPG	
367.8 ft.	00:19:54	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TF at 367.8 ft_1.JPG	
384.8 ft.	00:20:34	FH4					☐	12	/ 12	4	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FH4 at 384.8 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
392.7 ft.	00:21:01	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TFC at 392.7 ft_1.JPG	
394.4 ft.	00:21:17	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TFC at 394.4 ft_1.JPG	
408.0 ft.	00:22:04	MMC					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-MMC at 408.0 ft_1.JPG	PVC
412.8 ft.	00:22:23	MMC					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-MMC at 412.8 ft_1.JPG	VCP
417.9 ft.	00:22:49	FC					☐	3	/ 5	2	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FC at 417.9 ft_1.JPG	
423.0 ft.	00:23:08	TB		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-TB at 423.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
430.3 ft.	00:24:18	FS					☐	4	7	3	LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-FS at 430.3 ft_1.JPG	
477.8 ft.	00:28:22	ACOM					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12015'-AMH 'J12015'-ACOM at 477.8 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250331 11:57
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12040-J12002	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 379.500 ft.	Length surveyed: 379.500 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12040	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12002	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	37	5143	2.8	0	0	3	3100	3.0	40	2.9	5.1	0.0
2	7	14				0	0							
3	2	6				1	3							
4	3	12				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12002
0.0 ft.	00:00:00	MWL				5	☐	/				
3.0 ft.	00:00:37	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FC at 3.0 ft_1.JPG	
7.1 ft.	00:01:09	FS					☐	5 / 9		3	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FS at 7.1 ft_1.JPG	
19.4 ft.	00:01:40	HSV					☐	12 /		5	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-HSV at 19.4 ft_1.JPG	
36.3 ft.	00:02:37	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FC at 36.3 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
44.1 ft.	00:03:10	FC					☐	12	12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FC at 44.1 ft_1.JPG	
45.4 ft.	00:03:17	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TFC at 45.4 ft_1.JPG	
47.5 ft.	00:03:28	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TFC at 47.5 ft_1.JPG	
63.4 ft.	00:04:03	B					☐	9	2	4	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-B at 63.4 ft_1.JPG	
90.7 ft.	00:05:03	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TB at 90.7 ft_1.JPG	
96.6 ft.	00:05:44	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 96.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
97.9 ft.	00:05:56	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 97.9 ft_1.JPG	
102.0 ft.	00:06:19	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FC at 102.0 ft_1.JPG	
108.3 ft.	00:06:39	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FC at 108.3 ft_1.JPG	
138.7 ft.	00:07:30	B					☐	3 / 7		4	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-B at 138.7 ft_1.JPG	
140.9 ft.	00:07:48	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 140.9 ft_1.JPG	
140.9 ft.	00:07:56	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FC at 140.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
147.6 ft.	00:08:23	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TFC at 147.6 ft_1.JPG	
148.8 ft.	00:08:33	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 148.8 ft_1.JPG	
157.1 ft.	00:09:05	TBD		4.000			☐	3	/	3	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TBD at 157.1 ft_1.JPG	
198.0 ft.	00:10:43	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 198.0 ft_1.JPG	
199.7 ft.	00:11:16	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TFC at 199.7 ft_1.JPG	
231.1 ft.	00:12:55	TB		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TB at 231.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
248.8 ft.	00:13:34	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 248.8 ft_1.JPG	
253.4 ft.	00:13:58	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 253.4 ft_1.JPG	
277.6 ft.	00:14:54	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 277.6 ft_1.JPG	
306.1 ft.	00:15:55	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 306.1 ft_1.JPG	
328.3 ft.	00:16:44	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 328.3 ft_1.JPG	
356.7 ft.	00:17:41	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TFC at 356.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
371.7 ft.	00:18:22	FC					☐	12	12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FC at 371.7 ft_1.JPG	
373.7 ft.	00:18:34	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TB at 373.7 ft_1.JPG	
375.0 ft.	00:18:49	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TF at 375.0 ft_1.JPG	
375.8 ft.	00:19:05	FS					☐	4	7	3	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-FS at 375.8 ft_1.JPG	
377.2 ft.	00:19:20	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-TFC at 377.2 ft_1.JPG	
378.0 ft.	00:19:34	B					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-B at 378.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
379.5 ft.	00:19:44	ACOM					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12040'-AMH 'J12002'-ACOM at 379.5 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250331 13:14	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV	Inspection status: CI	Consequence of failure: NONE	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: J12017-J12002	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 3.000 ft.	Length surveyed: 3.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12017	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12002	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	5	5100	5.0	0	0	0	0000	0.0	5	5.0	5.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12002
0.0 ft.	00:00:00	MWL				5	☐	/				
3.0 ft.	00:00:30	X				100	☐	/		5	LINCOLN WASTEWATER CONDITION-AMH 'J12017'-AMH 'J12002'-XP at 0.0 ft_1.JPG	NO PIPE BIG VOID
3.0 ft.	00:00:33	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12017'-AMH 'J12002'-MSA at 0.0 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250331 13:19
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12002-J12011	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 174.200 ft.	Length surveyed: 174.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12002	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12011	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	16	4224	2.7	0	0	0	0000	0.0	16	2.7	4.2	0.0
2	4	8				0	0							
3	0	0				0	0							
4	2	8				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12002
0.0 ft.	00:00:00	MWL				5	☐	/				
8.5 ft.	00:01:22	FC					☐	8 / 3		2	LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-FC at 8.5 ft_1.JPG	
44.9 ft.	00:02:39	FC					☐	9 / 11		2	LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-FC at 44.9 ft_1.JPG	
61.3 ft.	00:03:30	FC					☐	9 / 3		2	LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-FC at 61.3 ft_1.JPG	
65.1 ft.	00:03:52	FM					☐	8 / 4		4	LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-FM at 65.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
69.1 ft.	00:04:10	FM					☐	8	4	4	LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-FM at 69.1 ft_1.JPG	
77.0 ft.	00:04:29	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-TF at 77.0 ft_1.JPG	
79.3 ft.	00:04:50	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-TF at 79.3 ft_1.JPG	
116.1 ft.	00:06:07	FC					☐	12	12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-FC at 116.1 ft_1.JPG	
174.2 ft.	00:07:44	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12002'-AMH 'J12011'-AMH at 174.2 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250331 13:35
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: I12012-J12018	Street: 6TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 433.700 ft.	Length surveyed: 433.700 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12012	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12018	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	10	4221	3.3	0	0	4	4100	4.0	14	3.5	4.3	0.0
2	1	2				0	0							
3	0	0				0	0							
4	2	8				1	4							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12018
0.0 ft.	00:00:00	MWL				5	☐	/				
15.9 ft.	00:00:00	RPP					☐	12 / 12				PATCH
47.5 ft.	00:02:34	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-FM at 47.5 ft_1.JPG	
49.3 ft.	00:02:51	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 49.3 ft_1.JPG	
49.3 ft.	00:02:52	RBL				100	☐	3 /		4	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-RBL at 49.3 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
67.3 ft.	00:03:37	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 67.3 ft_1.JPG	
72.2 ft.	00:03:55	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 72.2 ft_1.JPG	
98.3 ft.	00:05:08	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TFC at 98.3 ft_1.JPG	
100.4 ft.	00:05:25	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 100.4 ft_1.JPG	
110.9 ft.	00:05:53	TF		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 110.9 ft_1.JPG	
118.6 ft.	00:06:22	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 118.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
140.8 ft.	00:07:21	RPP					☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-RPP at 140.8 ft_1.JPG	PATCH
143.3 ft.	00:07:38	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TB at 143.3 ft_1.JPG	
155.6 ft.	00:08:18	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 155.6 ft_1.JPG	
157.2 ft.	00:08:30	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TFC at 157.2 ft_1.JPG	
204.0 ft.	00:09:59	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 204.0 ft_1.JPG	
206.1 ft.	00:10:07	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 206.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
257.0 ft.	00:11:55	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TFC at 257.0 ft_1.JPG	
285.1 ft.	00:13:50	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 285.1 ft_1.JPG	
313.8 ft.	00:15:47	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 313.8 ft_1.JPG	
318.1 ft.	00:16:05	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 318.1 ft_1.JPG	
335.4 ft.	00:16:48	FM					☐	12	/ 12	4	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-FM at 335.4 ft_1.JPG	
358.9 ft.	00:17:44	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TB at 358.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
368.9 ft.	00:18:29	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TFC at 368.9 ft_1.JPG	
371.3 ft.	00:18:47	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TFC at 371.3 ft_1.JPG	
383.1 ft.	00:19:28	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TB at 383.1 ft_1.JPG	
402.1 ft.	00:20:22	FC					☐	8	/ 2	2	LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-FC at 402.1 ft_1.JPG	
403.5 ft.	00:20:38	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TB at 403.5 ft_1.JPG	
421.9 ft.	00:21:22	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TB at 421.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
425.8 ft.	00:21:42	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TB at 425.8 ft_1.JPG	
428.5 ft.	00:21:59	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TF at 428.5 ft_1.JPG	
429.8 ft.	00:22:48	TFC		6.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-TFC at 429.8 ft_1.JPG	
433.7 ft.	00:23:50	ACOM					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'I12012'-AMH 'J12018'-ACOM at 433.7 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250401 07:22	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV	Inspection status: CI	Consequence of failure: NONE	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: I12024-J12027	Street: 6TH ST ALLEY
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 400.200 ft.	Length surveyed: 400.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: I12024	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12027	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	5	5100	5.0	0	0	0	0000	0.0	5	5.0	5.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				I12024
0.0 ft.	00:00:00	MWL				5	☐	/				
1.5 ft.	00:00:17	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-TF at 1.5 ft_1.JPG	
3.8 ft.	00:00:43	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-TFC at 3.8 ft_1.JPG	
5.4 ft.	00:01:04	MMC					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-MMC at 5.4 ft_1.JPG	PVC
91.6 ft.	00:05:51	HSV					☐	11 / 1		5	LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-HSV at 91.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
138.1 ft.	00:08:17	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-TF at 138.1 ft_1.JPG	
188.2 ft.	00:10:10	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-TF at 188.2 ft_1.JPG	
215.3 ft.	00:11:31	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-TF at 215.3 ft_1.JPG	
249.6 ft.	00:12:41	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-TF at 249.6 ft_1.JPG	
300.1 ft.	00:15:05	MWL				45	☐		/		LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-MWL at 300.1 ft_1.JPG	
326.8 ft.	00:16:48	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-TF at 326.8 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
400.2 ft.	00:29:04	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'I12024'-AMH 'J12027'-AMH at 400.2 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250401 08:13
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: U	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12048-J12027	Street: 6TH ST
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 59.5 ft.	Length surveyed: 59.5 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J12048	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12027	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	4	2200	2.00	0	0	4	4100	4.00	8	2.67		
2	2	4				0	0							
3	0	0				0	0							
4	0	0				1	4							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12027
0.0 ft.		MWL				5	☐	/				
0.1 ft.	00:00:29	JOL					☐	/		2	LINCOLN WASTEWATER CONDITION-AMH 'J12048'-AMH 'J12027'-JOL at 0.1 ft.JPG	
11.0 ft.	00:00:59	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12048'-AMH 'J12027'-FC at 11.0 ft.JPG	
45.4 ft.	00:02:24	TBI		4.000	2.000		☐	3 /		4	LINCOLN WASTEWATER CONDITION-AMH 'J12048'-AMH 'J12027'-TBI at 45.4 ft.JPG	
49.6 ft.	00:02:51	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12048'-AMH 'J12027'-TFC at 49.6 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
59.5 ft.	00:03:34	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12048'-AMH 'J12027'-MSA at 59.5 ft.JPG	CAMERA UNDER WATER

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250401 08:39
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13016-J13008	Street: MCBEAN PARK DR
City: LINCOLN	Location code: B	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 383.200 ft.	Length surveyed: 383.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13016	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13008	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	0	0000	0.0	0	0	0	0000	0.0	0	0.0	1.0	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J13008
0.0 ft.	00:00:00	MWL				5	☐	/				
46.8 ft.	00:01:56	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TF at 46.8 ft_1.JPG	
58.8 ft.	00:02:23	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TF at 58.8 ft_1.JPG	
61.0 ft.	00:02:37	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 61.0 ft_1.JPG	
76.7 ft.	00:03:13	TB		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 76.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
89.8 ft.	00:03:44	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 89.8 ft_1.JPG	
109.6 ft.	00:04:26	TFC		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 109.6 ft_1.JPG	
111.9 ft.	00:04:36	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 111.9 ft_1.JPG	
113.1 ft.	00:04:58	RPP					☐	12 / 1			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-RPP at 113.1 ft_1.JPG	PATCH
113.8 ft.	00:05:13	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 113.8 ft_1.JPG	
160.4 ft.	00:06:40	TB		4.000			☐	1 /			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 160.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
162.5 ft.	00:06:54	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 162.5 ft_1.JPG	
164.4 ft.	00:07:06	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 164.4 ft_1.JPG	
166.9 ft.	00:07:18	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 166.9 ft_1.JPG	
203.9 ft.	00:08:40	TB		4.000			☐	1	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 203.9 ft_1.JPG	
211.6 ft.	00:09:03	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 211.6 ft_1.JPG	
213.4 ft.	00:09:21	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 213.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
261.8 ft.	00:10:49	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 261.8 ft_1.JPG	
264.3 ft.	00:11:04	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TF at 264.3 ft_1.JPG	
266.4 ft.	00:11:15	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 266.4 ft_1.JPG	
280.5 ft.	00:11:46	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 280.5 ft_1.JPG	
314.9 ft.	00:12:54	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TF at 314.9 ft_1.JPG	
316.9 ft.	00:13:07	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TF at 316.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
321.1 ft.	00:13:34	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 321.1 ft_1.JPG	
347.3 ft.	00:14:29	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 347.3 ft_1.JPG	
349.7 ft.	00:14:40	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 349.7 ft_1.JPG	
373.9 ft.	00:15:36	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TF at 373.9 ft_1.JPG	
380.1 ft.	00:16:43	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TB at 380.1 ft_1.JPG	
381.9 ft.	00:17:03	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-TFC at 381.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
383.2 ft.	00:17:25	ACOM					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J13016'-AMH 'J13008'-ACOM at 383.2 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250401 09:41
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13011-J13002	Street: MCBEAN PARK DR
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 188.800 ft.	Length surveyed: 188.800 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13011	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13002	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	9	4131	3.0	0	0	0	0000	0.0	9	3.0	4.1	0.0
2	1	2				0	0							
3	1	3				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J13011
0.0 ft.	00:00:00	MWL				5	☐	/				
65.8 ft.	00:02:24	TFC		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-TFC at 65.8 ft_1.JPG	
68.0 ft.	00:02:35	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-TF at 68.0 ft_1.JPG	
86.2 ft.	00:03:10	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-TB at 86.2 ft_1.JPG	
118.7 ft.	00:04:27	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-TF at 118.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
121.0 ft.	00:04:50	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-TFC at 121.0 ft_1.JPG	
168.0 ft.	00:06:27	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-TF at 168.0 ft_1.JPG	
170.2 ft.	00:06:36	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-TF at 170.2 ft_1.JPG	
177.0 ft.	00:06:54	FH2					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-FH2 at 177.0 ft_1.JPG	
183.2 ft.	00:07:15	FC					☐	12 / 3		2	LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-FC at 183.2 ft_1.JPG	
187.0 ft.	00:07:34	B					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-B at 187.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
188.8 ft.	00:07:50	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J13011'-AMH 'J13002'-MSA at 188.8 ft_1.JPG	CAMERA WILL NOT MAKE IT PASSED BROKEN PIPE

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250401 09:58	
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: U	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13010-J13002	Street: MCBEAN PARK DR
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 398.9 ft.	Length surveyed: 398.9 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J13010	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J13002	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	2	2100	2.00	0	0	3	3100	3.00	5	2.50		
2	1	2				0	0							
3	0	0				1	3							
4	0	0				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J13002
0.0 ft.		MWL				5	☐	/				
47.6 ft.	00:01:54	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TF at 47.6 ft.JPG	
49.7 ft.	00:02:07	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TF at 49.7 ft.JPG	
89.1 ft.	00:03:55	FC					☐	12	/ 12	2	LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-FC at 89.1 ft.JPG	
98.4 ft.	00:04:26	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TF at 98.4 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
100.3 ft.	00:04:42	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TB at 100.3 ft.JPG	
100.5 ft.	00:04:53	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TFC at 100.5 ft.JPG	
147.6 ft.	00:06:56	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TFC at 147.6 ft.JPG	
163.9 ft.	00:07:55	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TB at 163.9 ft.JPG	
168.6 ft.	00:08:16	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TB at 168.6 ft.JPG	
189.0 ft.	00:09:32	TB		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TB at 189.0 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
190.4 ft.	00:09:42	RPP					☐	10	/ 1		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-RPP at 190.4 ft.JPG	PATCH
201.1 ft.	00:10:12	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TF at 201.1 ft.JPG	
248.2 ft.	00:11:54	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TFC at 248.2 ft.JPG	
250.3 ft.	00:12:10	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TF at 250.3 ft.JPG	
297.2 ft.	00:14:03	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TF at 297.2 ft.JPG	
308.1 ft.	00:14:53	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TB at 308.1 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
314.2 ft.	00:15:23	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TFC at 314.2 ft.JPG	
344.4 ft.	00:16:55	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TFC at 344.4 ft.JPG	
346.6 ft.	00:17:17	TBI		4.000	1.000		☐	10	/	3	LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TBI at 346.6 ft.JPG	
398.9 ft.	00:21:14	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-TF at 398.9 ft.JPG	
398.9 ft.	00:21:26	AEP					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J13010'-AMH 'J13002'-AEP at 398.9 ft.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250401 10:51	
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: U	Technology used:	Inspection Status:	Consequence of failure:	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: J12052-J12032	Street: MCBEAN PARK DR
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 397.2 ft.	Length surveyed: 397.2 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J12052	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12032	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	20	4234	3.33	0	0	9	3300	3.00	29	3.22		
2	0	0				0	0							
3	4	12				3	9							
4	2	8				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12032
0.0 ft.		MWL				5	☐	/				
55.6 ft.	00:02:31	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TF at 55.6 ft.JPG	
58.6 ft.	00:02:49	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TF at 58.6 ft.JPG	
61.3 ft.	00:03:17	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-FM at 61.3 ft.JPG	
78.3 ft.	00:04:01	FS					☐	5 / 8		3	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-FS at 78.3 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
98.0 ft.	00:04:43	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TB at 98.0 ft.JPG	
98.8 ft.	00:05:17	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-FM at 98.8 ft.JPG	
100.3 ft.	00:05:28	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TF at 100.3 ft.JPG	
102.5 ft.	00:05:36	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TFC at 102.5 ft.JPG	
125.9 ft.	00:07:21	FS					☐	12 / 4		3	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-FS at 125.9 ft.JPG	
152.3 ft.	00:08:53	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TB at 152.3 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
154.1 ft.	00:09:02	TBI		4.000	1.000		☐	9 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TBI at 154.1 ft.JPG	
202.8 ft.	00:10:50	TBI		4.000	1.000		☐	10 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TBI at 202.8 ft.JPG	
209.3 ft.	00:11:14	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TF at 209.3 ft.JPG	
219.8 ft.	00:11:35	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TF at 219.8 ft.JPG	
242.0 ft.	00:12:19	TFC		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TFC at 242.0 ft.JPG	
260.2 ft.	00:13:02	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TFC at 260.2 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
287.2 ft.	00:13:59	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TB at 287.2 ft.JPG	
289.9 ft.	00:14:34	FL					☐	2	/	3	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-FL at 289.9 ft.JPG	
298.2 ft.	00:15:10	TBI		4.000	1.000		☐	10	/	3	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TBI at 298.2 ft.JPG	
299.7 ft.	00:15:31	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TB at 299.7 ft.JPG	
315.2 ft.	00:16:27	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TFC at 315.2 ft.JPG	
317.3 ft.	00:16:57	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TF at 317.3 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
330.3 ft.	00:17:46	FS					☐	3 / 7		3	LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-FS at 330.3 ft.JPG	
331.2 ft.	00:18:01	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TF at 331.2 ft.JPG	
356.3 ft.	00:18:52	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TFC at 356.3 ft.JPG	
358.3 ft.	00:19:10	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TF at 358.3 ft.JPG	
376.3 ft.	00:19:59	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TB at 376.3 ft.JPG	
382.6 ft.	00:20:25	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TB at 382.6 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
392.5 ft.	00:20:58	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TFC at 392.5 ft.JPG	
395.5 ft.	00:21:17	TFC		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-TFC at 395.5 ft.JPG	
397.2 ft.	00:21:48	ACOM					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12052'-AMH 'J12032'-ACOM at 397.2 ft.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250401 12:42
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: U	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12024-J12029	Street: MCBEAN PARK DR
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 249.8 ft.	Length surveyed: 249.8 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J12024	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12029	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	9	4131	3.00	0	0	3	3100	3.00	12	3.00		
2	1	2				0	0							
3	1	3				1	3							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12029
0.0 ft.		MWL				5	☐	/				
9.3 ft.	00:01:04	RPP					☐	1 / 2			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-RPP at 9.3 ft.JPG	PATCH
67.9 ft.	00:02:53	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TF at 67.9 ft.JPG	
84.1 ft.	00:03:26	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TF at 84.1 ft.JPG	
88.2 ft.	00:03:43	FL					☐	12 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-FL at 88.2 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
93.0 ft.	00:04:18	B					☐	11	/ 1	4	LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-B at 93.0 ft.JPG	
93.7 ft.	00:04:34	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TF at 93.7 ft.JPG	
96.0 ft.	00:04:47	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TF at 96.0 ft.JPG	
96.0 ft.	00:04:52	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TF at 96.0 ft_1.JPG	
118.4 ft.	00:05:45	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TF at 118.4 ft.JPG	
128.6 ft.	00:06:12	RPP					☐	11	/ 1		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-RPP at 128.6 ft.JPG	PATCH

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
128.9 ft.	00:06:34	FC					☐	12	12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-FC at 128.9 ft.JPG	
131.8 ft.	00:06:50	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TF at 131.8 ft.JPG	
160.2 ft.	00:07:52	RPP					☐	11	/ 1		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-RPP at 160.2 ft.JPG	PATCH
162.8 ft.	00:08:12	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TFC at 162.8 ft.JPG	
164.6 ft.	00:08:23	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TB at 164.6 ft.JPG	
167.0 ft.	00:08:37	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TFC at 167.0 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
189.3 ft.	00:09:25	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TF at 189.3 ft.JPG	
199.5 ft.	00:09:58	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TFC at 199.5 ft.JPG	
204.1 ft.	00:10:12	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TB at 204.1 ft.JPG	
208.4 ft.	00:10:31	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TB at 208.4 ft.JPG	
217.7 ft.	00:10:59	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TFC at 217.7 ft.JPG	
230.2 ft.	00:11:27	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TFC at 230.2 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
249.0 ft.	00:12:16	TBI		4.000	1.000		☐	9 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-TBI at 249.0 ft.JPG	
249.8 ft.	00:14:30	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12024'-AMH 'J12029'-MSA at 249.8 ft.JPG	CAMERA WILL NOT MAKE IT PASSED TBI

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250402 09:30	
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: U	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12025-J12029	Street: MCBEAN PARK DR
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 417.4 ft.	Length surveyed: 417.4 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J12025	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12029	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	2	2100	2.00	0	0	11	5132	3.67	13	3.25		
2	1	2				0	0							
3	0	0				2	6							
4	0	0				0	0							
5	0	0				1	5							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12029
0.0 ft.		MWL				5	☐	/				
48.8 ft.	00:01:38	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 48.8 ft_1.JPG	
55.1 ft.	00:01:54	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 55.1 ft.JPG	
55.1 ft.	00:02:12	FC					☐	7 / 2		2	LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-FC at 55.1 ft.JPG	
67.6 ft.	00:02:39	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TB at 67.6 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
77.7 ft.	00:03:03	TBI		4.000	1.000		☐	11 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TBI at 77.7 ft.JPG	
100.0 ft.	00:03:43	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TFC at 100.0 ft.JPG	
117.9 ft.	00:04:20	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 117.9 ft.JPG	
132.3 ft.	00:04:47	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TB at 132.3 ft.JPG	
135.0 ft.	00:04:59	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TB at 135.0 ft.JPG	
154.5 ft.	00:05:40	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TFC at 154.5 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
157.6 ft.	00:05:54	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 157.6 ft.JPG	
208.4 ft.	00:07:16	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 208.4 ft.JPG	
210.4 ft.	00:07:24	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 210.4 ft.JPG	
244.5 ft.	00:08:16	TB		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TB at 244.5 ft.JPG	
259.1 ft.	00:08:46	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TFC at 259.1 ft.JPG	
261.1 ft.	00:09:02	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 261.1 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
310.3 ft.	00:10:54	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TB at 310.3 ft.JPG	
313.9 ft.	00:11:09	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TFC at 313.9 ft.JPG	
318.3 ft.	00:11:23	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 318.3 ft.JPG	
349.1 ft.	00:12:34	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TB at 349.1 ft.JPG	
356.6 ft.	00:13:03	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TFC at 356.6 ft.JPG	
358.8 ft.	00:13:14	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TFC at 358.8 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
372.9 ft.	00:13:47	TB		4.000			☐	11 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TB at 372.9 ft.JPG	
405.9 ft.	00:15:06	TBI		4.000	1.000		☐	11 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TBI at 405.9 ft.JPG	
408.0 ft.	00:16:24	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-TF at 408.0 ft.JPG	
416.4 ft.	00:16:52	RBB				85	☐	12 / 12		5	LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-RBB at 416.4 ft.JPG	
417.4 ft.	00:17:17	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12025'-AMH 'J12029'-MSA at 417.4 ft.JPG	CAMERA WILL NOT MAKE IT PASSED ROOT BALL

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250402 10:15
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: U	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12049-J12028	Street: MCBEAN PARK DR
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 205.3 ft.	Length surveyed: 205.3 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J12049	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12028	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	2	2100	2.00	0	0	4	4100	4.00	6	3.00		
2	1	2				0	0							
3	0	0				0	0							
4	0	0				1	4							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12028
0.0 ft.		MWL				5	☐	/				
59.3 ft.	00:01:49	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TF at 59.3 ft.JPG	
71.4 ft.	00:02:19	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TF at 71.4 ft.JPG	
91.6 ft.	00:03:11	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TB at 91.6 ft.JPG	
110.1 ft.	00:03:42	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TFC at 110.1 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
112.4 ft.	00:03:52	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TF at 112.4 ft.JPG	
116.8 ft.	00:04:02	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TB at 116.8 ft.JPG	
147.3 ft.	00:05:06	FC					☐	6 / 8		2	LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-FC at 147.3 ft.JPG	
160.8 ft.	00:05:34	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TF at 160.8 ft.JPG	
183.2 ft.	00:06:13	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TF at 183.2 ft.JPG	
204.8 ft.	00:06:48	TBI		4.000	2.000		☐	3 /		4	LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-TBI at 204.8 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
205.3 ft.	00:07:49	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12049'-AMH 'J12028'-MSA at 205.3 ft.JPG	CAMERA WILL NOT MAKE IT PASSED TBI

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250402 10:29
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12050-J12028	Street: MCBEAN PARK DR
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 415.300 ft.	Length surveyed: 415.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12050	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12028	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	23	5241	3.3	0	0	0	0000	0.0	23	3.3	5.2	0.0
2	3	6				0	0							
3	1	3				0	0							
4	1	4				0	0							
5	2	10				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12028
0.0 ft.	00:00:00	MWL				5	☐	/				
52.6 ft.	00:04:16	MWLS				40	☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-MWLS at 52.6 ft_1.JPG	
55.1 ft.	00:04:25	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 55.1 ft_1.JPG	
67.1 ft.	00:04:52	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TB at 67.1 ft_1.JPG	
68.6 ft.	00:05:00	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TFC at 68.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
103.2 ft.	00:06:12	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TFC at 103.2 ft_1.JPG	
105.6 ft.	00:06:24	TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TB at 105.6 ft_1.JPG	
138.5 ft.	00:07:27	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 138.5 ft_1.JPG	
143.1 ft.	00:08:14	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-FC at 143.1 ft_1.JPG	
152.1 ft.	00:08:37	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-FC at 152.1 ft_1.JPG	
154.5 ft.	00:08:47	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 154.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
156.1 ft.	00:08:58	HVV					☐	1	/	5	LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-HVV at 156.1 ft_1.JPG	
156.9 ft.	00:09:08	HVV					☐	10	/	5	LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-HVV at 156.9 ft_1.JPG	
161.6 ft.	00:09:52	FC					☐	12	/ 12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-FC at 161.6 ft_1.JPG	
183.5 ft.	00:10:35	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TB at 183.5 ft_1.JPG	
199.6 ft.	00:11:09	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 199.6 ft_1.JPG	
201.1 ft.	00:11:17	H					☐	11	/	4	LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-H at 201.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
201.9 ft.	00:11:29	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TFC at 201.9 ft_1.JPG	
242.3 ft.	00:12:56	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 242.3 ft_1.JPG	
244.5 ft.	00:13:05	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TFC at 244.5 ft_1.JPG	
272.9 ft.	00:14:22	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TB at 272.9 ft_1.JPG	
304.6 ft.	00:15:21	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TFC at 304.6 ft_1.JPG	
308.3 ft.	00:15:35	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TB at 308.3 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
328.1 ft.	00:16:19	TB		6.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TB at 328.1 ft_1.JPG	
336.7 ft.	00:16:53	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TB at 336.7 ft_1.JPG	
342.3 ft.	00:17:20	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 342.3 ft_1.JPG	
344.7 ft.	00:17:31	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 344.7 ft_1.JPG	
349.3 ft.	00:17:51	RPP					☐	11 / 1			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-RPP at 349.3 ft_1.JPG	PATCH
350.5 ft.	00:18:00	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TFC at 350.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
374.7 ft.	00:18:42	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 374.7 ft_1.JPG	
391.4 ft.	00:19:16	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TFC at 391.4 ft_1.JPG	
397.5 ft.	00:19:33	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TFC at 397.5 ft_1.JPG	
399.6 ft.	00:20:38	MGO					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-MGO at 399.6 ft_1.JPG	CLEAN OUT
413.3 ft.	00:21:50	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 413.3 ft_2.JPG	
413.3 ft.	00:21:54	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-TF at 413.3 ft_1_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
415.3 ft.	00:22:11	ACOM					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12050'-AMH 'J12028'-ACOM at 415.3 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250402 11:37	
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV	Inspection status: CI	Consequence of failure: NONE	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: J12026-J12032	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 477.300 ft.	Length surveyed: 477.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12026	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12032	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	31	4137	2.8	0	0	0	0000	0.0	31	2.8	4.1	0.0
2	3	6				0	0							
3	7	21				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12026
0.0 ft.	00:00:00	MWL				5	☐	/				
43.9 ft.	00:02:51	FL					☐	12 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FL at 43.9 ft_1.JPG	
64.6 ft.	00:03:36	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TFC at 64.6 ft_1.JPG	
66.7 ft.	00:03:48	TFC		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TFC at 66.7 ft_1.JPG	
85.8 ft.	00:04:55	FS					☐	11 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FS at 85.8 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
119.3 ft.	00:06:18	FC					☐	6	2	2	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FC at 119.3 ft_1.JPG	
120.3 ft.	00:06:27	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TB at 120.3 ft_1.JPG	
123.4 ft.	00:06:51	FL					☐	10	/	3	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FL at 123.4 ft_1.JPG	
124.6 ft.	00:07:02	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 124.6 ft_1.JPG	
126.6 ft.	00:07:12	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TFC at 126.6 ft_1.JPG	
133.6 ft.	00:07:46	FC					☐	11	2	2	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FC at 133.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
150.1 ft.	00:08:43	FC					☐	12	12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FC at 150.1 ft_1.JPG	
176.0 ft.	00:09:26	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 176.0 ft_1.JPG	
178.1 ft.	00:09:36	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TFC at 178.1 ft_1.JPG	
181.7 ft.	00:09:58	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TB at 181.7 ft_1.JPG	
195.4 ft.	00:10:34	FM					☐	10	3	4	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FM at 195.4 ft_1.JPG	
211.0 ft.	00:11:04	TB		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TB at 211.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
212.0 ft.	00:11:17	FS					☐	8	11	3	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FS at 212.0 ft_1.JPG	
225.7 ft.	00:11:49	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 225.7 ft_1.JPG	
228.0 ft.	00:12:06	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TFC at 228.0 ft_1.JPG	
275.6 ft.	00:13:41	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TFC at 275.6 ft_1.JPG	
277.4 ft.	00:13:54	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 277.4 ft_1.JPG	
324.9 ft.	00:15:31	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 324.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
326.9 ft.	00:15:45	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 326.9 ft_1.JPG	
376.5 ft.	00:17:24	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 376.5 ft_1.JPG	
382.7 ft.	00:17:49	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 382.7 ft_1.JPG	
393.2 ft.	00:18:25	FS					☐	3	/ 6	3	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FS at 393.2 ft_1.JPG	
397.6 ft.	00:18:48	FS					☐	9	/ 5	3	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FS at 397.6 ft_1.JPG	
410.2 ft.	00:19:27	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 410.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
413.8 ft.	00:19:42	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-TF at 413.8 ft_1.JPG	
416.2 ft.	00:20:13	FS					☐	6	/ 3	3	LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-FS at 416.2 ft_1.JPG	
477.3 ft.	00:22:22	AMH					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'J12026'-AMH 'J12032'-AMH at 477.3 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250402 12:19	
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: U	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: K12040-J12026	Street: 3RD ST
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 406.3 ft.	Length surveyed: 406.3 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: K12040	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12026	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	1	1	106	5944	3.42	0	0	0	0000	0.00	106	3.42		
2	7	14				0	0							
3	10	30				0	0							
4	4	16				0	0							
5	9	45				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12026
0.0 ft.		MWL				5	☐	/				
24.0 ft.	00:01:29	FC					☐	6 / 9		2	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FC at 24.0 ft.JPG	
28.1 ft.	00:02:00	FC					☐	5 / 9		2	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FC at 28.1 ft.JPG	
47.5 ft.	00:02:44	TFC			4.000		☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TFC at 47.5 ft.JPG	
49.7 ft.	00:02:53	TF			4.000		☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 49.7 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
58.0 ft.	00:03:32	FH3					☐	8 / 4		5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FH3 at 58.0 ft.JPG	
67.2 ft.	00:04:38	FL					☐	12 /		3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FL at 67.2 ft.JPG	
74.6 ft.	00:04:54	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TB at 74.6 ft.JPG	
79.4 ft.	00:05:20	FH3					☐	8 / 5		5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FH3 at 79.4 ft.JPG	
82.9 ft.	00:05:31	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TB at 82.9 ft.JPG	
89.6 ft.	00:05:53	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TB at 89.6 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
91.1 ft.	00:06:04	JOL					☐	/		2	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-JOL at 91.1 ft.JPG	
94.0 ft.	00:06:15	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 94.0 ft.JPG	
97.9 ft.	00:06:31	FH4					☐	12 / 12		5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FH4 at 97.9 ft.JPG	
99.3 ft.	00:06:39	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TFC at 99.3 ft.JPG	
152.8 ft.	00:08:30	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TB at 152.8 ft.JPG	
154.5 ft.	00:09:00	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 154.5 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
171.2 ft.	00:09:38	HSV					☐	12 /		5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-HSV at 171.2 ft.JPG	
173.6 ft.	00:10:02	FS					☐	5 / 7		3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FS at 173.6 ft.JPG	
193.6 ft.	00:10:50	FC					☐	8 / 5		2	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FC at 193.6 ft.JPG	
195.8 ft.	00:11:12	FC					☐	8 / 4		2	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FC at 195.8 ft.JPG	
203.7 ft.	00:11:29	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 203.7 ft.JPG	
205.2 ft.	00:11:42	H					☐	12 /		3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-H at 205.2 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
205.7 ft.	00:11:50	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 205.7 ft.JPG	
212.7 ft.	00:12:33	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FC at 212.7 ft.JPG	
222.6 ft.	00:13:21	FC					☐	8 / 4		2	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FC at 222.6 ft.JPG	
244.8 ft.	00:14:19	FM					☐	9 / 3		4	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FM at 244.8 ft.JPG	
245.8 ft.	00:14:25	MMC					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-MMC at 245.8 ft.JPG	PVC
246.7 ft.	00:14:35	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 246.7 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
248.2 ft.	00:14:46	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 248.2 ft.JPG	
249.8 ft.	00:14:54	MMC					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-MMC at 249.8 ft.JPG	VCP
265.4 ft.	00:15:39	FM					☐	12	/ 12	4	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FM at 265.4 ft.JPG	
294.5 ft.	00:16:44	H					☐	12	/	3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-H at 294.5 ft.JPG	
295.9 ft.	00:17:13	FM					☐	12	/ 5	4	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FM at 295.9 ft.JPG	
297.8 ft.	00:17:21	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 297.8 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
300.6 ft.	00:17:39	FS					☐	4	8	3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FS at 300.6 ft.JPG	
301.9 ft.	00:17:47	B					☐	12	12	5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-B at 301.9 ft.JPG	
322.1 ft.	00:18:22	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 322.1 ft.JPG	
322.3 ft.	00:18:31	FS					☐	1	4	3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FS at 322.3 ft.JPG	
325.0 ft.	00:18:51	FS					☐	5	8	3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FS at 325.0 ft.JPG	
330.9 ft.	00:19:15	FS					☐	9	2	3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FS at 330.9 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
334.8 ft.	00:19:27	JOM					☐	/		1	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-JOM at 334.8 ft.JPG	
336.5 ft.	00:19:36	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 336.5 ft.JPG	
340.4 ft.	00:19:58	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TFC at 340.4 ft.JPG	
341.6 ft.	00:20:24	B					☐	10	/ 3	5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-B at 341.6 ft.JPG	
347.0 ft.	00:20:44	B					☒	12	/ 12	5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-B at 347.0 ft.JPG	
351.6 ft.	00:21:11	B					☒	4	/ 7	5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-B at 351.6 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
355.5 ft.	00:21:30	FS					☐	6	9	3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FS at 355.5 ft.JPG	
357.9 ft.	00:21:42	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 357.9 ft.JPG	
384.1 ft.	00:22:46	FM					☒	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FM at 384.1 ft.JPG	
387.8 ft.	00:23:03	B					☒	12	12	5	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-B at 387.8 ft.JPG	
400.5 ft.	00:23:27	FS					☒	4	8	3	LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-FS at 400.5 ft.JPG	
406.3 ft.	00:23:45	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-TF at 406.3 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
406.3 ft.	00:23:50	AEP					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'K12040'-AMH 'J12026'-AEP at 406.3 ft.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250402 12:59
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J13018-J12026	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 147.700 ft.	Length surveyed: 147.700 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J13018	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12026	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	7	4131	3.5	0	0	2	2100	2.0	9	3.0	4.1	0.0
2	0	0				1	2							
3	1	3				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12026
0.0 ft.	00:00:00	MWL				5	☐	/				
61.4 ft.	00:02:08	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J13018'-AMH 'J12026'-TF at 61.4 ft_1.JPG	
61.9 ft.	00:02:22	FS					☒	6 / 9		3	LINCOLN WASTEWATER CONDITION-AMH 'J13018'-AMH 'J12026'-FS at 61.9 ft_1.JPG	
70.5 ft.	00:02:43	DSC				5	☐	5 / 7		2	LINCOLN WASTEWATER CONDITION-AMH 'J13018'-AMH 'J12026'-DSC at 70.5 ft_1.JPG	
146.7 ft.	00:04:50	JOL					☐	/		4	LINCOLN WASTEWATER CONDITION-AMH 'J13018'-AMH 'J12026'-JOL at 146.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
147.7 ft.	00:05:21	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J13018'-AMH 'J12026'-MSA at 147.7 ft_1.JPG	CAMERA WILL NOT MAKE IT PASSED JOL

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250402 13:35
Sheet number:	Weather: 1	Pre-cleaning: J	Date cleaned:	Flow control:	Purpose: F
Direction: U	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12036-J12062	Street: 4TH ST ALLEY
City: LINCOLN	Location code:	Location details:

Pipe:

Sewer use:	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 230.1 ft.	Length surveyed: 230.1 ft.	Year laid:	Year renewed:

Measurements:

Upstream MH No: J12036	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12062	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	15	4331	3.75	0	0	5	5100	5.00	20	4.00		
2	0	0				0	0							
3	1	3				0	0							
4	3	12				0	0							
5	0	0				1	5							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12062
0.0 ft.		MWL				5	☐	/				
76.0 ft.	00:01:58	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-FM at 76.0 ft.JPG	
78.0 ft.	00:02:07	TF		6.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TF at 78.0 ft.JPG	
84.1 ft.	00:02:25	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-FM at 84.1 ft.JPG	
87.8 ft.	00:02:35	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TFC at 87.8 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
96.0 ft.	00:02:54	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TB at 96.0 ft.JPG	
100.0 ft.	00:03:09	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TFC at 100.0 ft.JPG	
114.7 ft.	00:03:37	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TB at 114.7 ft.JPG	
134.9 ft.	00:04:16	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TF at 134.9 ft.JPG	
152.6 ft.	00:04:48	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TB at 152.6 ft.JPG	
181.3 ft.	00:05:42	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TF at 181.3 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
183.6 ft.	00:05:51	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TF at 183.6 ft.JPG	
183.6 ft.	00:05:59	TB		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TB at 183.6 ft.JPG	
227.0 ft.	00:07:38	FL					☐	2 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-FL at 227.0 ft.JPG	
228.5 ft.	00:07:49	FM					☐	6 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-FM at 228.5 ft.JPG	
229.1 ft.	00:07:59	TBI		4.000	3.000		☐	2 /		5	LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-TBI at 229.1 ft.JPG	
230.1 ft.	00:08:57	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12036'-AMH 'J12062'-MSA at 230.1 ft.JPG	CAMERA WILL NOT MAKE IT PASSED TBI

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250402 14:05
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12062-J12071	Street: 4TH ST ALLEY
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 49.300 ft.	Length surveyed: 49.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12062	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12071	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	13	5142	4.3	0	0	0	0000	0.0	13	4.3	5.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	2	8				0	0							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12062
0.0 ft.	00:00:00	MWL				5	☐	/				
0.2 ft.	00:00:12	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-FM at 0.2 ft_1.JPG	
37.9 ft.	00:01:41	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TFC at 37.9 ft_1.JPG	
40.0 ft.	00:02:01	TFC		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TFC at 40.0 ft_1.JPG	
43.1 ft.	00:02:30	BSV					☐	9 / 3		5	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-BSV at 43.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
44.0 ft.	00:02:43	TB		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TB at 44.0 ft_1.JPG	
46.3 ft.	00:02:56	B					☐	3 / 7		4	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-B at 46.3 ft_1.JPG	
48.9 ft.	00:03:29	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TB at 48.9 ft_1.JPG	
49.3 ft.	00:03:54	MSA					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-MSA at 49.3 ft_1.JPG	CAMERA WILL NOT MAKE IT PASSED BROKEN PIPE

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250403 07:57
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12062-J12071	Street: 4TH ST ALLEY
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 49.300 ft.	Length surveyed: 349.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12062	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12071	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	27	4433	3.4	0	0	5	3121	2.5	32	3.2	4.4	0.0
2	1	2				1	2							
3	3	9				1	3							
4	4	16				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12071
0.0 ft.	00:00:00	MWL				5	☐	/				
14.2 ft.	00:00:57	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-FC at 14.2 ft_1.JPG	
21.4 ft.	00:01:39	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-FM at 21.4 ft_1.JPG	
21.4 ft.	00:01:41	JOM					☐	/		3	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-JOM at 21.4 ft_1.JPG	
32.4 ft.	00:02:10	RTJ				10	☒	12 /		2	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-RTJ at 32.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
55.1 ft.	00:02:58	RPP					☐	10	/ 1		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-RPP at 55.1 ft_1.JPG	PATCH
59.4 ft.	00:03:26	TBD		4.000			☐	3	/	3	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TBD at 59.4 ft_1.JPG	BROKEN
61.3 ft.	00:03:35	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TFC at 61.3 ft_1.JPG	
77.5 ft.	00:04:08	TB		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TB at 77.5 ft_1.JPG	
105.0 ft.	00:05:07	FS					☐	12	/ 4	3	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-FS at 105.0 ft_1.JPG	
106.4 ft.	00:05:22	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TB at 106.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
108.2 ft.	00:05:32	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TFC at 108.2 ft_1.JPG	
110.8 ft.	00:05:44	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 110.8 ft_1.JPG	
145.9 ft.	00:07:10	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 145.9 ft_1.JPG	
147.2 ft.	00:07:20	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TFC at 147.2 ft_1.JPG	
192.2 ft.	00:08:49	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 192.2 ft_1.JPG	
207.0 ft.	00:09:38	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TFC at 207.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
209.3 ft.	00:09:48	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TFC at 209.3 ft_1.JPG	
225.5 ft.	00:10:31	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 225.5 ft_1.JPG	
246.6 ft.	00:11:09	RPP					☐	10 /	2		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-RPP at 246.6 ft_1.JPG	PATCH
250.4 ft.	00:11:23	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 250.4 ft_1.JPG	
257.2 ft.	00:11:42	RPP					☐	10 /	12		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-RPP at 257.2 ft_1.JPG	PATCH
260.1 ft.	00:11:55	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 260.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
262.2 ft.	00:12:06	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 262.2 ft_1.JPG	
273.0 ft.	00:12:42	FS					☐	5 / 7		3	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-FS at 273.0 ft_1.JPG	
301.0 ft.	00:13:39	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 301.0 ft_1.JPG	
303.0 ft.	00:13:53	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 303.0 ft_1.JPG	
313.0 ft.	00:14:17	H					☐	12 /		4	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-H at 313.0 ft_1.JPG	
323.5 ft.	00:14:47	RPPD					☐	11 / 1		4	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-RPPD at 323.5 ft_1.JPG	PATCH

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
337.5 ft.	00:15:17	RPP					☐	11	12		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-RPP at 337.5 ft_1.JPG	PATCH
343.1 ft.	00:15:41	JOL					☐	/		4	LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-JOL at 343.1 ft_1.JPG	
345.6 ft.	00:16:04	TF		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 345.6 ft_1.JPG	
348.2 ft.	00:17:10	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12062'-AMH 'J12071'-TF at 348.2 ft_1.JPG	
349.2 ft.	00:17:42	MSA					☐	/				CAMERA WILL NOT MAKE IT PASSED DEBRIS

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250403 08:44
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12071-J12072	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 12 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 361.100 ft.	Length surveyed: 361.100 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12071	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12072	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	46	4834	3.5	0	0	0	0000	0.0	46	3.5	4.8	0.0
2	1	2				0	0							
3	4	12				0	0							
4	8	32				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12071
0.0 ft.	00:00:00	MWL				5	☐	/				
2.0 ft.	00:00:22	FS					☐	9 / 10		3	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FS at 2.0 ft_1.JPG	
16.8 ft.	00:01:05	FM					☐	2 / 6		4	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FM at 16.8 ft_1.JPG	
23.0 ft.	00:01:36	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FM at 23.0 ft_1.JPG	
37.9 ft.	00:02:09	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FM at 37.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
156.2 ft.	00:05:05	FM					☐	10	2	4	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FM at 156.2 ft_1.JPG	
204.9 ft.	00:06:35	FM					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FM at 204.9 ft_1.JPG	
220.0 ft.	00:07:24	CM					☐	12	12	3	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-CM at 220.0 ft_1.JPG	
252.7 ft.	00:08:06	FS					☒	12	4	3	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FS at 252.7 ft_1.JPG	
293.6 ft.	00:08:58	FM					☐	2	5	4	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FM at 293.6 ft_1.JPG	
301.5 ft.	00:09:31	FC					☐	8	5	2	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FC at 301.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
324.2 ft.	00:10:11	FM					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FM at 324.2 ft_1.JPG	
334.3 ft.	00:10:42	FL					☐	12	/	3	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FL at 334.3 ft_1.JPG	
336.8 ft.	00:11:05	FM					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-FM at 336.8 ft_1.JPG	
361.1 ft.	00:11:40	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12071'-AMH 'J12072'-AMH at 361.1 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250403 09:08
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12070-J12071	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 12 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 112.500 ft.	Length surveyed: 112.500 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12070	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12071	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	7	4131	3.5	0	0	0	0000	0.0	7	3.5	4.1	0.0
2	0	0				0	0							
3	1	3				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12071
0.0 ft.	00:00:00	MWL				10	☐	/				
22.1 ft.	00:01:16	CM					☐	7 / 5		3	LINCOLN WASTEWATER CONDITION-AMH 'J12070'-AMH 'J12071'-CM at 22.1 ft_1.JPG	
103.6 ft.	00:03:35	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12070'-AMH 'J12071'-FM at 103.6 ft_1.JPG	
112.5 ft.	00:04:14	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12070'-AMH 'J12071'-AMH at 112.5 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250403 09:15
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12070-J12001	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 12 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 58.000 ft.	Length surveyed: 58.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12070	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12001	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	4	4100	4.0	0	0	0	0000	0.0	4	4.0	4.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12001
0.0 ft.	00:00:00	MWL				5	☐	/				
26.7 ft.	00:00:49	FM					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12070'-AMH 'J12001'-FM at 26.7 ft_1.JPG	
55.6 ft.	00:01:30	MMC					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12070'-AMH 'J12001'-MMC at 55.6 ft_1.JPG	PVC 10 INCH
58.0 ft.	00:01:44	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12070'-AMH 'J12001'-AMH at 58.0 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250403 09:45
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12016-J12069	Street: J ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 956.500 ft.	Length surveyed: 956.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12016	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12069	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	253	453N	3.0	0	0	0	0000	0.0	253	3.0	4.5	0.0
2	1	2				0	0							
3	77	231				0	0							
4	5	20				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12016
0.0 ft.	00:00:00	MWL				10	☐	/				
20.1 ft.	00:01:41	FS					☐	1 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 20.1 ft_1.JPG	
26.7 ft.	00:02:11	FS					☐	12 / 12		3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 26.7 ft_1.JPG	
35.6 ft.	00:02:42	FS					☐	9 / 12		3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 35.6 ft_1.JPG	
41.0 ft.	00:03:01	FS					☐	12 / 4		3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 41.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
47.5 ft.	00:03:17	FS					☐	7	11	3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 47.5 ft_1.JPG	
48.0 ft.	00:03:50	FM					☐	8	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FM at 48.0 ft_1.JPG	
60.3 ft.	00:04:19	FS					☐	1	4	3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 60.3 ft_1.JPG	
61.0 ft.	00:04:29	FM					☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FM at 61.0 ft_1.JPG	
63.8 ft.	00:04:40	FS	S01				☒	9	3	3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 63.8 ft_1.JPG	
162.2 ft.	00:06:22	MGO					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-MGO at 162.2 ft_1.JPG	WATER LEVEL TOO HIGH TO SEE

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
180.9 ft.	00:07:23	MWL				45	☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-MWL at 180.9 ft_1.JPG	
200.8 ft.	00:09:00	FM					☐	6 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FM at 200.8 ft_1.JPG	
406.4 ft.	00:17:09	FS	F01				☐	10 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 406.4 ft_1.JPG	
600.4 ft.	00:21:42	TB		4.000			☐	11 /			LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-TB at 600.4 ft_1.JPG	
820.5 ft.	00:33:40	FS					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 820.5 ft_1.JPG	
843.9 ft.	00:34:37	FS					☐	10 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FS at 843.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
926.1 ft.	00:36:42	FC					☐	12	12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FC at 926.1 ft_1.JPG	
941.1 ft.	00:37:11	FM	S02				☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FM at 941.1 ft_1.JPG	
948.8 ft.	00:37:25	FM	F02				☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-FM at 948.8 ft_1.JPG	
956.3 ft.	00:37:52	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12016'-AMH 'J12069'-AMH at 956.3 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250403 12:45
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12041-J12012	Street: 4TH ST ALLEY
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 406.600 ft.	Length surveyed: 406.600 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12041	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12012	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	40	4338	3.1	0	0	2	2100	2.0	42	3.0	4.3	0.0
2	2	4				1	2							
3	8	24				0	0							
4	3	12				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12041
0.0 ft.	00:00:00	MWL				5	☐	/				
9.3 ft.	00:00:43	TF		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TF at 9.3 ft_1.JPG	
14.6 ft.	00:00:59	B					☐	5	/ 8	4	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-B at 14.6 ft_1.JPG	
36.3 ft.	00:01:35	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TF at 36.3 ft_1.JPG	
45.8 ft.	00:02:00	FS					☐	5	/ 8	3	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FS at 45.8 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
49.9 ft.	00:02:14	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 49.9 ft_1.JPG	
52.0 ft.	00:02:27	TFC		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 52.0 ft_1.JPG	
65.8 ft.	00:03:20	FS					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FS at 65.8 ft_1.JPG	
68.1 ft.	00:03:36	FS					☐	2 / 7		3	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FS at 68.1 ft_1.JPG	
83.3 ft.	00:04:26	FS					☐	7 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FS at 83.3 ft_1.JPG	
88.0 ft.	00:04:48	TB		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TB at 88.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
102.9 ft.	00:05:14	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TF at 102.9 ft_1.JPG	
104.9 ft.	00:05:26	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 104.9 ft_1.JPG	
116.0 ft.	00:05:55	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TB at 116.0 ft_1.JPG	
150.1 ft.	00:06:58	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 150.1 ft_1.JPG	
151.9 ft.	00:07:09	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 151.9 ft_1.JPG	
152.7 ft.	00:07:18	B					☐	1	/ 5	4	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-B at 152.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
198.8 ft.	00:08:39	FC					☐	12	12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FC at 198.8 ft_1.JPG	
203.0 ft.	00:08:53	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 203.0 ft_1.JPG	
204.0 ft.	00:09:13	B					☐	2	8	4	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-B at 204.0 ft_1.JPG	
205.6 ft.	00:09:20	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 205.6 ft_1.JPG	
209.4 ft.	00:09:42	FS					☐	6	8	3	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FS at 209.4 ft_1.JPG	
219.6 ft.	00:10:04	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TB at 219.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
219.6 ft.	00:10:17	FL					☐	10 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FL at 219.6 ft_1.JPG	
221.0 ft.	00:10:30	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FC at 221.0 ft_1.JPG	
222.5 ft.	00:10:38	TFC		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 222.5 ft_1.JPG	
228.3 ft.	00:10:59	TB		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TB at 228.3 ft_1.JPG	
233.2 ft.	00:11:13	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TB at 233.2 ft_1.JPG	
259.5 ft.	00:11:55	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 259.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
262.1 ft.	00:12:08	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TF at 262.1 ft_1.JPG	
295.9 ft.	00:13:04	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TF at 295.9 ft_1.JPG	
308.6 ft.	00:13:34	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 308.6 ft_1.JPG	
310.6 ft.	00:13:47	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TFC at 310.6 ft_1.JPG	
315.2 ft.	00:14:02	TB		6.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TB at 315.2 ft_1.JPG	
324.8 ft.	00:14:32	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TF at 324.8 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
331.6 ft.	00:15:05	FS					☐	4 / 7		3	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FS at 331.6 ft_1.JPG	
342.4 ft.	00:15:32	FL					☐	8 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-FL at 342.4 ft_1.JPG	
347.9 ft.	00:15:49	RTJ				5	☒	2 / 3		2	LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-RTJ at 347.9 ft_1.JPG	
351.3 ft.	00:16:12	TB		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TB at 351.3 ft_1.JPG	
353.8 ft.	00:16:23	MMC					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-MMC at 353.8 ft_1.JPG	PVC
369.5 ft.	00:17:57	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-TF at 369.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
406.6 ft.	00:19:20	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12041'-AMH 'J12012'-AMH at 406.6 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250403 13:36
Sheet number:	Weather: 1	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12012-J12019	Street: 4TH ST ALLEY
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 485.900 ft.	Length surveyed: 485.900 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12012	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12019	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	29	4335	3.2	0	0	0	0000	0.0	29	3.2	4.3	0.0
2	1	2				0	0							
3	5	15				0	0							
4	3	12				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12012
0.0 ft.	00:00:00	MWL				5	☐	/				
1.0 ft.	00:00:40	FS					☐	4 / 6		3	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-FS at 0.0 ft_1.JPG	
6.0 ft.	00:01:23	B					☐	12 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-B at 6.0 ft_1.JPG	
26.7 ft.	00:02:07	FL					☐	9 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-FL at 26.7 ft_1.JPG	
35.0 ft.	00:02:31	FL					☐	10 /		3	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-FL at 35.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
41.1 ft.	00:03:15	FS					☐	11	3	3	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-FS at 41.1 ft_1.JPG	
81.2 ft.	00:04:47	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 81.2 ft_1.JPG	
83.1 ft.	00:05:01	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 83.1 ft_1.JPG	
92.5 ft.	00:05:29	TB		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TB at 92.5 ft_1.JPG	
131.5 ft.	00:06:36	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 131.5 ft_1.JPG	
133.6 ft.	00:06:46	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 133.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
172.0 ft.	00:07:58	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TB at 172.0 ft_1.JPG	
174.2 ft.	00:08:16	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-FC at 174.2 ft_1.JPG	
181.8 ft.	00:08:40	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 181.8 ft_1.JPG	
183.9 ft.	00:08:52	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TF at 183.9 ft_1.JPG	
228.0 ft.	00:10:04	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 228.0 ft_1.JPG	
229.6 ft.	00:10:16	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TB at 229.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
229.9 ft.	00:10:27	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TF at 229.9 ft_1.JPG	
229.9 ft.	00:10:34	FM					☐	1 / 4		4	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-FM at 229.9 ft_1.JPG	
239.9 ft.	00:11:01	TB		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TB at 239.9 ft_1.JPG	
280.3 ft.	00:12:13	FS					☐	12 / 7		3	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-FS at 280.3 ft_1.JPG	
282.1 ft.	00:12:26	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 282.1 ft_1.JPG	
284.2 ft.	00:12:39	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TF at 284.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
292.7 ft.	00:13:06	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TB at 292.7 ft_1.JPG	
315.9 ft.	00:13:49	MMC					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-MMC at 315.9 ft_1.JPG	PVC
332.2 ft.	00:14:28	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 332.2 ft_1.JPG	
334.2 ft.	00:14:44	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 334.2 ft_1.JPG	
350.0 ft.	00:15:23	TB		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TB at 350.0 ft_1.JPG	
380.5 ft.	00:16:10	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 380.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
382.7 ft.	00:16:22	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TF at 382.7 ft_1.JPG	
400.6 ft.	00:16:56	TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TB at 400.6 ft_1.JPG	
430.9 ft.	00:17:50	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TFC at 430.9 ft_1.JPG	
432.7 ft.	00:18:03	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-TF at 432.7 ft_1.JPG	
482.9 ft.	00:19:24	B					☐	5 / 9		4	LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-B at 482.9 ft_1.JPG	
485.9 ft.	00:19:34	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12012'-AMH 'J12019'-AMH at 485.9 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250407 07:27
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12020-J12021	Street: I ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 480.400 ft.	Length surveyed: 480.400 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12020	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12021	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	20	4232	2.9	0	0	0	0000	0.0	20	2.9	4.2	0.0
2	3	6				0	0							
3	2	6				0	0							
4	2	8				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12020
0.0 ft.	00:00:00	MWL				10	☐	/				
0.6 ft.	00:00:18	FS					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-FS at 0.6 ft_1.JPG	
86.2 ft.	00:02:36	FM					☐	8 / 1		4	LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-FM at 86.2 ft_1.JPG	
116.1 ft.	00:03:47	TFC			4.000		☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-TFC at 116.1 ft_1.JPG	
118.2 ft.	00:04:01	TFC			4.000		☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-TFC at 118.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
170.1 ft.	00:05:52	FM					☐	11	1	4	LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-FM at 170.1 ft_1.JPG	
238.9 ft.	00:07:48	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-TFC at 238.9 ft_1.JPG	
240.9 ft.	00:08:02	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-TFC at 240.9 ft_1.JPG	
249.3 ft.	00:08:34	FC					☒	12	12	2	LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-FC at 249.3 ft_1.JPG	
321.4 ft.	00:11:20	FS					☐	12	5	3	LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-FS at 321.4 ft_1.JPG	
359.1 ft.	00:12:25	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-TFC at 359.1 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
361.2 ft.	00:12:38	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-TFC at 361.2 ft_1.JPG	
428.3 ft.	00:14:48	FC					☐	7 / 3		2	LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-FC at 428.3 ft_1.JPG	
444.1 ft.	00:15:38	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-FC at 444.1 ft_1.JPG	
480.4 ft.	00:17:20	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12020'-AMH 'J12021'-AMH at 480.4 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250407 08:13
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12021-J12009	Street: I
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 481.000 ft.	Length surveyed: 481.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12021	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	1	1	21	4134	2.6	0	0	0	0000	0.0	21	2.6	4.1	0.0
2	2	4				0	0							
3	4	12				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12021
0.0 ft.	00:00:00	MWL				10	☐	/				
49.7 ft.	00:01:56	CC					☐	12 / 12		1	LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-CC at 49.7 ft_1.JPG	
79.5 ft.	00:02:51	TB		4.000			☐	1 /			LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-TB at 79.5 ft_1.JPG	
100.1 ft.	00:03:53	FS					☐	9 / 2		3	LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-FS at 100.1 ft_1.JPG	
250.0 ft.	00:08:21	FS					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-FS at 250.0 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
304.3 ft.	00:10:50	FM					☐	11	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-FM at 304.3 ft_1.JPG	
325.1 ft.	00:12:06	FS					☐	7	3	3	LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-FS at 325.1 ft_1.JPG	
345.4 ft.	00:12:59	FS					☐	3	9	3	LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-FS at 345.4 ft_1.JPG	
442.8 ft.	00:16:08	FC					☐	11	2	2	LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-FC at 442.8 ft_1.JPG	
452.7 ft.	00:16:54	FC					☐	10	3	2	LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-FC at 452.7 ft_1.JPG	
481.0 ft.	00:20:04	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12021'-AMH 'J12009'-AMH at 481.0 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250407 09:11
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: L	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12013-J12022	Street: 4TH ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 312.600 ft.	Length surveyed: 312.600 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12013	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12022	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	8	4122	2.7	0	0	2	2100	2.0	10	2.5	4.1	0.0
2	2	4				1	2							
3	0	0				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12022
0.0 ft.	00:00:00	MWL				10	☐	/				
211.2 ft.	00:06:08	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12013'-AMH 'J12022'-FC at 211.2 ft_1.JPG	
219.3 ft.	00:06:44	B					☐	12 / 8		4	LINCOLN WASTEWATER CONDITION-AMH 'J12013'-AMH 'J12022'-B at 219.3 ft_1.JPG	
227.6 ft.	00:07:14	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12013'-AMH 'J12022'-FC at 227.6 ft_1.JPG	
253.5 ft.	00:08:26	DAGS				10	☐	4 / 8		2	LINCOLN WASTEWATER CONDITION-AMH 'J12013'-AMH 'J12022'-DAGS at 253.5 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
270.9 ft.	00:08:56	TF		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12013'-AMH 'J12022'-TF at 270.9 ft_1.JPG	
276.5 ft.	00:09:16	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12013'-AMH 'J12022'-TB at 276.5 ft_1.JPG	
312.6 ft.	00:10:28	AMH					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'J12013'-AMH 'J12022'-AMH at 312.6 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250407 09:33
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12022-J12021	Street: 4TH ST
City: LINCOLN	Location code:	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 182.400 ft.	Length surveyed: 182.400 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12022	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12021	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	12	4132	3.0	0	0	0	0000	0.0	12	3.0	4.1	0.0
2	1	2				0	0							
3	2	6				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12022
0.0 ft.	00:00:00	MWL				10	☐	/				
2.0 ft.	00:00:23	B					☐	10 / 4		4	LINCOLN WASTEWATER CONDITION-AMH 'J12022'-AMH 'J12021'-B at 2.0 ft_1.JPG	
26.1 ft.	00:01:36	FC					☐	12 / 6		2	LINCOLN WASTEWATER CONDITION-AMH 'J12022'-AMH 'J12021'-FC at 26.1 ft_1.JPG	
130.5 ft.	00:04:48	FS					☐	10 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12022'-AMH 'J12021'-FS at 130.5 ft_1.JPG	
174.4 ft.	00:06:22	FS					☐	11 / 5		3	LINCOLN WASTEWATER CONDITION-AMH 'J12022'-AMH 'J12021'-FS at 174.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
182.4 ft.	00:06:41	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12022'-AMH 'J12021'-AMH at 182.4 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250407 10:09
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12023-J12009	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 183.900 ft.	Length surveyed: 183.900 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12023	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	12	4222	3.0	0	0	0	0000	0.0	12	3.0	4.2	0.0
2	2	4				0	0							
3	0	0				0	0							
4	2	8				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12023
0.0 ft.	00:00:00	MWL				10	☐	/				
27.1 ft.	00:01:36	FC					☐	1 / 2		2	LINCOLN WASTEWATER CONDITION-AMH 'J12023'-AMH 'J12009'-FC at 27.1 ft_1.JPG	
139.3 ft.	00:04:52	B					☒	1 / 2		4	LINCOLN WASTEWATER CONDITION-AMH 'J12023'-AMH 'J12009'-B at 139.3 ft_1.JPG	
177.4 ft.	00:07:09	FM					☐	11 / 1		4	LINCOLN WASTEWATER CONDITION-AMH 'J12023'-AMH 'J12009'-FM at 177.4 ft_1.JPG	
181.9 ft.	00:07:33	FC					☐	12 / 12		2	LINCOLN WASTEWATER CONDITION-AMH 'J12023'-AMH 'J12009'-FC at 181.9 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
183.9 ft.	00:07:47	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12023'-AMH 'J12009'-AMH at 183.9 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250407 10:19
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12009-J12019	Street: 3RD ST
City: LINCOLN	Location code:	Location details:

Pipe:

Pipe use: SS	Height: 12 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 174.500 ft.	Length surveyed: 174.500 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12009	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12019	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	18	4232	3.0	0	0	0	0000	0.0	18	3.0	4.2	0.0
2	2	4				0	0							
3	2	6				0	0							
4	2	8				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12009
0.0 ft.	00:00:00	MWL				5	☐	/				
12.6 ft.	00:00:35	FM					☐	9 / 3		4	LINCOLN WASTEWATER CONDITION-AMH 'J12009'-AMH 'J12019'-FM at 12.6 ft_1.JPG	
30.6 ft.	00:01:26	FS					☐	9 / 3		3		
48.5 ft.	00:02:16	CM					☐	8 / 1		3		
109.5 ft.	00:04:19	FM					☐	12 / 12		4		
117.7 ft.	00:04:49	FC					☐	9 / 3		2		
158.1 ft.	00:06:16	FC					☐	9 / 1		2		
174.5 ft.	00:06:52	AMH					☐	/				END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250407 10:31
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12019-J12001	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 12 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 184.400 ft.	Length surveyed: 184.400 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12019	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12001	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	26	4332	2.9	0	0	0	0000	0.0	26	2.9	4.3	0.0
2	4	8				0	0							
3	2	6				0	0							
4	3	12				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12019
0.0 ft.	00:00:00	MWL				15	☐	/				
66.3 ft.	00:02:06	CM					☐	9 / 3		3		
73.5 ft.	00:02:33	FC					☐	8 / 4		2		
79.0 ft.	00:03:06	FS					☐	8 / 12		3		
120.9 ft.	00:04:37	FC					☐	8 / 9		2		
142.2 ft.	00:05:37	FC					☐	8 / 4		2		
157.7 ft.	00:06:25	FC					☒	8 / 4		2		
163.9 ft.	00:06:51	B					☐	11 / 1		4		
165.0 ft.	00:07:01	FM					☐	12 / 12		4		
178.0 ft.	00:07:37	FM					☐	12 / 12		4		
184.4 ft.	00:08:14	AMH					☐	/				END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250407 12:34
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12045-J12023	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 392.000 ft.	Length surveyed: 392.000 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12045	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12023	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	0	0000	0.0	0	0	5	5100	5.0	5	5.0	5.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	0	0				1	5							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12023
0.0 ft.	00:00:00	MWL				5	☐	/				
44.7 ft.	00:02:27	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 44.7 ft_1.JPG	
46.7 ft.	00:02:37	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 46.7 ft_1.JPG	
68.3 ft.	00:03:28	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TF at 68.3 ft_1.JPG	
91.7 ft.	00:04:33	TF		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TF at 91.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
101.3 ft.	00:04:51	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 101.3 ft_1.JPG	
103.7 ft.	00:05:03	TF		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TF at 103.7 ft_1.JPG	
146.0 ft.	00:06:26	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 146.0 ft_1.JPG	
148.3 ft.	00:06:35	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 148.3 ft_1.JPG	
179.0 ft.	00:07:37	TB		4.000			☐	12	/		LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TB at 179.0 ft_1.JPG	
194.7 ft.	00:08:10	TFC		4.000			☐	3	/		LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 194.7 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
196.8 ft.	00:08:20	TF		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TF at 196.8 ft_1.JPG	
200.4 ft.	00:08:35	TF		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TF at 200.4 ft_1.JPG	
251.4 ft.	00:10:10	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 251.4 ft_1.JPG	
257.7 ft.	00:10:31	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TF at 257.7 ft_1.JPG	
262.4 ft.	00:10:55	TB		4.000			☐	12 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TB at 262.4 ft_1.JPG	
296.4 ft.	00:11:54	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 296.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
298.4 ft.	00:12:02	TFC		4.000			☐	9	/		LINCOLN WASTEWATER CONDITION-AMH 'J12045'-AMH 'J12023'-TFC at 298.4 ft_1.JPG	
308.2 ft.	00:12:27	TB		4.000			☐	2	/			
349.0 ft.	00:14:11	TFC		4.000			☐	3	/			
351.1 ft.	00:14:20	TB		4.000			☐	10	/			
353.2 ft.	00:14:34	TB		6.000			☐	3	/			
392.0 ft.	00:15:58	TF		4.000			☐	2	/			
392.0 ft.	00:16:19	RBB				100	☐	12	/ 12	5		
392.0 ft.	00:16:21	MSA					☐	/				CAMERA WILL NOT MAKE IT PASSED ROOT BALL

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by:	Certificate number:	Reviewed by:	Reviewer certificate no.	Owner:	Customer:
TARREN	P0048167-052024				
P/O number:	Work order no.:	Media label:	Project name:	Start date/time:	
			LINCOLN WASTEWATER CONDITION	20250408 07:33	
Sheet number:	Weather:	Pre-cleaning:	Date cleaned:	Flow control:	Purpose:
	1	N			F
Direction:	Technology used:		Inspection Status:	Consequence of failure:	Pressure value:
U					

Location:

Drainage area:	Pipe segment ref.:	Street:
	J12046-J12023	3RD ST
City:	Location code:	Location details:
LINCOLN		

Pipe:

Sewer use:	Height:	Width:	Shape:	Material:	Lining method:
	6 in.		C	VCP	
Coating method:	Pipe joint length:	Total length:	Length surveyed:	Year laid:	Year renewed:
		415.1 ft.	415.1 ft.		

Measurements:

Upstream MH No:	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
J12046						
Downstream MH No:	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
J12023						
Coordinate system:	Vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	2	2	32	5141	2.46	0	0	9	4131	3.00	41	2.56		
2	6	12				1	2							
3	3	9				1	3							
4	1	4				1	4							
5	1	5				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				J12023
0.0 ft.		MWL				5	☐	/				
23.1 ft.	00:01:09	JOL					☐	/		2	LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-JOL at 23.1 ft.JPG	
33.7 ft.	00:03:34	RPP					☐	11 / 1			LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-RPP at 33.7 ft.JPG	PATCH
60.5 ft.	00:05:21	TF			4.000		☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-TF at 60.5 ft.JPG	
62.7 ft.	00:05:32	TFC			4.000		☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-TFC at 62.7 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
74.7 ft.	00:06:11	TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-TB at 74.7 ft.JPG	
87.6 ft.	00:07:09	TBC		4.000			☐	9 /		2	LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-TBC at 87.6 ft.JPG	
87.6 ft.	00:07:36	B					☐	12 / 12		5	LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-B at 87.6 ft.JPG	
99.1 ft.	00:08:17	TB		4.000			☐	9 /				
105.8 ft.	00:08:39	TFC		4.000			☐	9 /				
143.0 ft.	00:10:43	FS					☐	12 / 12		3		
151.2 ft.	00:11:16	TFC		4.000			☐	9 /				
152.8 ft.	00:11:27	TFC		4.000			☐	2 /				
169.4 ft.	00:12:14	TBI		4.000	1.000		☐	3 /		3		
173.0 ft.	00:13:04	TB		4.000			☐	9 /				
192.8 ft.	00:14:30	FC					☐	12 / 12		2		
194.4 ft.	00:15:02	FL					☐	9 /		3		
200.6 ft.	00:15:32	TBI		4.000	2.000		☐	10 /		4		
202.4 ft.	00:15:49	TF		4.000			☐	2 /				
226.9 ft.	00:17:16	TB		4.000			☐	2 /				
251.7 ft.	00:18:34	TFC		4.000			☐	9 /				

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
254.1 ft.	00:18:52	TFC		4.000			☐	2	/			
273.5 ft.	00:19:48	TB		4.000			☐	9	/			
290.2 ft.	00:21:23	TB		4.000			☐	3	/			
291.7 ft.	00:22:10	FS					☐	12	/ 12	3		
302.9 ft.	00:24:17	FM					☐	12	/ 12	4		
302.9 ft.	00:24:22	TFC		4.000			☐	9	/			
305.6 ft.	00:24:39	TFC		4.000			☐	3	/			
313.3 ft.	00:25:21	TF		4.000			☐	9	/			
325.5 ft.	00:26:27	FC					☐	12	/ 12	2		
330.9 ft.	00:27:07	FC					☐	12	/ 12	2		
344.6 ft.	00:28:05	FC					☐	12	/ 12	2		
346.8 ft.	00:28:24	CC					☐	12	/ 12	1		
351.5 ft.	00:28:53	TF		4.000			☐	3	/			
352.1 ft.	00:29:04	TFC		4.000			☐	9	/			
354.6 ft.	00:29:22	TFC		4.000			☐	3	/			
363.5 ft.	00:30:46	FC					☐	12	/ 12	2		
369.9 ft.	00:32:41	CC					☐	12	/ 12	1		
374.5 ft.	00:34:21	TF		4.000			☐	9	/			
407.2 ft.	00:36:10	TFC		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-TFC at 407.2 ft.JPG	
414.4 ft.	00:36:37	TB		4.000			☐	1	/		LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-TB at 414.4 ft.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
415.1 ft.	00:37:03	ACOM					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12046'-AMH 'J12023'-ACOM at 415.1 ft.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250408 09:59
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used:		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12039-J12019	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 284.200 ft.	Length surveyed: 284.200 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12039	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12019	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	4	4100	4.0	0	0	0	0000	0.0	4	4.0	4.1	0.0
2	0	0				0	0							
3	0	0				0	0							
4	1	4				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12019
0.0 ft.	00:00:00	MWL				10	☐	/				
40.6 ft.	00:02:19	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TB at 40.6 ft_1.JPG	
49.0 ft.	00:02:41	TF		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TF at 49.0 ft_1.JPG	
51.2 ft.	00:02:50	TFC		5.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TFC at 51.2 ft_1.JPG	
63.2 ft.	00:03:19	TF		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TF at 63.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
88.0 ft.	00:04:11	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TFC at 88.0 ft_1.JPG	
90.3 ft.	00:04:22	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TFC at 90.3 ft_1.JPG	
121.6 ft.	00:05:35	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TB at 121.6 ft_1.JPG	
139.5 ft.	00:06:15	TFC		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TFC at 139.5 ft_1.JPG	
141.5 ft.	00:06:23	TFC		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TFC at 141.5 ft_1.JPG	
152.2 ft.	00:06:46	TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TB at 152.2 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
181.1 ft.	00:07:50	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TB at 181.1 ft_1.JPG	
186.8 ft.	00:08:11	TFC		4.000			☐	2 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TFC at 186.8 ft_1.JPG	
188.9 ft.	00:08:20	TFC		4.000			☐	10 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TFC at 188.9 ft_1.JPG	
215.7 ft.	00:09:06	TB		4.000			☐	3 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TB at 215.7 ft_1.JPG	
221.0 ft.	00:09:52	B					☐	9 / 12		4	LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-B at 221.0 ft_1.JPG	
222.4 ft.	00:10:20	TB		4.000			☐	9 /			LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TB at 222.4 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
238.4 ft.	00:10:57	TFC		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TFC at 238.4 ft_1.JPG	
275.6 ft.	00:11:59	TF		4.000			☐	2	/		LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-TF at 275.6 ft_1.JPG	
284.2 ft.	00:12:23	ACOM					☐		/		LINCOLN WASTEWATER CONDITION-AMH 'J12039'-AMH 'J12019'-ACOM at 284.2 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20250408 11:59	
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV	Inspection status: CI	Consequence of failure: NONE	Pressure value:	

Location:

Drainage area:	Pipe segment ref.: K12020-K12075	Street: 2ND ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: PR	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 183.300 ft.	Length surveyed: 183.300 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: K12020	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: K12075	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	9	3300	3.0	0	0	0	0000	0.0	9	3.0	3.3	0.0
2	0	0				0	0							
3	3	9				0	0							
4	0	0				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				K12020
0.0 ft.	00:00:00	MWL				5	☐	/				
16.9 ft.	00:00:57	FS					☐	4 / 7		3	LINCOLN WASTEWATER CONDITION-AMH 'K12020'-AMH 'K12075'-FS at 16.9 ft_1.JPG	
80.3 ft.	00:02:53	TFC		4.000			☐	2 /				
83.5 ft.	00:03:07	TF		4.000			☐	10 /				
152.8 ft.	00:05:26	FS					☒	4 / 6		3	LINCOLN WASTEWATER CONDITION-AMH 'K12020'-AMH 'K12075'-FS at 152.8 ft_1.JPG	
156.6 ft.	00:05:58	FL					☐	8 /		3	LINCOLN WASTEWATER CONDITION-AMH 'K12020'-AMH 'K12075'-FL at 156.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
183.3 ft.	00:07:07	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'K12020'-AMH 'K12075'-AMH at 183.3 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250408 12:37
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12001-K12084	Street: J ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 10 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 479.100 ft.	Length surveyed: 479.100 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12001	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: K12084	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	303	4M35	3.9	0	0	0	0000	0.0	303	3.9	5.0	0.0
2	2	4				0	0							
3	5	15				0	0							
4	71	284				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12001
0.0 ft.	00:00:00	MWL				10	☐	/				
38.6 ft.	00:01:39	FS					☐	9 / 1		3	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FS at 38.6 ft_1.JPG	
41.1 ft.	00:01:59	FS					☐	9 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FS at 41.1 ft_1.JPG	
51.5 ft.	00:02:36	FS					☐	10 / 3		3	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FS at 51.5 ft_1.JPG	
61.6 ft.	00:03:10	FM					☐	9 / 3		4	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FM at 61.6 ft_1.JPG	

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
64.1 ft.	00:03:48	FS					☐	10	/ 4	3	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FS at 64.1 ft_1.JPG	
68.8 ft.	00:04:20	FS					☐	9	/ 3	3	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FS at 68.8 ft_1.JPG	
87.9 ft.	00:04:52	TB		4.000			☐	10	/		LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-TB at 87.9 ft_1.JPG	
99.5 ft.	00:05:26	FC					☐	10	/ 4	2	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FC at 99.5 ft_1.JPG	
117.4 ft.	00:06:12	FC					☐	8	/ 3	2	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FC at 117.4 ft_1.JPG	
124.8 ft.	00:06:43	FM	S01				☐	12	/ 12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FM at 124.8 ft_1.JPG	
451.0 ft.	00:19:49	MWL				45	☐	/				

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
475.0 ft.	00:21:02	FM	F01				☐	12	12	4	LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-FM at 475.0 ft_1.JPG	
479.1 ft.	00:21:12	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12001'-AMH 'K12084'-AMH at 479.1 ft_1.JPG	END OF NSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label: n/a	Project name: LINCOLN WASTEWATER CONDITION		Start date/time: 20250408 13:28
Sheet number:	Weather: 1	Pre-cleaning: N	Date cleaned:	Flow control: N	Purpose: F
Direction: D	Technology used: CCTV		Inspection status: CI	Consequence of failure: NONE	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12069-J12070	Street: 3RD ST
City: LINCOLN	Location code: C	Location details:

Pipe:

Pipe use: SS	Height: 12 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 58.700 ft.	Length surveyed: 58.700 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12069	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: J12070	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	0	0000	0.0	0	0	0	0000	0.0	0	0.0	1.0	0.0
2	0	0				0	0							
3	0	0				0	0							
4	0	0				0	0							
5	0	0				0	0							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.	00:00:00	AMH					☐	/				J12069
0.0 ft.	00:00:00	MWL				10	☐	/				
58.7 ft.	00:01:23	AMH					☐	/			LINCOLN WASTEWATER CONDITION-AMH 'J12069'-AMH 'J12070'-AMH at 58.7 ft_1.JPG	END OF INSPECTION

PACP v7.0 Inspections and Scoring

General Information:

Surveyed by: TARREN	Certificate number: P0048167-052024	Reviewed by:	Reviewer certificate no.:	Owner:	Customer:
P/O number:	Work order no.:	Media label:	Project name: LINCOLN WASTEWATER CONDITION	Start date/time: 20260506 13:54	
Sheet number:	Weather:	Pre-cleaning: L	Date cleaned:	Flow control: N	Purpose: F
Direction: U	Technology used: CCTV		Inspection status: CI	Consequence of failure:	Pressure value:

Location:

Drainage area:	Pipe segment ref.: J12038-K12020	Street: 2ND ST
City: LINCOLN	Location code:	Location details:

Pipe:

Pipe use: SS	Height: 6 in.	Width:	Shape: C	Material: VCP	Lining method:
Coating method:	Pipe joint length:	Total length: 180.900 ft.	Length surveyed: 180.900 ft.	Year constructed:	Year renewed:

Measurements:

Upstream MH No: J12038	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
Downstream MH No: K12020	Rim to invert:	Rim to grade:	Grade to invert:	Northing:	Easting:	Elevation:
MH coordinate system:	MH vertical datum:	GPS accuracy:				

Additional Information:

Pipe Ratings

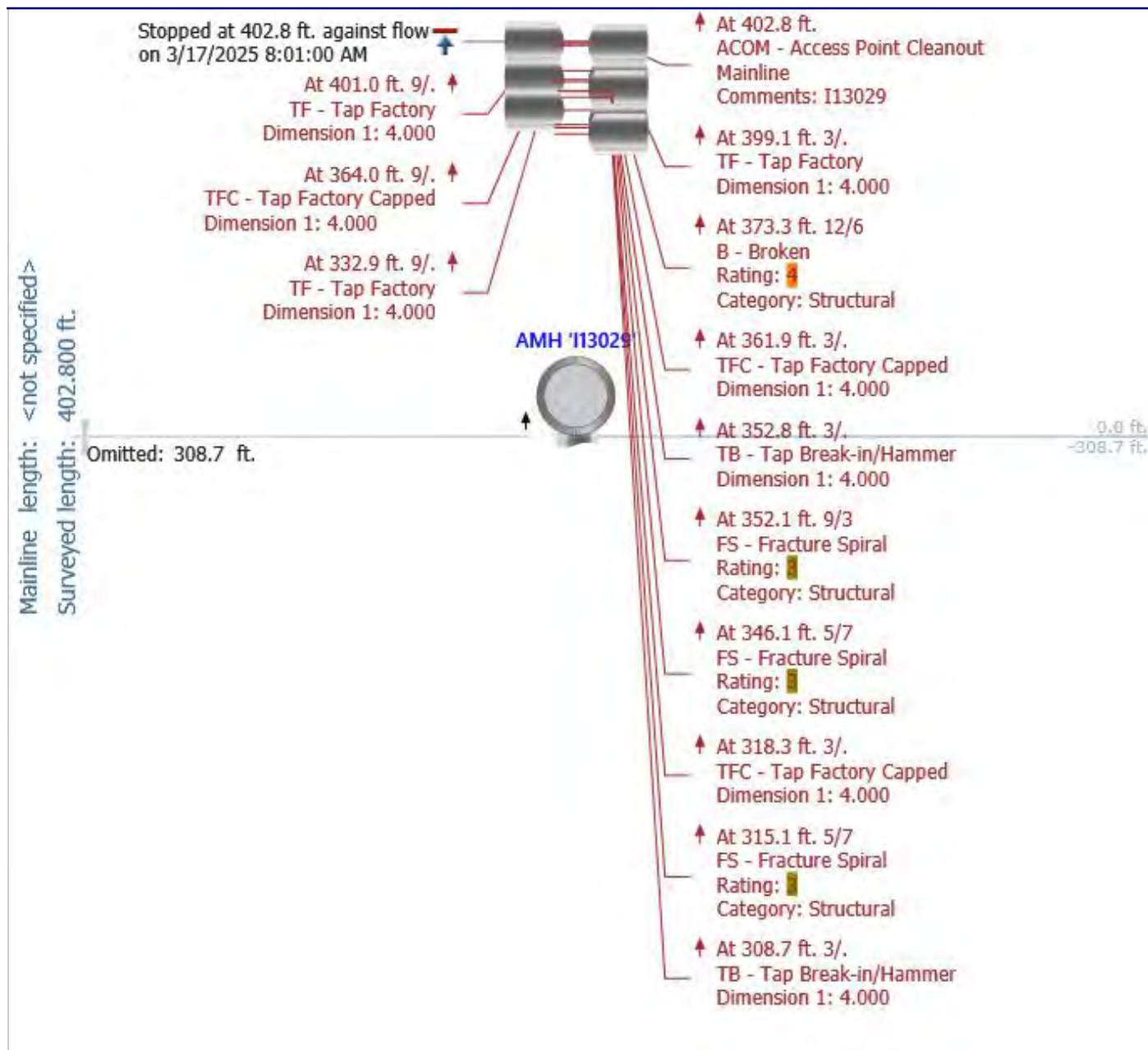
Grade	Structural:					O&M:					Overall:			
	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Amount of Defects	Segment Grade	Pipe Rating	Quick Rating	Pipe Rating Index	Pipe Rating	Pipe Rating Index	LoF	Risk
1	0	0	8	5131	4.0	0	0	8	5131	4.0	16	4.0	5.2	
2	0	0				0	0							
3	1	3				1	3							
4	0	0				0	0							
5	1	5				1	5							

Observations

Distance	Video Ref.	PACP Code	Continuous	Value Inches (mm)		%	Joint	Circumferential Location		Rating	Image Ref.	Remarks
				1st	2nd			At/From	To			
0.0 ft.		AMH					☐	/				K12020
0.0 ft.		MWL				5	☐	/				
67.3 ft.		TB		4.000			☐	9 /				
69.2 ft.		TFC		4.000			☐	3 /				
71.3 ft.		TFC		4.000			☐	9 /				
87.6 ft.		TBI		4.000	2.000		☐	1 /		5		
100.8 ft.		FL					☐	9 /		3		
116.4 ft.		TBI		4.000	1.000		☐	9 /		3		
116.4 ft.		TF		4.000			☐	3 /				
118.5 ft.		TFC		4.000			☐	9 /				
144.9 ft.		HSV					☐	11 /		5		
152.8 ft.		TF		4.000			☐	3 /				
159.7 ft.		TF		4.000			☐	2 /				
161.8 ft.		TFC		4.000			☐	10 /				
180.9 ft.		AEP					☐	/				

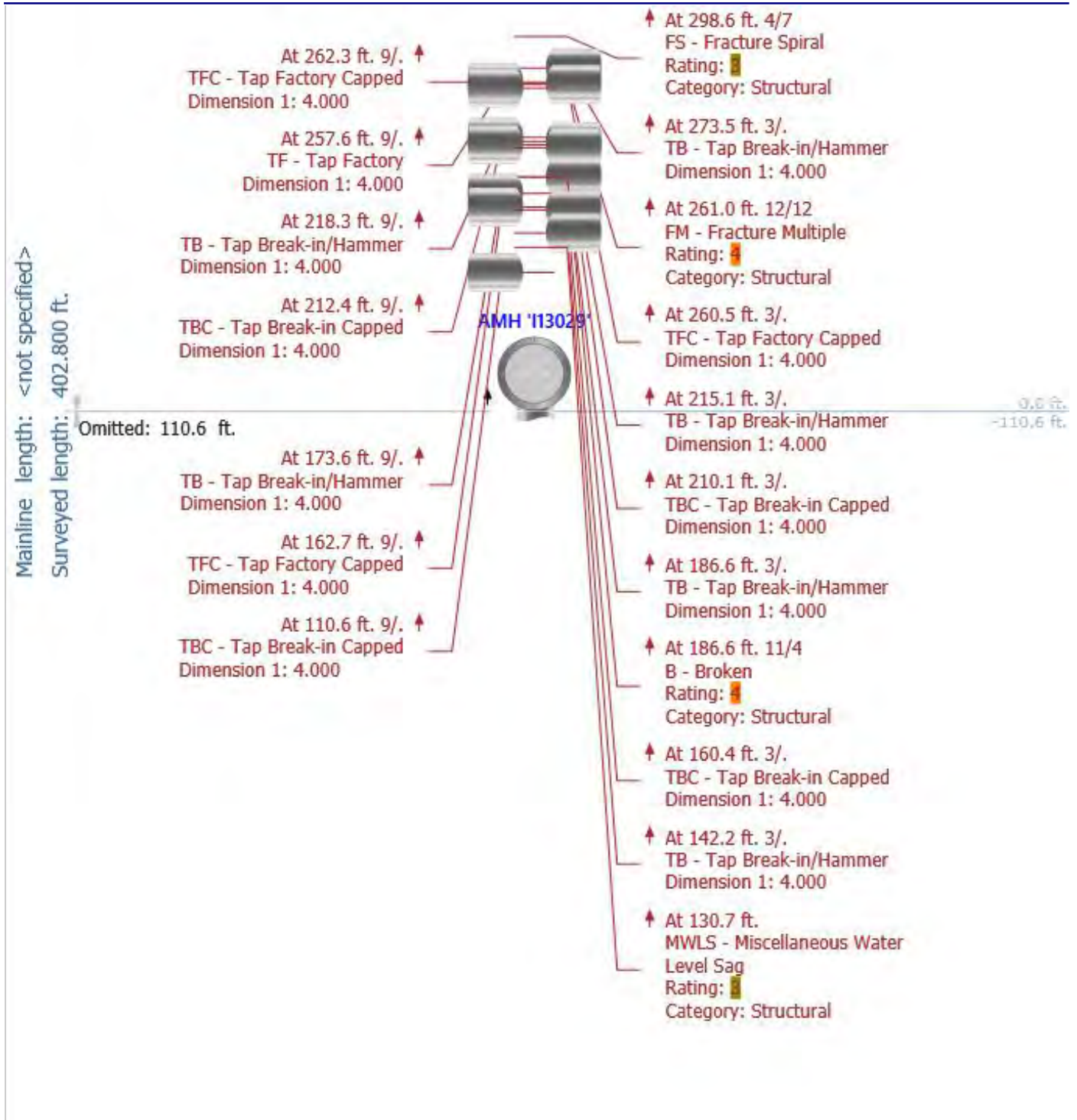
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13007 TO I13029	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 8:01 AM	U	1	C
Shape:	Material:	Height:	Width:
C	AC	6 in.	



Weather:

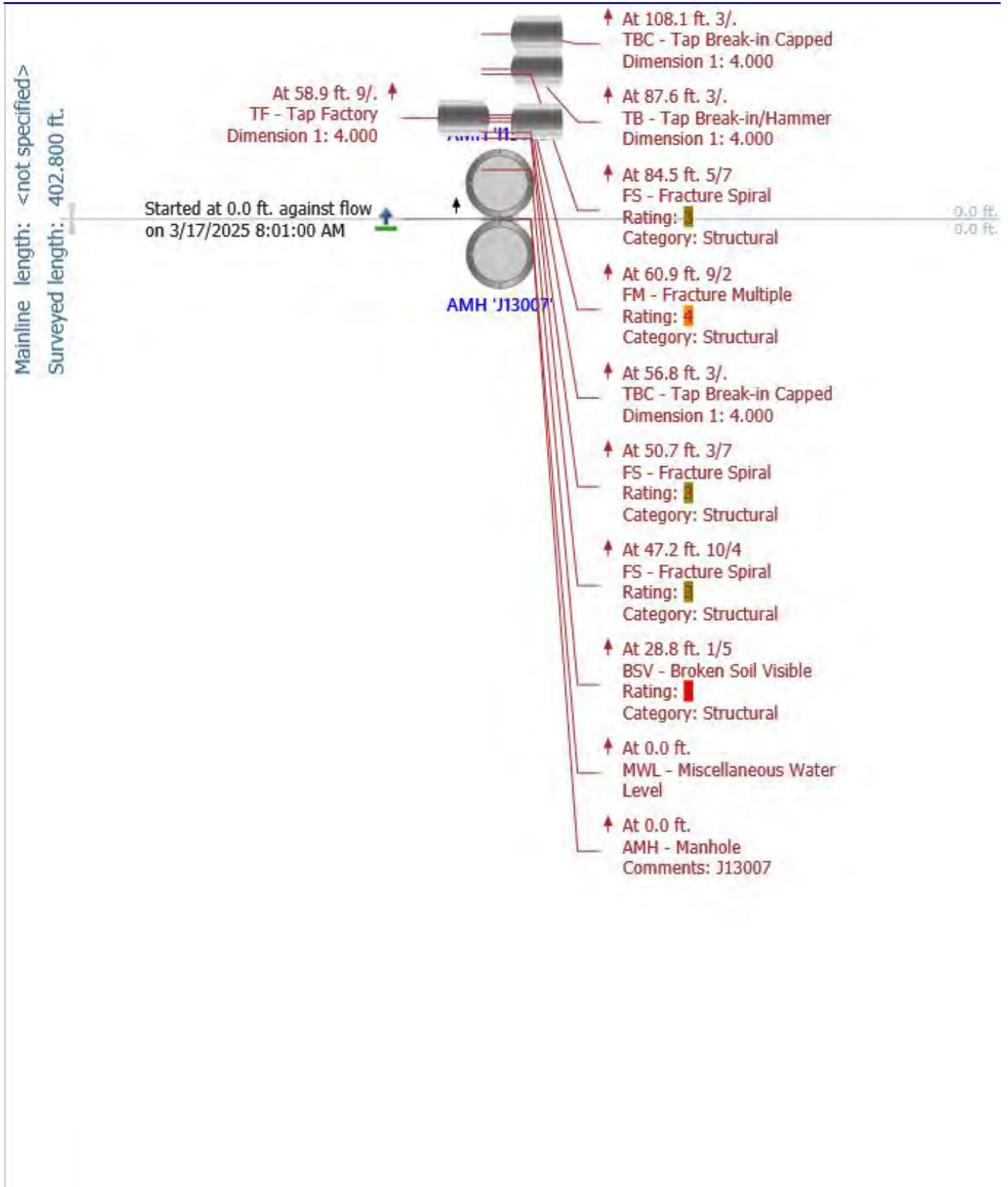
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Project name: **LINCOLN WASTEWATER CONDITION** Mainline ID: **J13007 TO I13029** Start date/time: **3/17/2025 8:01 AM** Direction: **U**

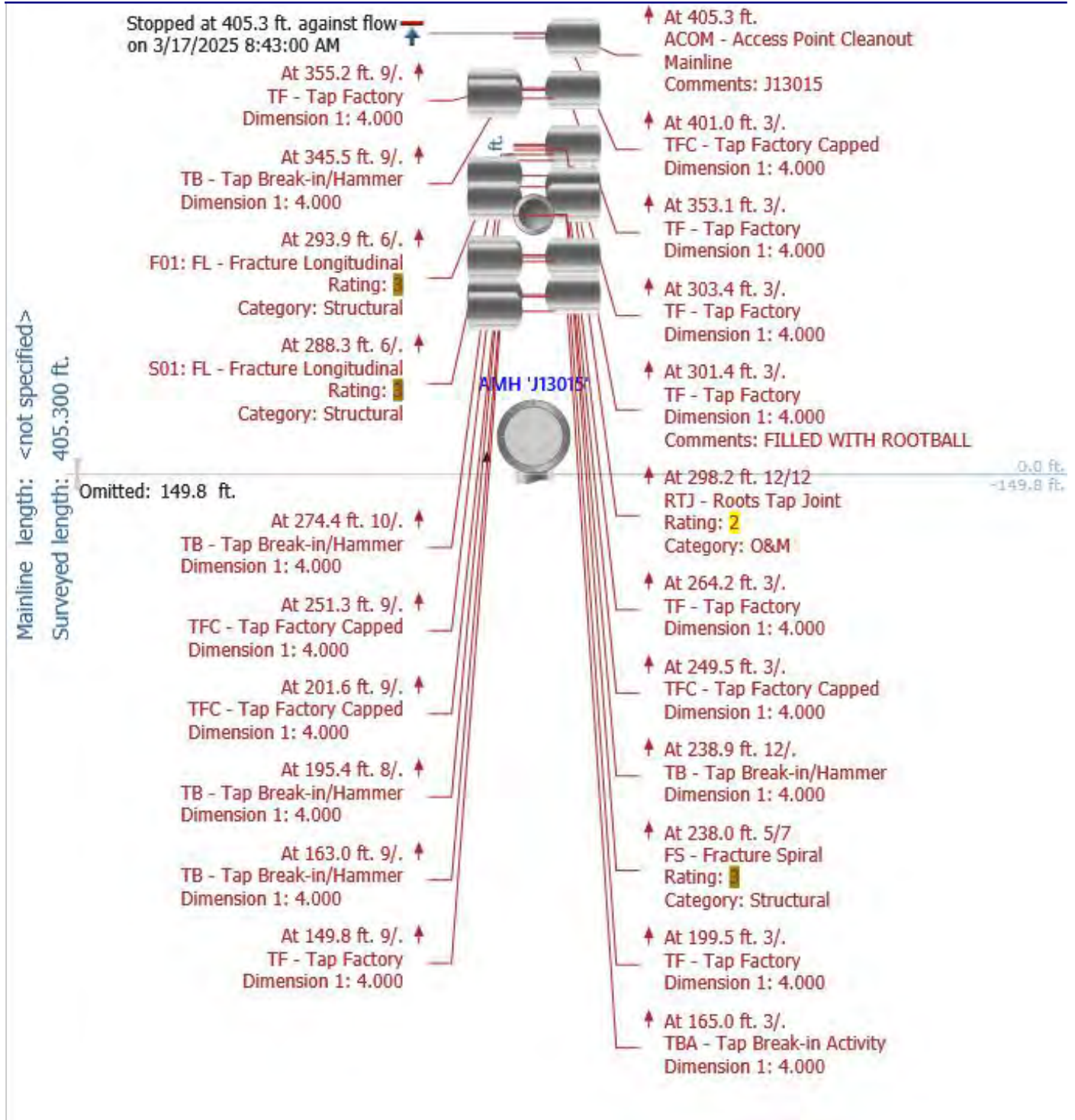
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13007 TO J13015	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 8:43 AM	U	1	C
Shape:	Material:	Height:	Width:
C	AC	6 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J13007 TO J13015

Start date/time:

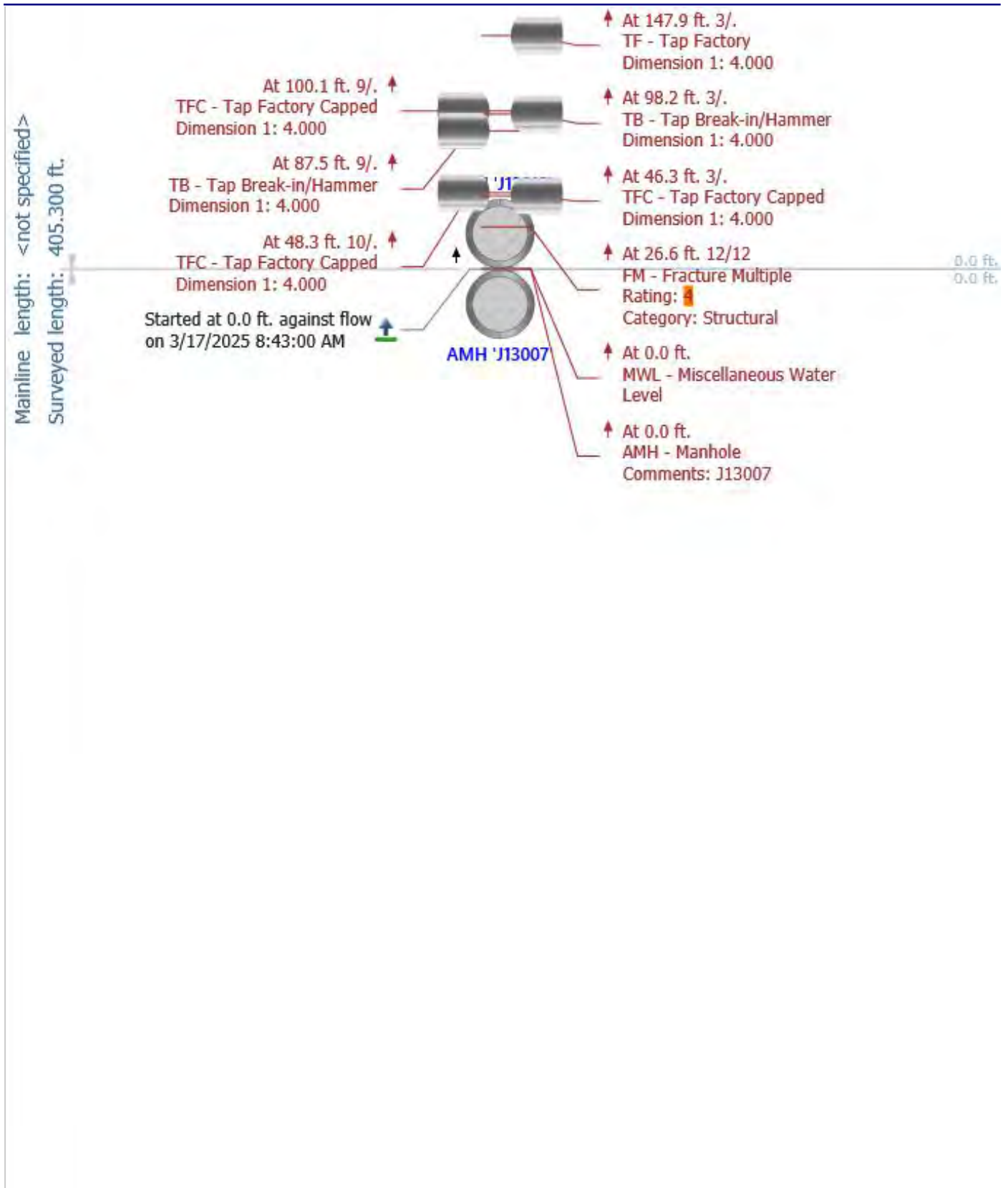
3/17/2025 8:43 AM

Direction:

U

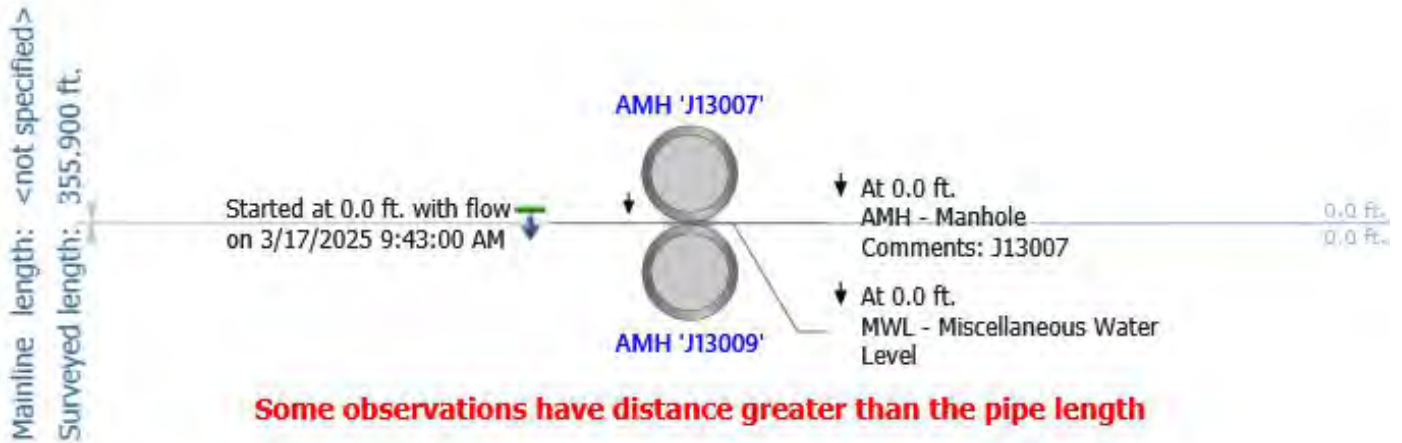
Weather:

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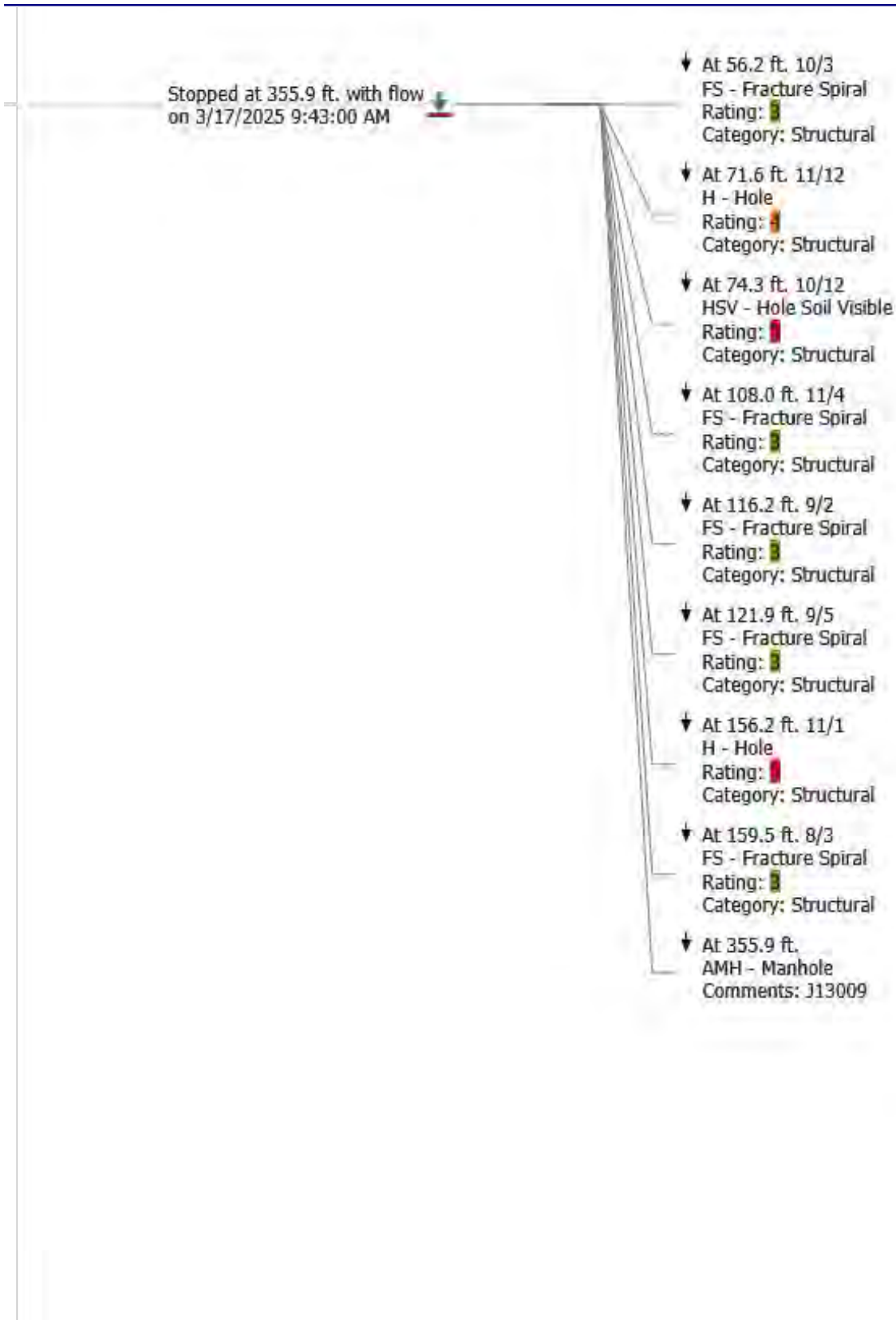
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13007 TO J13009	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 9:43 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



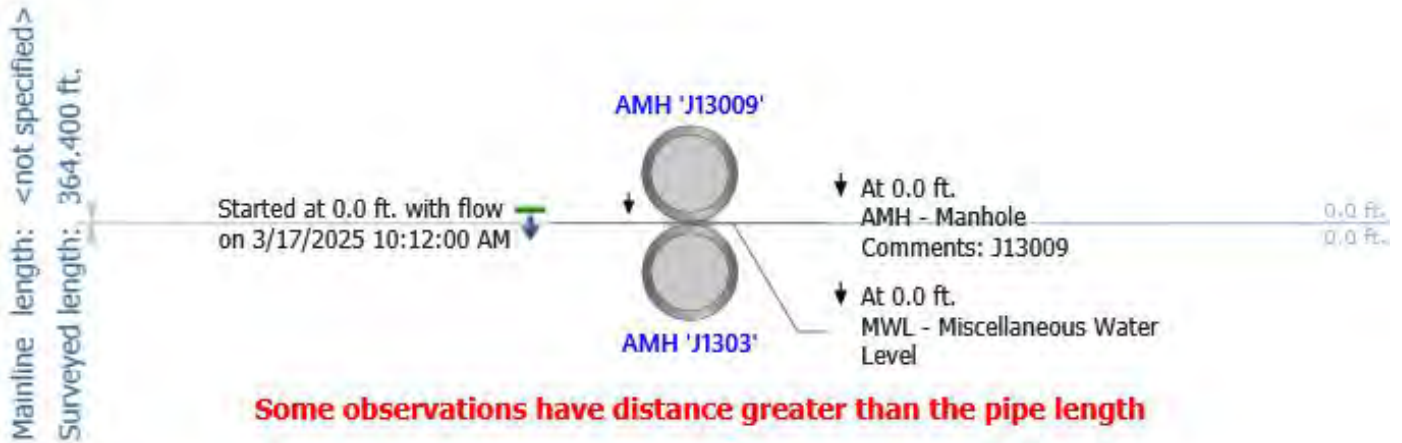
Weather:

1



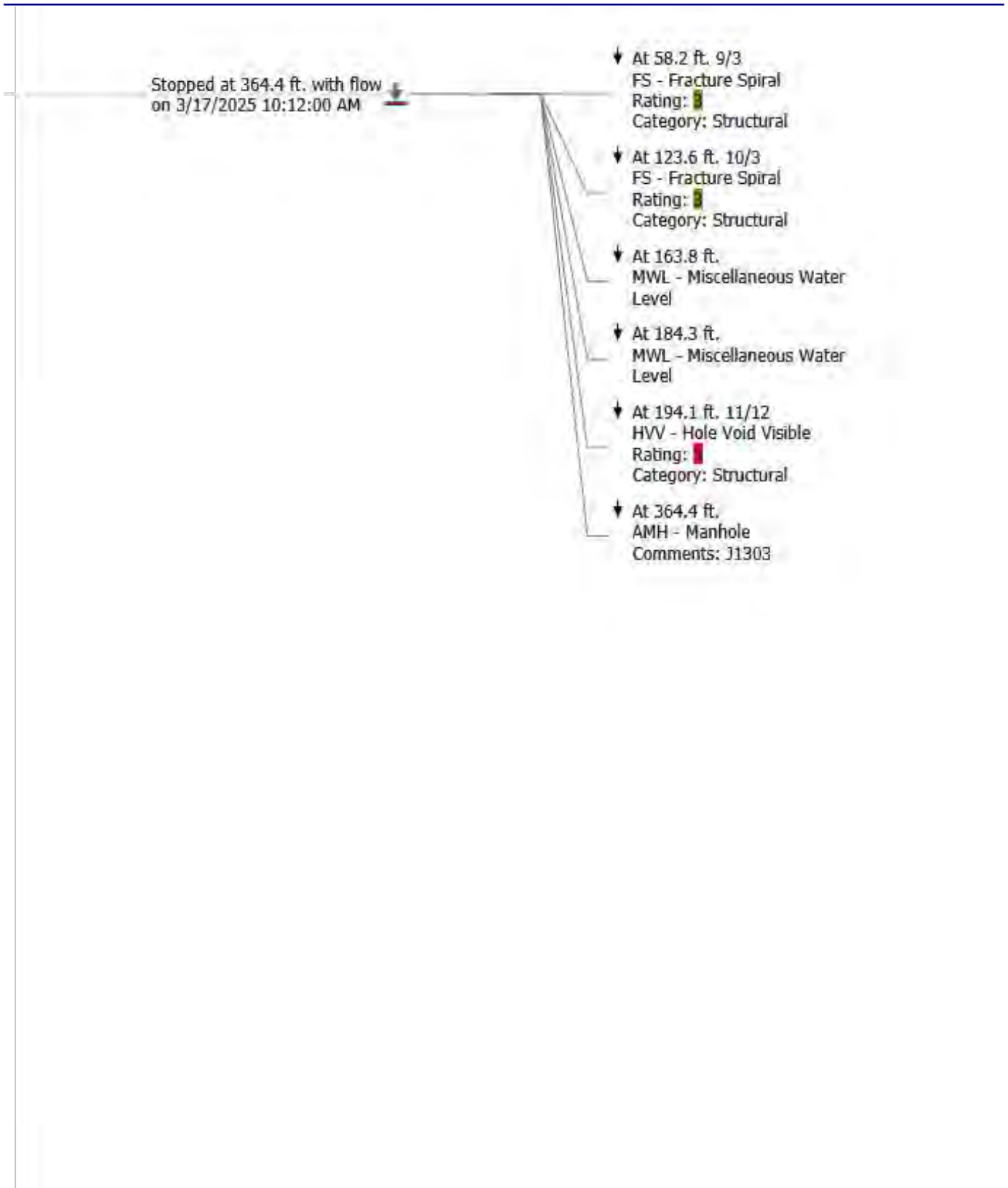
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13009 TO J1303	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 10:12 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



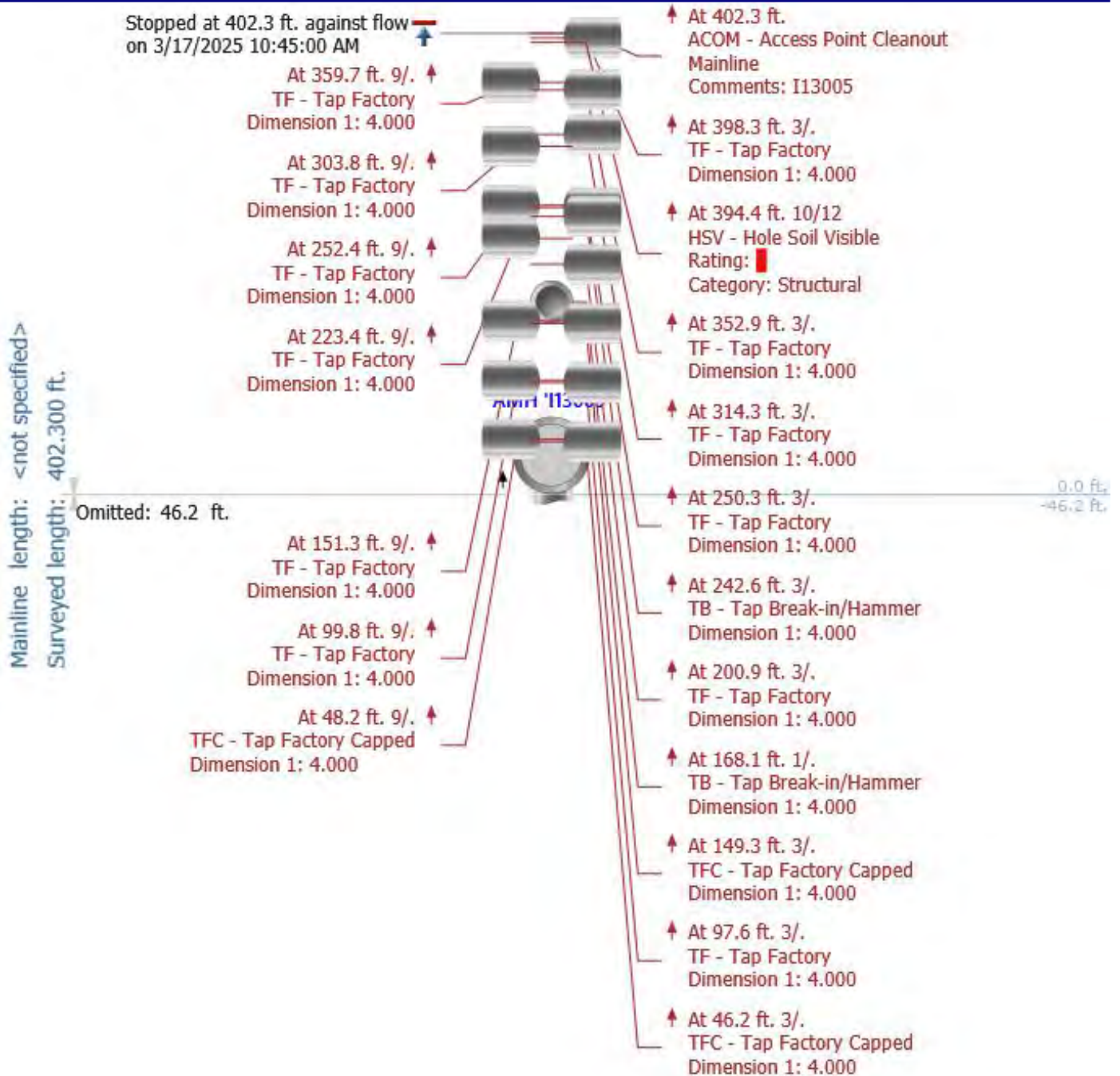
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13009 TO I13005	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 10:45 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

Mainline ID:

Start date/time:

Direction:

**LINCOLN WASTEWATER
CONDITION**

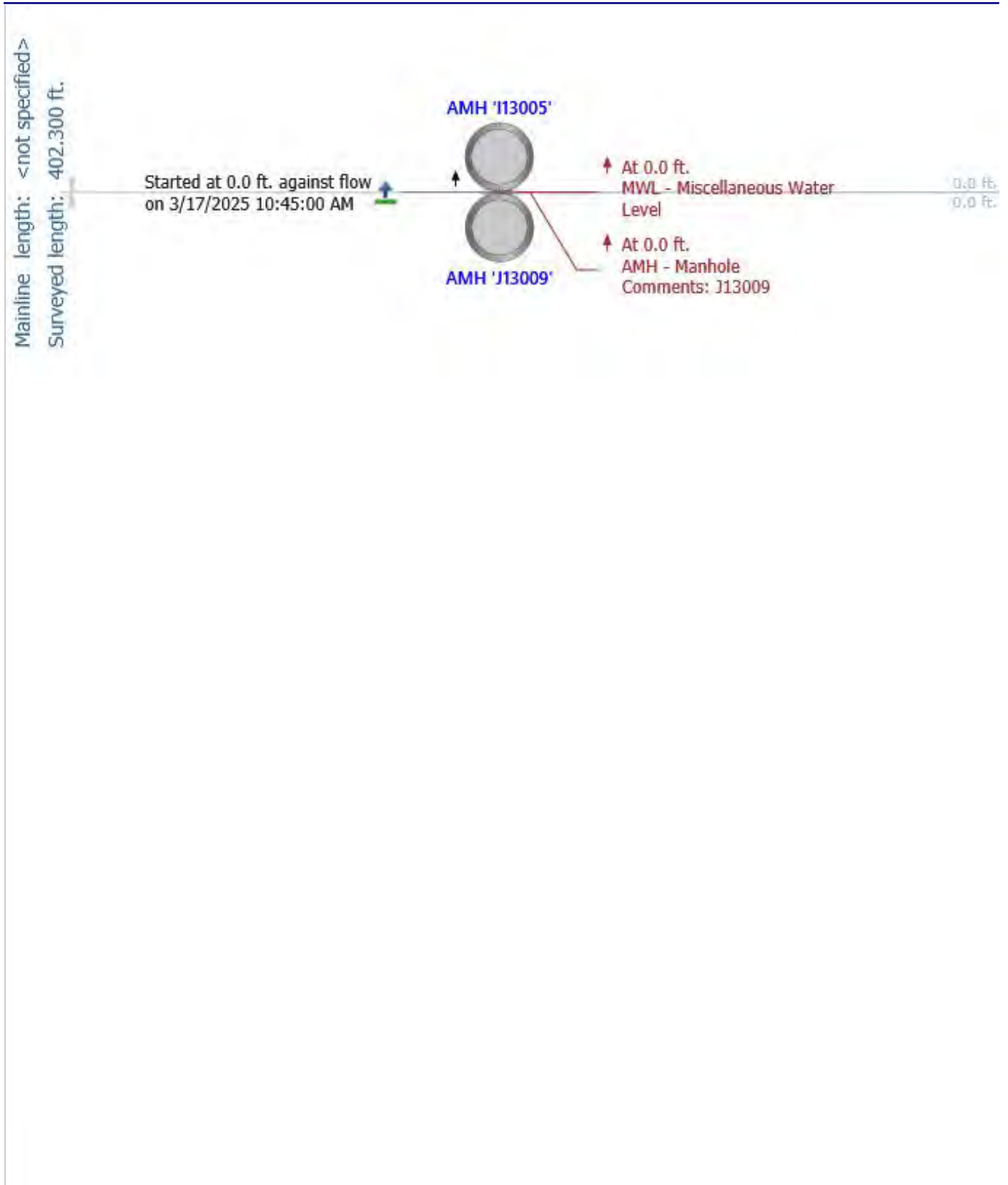
J13009 TO I13005

3/17/2025 10:45 AM

U

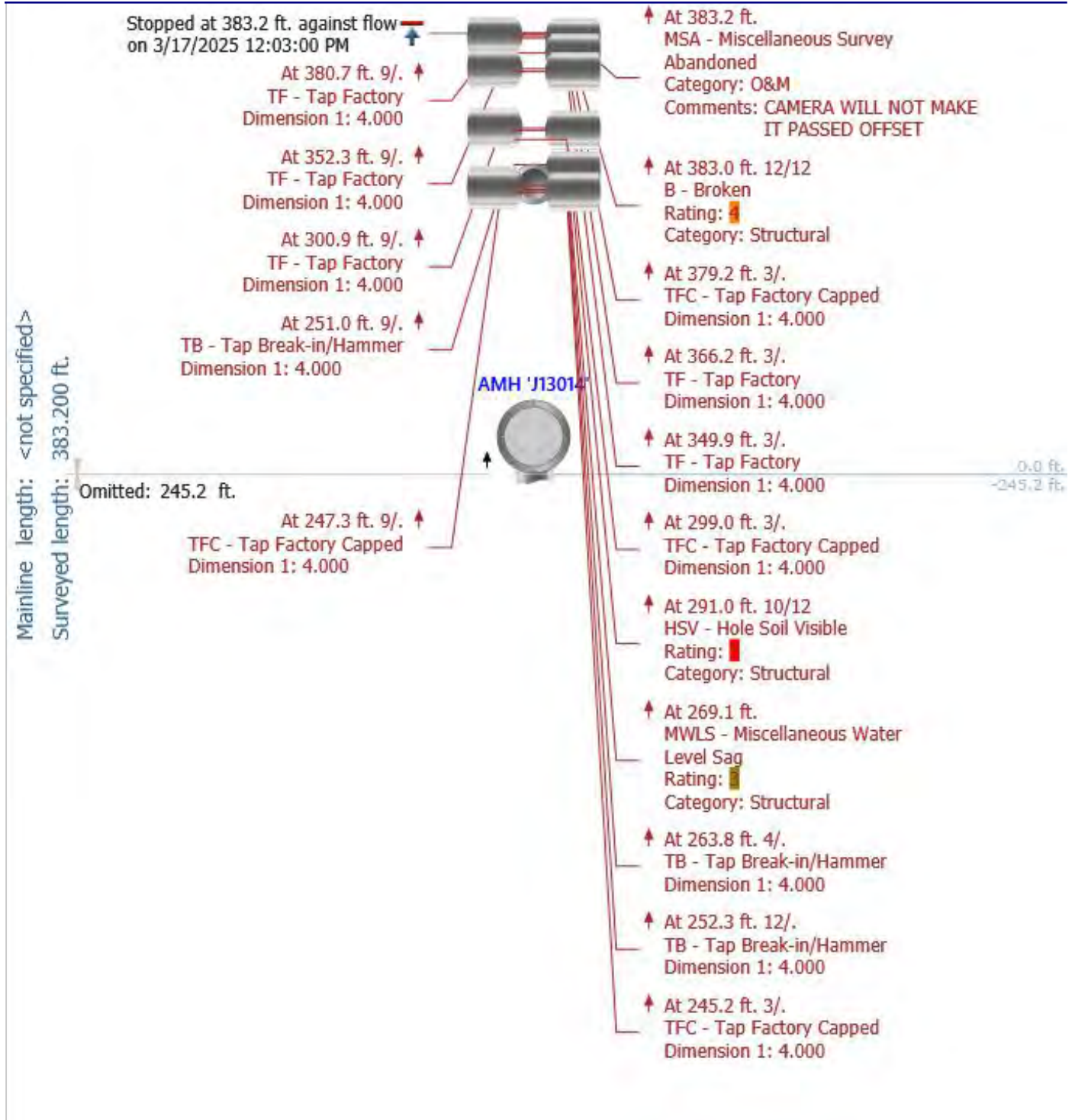
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13009 TO J13014	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 12:03 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Weather:

1

Mainline ID:

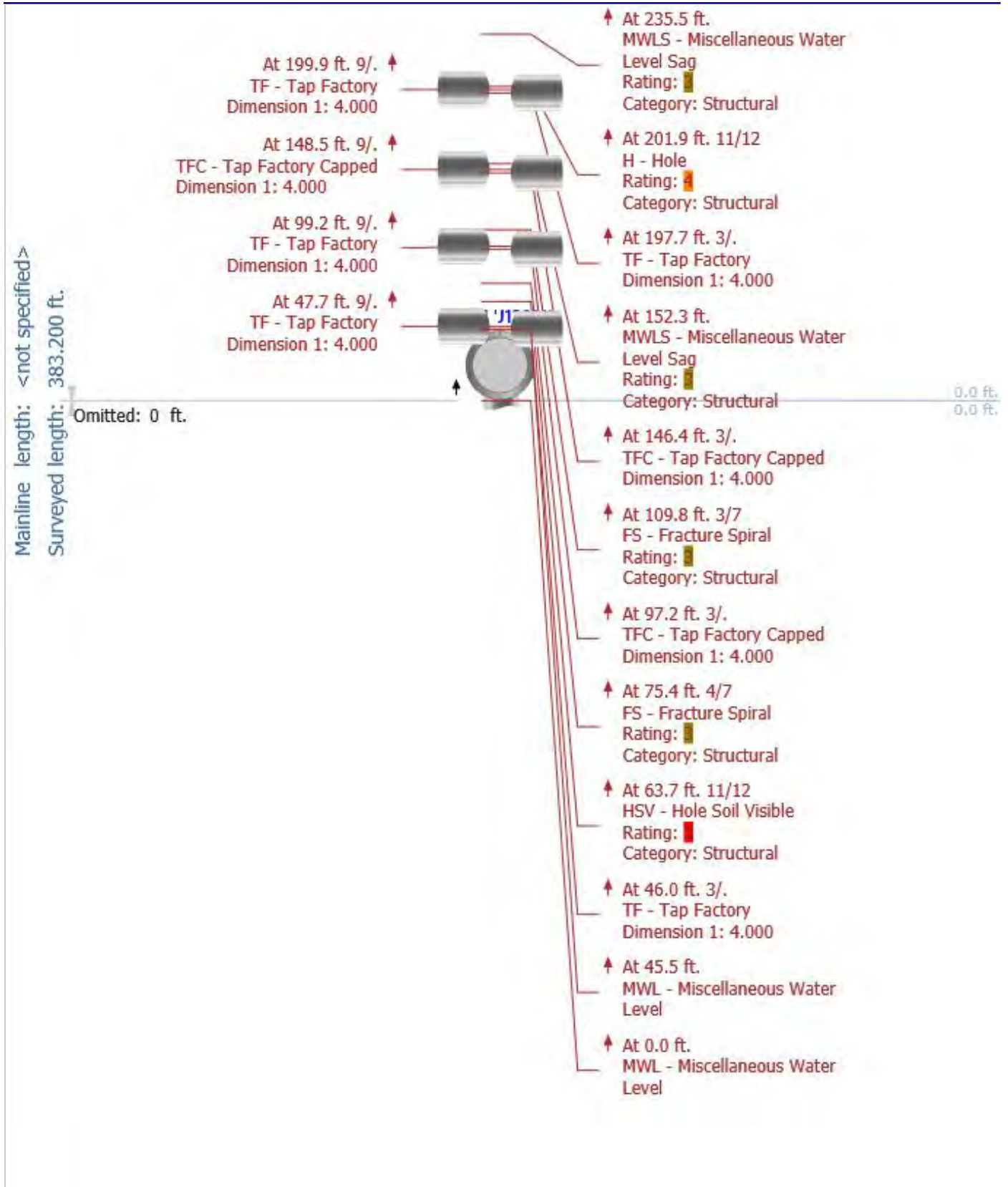
J13009 TO J13014

Start date/time:

3/17/2025 12:03 PM

Direction:

U



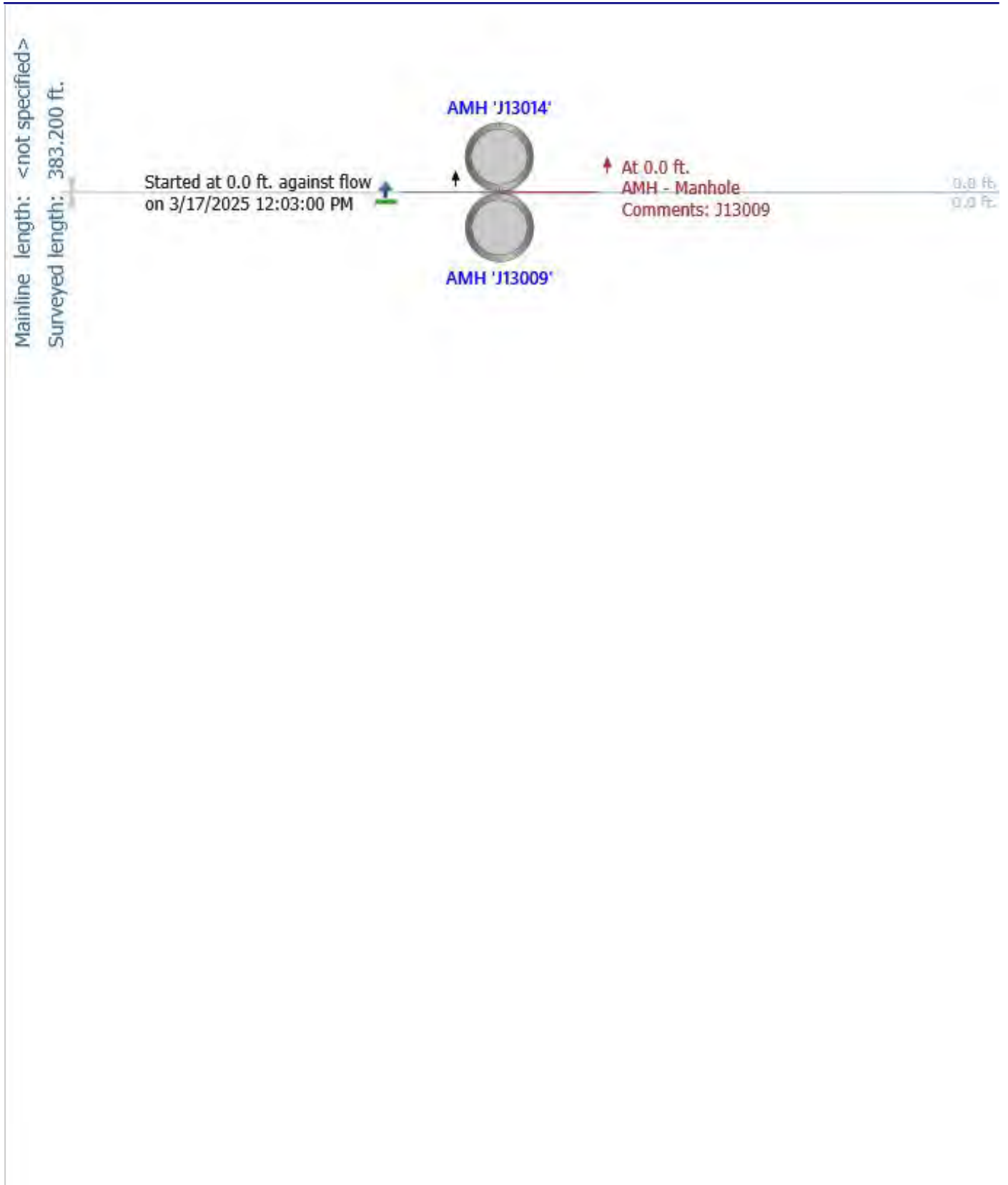
Project name: **LINCOLN WASTEWATER CONDITION**
Mainline ID: **J13009 TO J13014**

Start date/time: **3/17/2025 12:03 PM**

Direction: **U**

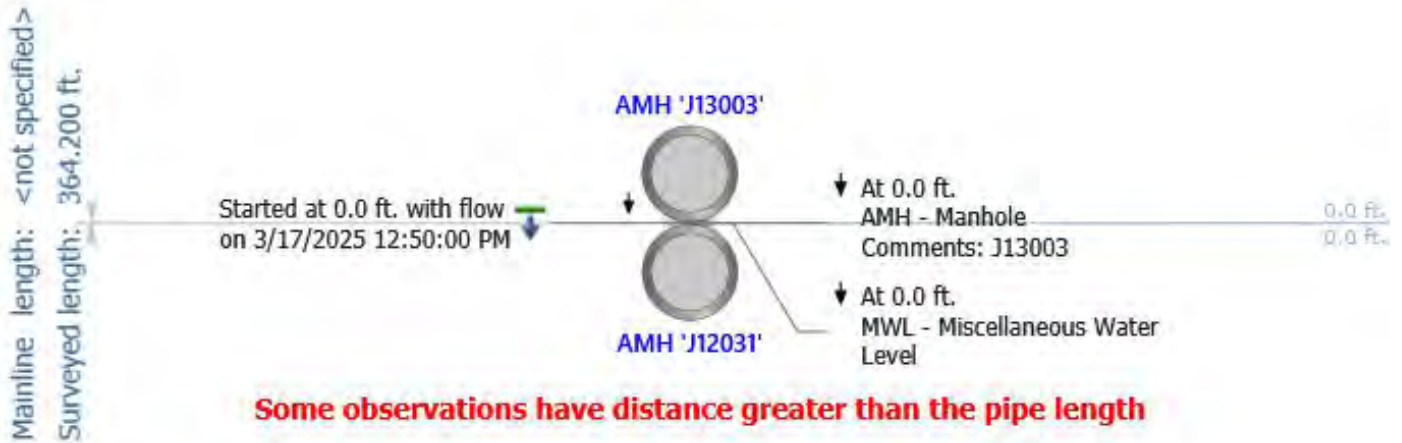
Weather:

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Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13003 TO J12031	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 12:50 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	

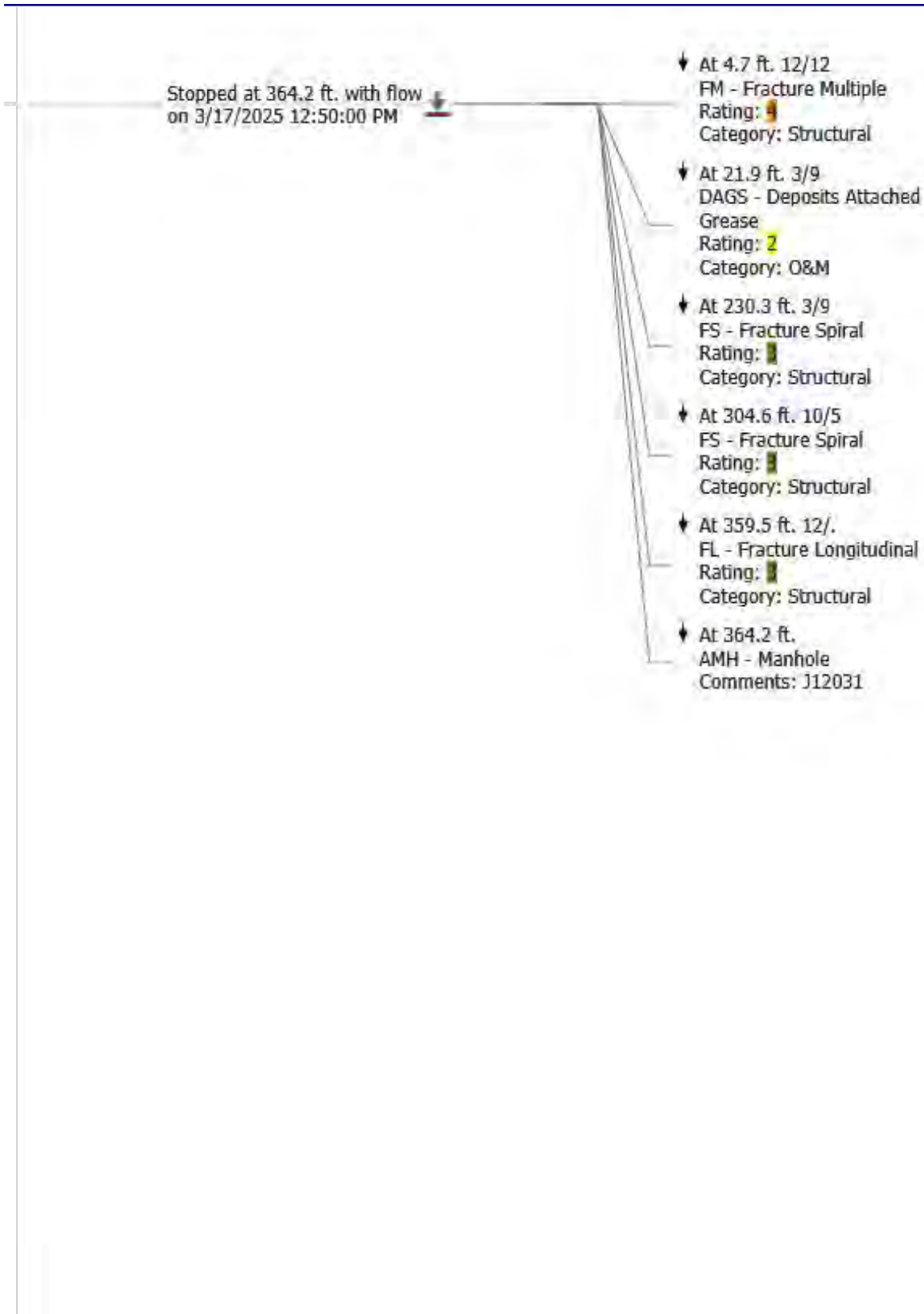


Project name: **LINCOLN WASTEWATER CONDITION**
Mainline ID: **J13003 TO J12031**

Start date/time: **3/17/2025 12:50 PM**
Direction: **D**

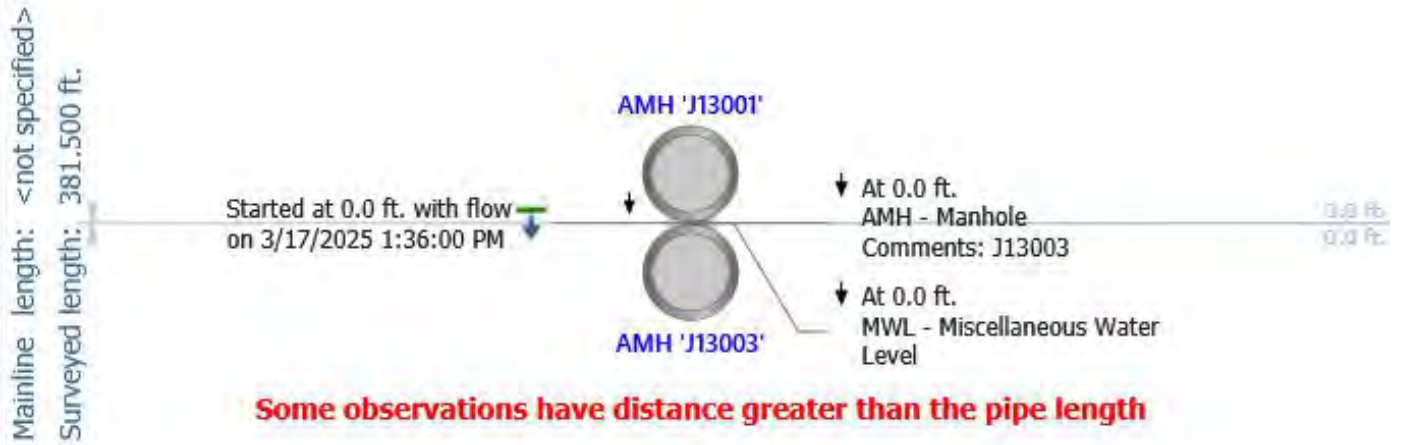
Weather:

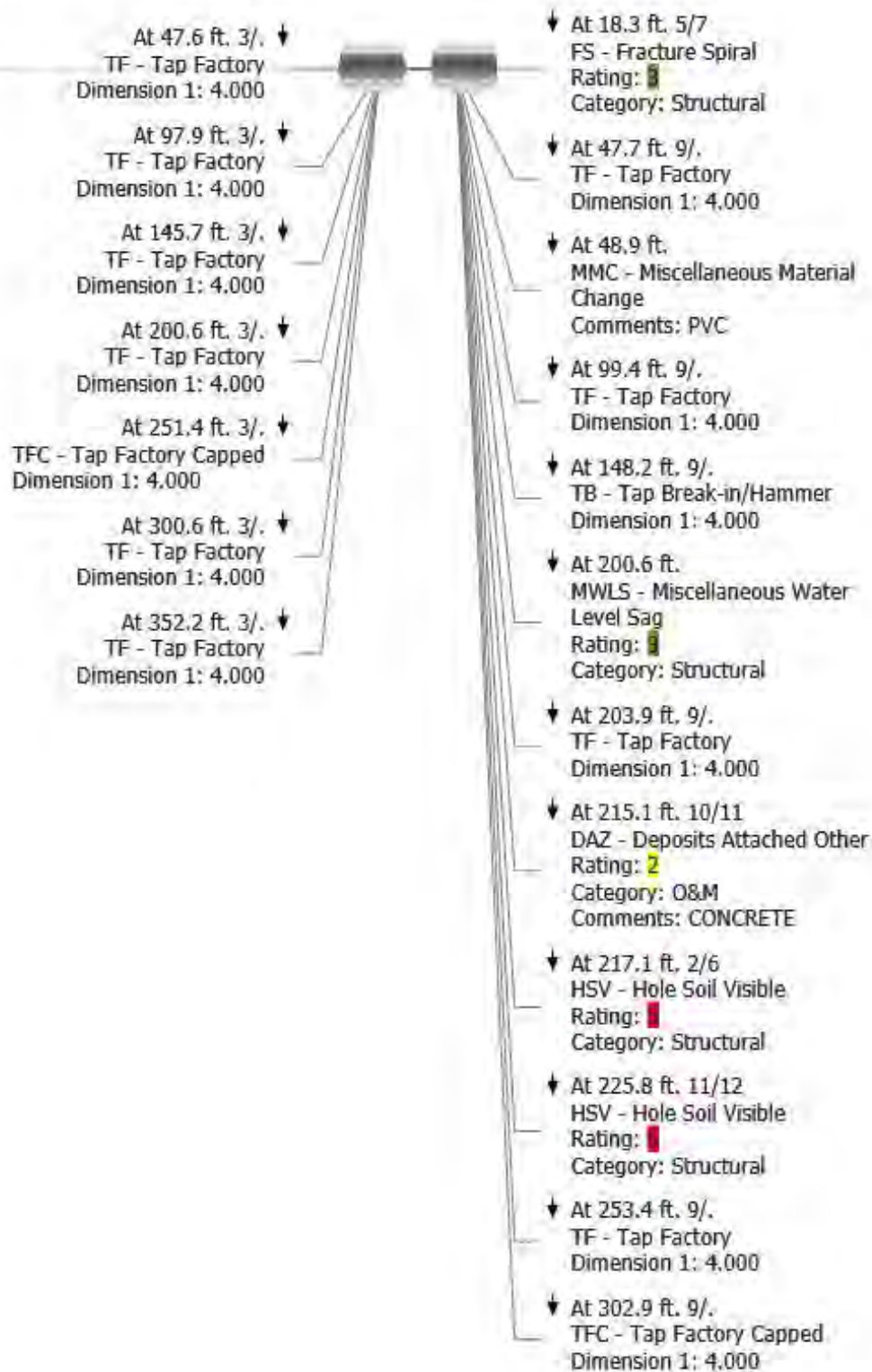
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Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13001 TO J13003	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 1:36 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





Project name: **LINCOLN WASTEWATER**
Mainline ID: **J13001 TO J13003**
CONDITION

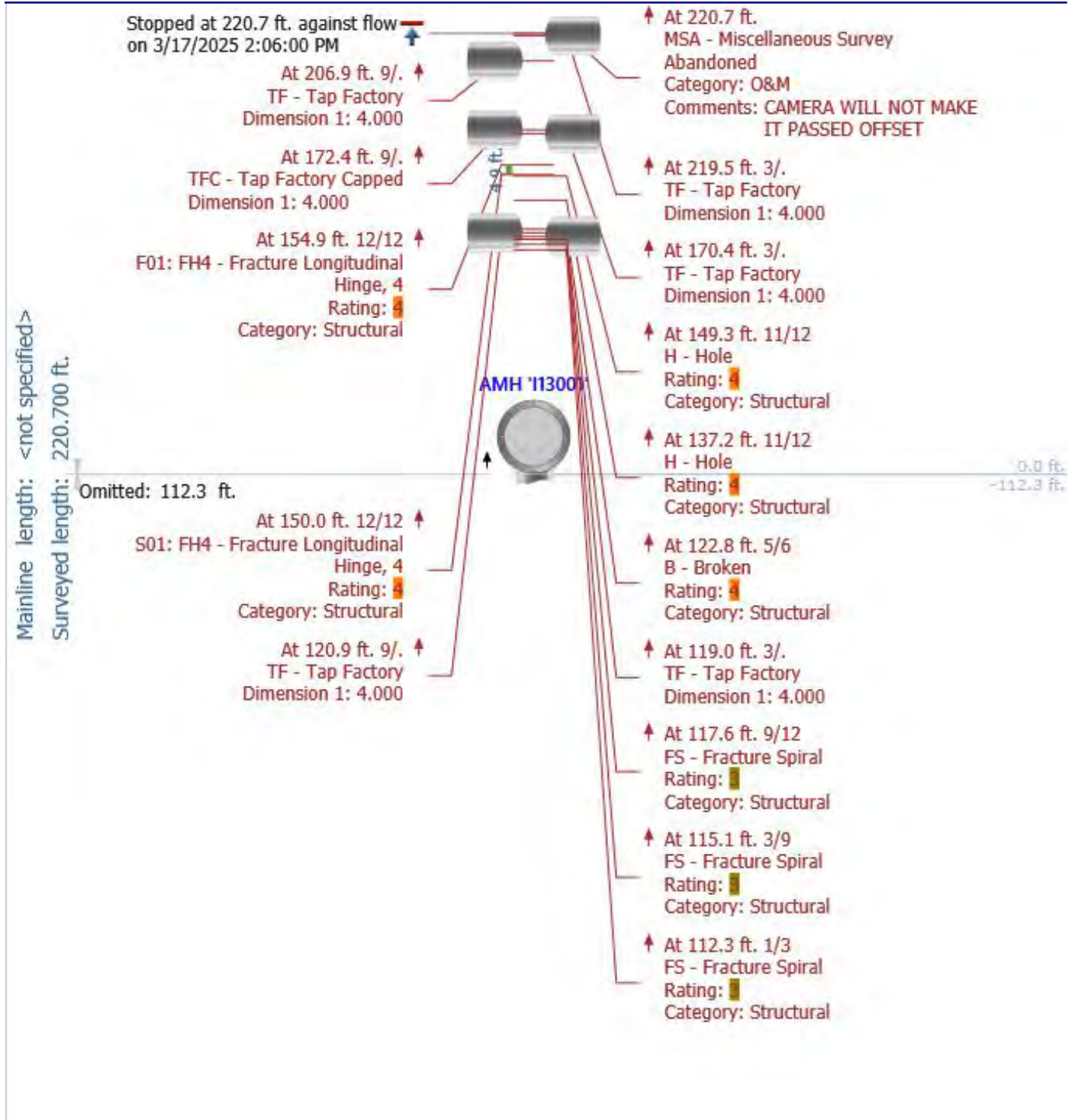
Start date/time: **3/17/2025 1:36 PM**
Direction: **D**

Weather:
1



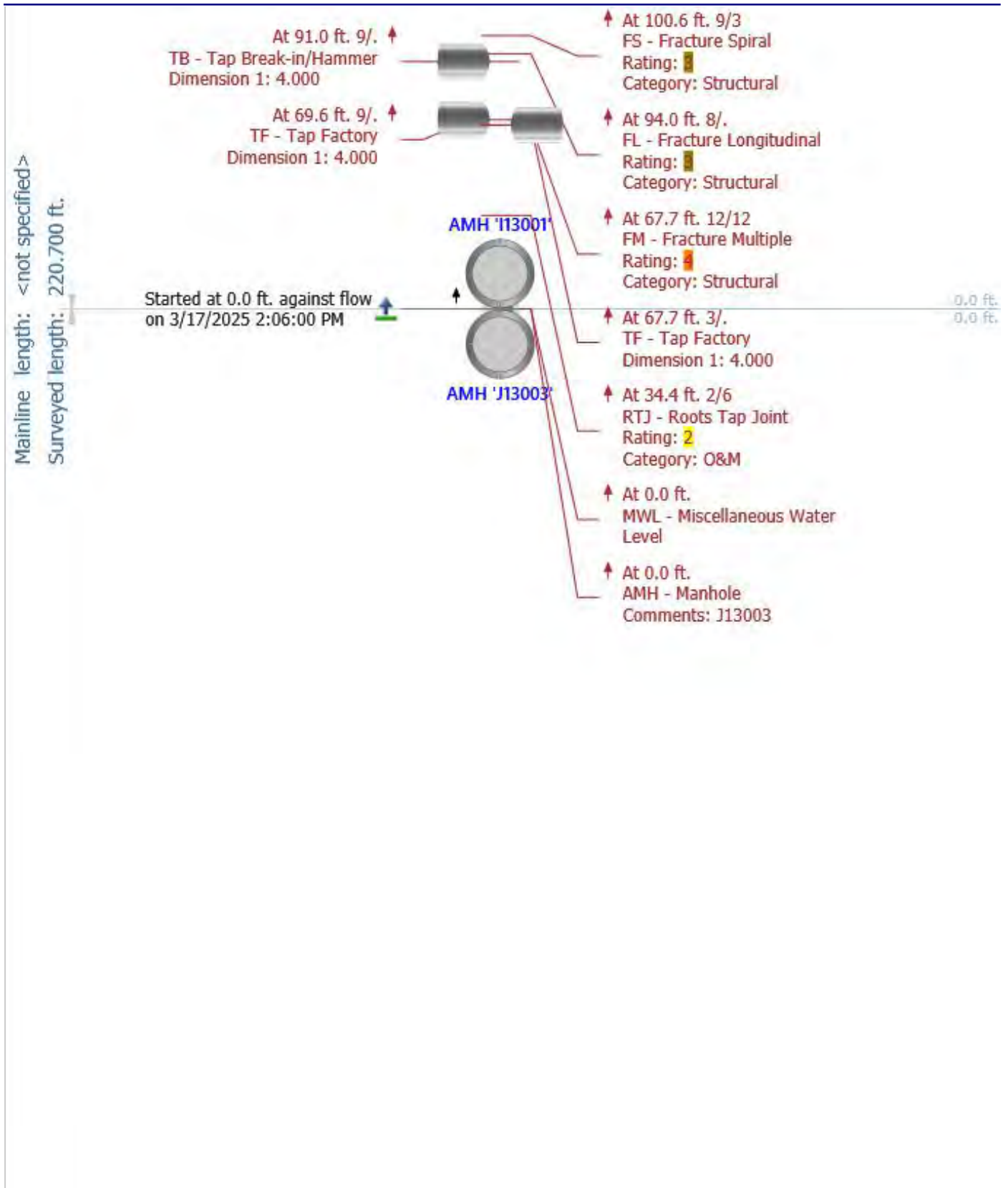
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13003 TO I13001	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/17/2025 2:06 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



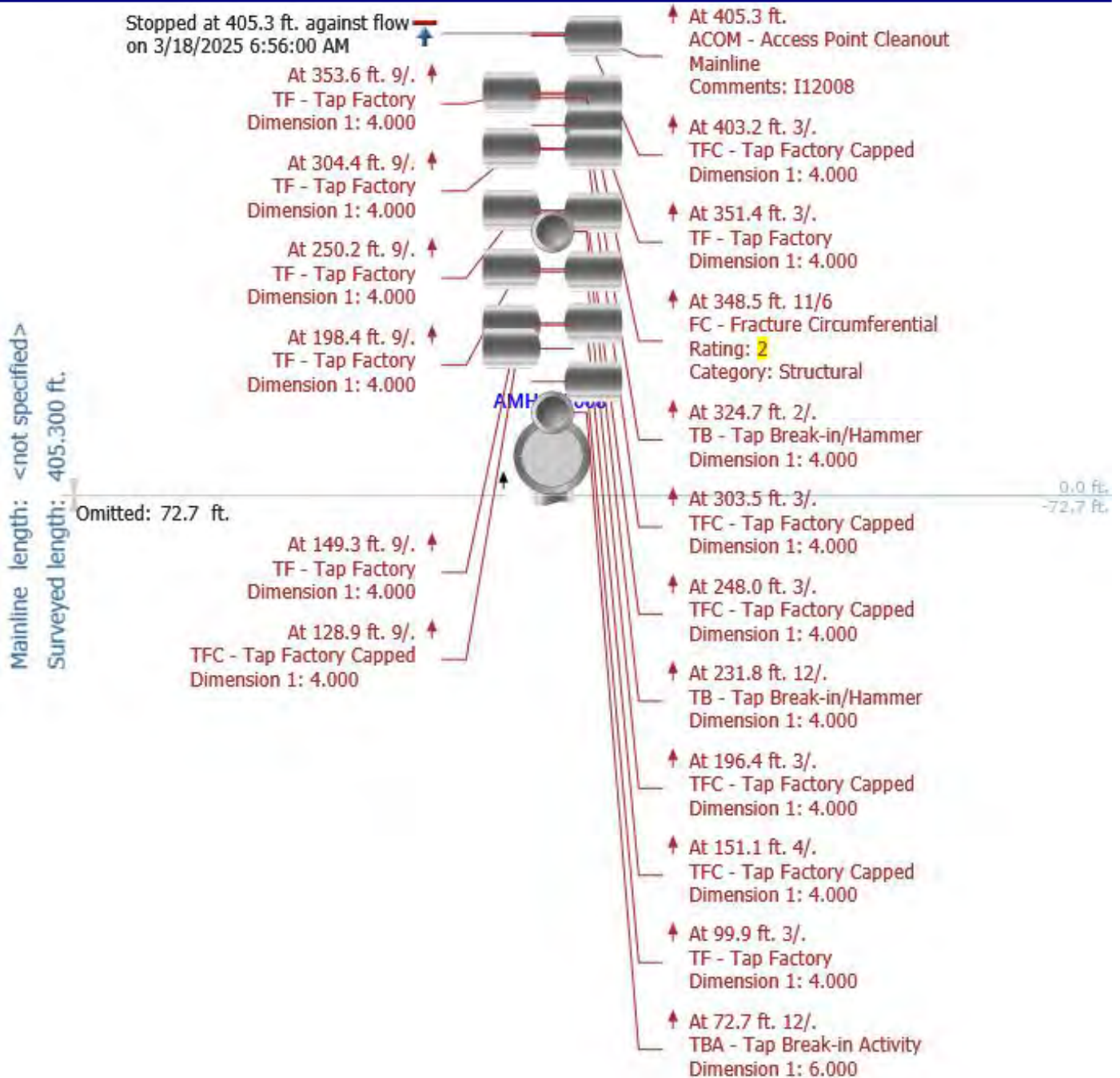
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12031 TO I12008	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 6:56 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J12031 TO I12008

Start date/time:

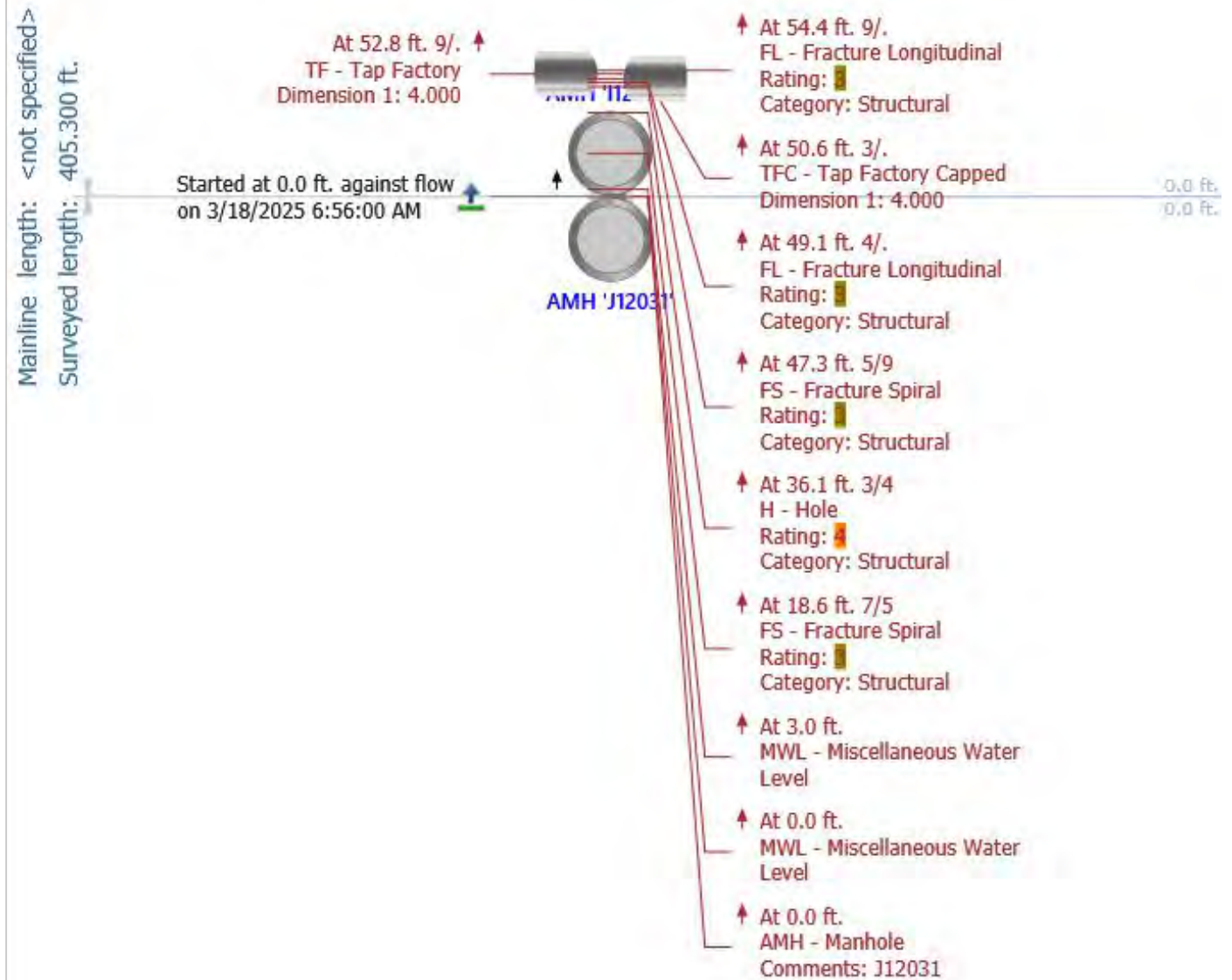
3/18/2025 6:56 AM

Direction:

U

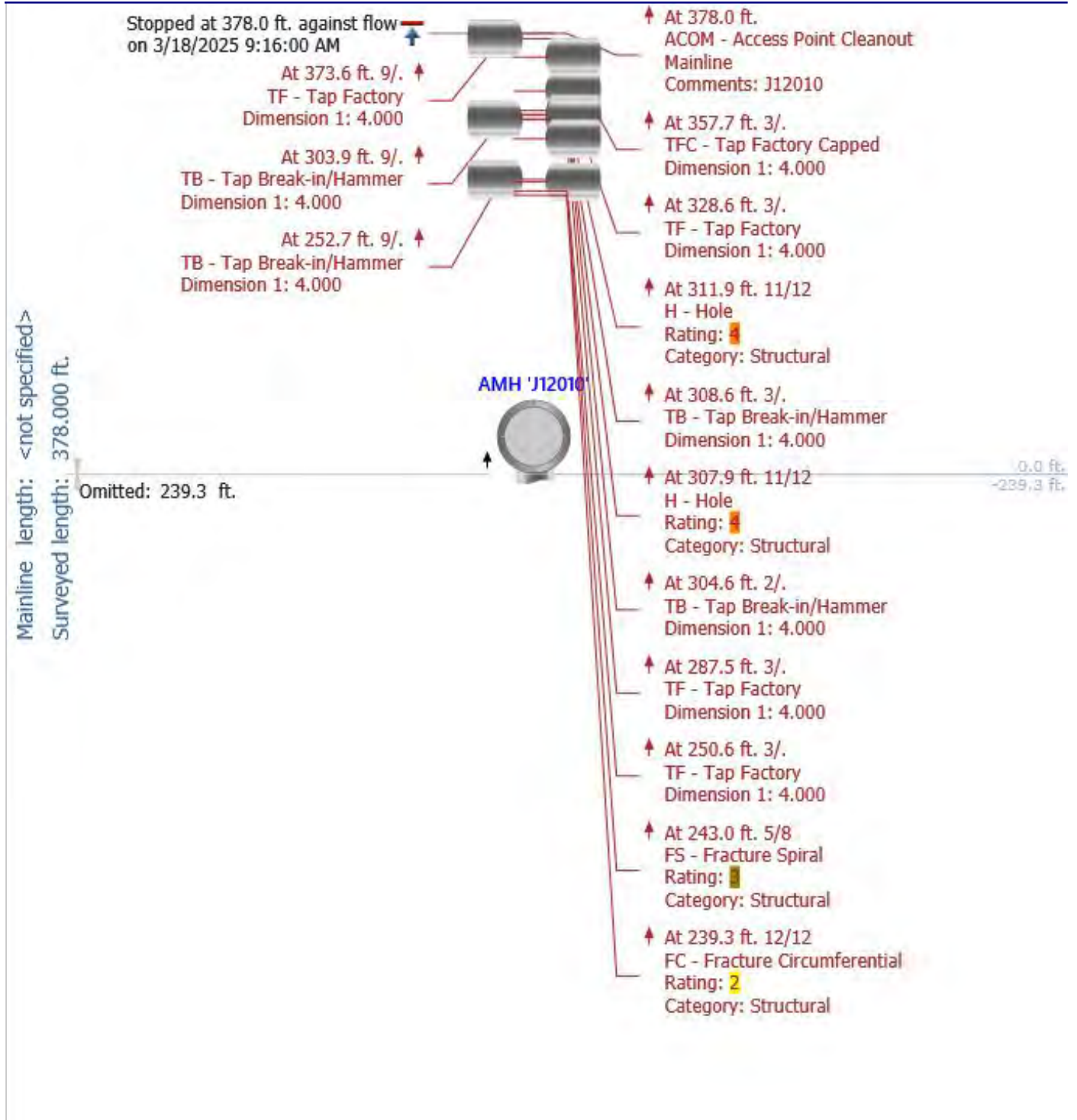
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12031 TO J12010	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 9:16 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Weather:

1

Mainline ID:

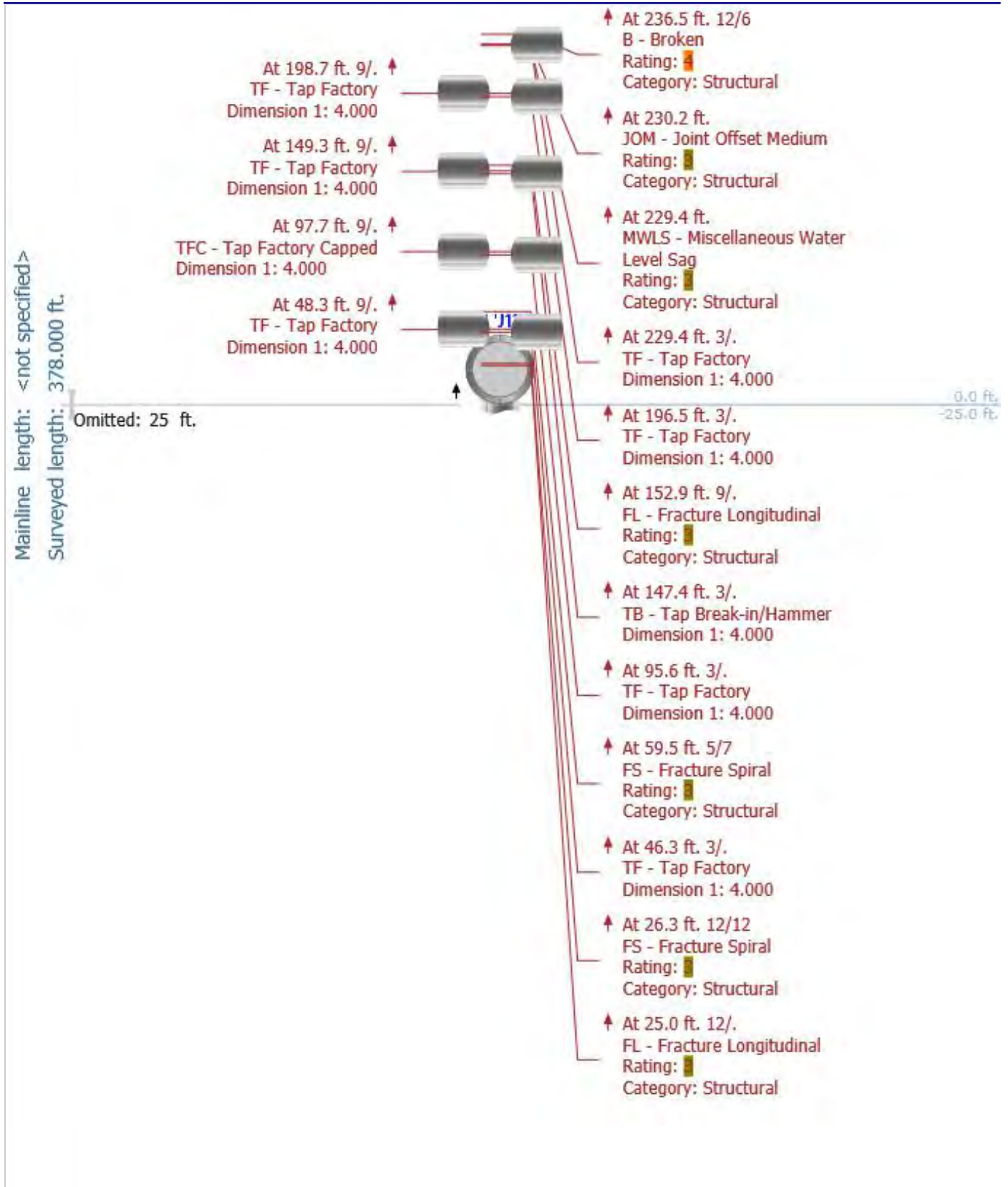
J12031 TO J12010

Start date/time:

3/18/2025 9:16 AM

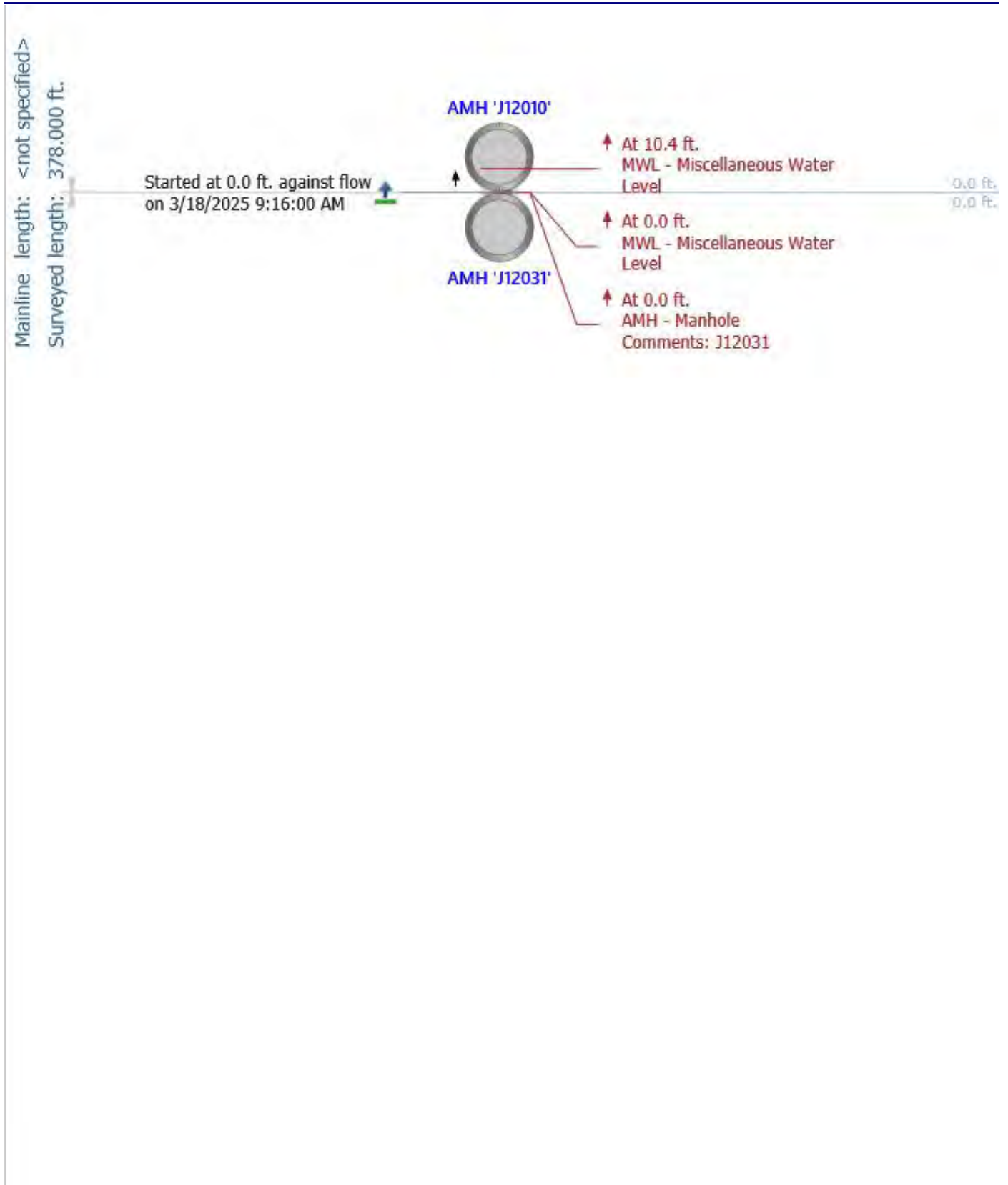
Direction:

U



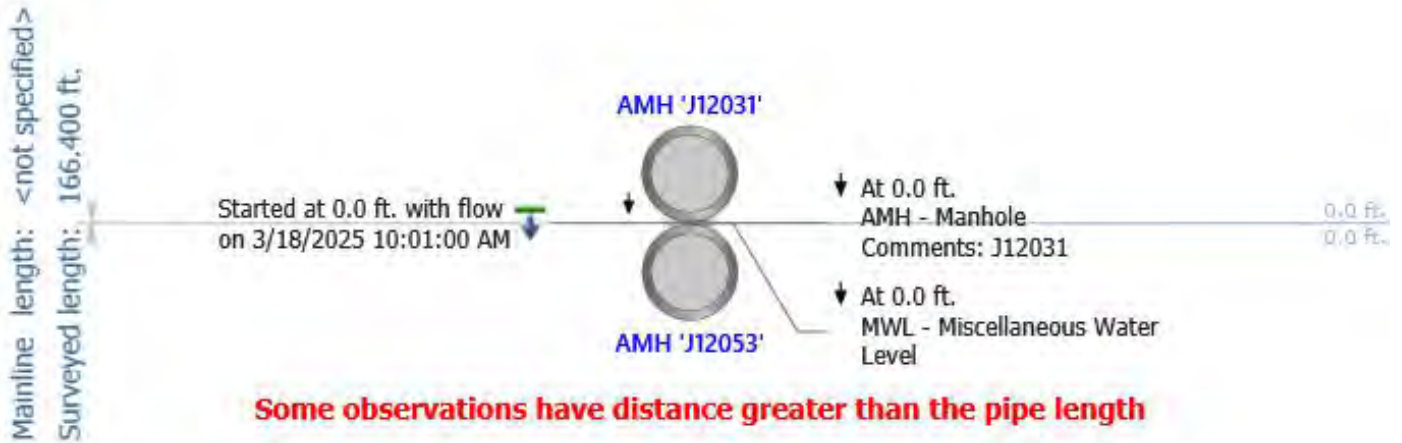
Weather:

1



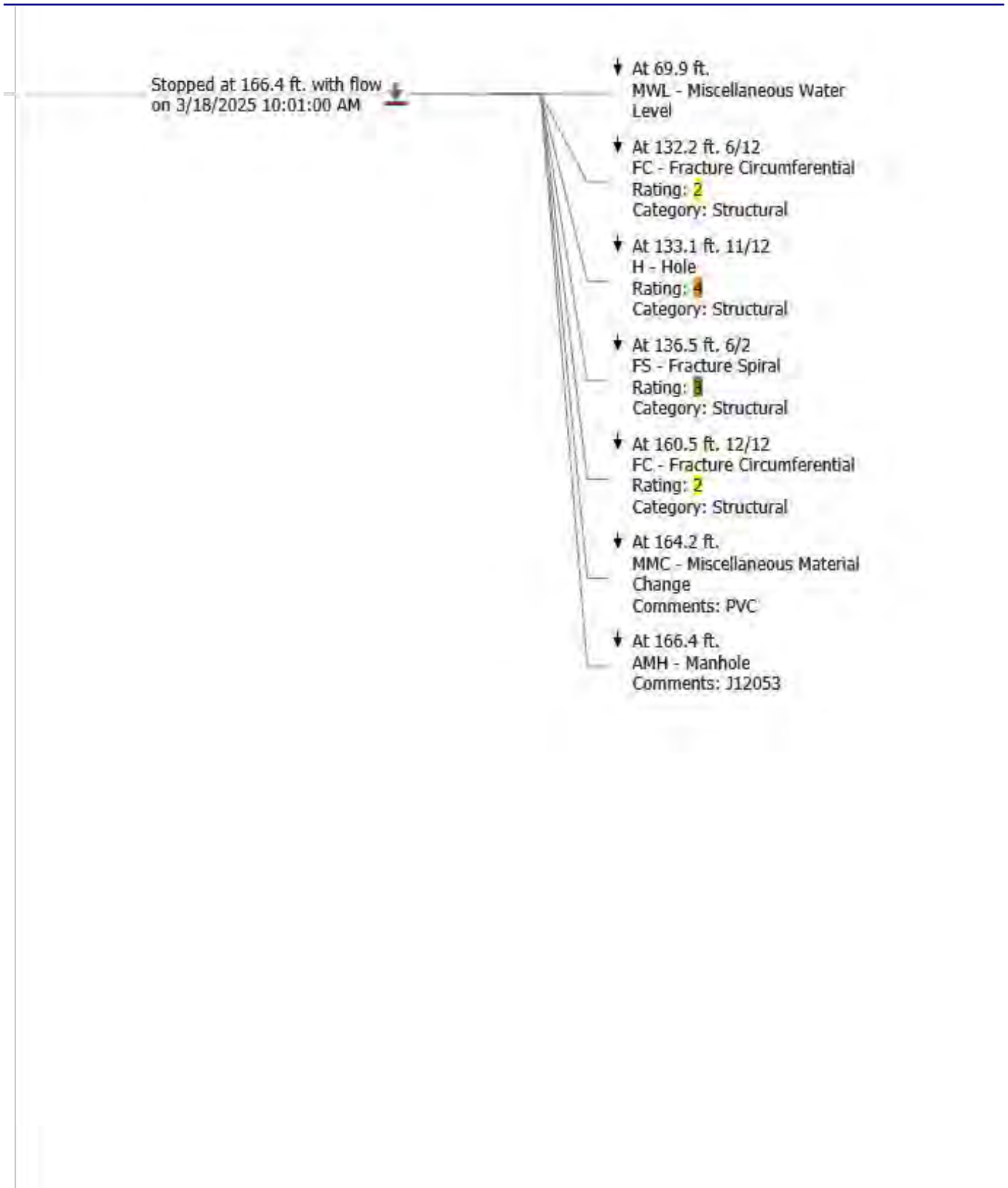
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12031 TO J12053	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 10:01 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



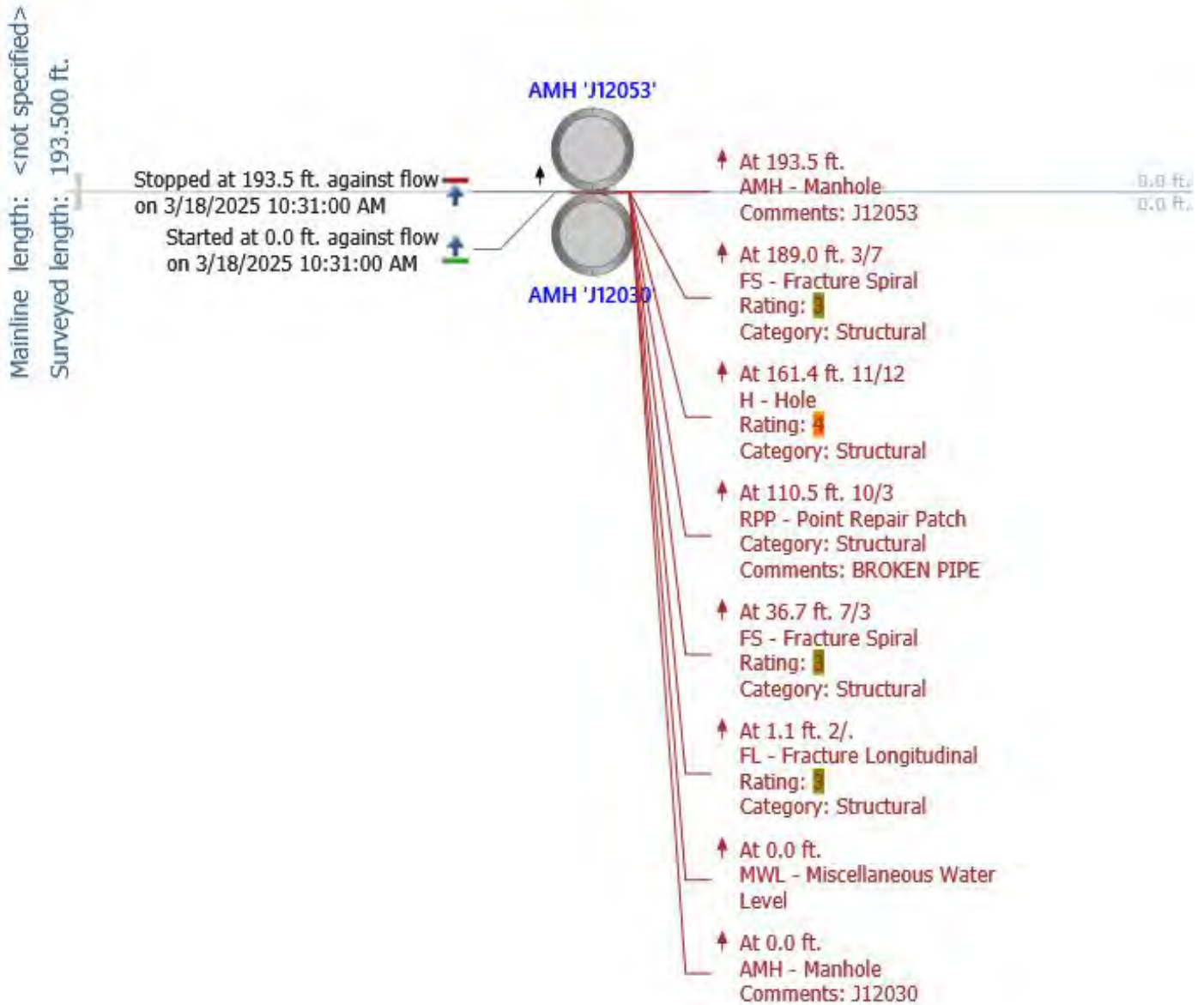
Weather:

1



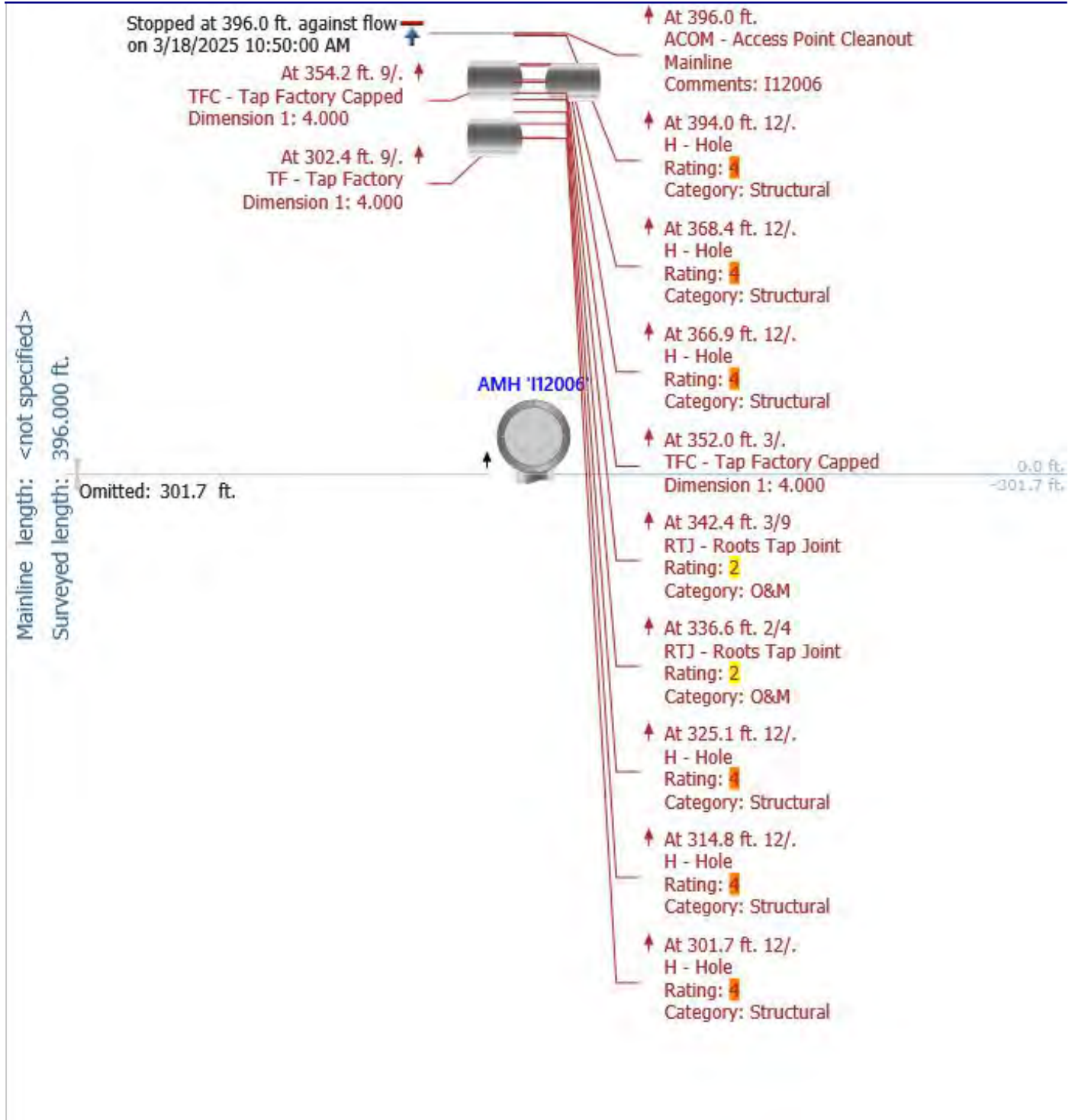
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12030 TO J12053	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 10:31 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



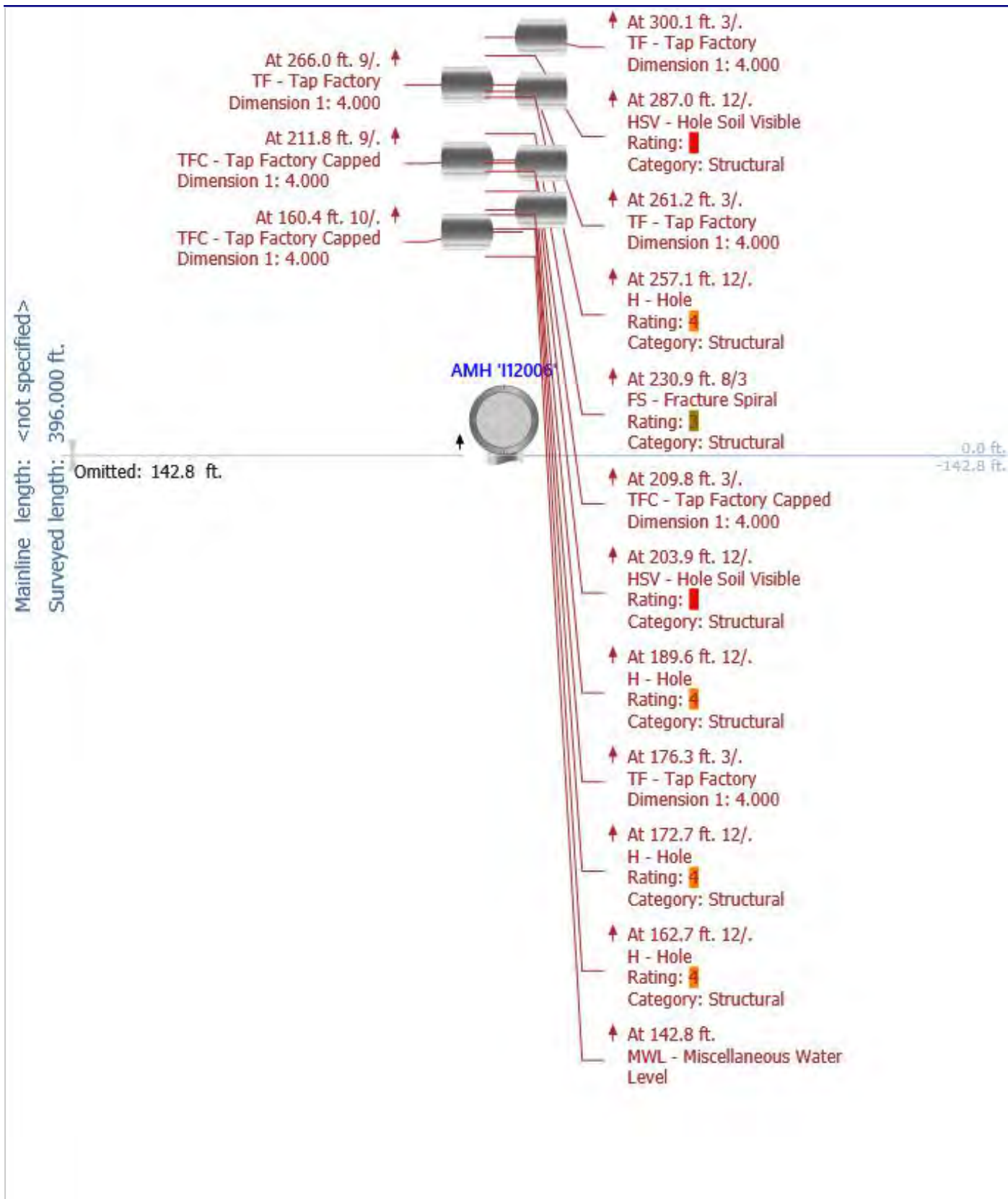
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12030 TO I12006	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 10:50 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



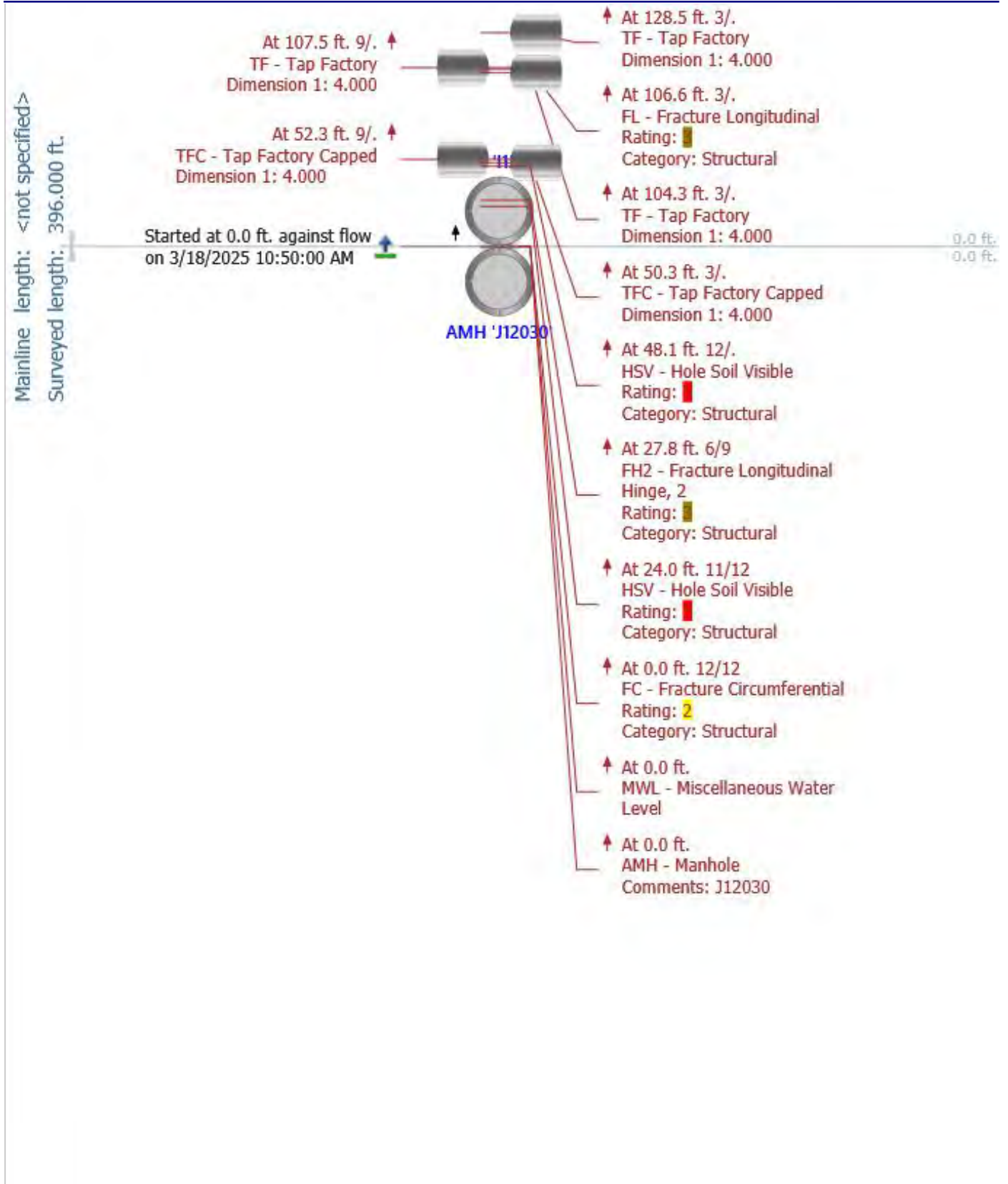
Weather:

1



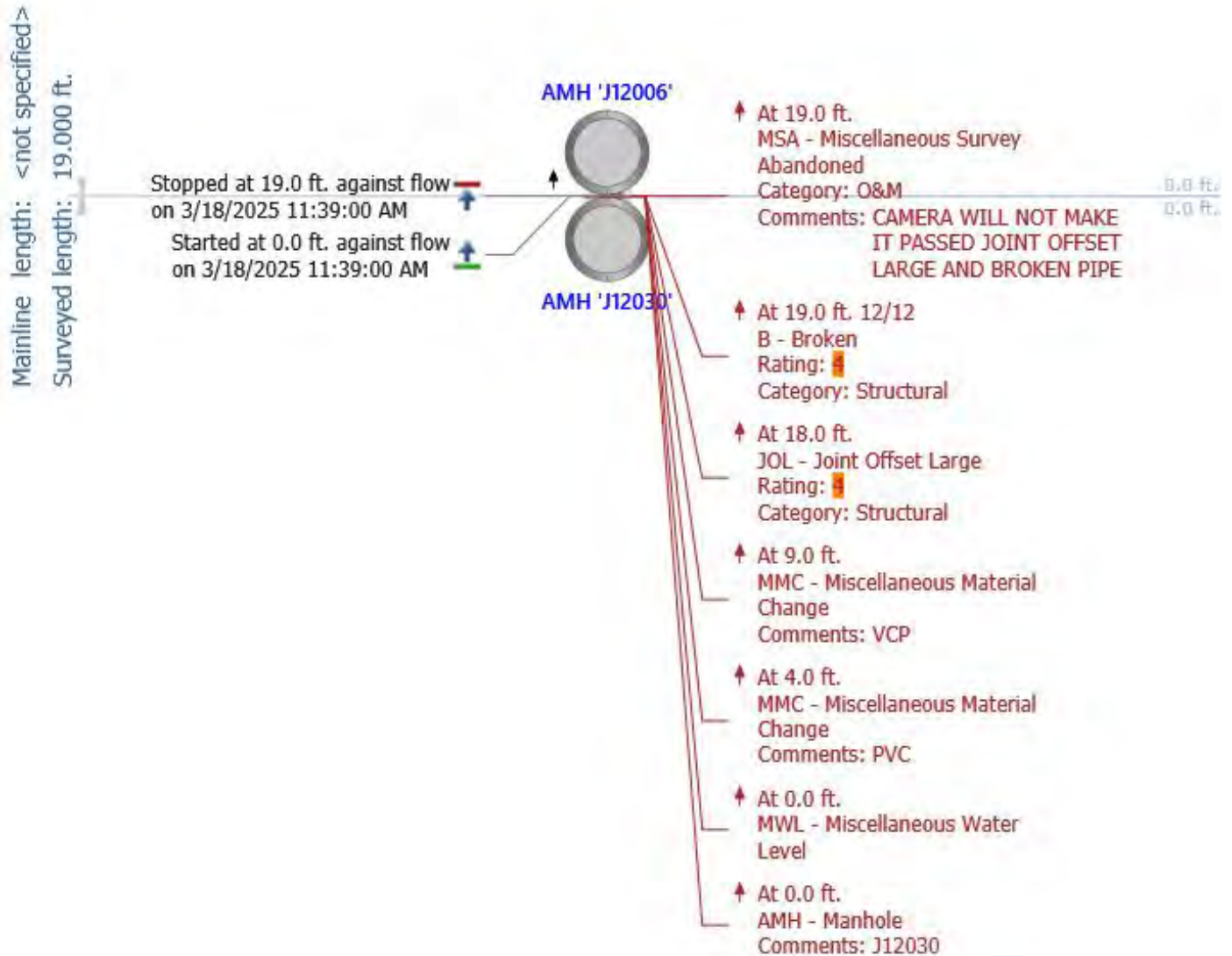
Weather:

1



Main Inspections Pipe Run with Images

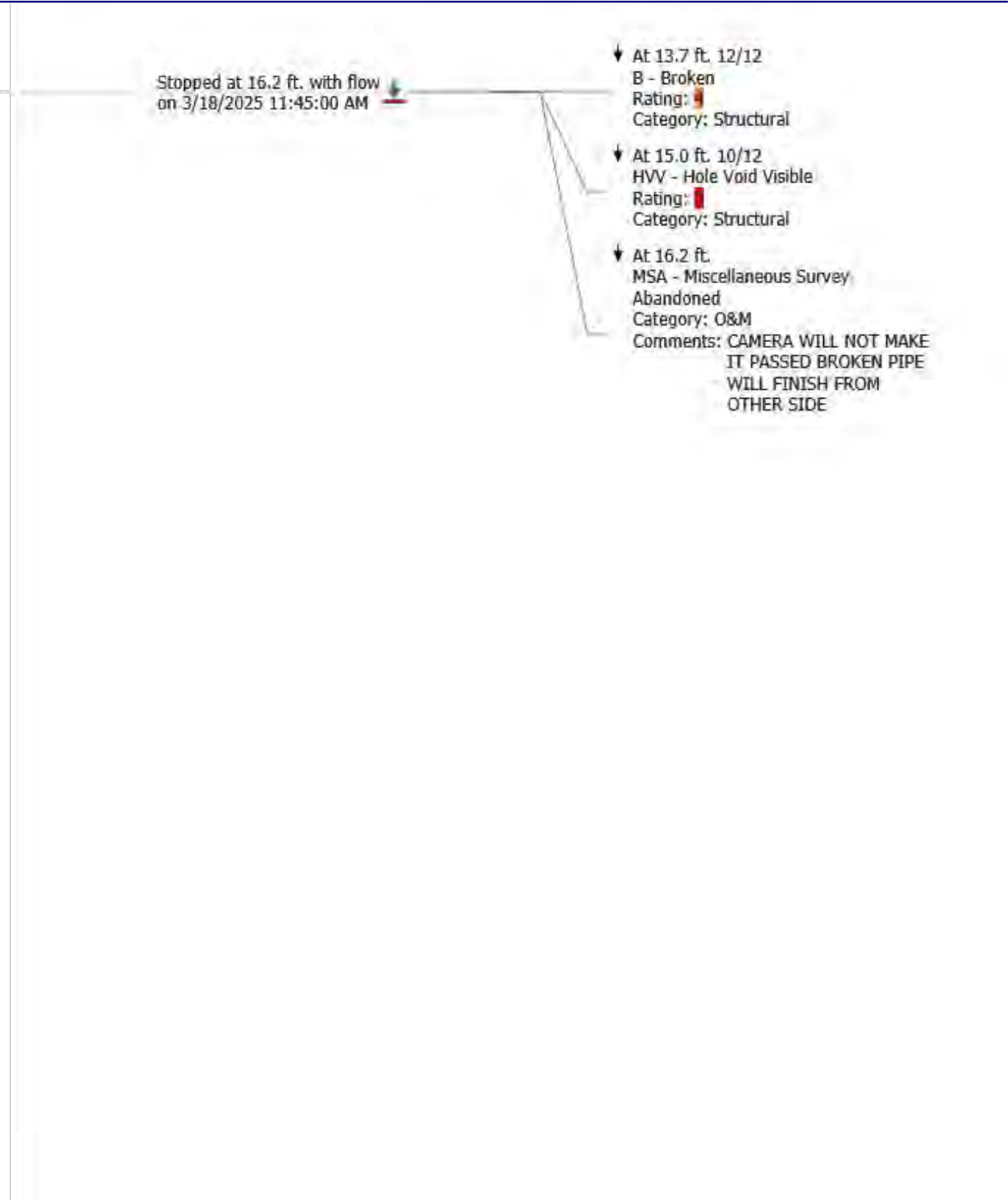
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12030 TO J12006	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 11:39 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Main Inspections Pipe Run with Images

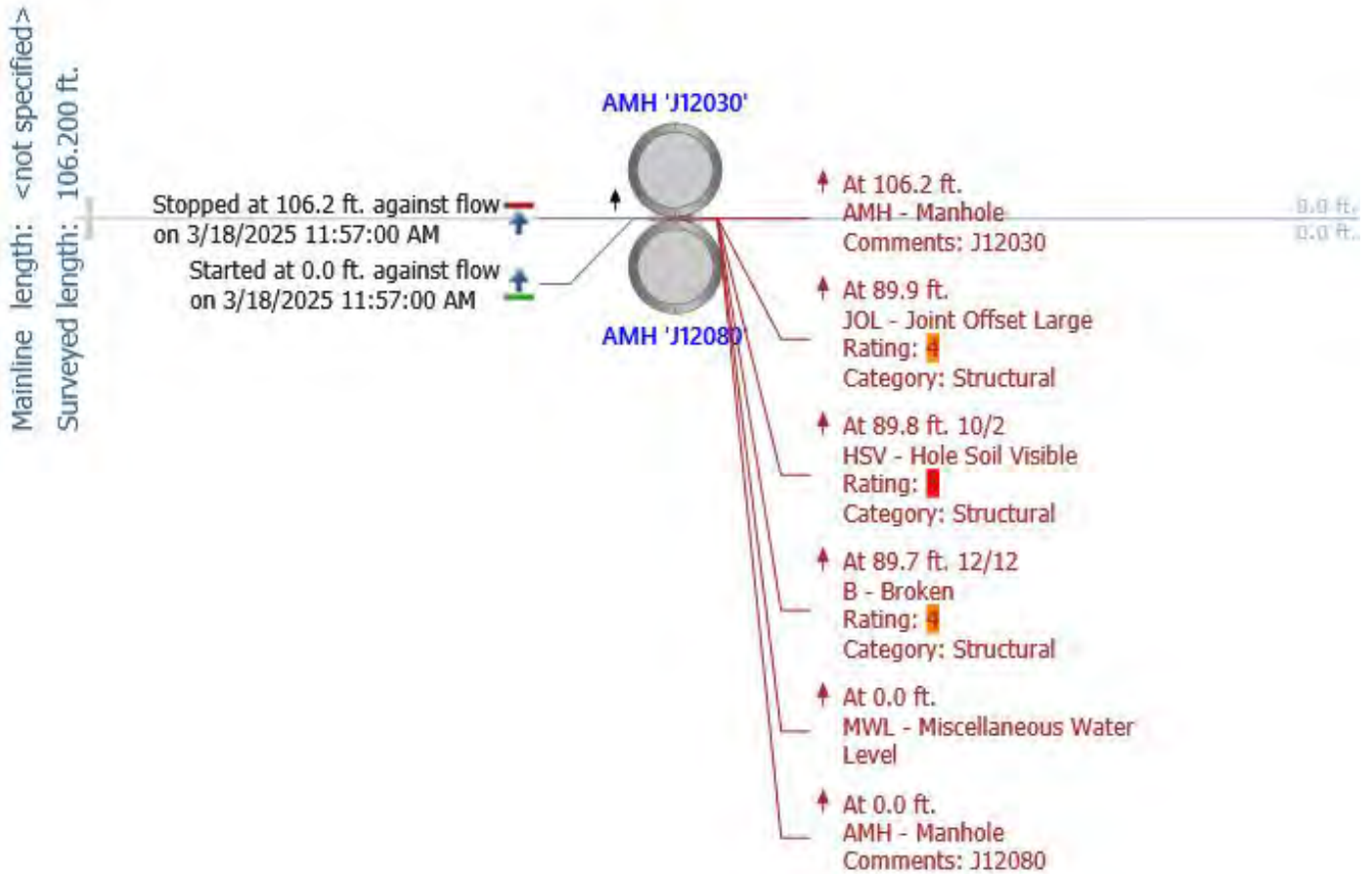
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12030 TO J12080	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 11:45 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





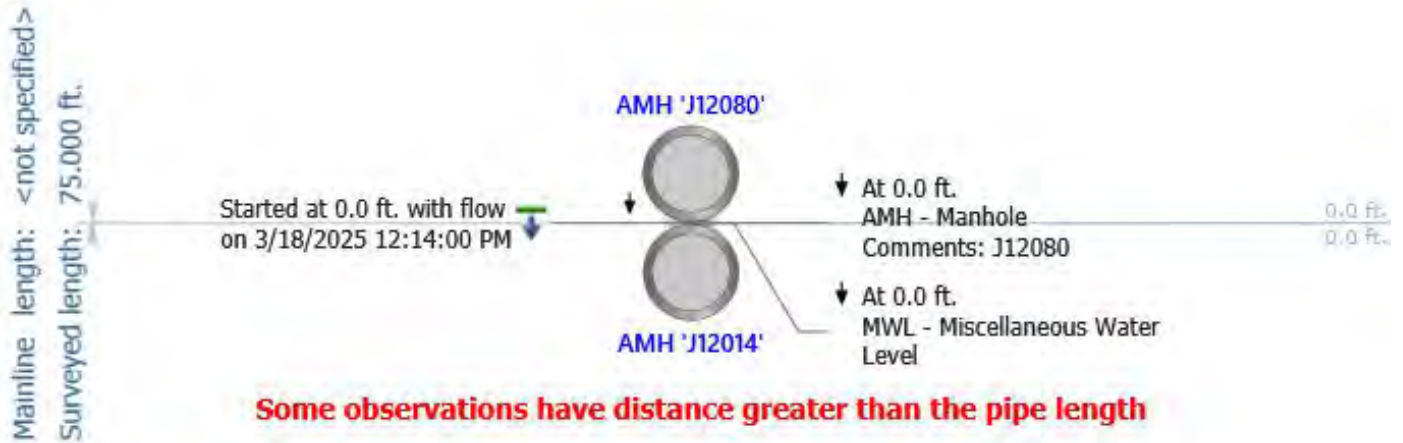
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12080 TO J12030	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 11:57 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



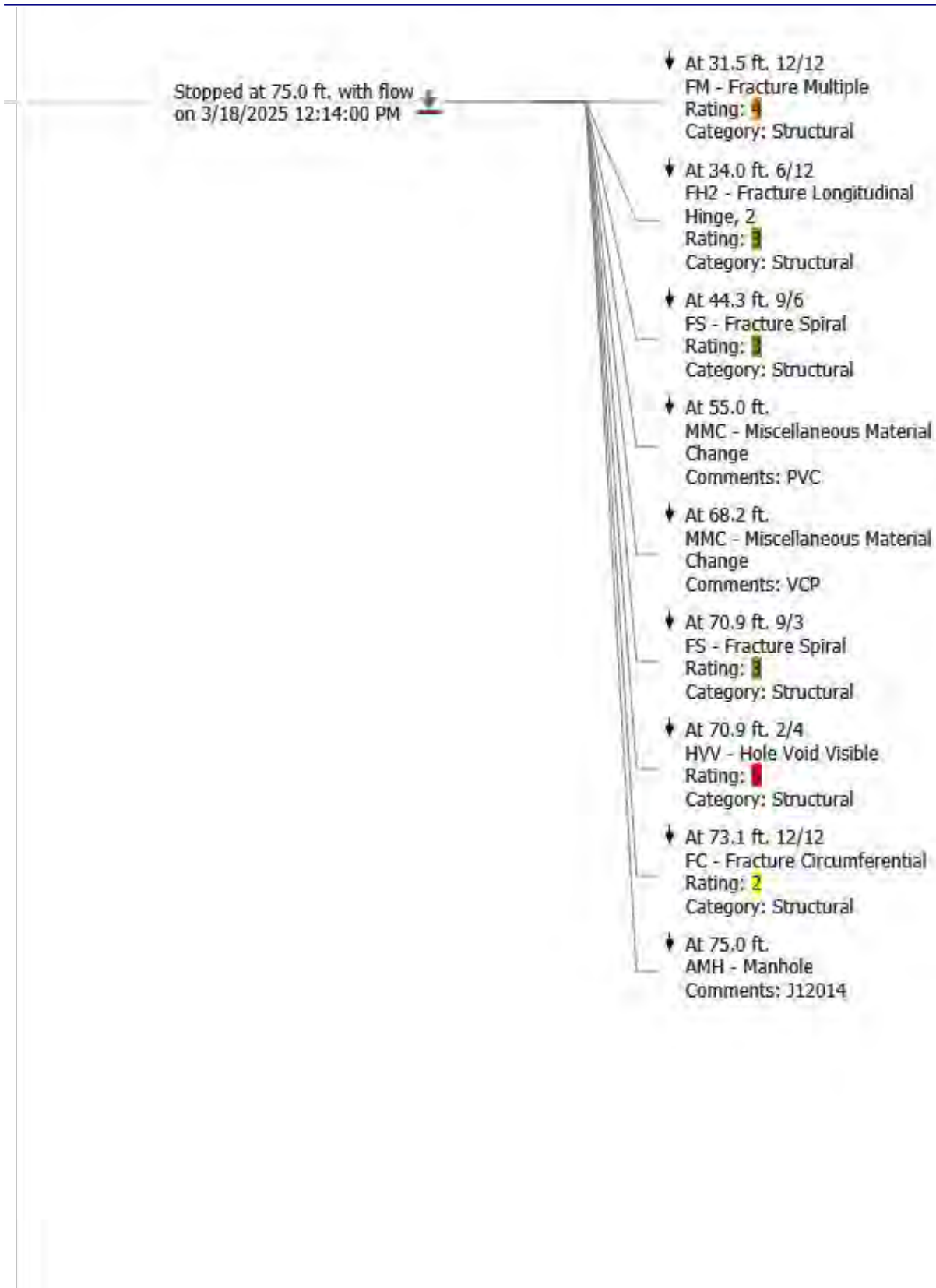
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12080 TO J12014	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 12:14 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



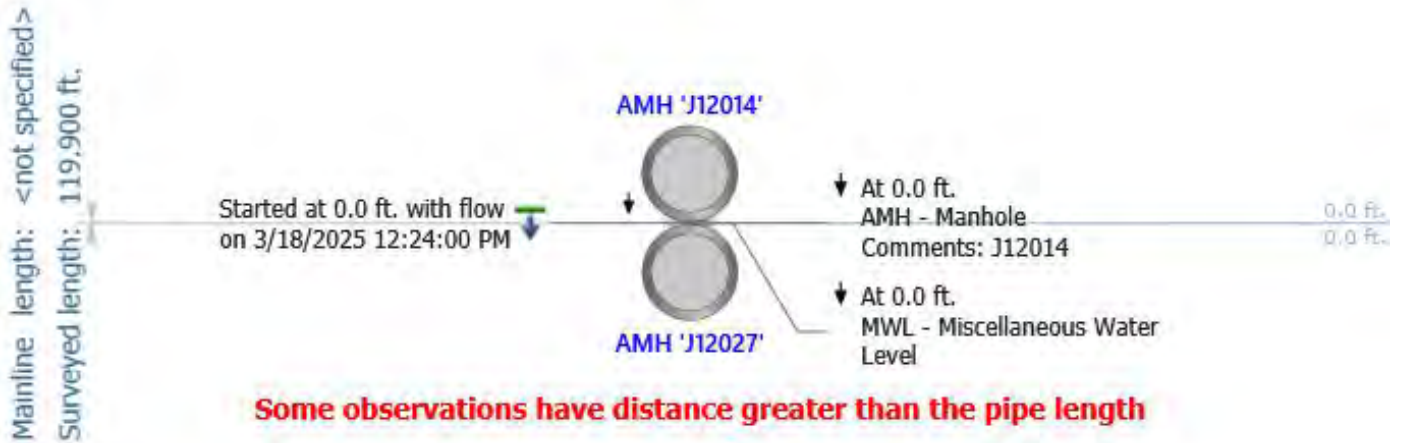
Weather:

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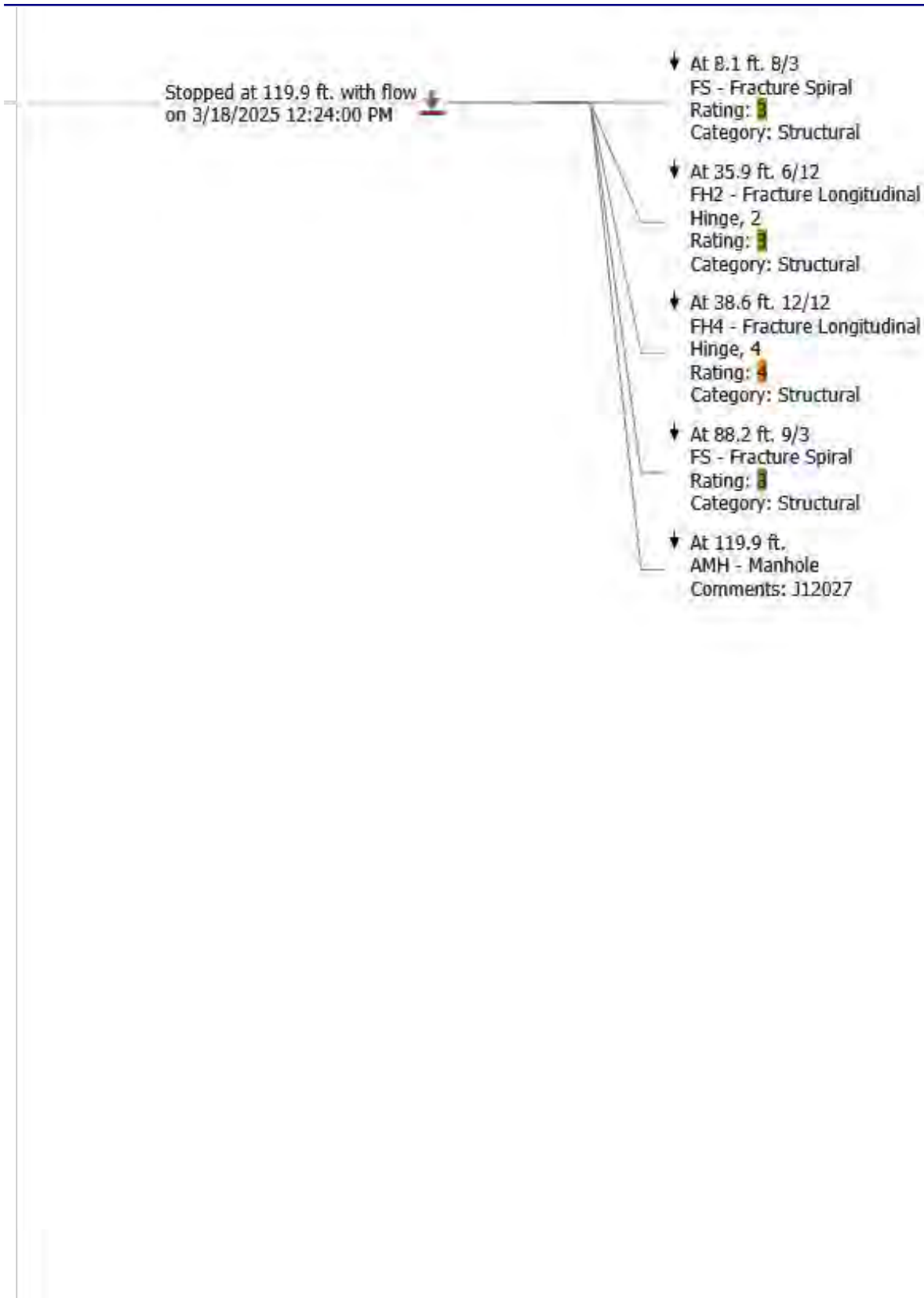
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12014 TO J12027	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 12:24 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



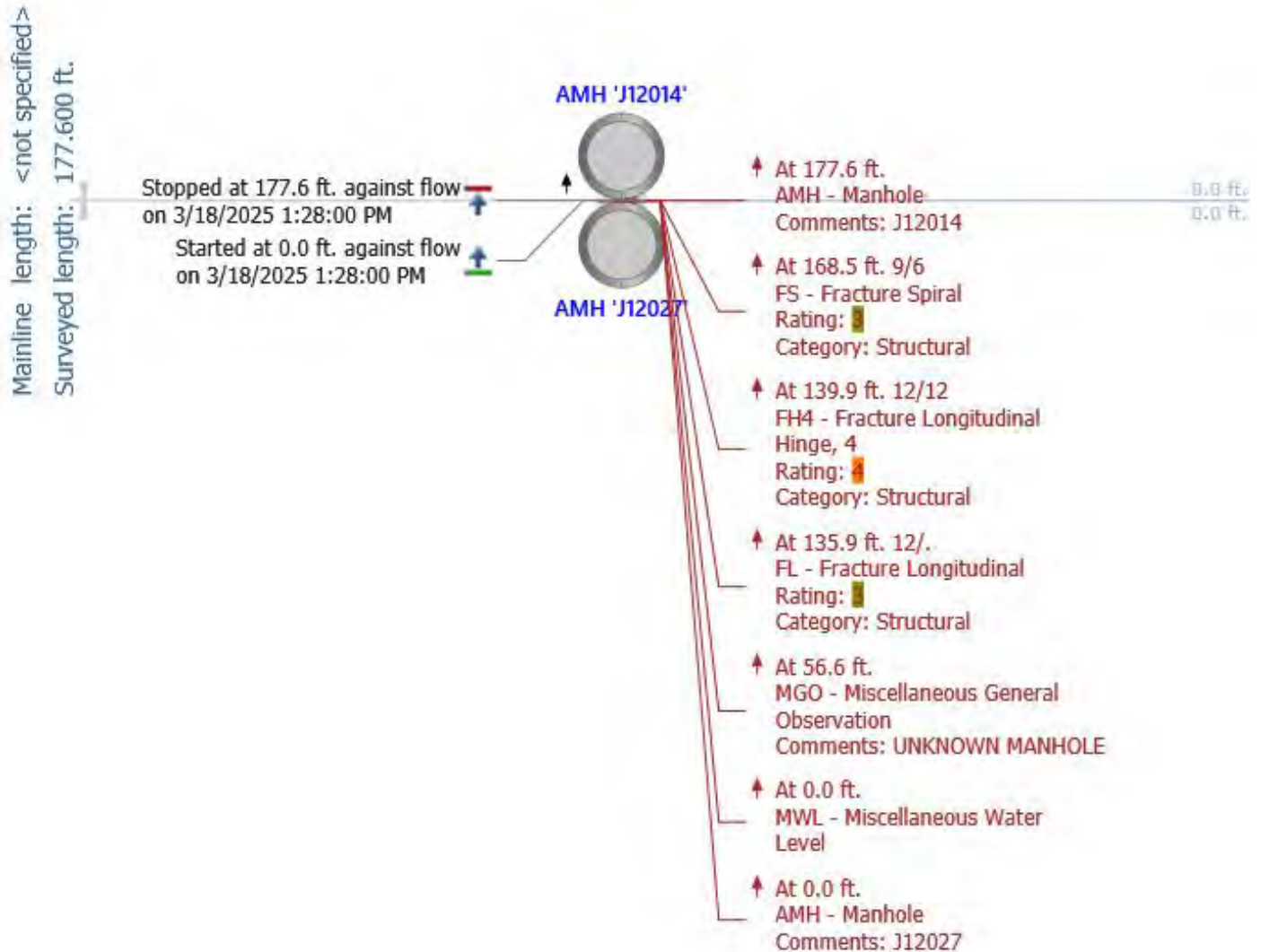
Weather:

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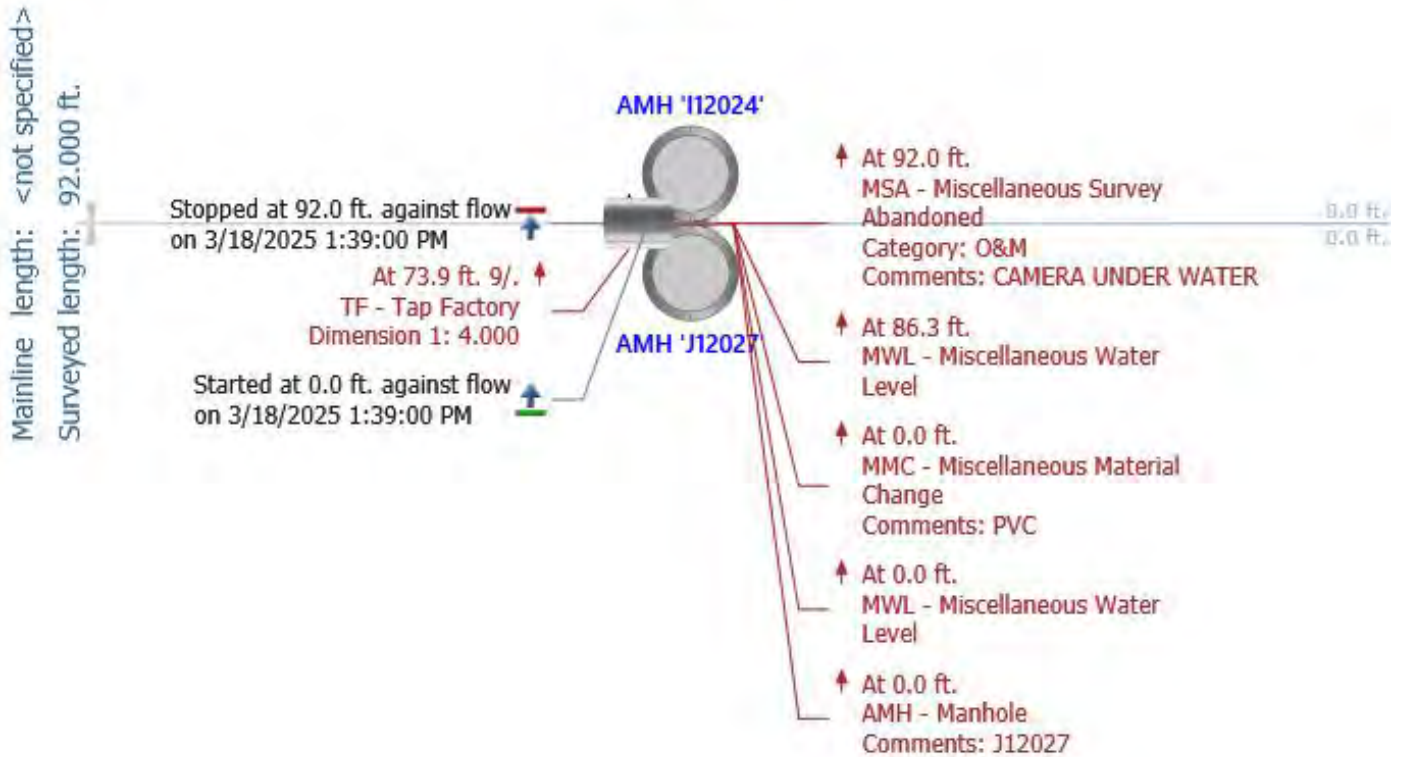
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12027 TO J12014	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 1:28 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



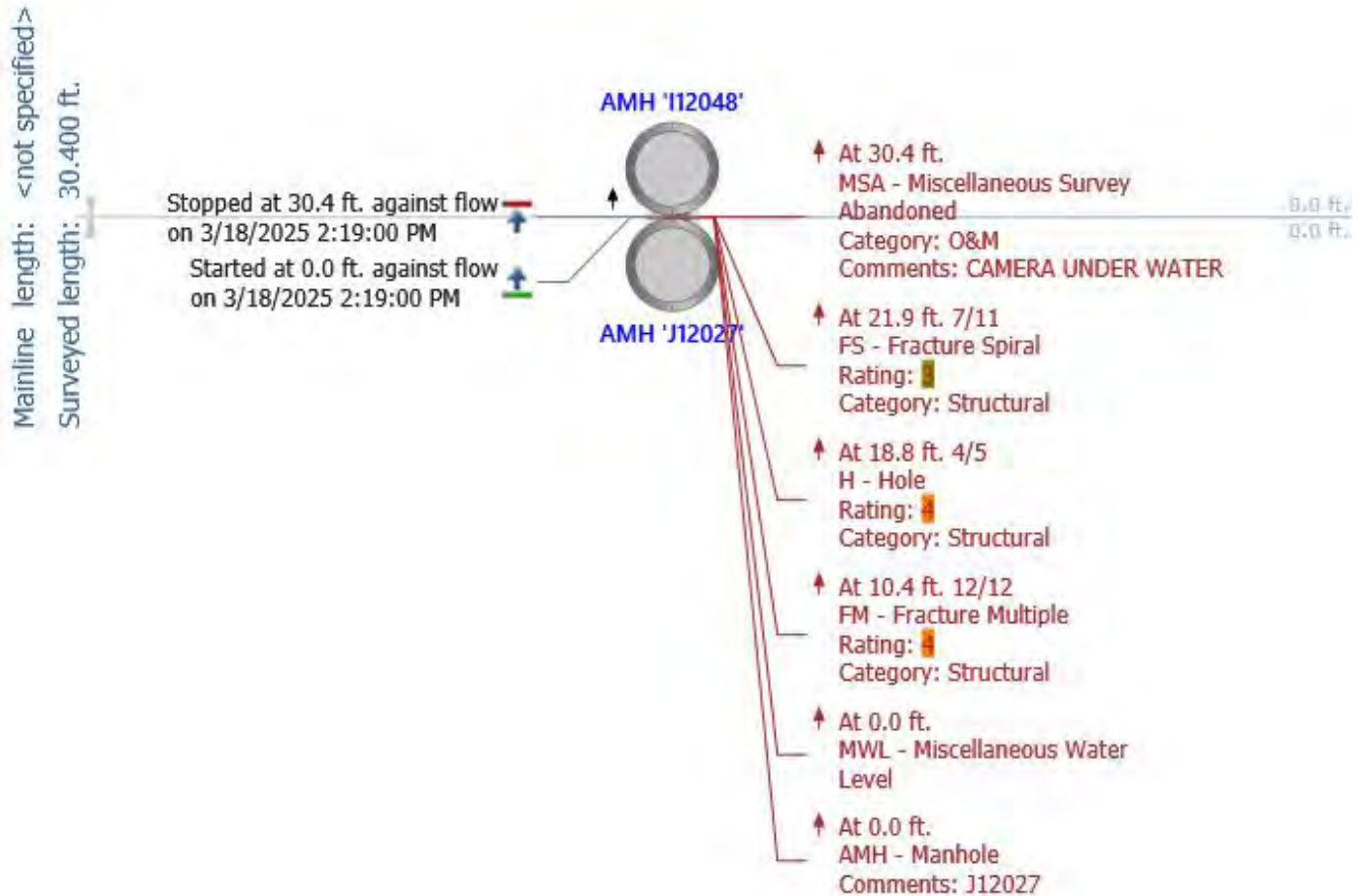
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12027 TO I12024	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 1:39 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



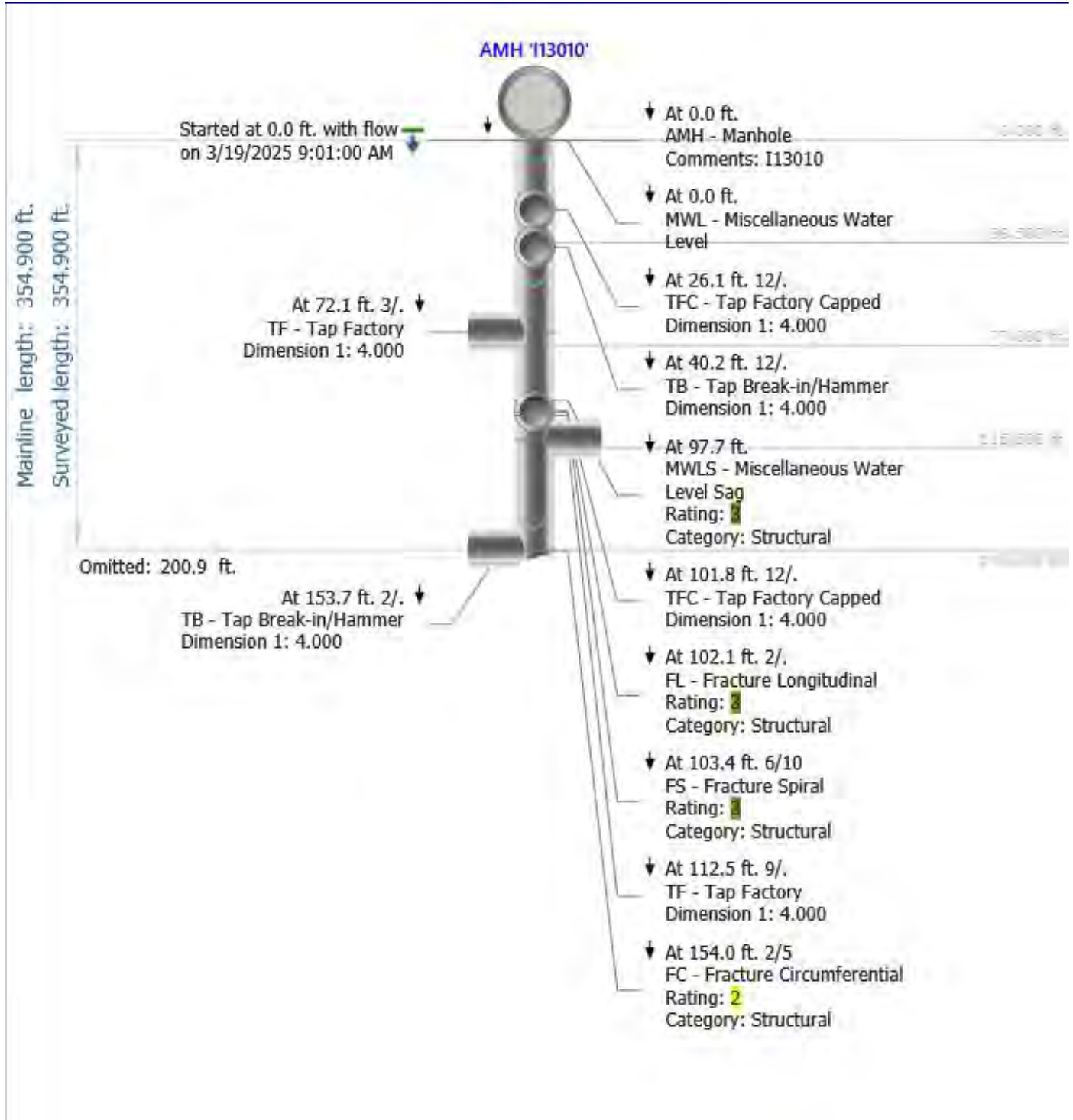
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12027 TO I12048	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/18/2025 2:19 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I13010-I13012	LINCOLN	EAST AVE
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 9:01 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

I13010-I13012

Start date/time:

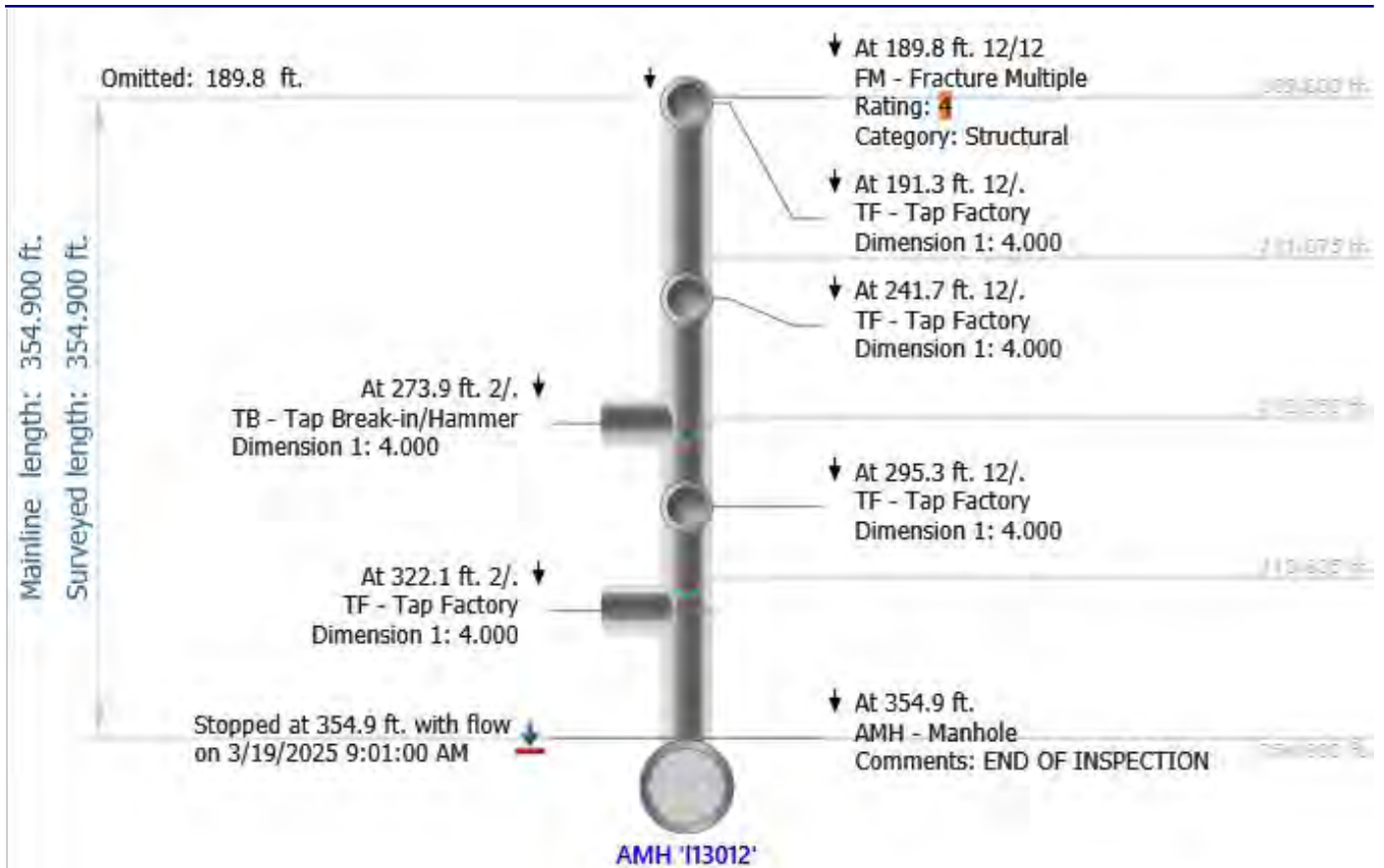
3/19/2025 9:01 AM

Direction:

D

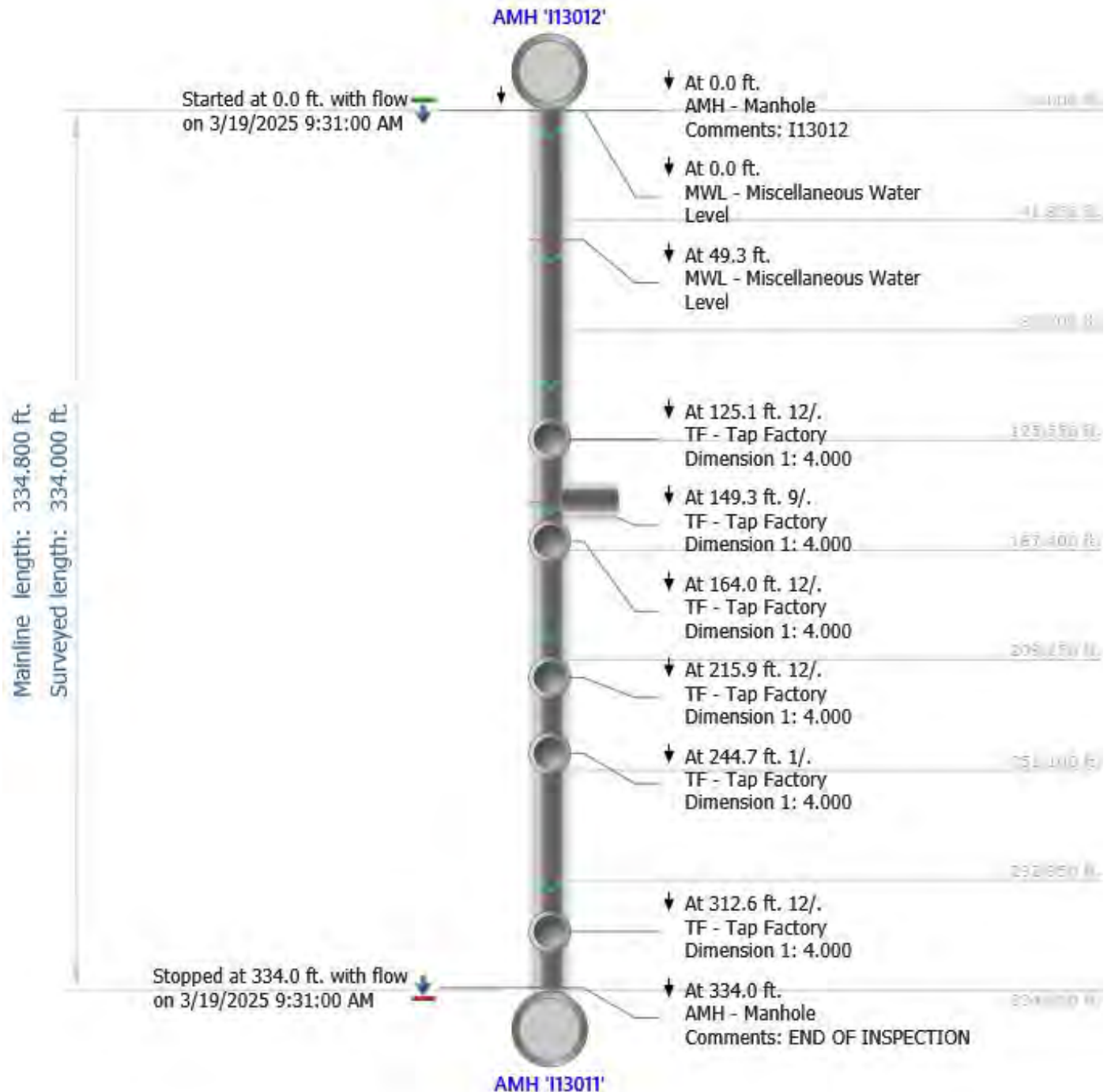
Weather:

1



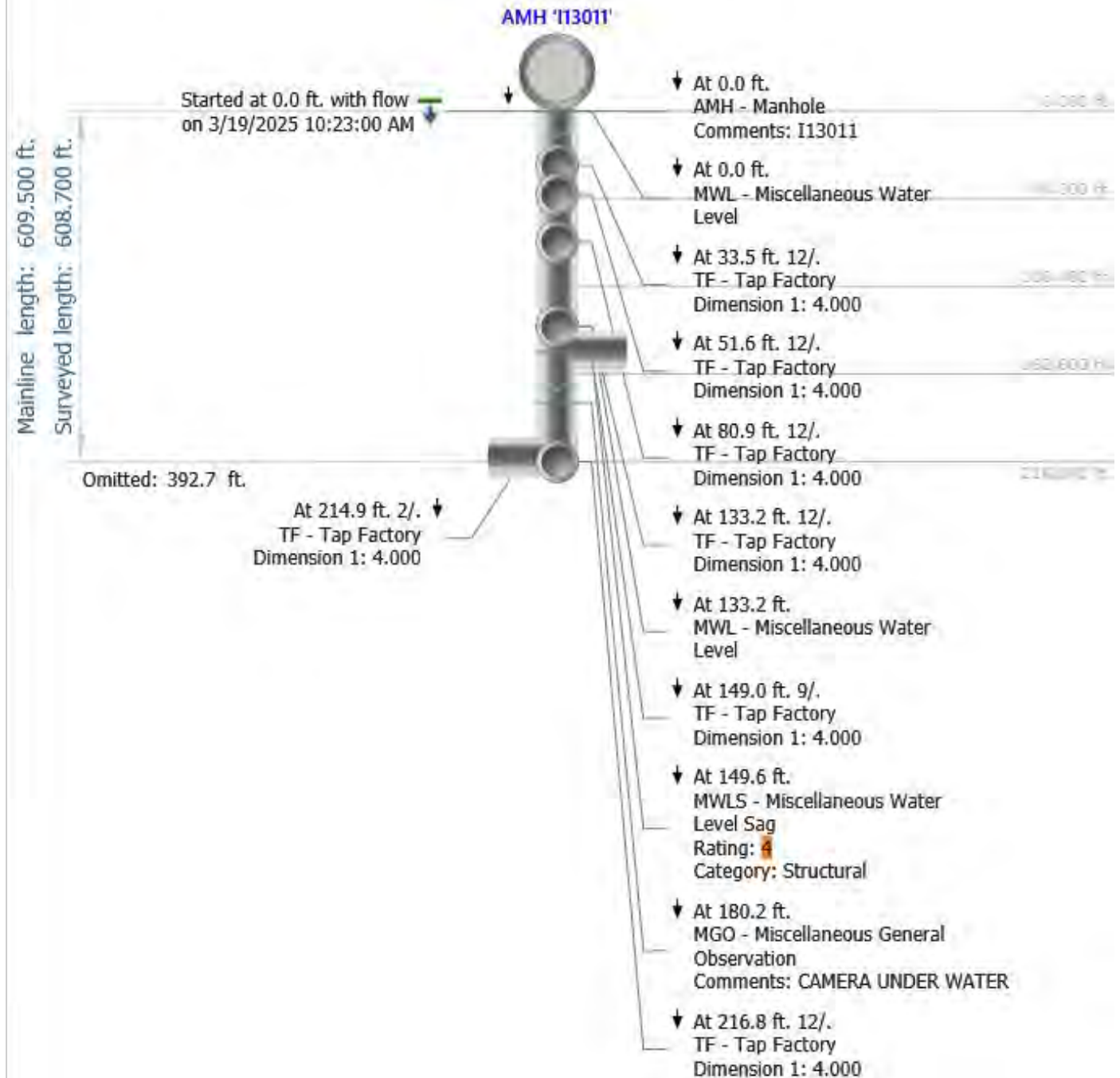
Main Inspections Pipe Run with Images

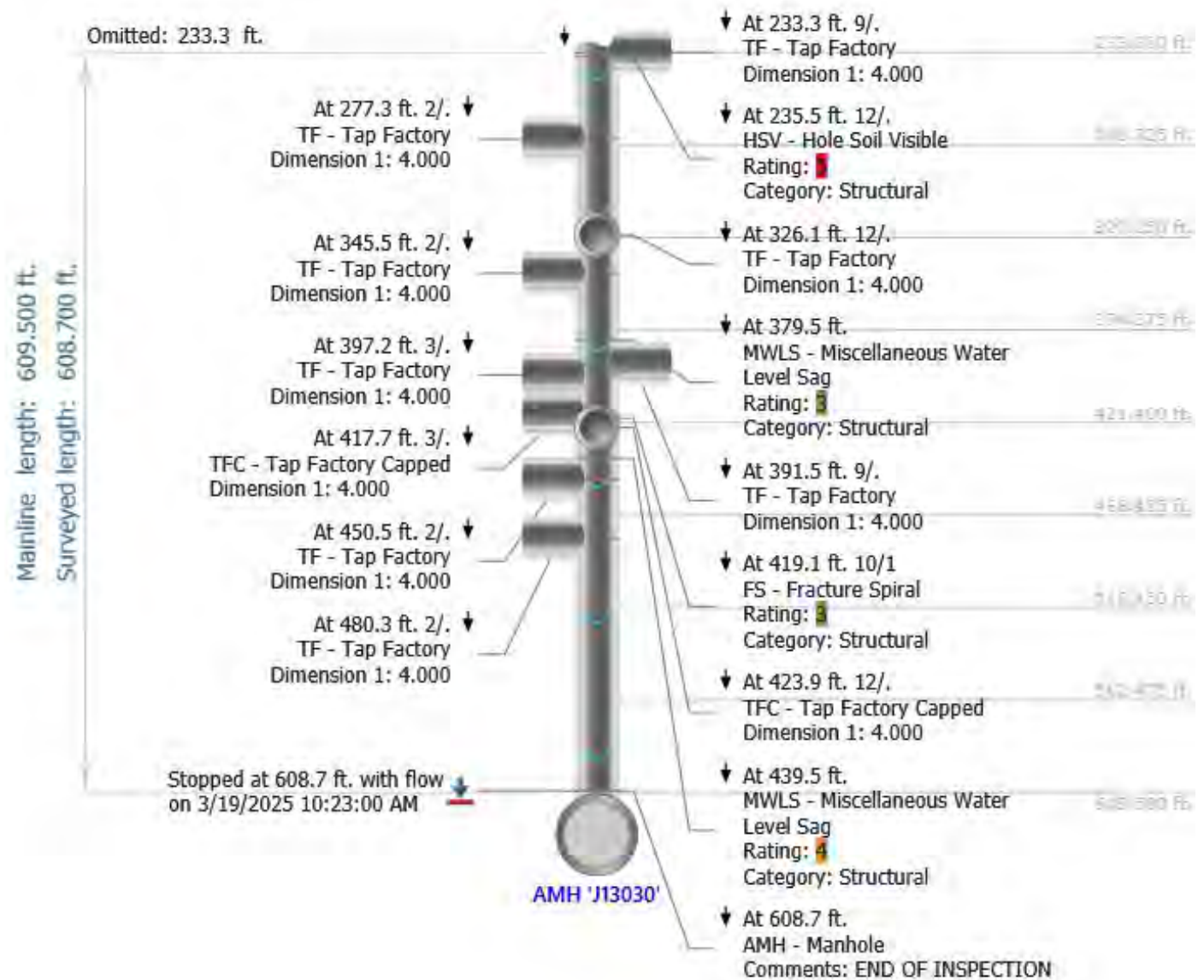
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I13012-I13011	LINCOLN	EAST AVE
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 9:31 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



Main Inspections Pipe Run with Images

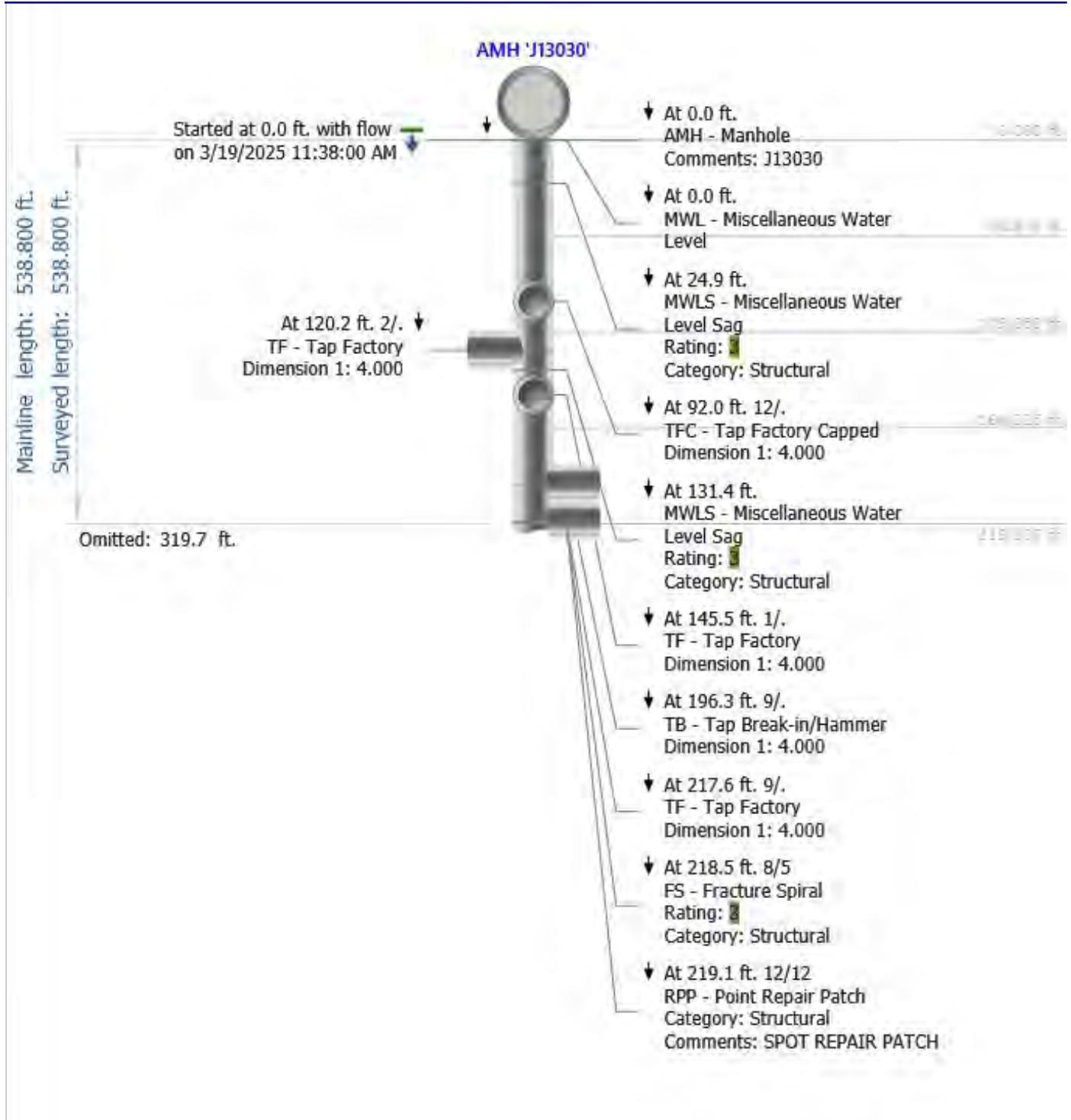
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I13011-J13030	LINCOLN	EAST AVE
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 10:23 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	





Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13030-J13005	LINCOLN	EAST AVE
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 11:38 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J13030-J13005

Start date/time:

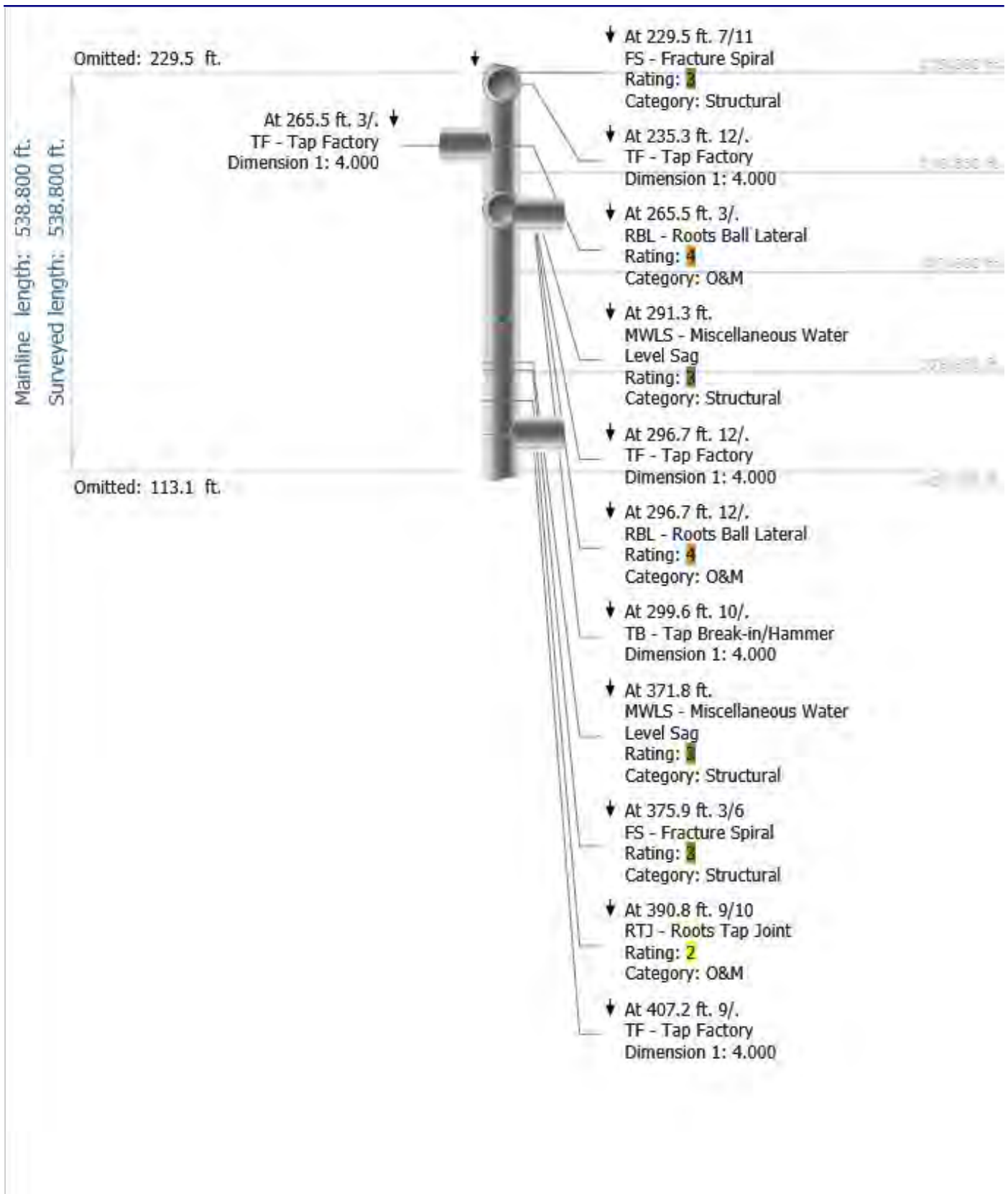
3/19/2025 11:38 AM

Direction:

D

Weather:

1



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J13030-J13005

Start date/time:

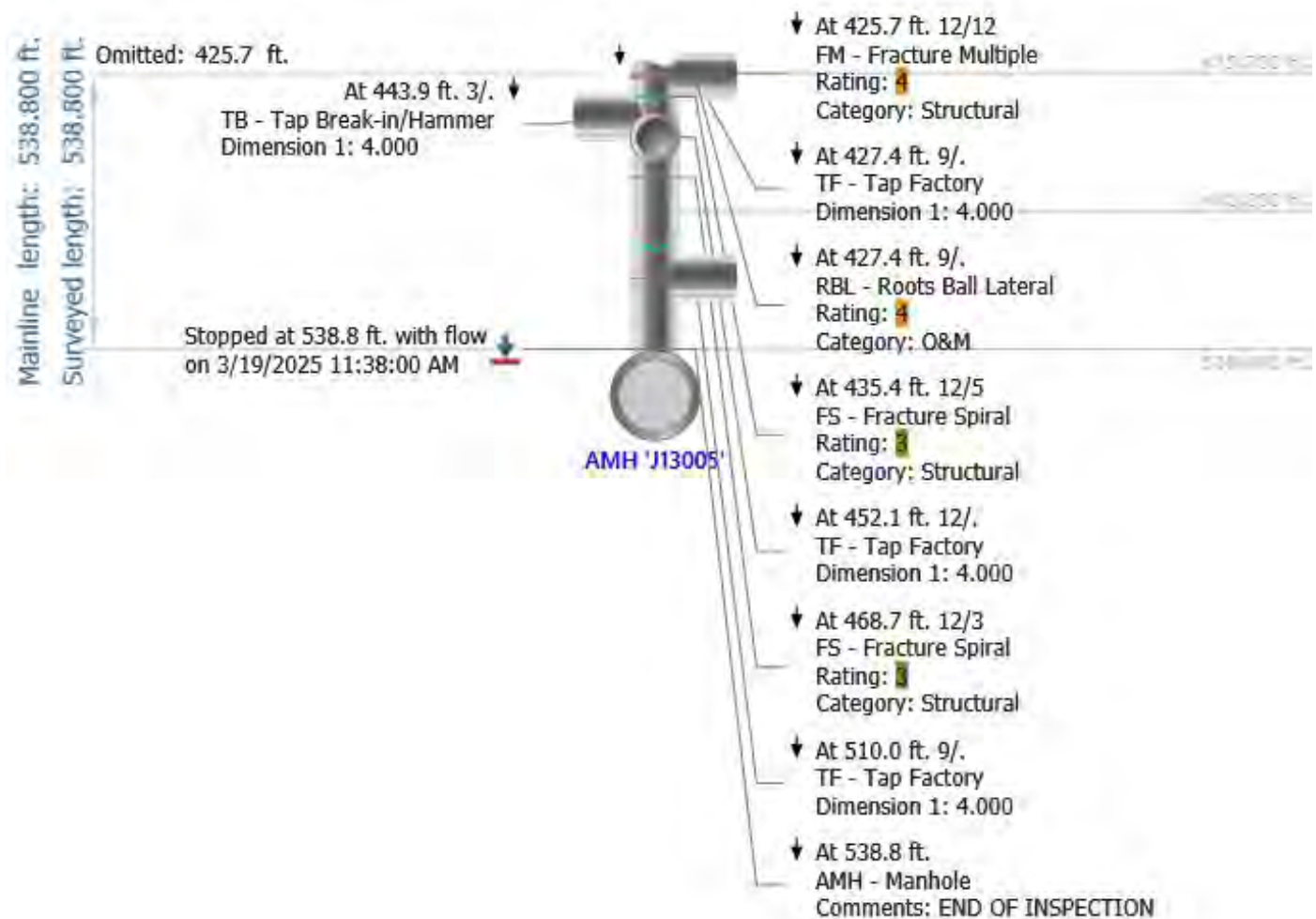
3/19/2025 11:38 AM

Direction:

D

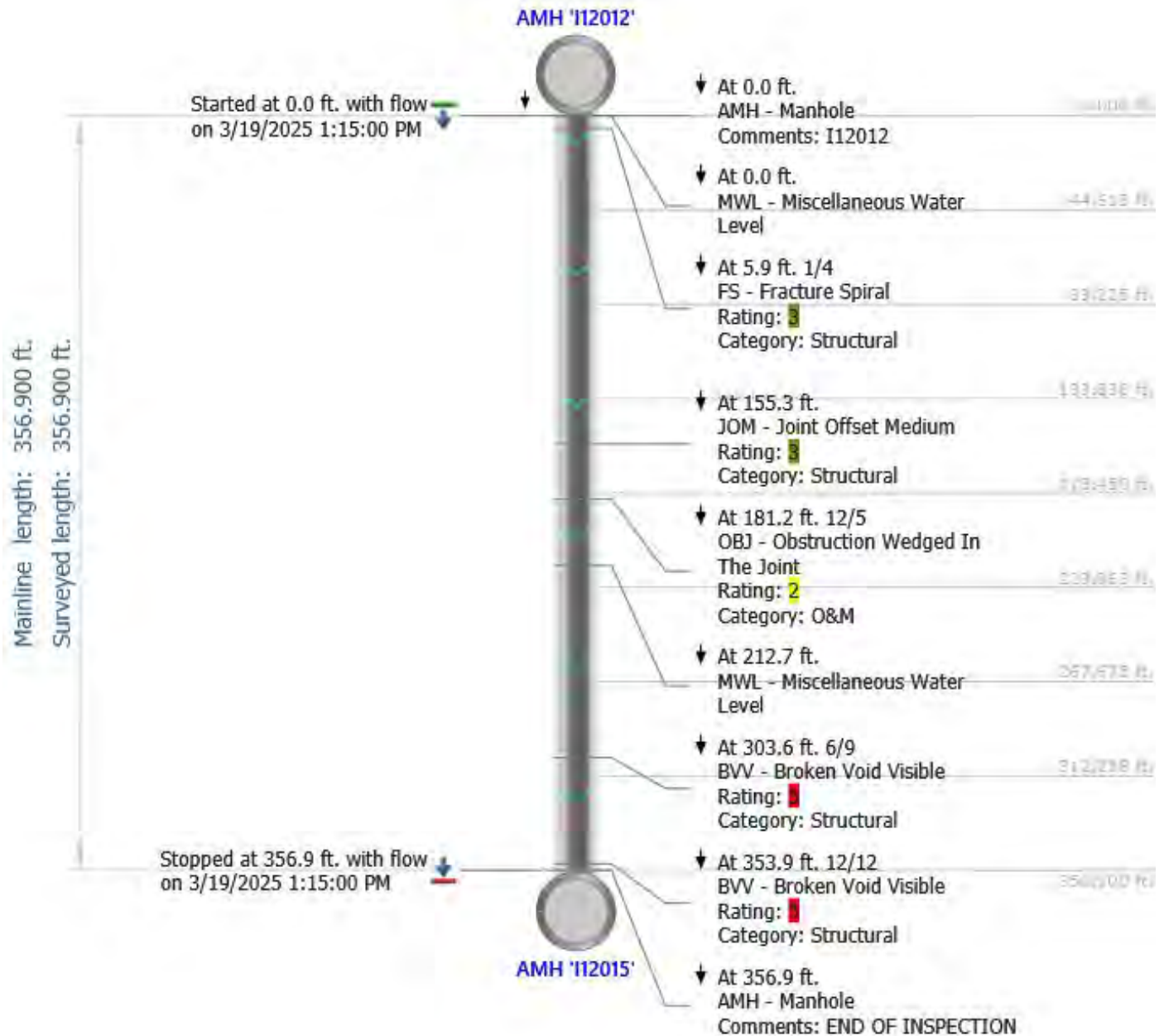
Weather:

1



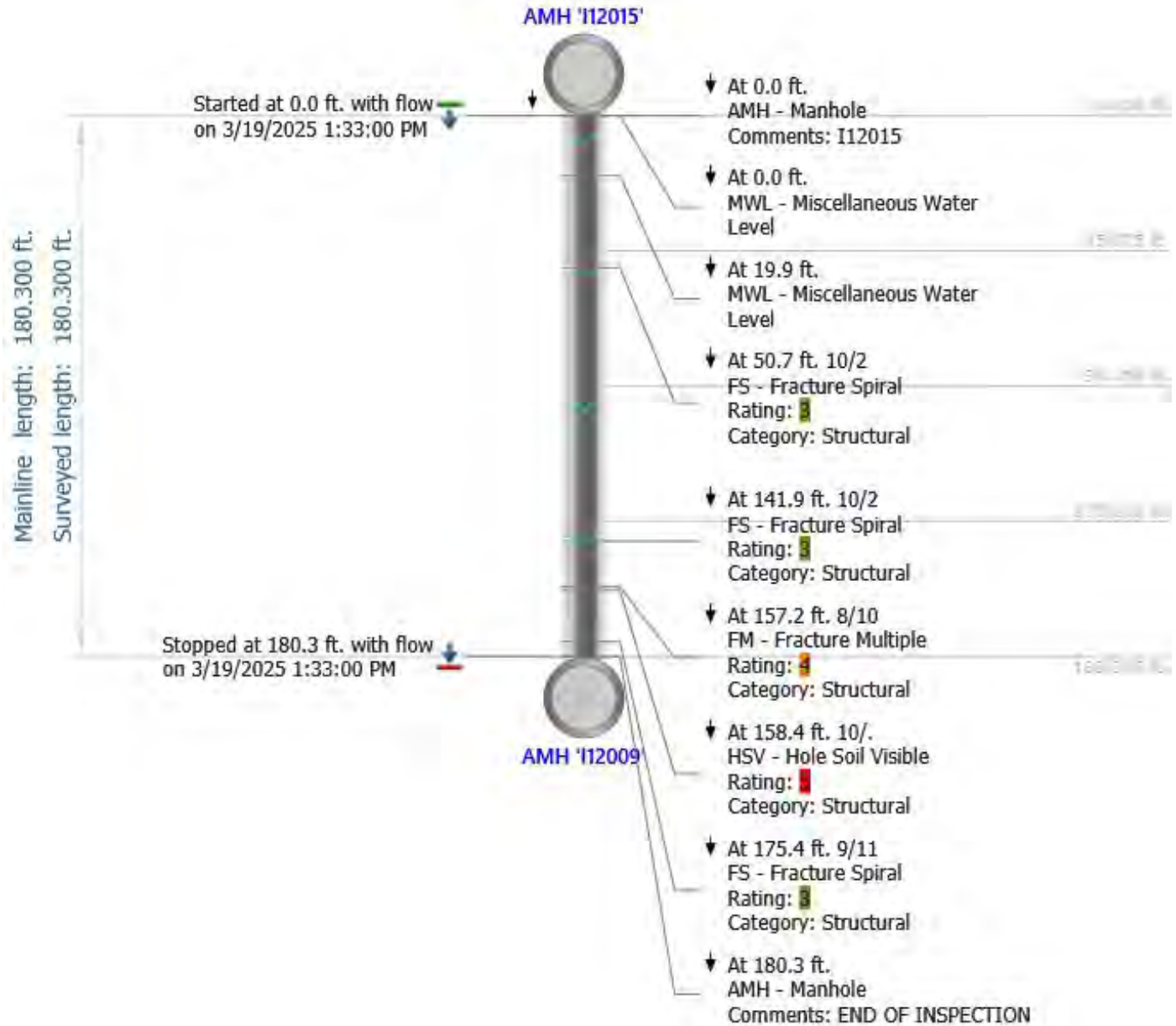
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12012-I12015	LINCOLN	7TH ST
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 1:15 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



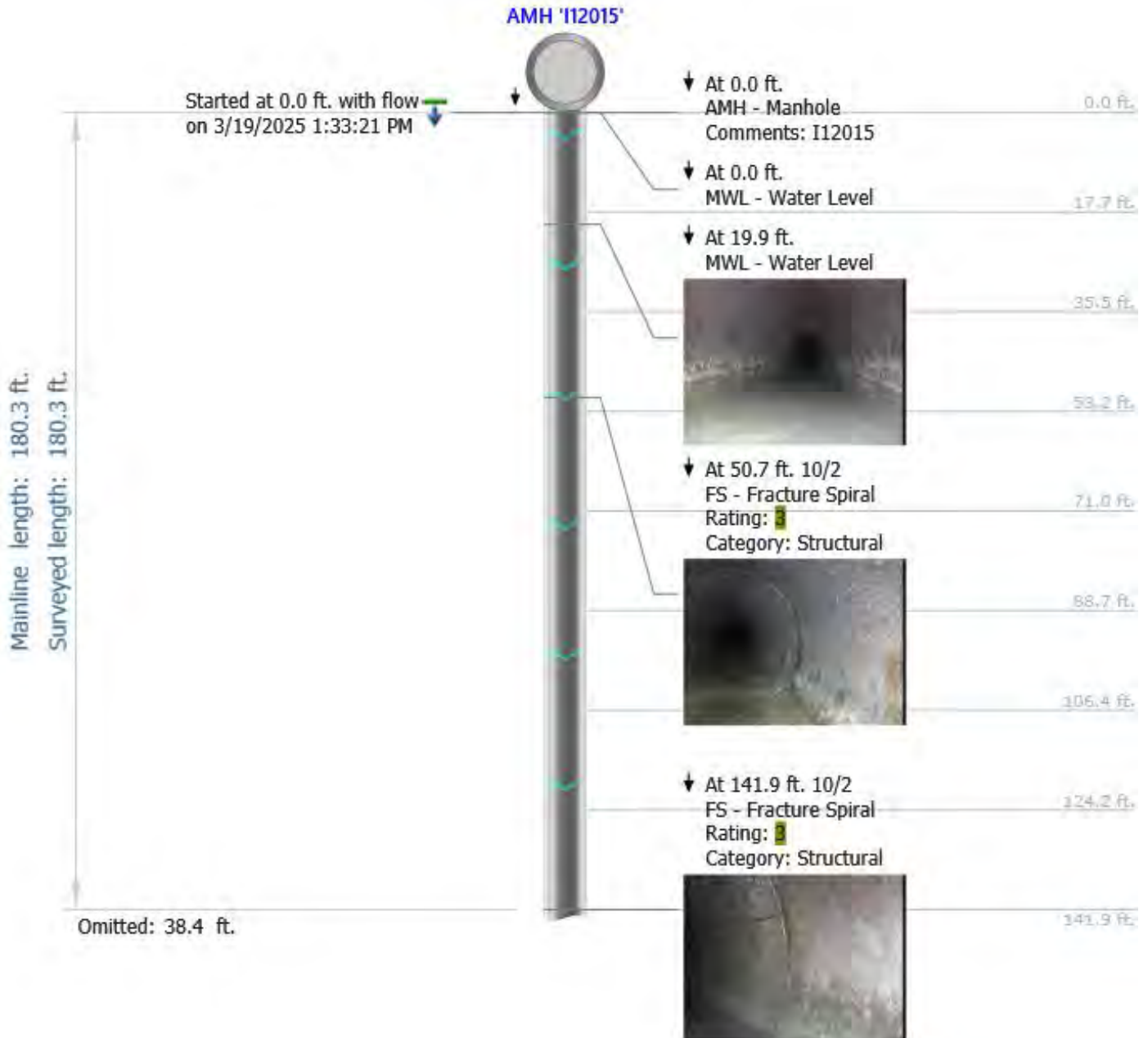
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12015-I12009	LINCOLN	7TH ST
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 1:33 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12015-I12009	LINCOLN	7TH ST
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 1:33 PM	D	1	
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

I12015-I12009

Start date/time:

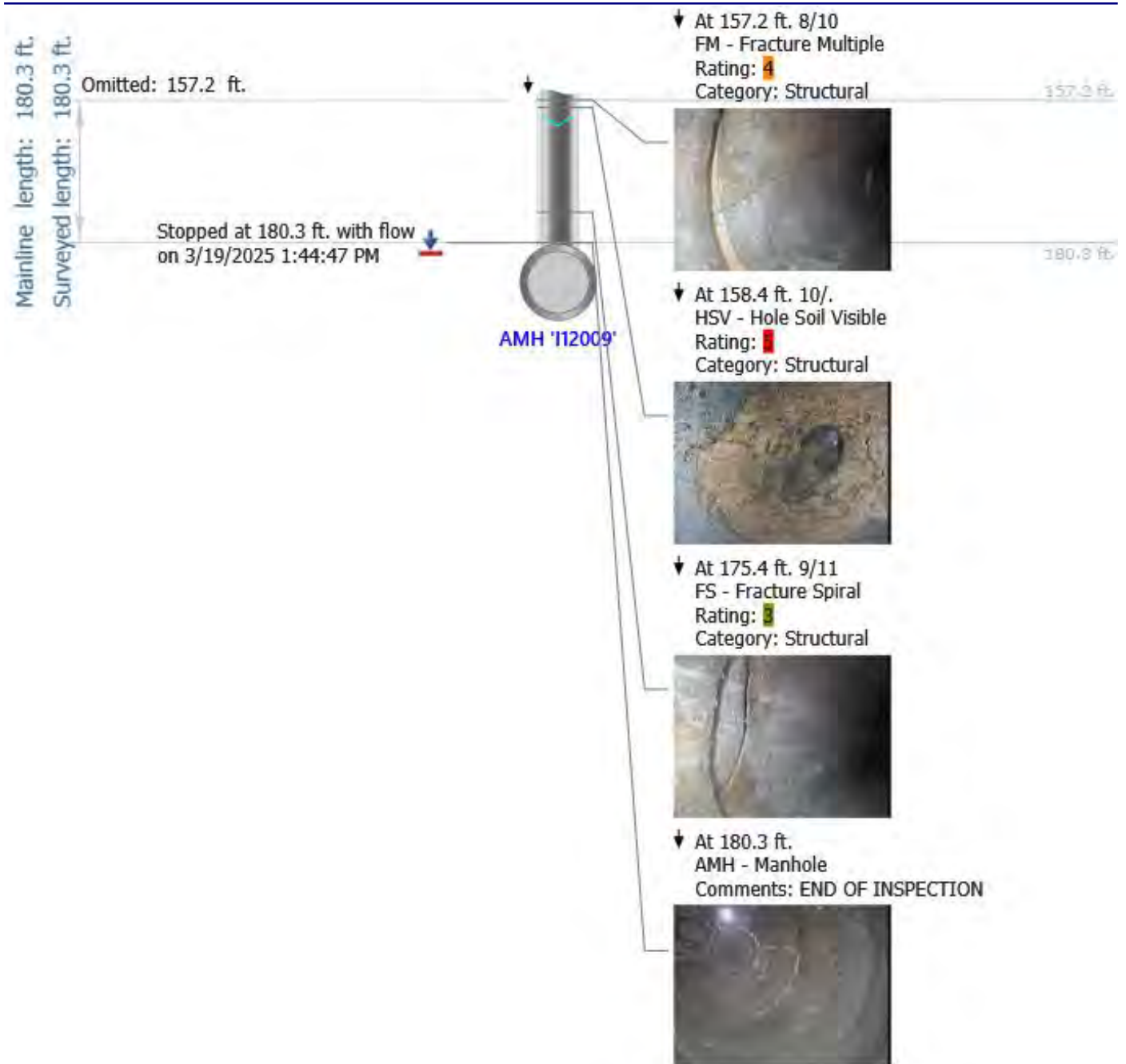
3/19/2025 1:33 PM

Direction:

D

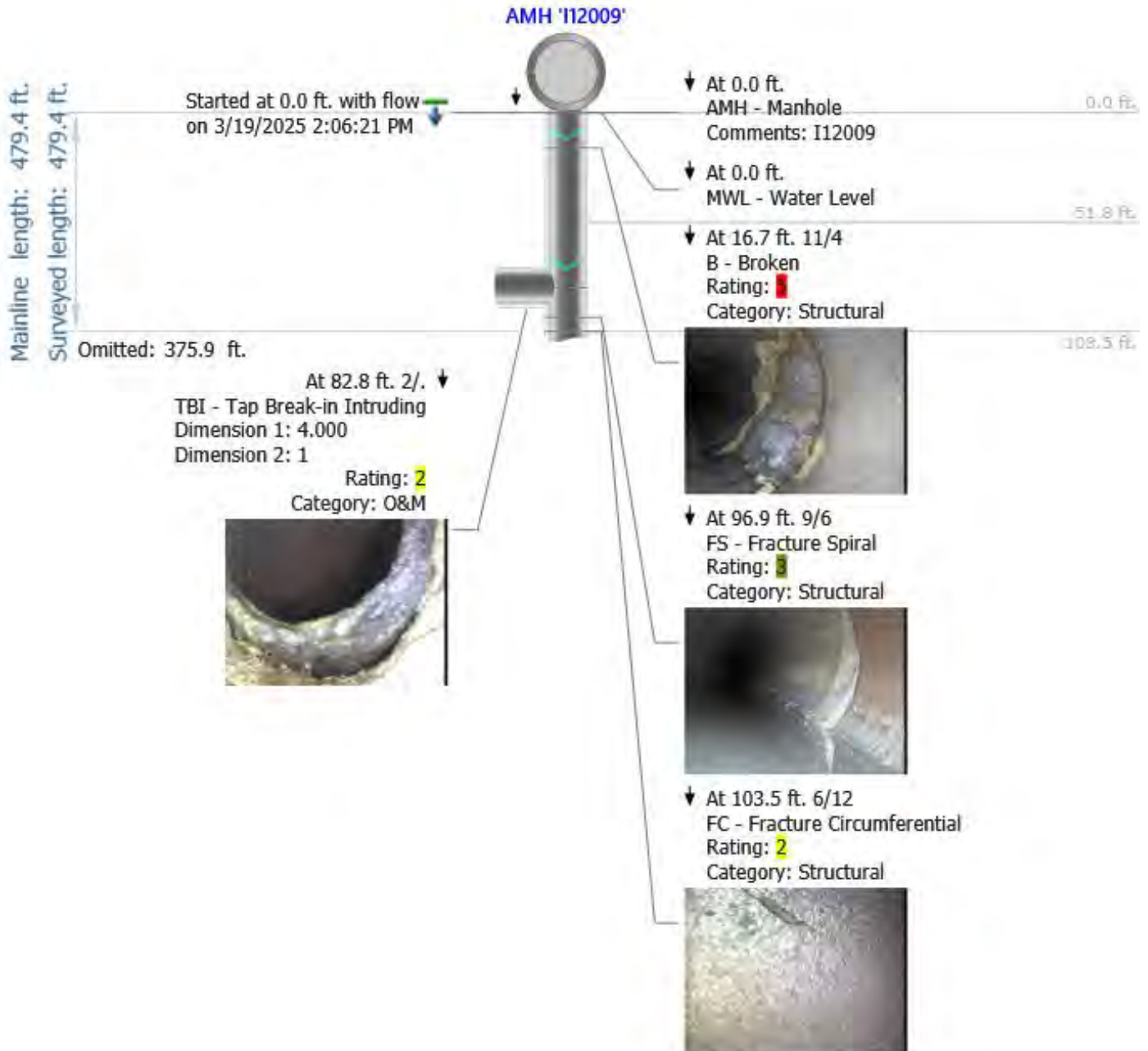
Weather:

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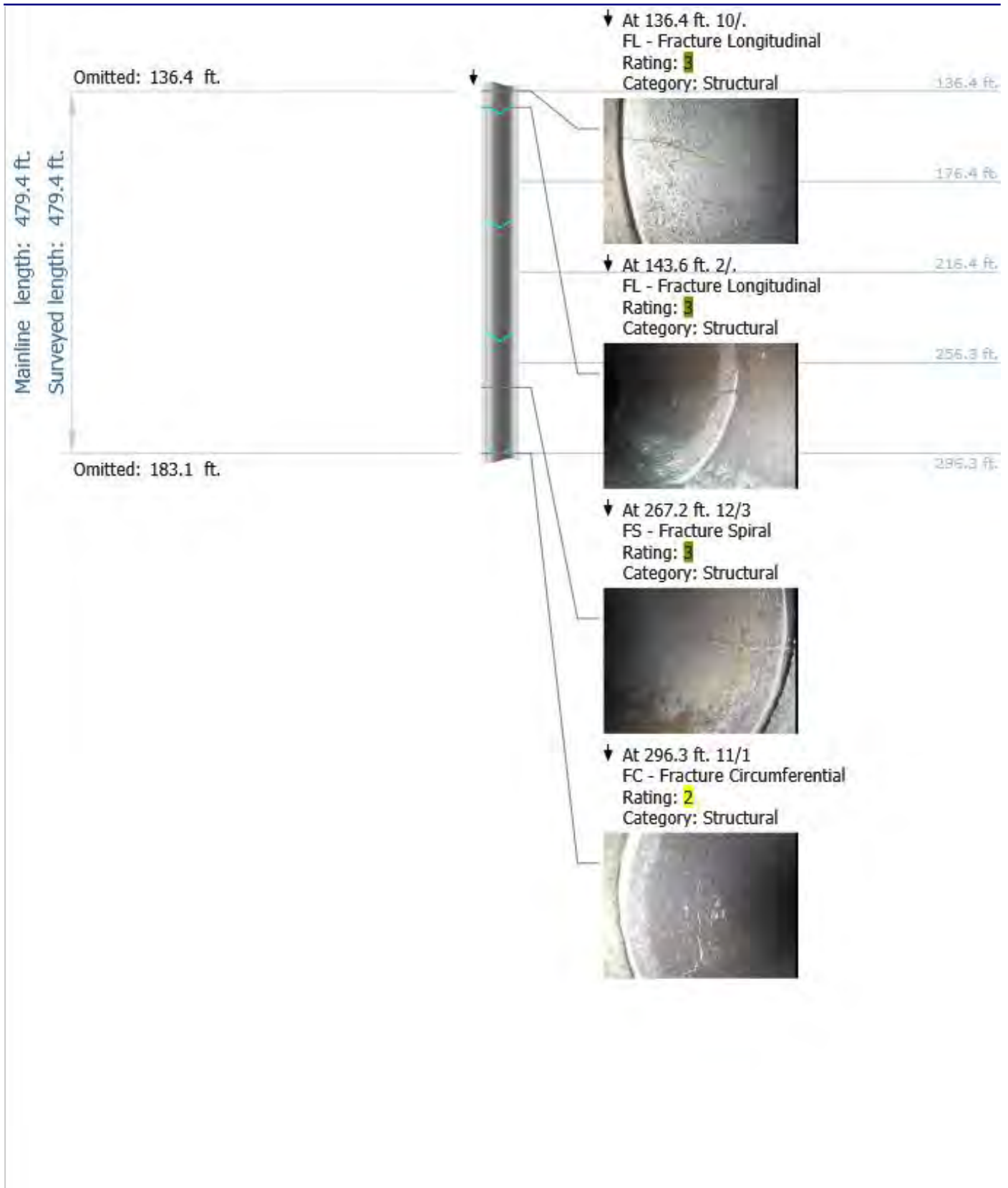
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12009-J12017	LINCOLN	J ST
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 2:06 PM	D	1	
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



Weather:

1



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

I12009-J12017

Start date/time:

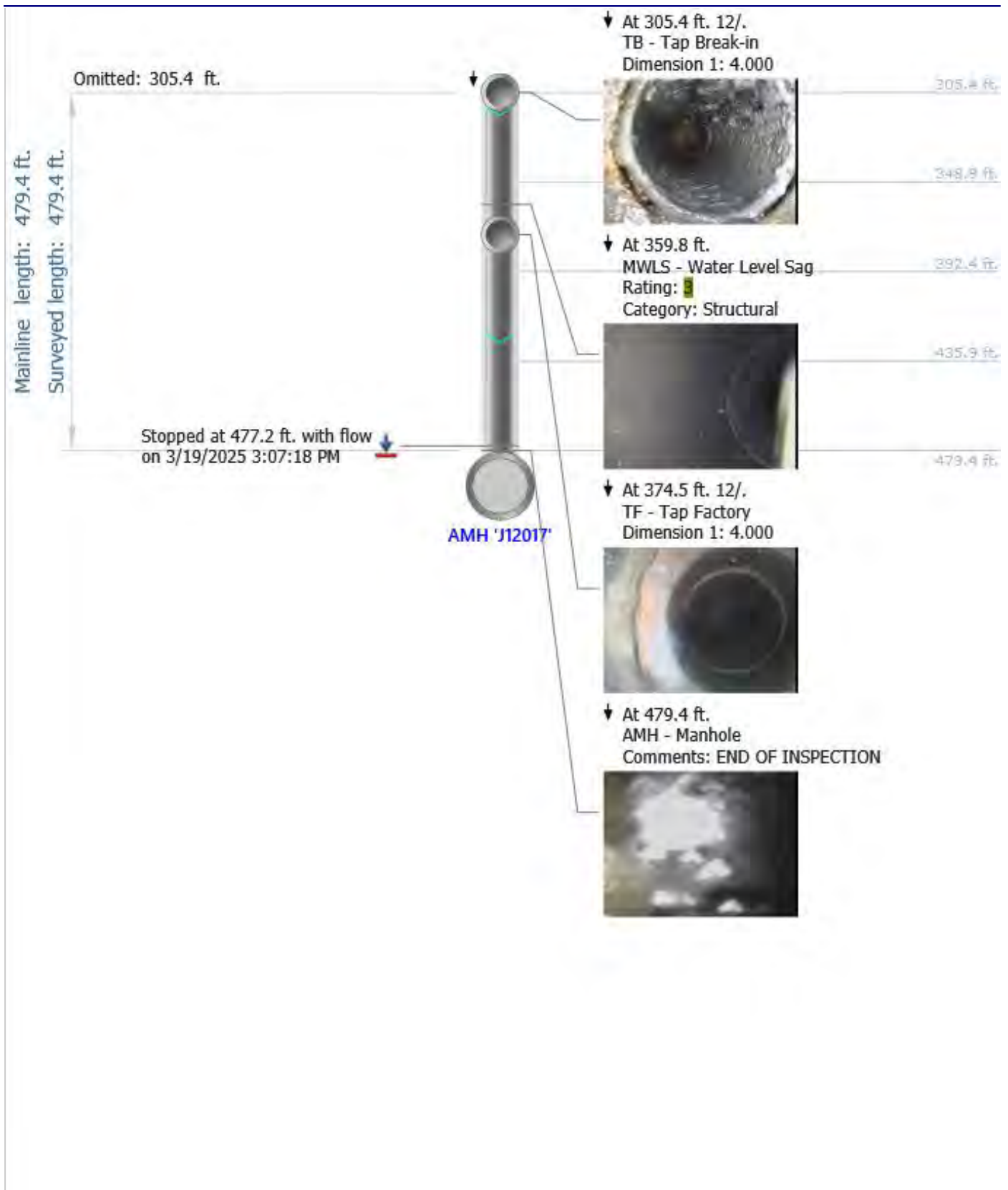
3/19/2025 2:06 PM

Direction:

D

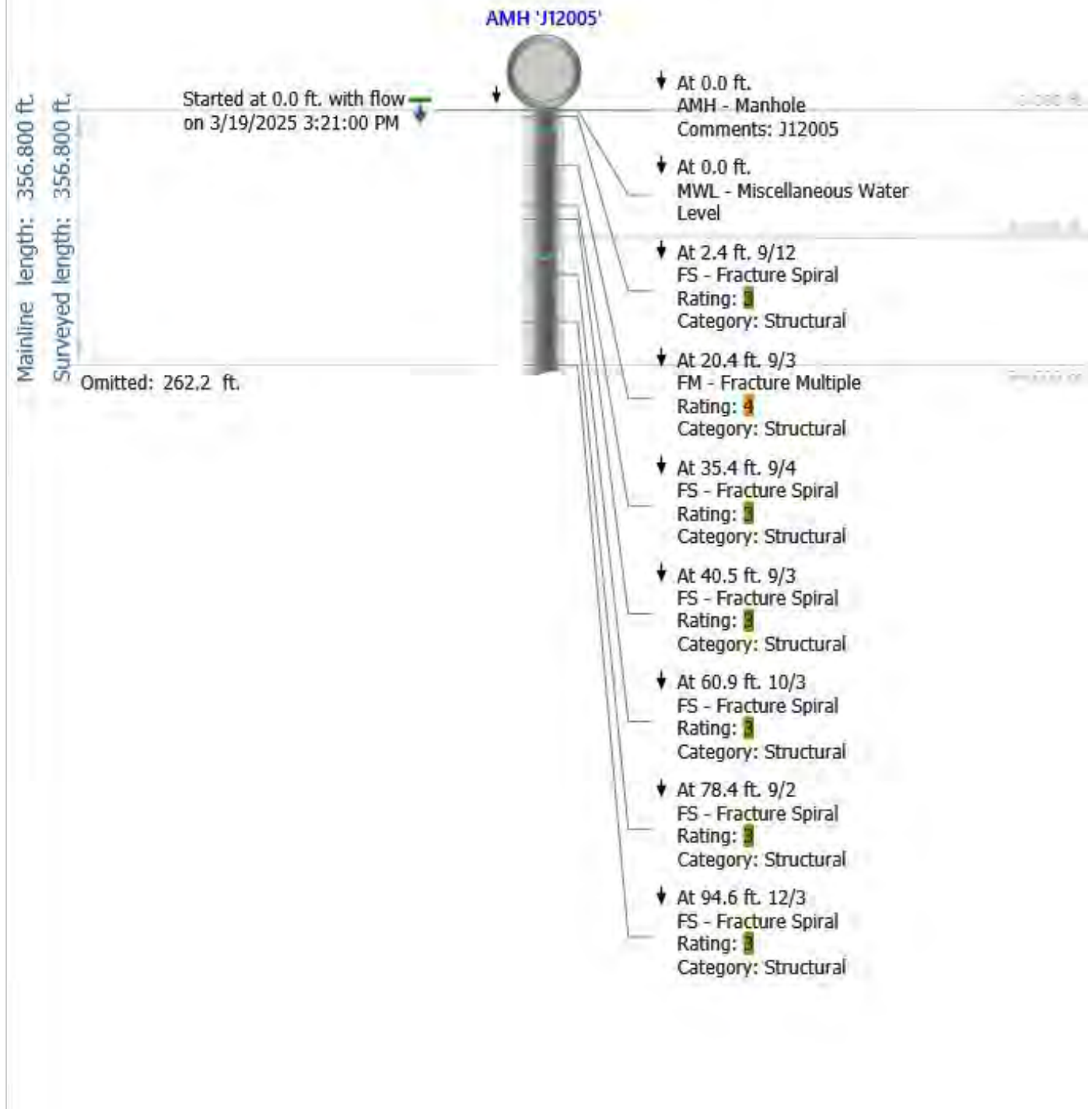
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12005-J12004	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/19/2025 3:21 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



**LINCOLN WASTEWATER
CONDITION**

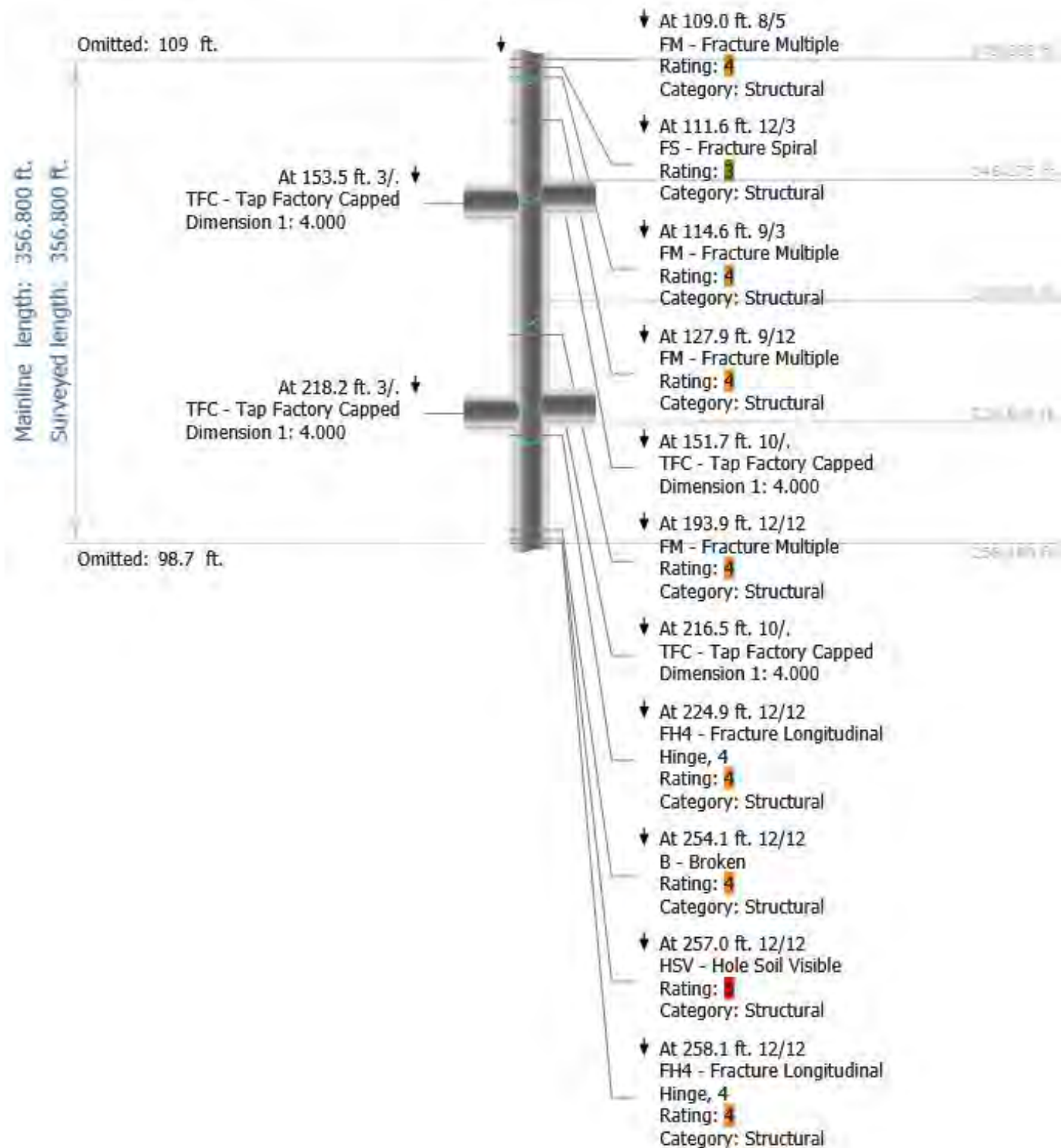
J12005-J12004

3/19/2025 3:21 PM

D

Weather:

1

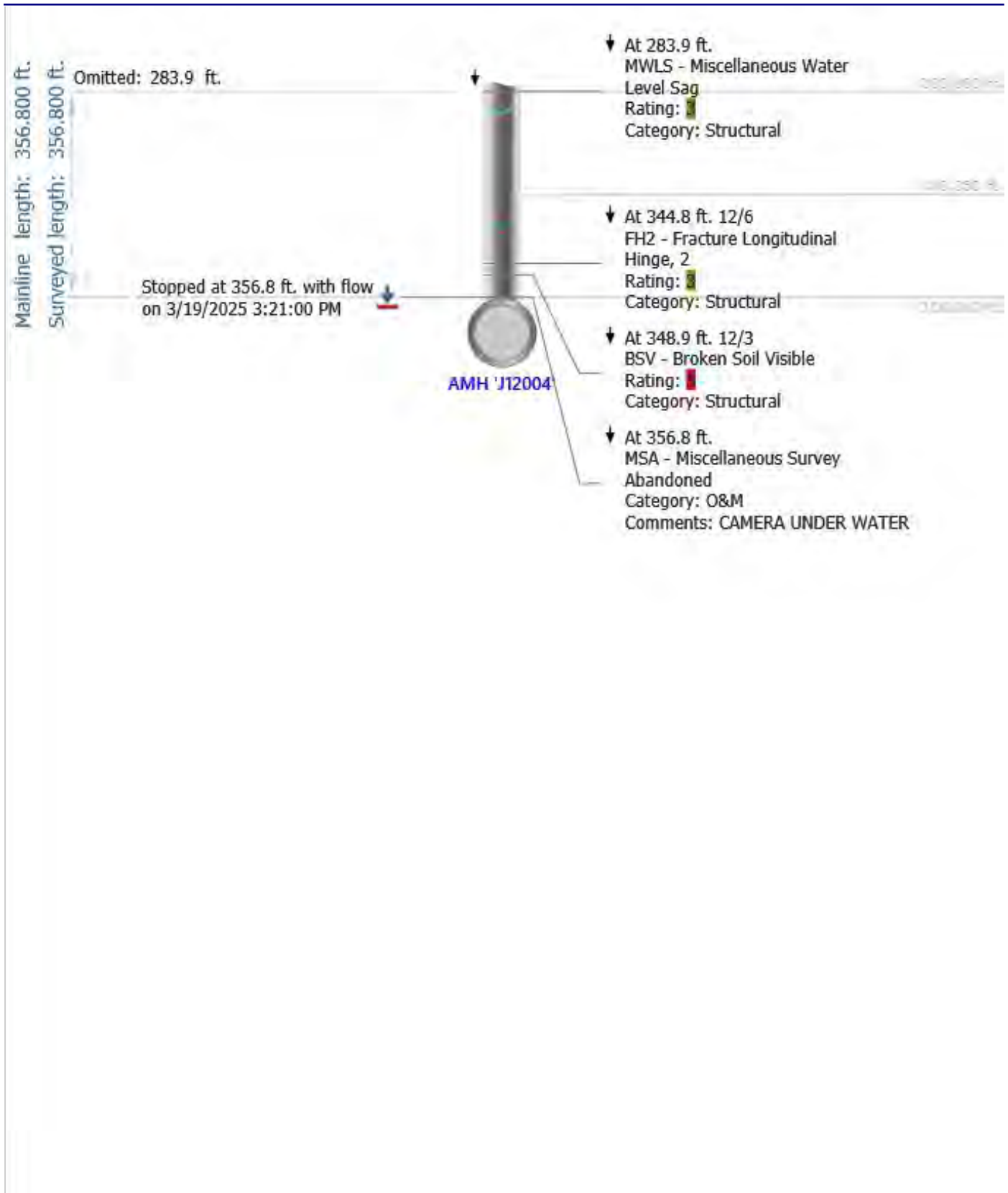


Project name: **LINCOLN WASTEWATER CONDITION**
Mainline ID: **J12005-J12004**

Start date/time: **3/19/2025 3:21 PM**
Direction: **D**

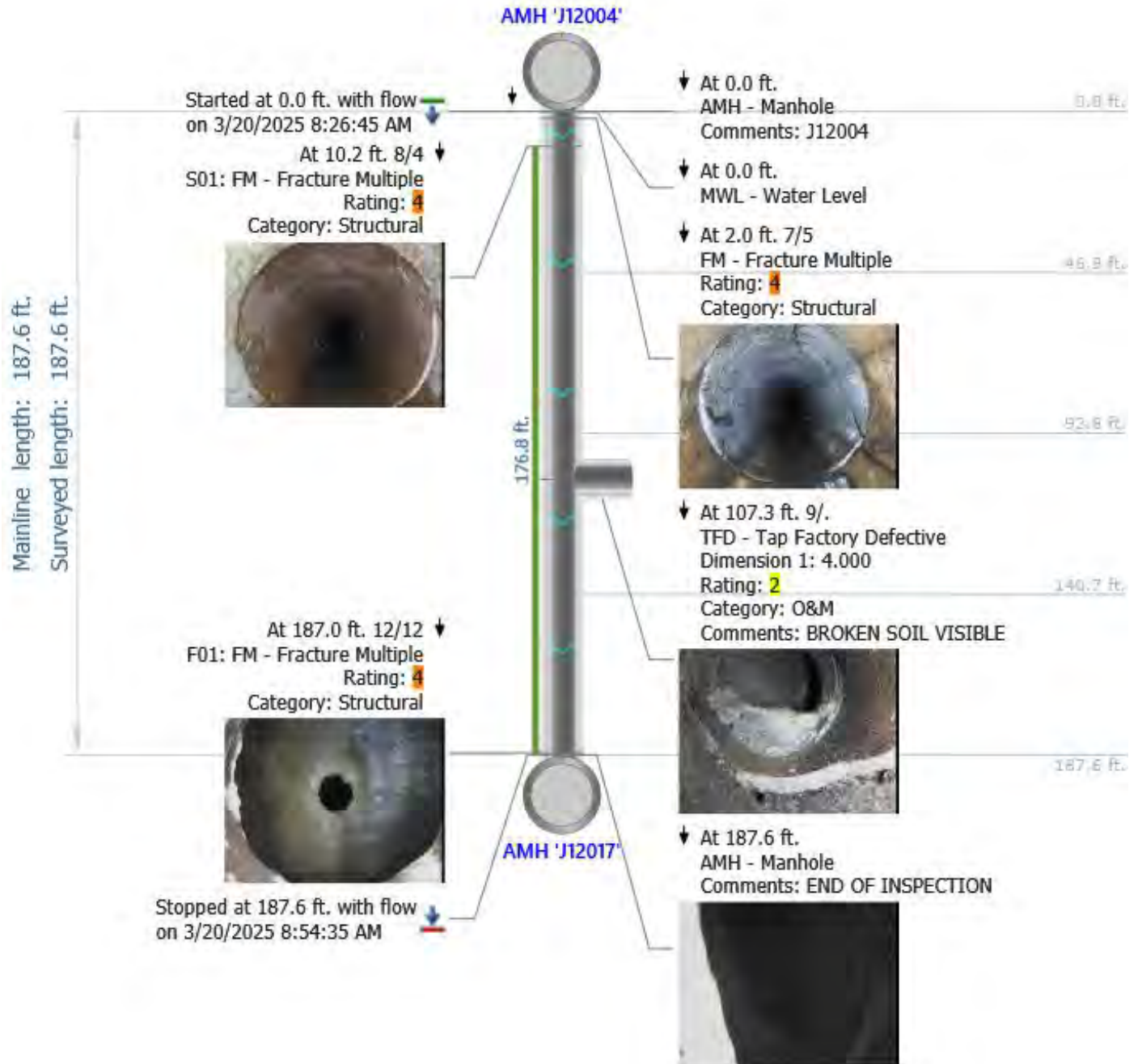
Weather:

1



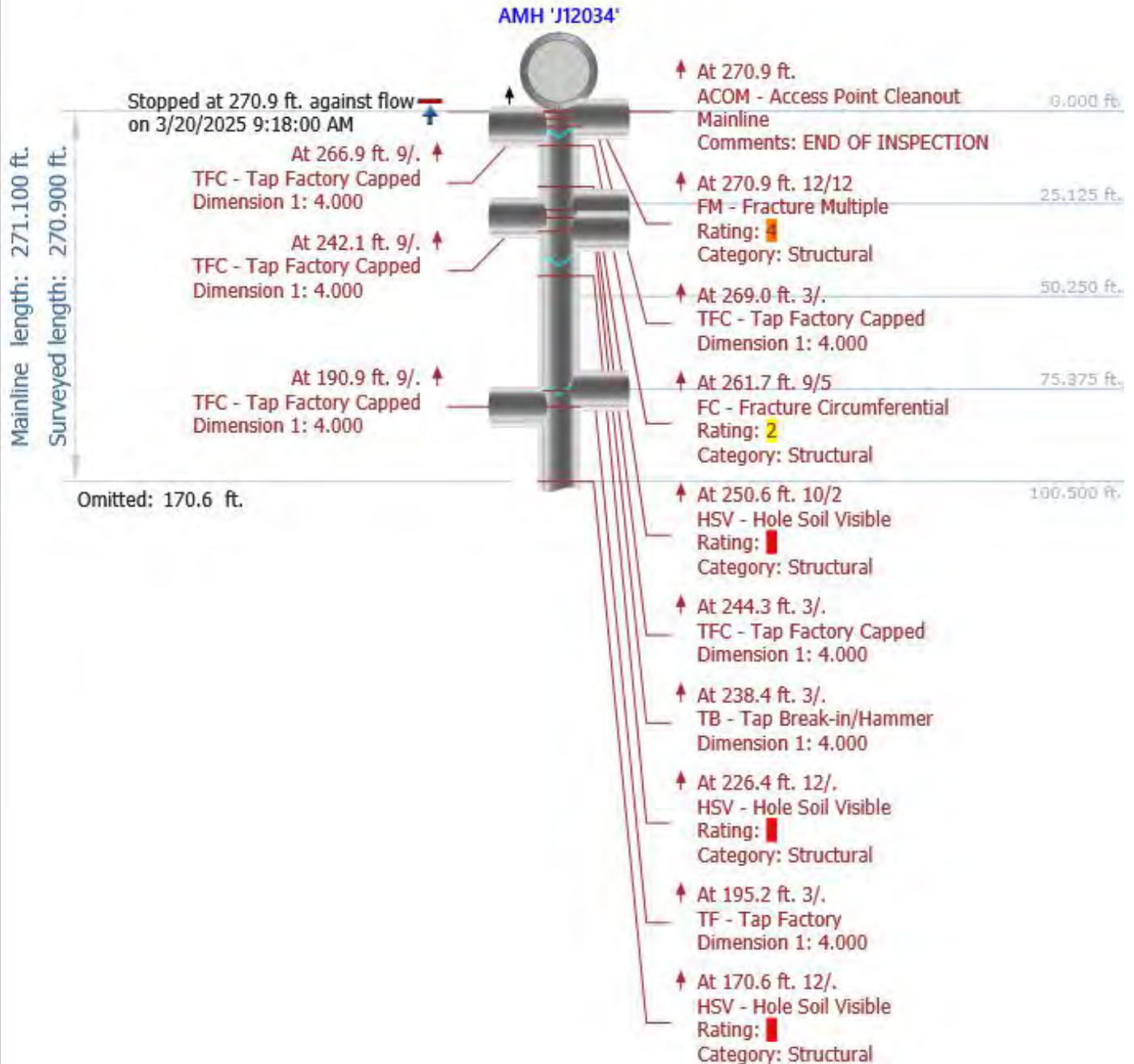
Main Inspections Pipe Run with Images

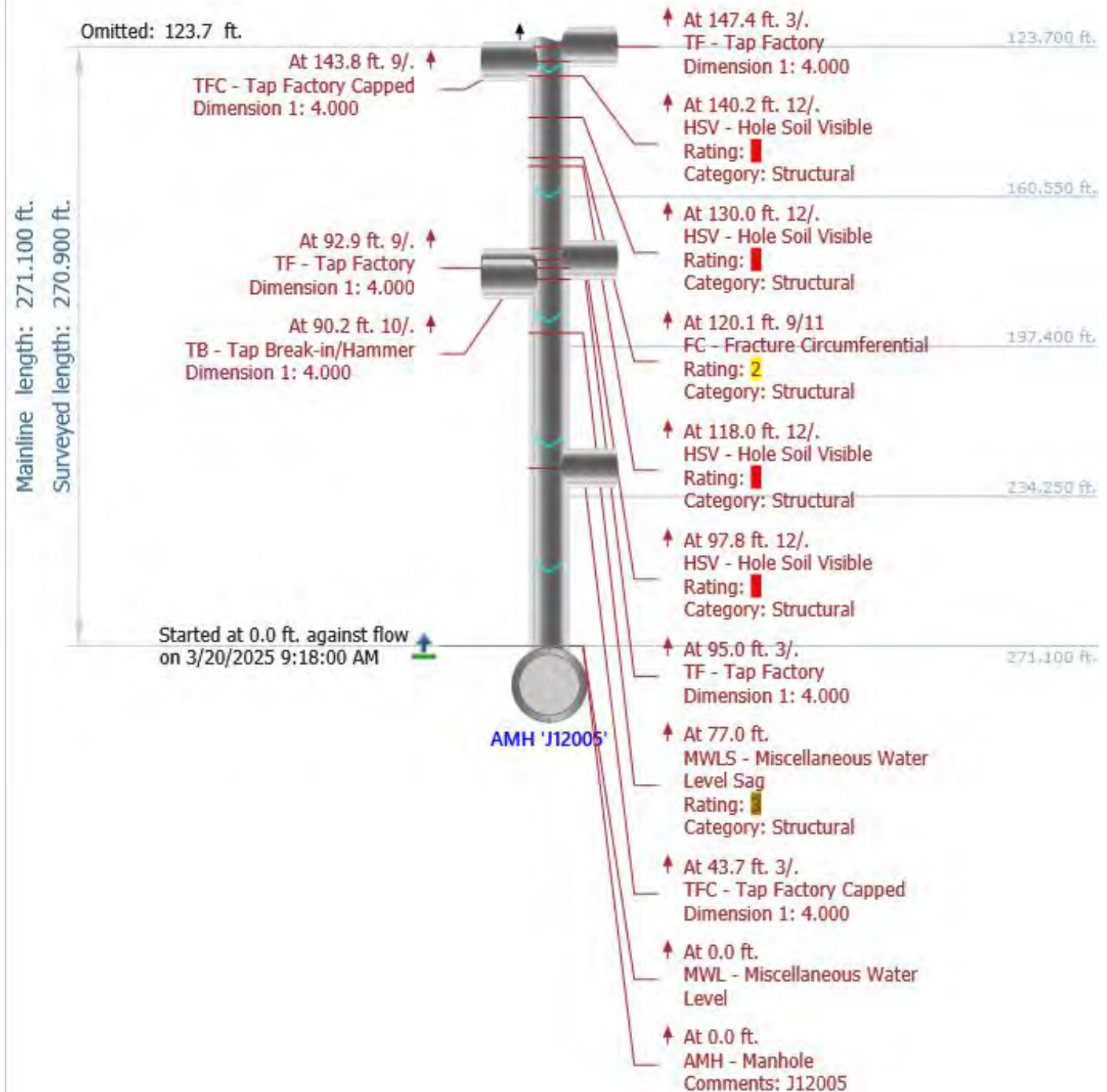
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12004-J12017	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 8:26 AM	D	1	
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Main Inspections Pipe Run with Images

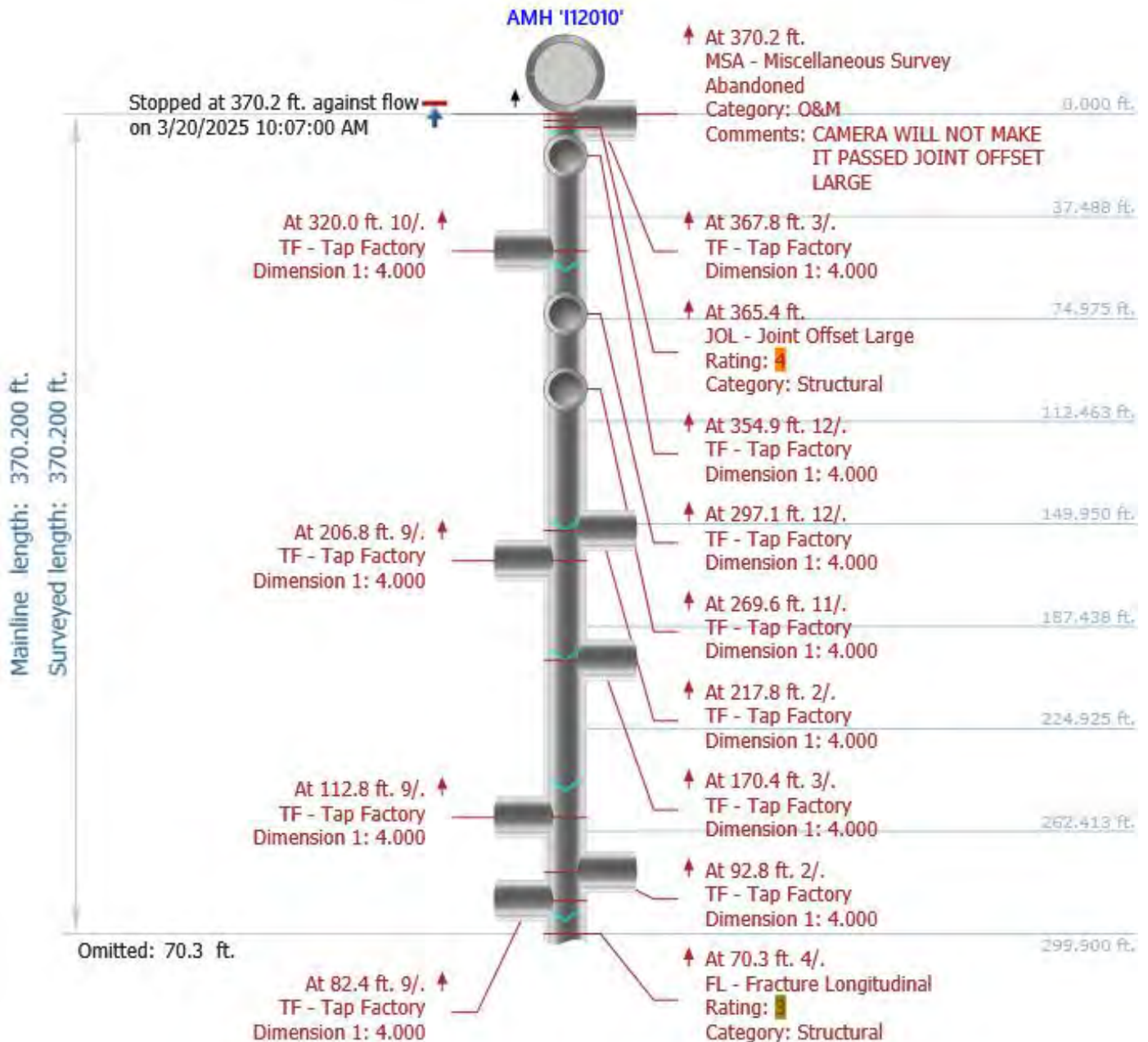
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12034-J12005	LINCOLN	L ST
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 9:18 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12010-I12011	LINCOLN	8TH ST ALLEY
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 10:07 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

I12010-I12011

Start date/time:

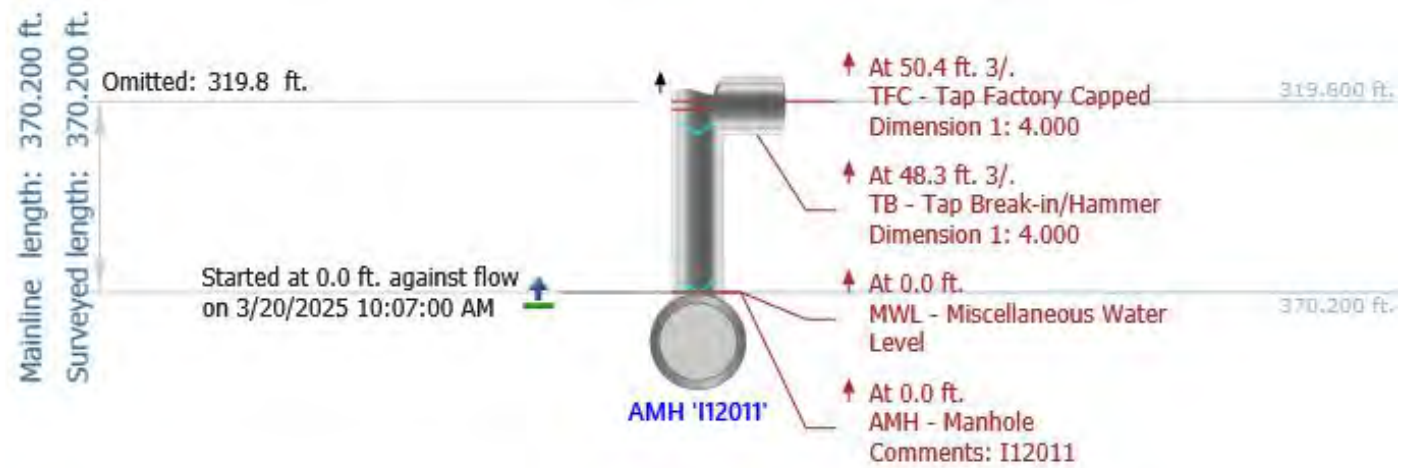
3/20/2025 10:07 AM

Direction:

U

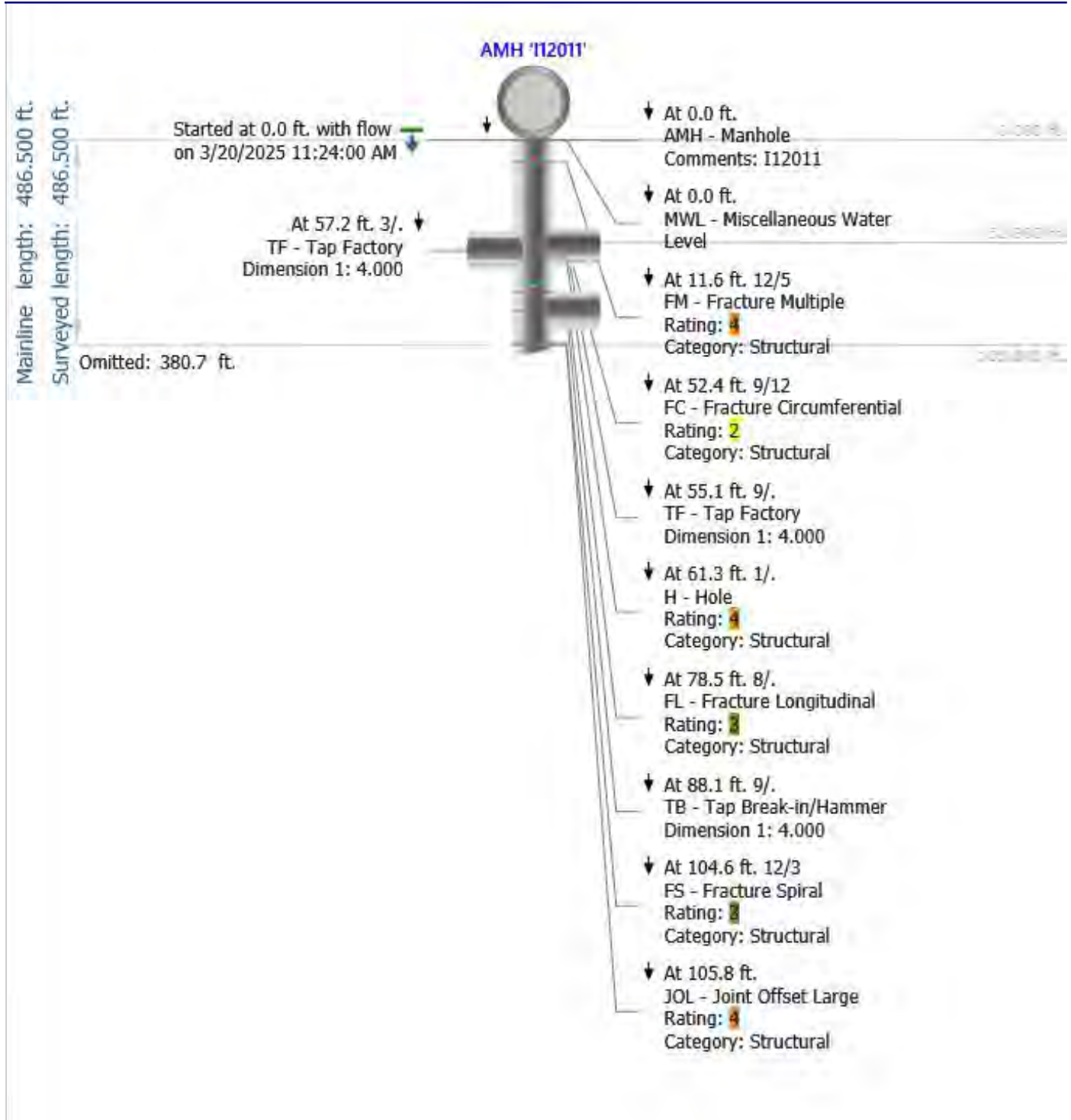
Weather:

1

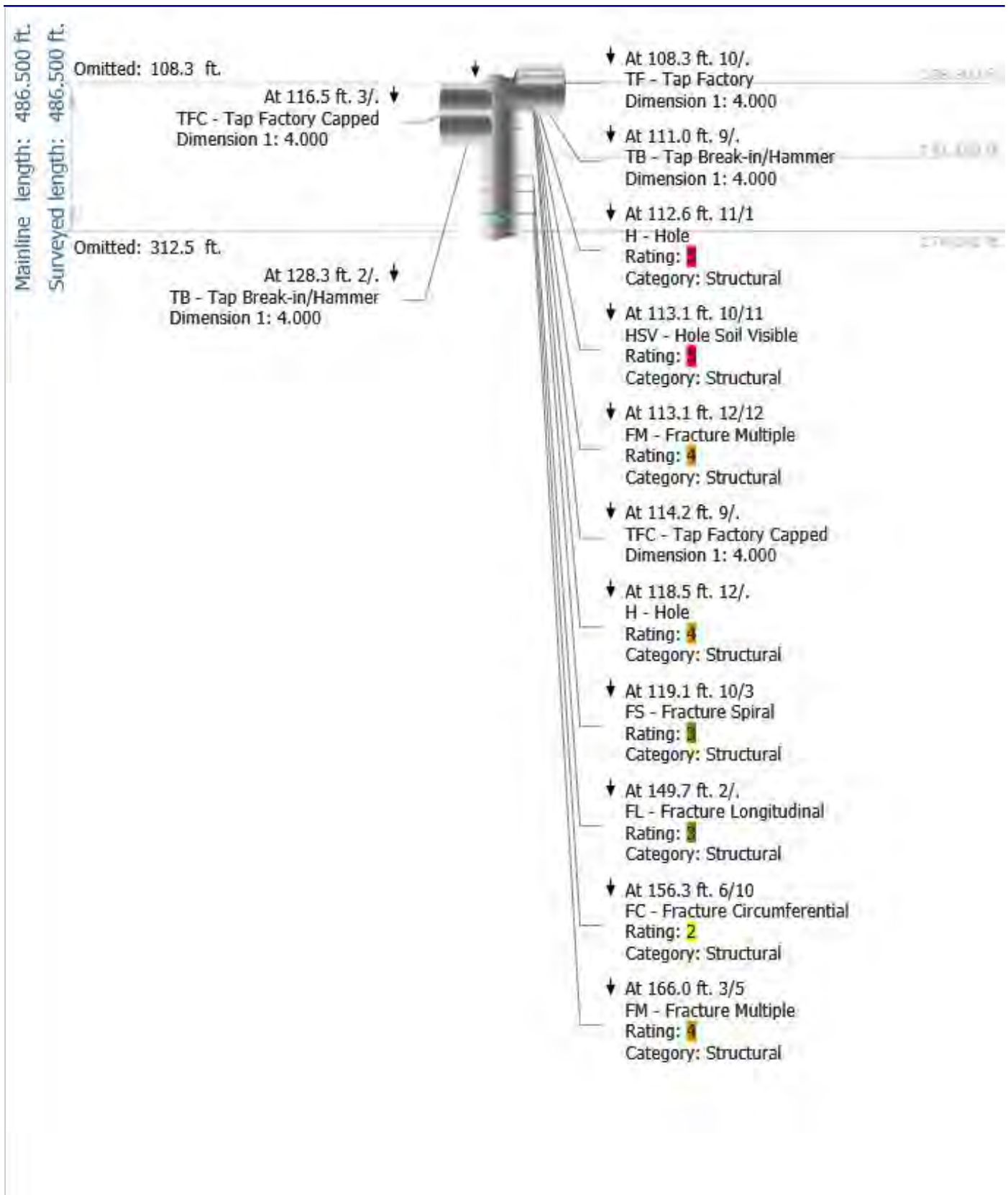


Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12011-I12015	LINCOLN	8TH ST
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 11:24 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Weather:

1

Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

I12011-I12015

Start date/time:

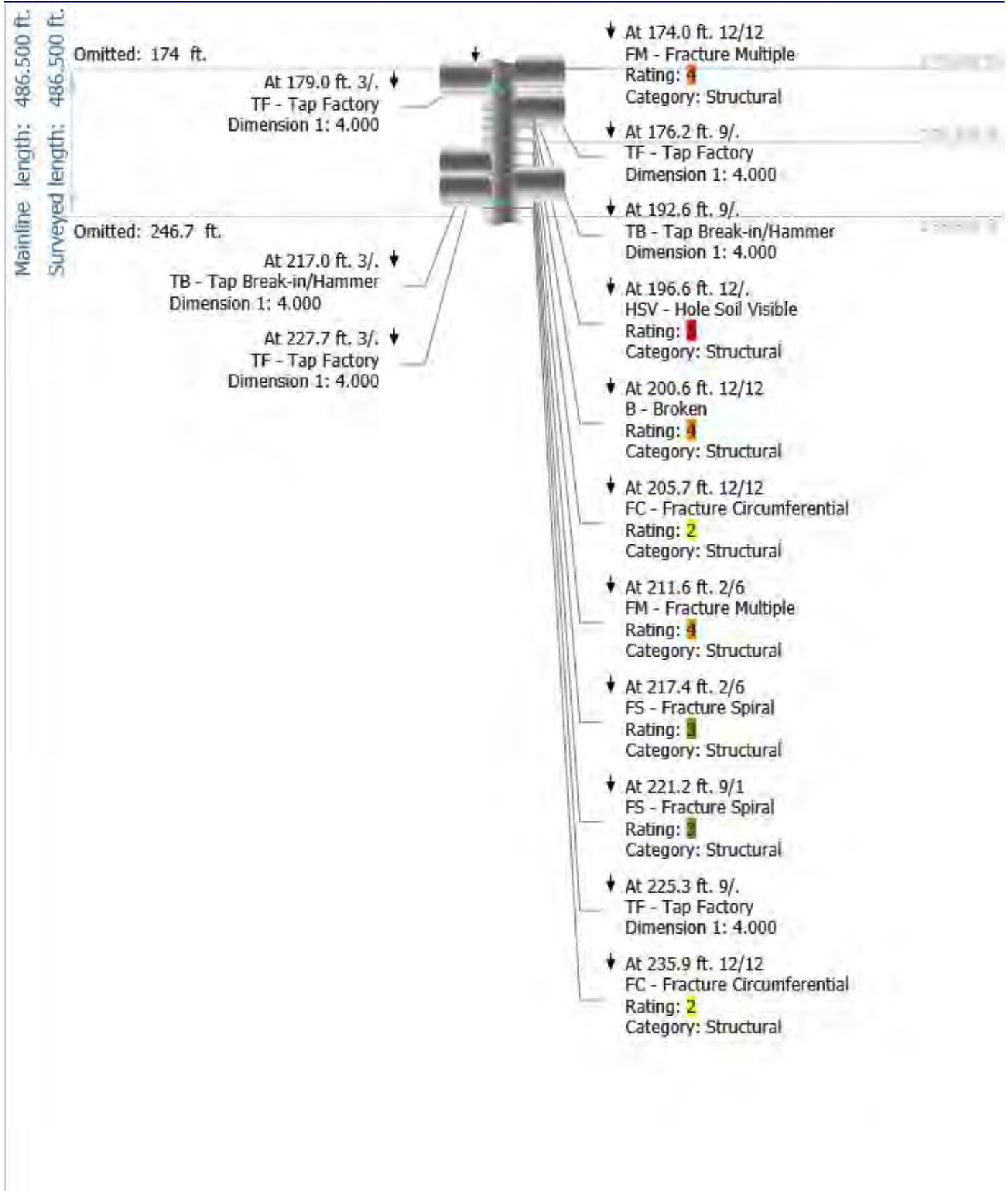
3/20/2025 11:24 AM

Direction:

D

Weather:

1



Project name:

**LINCOLN WASTEWATER
CONDITION**

Weather:

1

Mainline ID:

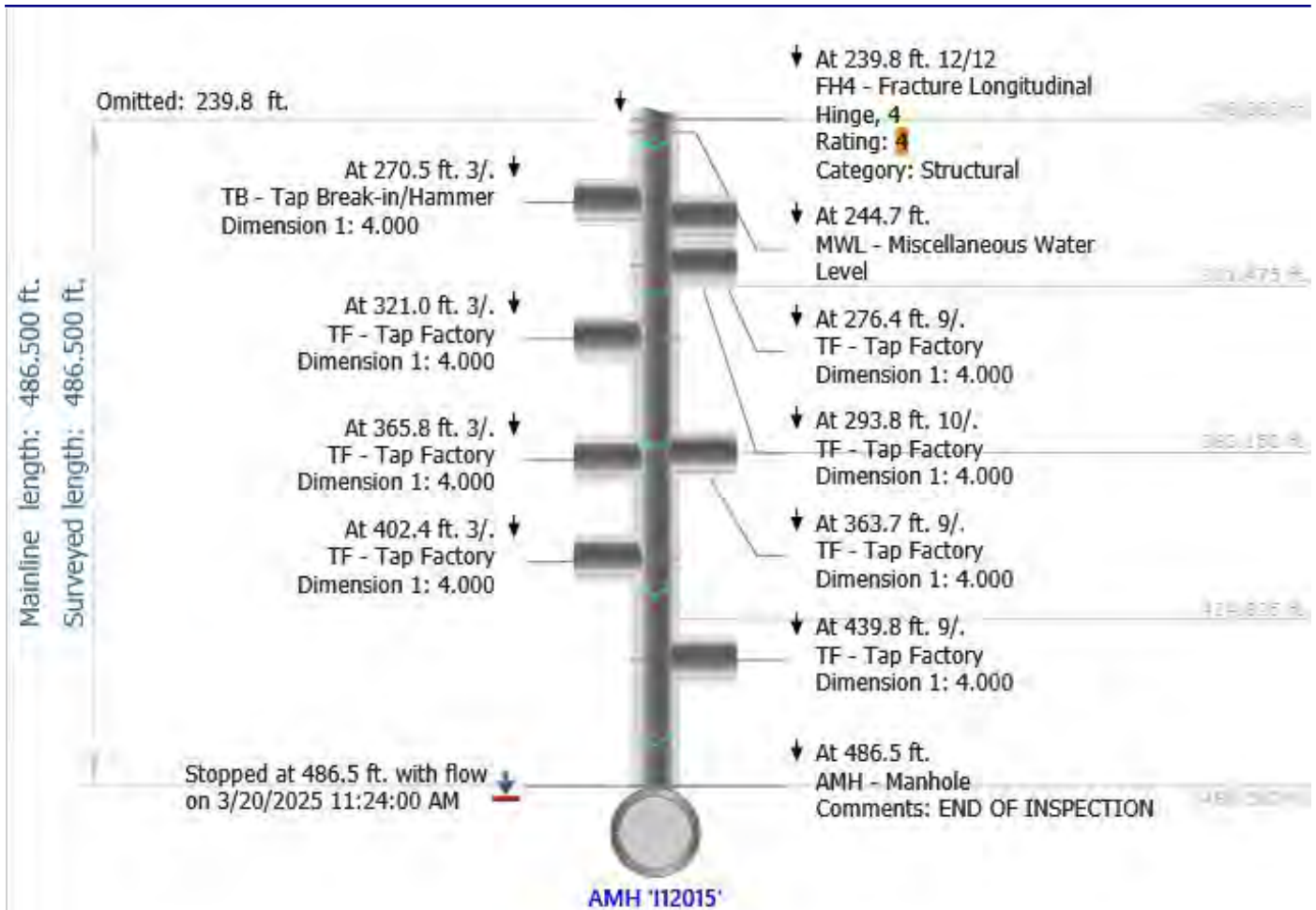
I12011-I12015

Start date/time:

3/20/2025 11:24 AM

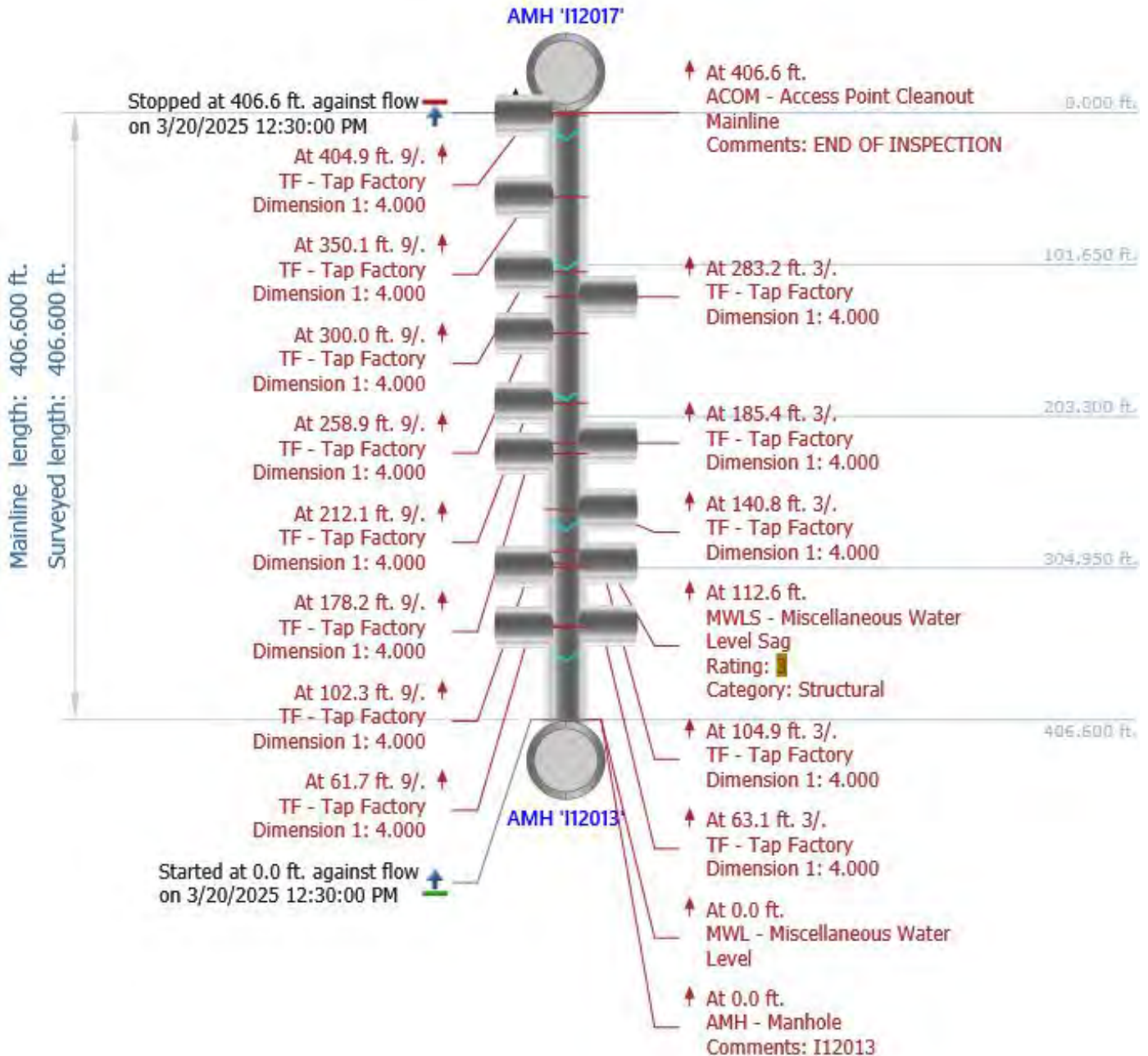
Direction:

D



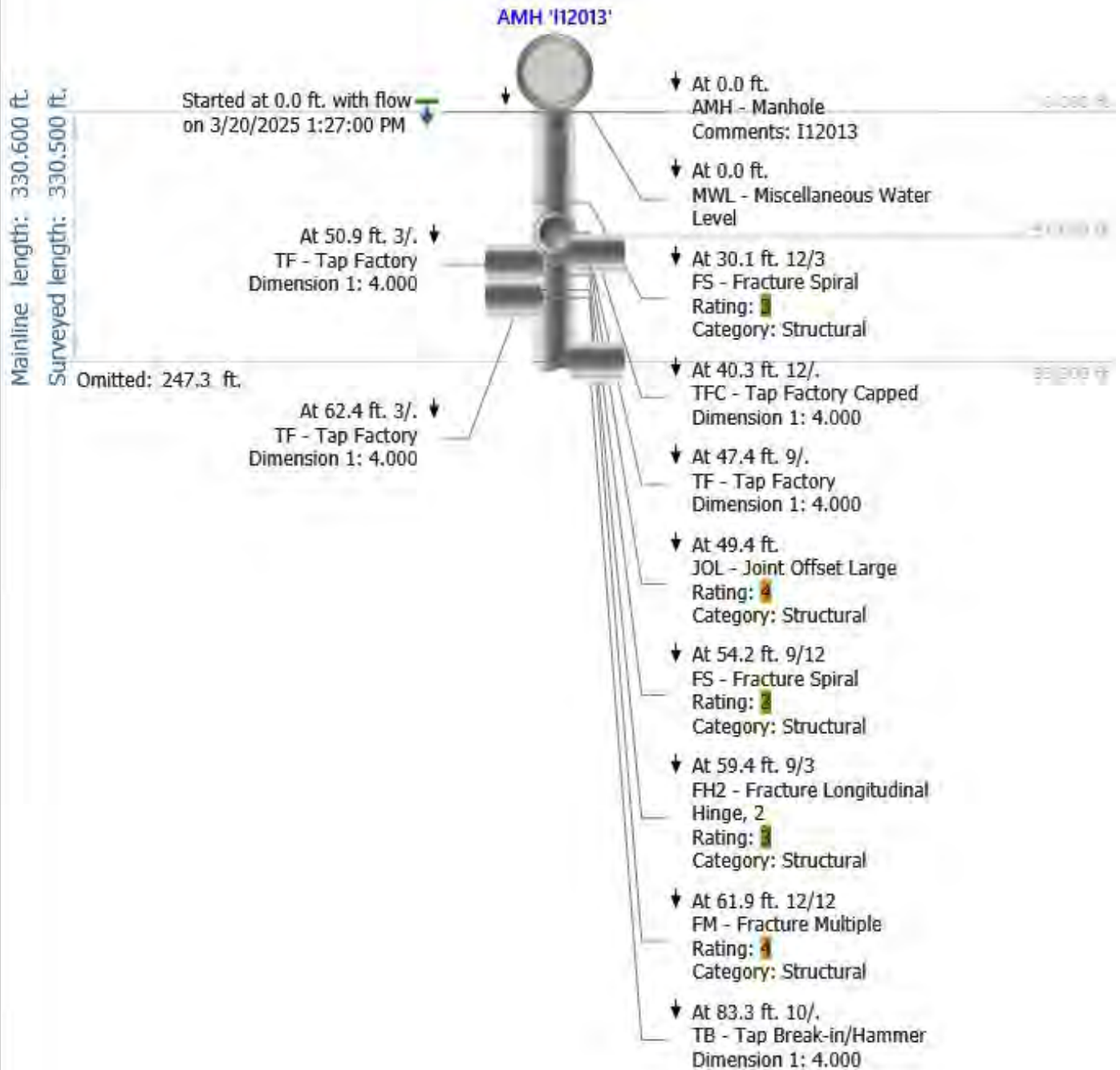
Main Inspections Pipe Run with Images

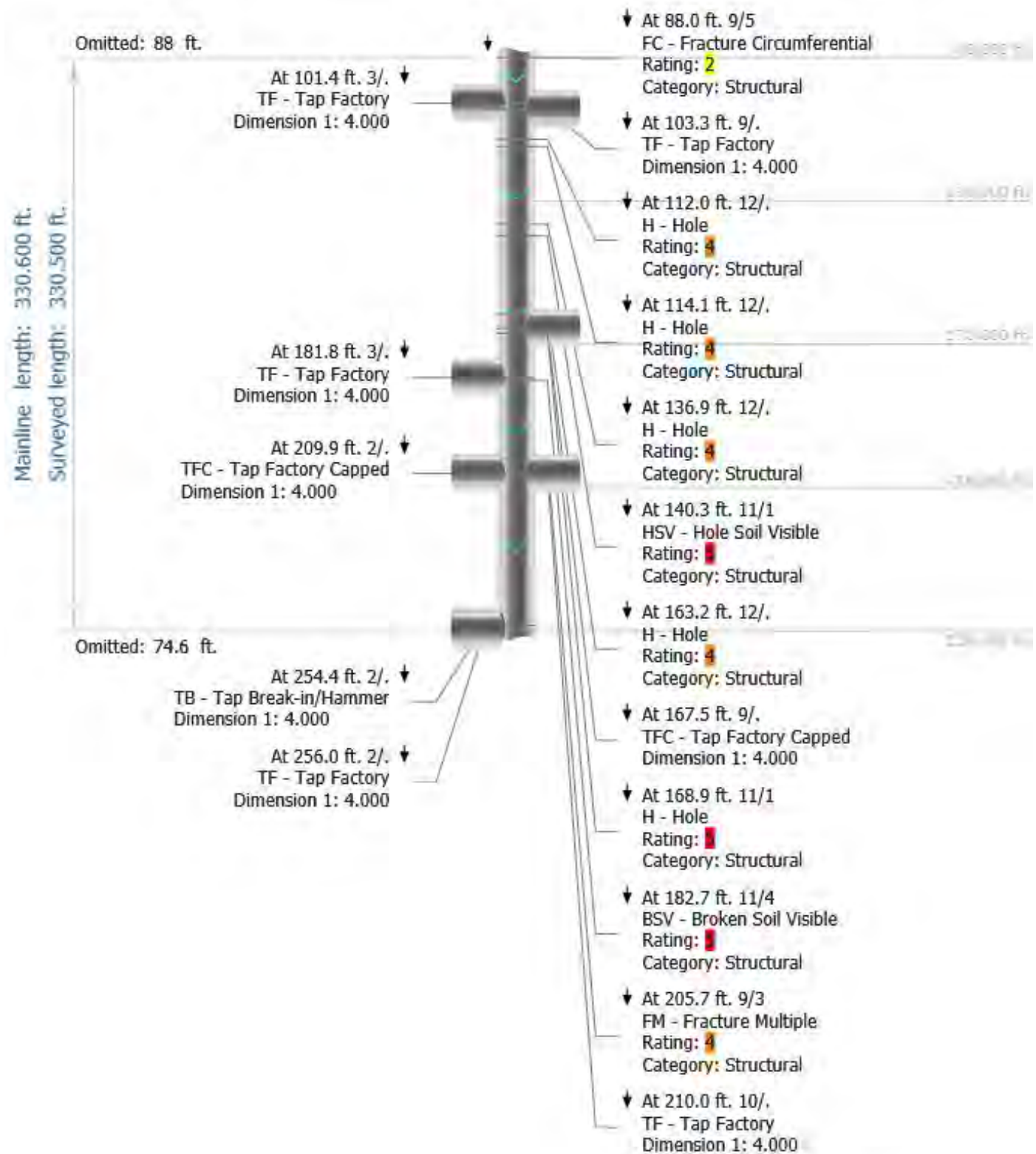
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12017-I12013	LINCOLN	8TH ST
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 12:30 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12013-I12012	LINCOLN	8TH ST
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 1:27 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

I12013-I12012

Start date/time:

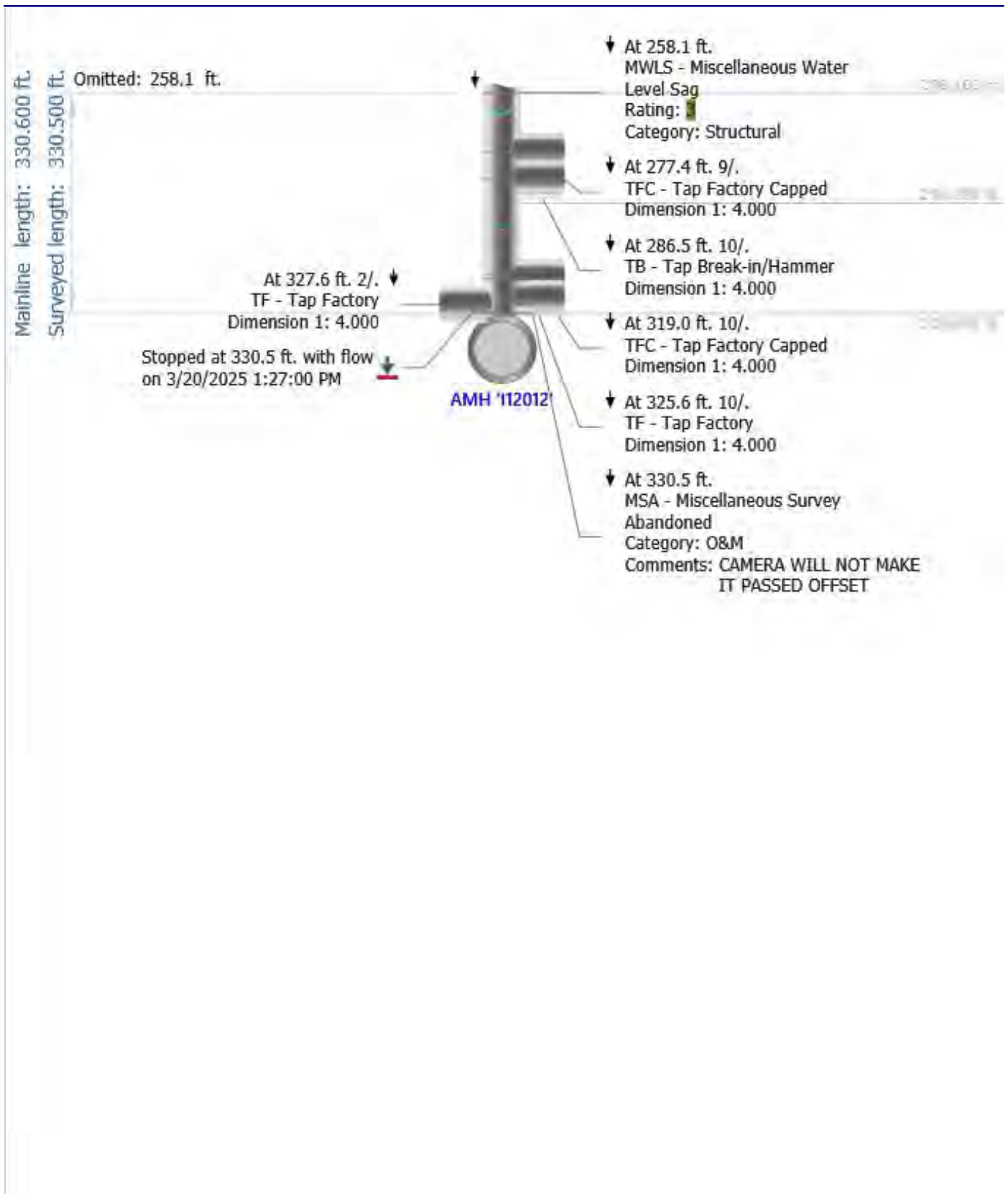
3/20/2025 1:27 PM

Direction:

D

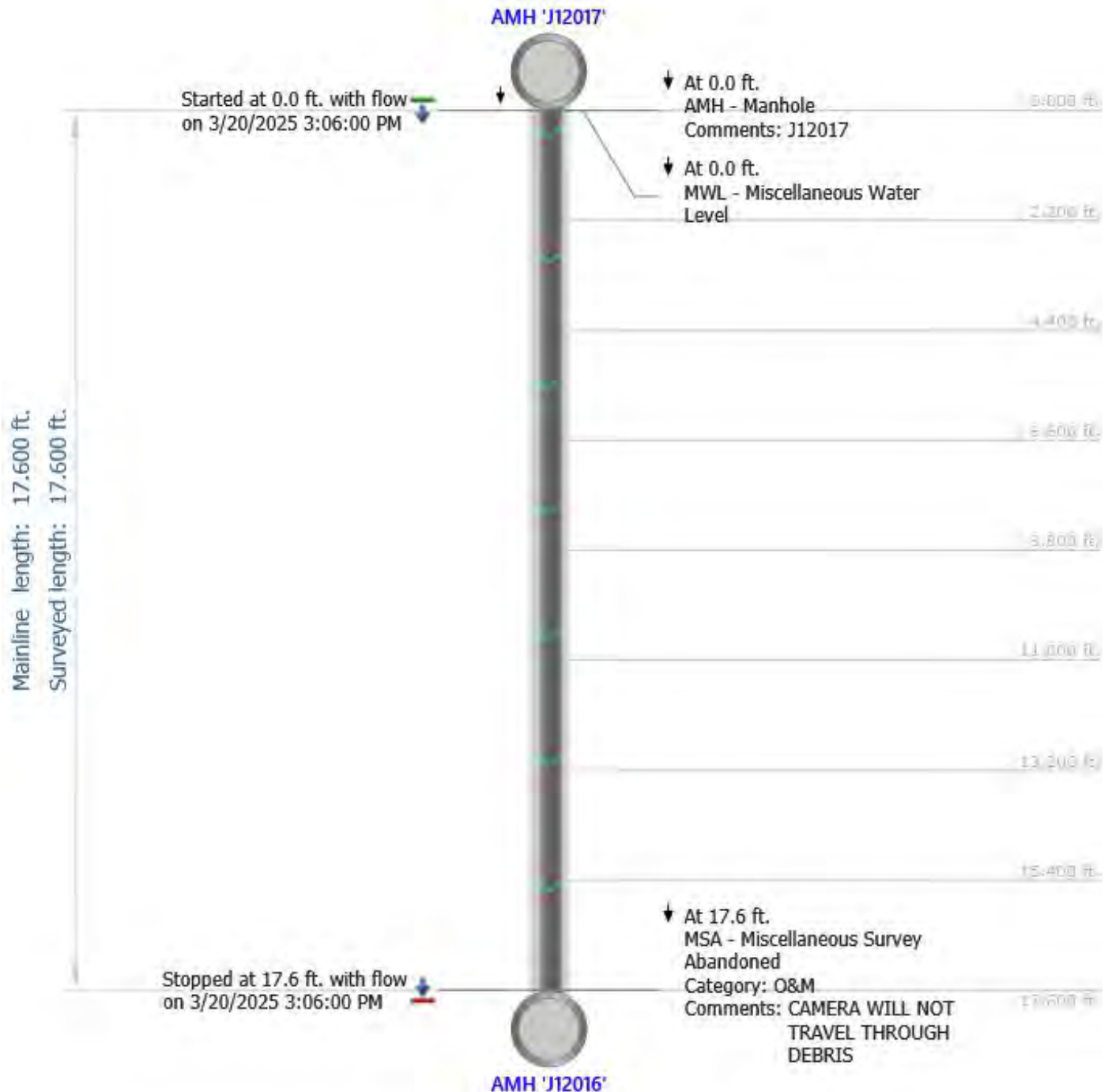
Weather:

1



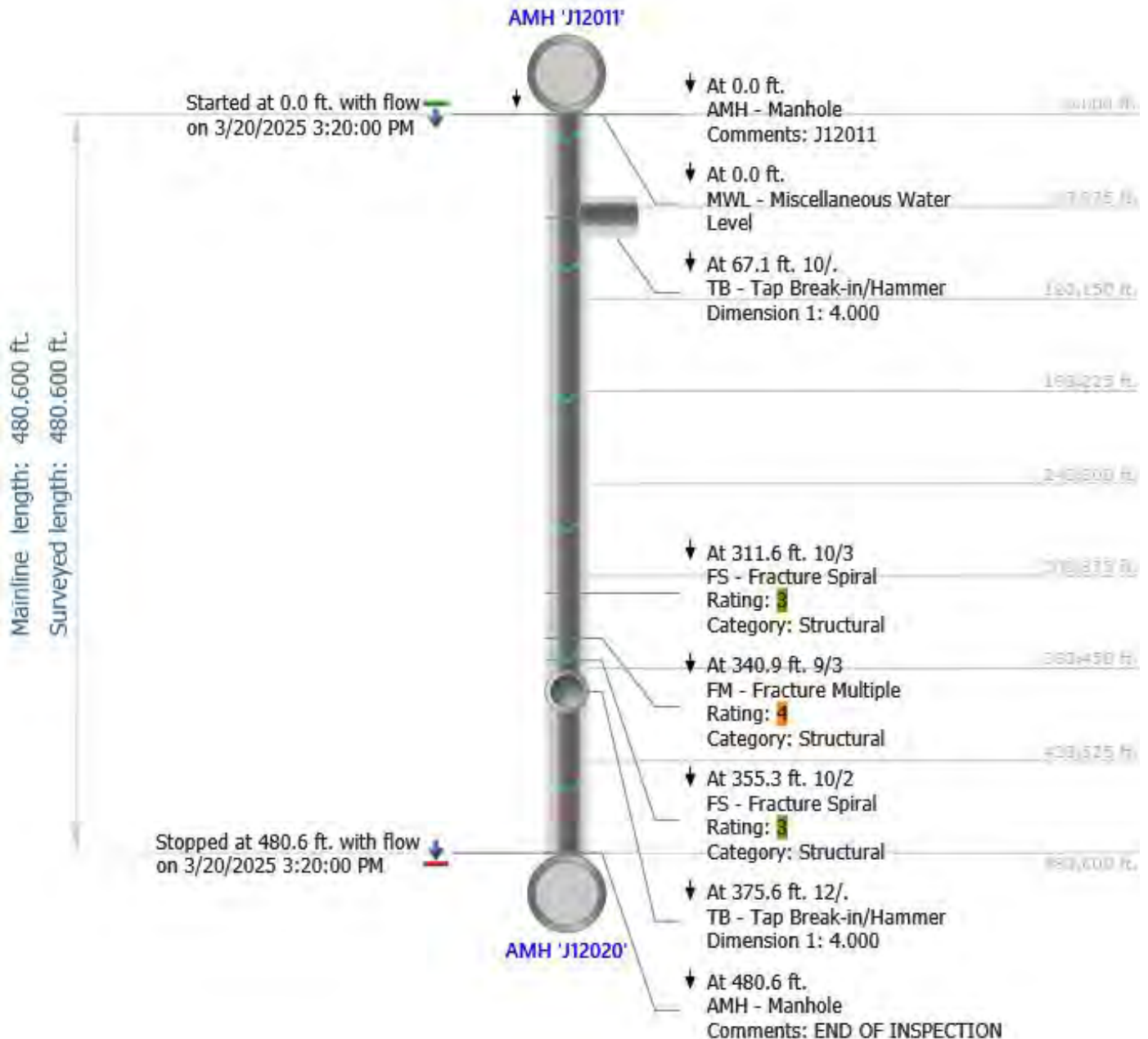
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12017-J12016	LINCOLN	J ST
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 3:06 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



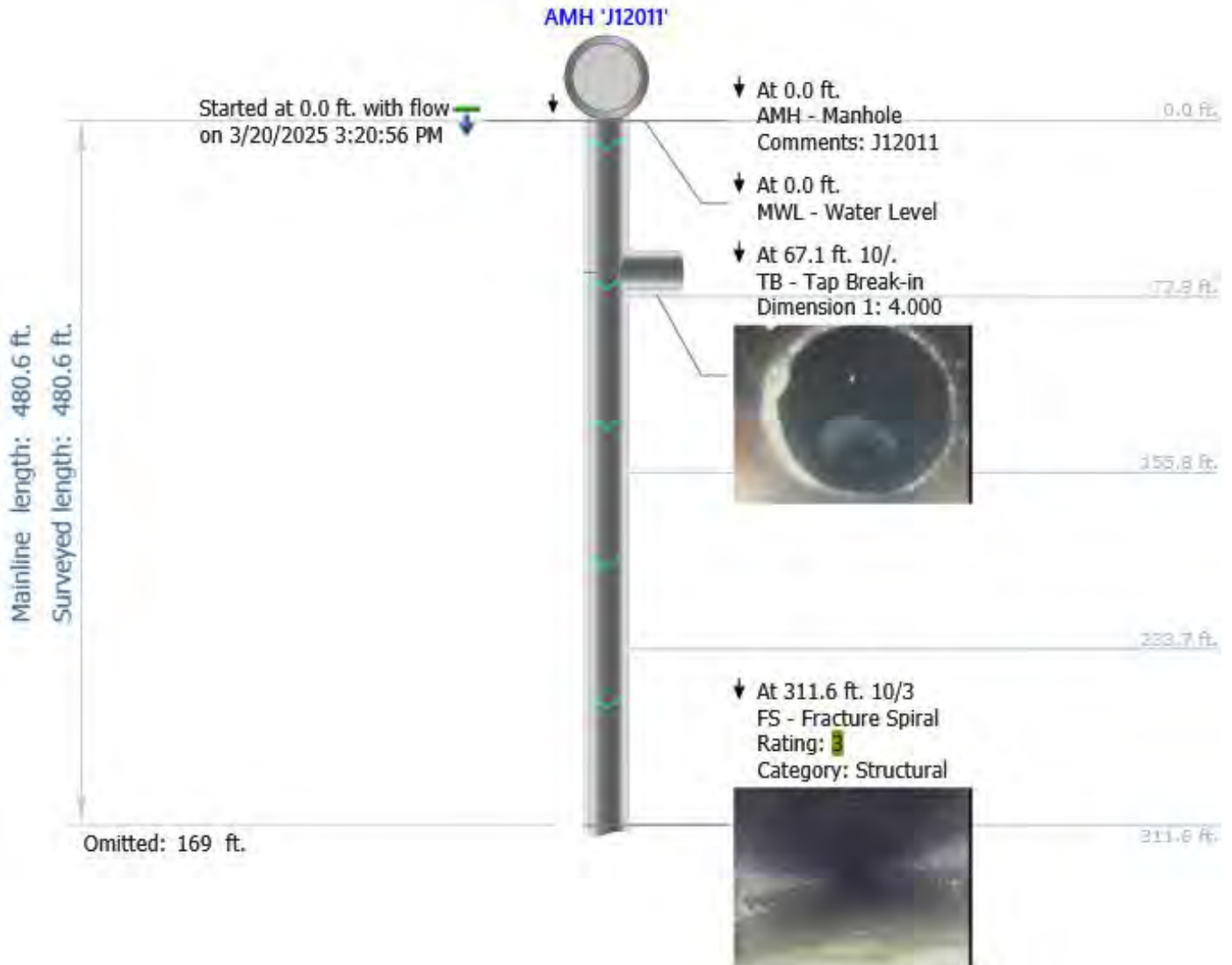
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12011-J12020	LINCOLN	I ST
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 3:20 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



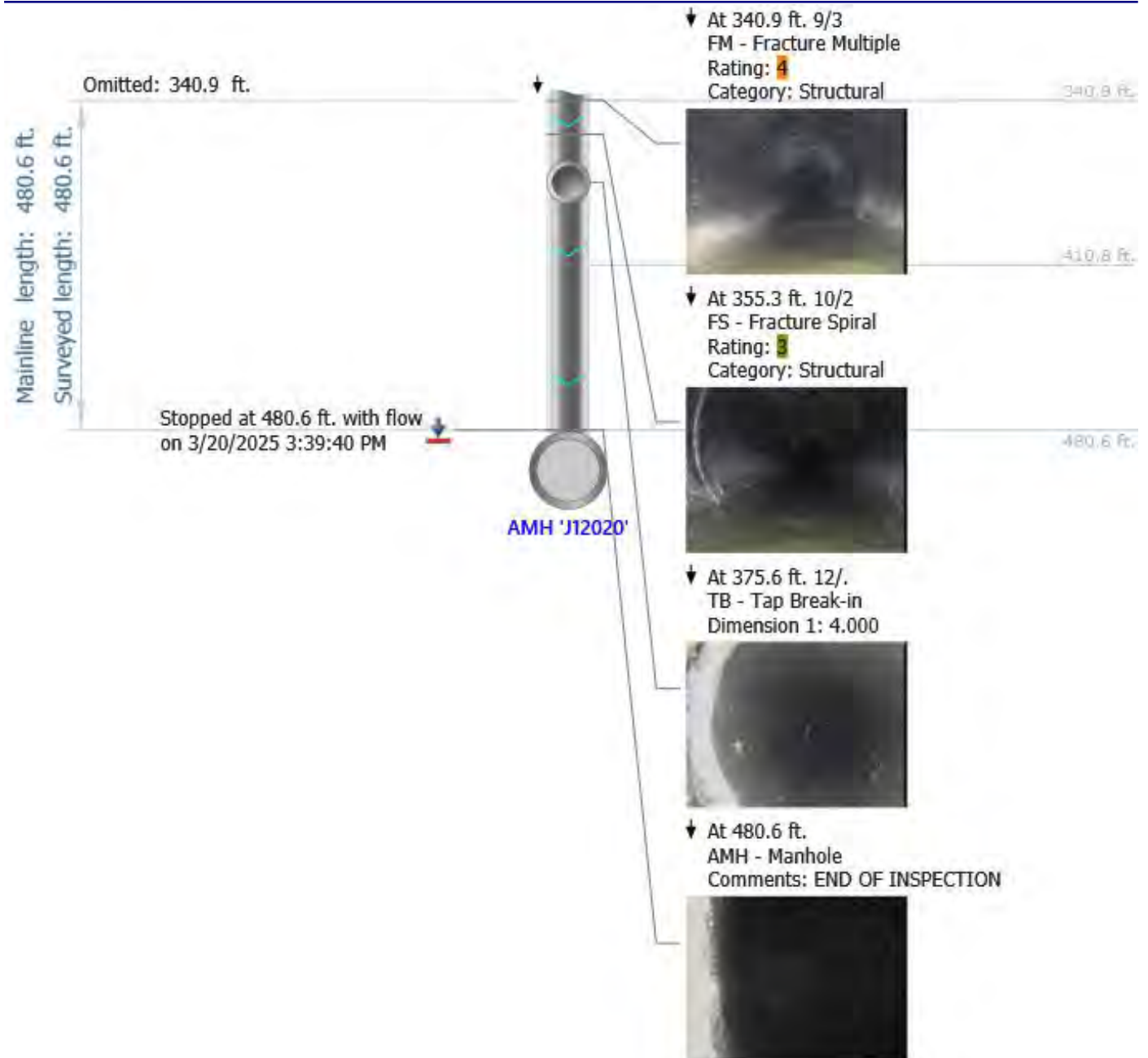
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12011-J12020	LINCOLN	I ST
Start date/time:	Direction:	Weather:	Location code:
3/20/2025 3:20 PM	D	1	
Shape:	Material:	Height:	Width:
C	VCP	8 in.	



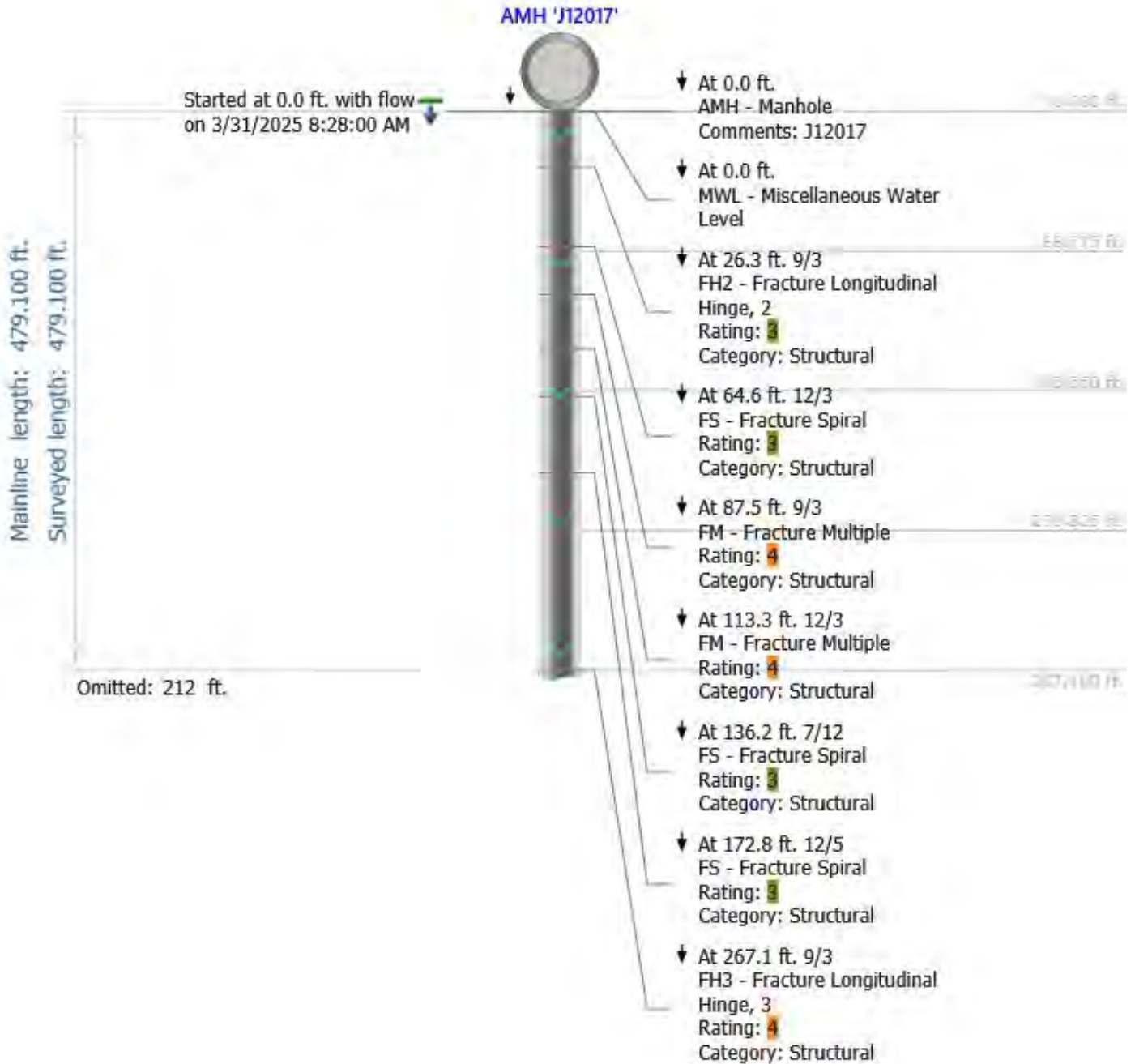
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12017-J12016	LINCOLN	J ST
Start date/time:	Direction:	Weather:	Location code:
3/31/2025 8:28 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J12017-J12016

Start date/time:

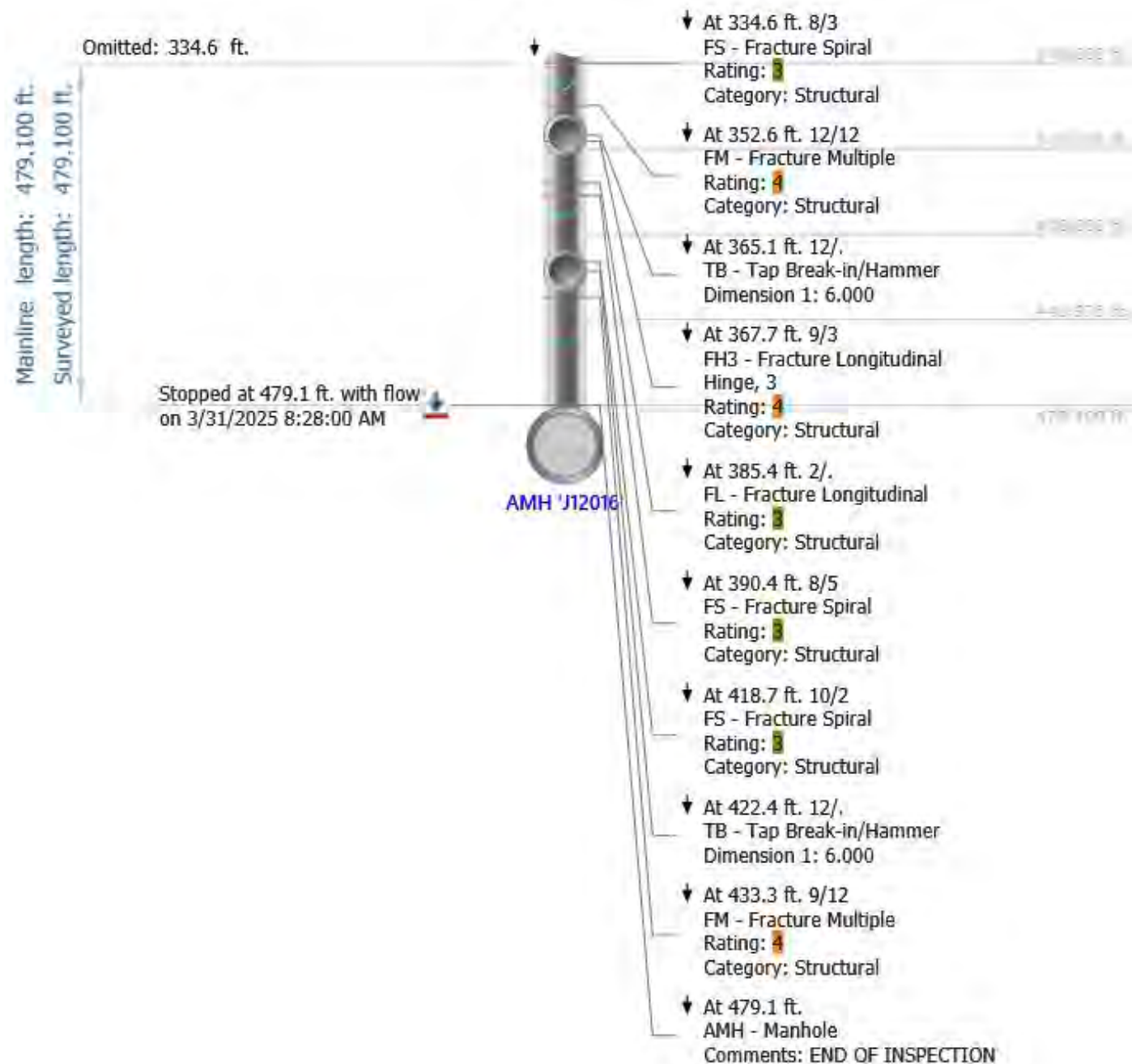
3/31/2025 8:28 AM

Direction:

D

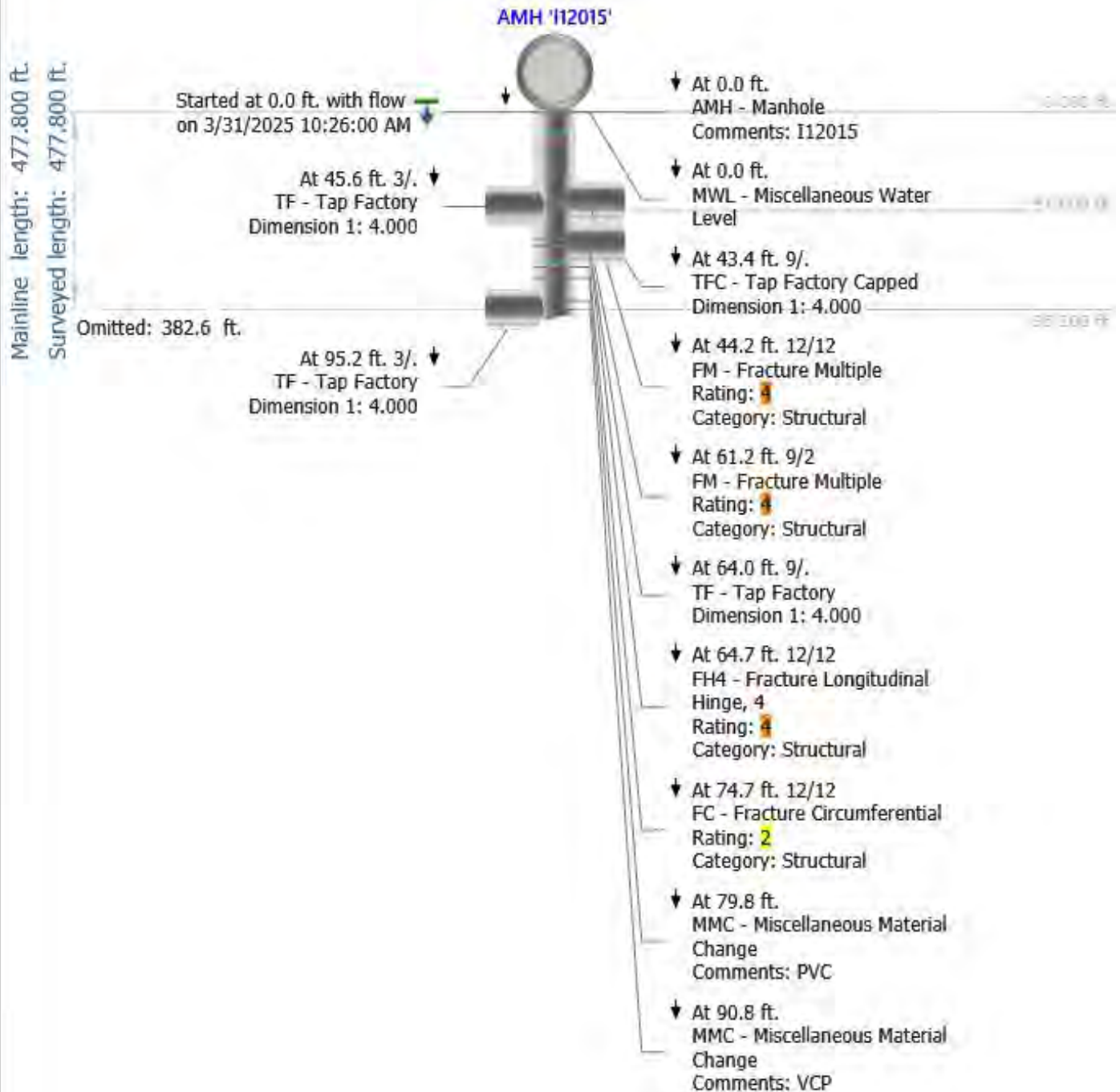
Weather:

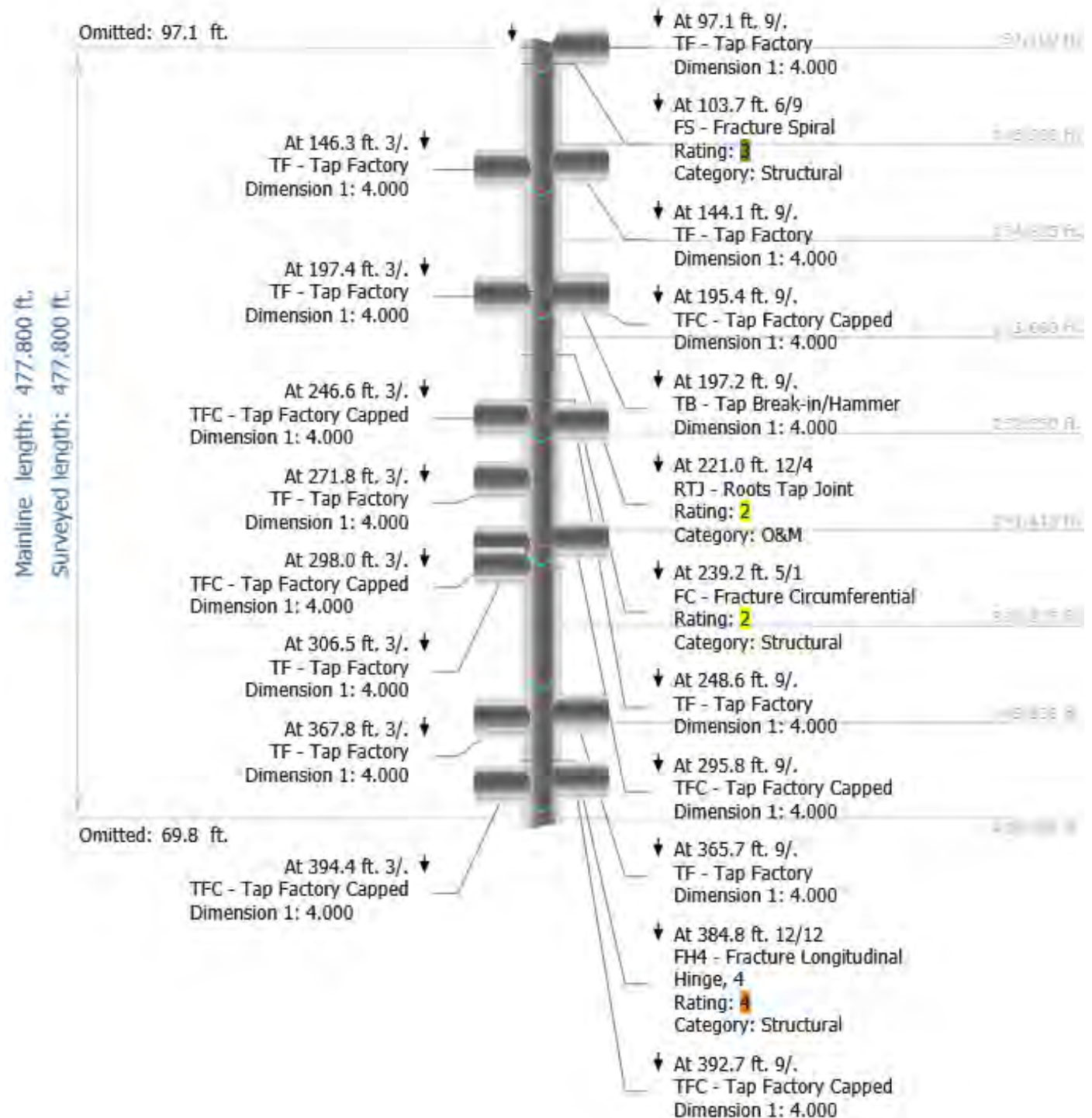
1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12015-J12015	LINCOLN	7TH ST
Start date/time:	Direction:	Weather:	Location code:
3/31/2025 10:26 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





Project name:

Mainline ID:

Start date/time:

Direction:

**LINCOLN WASTEWATER
CONDITION**

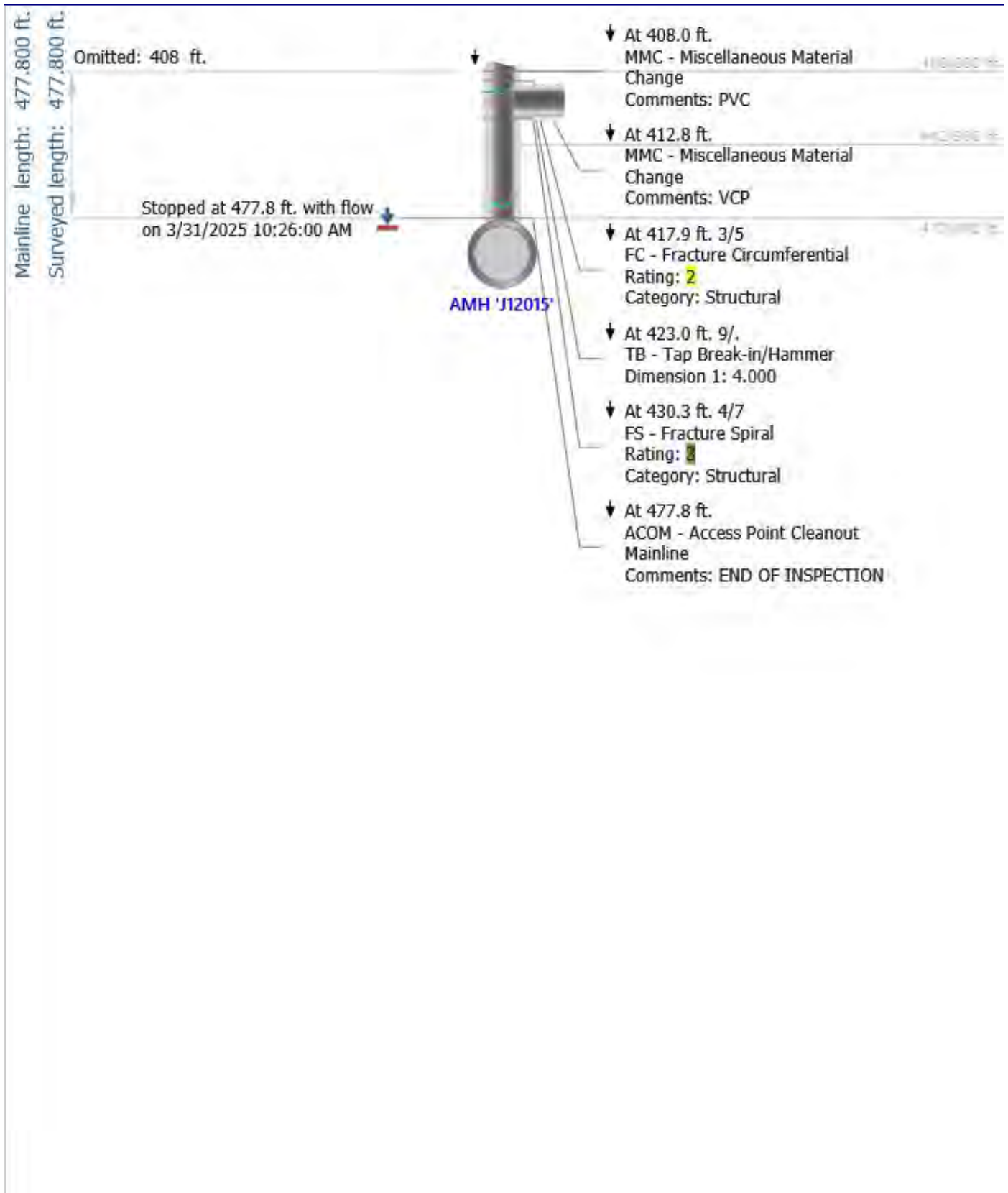
I12015-J12015

3/31/2025 10:26 AM

D

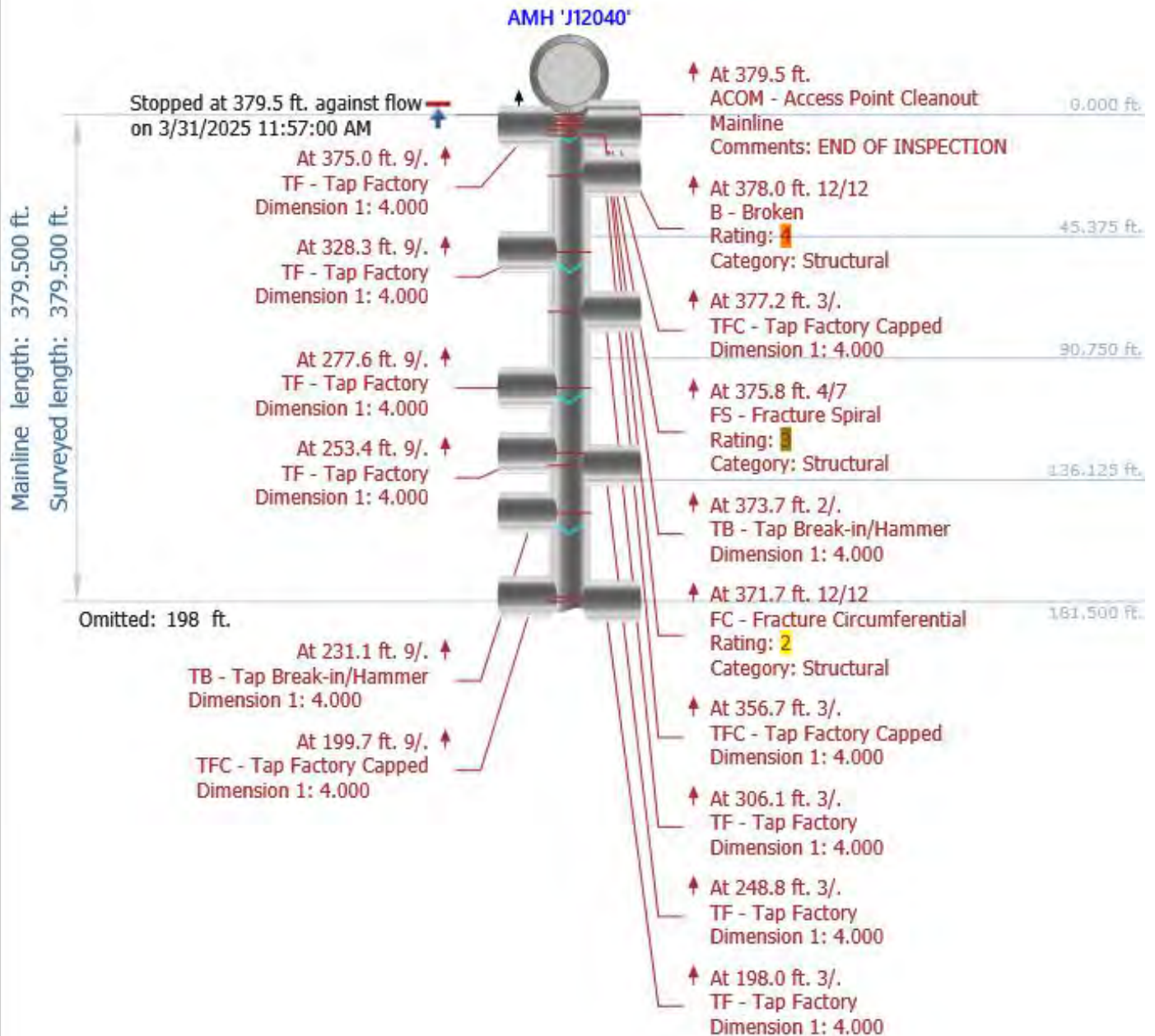
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12040-J12002	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/31/2025 11:57 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



**LINCOLN WASTEWATER
CONDITION**

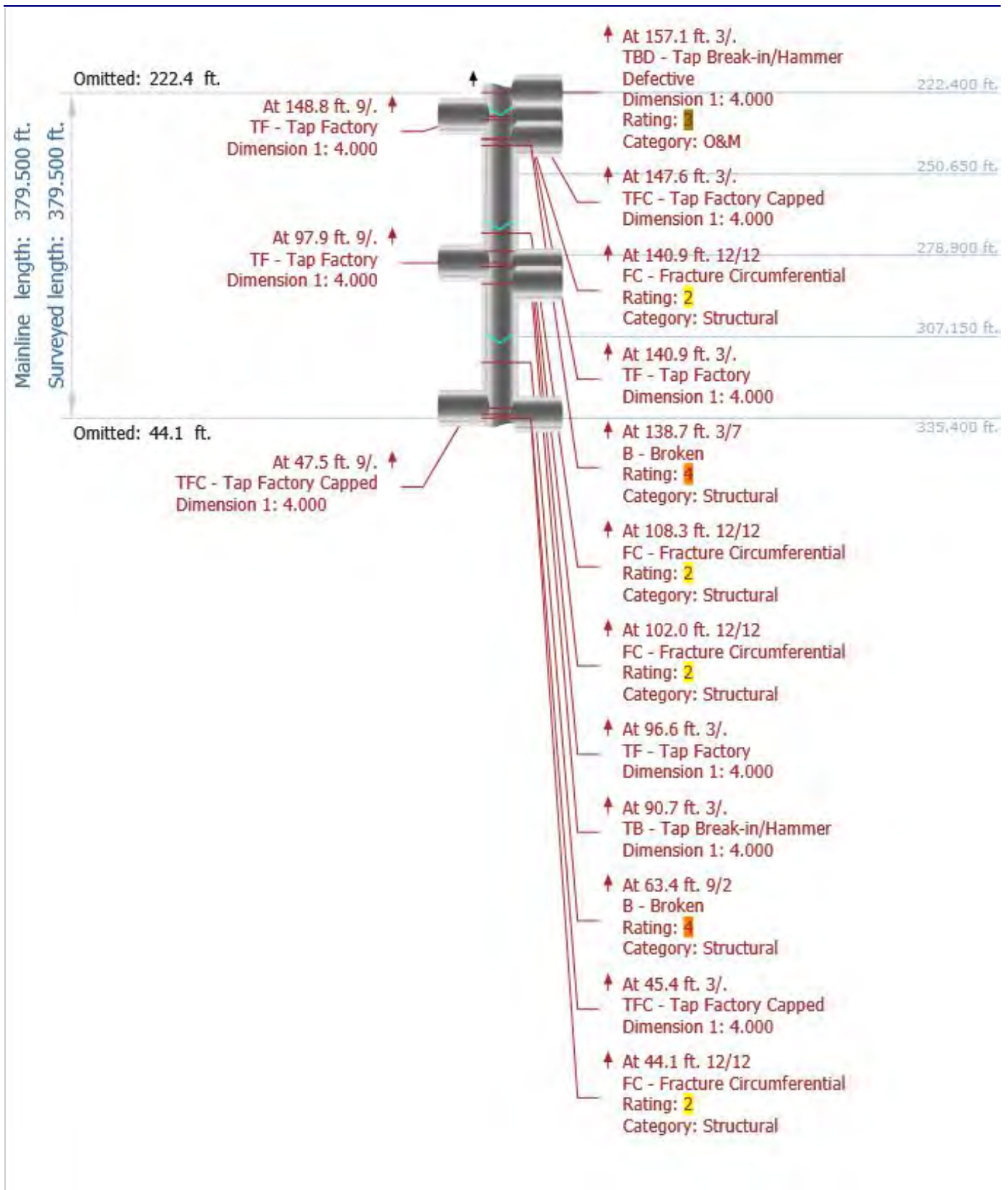
J12040-J12002

3/31/2025 11:57 AM

U

Weather:

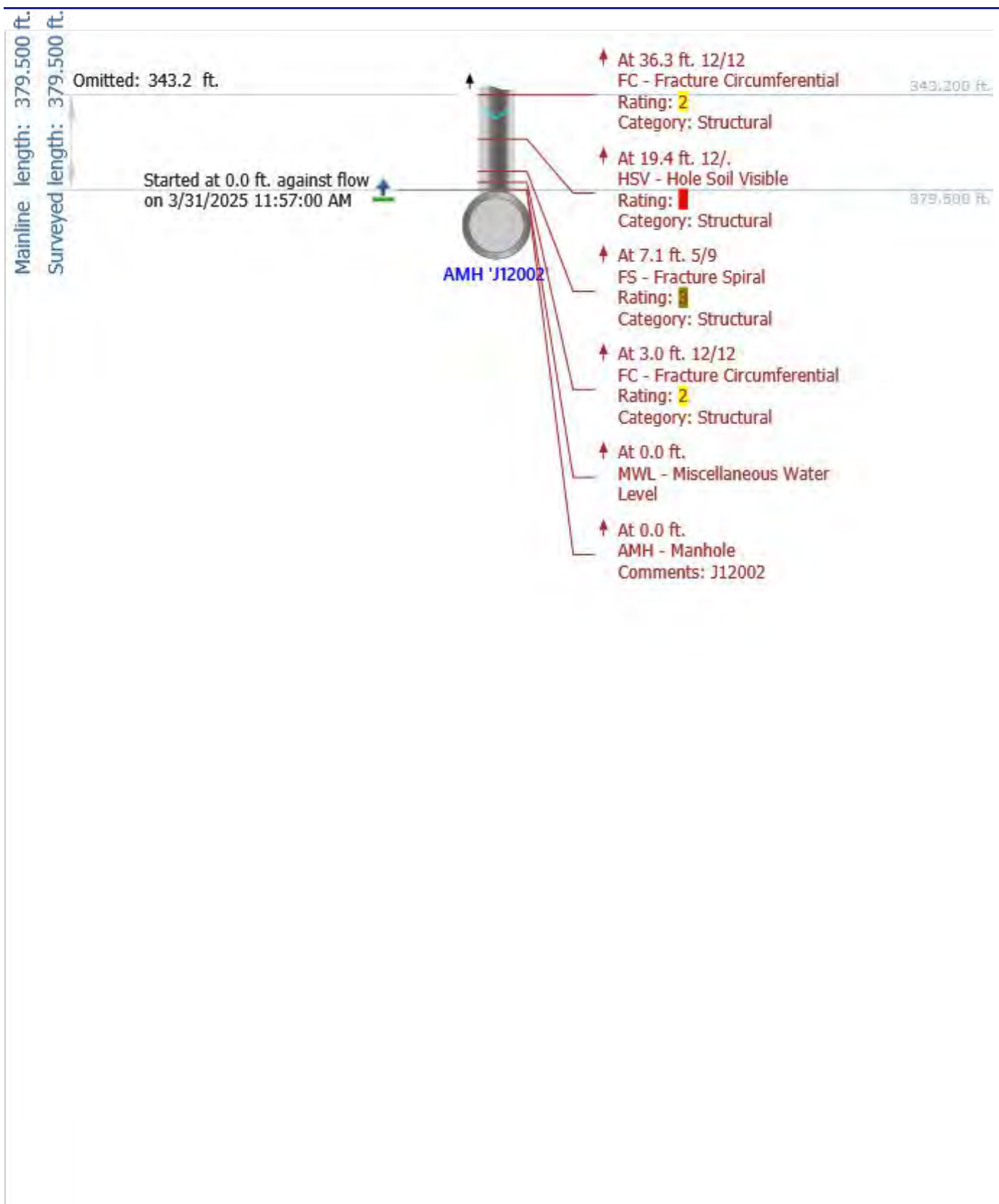
1



Project name: LINCOLN WASTEWATER CONDITION Mainline ID: J12040-J12002 Start date/time: 3/31/2025 11:57 AM Direction: U

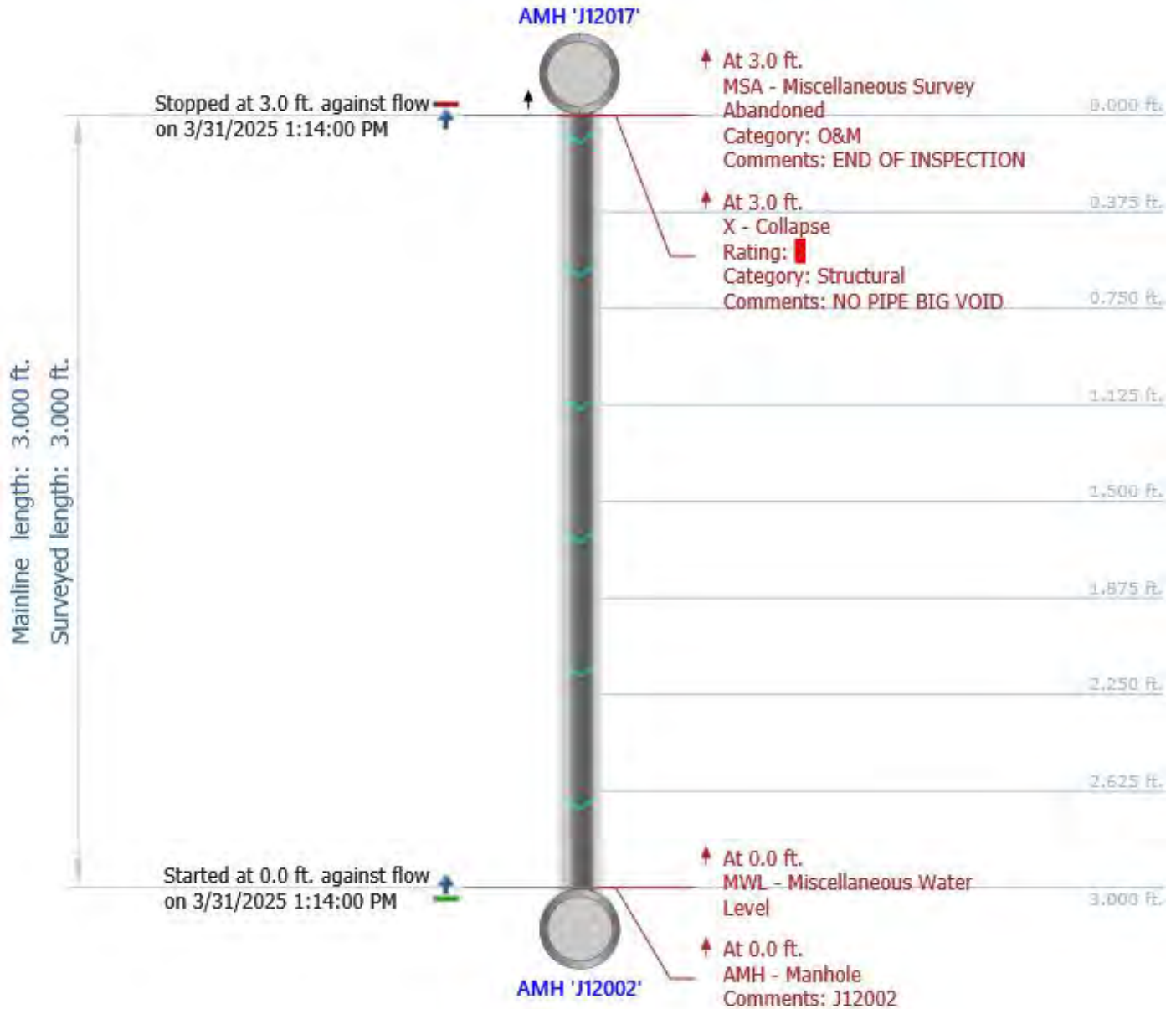
Weather:

1



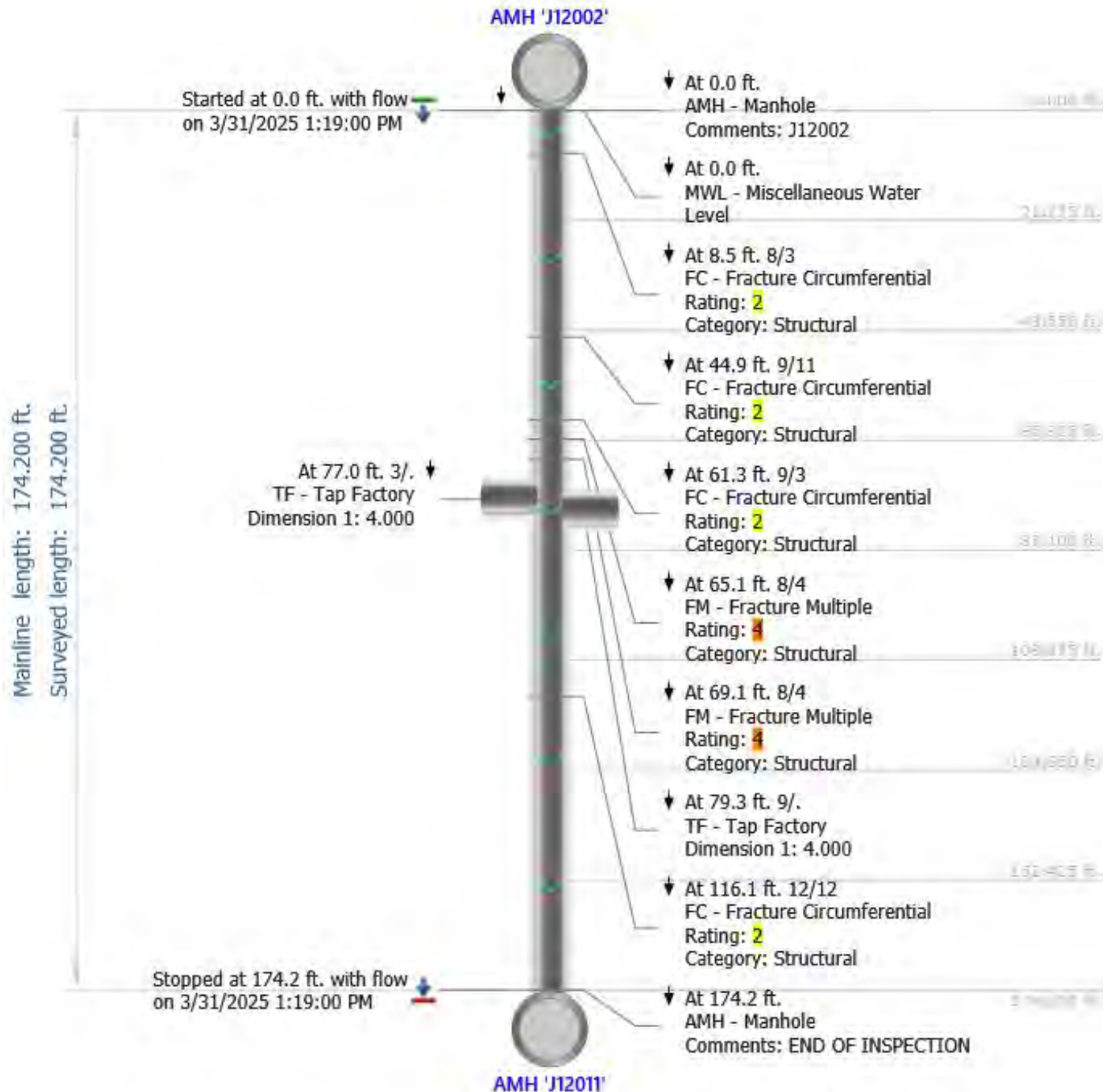
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12017-J12002	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/31/2025 1:14 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



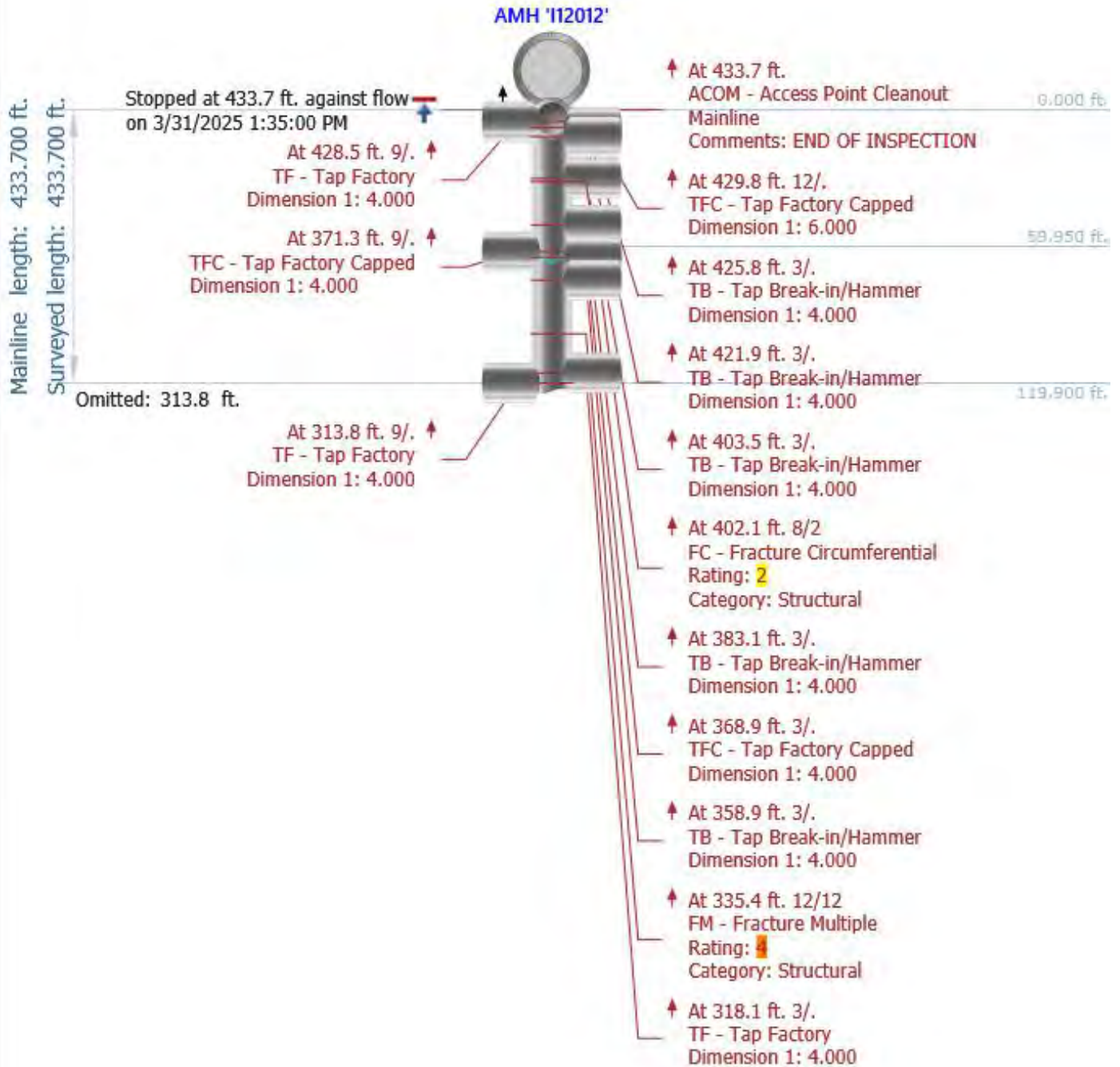
Main Inspections Pipe Run with Images

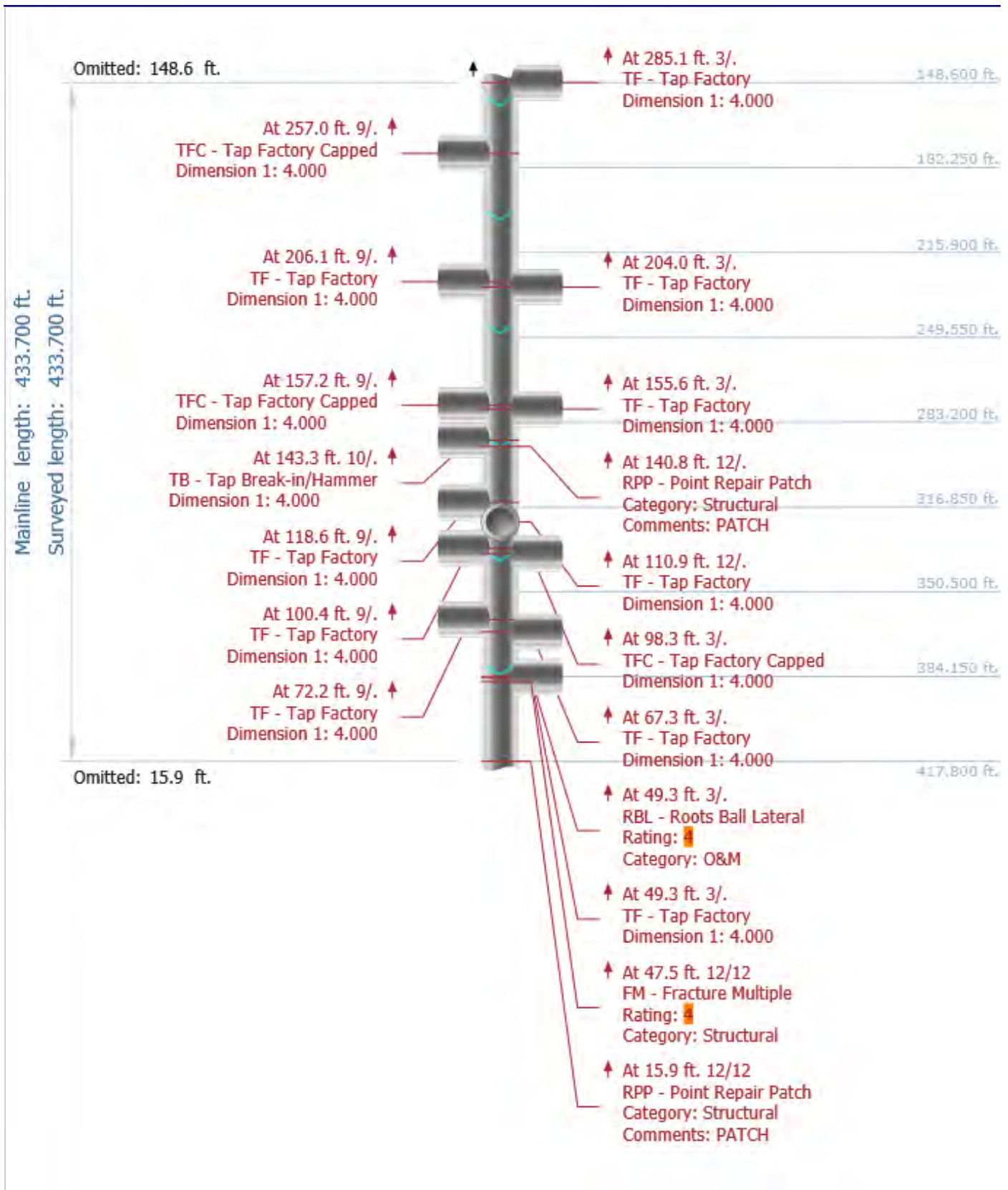
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12002-J12011	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/31/2025 1:19 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12012-J12018	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
3/31/2025 1:35 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

I12012-J12018

Start date/time:

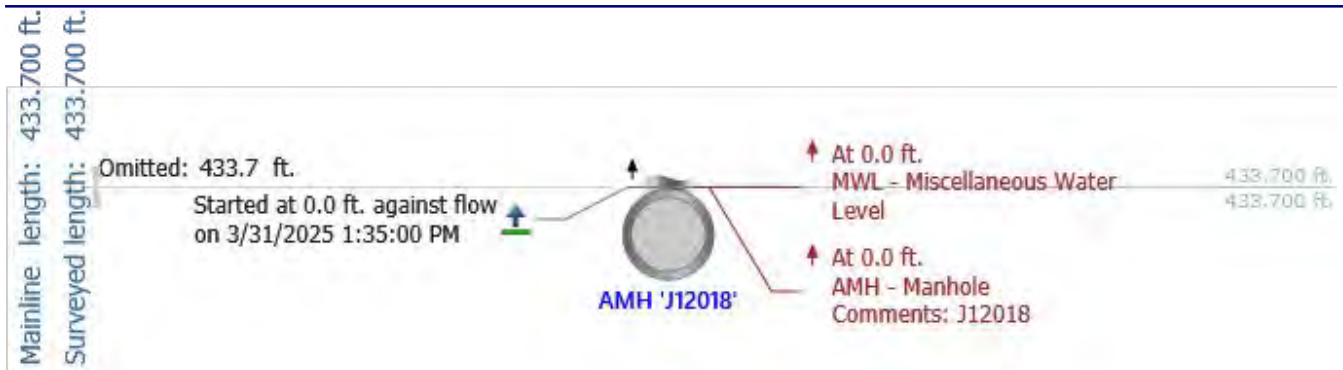
3/31/2025 1:35 PM

Direction:

U

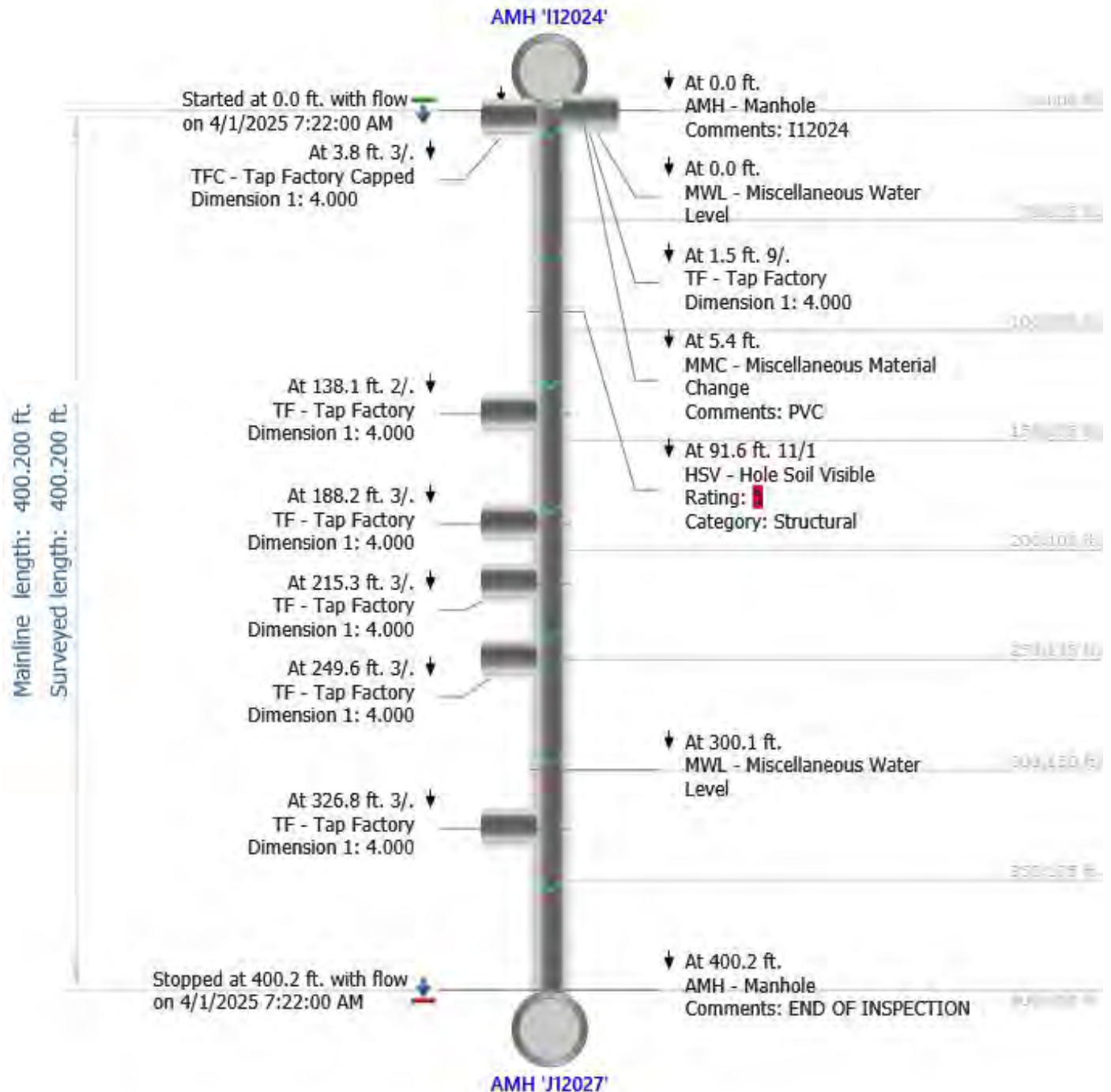
Weather:

1



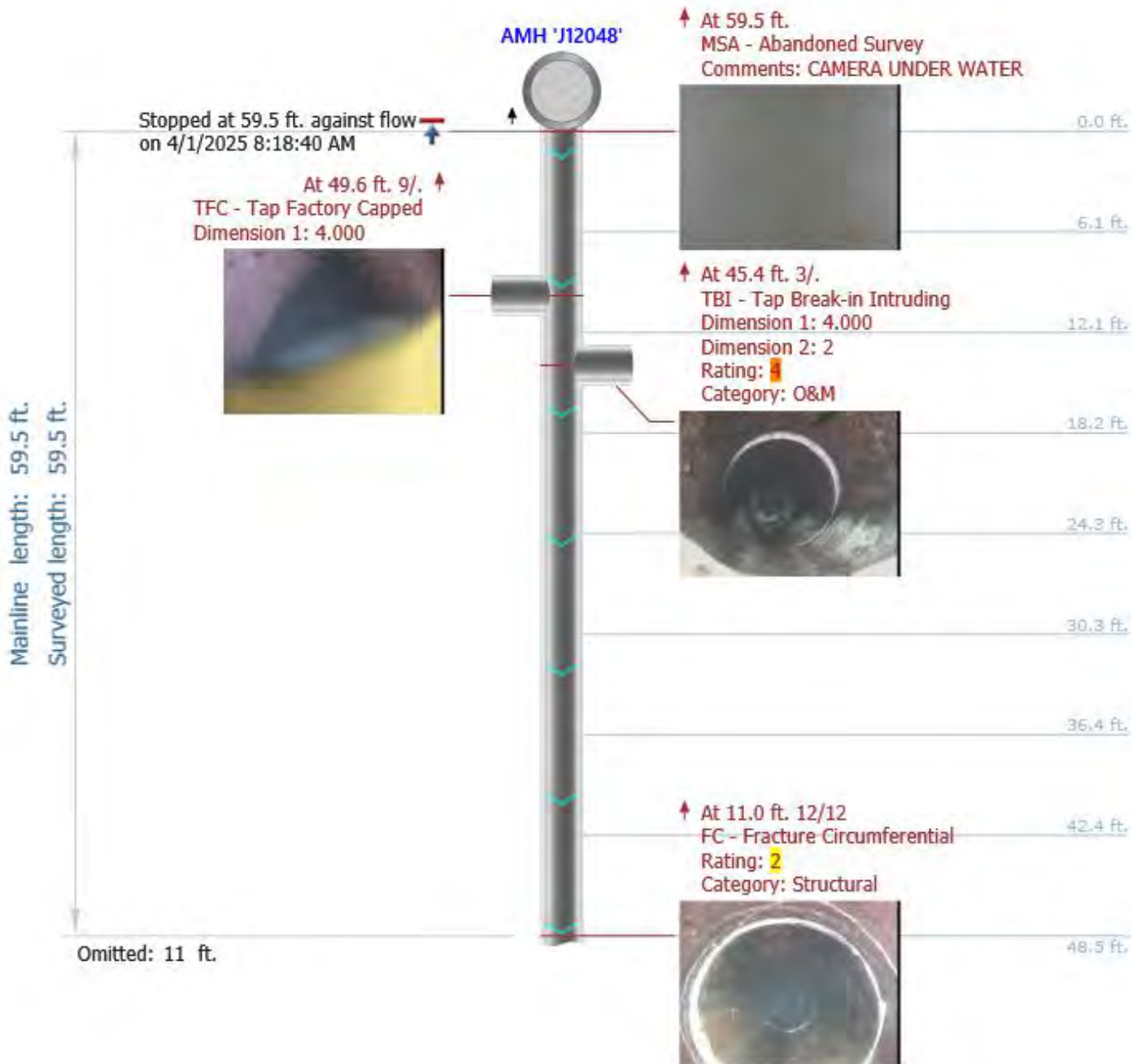
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	I12024-J12027	LINCOLN	6TH ST ALLEY
Start date/time:	Direction:	Weather:	Location code:
4/1/2025 7:22 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



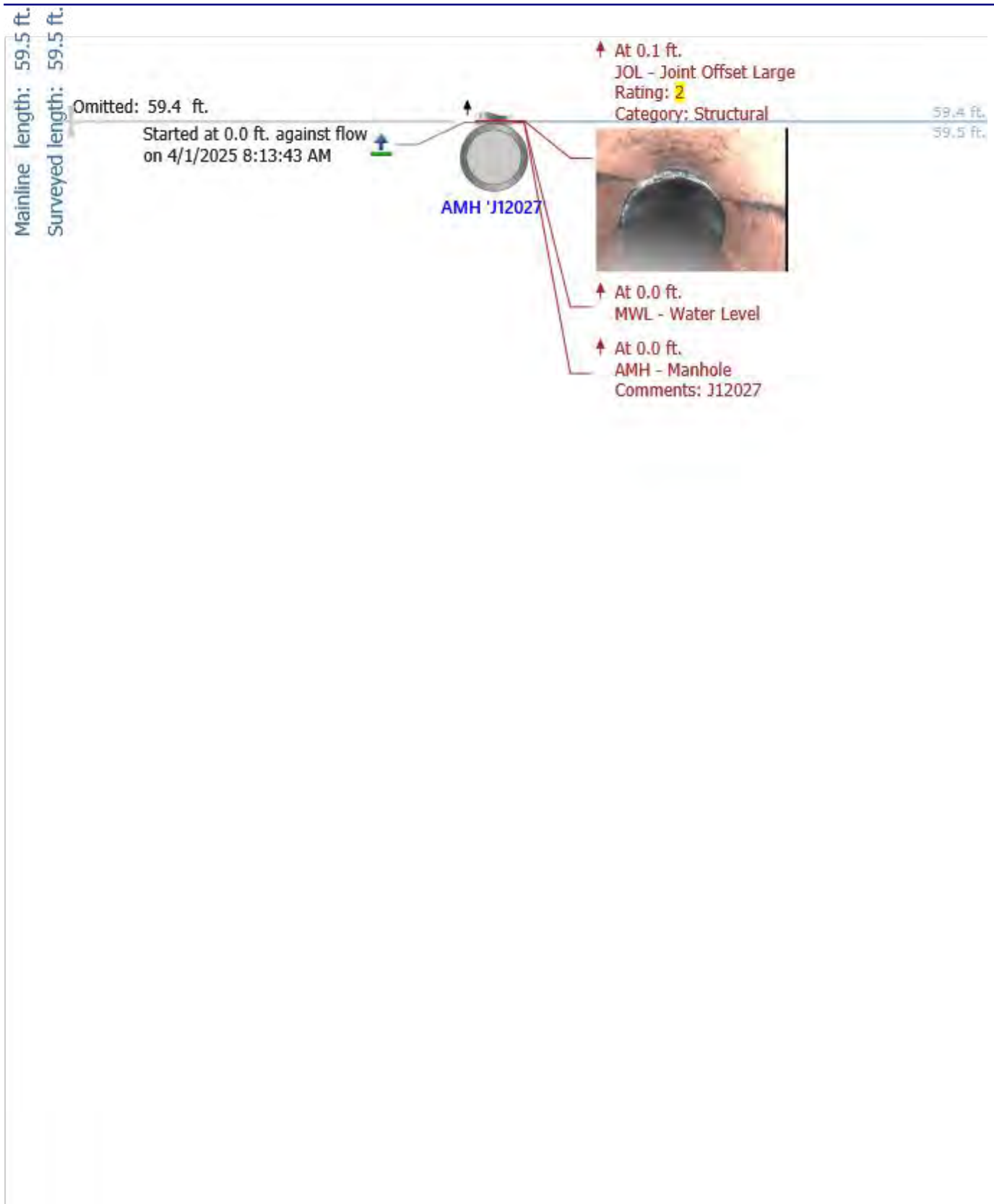
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12048-J12027	LINCOLN	6TH ST
Start date/time:	Direction:	Weather:	Location code:
4/1/2025 8:13 AM	U	1	
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



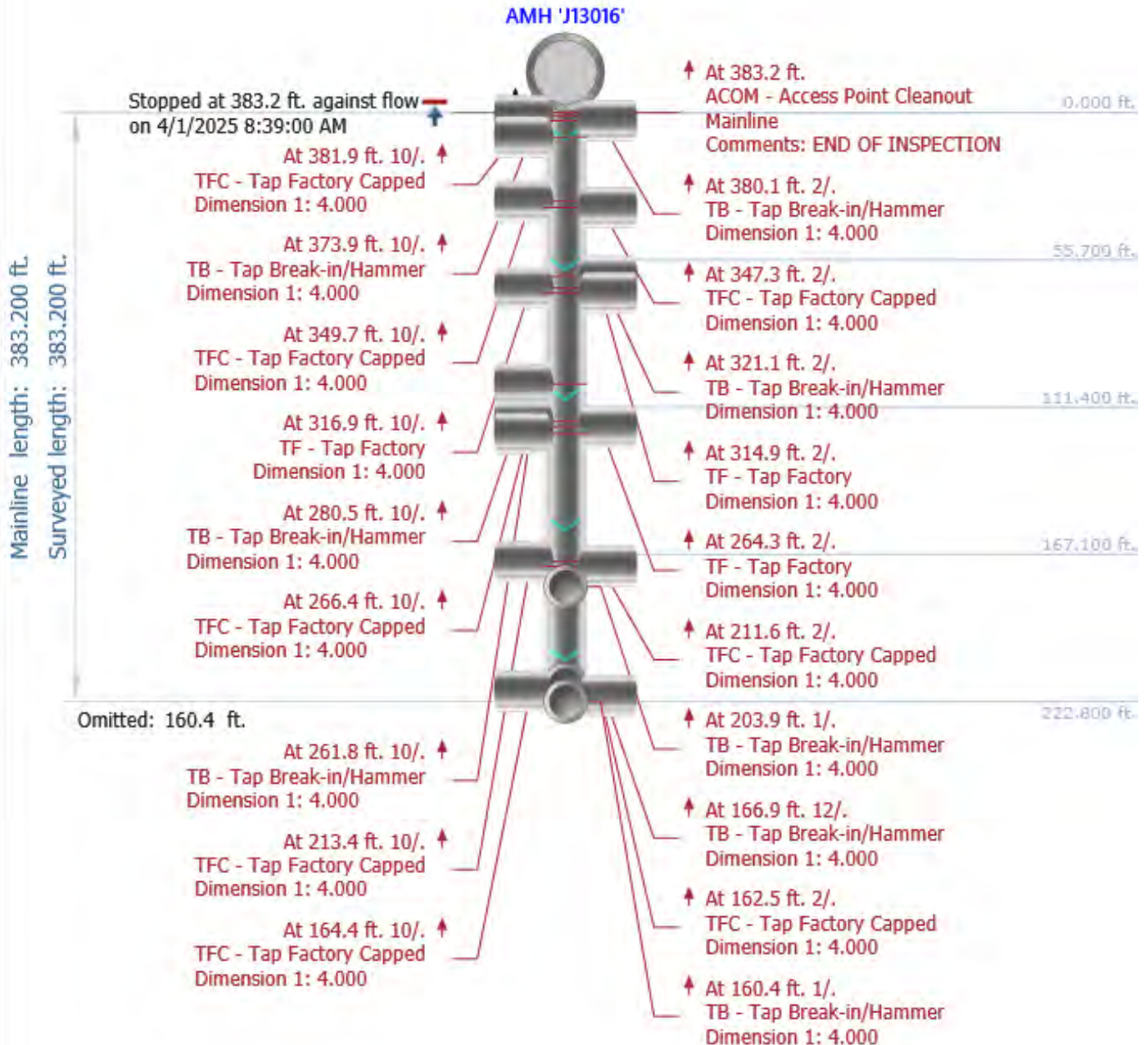
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13016-J13008	LINCOLN	MCBEAN PARK DR
Start date/time:	Direction:	Weather:	Location code:
4/1/2025 8:39 AM	U	1	B
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J13016-J13008

Start date/time:

4/1/2025 8:39 AM

Direction:

U

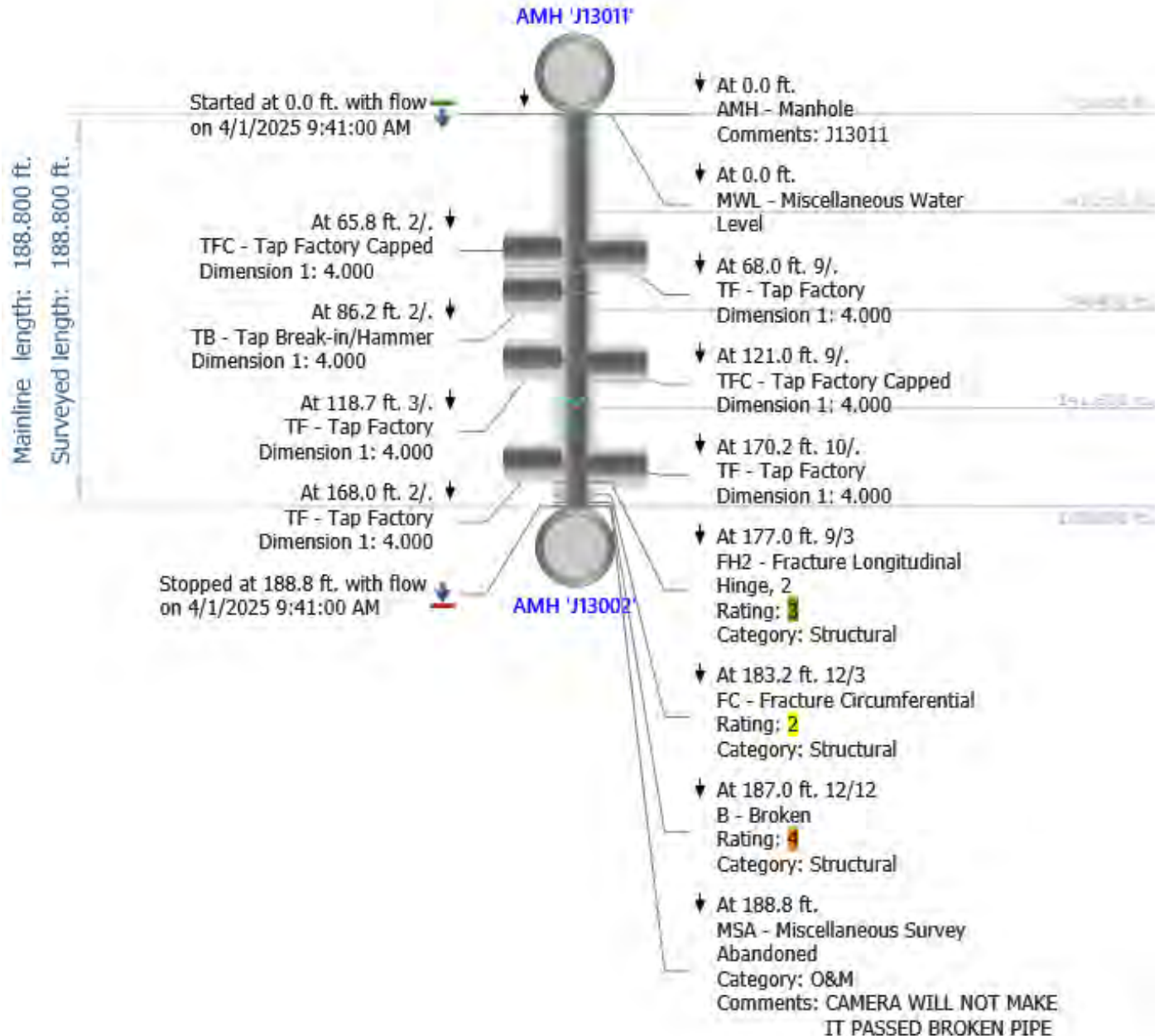
Weather:

1



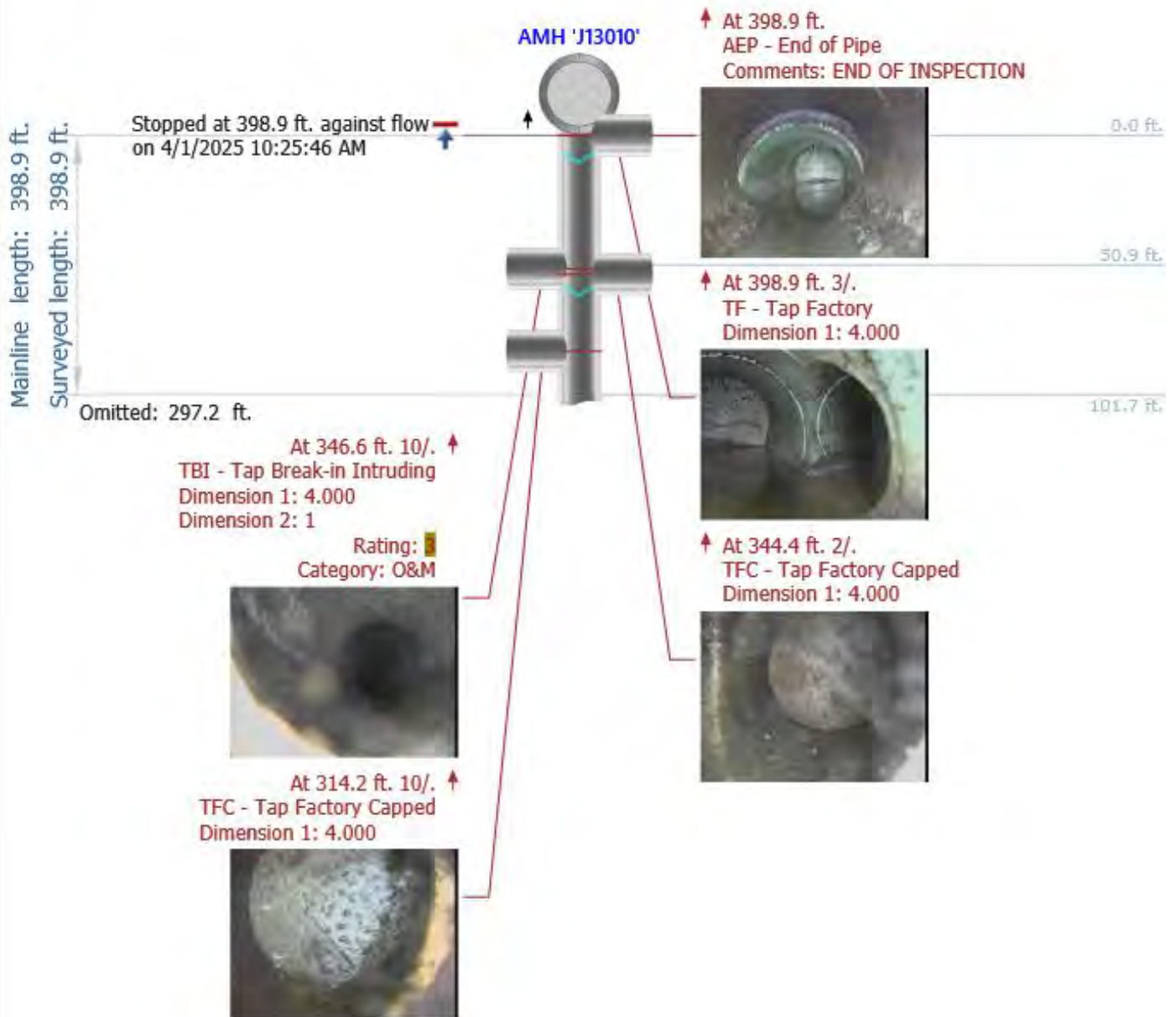
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13011-J13002	LINCOLN	MCBEAN PARK DR
Start date/time:	Direction:	Weather:	Location code:
4/1/2025 9:41 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



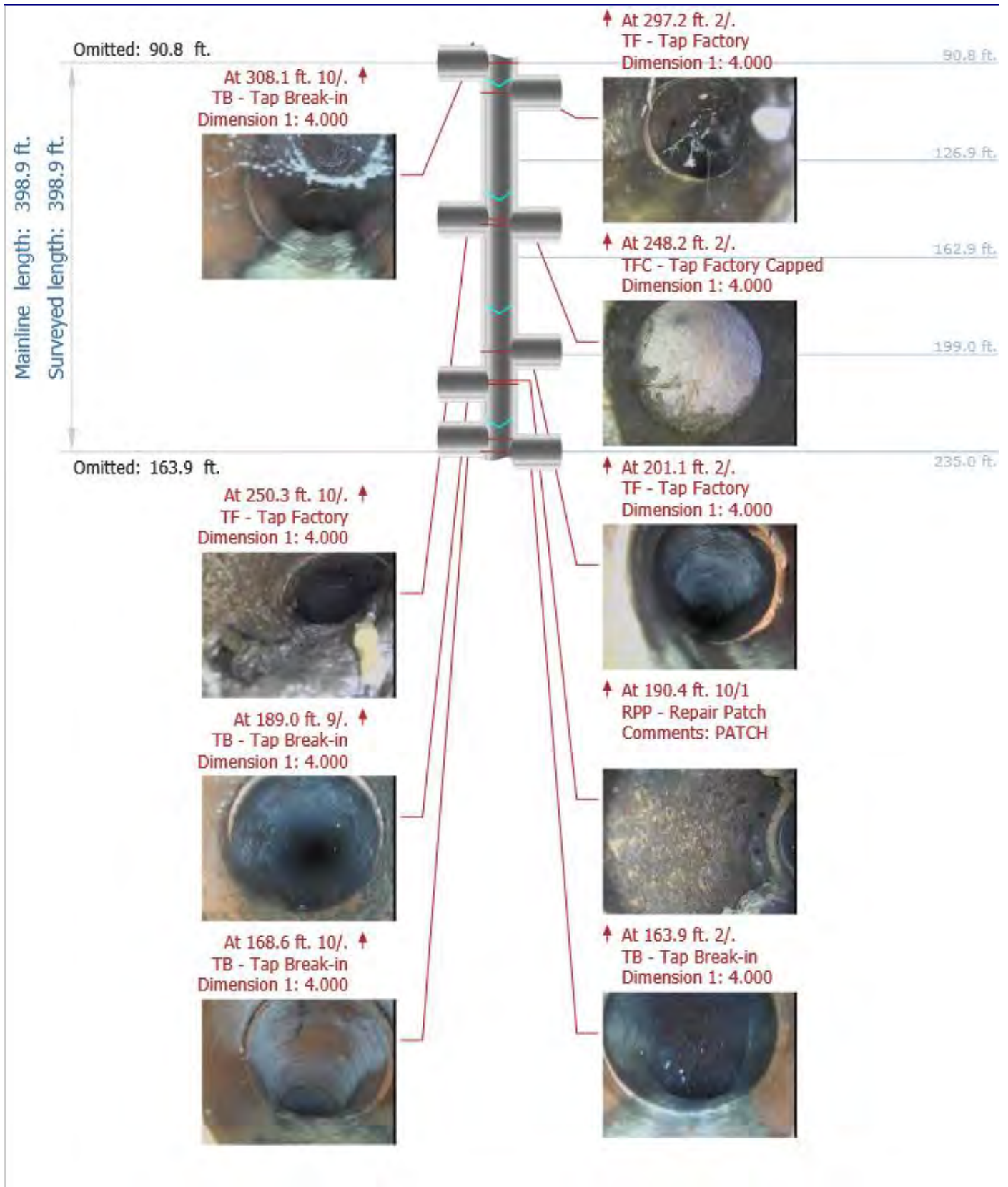
Main Inspections Pipe Run with Images

Project name: LINCOLN WASTEWATER CONDITION	Mainline ID: J13010-J13002	City: LINCOLN	Street: MCBEAN PARK DR
Start date/time: 4/1/2025 9:58 AM	Direction: U	Weather: 1	Location code:
Shape: C	Material: VCP	Height: 6 in.	Width:



Weather:

1



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J13010-J13002

Start date/time:

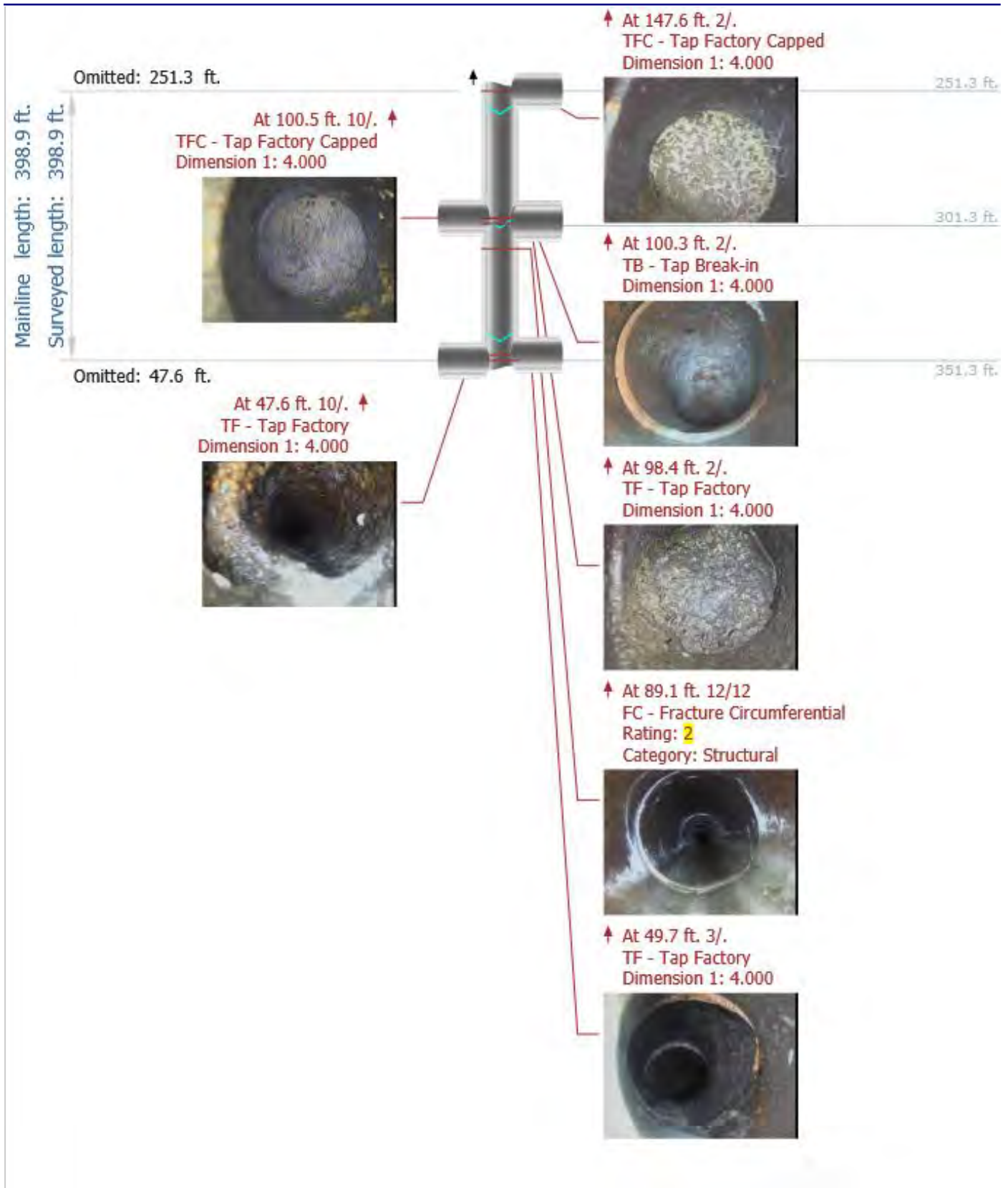
4/1/2025 9:58 AM

Direction:

U

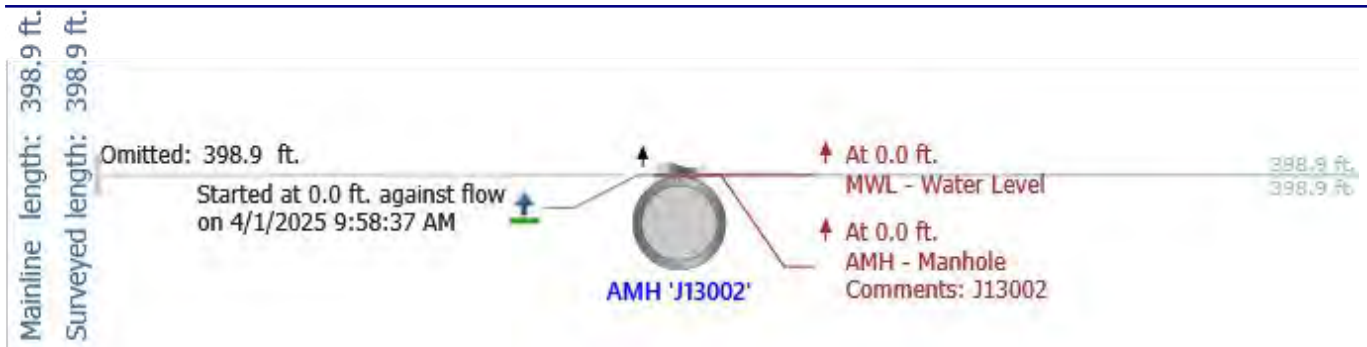
Weather:

1



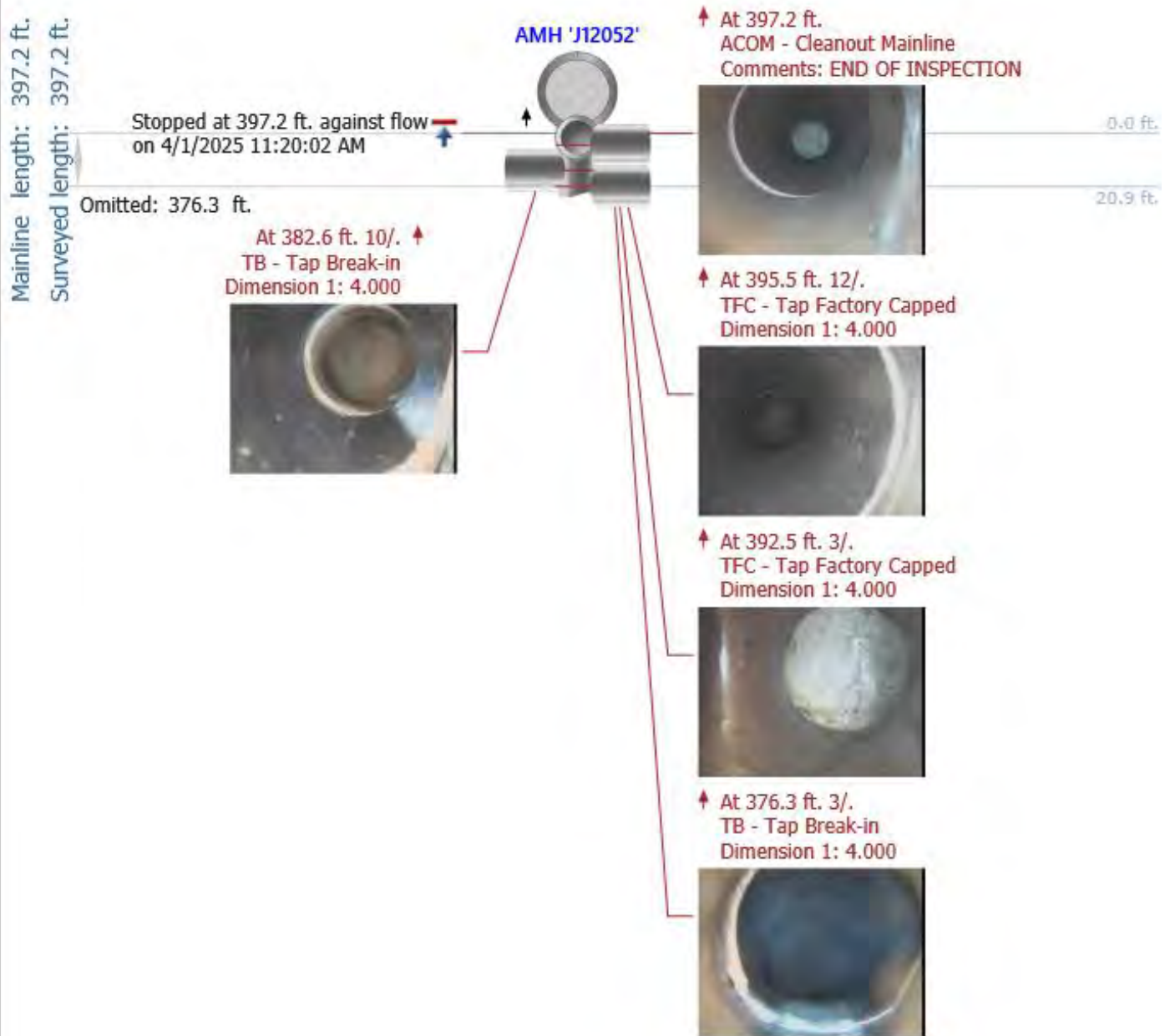
Weather:

1



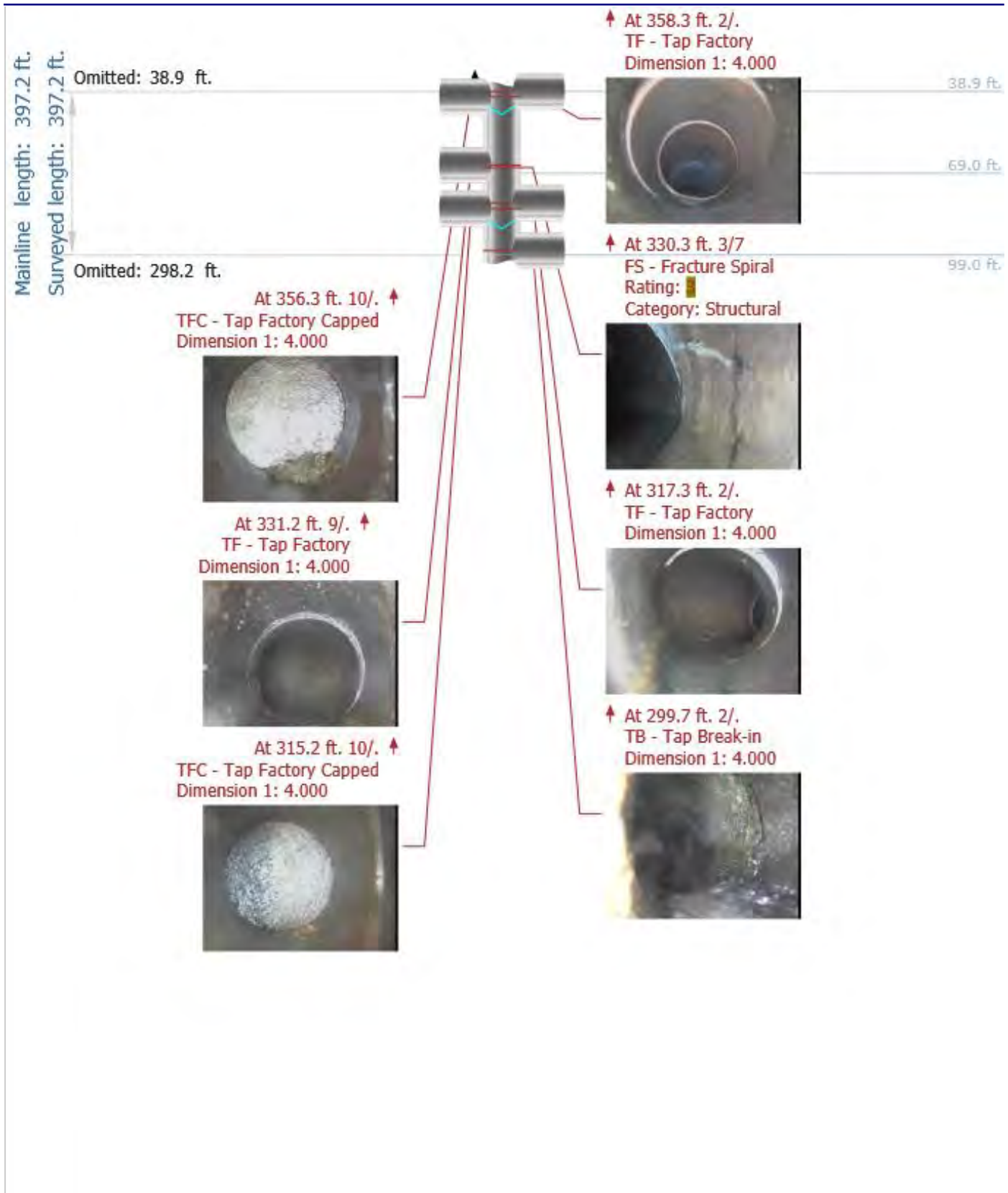
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12052-J12032	LINCOLN	MCBEAN PARK DR
Start date/time:	Direction:	Weather:	Location code:
4/1/2025 10:51 AM	U	1	
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



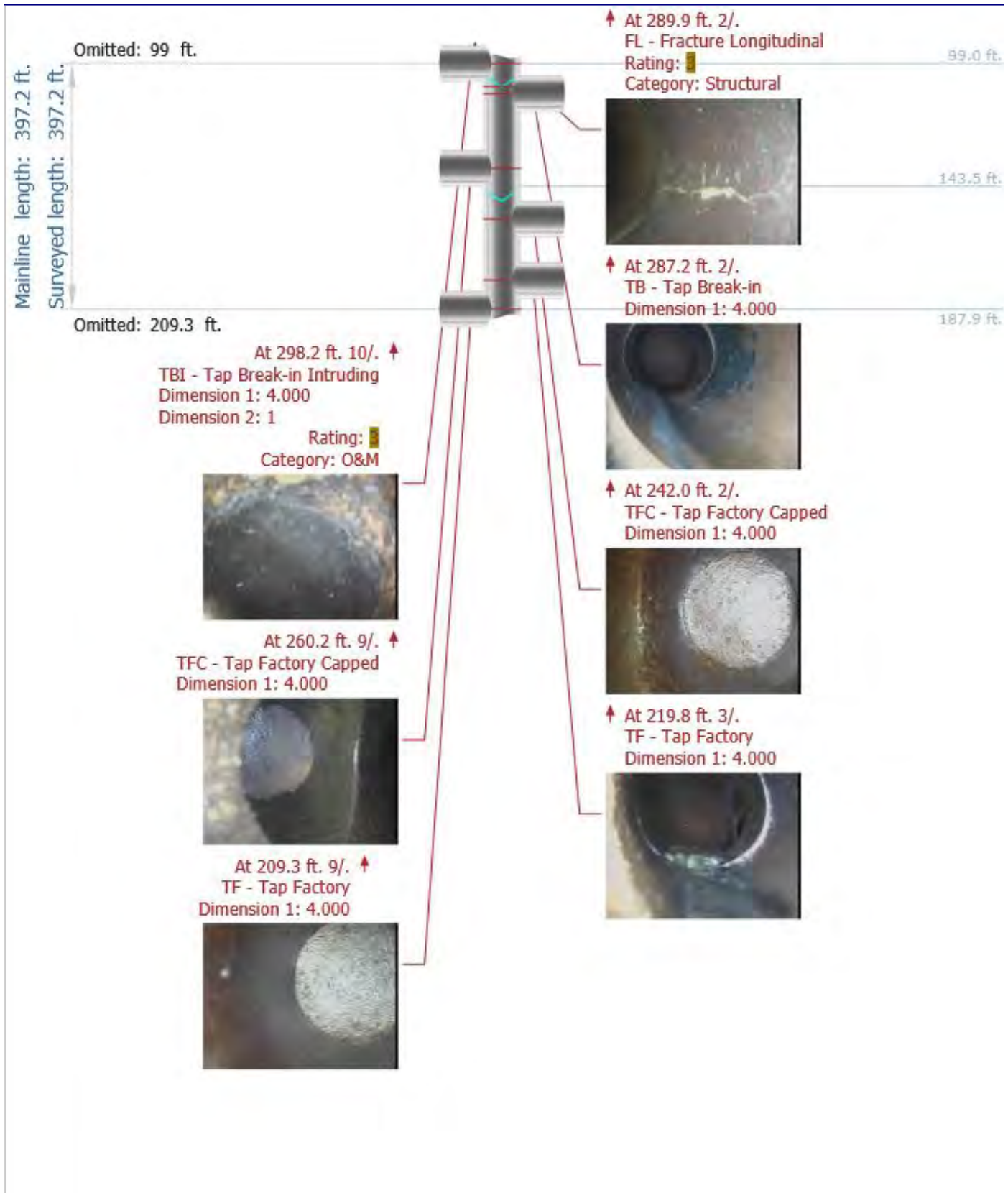
Weather:

1



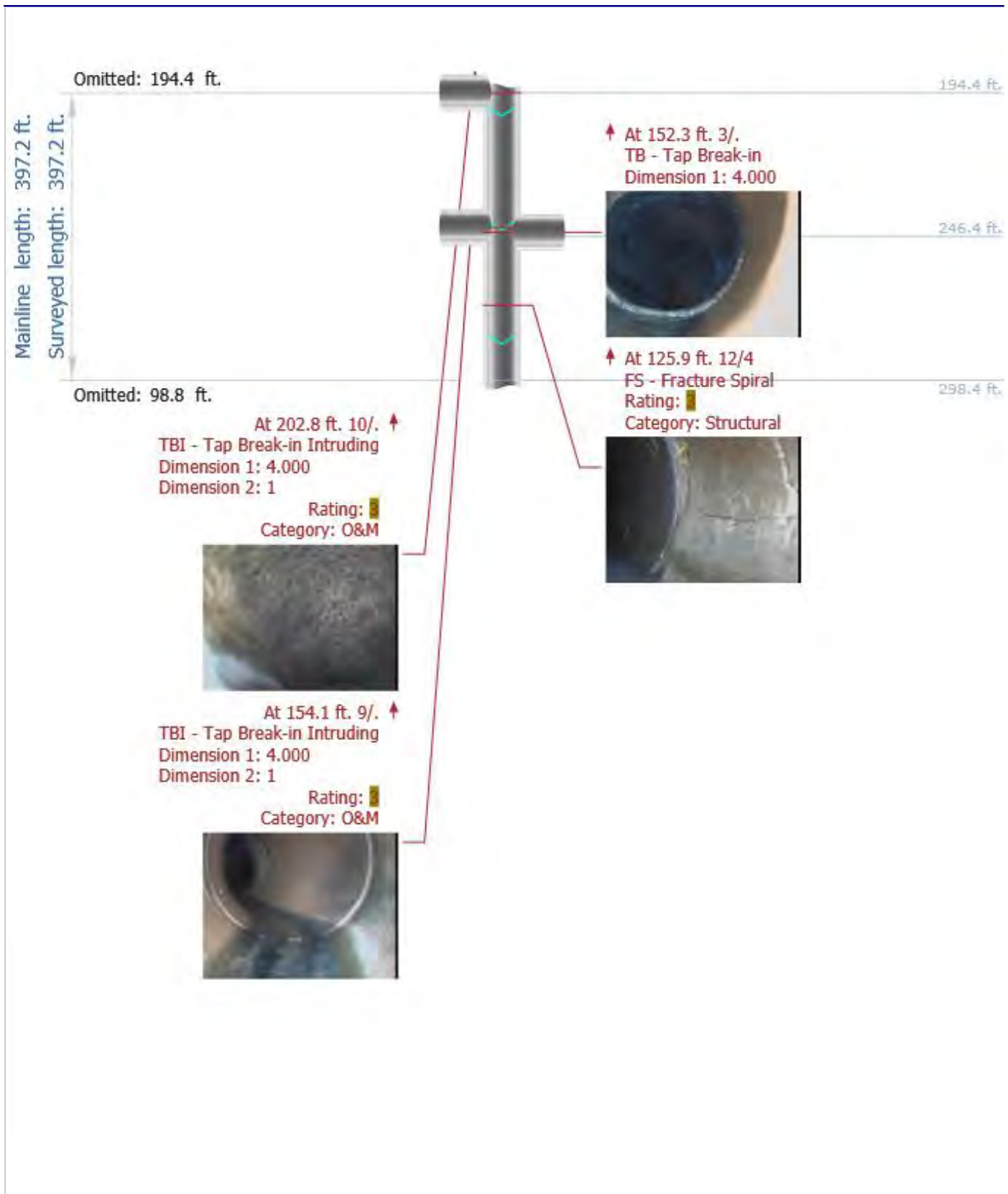
Weather:

1



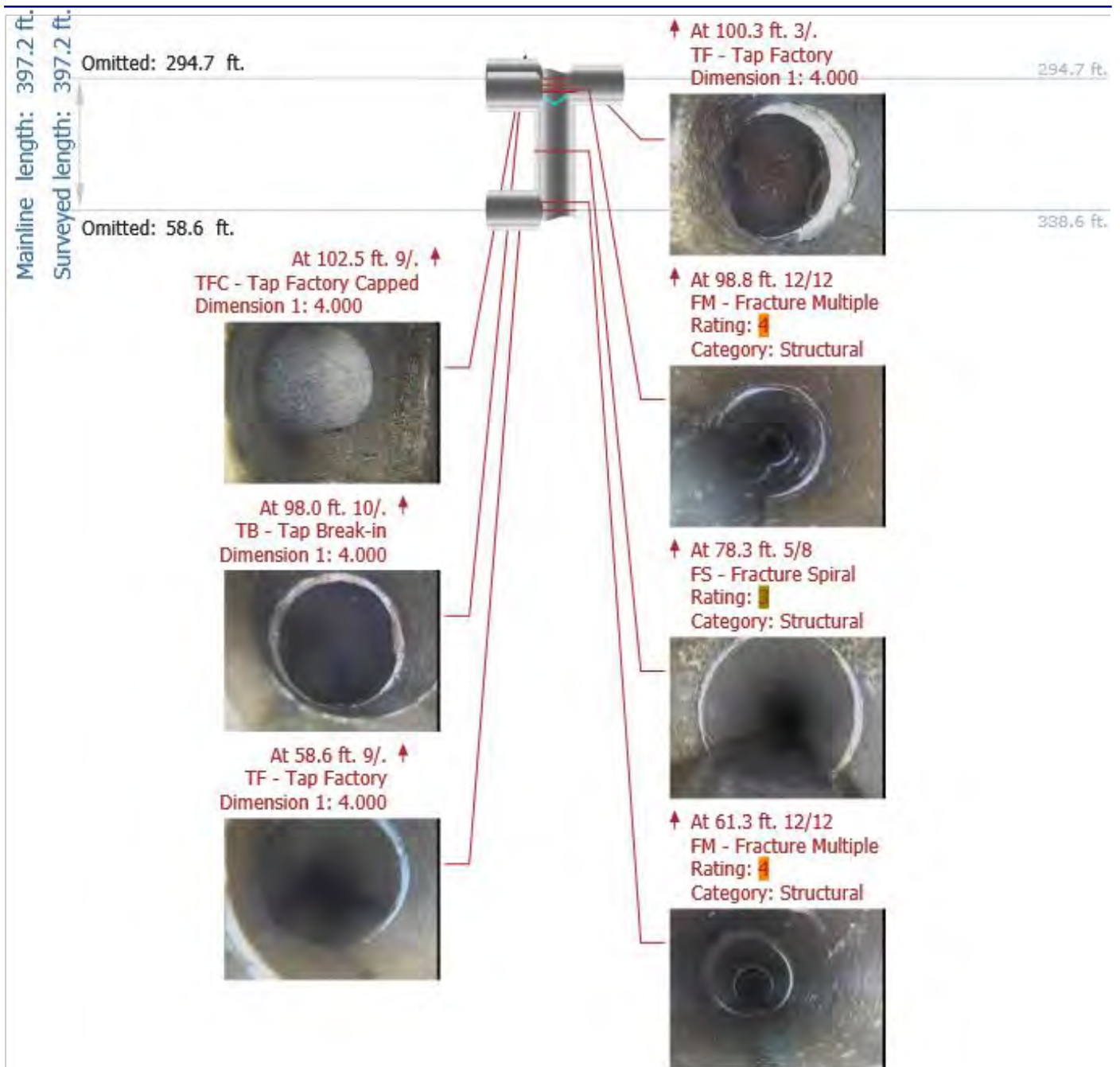
Weather:

1



**LINCOLN WASTEWATER
CONDITION****J12052-J12032****4/1/2025 10:51 AM****U**

Weather:

1

Project name: LINCOLN WASTEWATER CONDITION
Mainline ID: J12052-J12032
Start date/time: 4/1/2025 10:51 AM
Direction: U

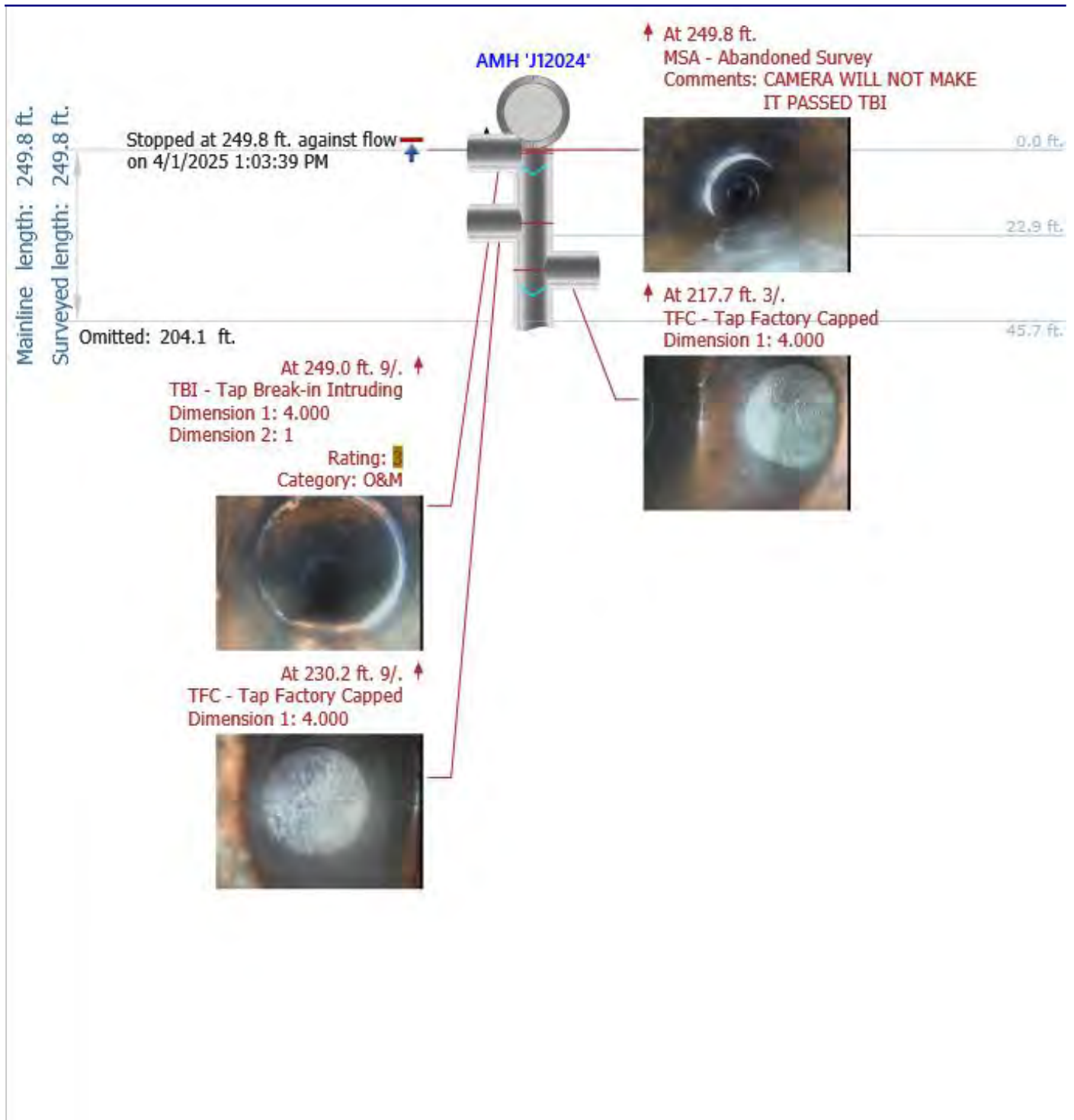
Weather:

1



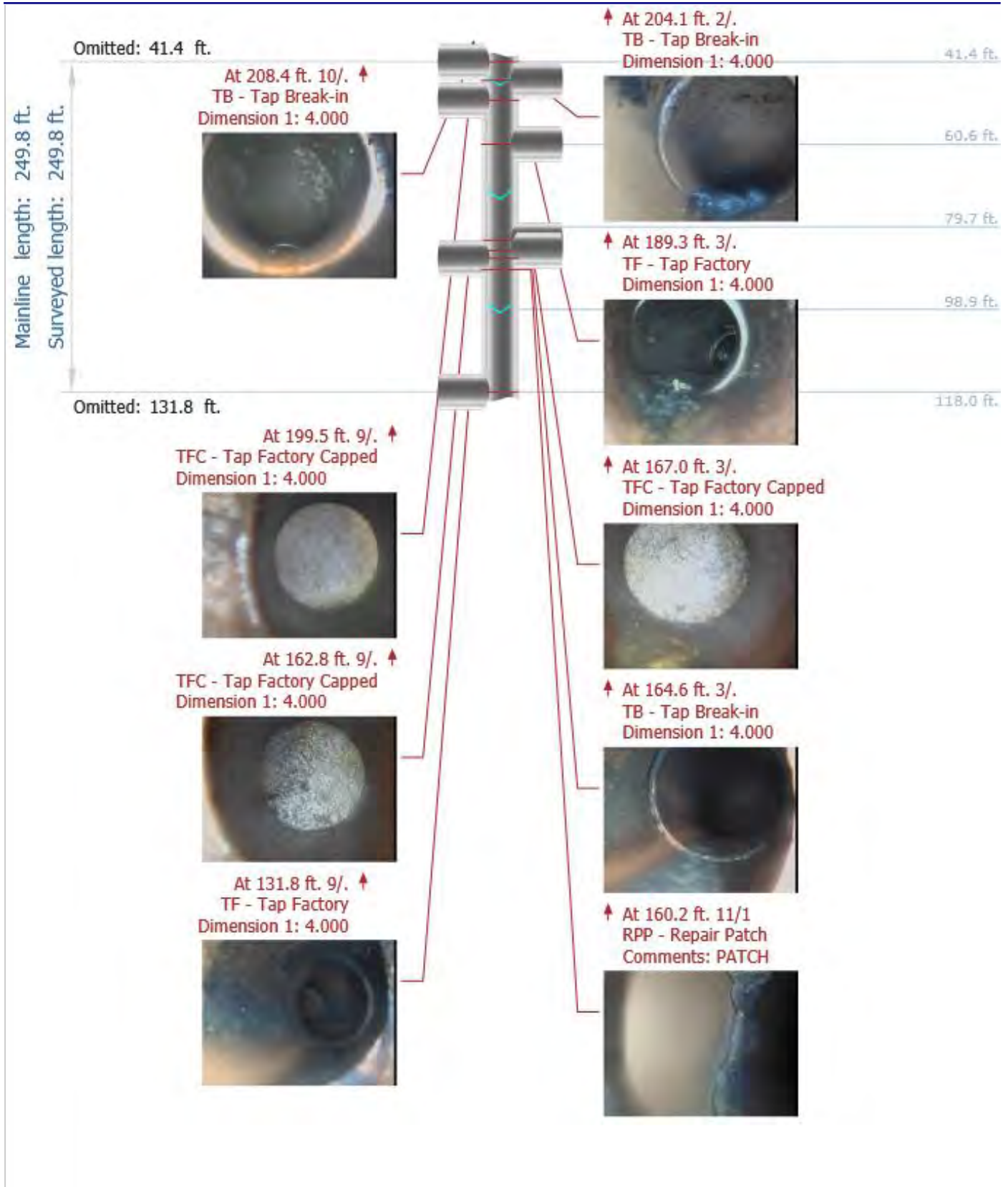
Main Inspections Pipe Run with Images

Project name: LINCOLN WASTEWATER CONDITION	Mainline ID: J12024-J12029	City: LINCOLN	Street: MCBEAN PARK DR
Start date/time: 4/1/2025 12:42 PM	Direction: U	Weather: 1	Location code:
Shape: C	Material: VCP	Height: 6 in.	Width:



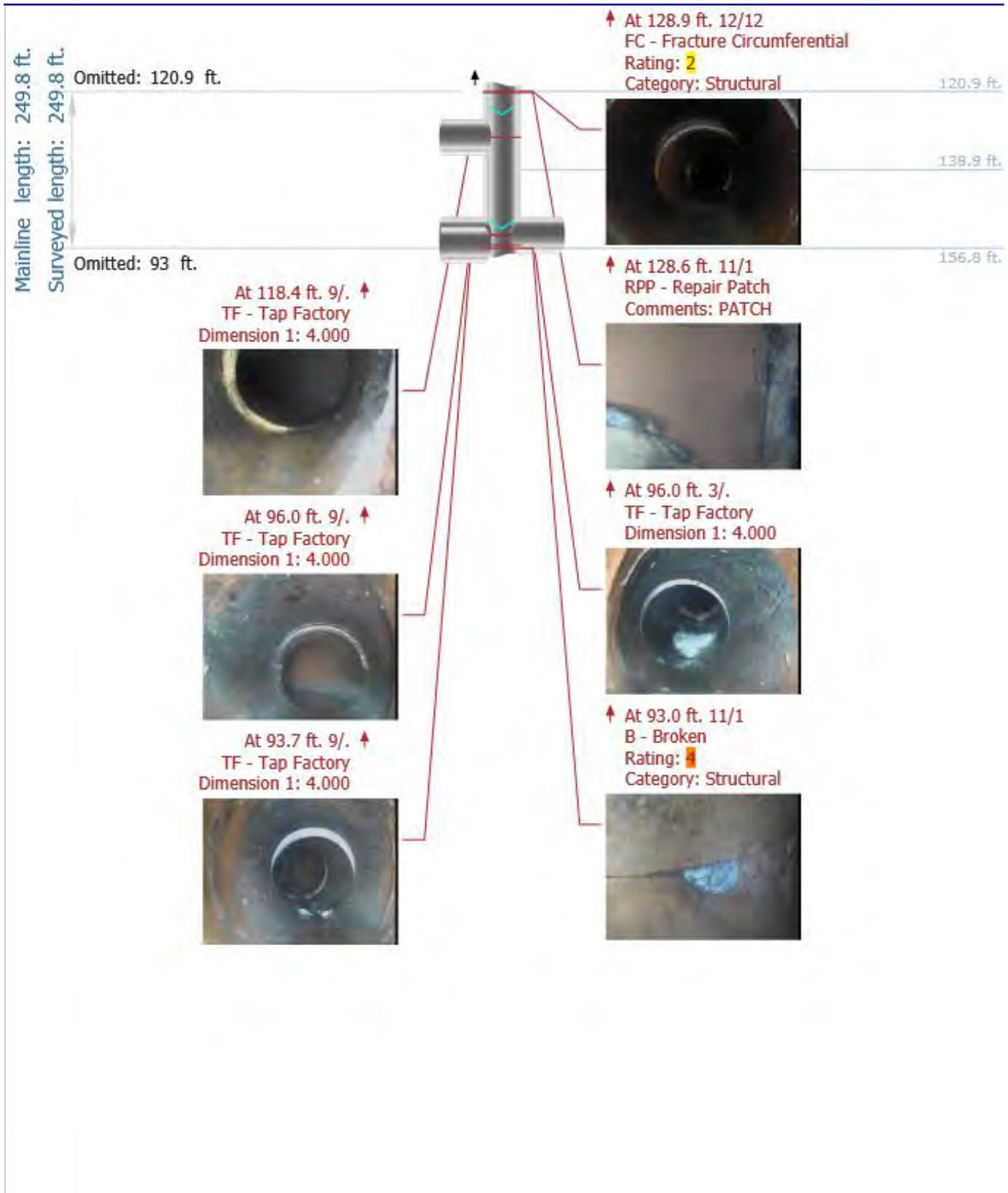
**LINCOLN WASTEWATER
CONDITION****J12024-J12029****4/1/2025 12:42 PM****U**

Weather:

1

Weather:

1



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J12024-J12029

Start date/time:

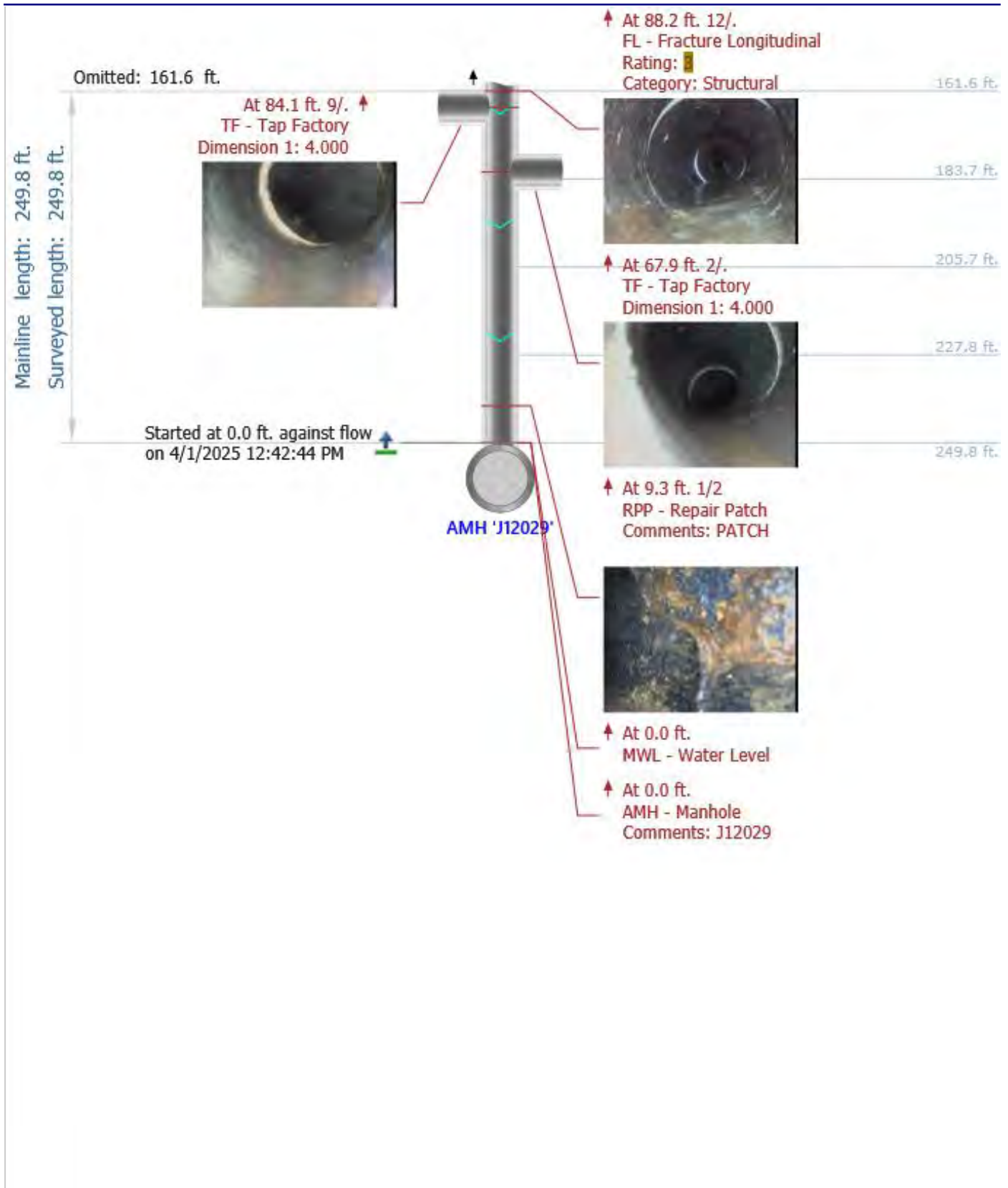
4/1/2025 12:42 PM

Direction:

U

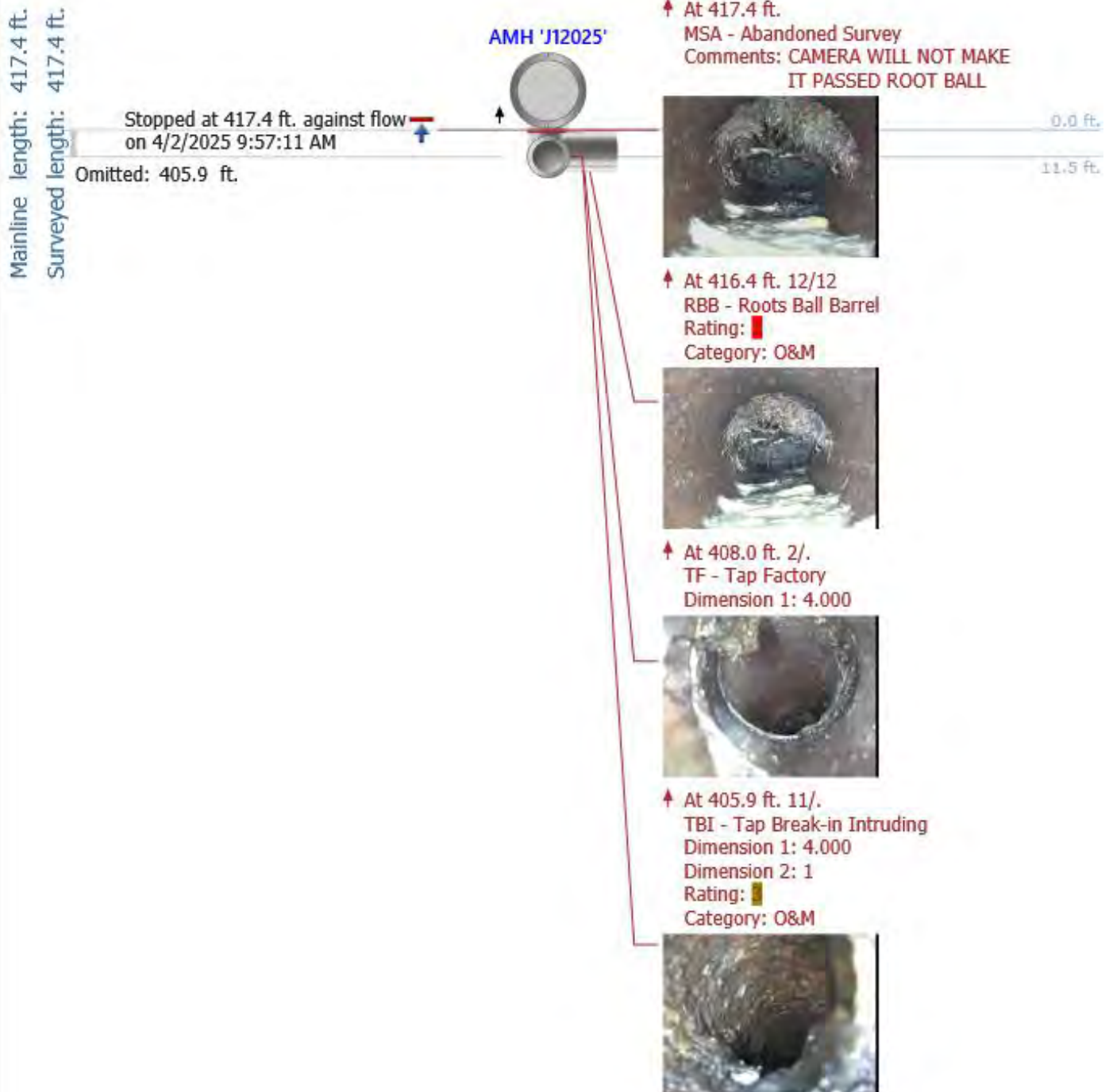
Weather:

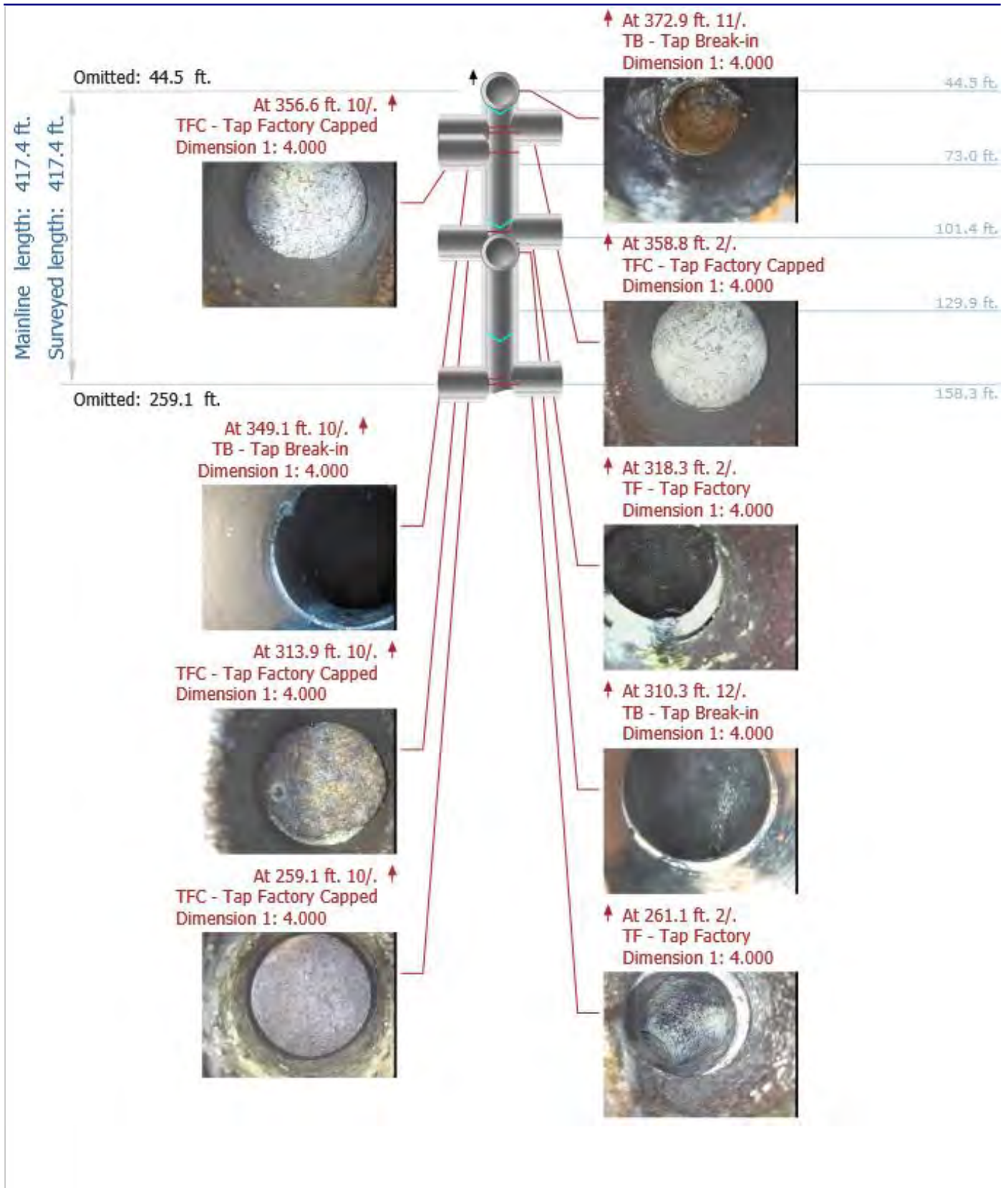
1



Main Inspections Pipe Run with Images

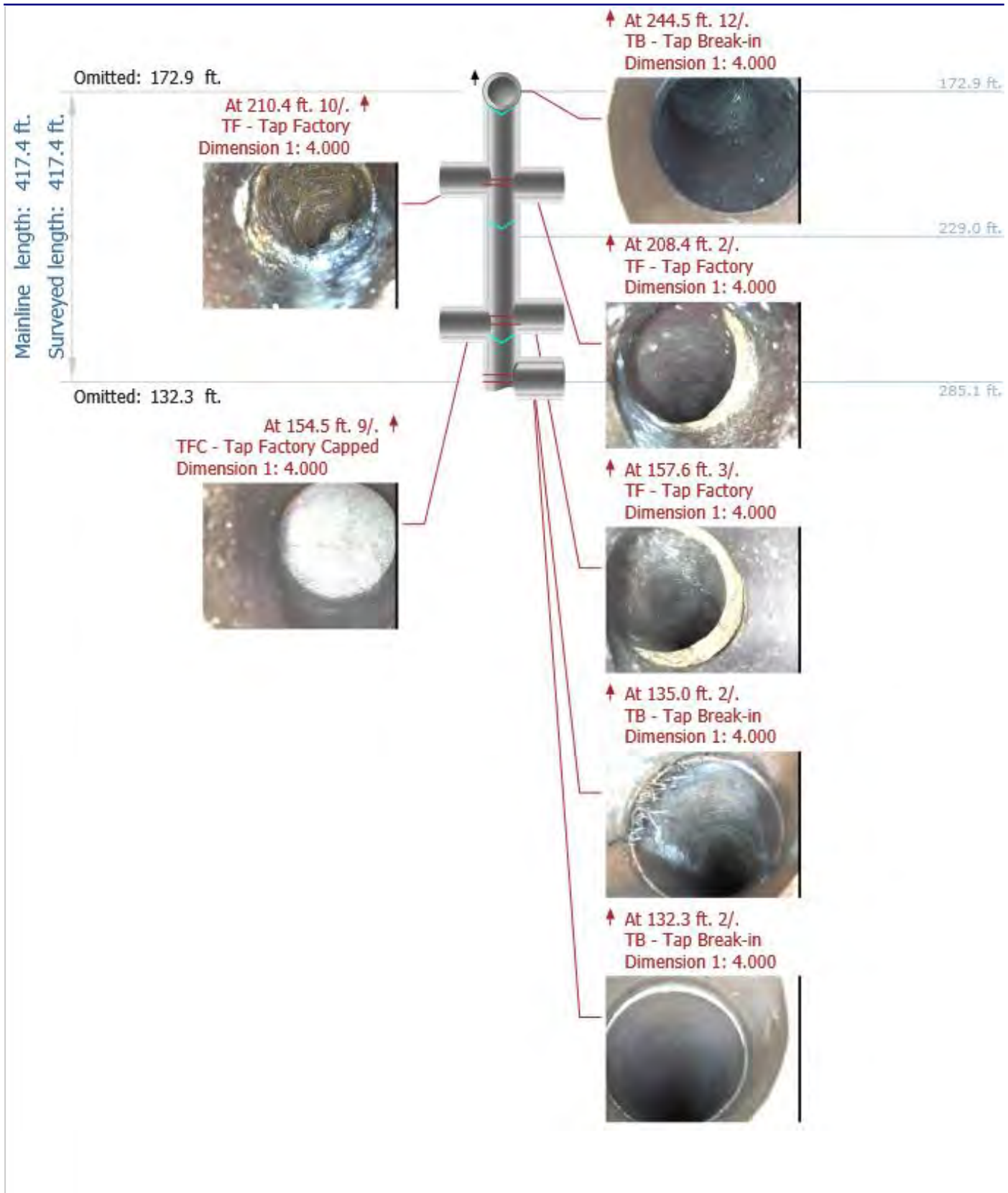
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12025-J12029	LINCOLN	MCBEAN PARK DR
Start date/time:	Direction:	Weather:	Location code:
4/2/2025 9:30 AM	U	1	
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





Weather:

1



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J12025-J12029

Start date/time:

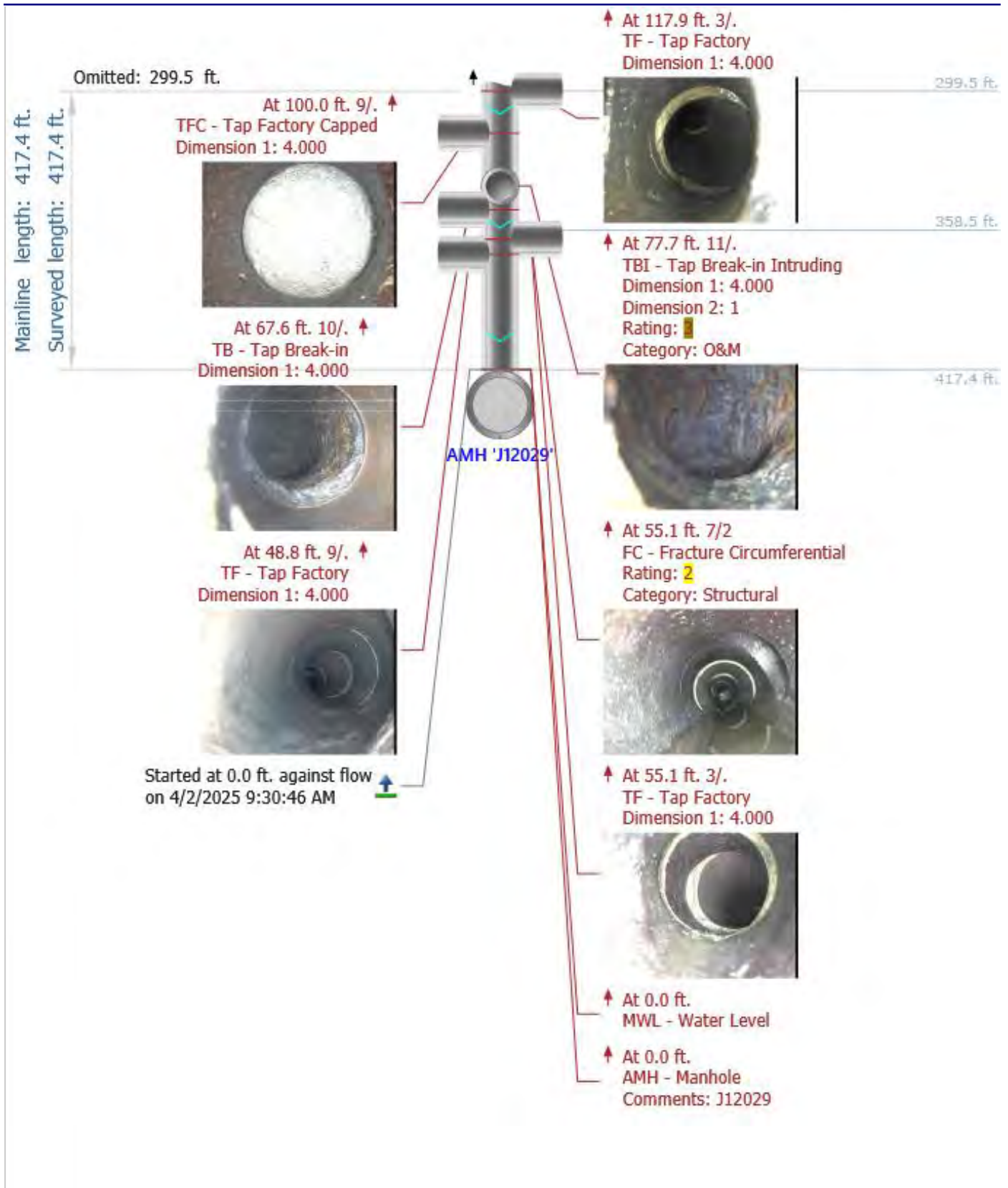
4/2/2025 9:30 AM

Direction:

U

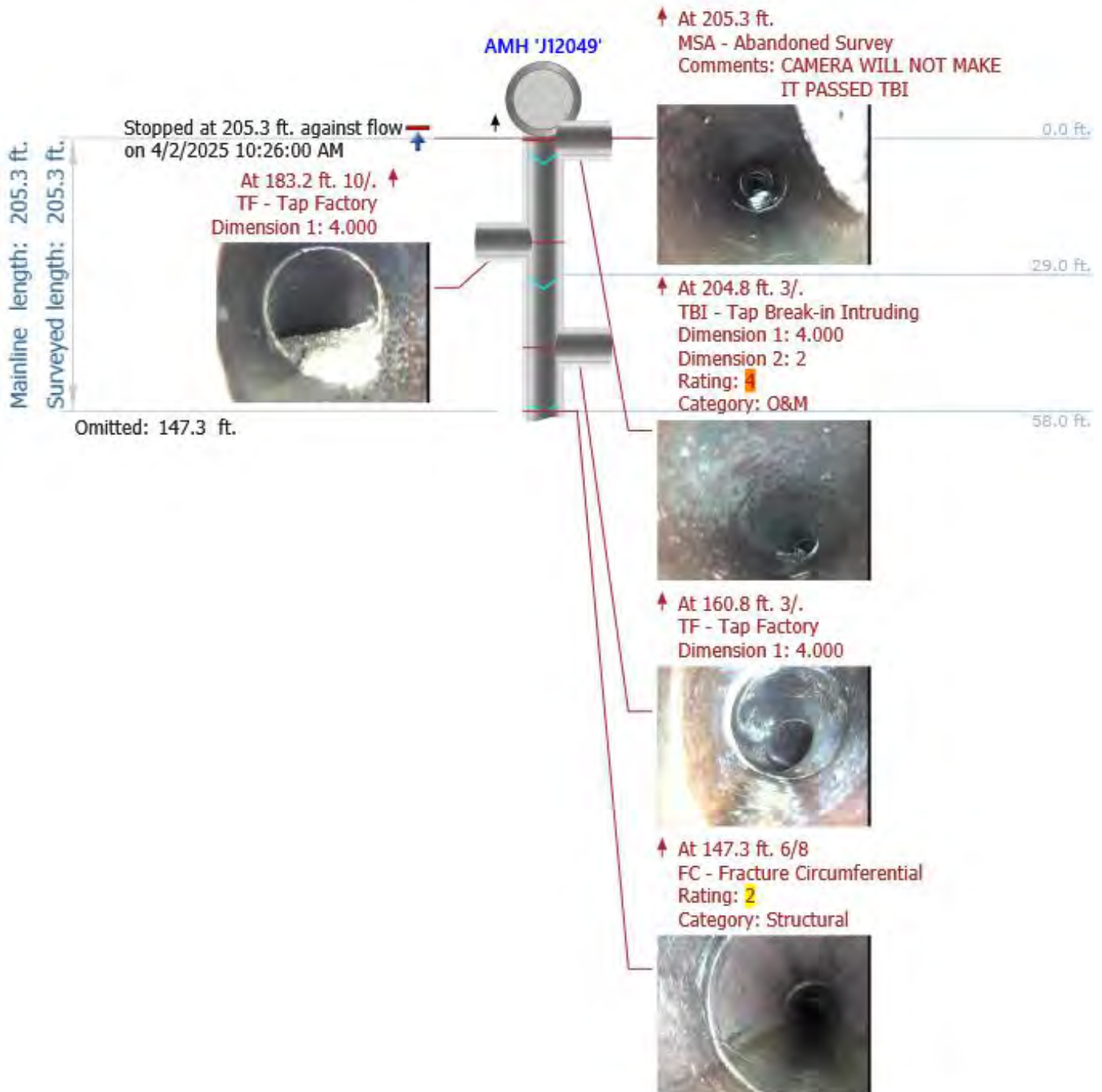
Weather:

1



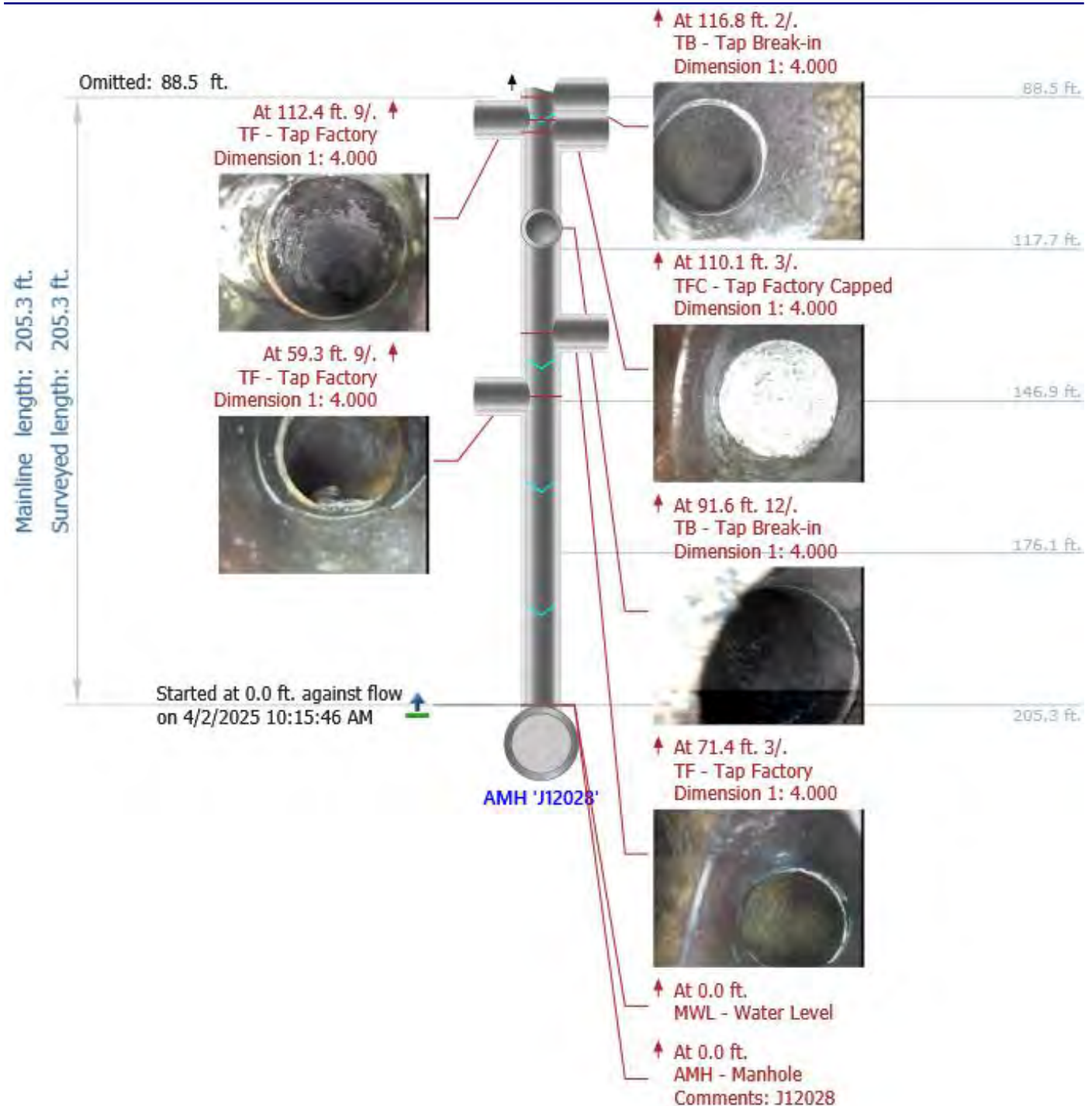
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12049-J12028	LINCOLN	MCBEAN PARK DR
Start date/time:	Direction:	Weather:	Location code:
4/2/2025 10:15 AM	U	1	
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



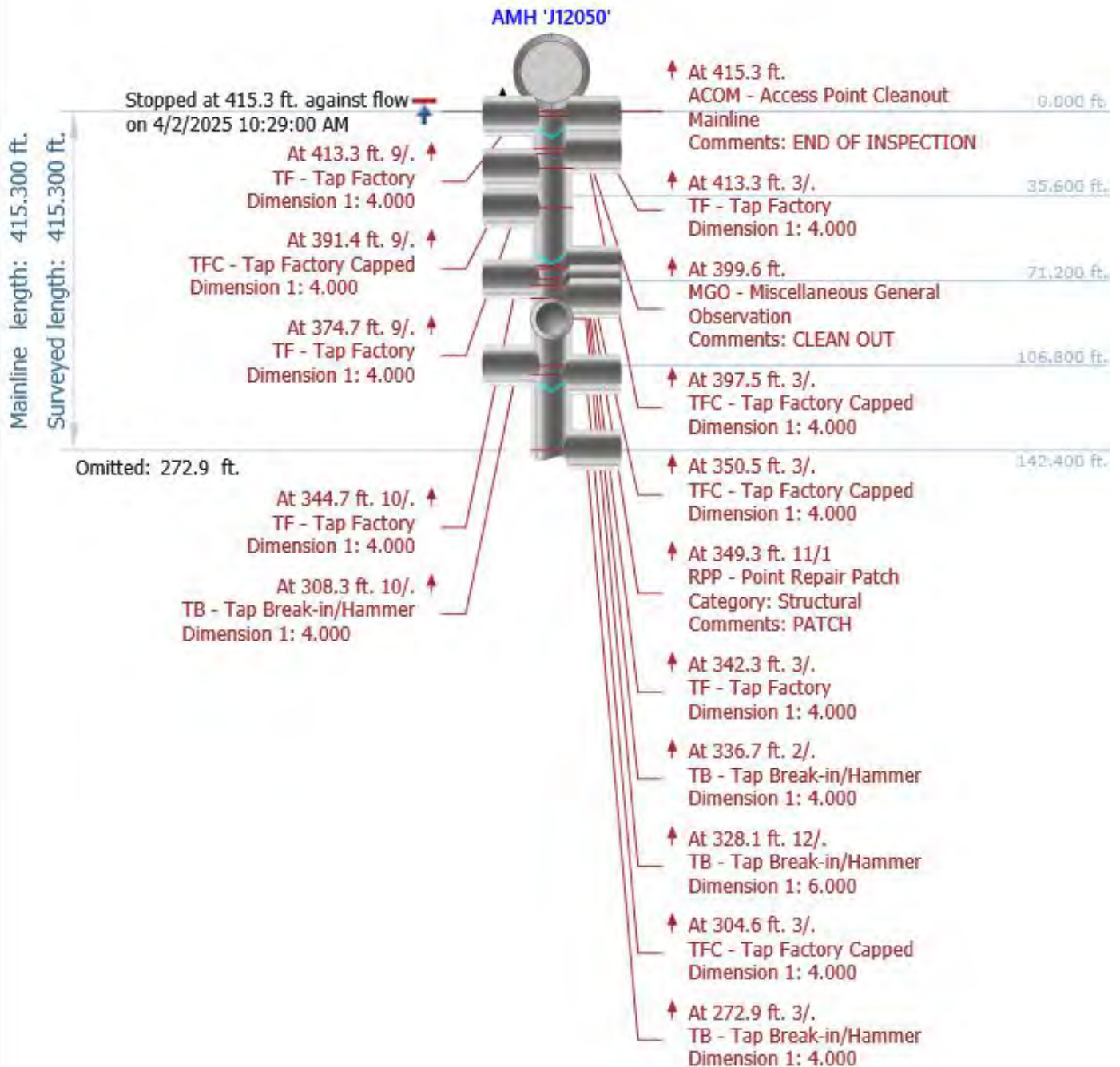
Weather:

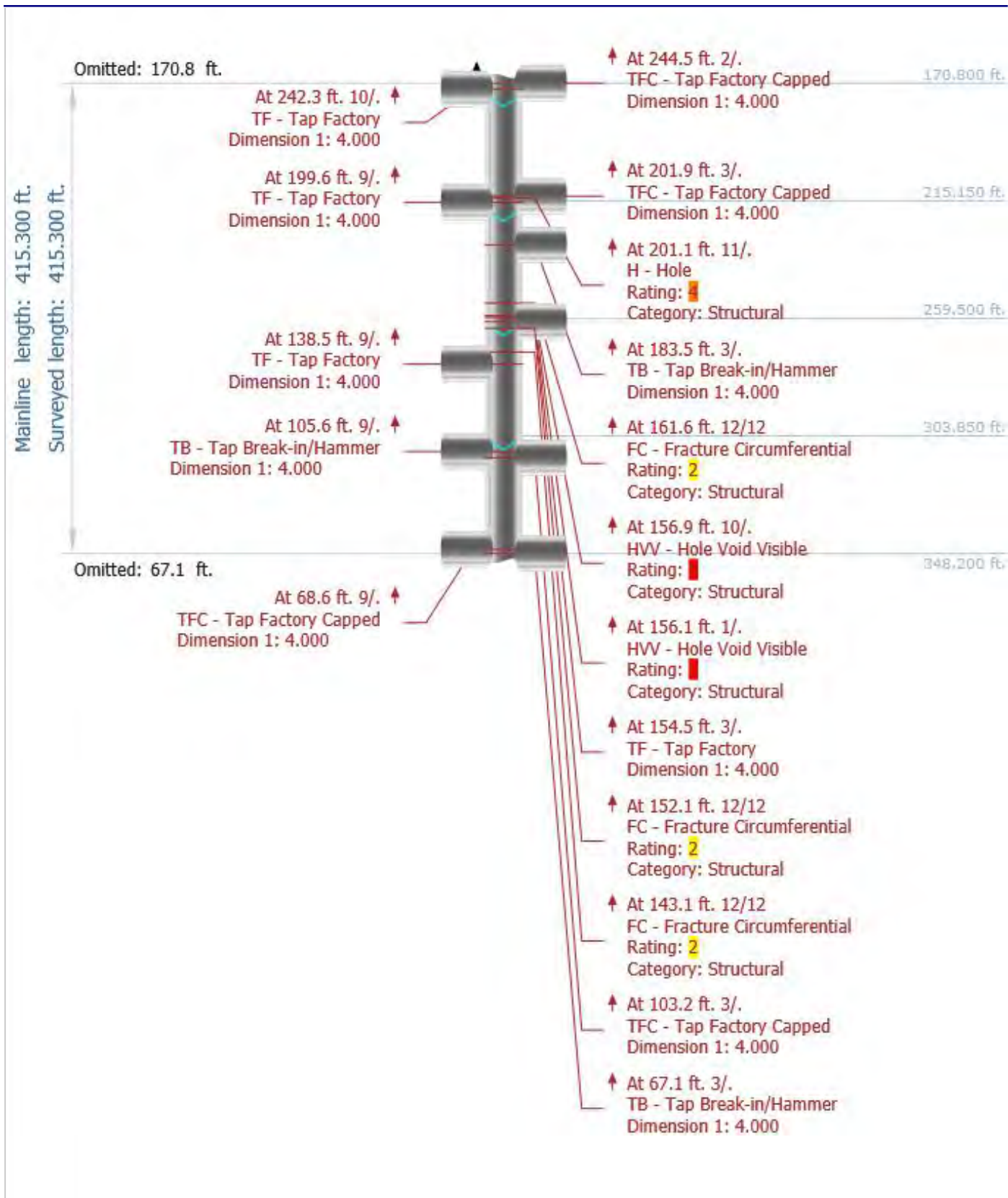
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Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12050-J12028	LINCOLN	MCBEAN PARK DR
Start date/time:	Direction:	Weather:	Location code:
4/2/2025 10:29 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	

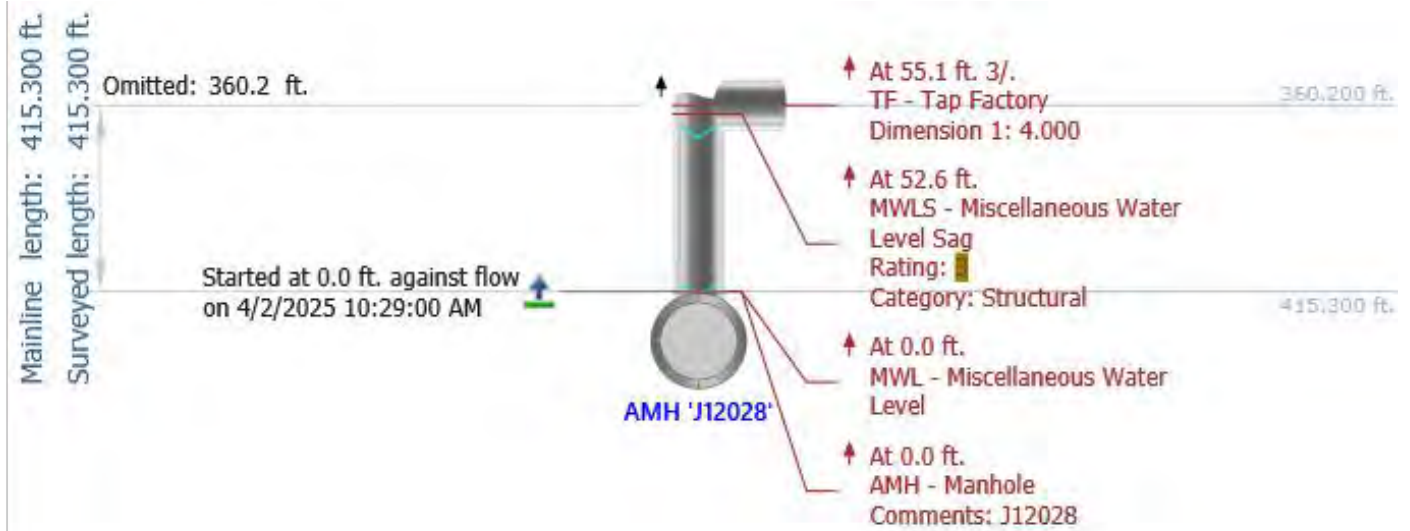




Project name: LINCOLN WASTEWATER CONDITION
Mainline ID: J12050-J12028
Start date/time: 4/2/2025 10:29 AM
Direction: U

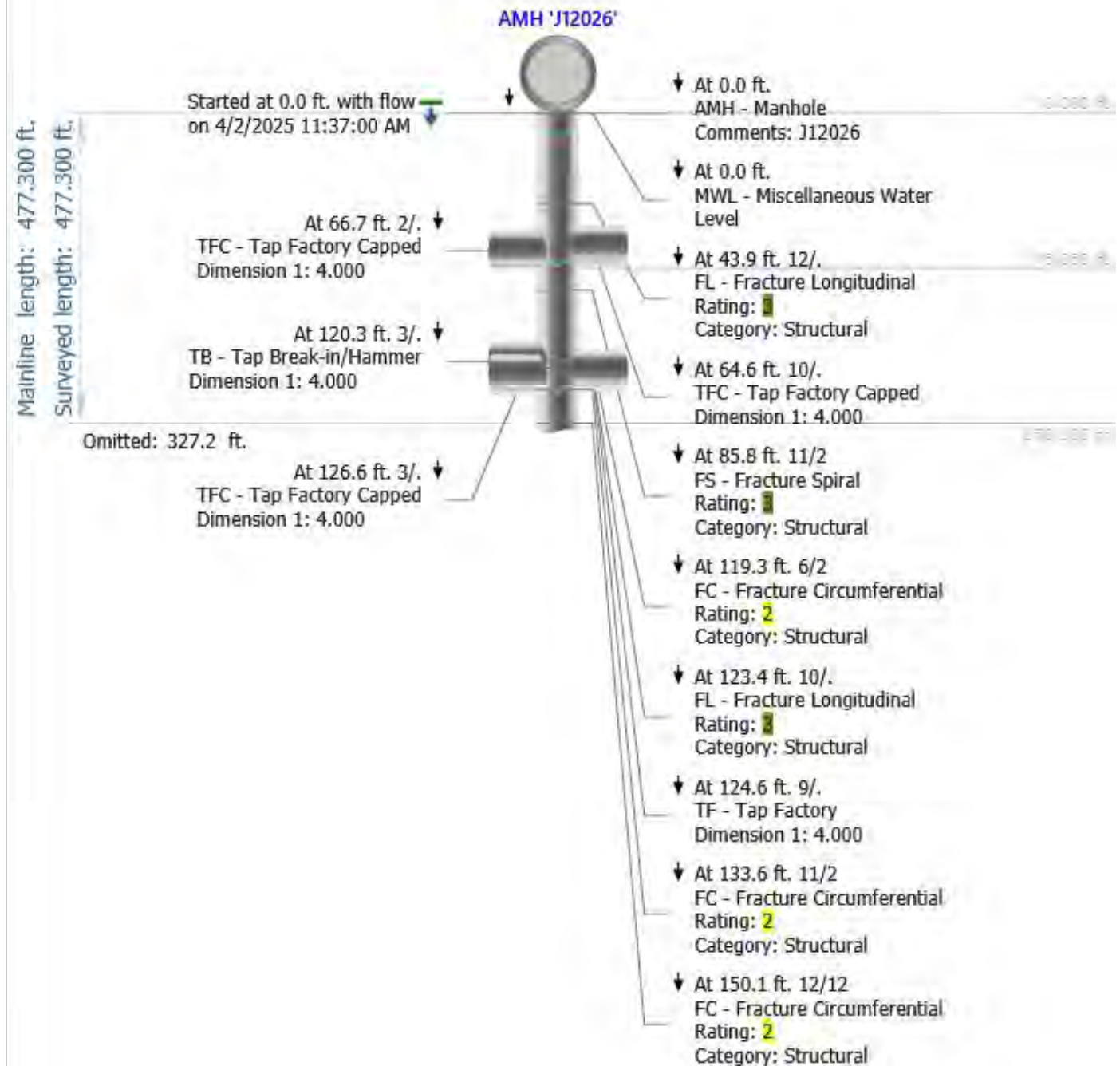
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12026-J12032	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/2/2025 11:37 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



**LINCOLN WASTEWATER
CONDITION**

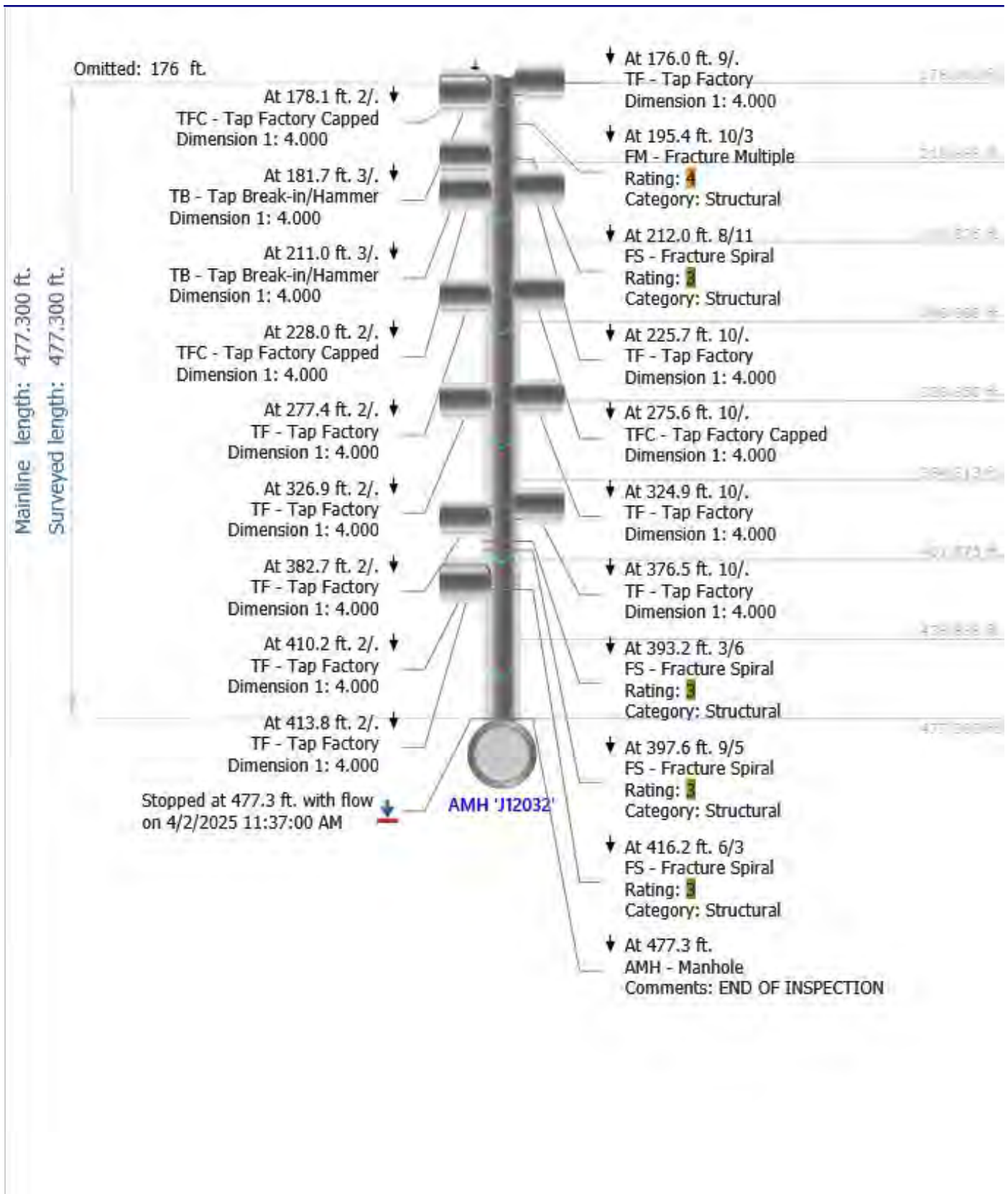
J12026-J12032

4/2/2025 11:37 AM

D

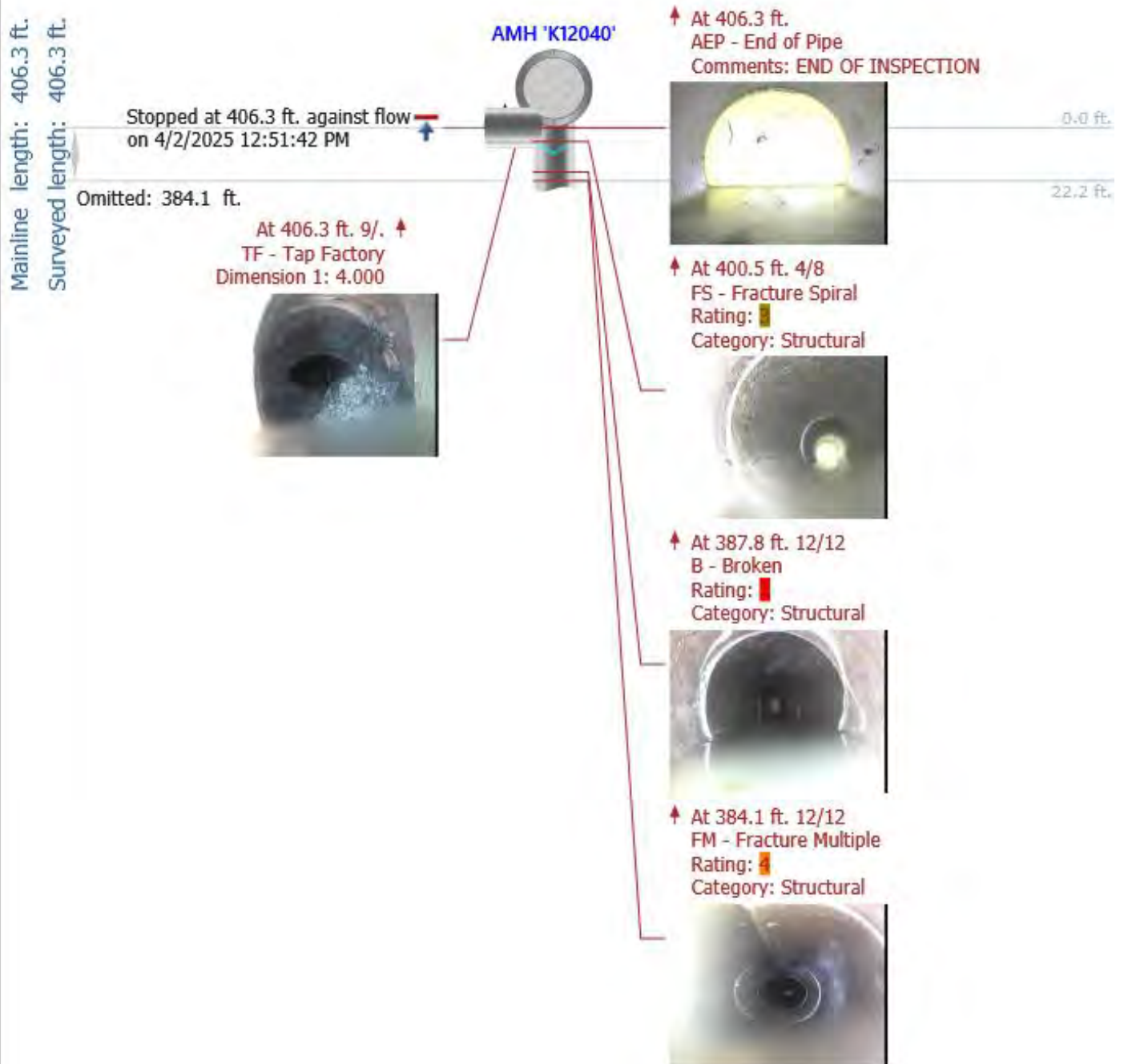
Weather:

1



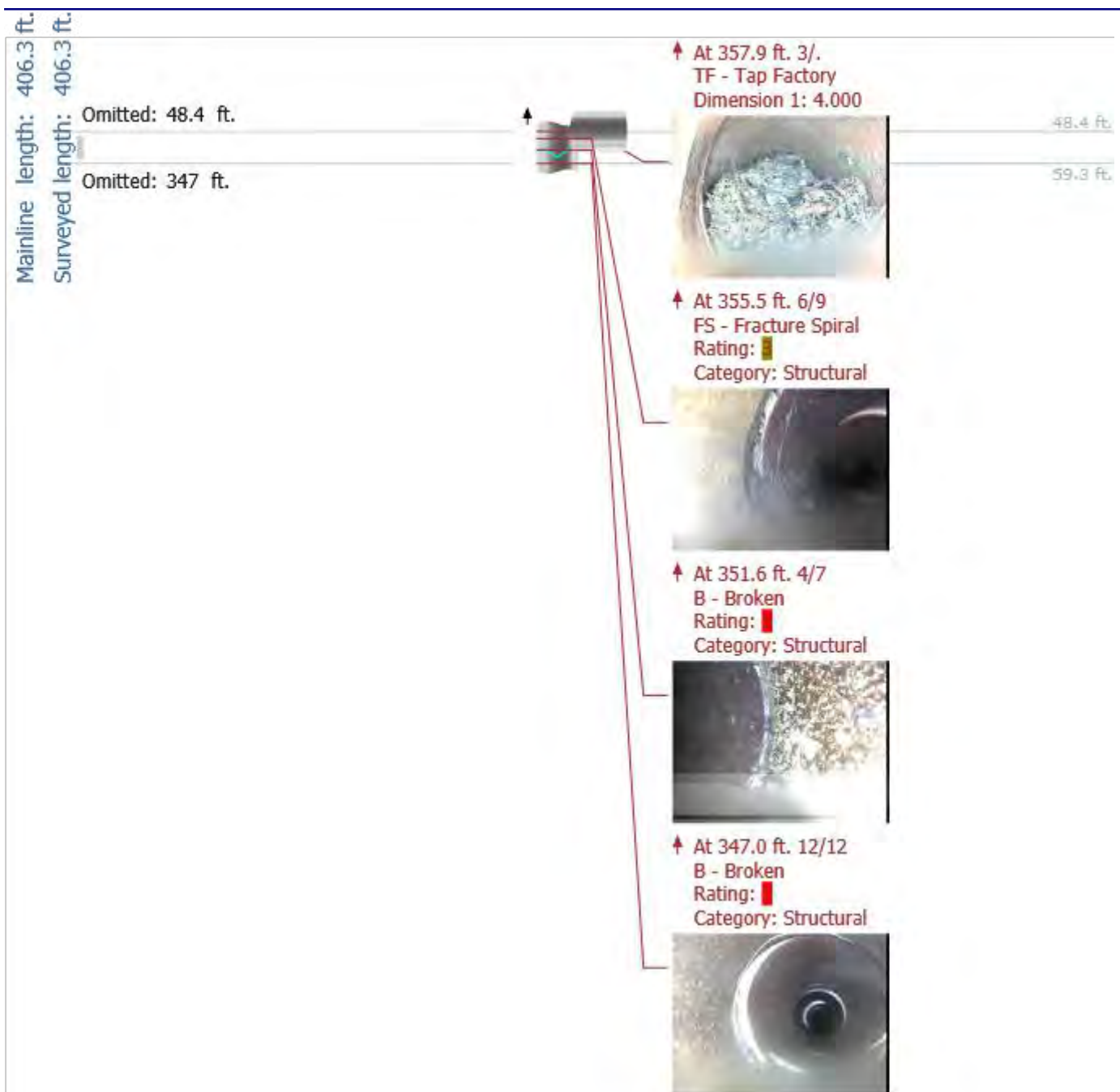
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	K12040-J12026	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/2/2025 12:19 PM	U	1	
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



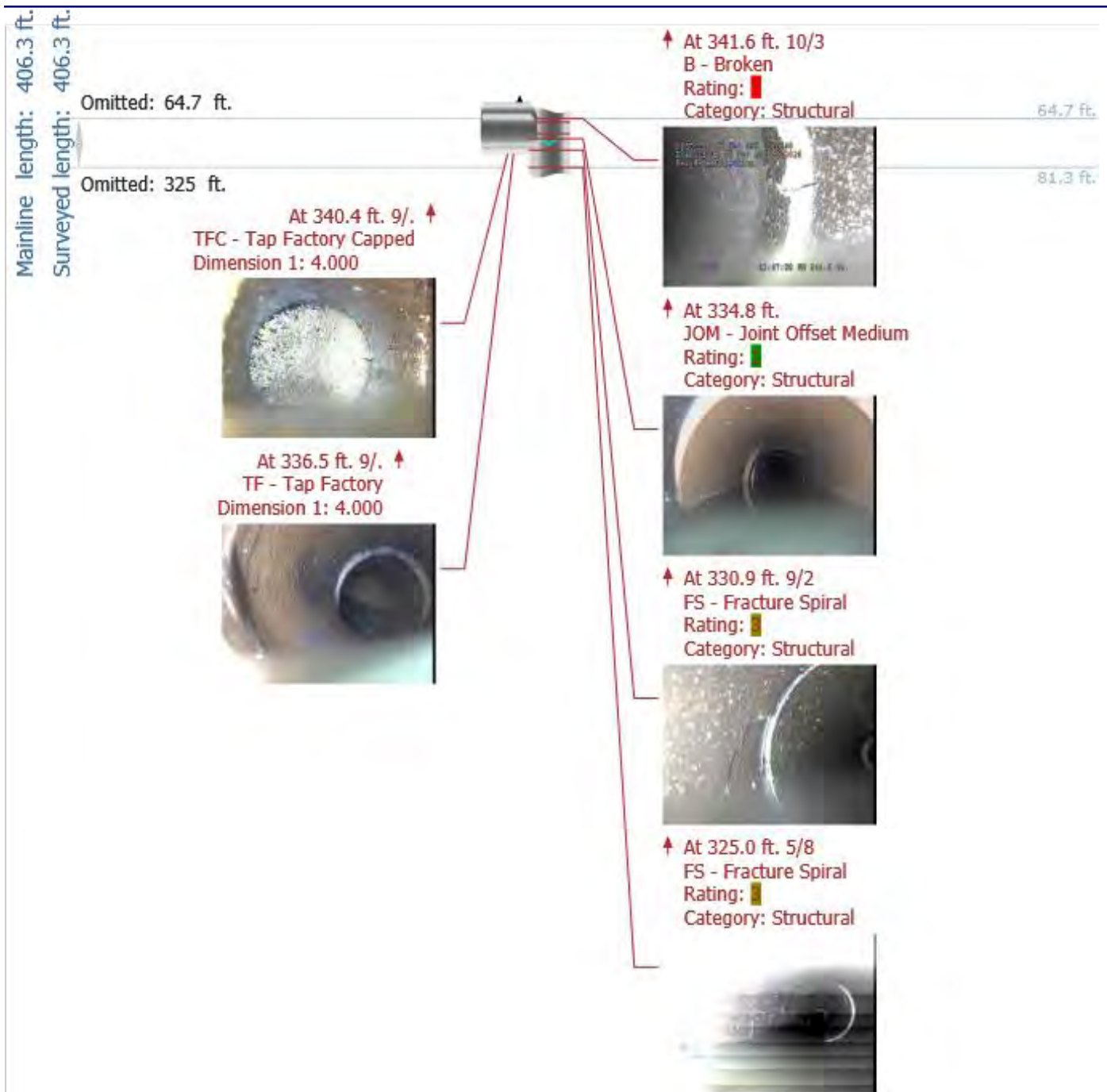
Weather:

1



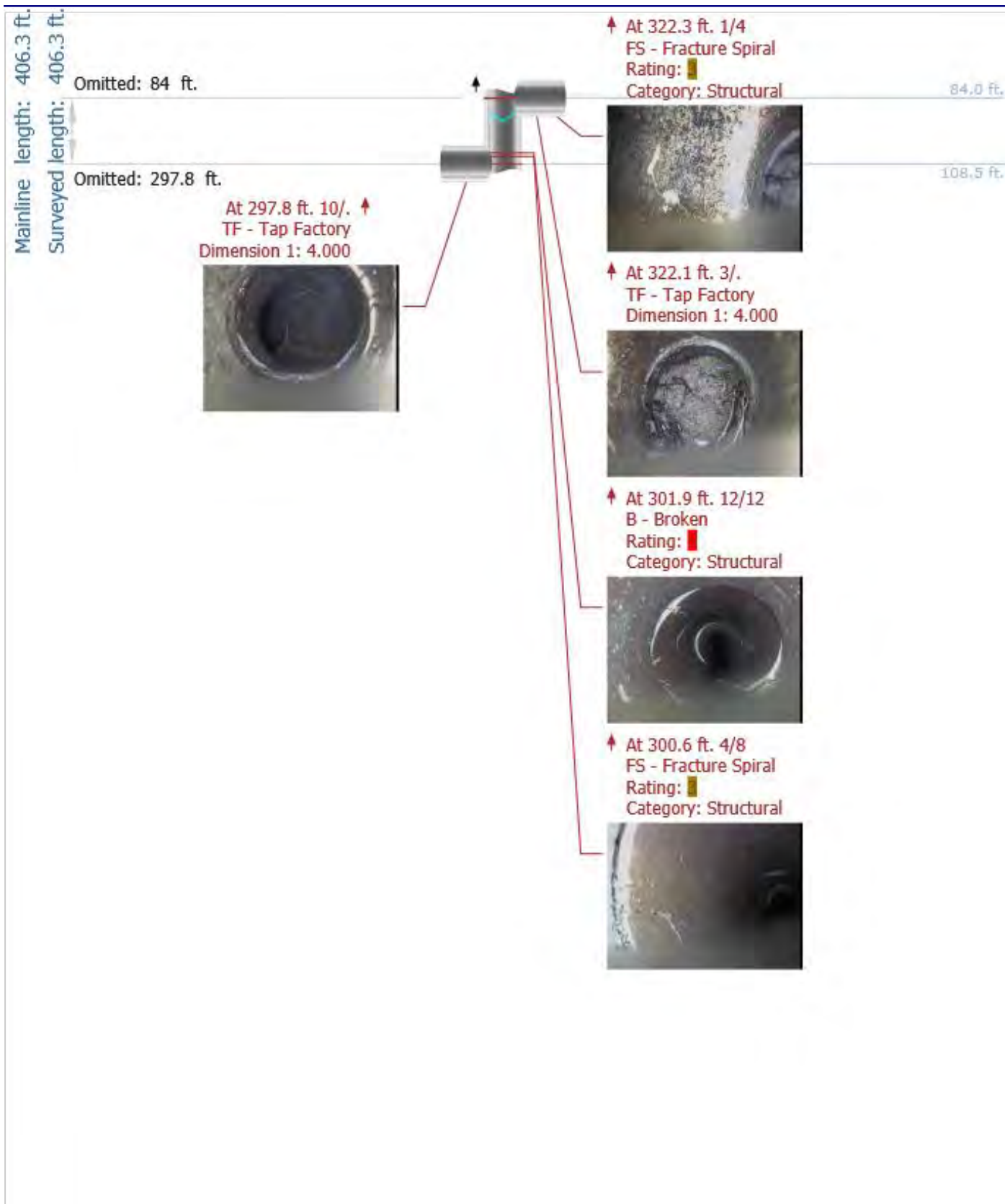
Weather:

1



Weather:

1



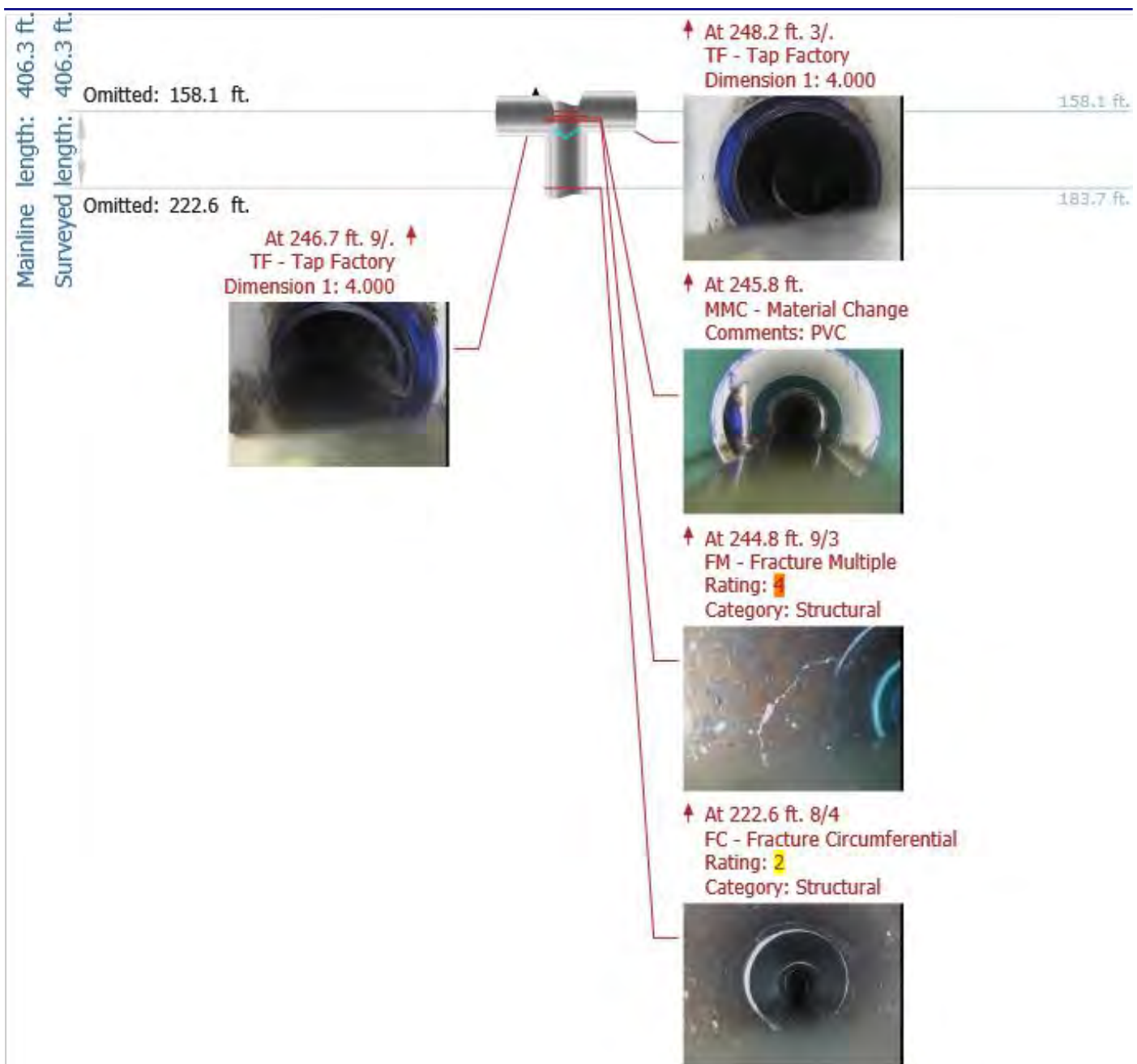
Weather:

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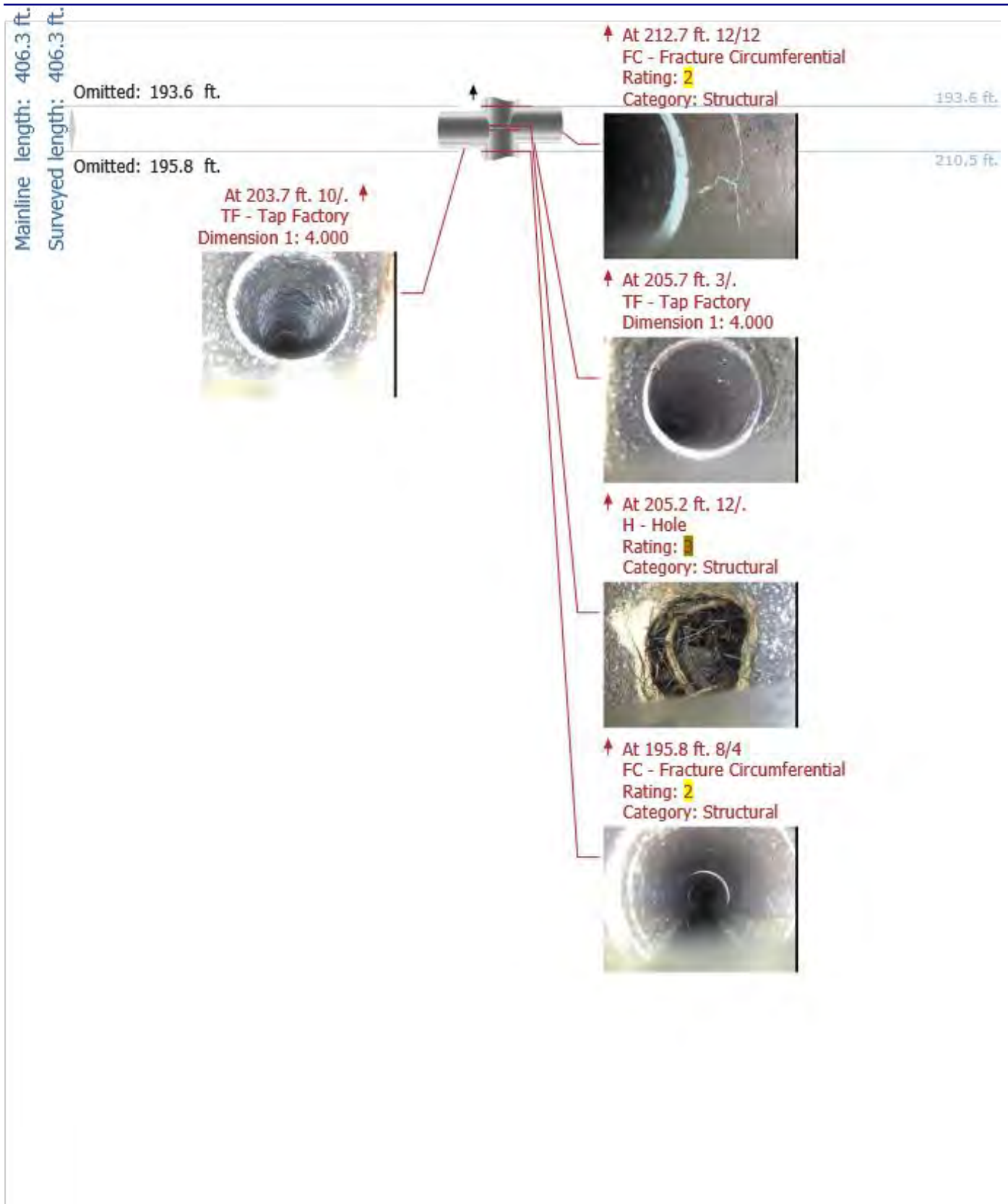
Weather:

1



Weather:

1



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

K12040-J12026

Start date/time:

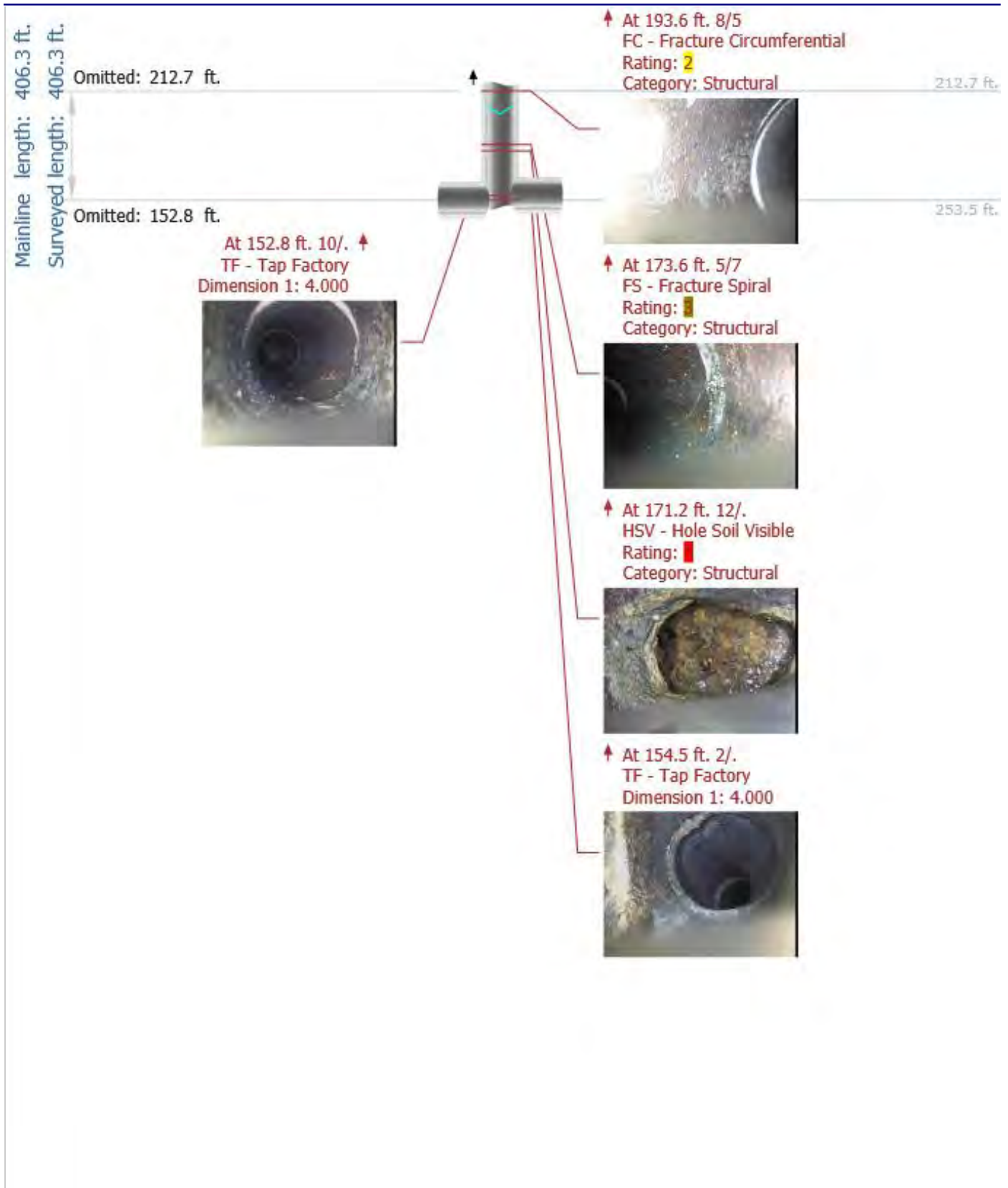
4/2/2025 12:19 PM

Direction:

U

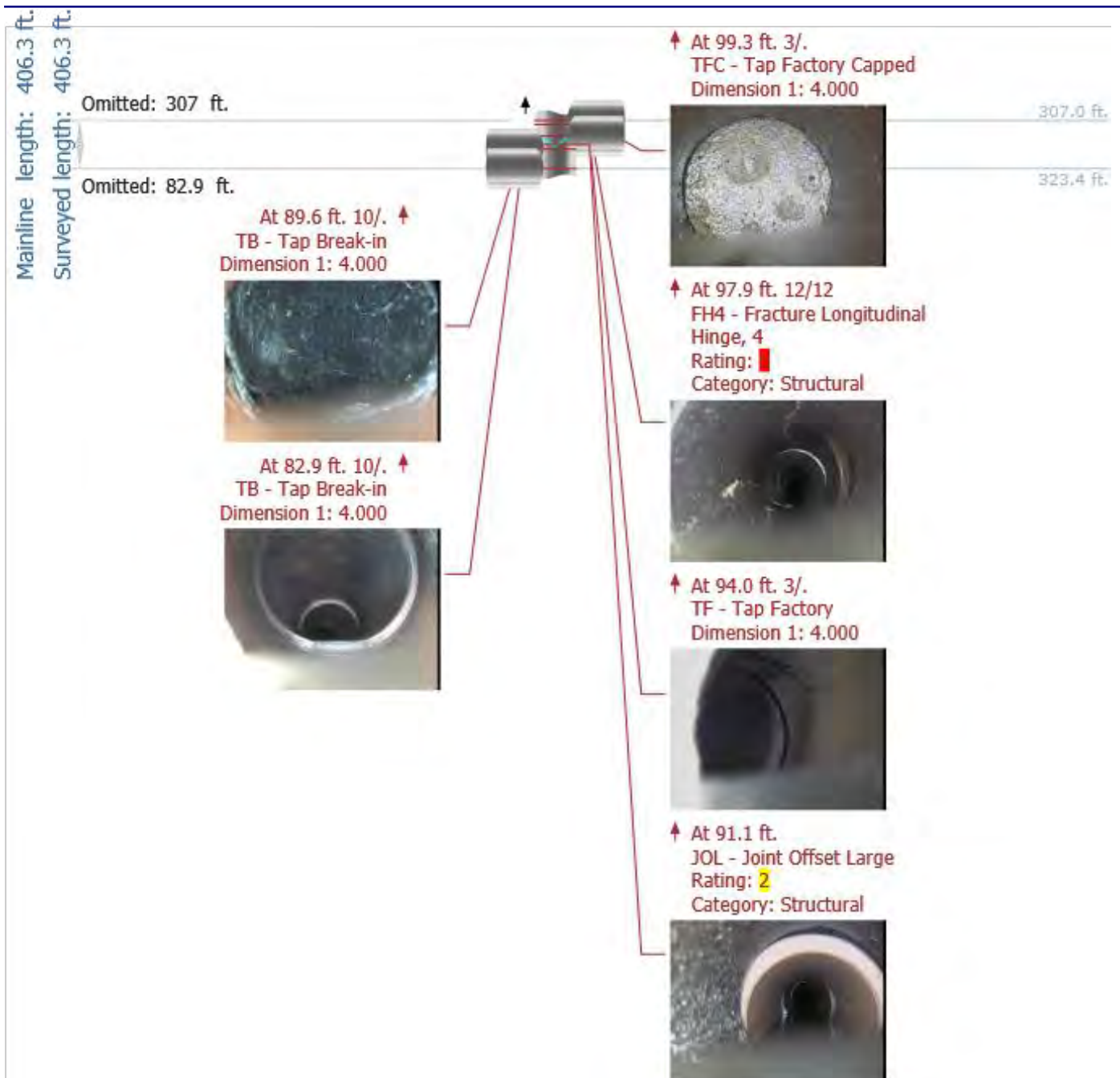
Weather:

1



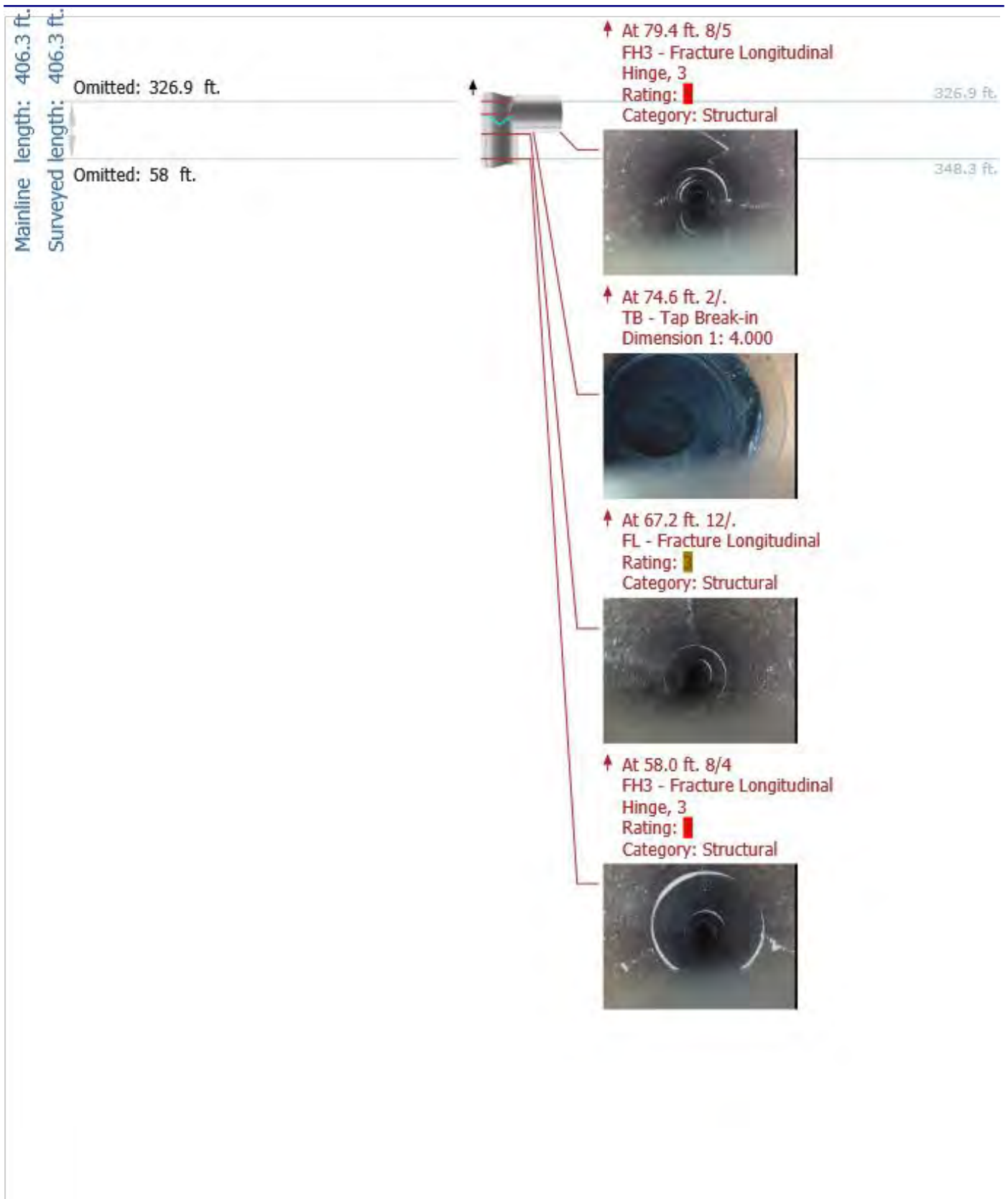
Weather:

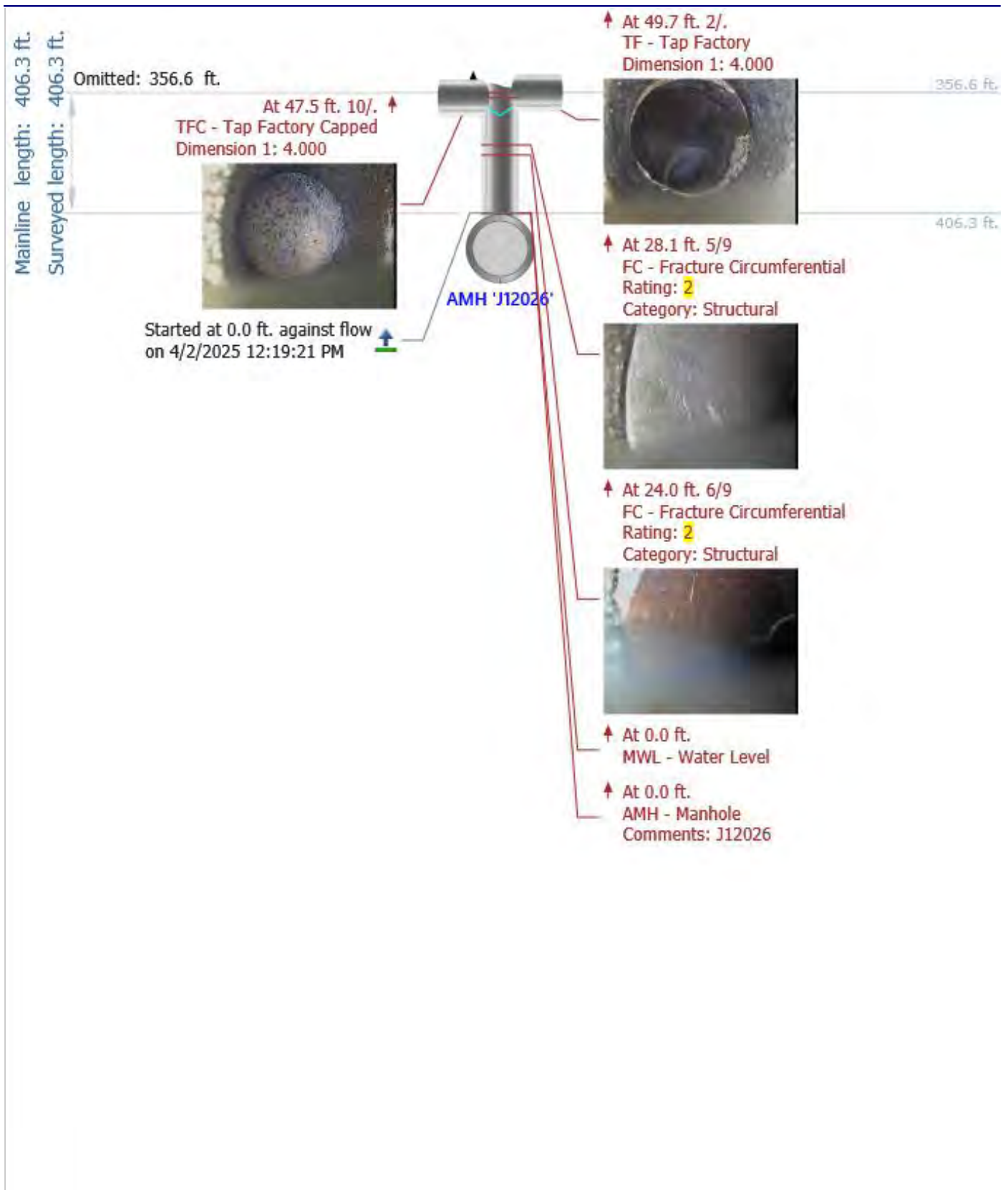
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Weather:

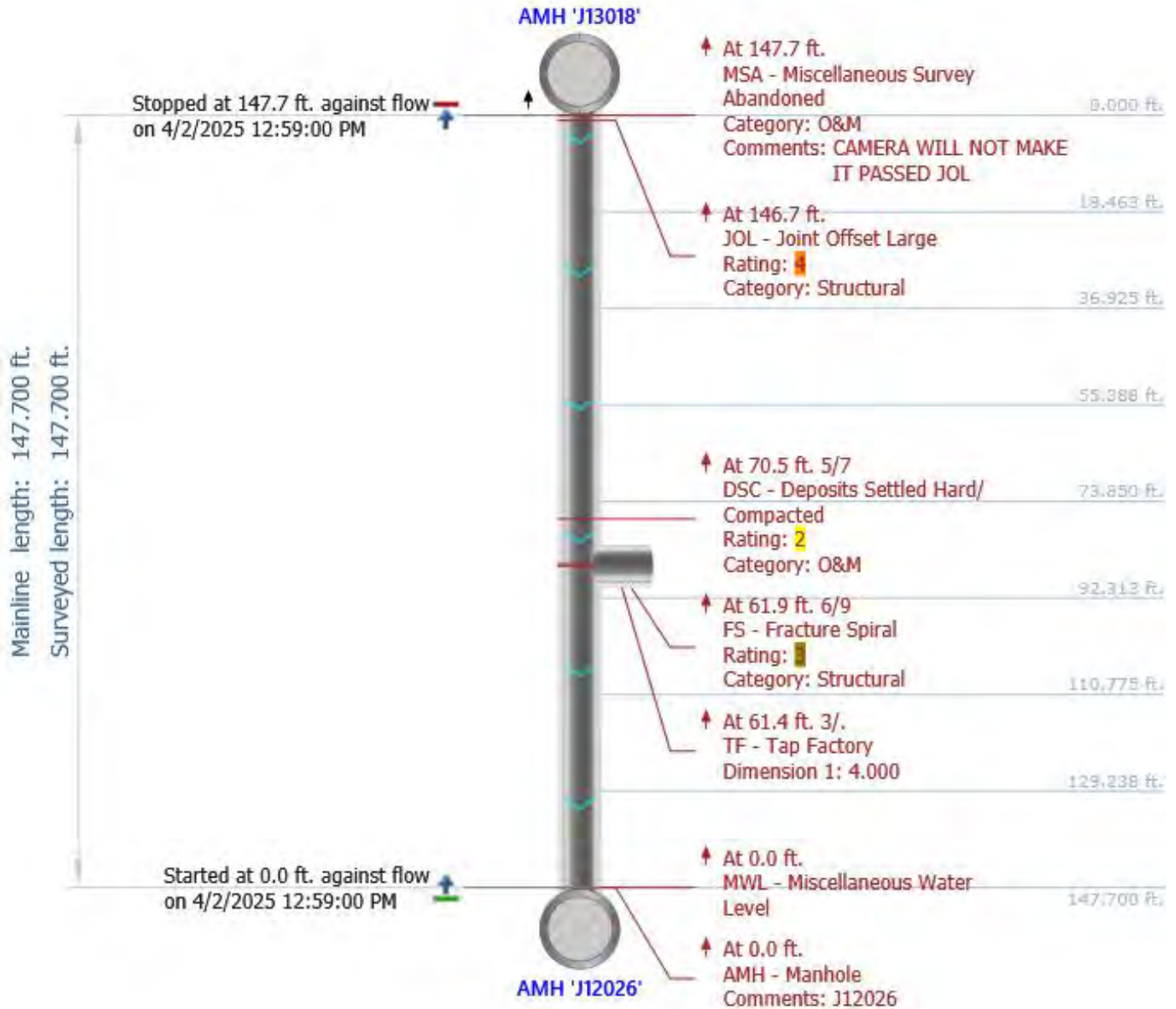
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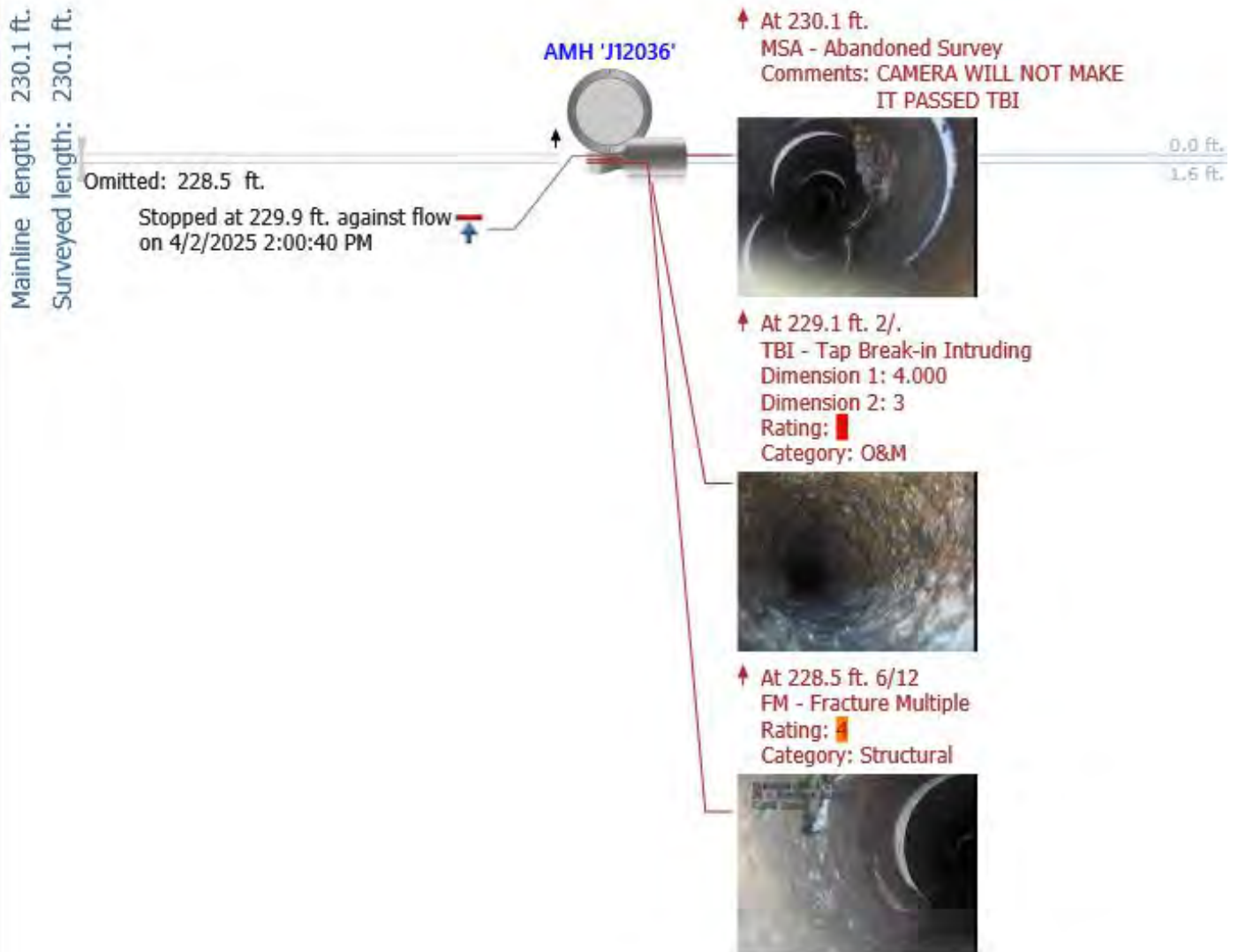
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J13018-J12026	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/2/2025 12:59 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



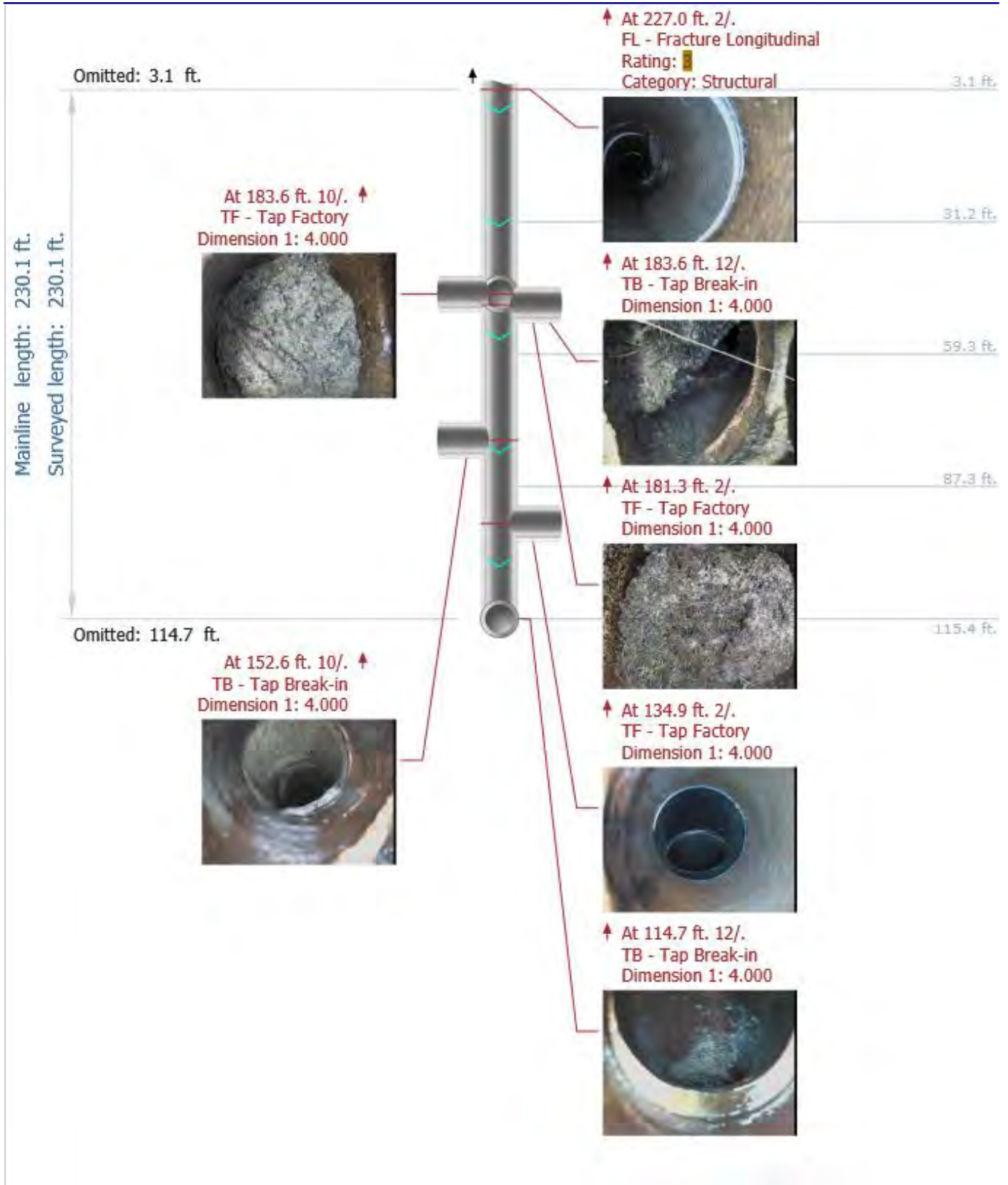
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12036-J12062	LINCOLN	4TH ST ALLEY
Start date/time:	Direction:	Weather:	Location code:
4/2/2025 1:35 PM	U	1	
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Weather:

1



Project name:

**LINCOLN WASTEWATER
CONDITION**

Weather:

1

Mainline ID:

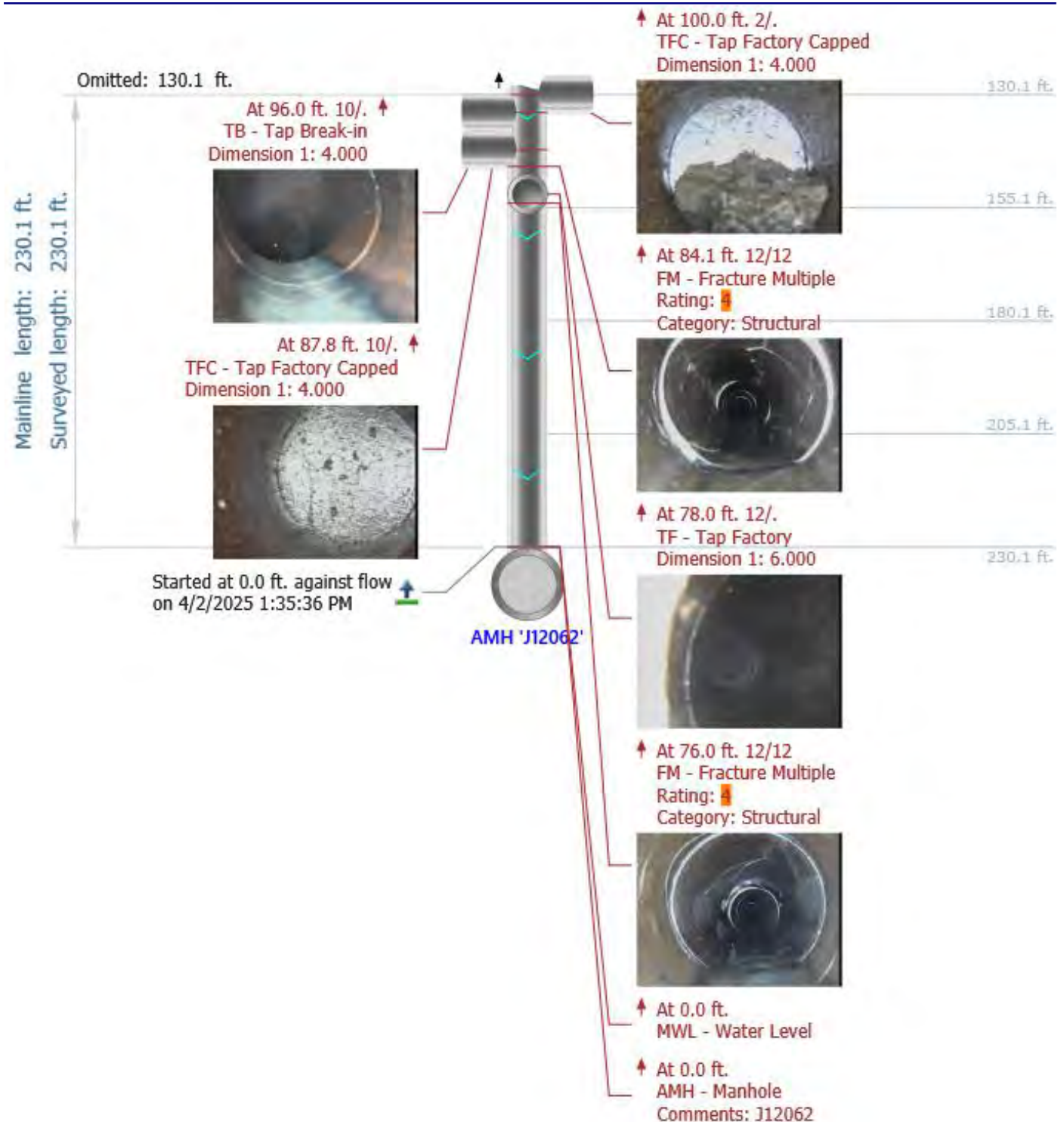
J12036-J12062

Start date/time:

4/2/2025 1:35 PM

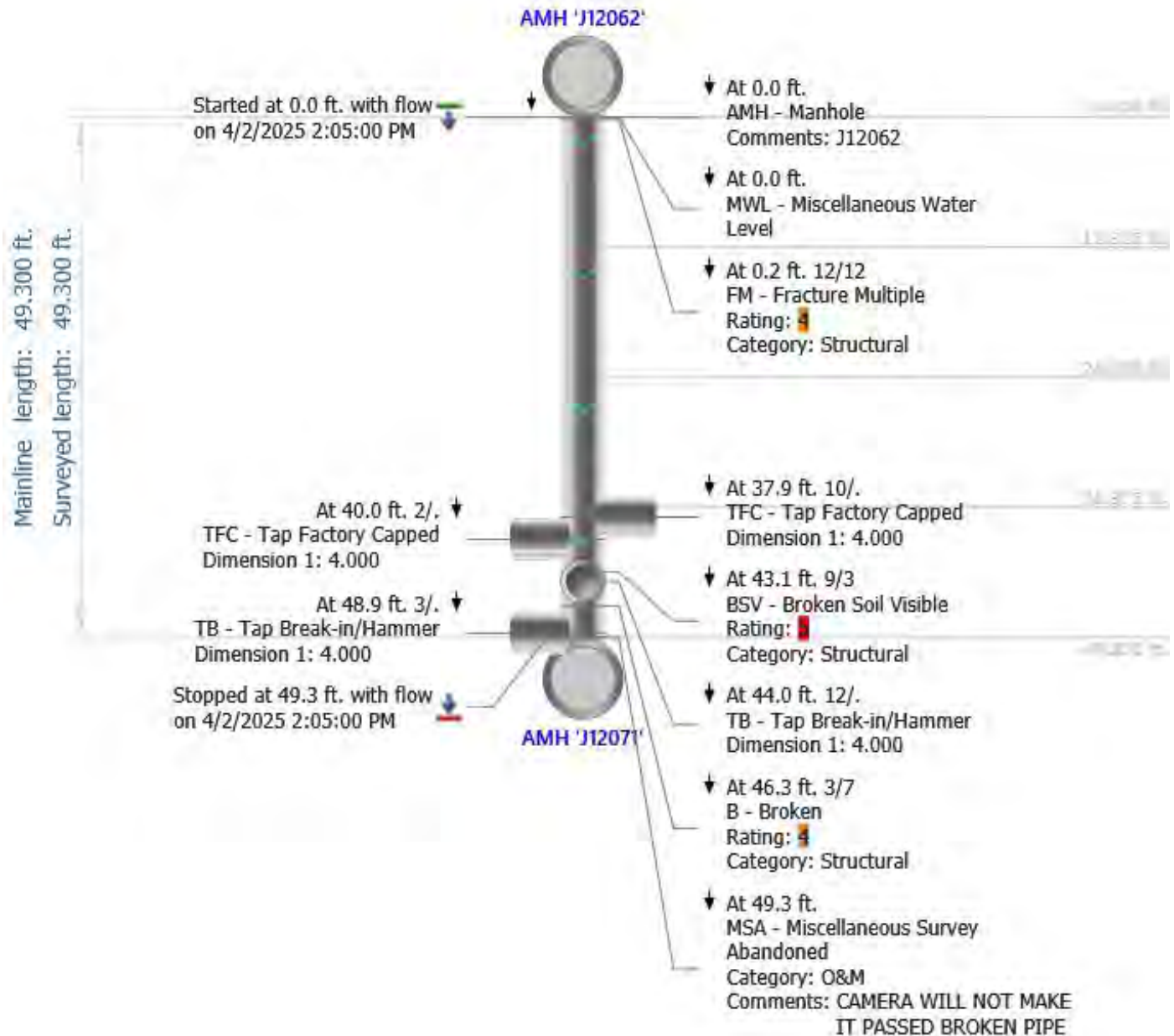
Direction:

U



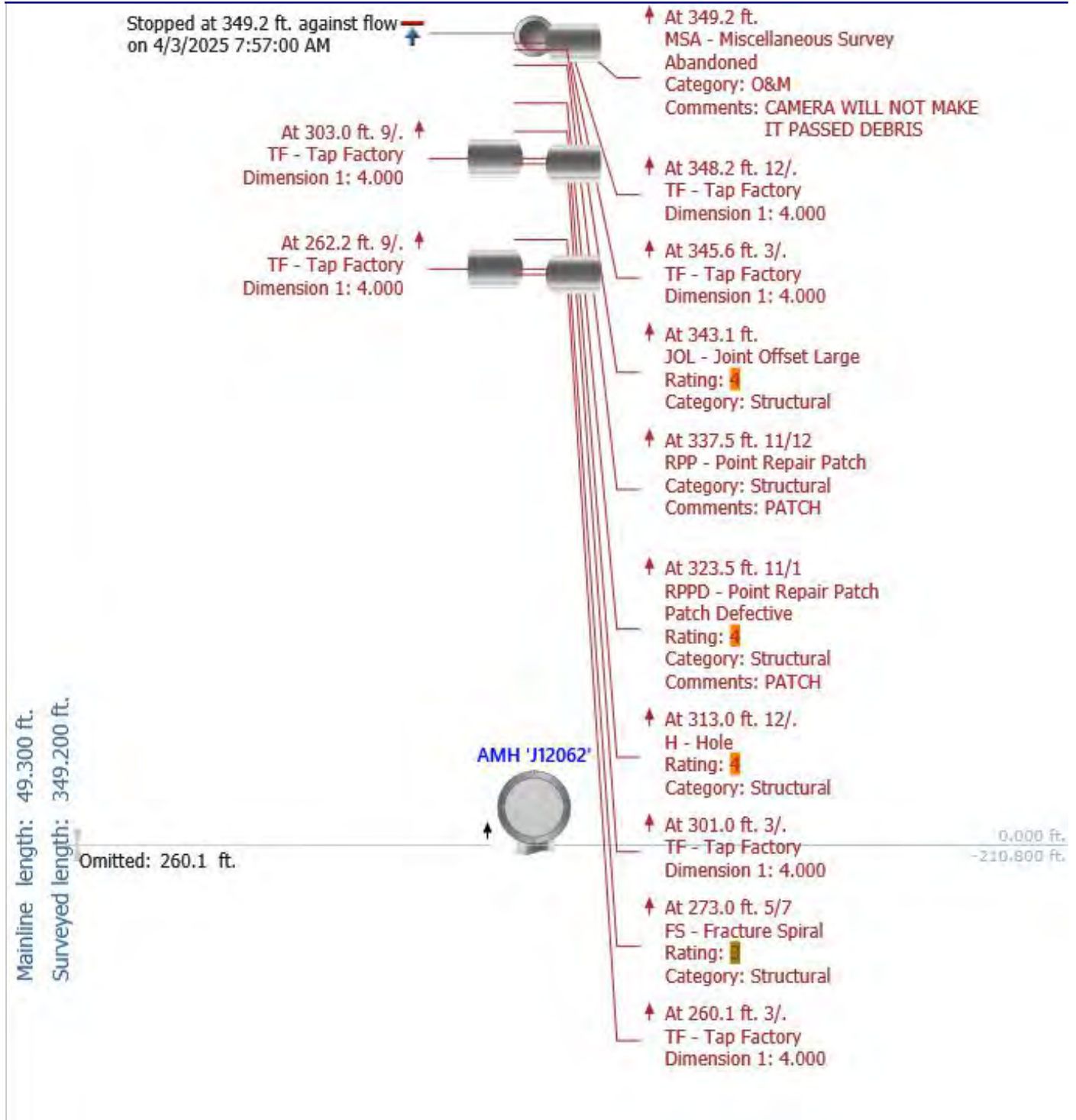
Main Inspections Pipe Run with Images

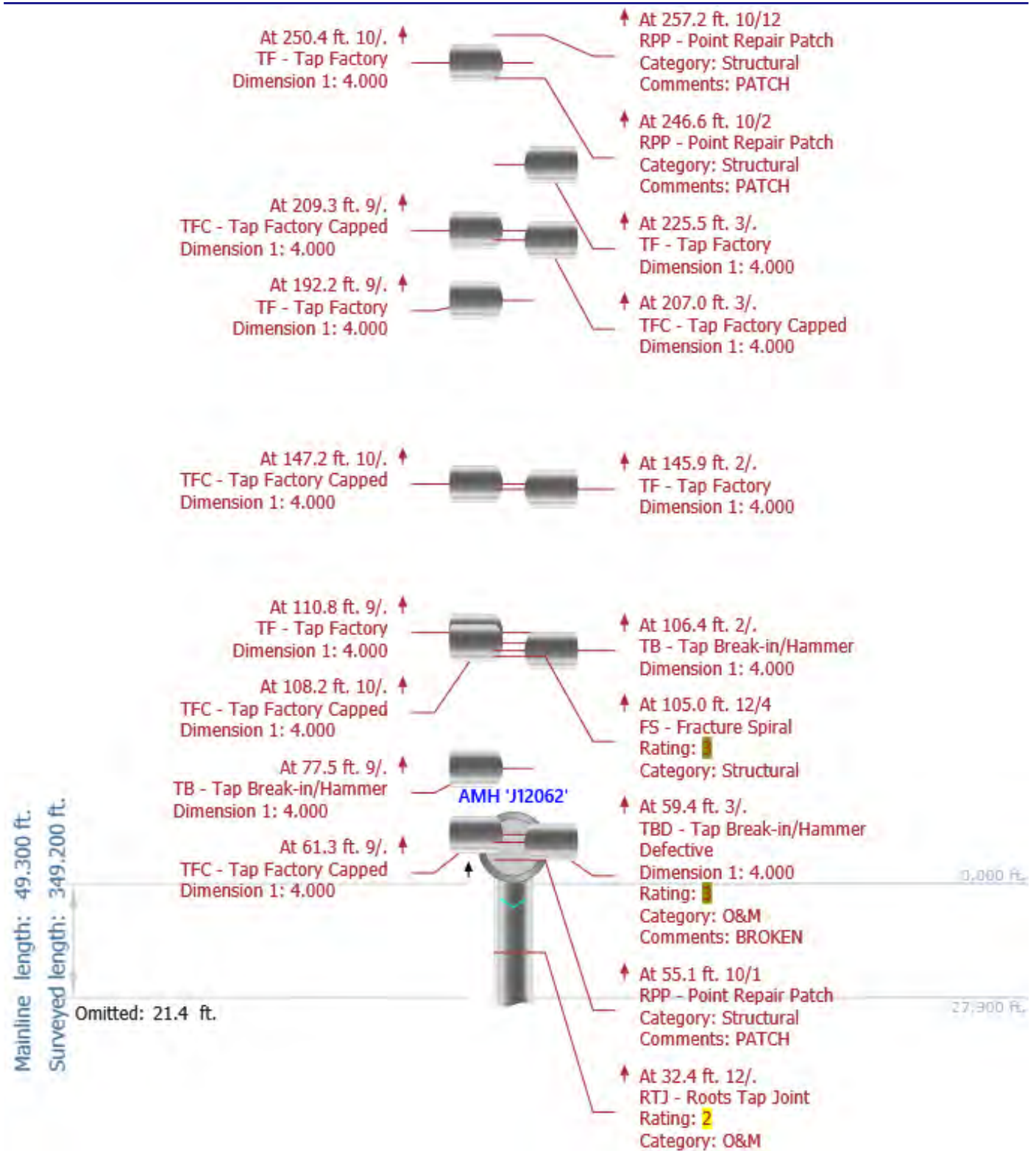
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12062-J12071	LINCOLN	4TH ST ALLEY
Start date/time:	Direction:	Weather:	Location code:
4/2/2025 2:05 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Main Inspections Pipe Run with Images

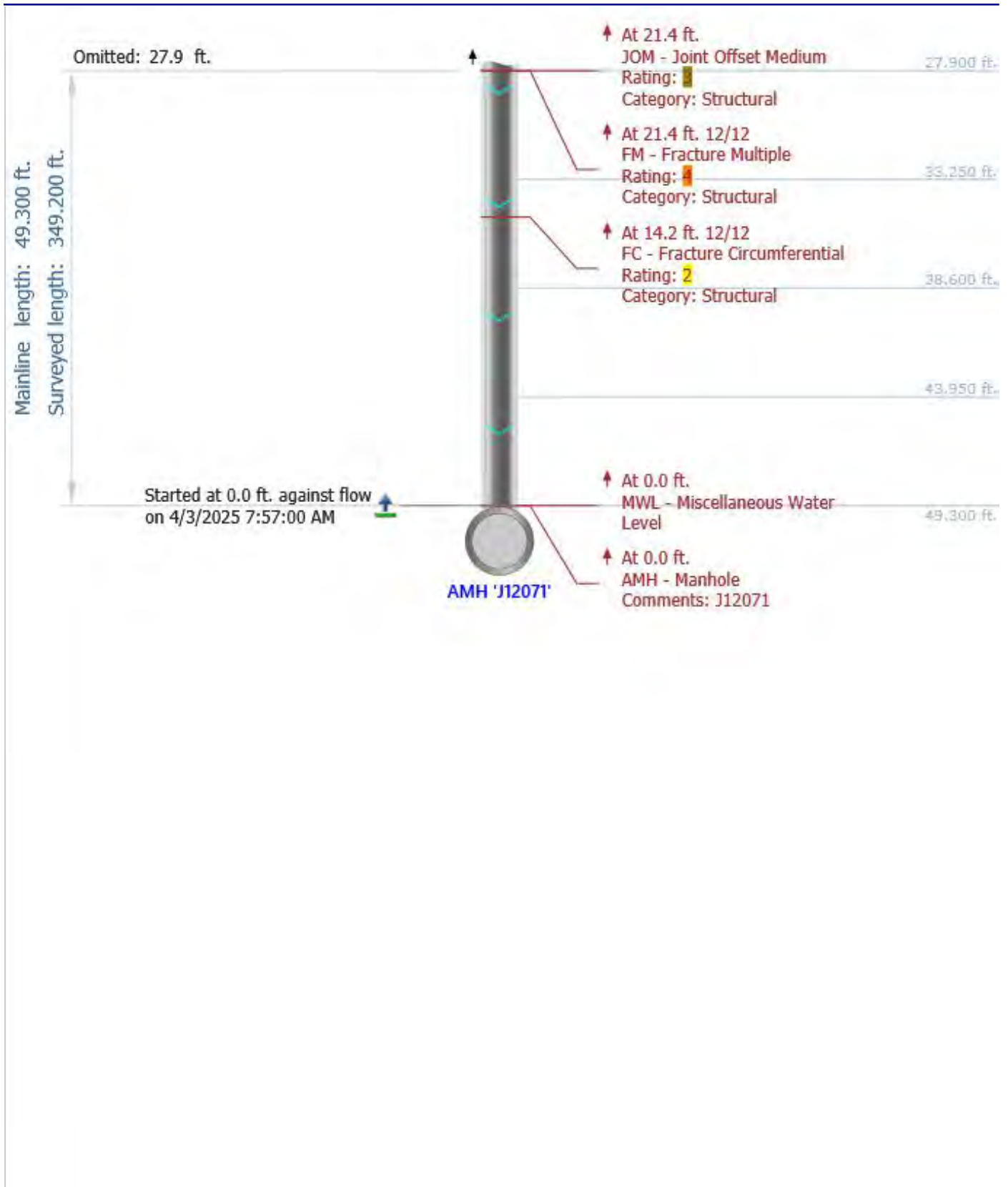
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12062-J12071	LINCOLN	4TH ST ALLEY
Start date/time:	Direction:	Weather:	Location code:
4/3/2025 7:57 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





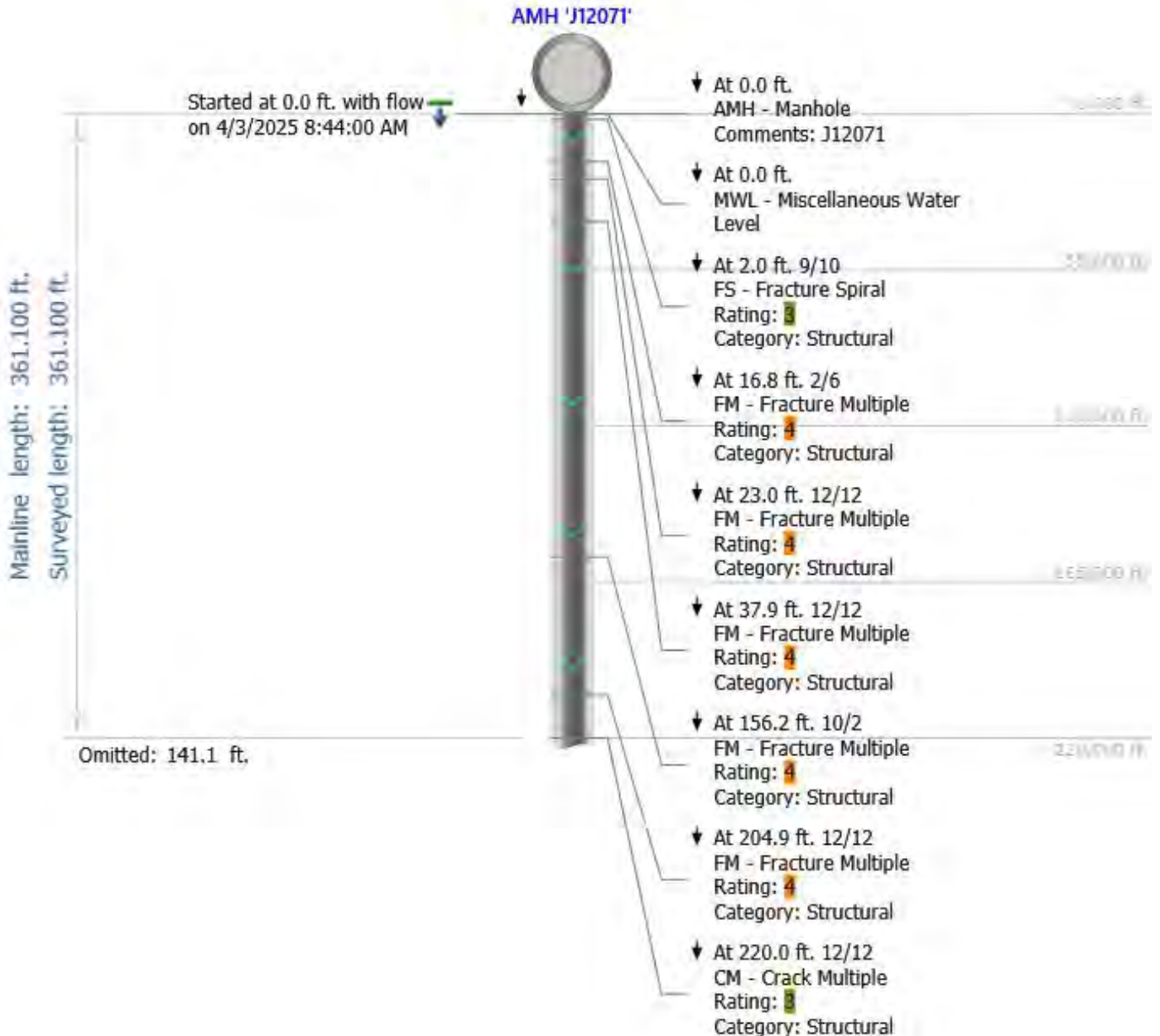
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12071-J12072	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/3/2025 8:44 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	12 in.	



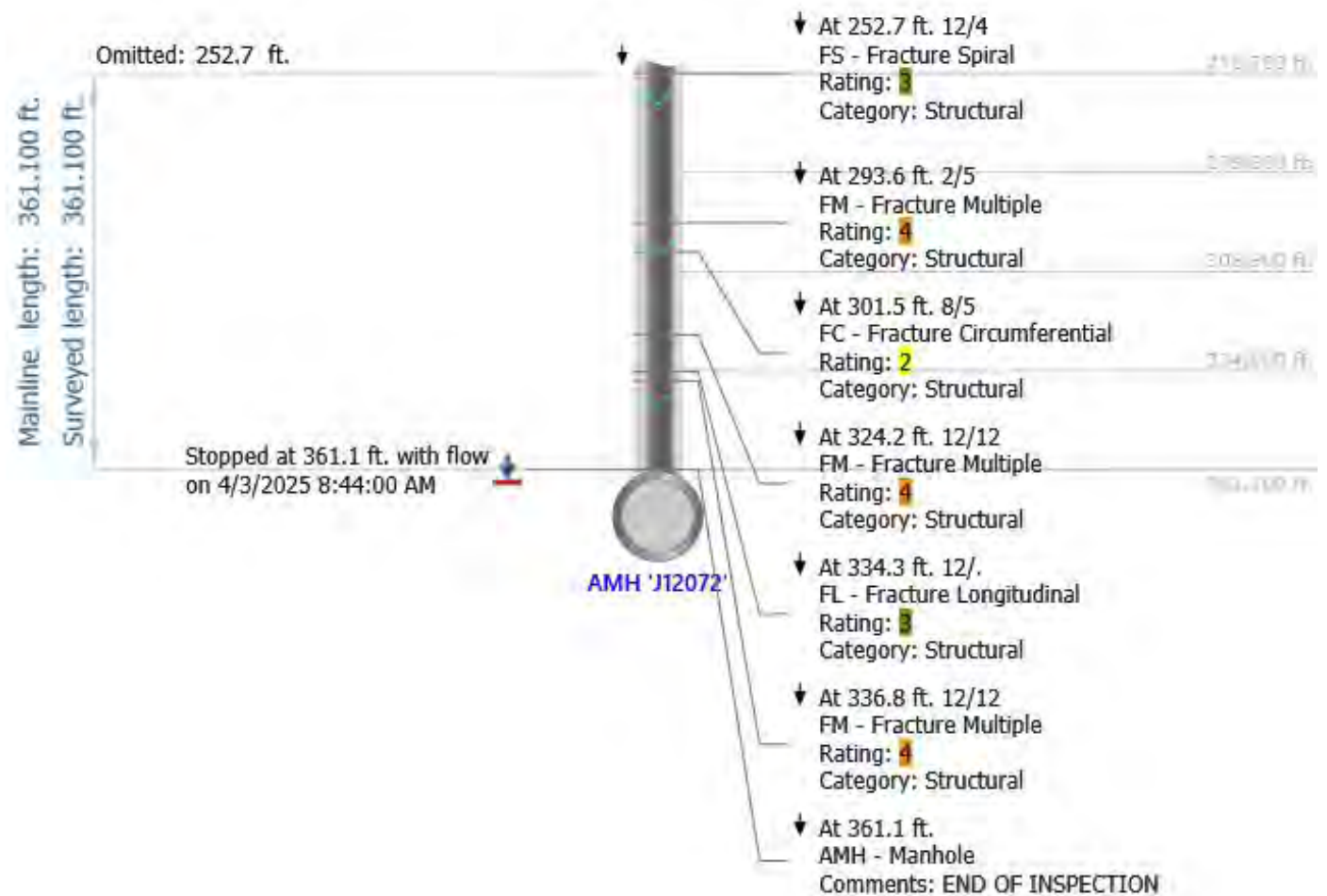
Project name: **LINCOLN WASTEWATER CONDITION**
Mainline ID: **J12071-J12072**

Start date/time: **4/3/2025 8:44 AM**

Direction: **D**

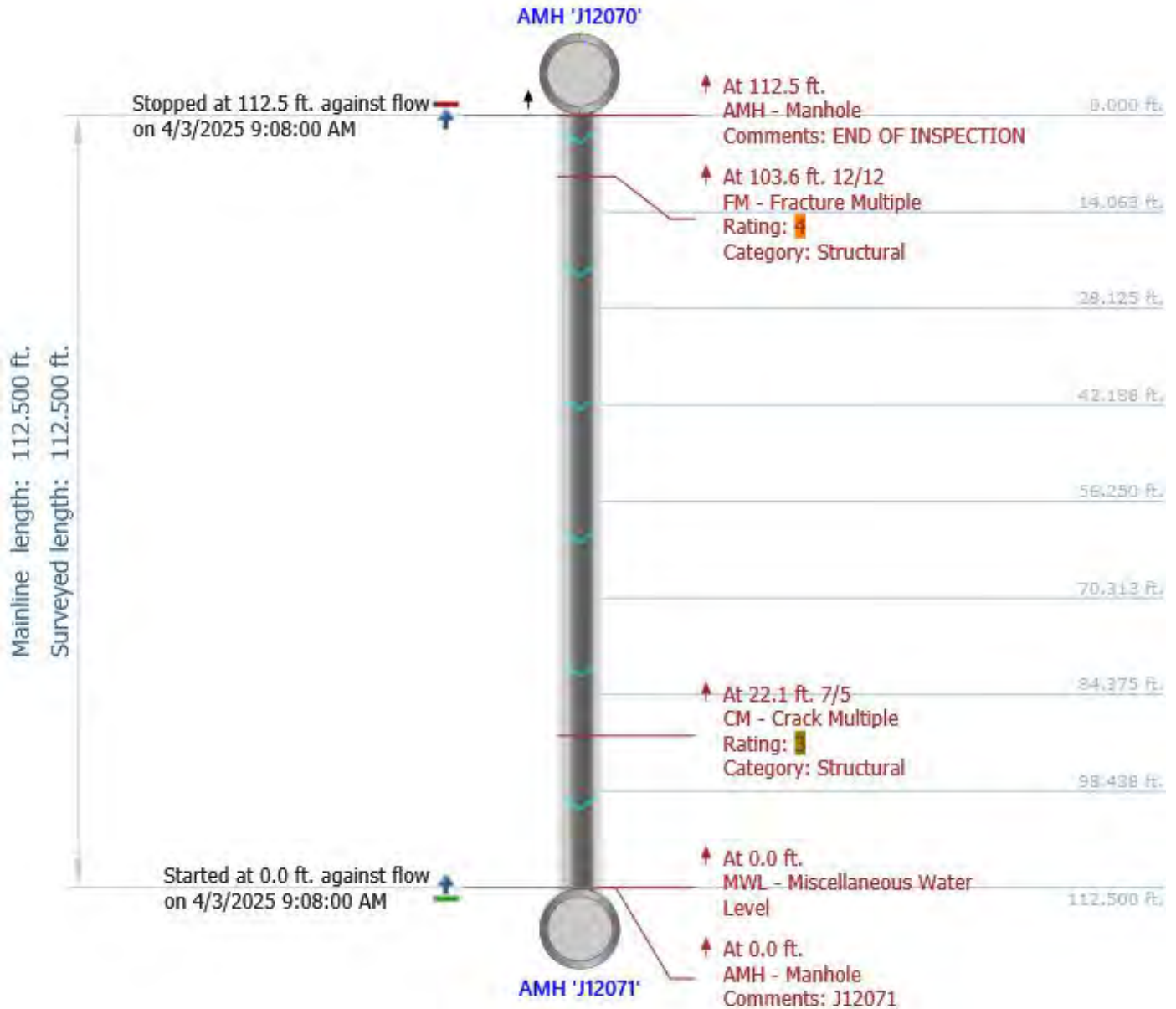
Weather:

1



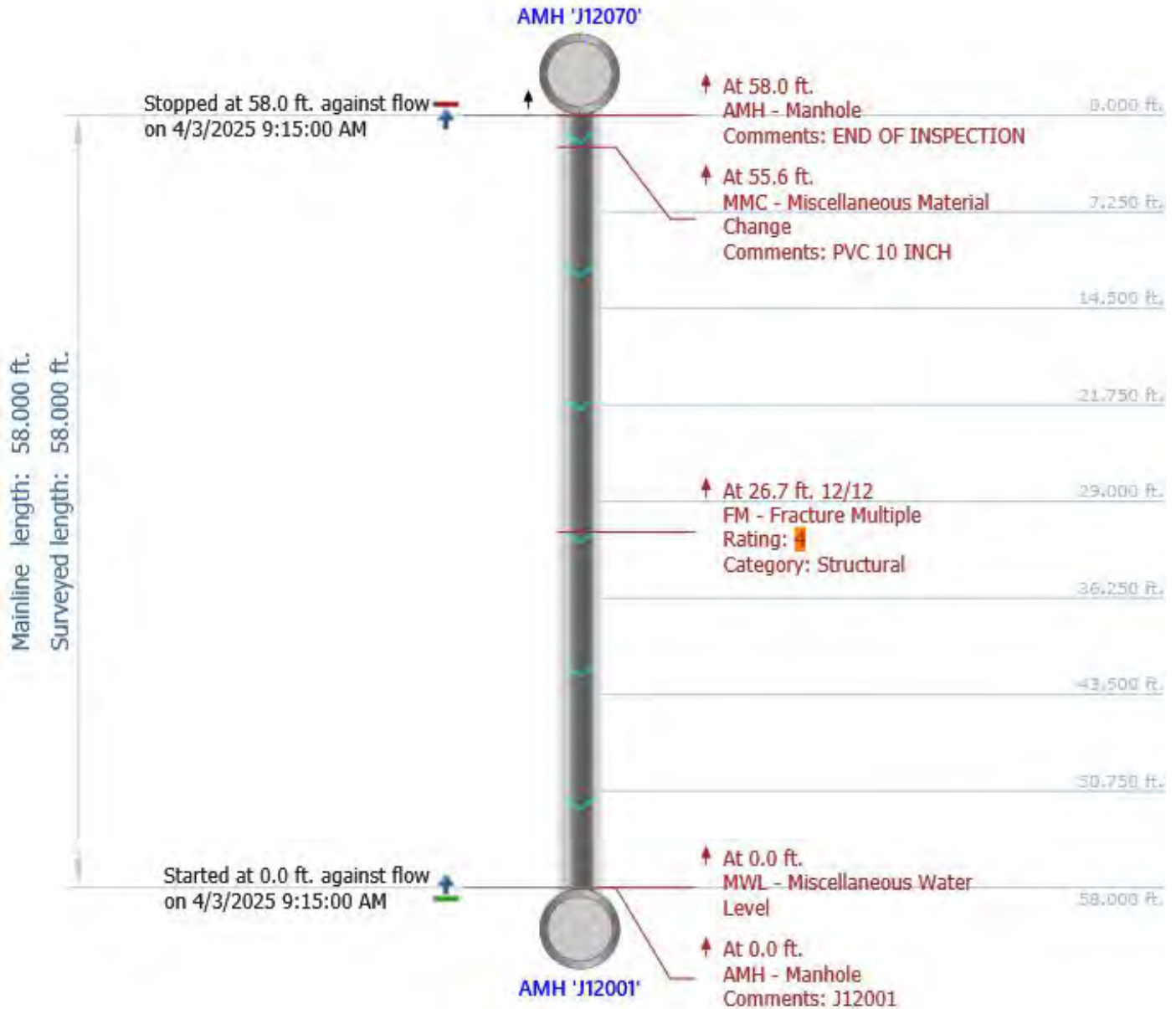
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12070-J12071	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/3/2025 9:08 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	12 in.	



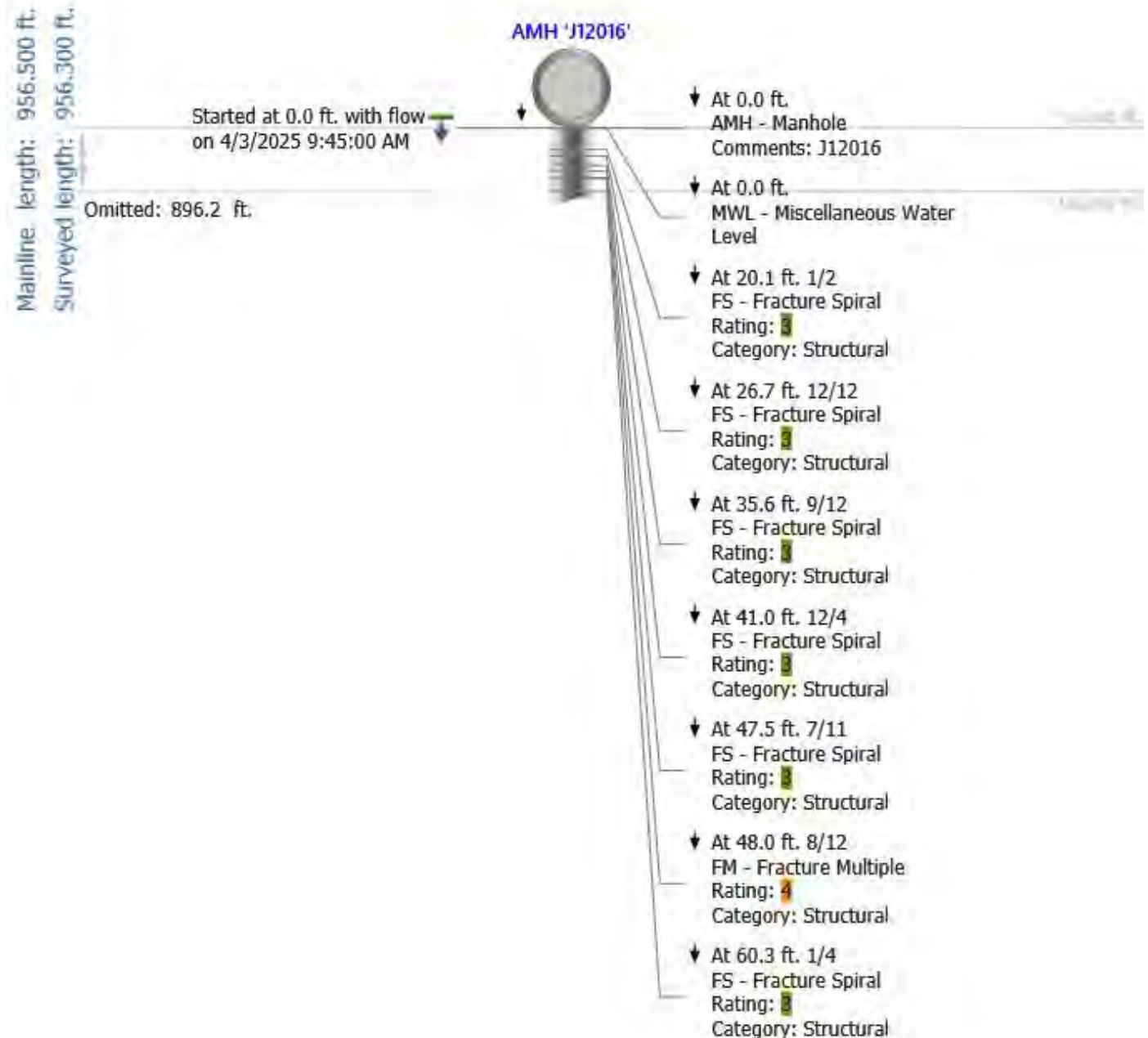
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12070-J12001	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/3/2025 9:15 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	12 in.	



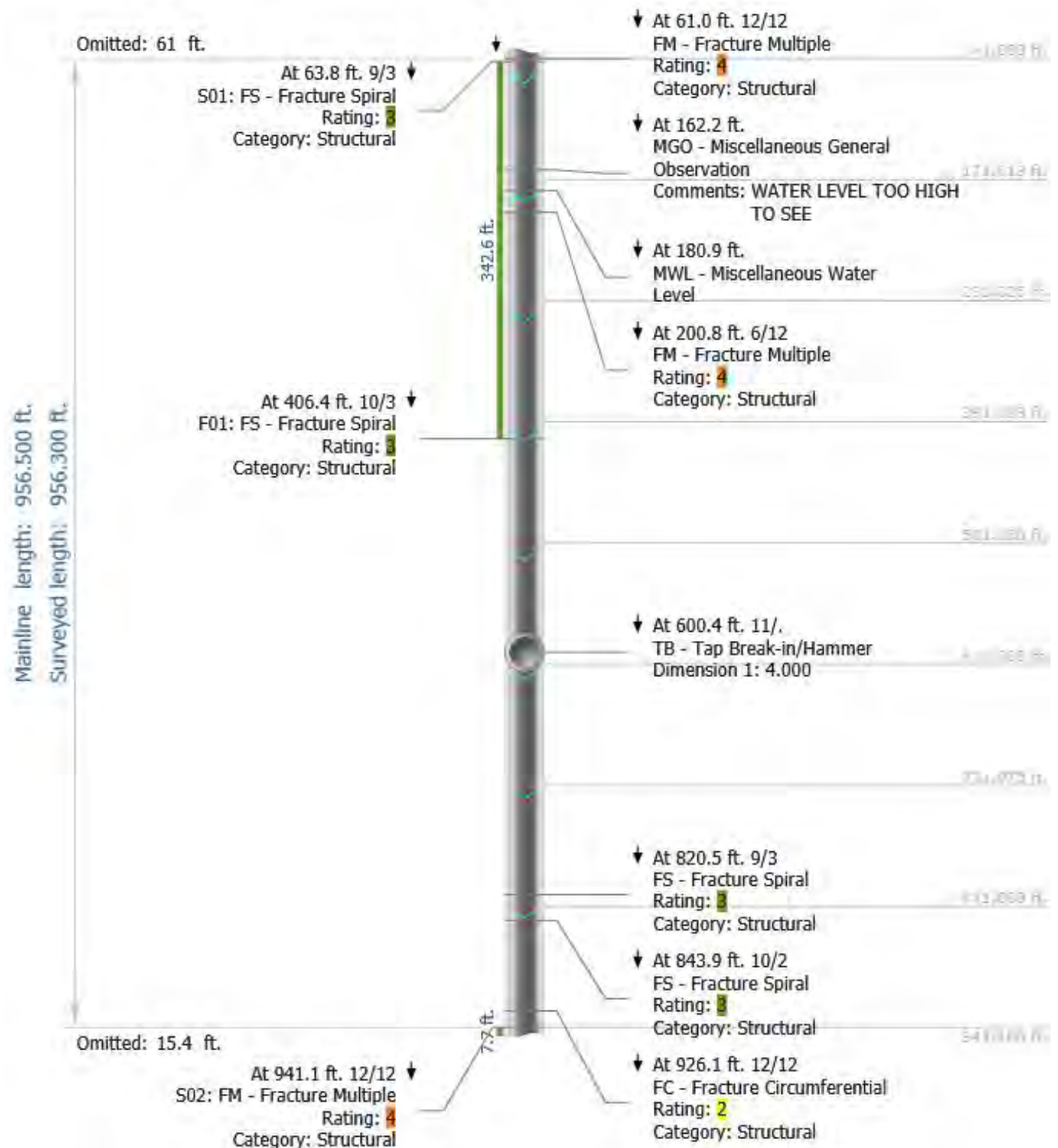
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12016-J12069	LINCOLN	J ST
Start date/time:	Direction:	Weather:	Location code:
4/3/2025 9:45 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



Weather:

1



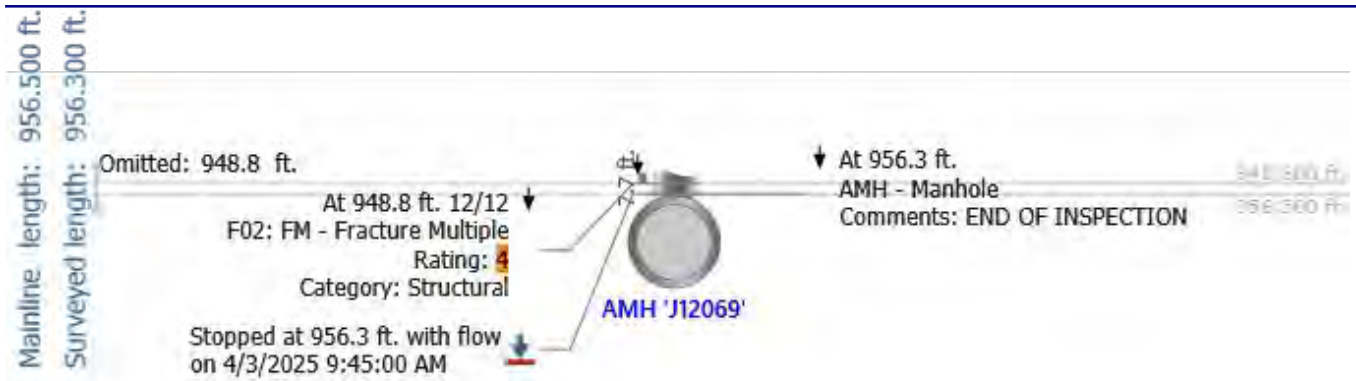
Project name: **LINCOLN WASTEWATER**
Mainline ID: **J12016-J12069**
CONDITION

Start date/time:
4/3/2025 9:45 AM

Direction:
D

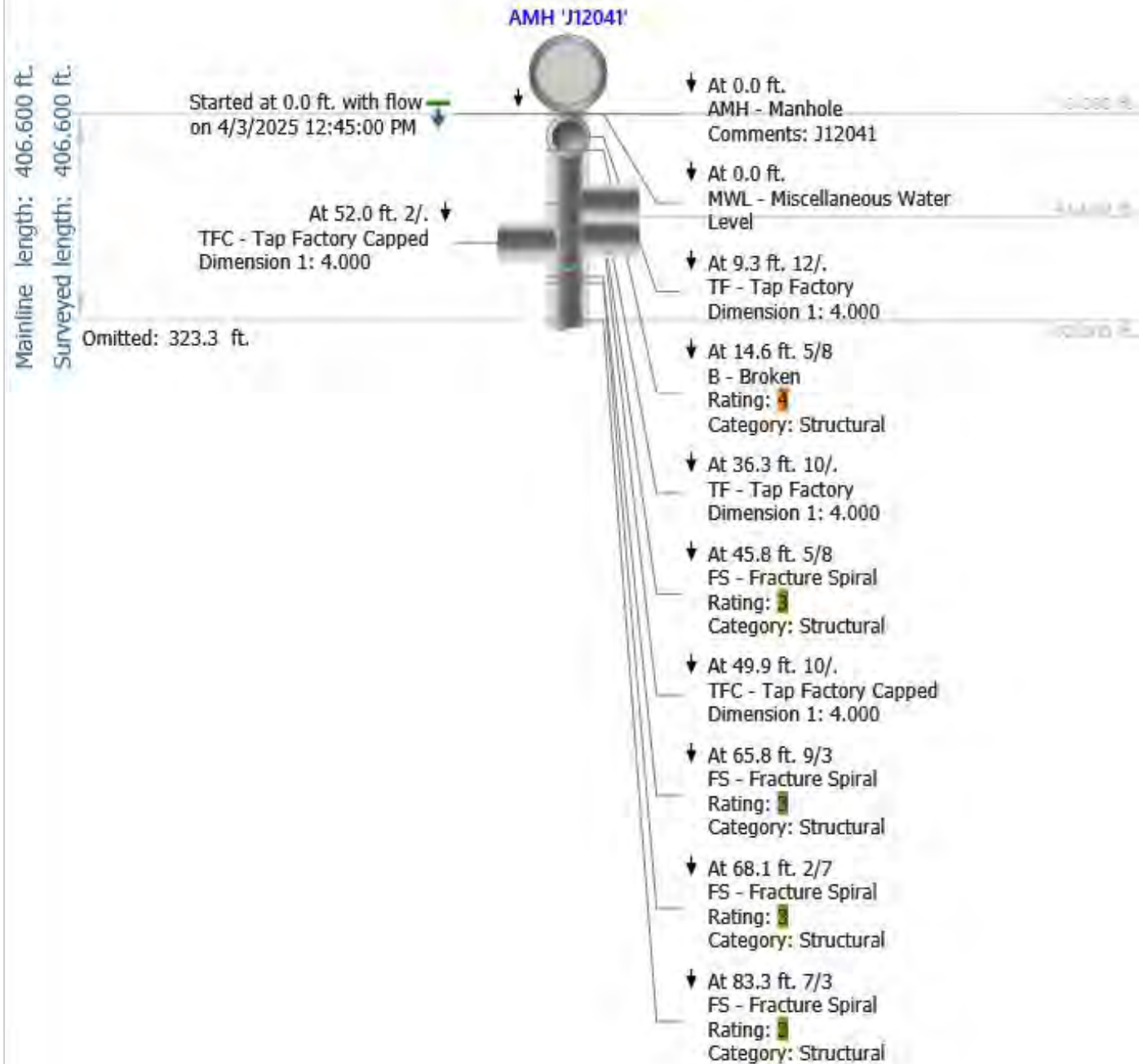
Weather:

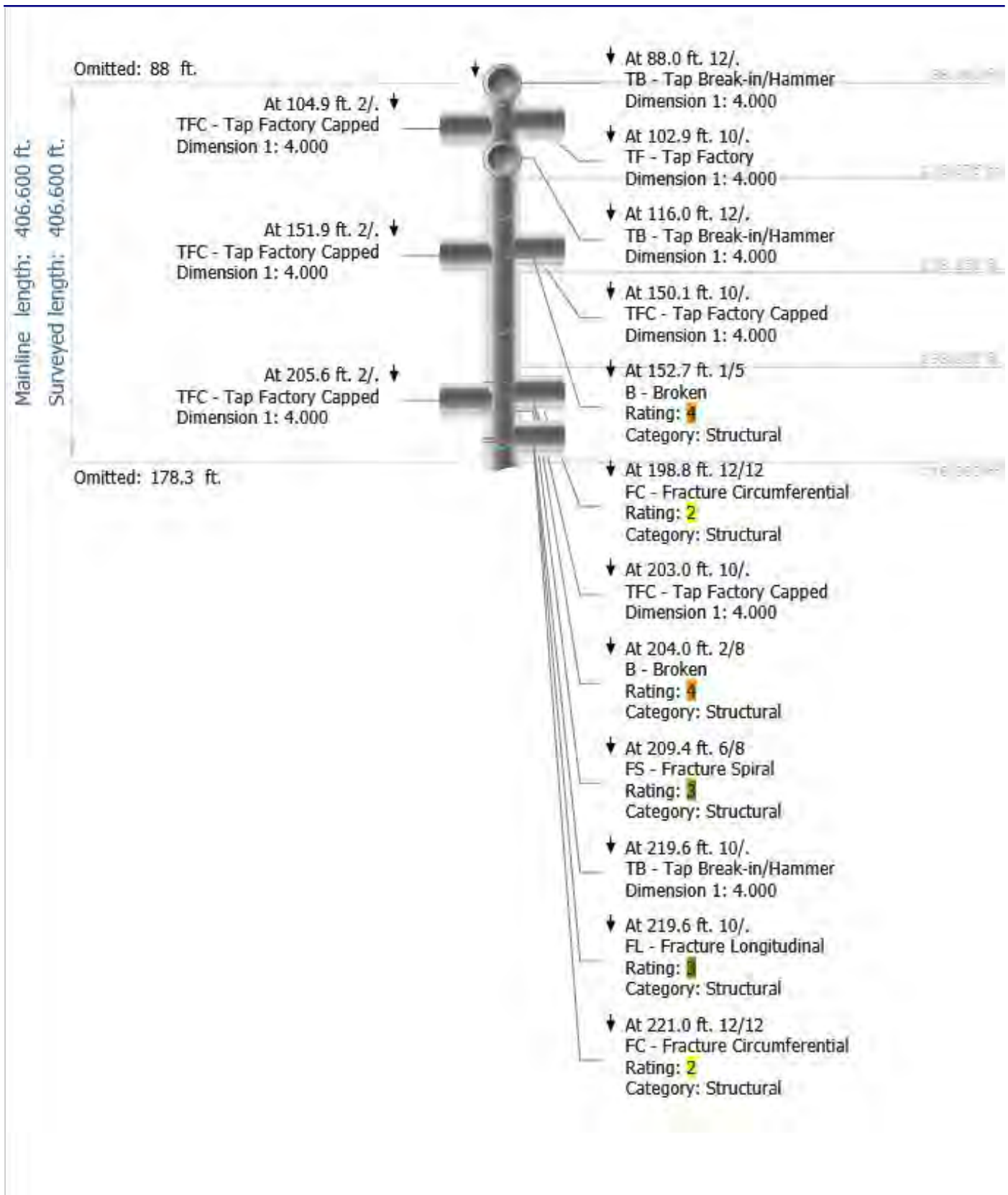
1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12041-J12012	LINCOLN	4TH ST ALLEY
Start date/time:	Direction:	Weather:	Location code:
4/3/2025 12:45 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	





Project name:

**LINCOLN WASTEWATER
CONDITION**

Weather:

1

Mainline ID:

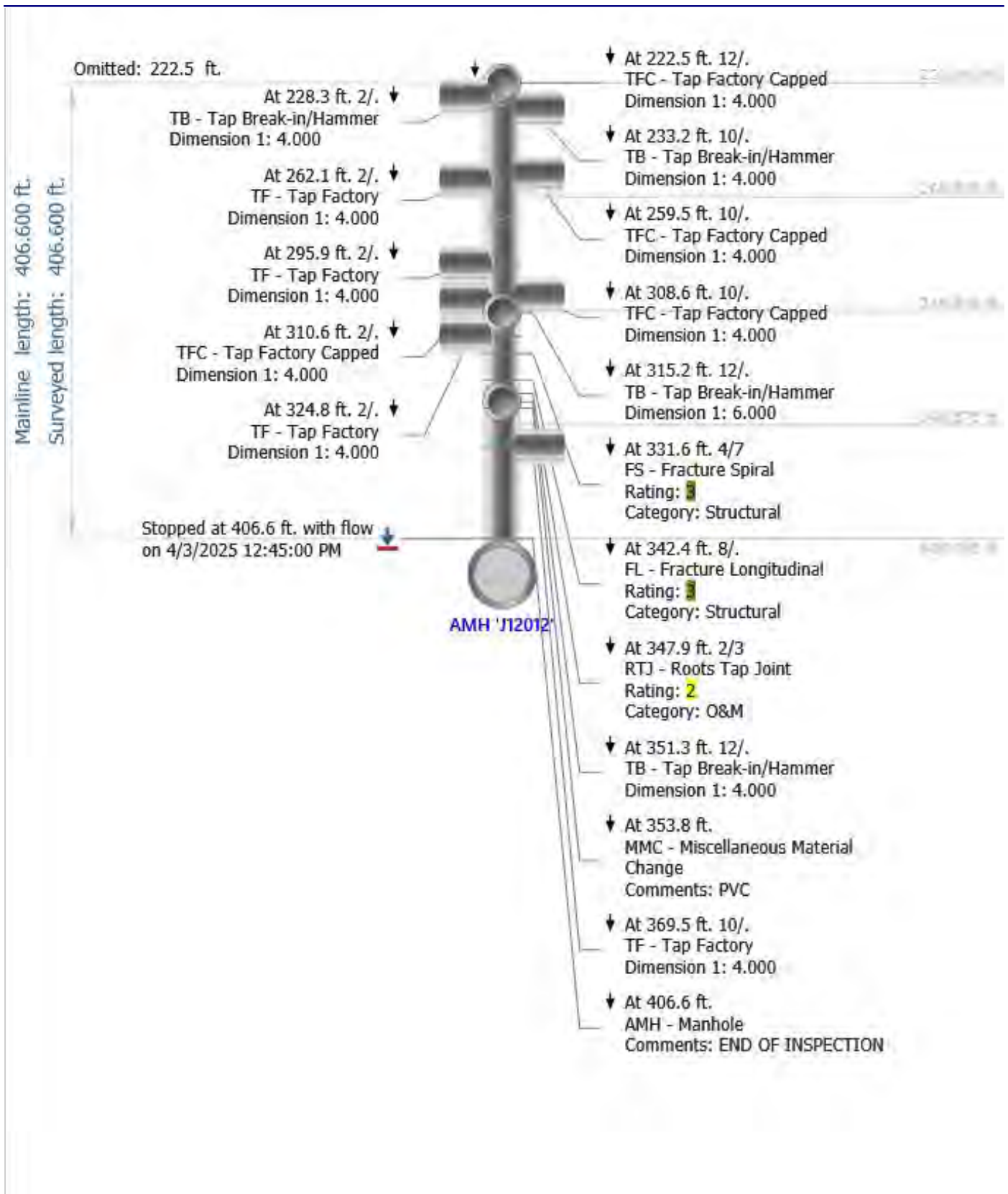
J12041-J12012

Start date/time:

4/3/2025 12:45 PM

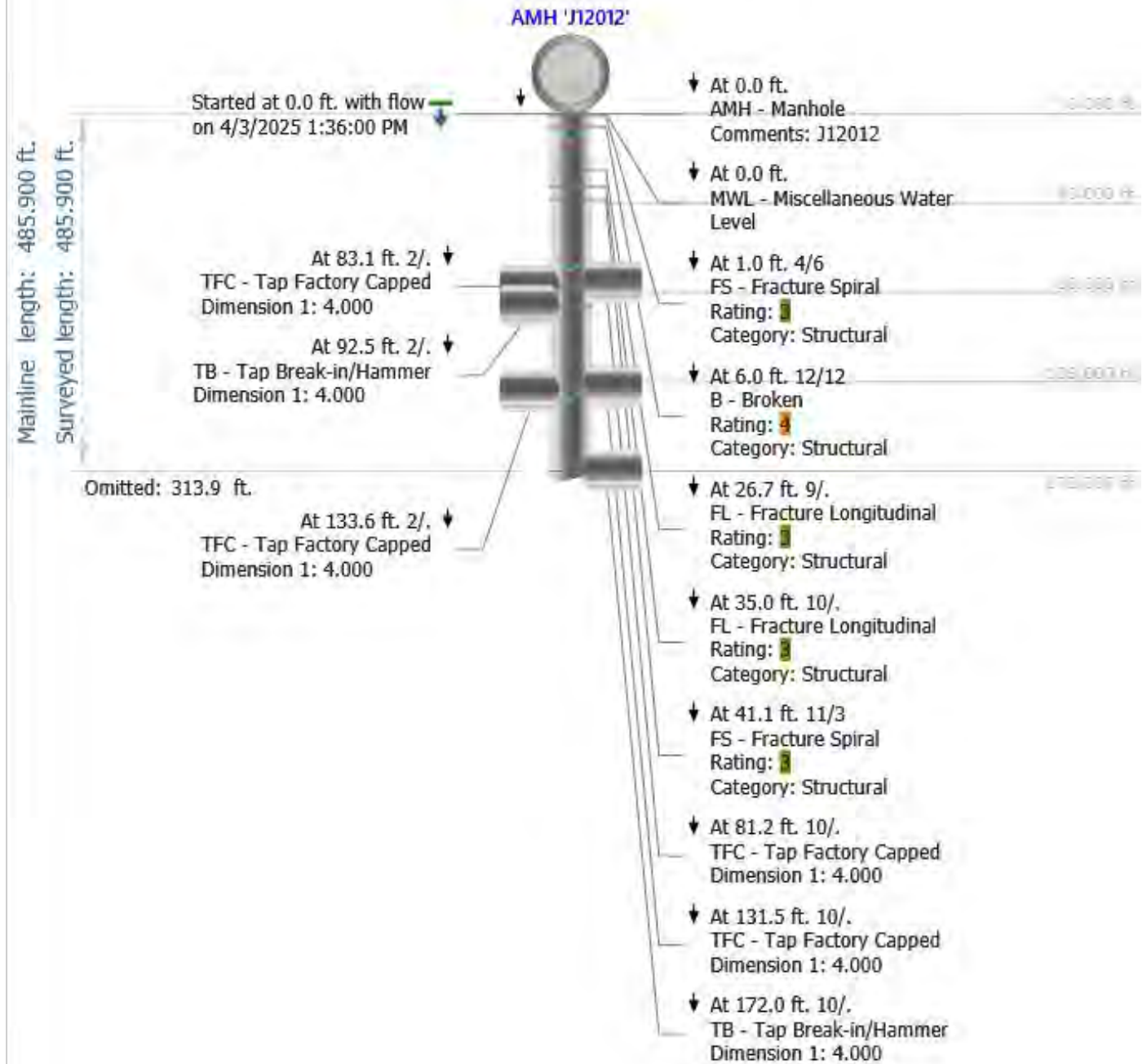
Direction:

D



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12012-J12019	LINCOLN	4TH ST ALLEY
Start date/time:	Direction:	Weather:	Location code:
4/3/2025 1:36 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Weather:

1

Mainline ID:

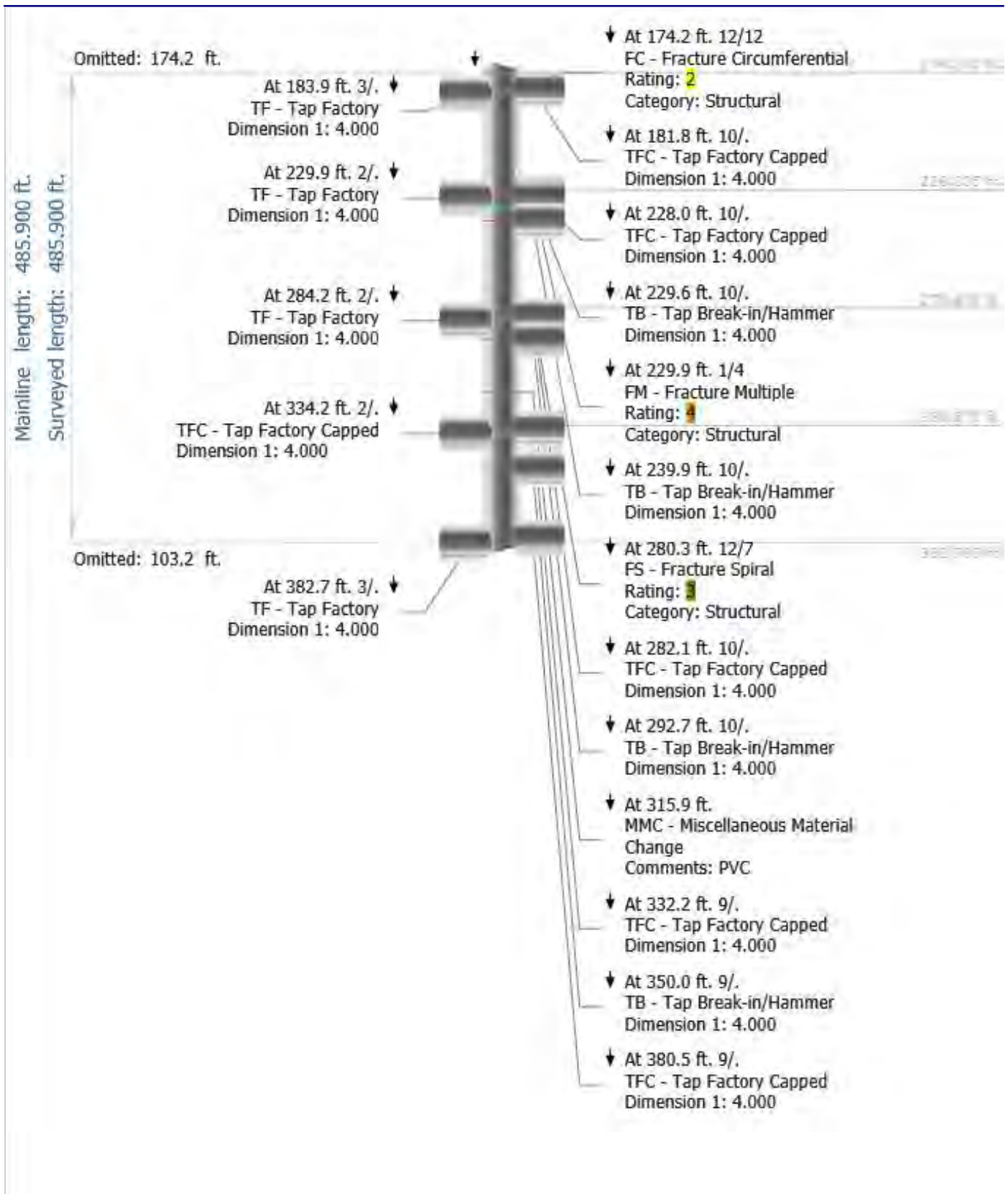
J12012-J12019

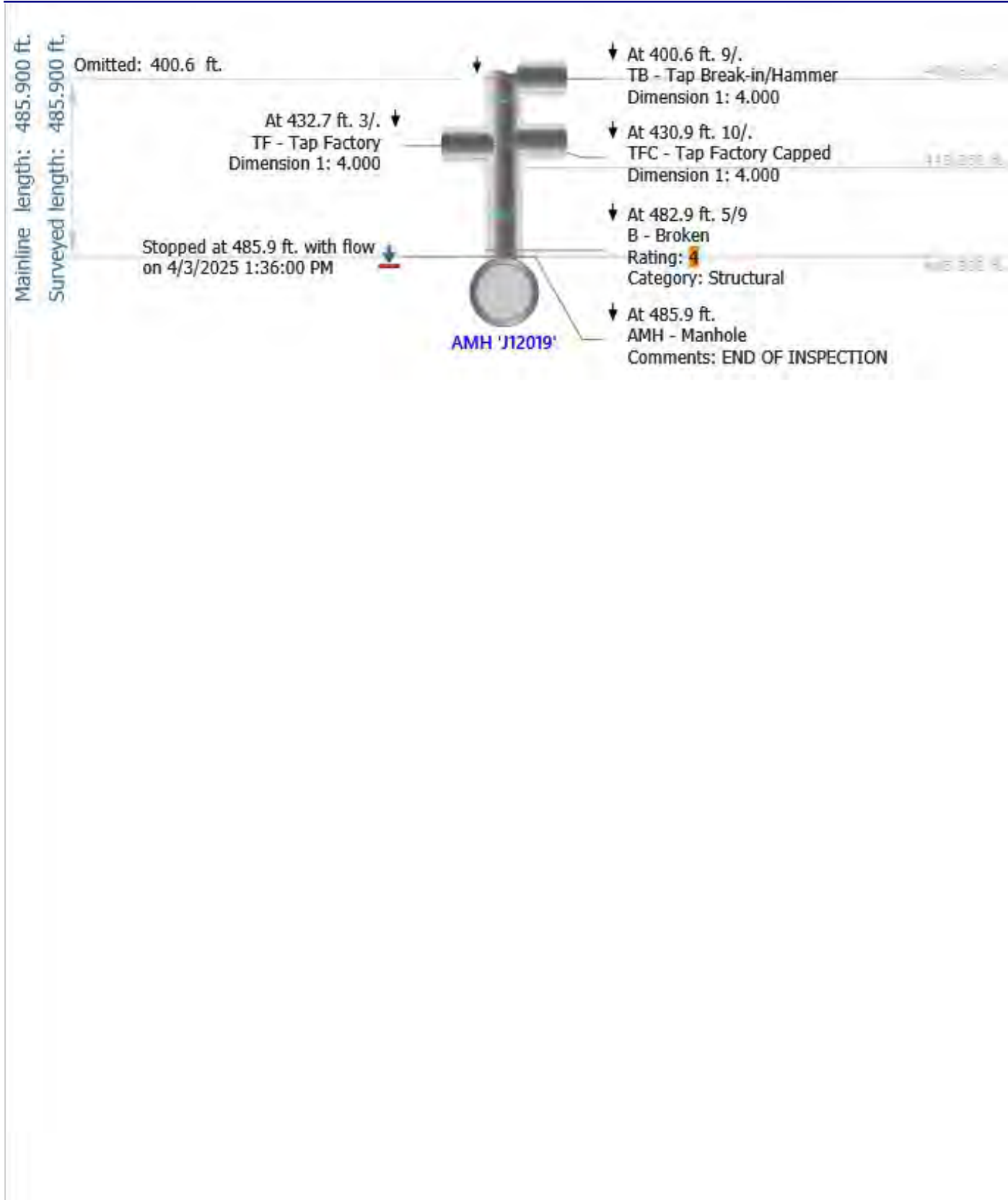
Start date/time:

4/3/2025 1:36 PM

Direction:

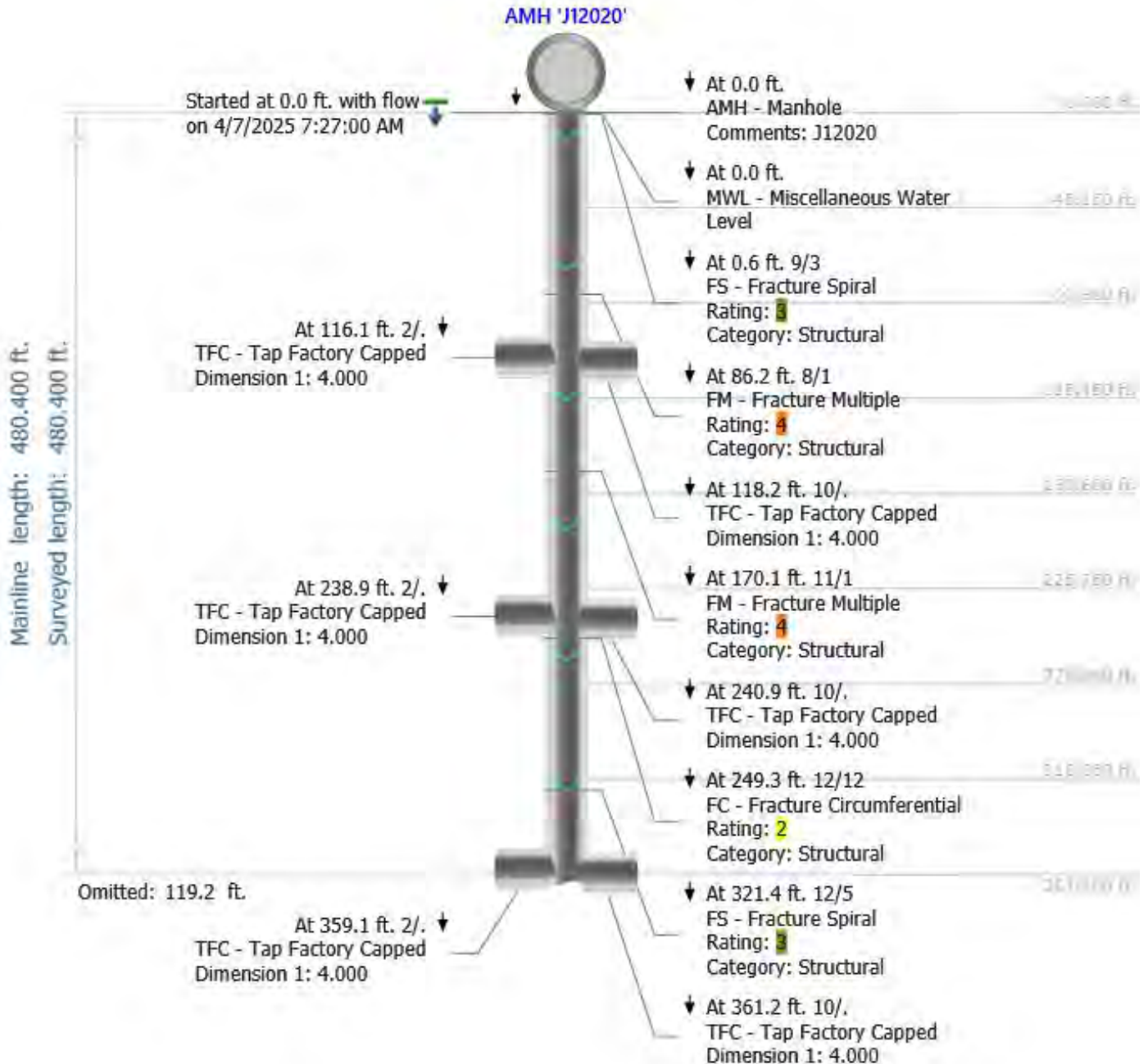
D





Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12020-J12021	LINCOLN	I ST
Start date/time:	Direction:	Weather:	Location code:
4/7/2025 7:27 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J12020-J12021

Start date/time:

4/7/2025 7:27 AM

Direction:

D

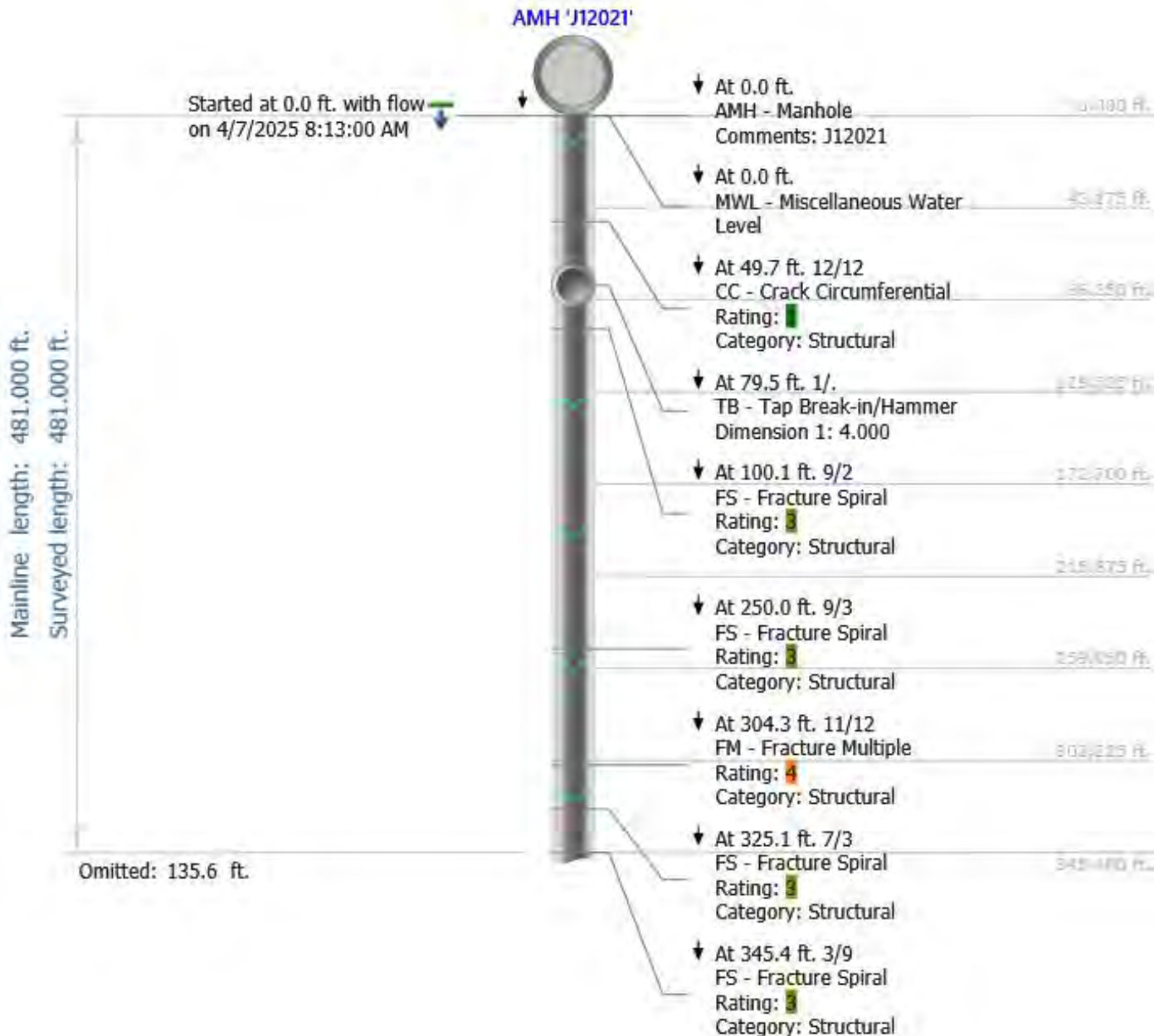
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12021-J12009	LINCOLN	I
Start date/time:	Direction:	Weather:	Location code:
4/7/2025 8:13 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J12021-J12009

Start date/time:

4/7/2025 8:13 AM

Direction:

D

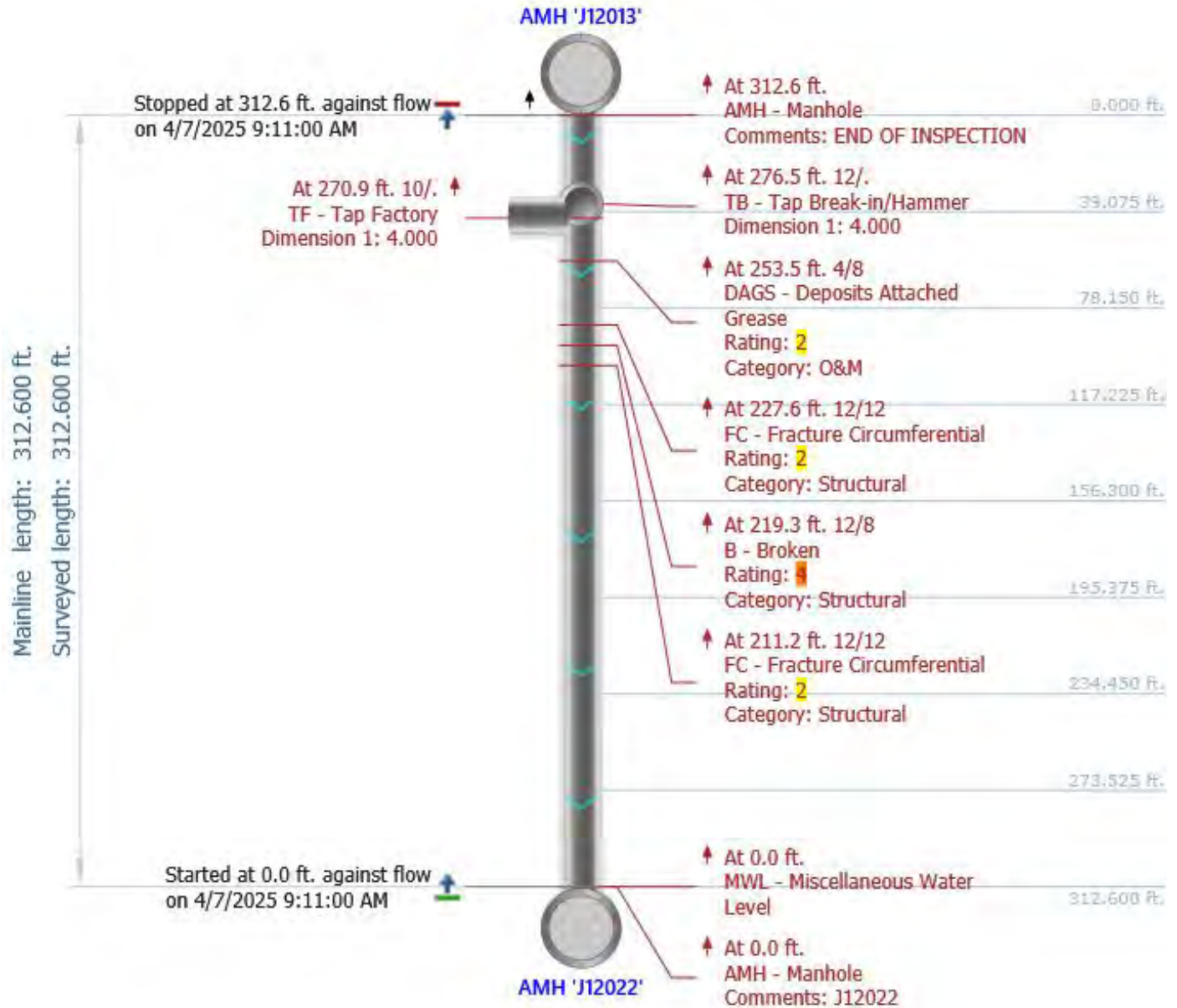
Weather:

1



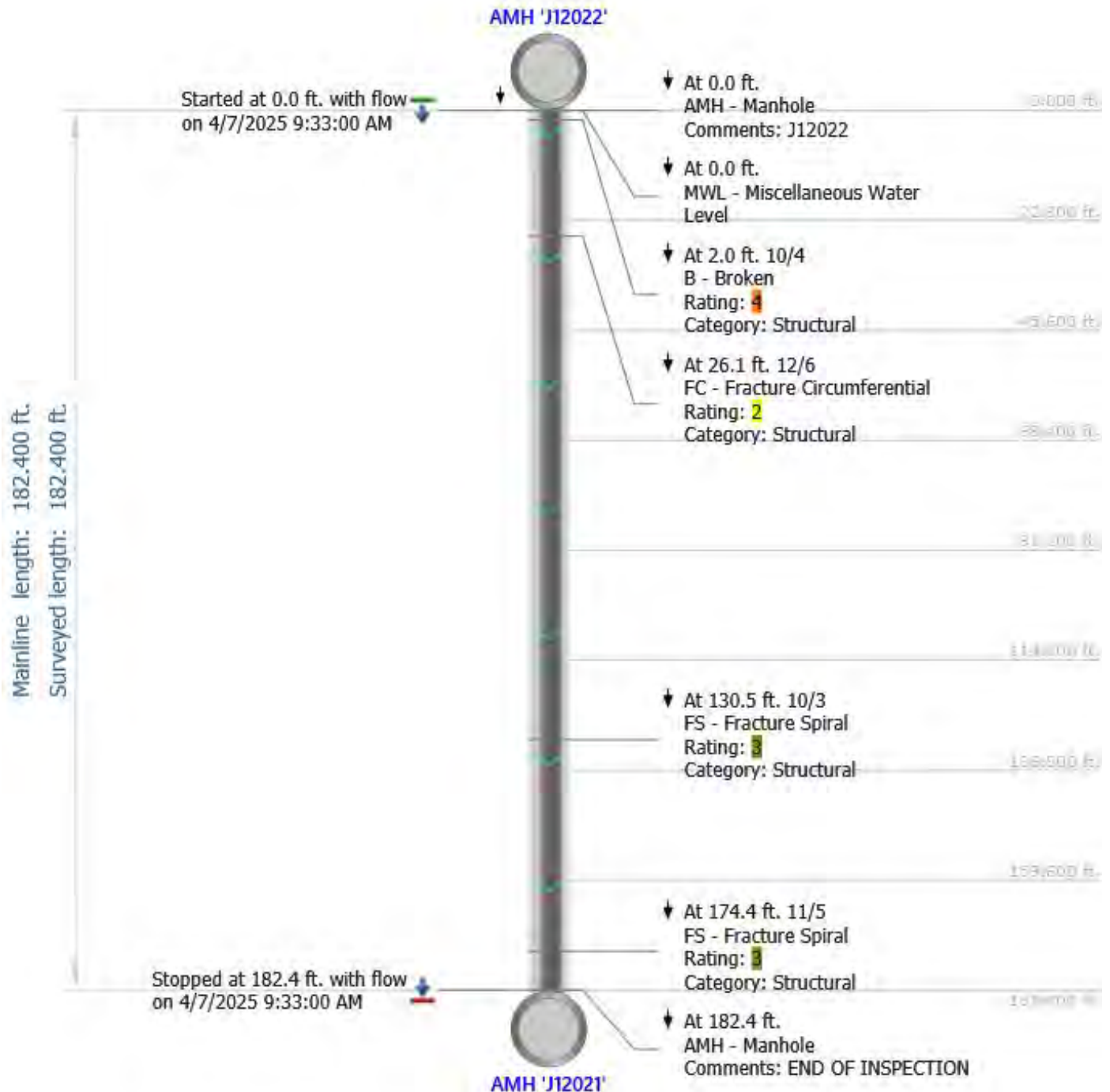
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12013-J12022	LINCOLN	4TH ST
Start date/time:	Direction:	Weather:	Location code:
4/7/2025 9:11 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



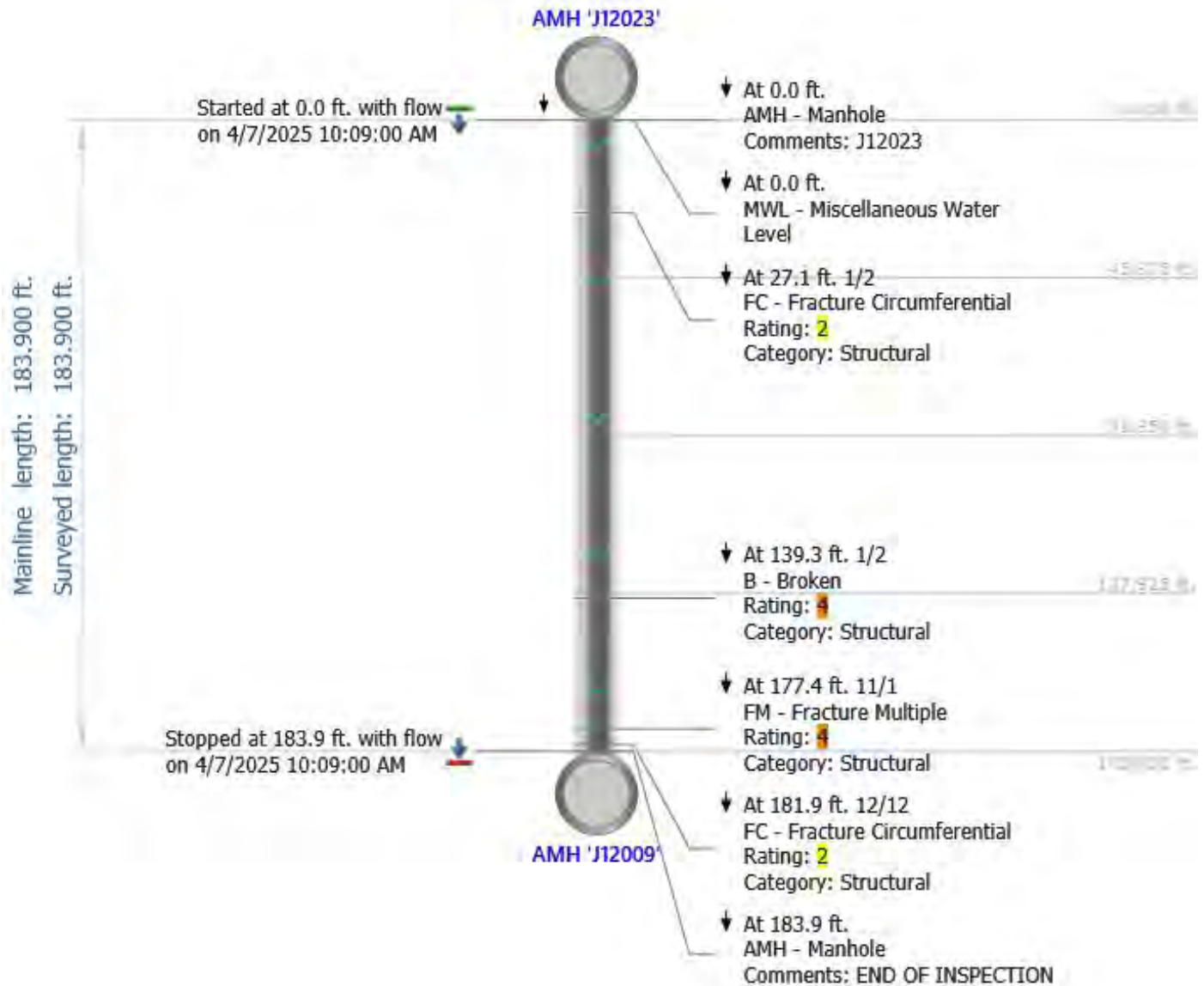
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12022-J12021	LINCOLN	4TH ST
Start date/time:	Direction:	Weather:	Location code:
4/7/2025 9:33 AM	D	1	
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



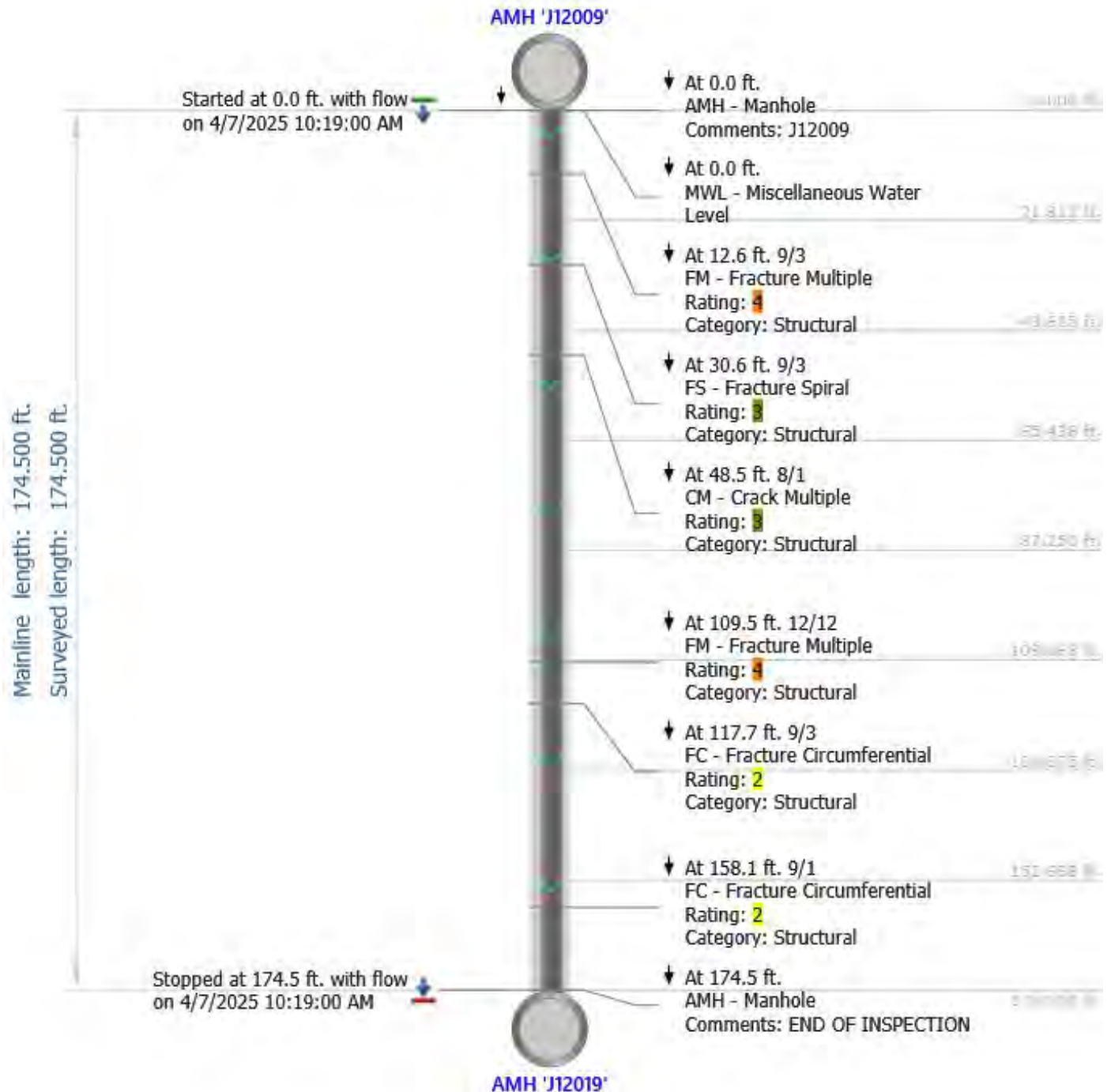
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12023-J12009	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/7/2025 10:09 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



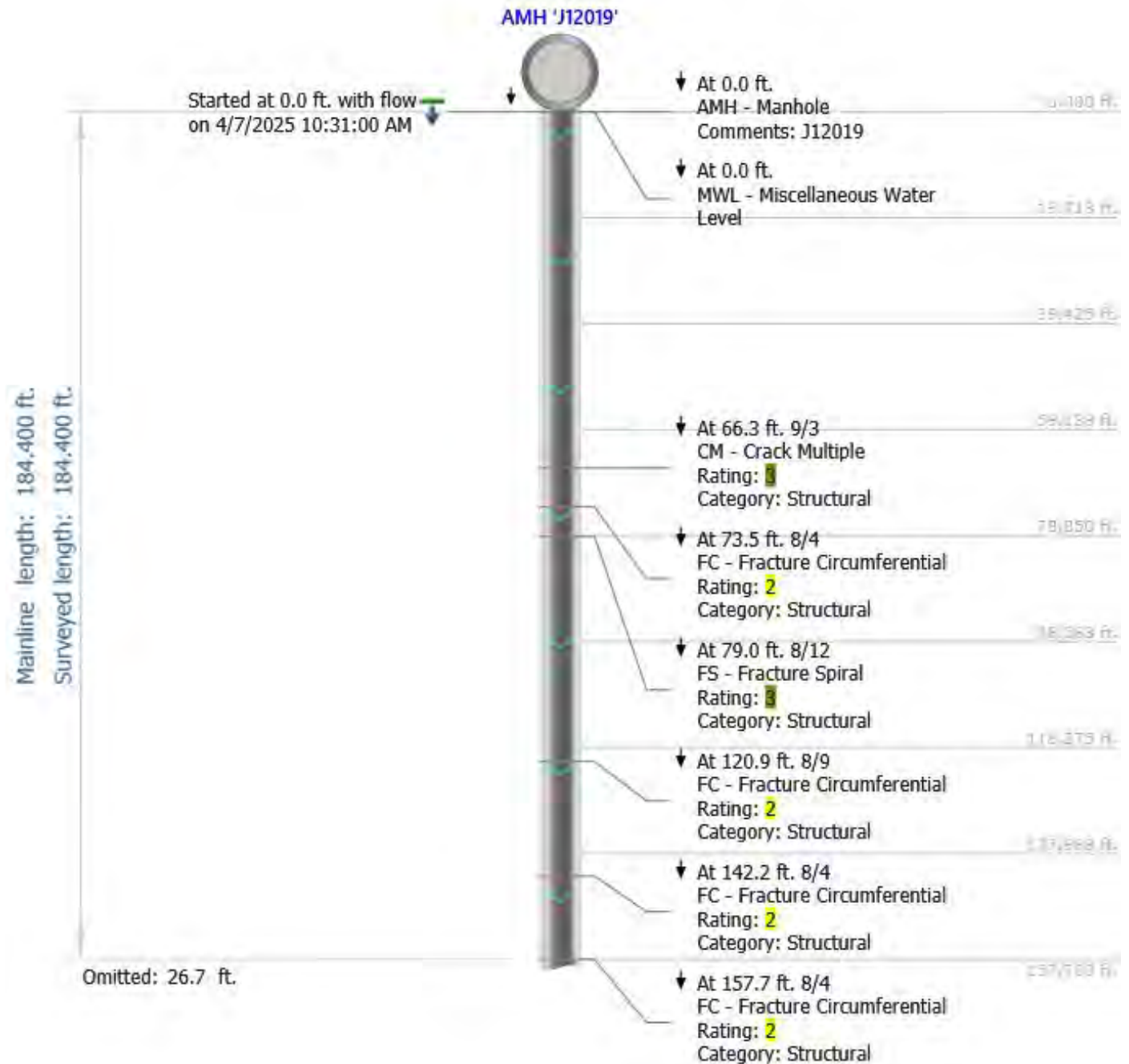
Main Inspections Pipe Run with Images

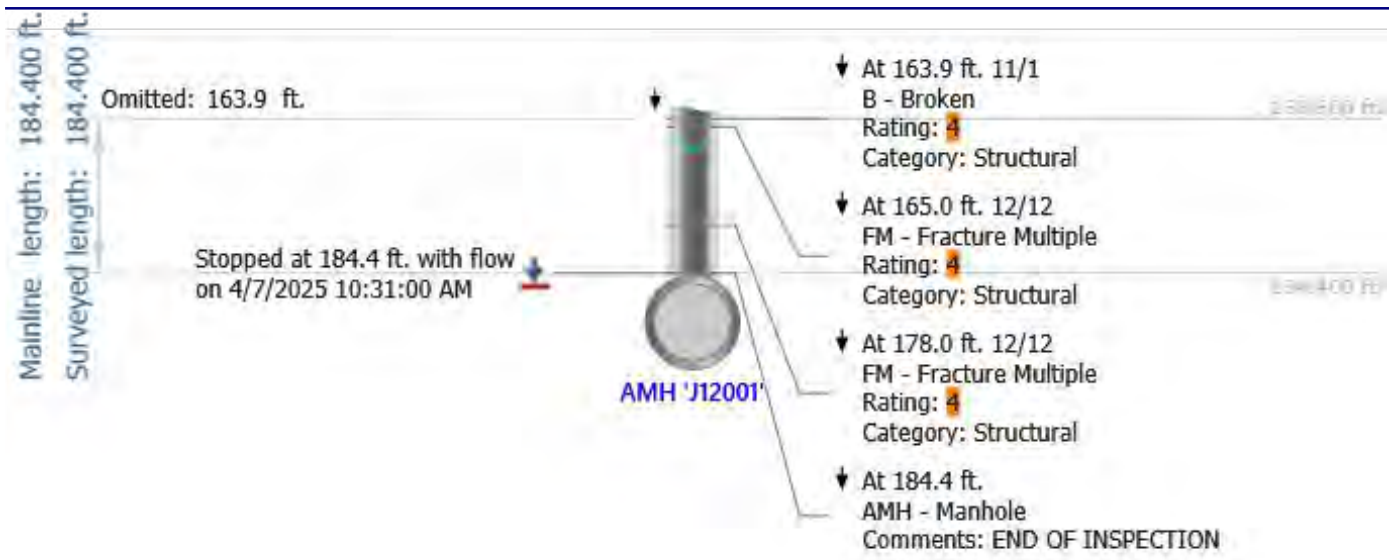
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12009-J12019	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/7/2025 10:19 AM	D	1	
Shape:	Material:	Height:	Width:
C	VCP	12 in.	



Main Inspections Pipe Run with Images

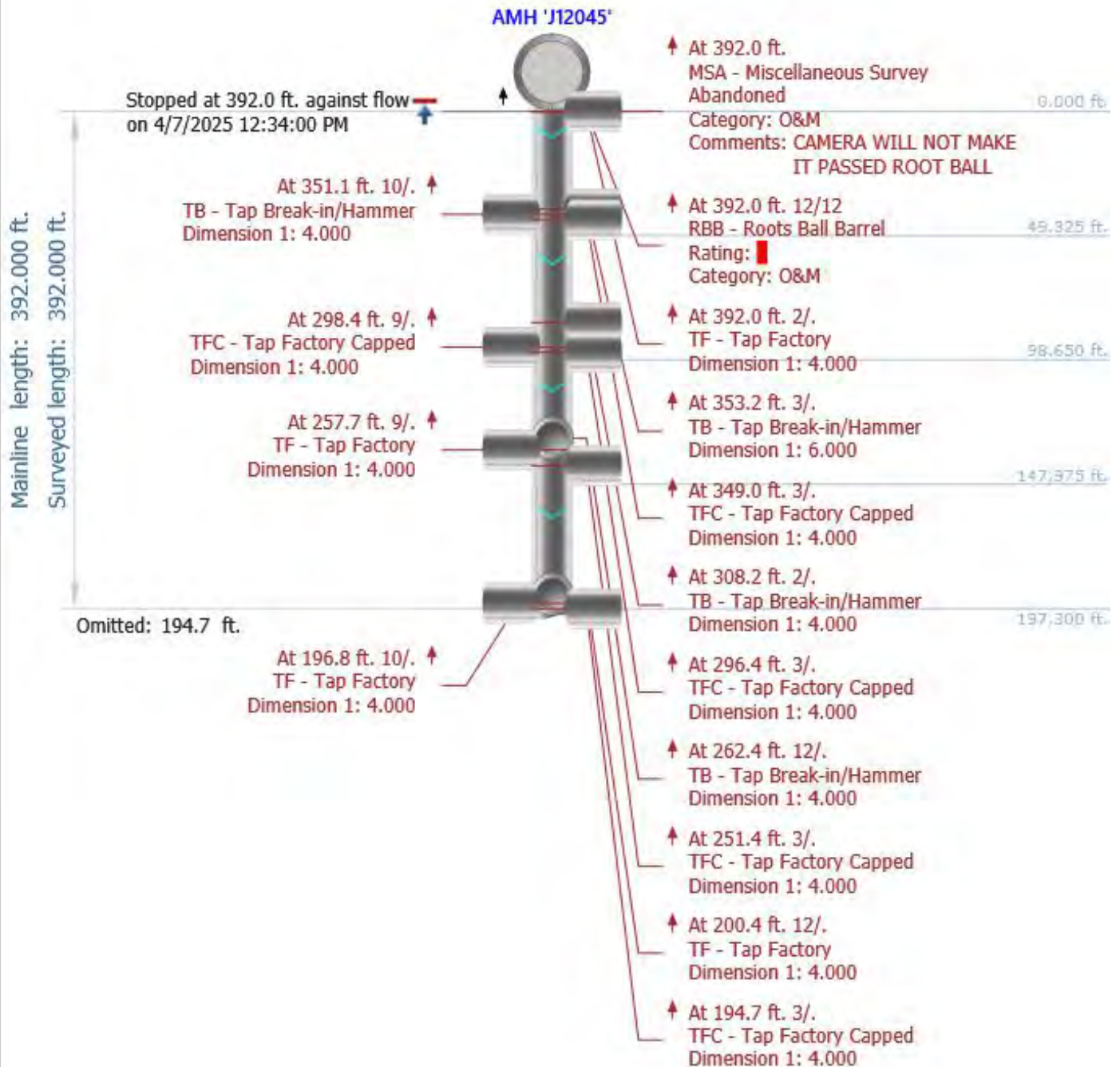
Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12019-J12001	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/7/2025 10:31 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	12 in.	





Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12045-J12023	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/7/2025 12:34 PM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J12045-J12023

Start date/time:

4/7/2025 12:34 PM

Direction:

U

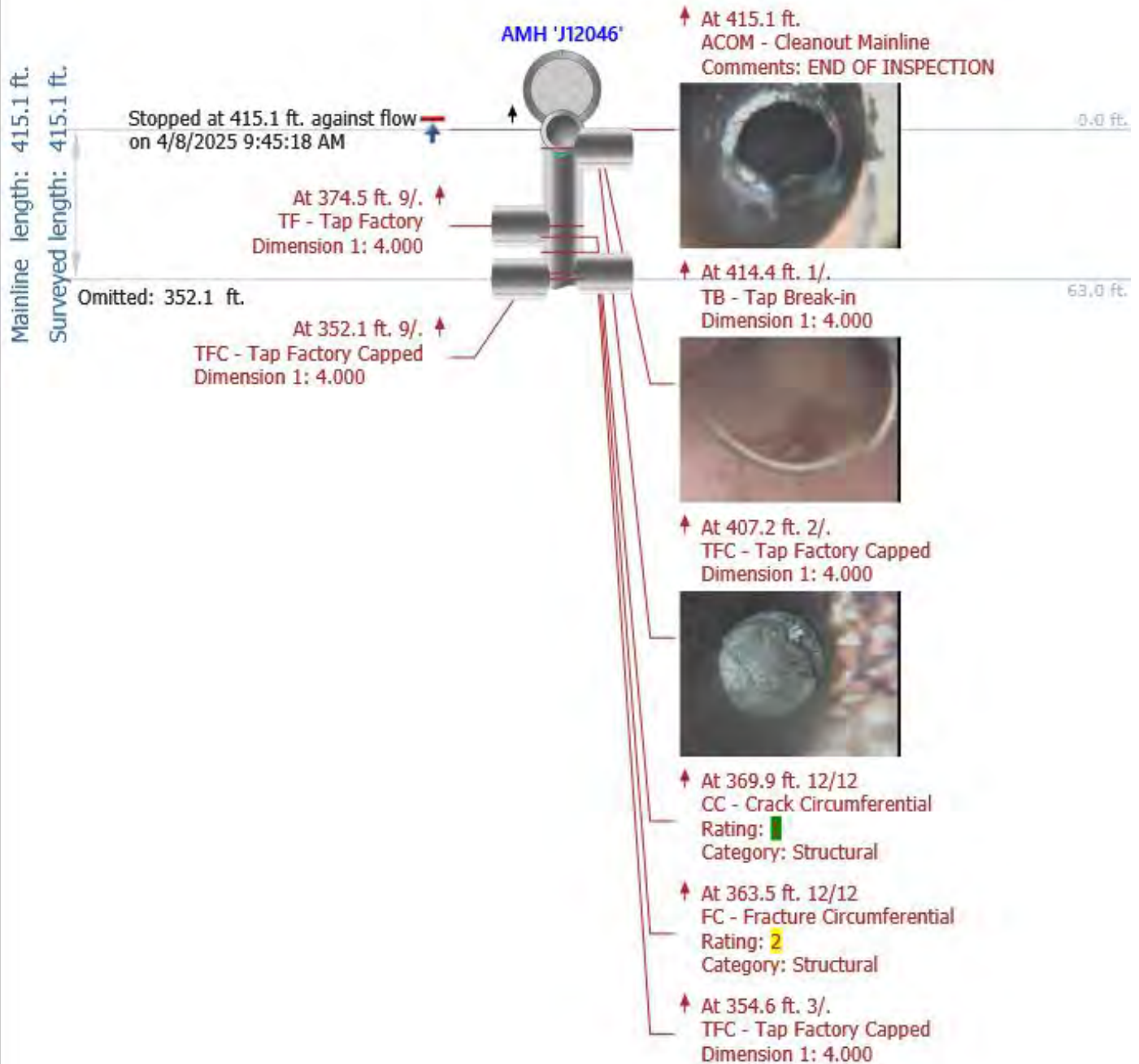
Weather:

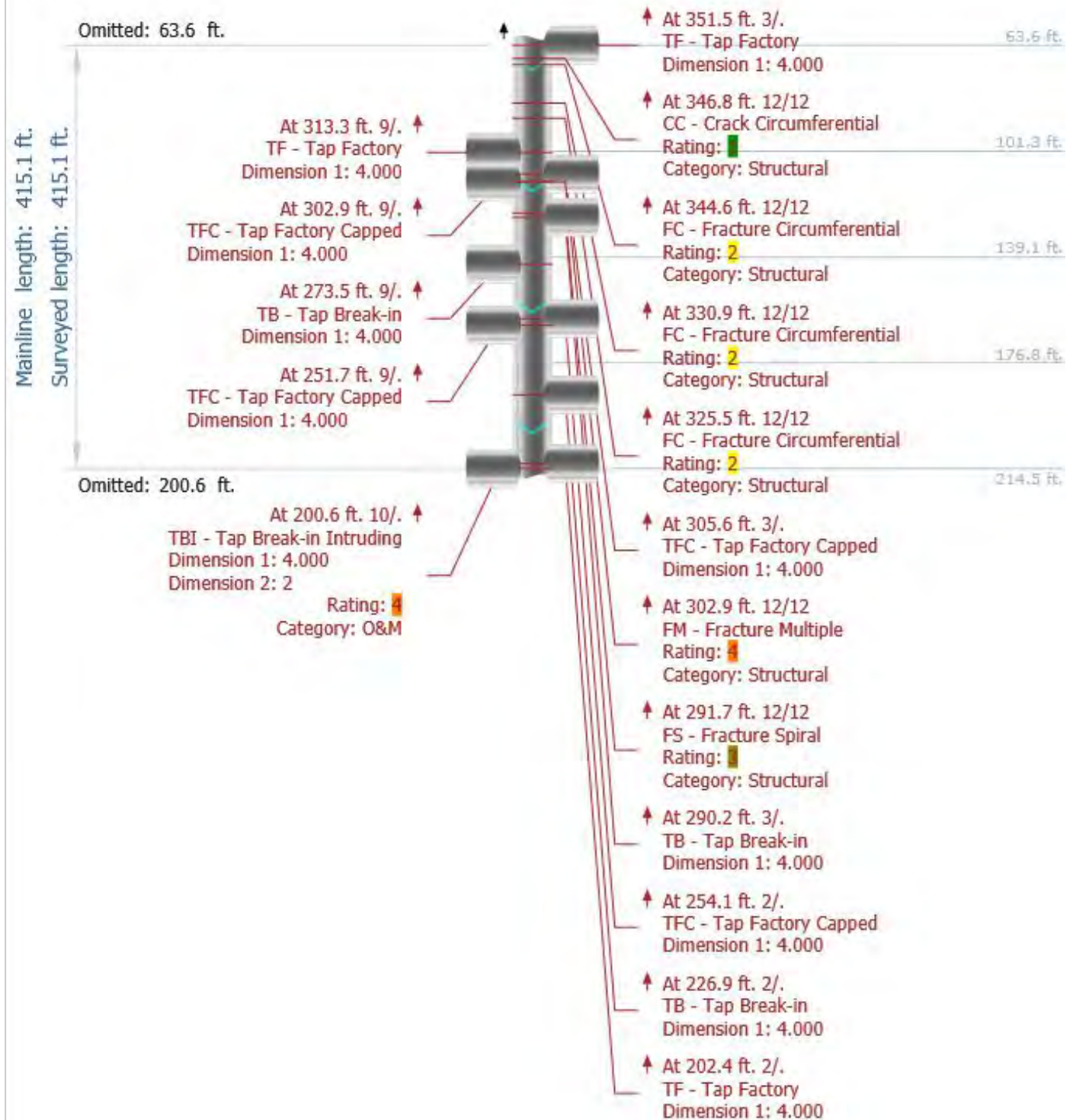
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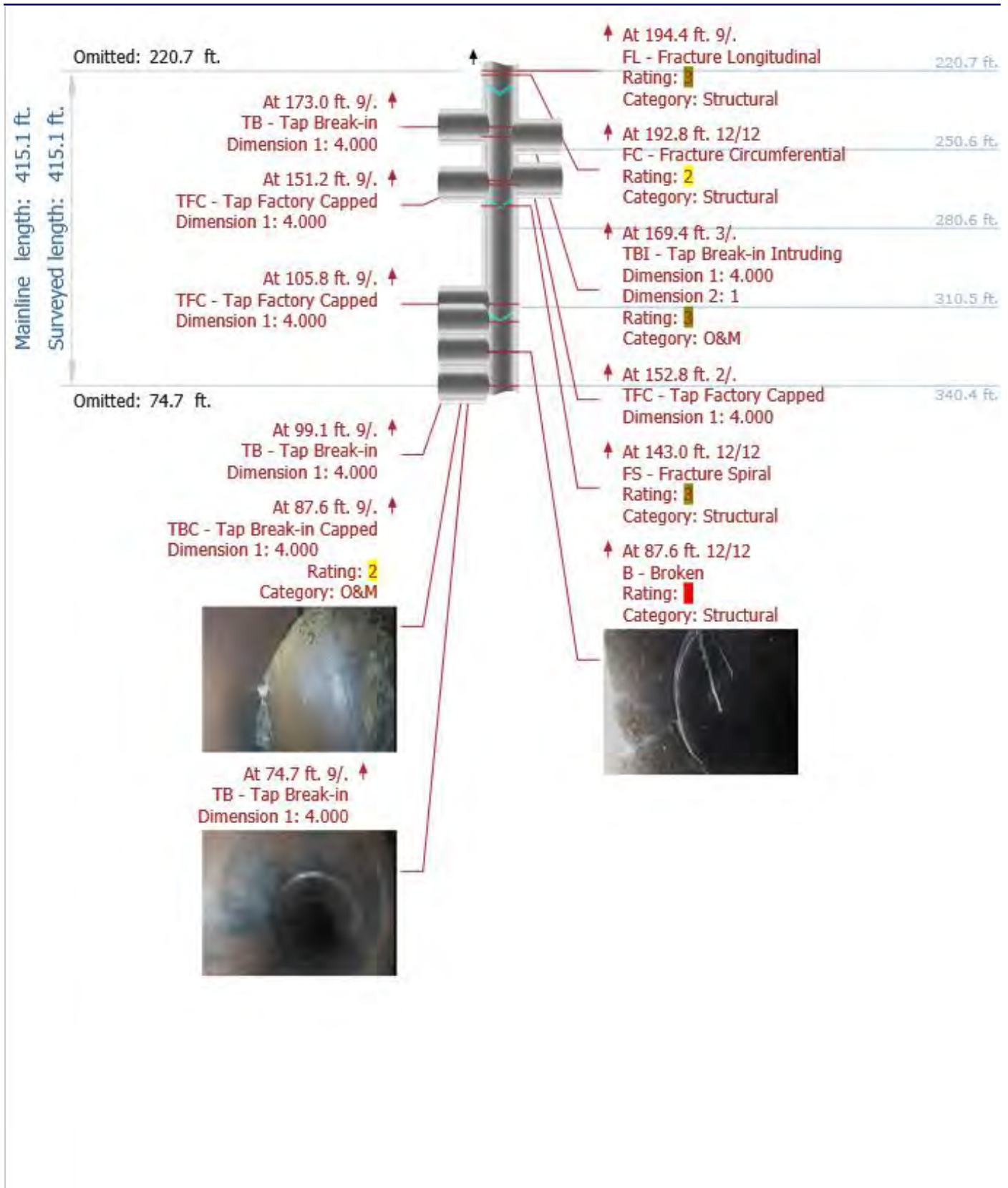


Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12046-J12023	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/8/2025 7:33 AM	U	1	
Shape:	Material:	Height:	Width:
C	VCP	6 in.	







Project name:

**LINCOLN WASTEWATER
CONDITION**

Mainline ID:

J12046-J12023

Start date/time:

4/8/2025 7:33 AM

Direction:

U

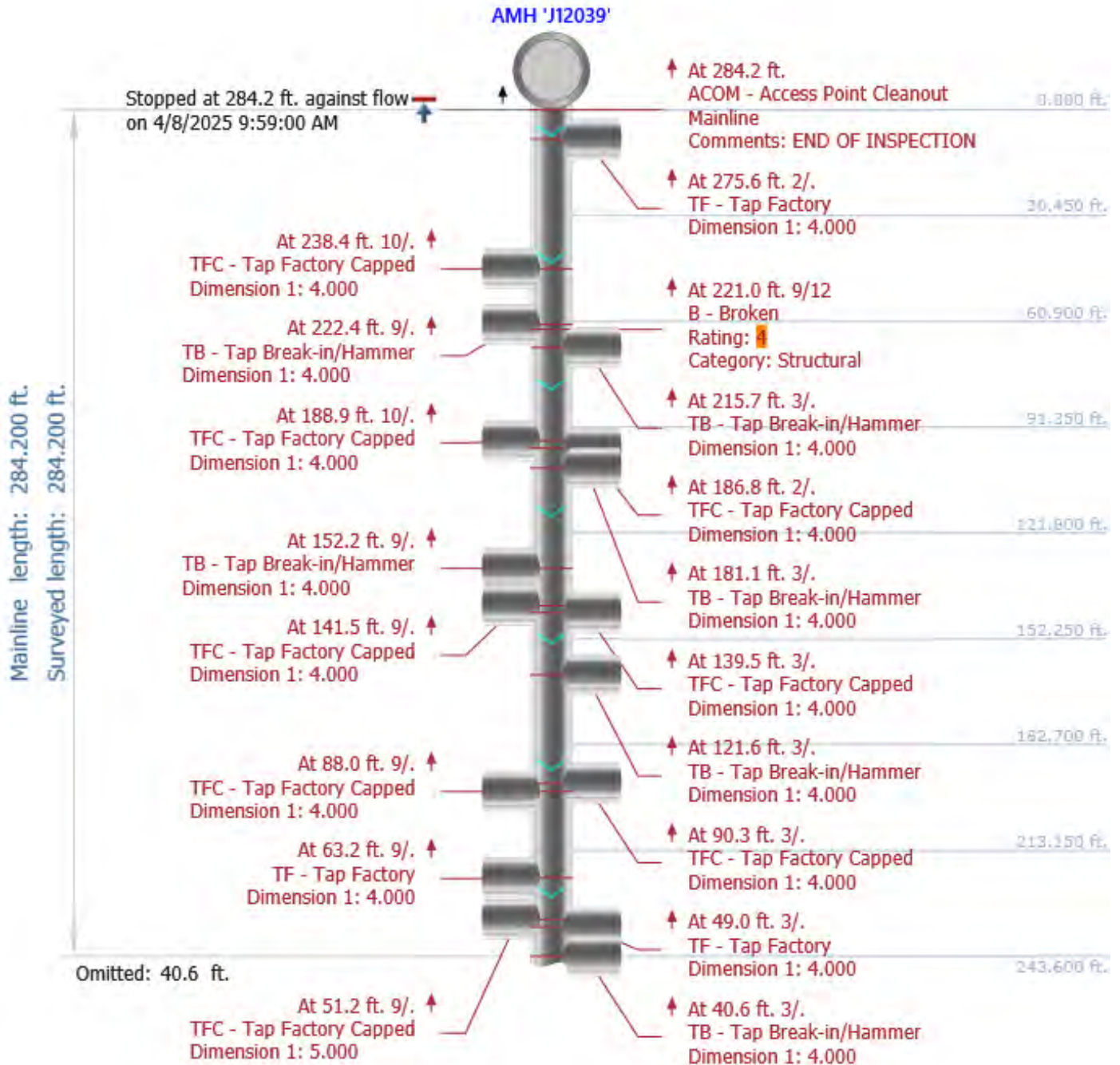
Weather:

1



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12039-J12019	LINCOLN	3RD ST
Start date/time:	Direction:	Weather:	Location code:
4/8/2025 9:59 AM	U	1	C
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Project name:

Mainline ID:

Start date/time:

Direction:

**LINCOLN WASTEWATER
CONDITION**

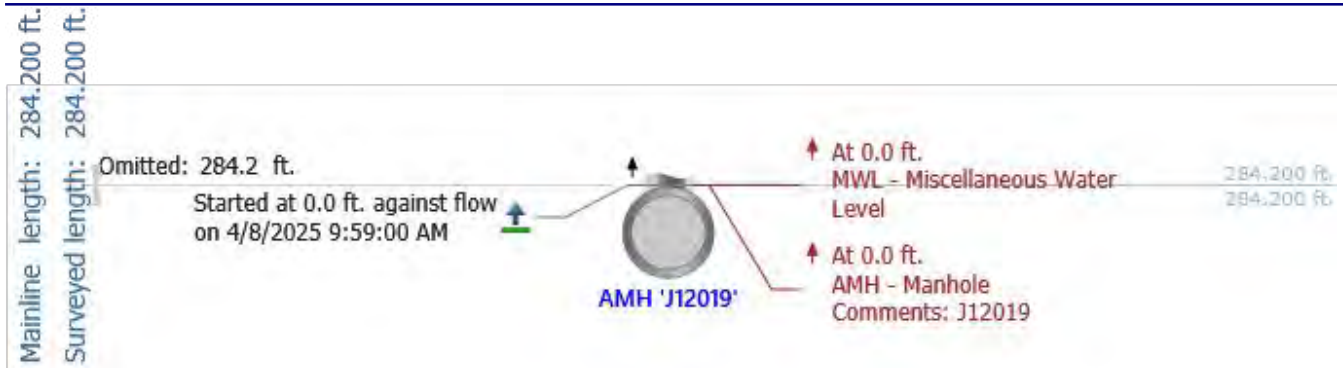
J12039-J12019

4/8/2025 9:59 AM

U

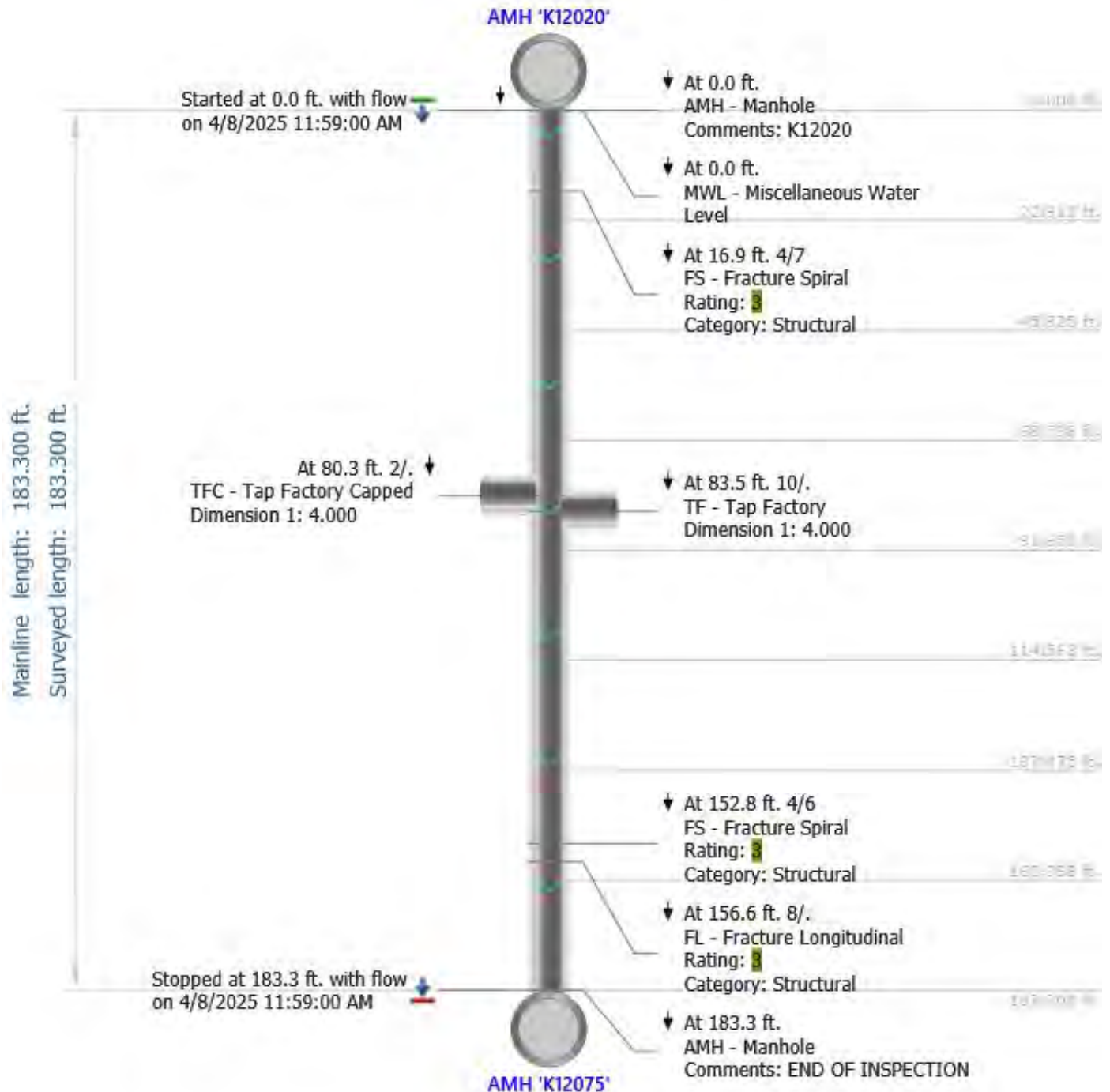
Weather:

1



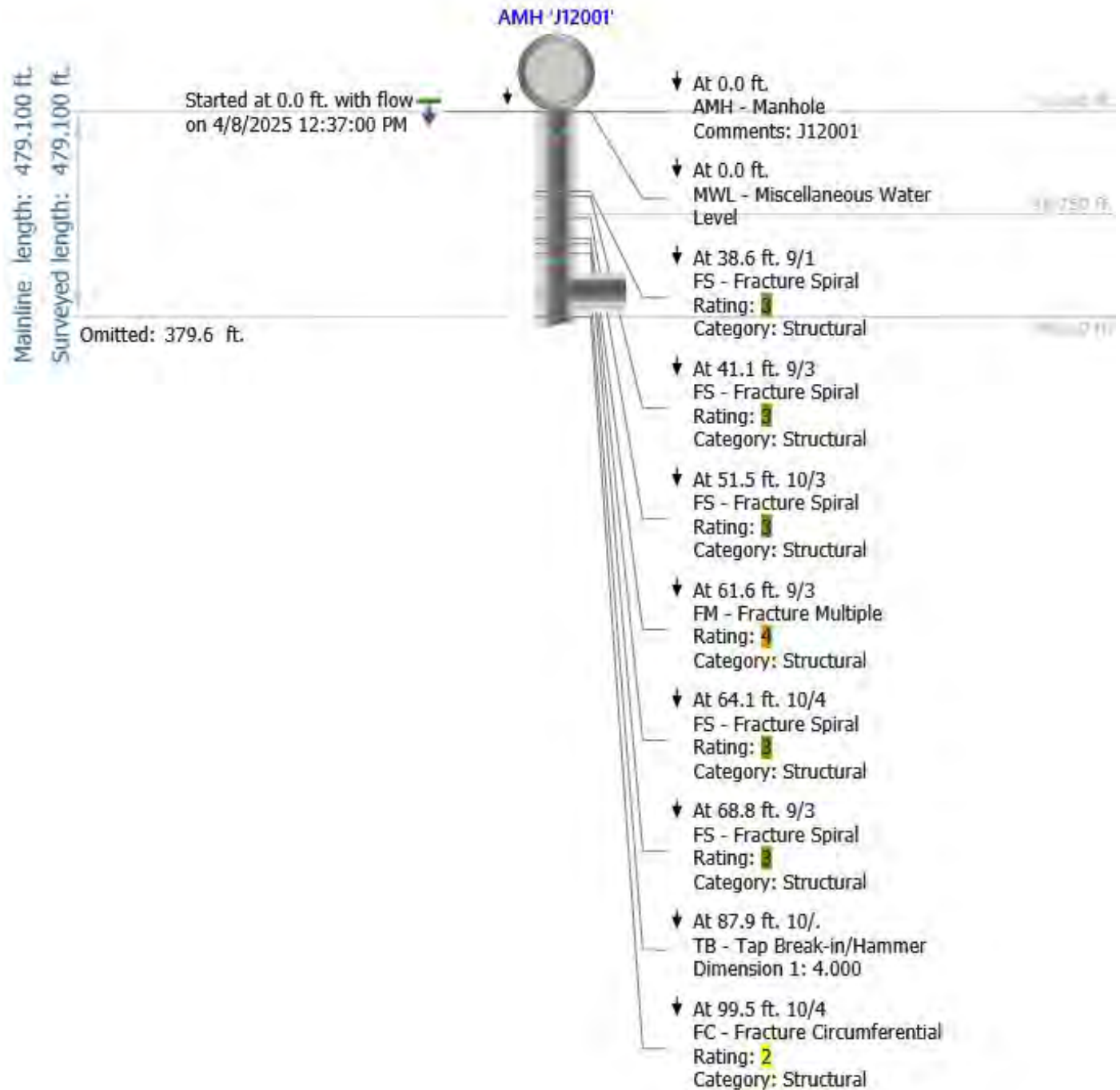
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	K12020-K12075	LINCOLN	2ND ST
Start date/time:	Direction:	Weather:	Location code:
4/8/2025 11:59 AM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



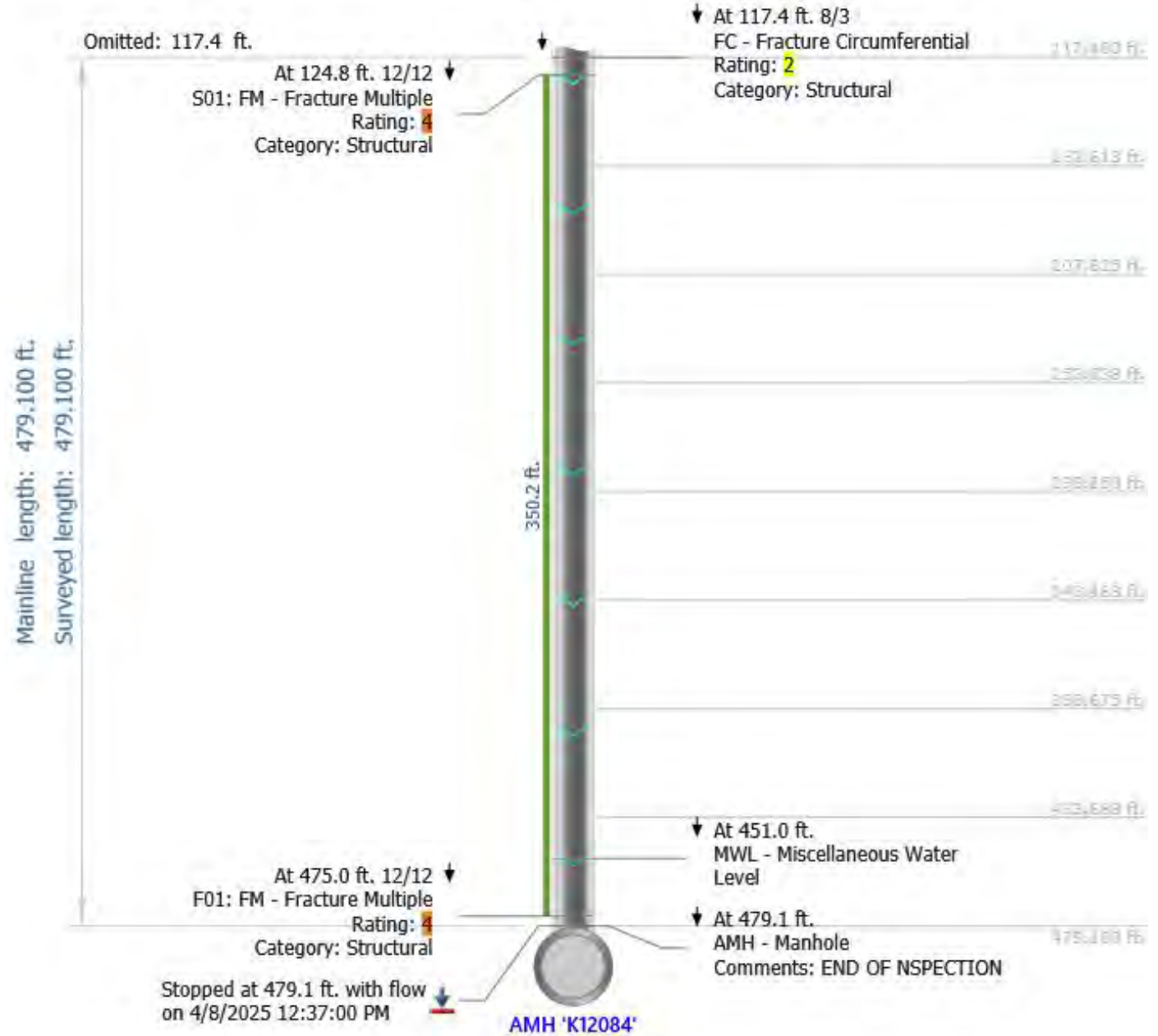
Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12001-K12084	LINCOLN	J ST
Start date/time:	Direction:	Weather:	Location code:
4/8/2025 12:37 PM	D	1	C
Shape:	Material:	Height:	Width:
C	VCP	10 in.	



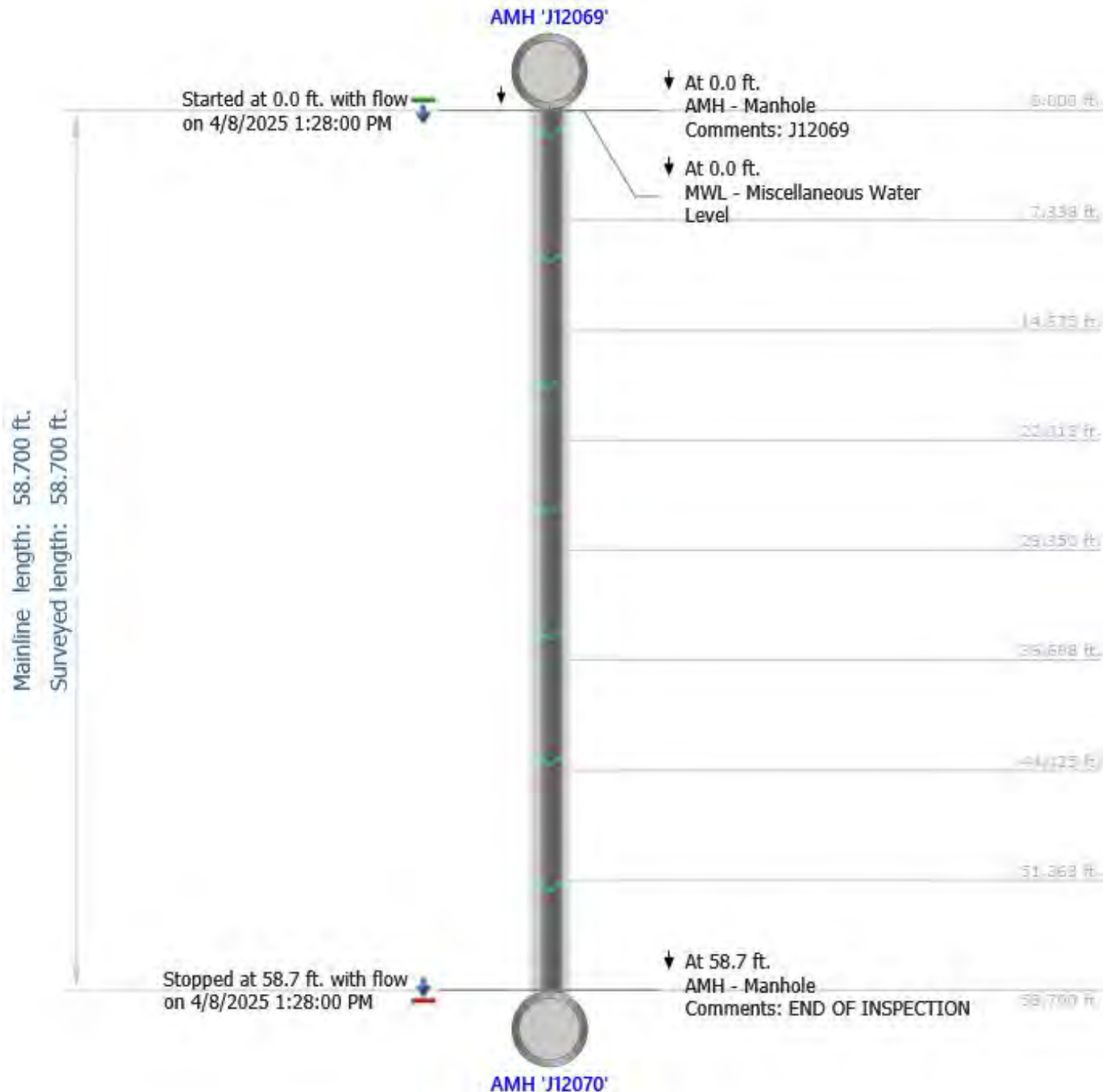
Weather:

1



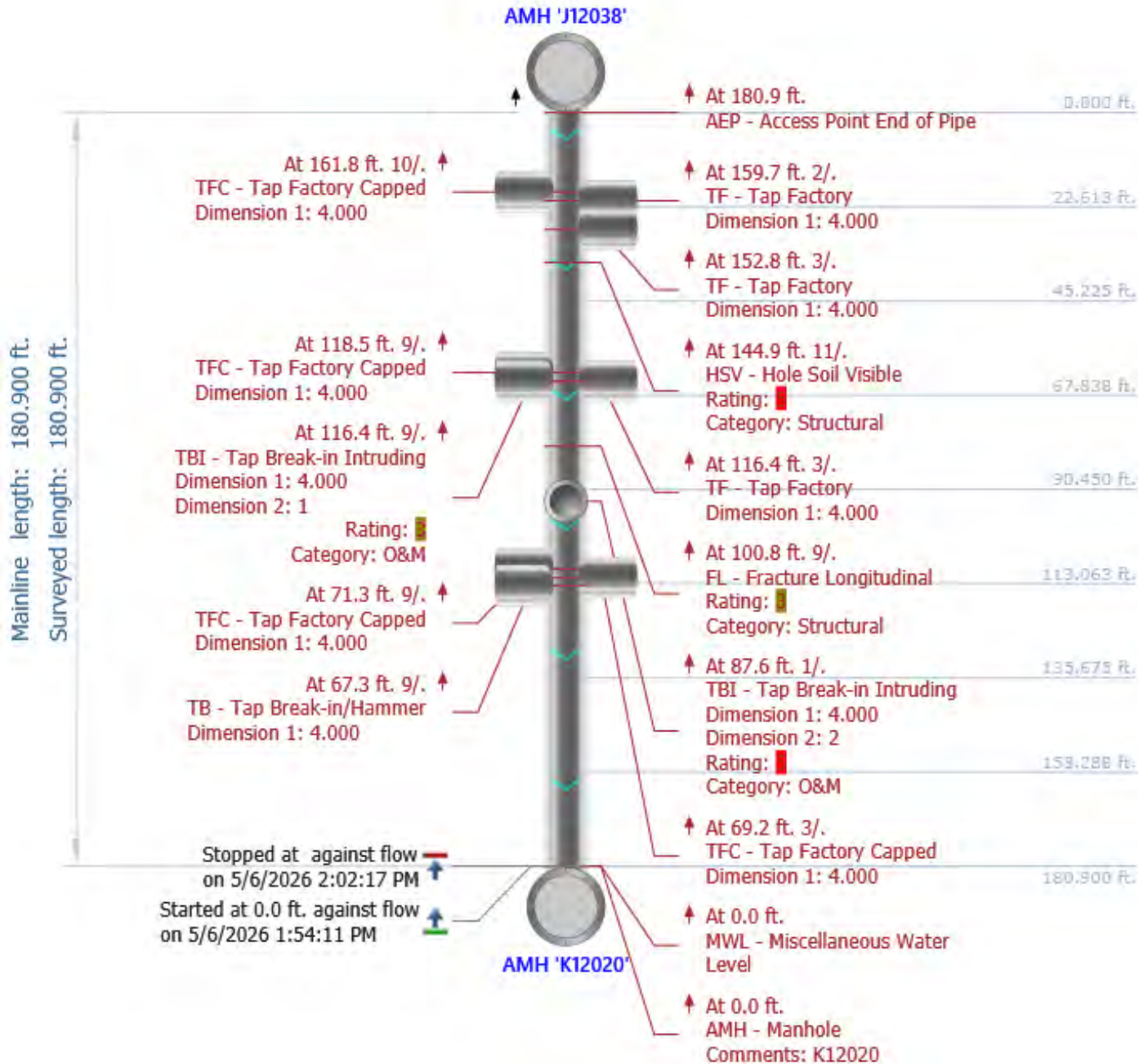
Main Inspections Pipe Run with Images

Project name: LINCOLN WASTEWATER CONDITION	Mainline ID: J12069-J12070	City: LINCOLN	Street: 3RD ST
Start date/time: 4/8/2025 1:28 PM	Direction: D	Weather: 1	Location code: C
Shape: C	Material: VCP	Height: 12 in.	Width:



Main Inspections Pipe Run with Images

Project name:	Mainline ID:	City:	Street:
LINCOLN WASTEWATER CONDITION	J12038-K12020	LINCOLN	2ND ST
Start date/time:	Direction:	Weather:	Location code:
5/6/2026 1:54 PM	U		
Shape:	Material:	Height:	Width:
C	VCP	6 in.	



Appendix C

Placer County SMD1 Flow Projections





SMD 1 WASTEWATER AND EDU PROJECTION

Unincorporated Placer County EDU Projection to Lincoln WWTRF (Year)			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	Projected Build-out EDUs & ADWF	
Bickford CSA 28, Zone 183 Lincoln WWTP	2025 EDUs	FY 25-26	FY 26 - 27	FY 27 - 28	FY 28 - 29	FY 29 - 30	FY 30 - 31	FY 31 - 32	FY 32 - 33	FY 33 - 34	FY 34 - 35	FY 35 - 36	FY 36 - 37	FY 37 - 38	FY 38 - 39	FY 39 - 40	FY 40 - 41	FY 41 - 42	FY 42 - 43	FY 43 - 44	FY 44 - 45	FY 45 - 46	FY 46 - 47	FY 47 - 48	FY 48 - 49	FY 49 - 50	FY 50 - 51	FY 51 - 52	FY 52- 53	FY 53 - 54	FY 54 - 55	FY 55 - 56	FY 56 - 57	FY 57 - 58	FY 58 - 59		
Bickford																																					
Residential (70% Reduction for Half of the Units)	125	60	80	40	49	100	150	200	150	100	100	153	100	100	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Non-Residential	0	0	0	0	20.7	0	0	0	51.7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total by Year :	125	60	80	40	69.7	100	150	200	201.7	100	100	153	100	100	50	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Cumulative EDUs Added	125	185	265	305	375	475	625	825	1026	1126	1226	1379	1479	1579	1629	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	1679	
North Auburn, SMD 1 - Lincoln WWTRF	Current 2025 EDUs	FY 25-26	FY 26 - 27	FY 27 - 28	FY 28 - 29	FY 29 - 30	FY 30 - 31	FY 31 - 32	FY 32 - 33	FY 33 - 34	FY 34 - 35	FY 35 - 36	FY 36 - 37	FY 37 - 38	FY 38 - 39	FY 39 - 40	FY 40 - 41	FY 41 - 42	FY 42 - 43	FY 43 - 44	FY 44 - 45	FY 45 - 46	FY 46 - 47	FY 47 - 48	FY 48 - 49	FY 49 - 50	FY 50 - 51	FY 51 - 52	FY 52- 53	FY 53 - 54	FY 54 - 55	FY 55 - 56	FY 56 - 57	FY 57 - 58	FY 58 - 59		
Residential																																					
Winchester Ph 5 and 6	0				5	5	5	5	5	5	5	5	5	5	5	5	5	5	1																		
Joeger 20	0										5	5	5	1																							
Atwood 80	0										20	10	10	10	10	5																					
Kemper Woods Subdivision	0											10	5	5	3																						
North/Hidden Ravine Estates	0										5	2	2	2																							
Timberline @ Auburn																																					
Residential (70% Reduction for All Residential Units)										132	132	107	57	52																							
Non-Residential										13.2	32.6	40.3	44.5																								
Briar Meadows Subdivision	0									10	6	5	5	5	5																						
Gateway Court Villas	0					10	8	3	3	3																											
Kemper Oaks II Subdivision	0					10	5	5	5	5	5	5	5	2																							
Hidden Creek						6	6	6																													
Commercial/Industrial																																					
SMD 1 Service Area	8373																																				
Miscellaneous Future Growth (Non-Project)		100	100	50	60	20	25	25	30	20	20	20	20	40	100	100	120	120	120	140	140	140	150	150	150	150	152	155	155	155	155	155	155	155	155	155	
Total SMD 1 Service Area (1)	8373	100	100	50	65	51	49	44	43	188	231	209	159	122	123	110	125	125	121	140	140	140	150	150	150	150	152	155	155	155	155	155	155	155	155	155	22998
Total by Year (SMD 1 + Bickford):	8498	160	180	90	135	151	199	244	245	288	331	362	259	222	173	160	125	125	121	140	140	140	150	150	150	150	152	155	155	155	155	155	155	155	155	155	
Cumulative EDUs Added (SMD 1 Only)		100	200	250	315	366	415	459	502	690	921	1130	1289	1411	1534	1644	1769	1894	2015	2155	2295	2435	2585	2735	2885	3035	3187	3342	3497	3652	3807	3962	4117	4272	4427		
Cumulative EDUs Added (SMD 1 + Bickford)		160	340	430	565	716	915	1159	1403	1692	2022	2385	2643	2865	3038	3198	3323	3448	3569	3709	3849	3989	4139	4289	4439	4589	4741	4896	5051	5206	5361	5516	5671	5826	5981	24677	
SMD 1 ADWF (215 gpd/EDU)	1.83	0.03	0.04	0.02	0.03	0.03	0.04	0.05	0.05	0.06	0.07	0.08	0.06	0.05	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03		
Total EDUs to Lincoln WWTP	8498	160	180	90	135	151	199	244	245	288	331	362	259	222	173	160	125	125	121	140	140	140	150	150	150	150	152	155	155	155	155	155	155	155	155	155	
Cumulative EDUs Total (SMD 1 Only)	8373	8473	8573	8623	8688	8739	8788	8832	8875	9063	9294	9503	9662	9784	9907	10017	10142	10267	10388	10528	10668	10808	10958	11108	11258	11408	11560	11715	11870	12025	12180	12335	12490	12645	12800		
Cumulative EDUs Total (SMD 1 +Bickford)	8498	8658	8838	8928	9063	9214	9413	9657	9901	10190	10520	10883	11141	11363	11536	11696	11821	11946	12067	12207	12347	12487	12637	12787	12937	13087	13239	13394	13549	13704	13859	14014	14169	14324	14479		
ADWF Total (SMD 1 + Bickford) MGD	1.83	1.86	1.90	1.92	1.95	1.98	2.02	2.08	2.13	2.19	2.26	2.34	2.40	2.44	2.48	2.51	2.54	2.57	2.59	2.62	2.65	2.68	2.72	2.75	2.78	2.81	2.85	2.88	2.91	2.95	2.98	3.01	3.05	3.08	3.11	5.31	
(1) Buildout per the SMD1 Sewer Model Update & Alternatives Evaluation for Trunk Sewer System Improvements ; Stantec, 2017																																					

Appendix D

Capital Improvement Program (CIP) – Opinion of Probable Costs Details





PROJECT: SEWER MASTER PLAN UPDATE
JOB NUMBER: 184032446
CLIENT: CITY OF LINCOLN
DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

DATE: 4/29/2026
PREPARED BY: BEW
CHECKED BY: SLB
ENR: 14,158

PROJECT COSTS SUMMARY

CIP ID	Name	Base Construction Costs	Construction Estimating Contingency @ 35%	Total Construction Costs:	Engineering, CM, and Admin @ 30%	Total Project Costs:
Condition Improvement Projects						
A	Infrastructure Repair and Replacement (R&R) Program	Annual Budget: \$3,000,000				
A.1	Lift Station O&M Improvements (Appendix B: TM 4)	Item to be included as part of the annual R&R Program				
A.2	Rehabilitation of Downtown Sewer Pipelines (Appendix B: TM 5)	Item to be included as part of the annual R&R Program				
A.3	Inflow and Infiltration (I/I) Reduction Program	Item to be included as part of the annual R&R Program				
B	Flightline Drive Lift Station Rehabilitation	\$350,000	\$123,000	\$473,000	\$142,000	\$615,000
C	Nicolaus Road Pump Station (NRPS) I/I Improvements	\$1,434,000	\$502,000	\$1,936,000	\$581,000	\$2,517,000
D	East Lincoln Parkway Pump Station (ELPPS) I/I Improvements	\$917,000	\$321,000	\$1,238,000	\$371,000	\$1,609,000
Capacity Improvement Projects						
1	Joiner/Twelve Bridges Dr.	\$1,940,000	\$679,000	\$2,619,000	\$786,000	\$3,405,000
2	Old Town North Trunk, 5th Street - Joiner Pkwy to R St.	\$634,000	\$222,000	\$856,000	\$257,000	\$1,113,000
3	Chambers Drive Sewer Diversion	\$36,000	\$13,000	\$49,000	\$15,000	\$64,000
4	Old Town South Trunk, Alley - Joiner Pkwy to R St.	\$649,000	\$227,000	\$876,000	\$263,000	\$1,139,000
5	Influent Trunk Sewer from Moore and Fiddymont Road	\$6,615,000	\$2,315,000	\$8,930,000	\$2,679,000	\$11,609,000
6	Moore Road Trunk Sewer - Phase I	\$8,170,000	\$2,860,000	\$11,030,000	\$3,309,000	\$14,339,000
7	Virginiatown Road Bypass - Epick Upsizing	\$1,803,000	\$631,000	\$2,434,000	\$730,000	\$3,164,000
8	Nelson Lane Trunk Sewer	\$19,480,000	\$6,818,000	\$26,298,000	\$7,889,000	\$34,187,000
9	Lincoln Square LS Bypass to Nelson Lane	\$1,070,000	\$375,000	\$1,445,000	\$434,000	\$1,879,000
10	NRPS Bypass to Nelson Lane	\$2,118,000	\$741,000	\$2,859,000	\$858,000	\$3,717,000
11	Moore Road Trunk Sewer - Phase II	\$2,181,000	\$763,000	\$2,944,000	\$883,000	\$3,827,000
12	N. Village 5/SUD-A PS (7.2 MGD) and Dual 18-inch Force Main	\$20,000,000	\$7,000,000	\$27,000,000	\$8,100,000	\$35,100,000
Buildout Improvement Projects						
Northeast - Village 2						
V2-PS	Village 2 Pump Station (2.8 MGD)	\$3,660,000	\$1,281,000	\$4,941,000	\$1,482,000	\$6,423,000
V2-FM	10-inch Dual Force Main	\$2,424,000	\$848,000	\$3,272,000	\$982,000	\$4,254,000
V2/V3-FM	18-inch Dual Force Main	\$3,359,000	\$1,176,000	\$4,535,000	\$1,361,000	\$5,896,000
V2-1	21-inch Sewer	\$2,890,000	\$1,012,000	\$3,902,000	\$1,171,000	\$5,073,000
V2-2	15-inch Sewer	\$2,306,000	\$807,000	\$3,113,000	\$934,000	\$4,047,000
V2-3	12-inch Sewer	\$1,171,000	\$410,000	\$1,581,000	\$474,000	\$2,055,000
V2-4	12-inch Sewer	\$1,555,000	\$544,000	\$2,099,000	\$630,000	\$2,729,000
V2-5	12-inch Sewer	\$2,435,000	\$852,000	\$3,287,000	\$986,000	\$4,273,000
Northeast - Village 3						
V3-PS	Village 3 Pump Station (5.5 MGD)	\$6,080,000	\$2,128,000	\$8,208,000	\$2,462,000	\$10,670,000
V3-FM-1	15-inch Dual Force Main	\$11,366,000	\$3,978,000	\$15,344,000	\$4,603,000	\$19,947,000
V3-FM-2	15-inch Dual Force Main	\$3,716,000	\$1,301,000	\$5,017,000	\$1,505,000	\$6,522,000
V3-1	24-inch Sewer	\$3,490,000	\$1,222,000	\$4,712,000	\$1,414,000	\$6,126,000
V3-2	18-inch Sewer	\$1,754,000	\$614,000	\$2,368,000	\$710,000	\$3,078,000
V3-3	12-inch Sewer	\$1,270,000	\$445,000	\$1,715,000	\$515,000	\$2,230,000
V3-4	12-inch Sewer	\$2,723,000	\$953,000	\$3,676,000	\$1,103,000	\$4,779,000
V3-5	12-inch Sewer	\$1,016,000	\$356,000	\$1,372,000	\$412,000	\$1,784,000
V3-6	24-inch Sewer	\$3,489,000	\$1,221,000	\$4,710,000	\$1,413,000	\$6,123,000
V3-7	15-inch Sewer	\$758,000	\$265,000	\$1,023,000	\$307,000	\$1,330,000
V3-8	12-inch Sewer	\$3,104,000	\$1,086,000	\$4,190,000	\$1,257,000	\$5,447,000
V3-9	12-inch Sewer	\$5,740,000	\$2,009,000	\$7,749,000	\$2,325,000	\$10,074,000



PROJECT: SEWER MASTER PLAN UPDATE
JOB NUMBER: 184032446
CLIENT: CITY OF LINCOLN
DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

DATE: 4/29/2026
PREPARED BY: BEW
CHECKED BY: SLB
ENR: 14,158

PROJECT COSTS SUMMARY

CIP ID	Name	Base Construction Costs	Construction Estimating Contingency @ 35%	Total Construction Costs:	Engineering, CM, and Admin @ 30%	Total Project Costs:
Northwest - SUD-A						
SUDA-1	30-inch Sewer	\$3,860,000	\$1,351,000	\$5,211,000	\$1,563,000	\$6,774,000
SUDA-2	24-inch Sewer	\$1,274,000	\$446,000	\$1,720,000	\$516,000	\$2,236,000
SUDA-3	21-inch Sewer	\$2,343,000	\$820,000	\$3,163,000	\$949,000	\$4,112,000
SUDA-4	21-inch Sewer	\$2,006,000	\$702,000	\$2,708,000	\$812,000	\$3,520,000
SUDA-5	18-inch Sewer	\$1,789,000	\$626,000	\$2,415,000	\$725,000	\$3,140,000
SUDA-6	15-inch Sewer	\$1,339,000	\$469,000	\$1,808,000	\$542,000	\$2,350,000
SUDA-7	12-inch Sewer	\$1,031,000	\$361,000	\$1,392,000	\$418,000	\$1,810,000
SUDA-8	12-inch Sewer	\$1,170,000	\$410,000	\$1,580,000	\$474,000	\$2,054,000
SUDA-9	12-inch Sewer	\$1,290,000	\$452,000	\$1,742,000	\$523,000	\$2,265,000
SUDA-10	12-inch Sewer	\$1,056,000	\$370,000	\$1,426,000	\$428,000	\$1,854,000
Northwest - Village 4						
V4-PS-1	Village 4 Pump Station 1 (3.2 MGD)	\$4,040,000	\$1,414,000	\$5,454,000	\$1,636,000	\$7,090,000
V4-FM-1	10-inch Dual Force Main	\$4,197,000	\$1,469,000	\$5,666,000	\$1,700,000	\$7,366,000
V4-1	24-inch Sewer	\$1,417,000	\$496,000	\$1,913,000	\$574,000	\$2,487,000
V4-2	18-inch Sewer	\$1,230,000	\$431,000	\$1,661,000	\$498,000	\$2,159,000
V4-3	15-inch Sewer	\$940,000	\$329,000	\$1,269,000	\$381,000	\$1,650,000
V4-4	15-inch Sewer	\$880,000	\$308,000	\$1,188,000	\$356,000	\$1,544,000
V4-5	12-inch Sewer	\$1,087,000	\$380,000	\$1,467,000	\$440,000	\$1,907,000
V4-6	12-inch Sewer	\$2,354,000	\$824,000	\$3,178,000	\$953,000	\$4,131,000
V4-7	12-inch Sewer	\$1,520,000	\$532,000	\$2,052,000	\$616,000	\$2,668,000
V4-PS-2	Village 4 Pump Station 2 (1.1 MGD)	\$1,810,000	\$634,000	\$2,444,000	\$733,000	\$3,177,000
V4-FM-2	6-inch Dual Force Main	\$812,000	\$284,000	\$1,096,000	\$329,000	\$1,425,000
V4-8	15-inch Sewer	\$239,000	\$84,000	\$323,000	\$97,000	\$420,000
V4-9	12-inch Sewer	\$1,302,000	\$456,000	\$1,758,000	\$527,000	\$2,285,000
V4-10	12-inch Sewer	\$970,000	\$340,000	\$1,310,000	\$393,000	\$1,703,000
V4-11	12-inch Sewer	\$2,112,000	\$739,000	\$2,851,000	\$855,000	\$3,706,000
Southwest - SUD-C						
V6/SUDC-PS	Village 6/SUD-C Pump Station (5.4 MGD)	\$5,980,000	\$2,093,000	\$8,073,000	\$2,422,000	\$10,495,000
V6/SUDC-FM	15-inch Dual Force Main	\$5,269,000	\$1,844,000	\$7,113,000	\$2,134,000	\$9,247,000
V6/SUDC-1	30-inch Sewer	\$570,000	\$200,000	\$770,000	\$231,000	\$1,001,000
SUDC-1	18-inch Sewer	\$1,724,000	\$603,000	\$2,327,000	\$698,000	\$3,025,000
SUDC-2	18-inch Sewer	\$1,769,000	\$619,000	\$2,388,000	\$716,000	\$3,104,000
SUDC-3	12-inch Sewer	\$1,959,000	\$686,000	\$2,645,000	\$794,000	\$3,439,000
Southwest - Village 6						
V6-PS	Village 6 Pump Station (1.6 MGD)	\$2,400,000	\$840,000	\$3,240,000	\$972,000	\$4,212,000
V6-FM	8-inch Dual Force Main	\$3,733,000	\$1,307,000	\$5,040,000	\$1,512,000	\$6,552,000
V6-1	21-inch Sewer	\$1,887,000	\$660,000	\$2,547,000	\$764,000	\$3,311,000
V6-2	15-inch Sewer	\$1,194,000	\$418,000	\$1,612,000	\$484,000	\$2,096,000
V6-3	12-inch Sewer	\$1,161,000	\$406,000	\$1,567,000	\$470,000	\$2,037,000
V6-4	18-inch Sewer	\$1,570,000	\$550,000	\$2,120,000	\$636,000	\$2,756,000
V6-5	15-inch Sewer	\$1,312,000	\$459,000	\$1,771,000	\$531,000	\$2,302,000
V6-6	12-inch Sewer	\$1,685,000	\$590,000	\$2,275,000	\$683,000	\$2,958,000



PROJECT: WASTEWATER MASTER PLAN

DATE: 4/29/2026

JOB NUMBER: 184032296

PREPARED BY: BEW

CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

I/I AND CONDITION ASSESSMENT PROJECTS

Flightline Drive Lift Station Rehabilitation

Item	Description	Cost
1	Replace Submersible Pumps	\$130,000
2	Replace Motor Control Panels (MCC / Control Panel)	\$120,000
3	Add Fall Protection at Wetwell	\$20,000
4	Investigate Autodialer & Water Supply Solenoid Control Systems	\$25,000
5	Add Seals to Conduits Entering Electrical Panels	\$10,000
6	Add Arc Flash Hazard Labels (NEC 110.16(A))	\$8,000
7	I/I Mitigation	\$40,000
Construction Costs		\$350,000
8	Construction Estimating Contingency @ 35%	\$123,000
Total Construction Costs:		\$473,000
9	Engineering, CM, and Admin @ 30%	\$142,000
Total Project Costs:		\$615,000

Nicolaus Road Pump Station (NRPS) I/I Improvements

Item	Item	Qty	Unit	Unit Cost	Cost
1	CIPP Lining (6-inch to 8-inch)	589	LF	\$ 120	\$71,000
2	CIPP Lining (10-inch to 12-inch)	6,186	LF	\$ 160	\$990,000
3	CIPP Lining (15-inch to 18-inch)	1,493	LF	\$ 250	\$373,000
Construction Costs					\$1,434,000
4	Construction Estimating Contingency @ 35%				\$502,000
Total Construction Costs:					\$1,936,000
5	Engineering, CM, and Admin @ 30%				\$581,000
Total Project Costs:					\$2,517,000

East Lincoln Parkway Pump Station (ELPPS) I/I Improvements

Item	Item	Qty	Unit	Unit Cost	Cost
1	CIPP Lining (6-inch to 8-inch)	1,799	LF	\$ 120	\$216,000
2	CIPP Lining (10-inch to 12-inch)	2,160	LF	\$ 160	\$346,000
3	CIPP Lining (15-inch to 18-inch)	1,422	LF	\$ 250	\$355,000
Construction Costs					\$917,000
4	Construction Estimating Contingency @ 35%				\$321,000
Total Construction Costs:					\$1,238,000
5	Engineering, CM, and Admin @ 30%				\$371,000
Total Project Costs:					\$1,609,000



PROJECT: SEWER MASTER PLAN UPDATE
JOB NUMBER: 184032446
CLIENT: CITY OF LINCOLN
DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

DATE: 4/29/2026
PREPARED BY: BEW
CHECKED BY: SLB
ENR: 14,158

CAPACITY IMPROVEMENT PROJECTS 1 TO 11

Joiner/Twelve Bridges Dr.

Project No. 1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
SE502SSP09	R13051	R13056	6.2	18.5	377	12.4	15	\$ 434	\$ 163,703
SE502SSP005	Q13052	Q13053	13.9	9.5	385	11.7	15	\$ 412	\$ 158,737
SE535SSP34	Q13050	Q13049	5.6	8.3	38	7.0	15	\$ 368	\$ 13,957
SE502SSP08	R13052	R13051	9.0	6.2	404	7.6	15	\$ 368	\$ 148,747
SE535SSP033	Q13049	Q13052	8.3	13.9	471	11.1	15	\$ 412	\$ 194,035
SE502SSP007	Q13053	R13052	9.5	9.0	360	9.3	15	\$ 368	\$ 132,771
SE535SSP35	Q13051	Q13050	10.5	5.6	549	8.0	15	\$ 368	\$ 202,351
SE536SSP03	R14051	Q14083	12.6	12.7	249	12.6	15	\$ 434	\$ 108,132
SE535SSP35	Q13051	Q13050	10.5	5.6	549	8.0	15	\$ 368	\$ 202,351
SE536SSP03	R14051	Q14083	15.2	10.5	604	12.8	15	\$ 434	\$ 262,016
SE570SSP10	R14052	R14051	13.7	12.6	343	13.1	15	\$ 455	\$ 156,376
SE535SSP37	Q14082	Q14084	13.7	15.2	398	14.4	15	\$ 485	\$ 192,884
Subtotal Joiner/Twelve Bridges Dr.								Base Construction Costs: \$ 1,940,000	
								Construction Estimating Contingency @ 35% \$ 679,000	
								Total Construction Costs: \$ 2,619,000	
								Engineering, CM, and Admin @ 30% \$ 786,000	
								Total Project Costs: \$ 3,405,000	

Old Town North Trunk, 5th Street - Joiner Pkwy to R St.

Project No. 2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
NW388SSP11	J10108	J10109	8.0	19.2	50	13.6	18	\$ 544	\$ 27,180
NW422SSP017	J10118	J10108	7.5	8.0	60	7.7	18	\$ 396	\$ 23,603
NW422SSP13	J11086	J10117	9.6	10.9	226	10.2	18	\$ 425	\$ 96,188
NW422SSP26	J11084	J11086	8.7	9.6	60	9.2	18	\$ 396	\$ 23,876
NW422SSP029	J11083	J11085	6.6	8.0	291	7.3	18	\$ 396	\$ 115,185
NW422SSP14	J10117	J10119	10.9	10.8	211	10.9	18	\$ 425	\$ 89,551
NW422SSP27	J11085	J11084	8.0	8.7	205	8.4	18	\$ 396	\$ 81,059
NW422SSP016	J10119	J10118	10.8	7.5	449	9.1	18	\$ 396	\$ 177,566
Subtotal Old Town North Trunk, 5th Street - Joiner Pkwy to R St.								Base Construction Costs: \$ 634,000	
								Construction Estimating Contingency @ 35% \$ 222,000	
								Total Construction Costs: \$ 856,000	
								Engineering, CM, and Admin @ 30% \$ 257,000	
								Total Project Costs: \$ 1,113,000	



PROJECT: SEWER MASTER PLAN UPDATE

DATE: 4/29/2026

JOB NUMBER: 184032446

PREPARED BY: BEW

CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

CAPACITY IMPROVEMENT PROJECTS 1 TO 11

Chambers Drive Sewer Diversion

Project No. 3

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
NW389SSP42	K09042	K09040	13.9	21.9	62	17.9	18	\$ 582	\$ 36,325
Subtotal	Chambers Drive Sewer Diversion					Base Construction Costs:			\$ 36,000
						Construction Estimating Contingency @ 35%		\$ 13,000	
						Total Construction Costs:		\$ 49,000	
						Engineering, CM, and Admin @ 30%		\$ 15,000	
						Total Project Costs:		\$ 64,000	

Old Town South Trunk, Alley - Joiner Pkwy to R St.

Project No. 4

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
NW389SSP041	K10049	K10038	6.7	14.0	166	10.4	18	\$ 425	\$ 70,709
NW423SSP25	K10037	K10036	9.3	8.9	67	9.1	18	\$ 396	\$ 26,309
NW423SSP26	K10036	K10039	8.9	8.0	147	8.5	18	\$ 396	\$ 58,053
NW389SSP039	K10039	K10049	8.0	6.7	205	7.4	18	\$ 396	\$ 81,023
NW423SSP031	K11042	K11044	9.3	8.0	156	8.6	18	\$ 396	\$ 61,879
NW423SSP27	K11043	K10037	8.8	9.3	543	9.0	18	\$ 396	\$ 214,640
NW423SSP032	K11044	K11043	8.0	8.8	344	8.4	18	\$ 396	\$ 135,911
Subtotal	Old Town South Trunk, Alley - Joiner Pkwy to R St.				Base Construction Costs:				\$ 649,000
					Construction Estimating Contingency @ 35%				\$ 227,000
					Total Construction Costs:				\$ 876,000
					Engineering, CM, and Admin @ 30%				\$ 263,000
					Total Project Costs:				\$ 1,139,000

Influent Trunk Sewer from Moore and Fiddymont Road

Project No. 5

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
V5P05_2	SW294SS08	MPU26_456	31.4	32.7	398	32.0	54	\$ 2,127	\$ 846,743
V5P05_6	SW294SS09	SW294SS08	31.9	31.4	448	31.7	54	\$ 2,045	\$ 916,494
V5P05_1	SW293SS03	SW294SS09	32.3	31.9	447	32.1	54	\$ 2,127	\$ 950,983
V5P05_5	SW293SS02	SW293SS03	30.8	32.3	447	31.6	54	\$ 2,045	\$ 913,828
V5P05_4	SW293SS01	SW293SS02	26.5	30.8	447	28.7	54	\$ 1,953	\$ 872,995
V5P03_2	SW259SS02	SW259SS03	28.1	25.5	325	26.8	54	\$ 1,908	\$ 619,441
V5P03_1	SW259SS01	SW259SS02	30.7	28.1	324	29.4	54	\$ 1,976	\$ 640,808
V5P05_3	SW259SS03	SW293SS01	25.5	26.5	447	26.0	54	\$ 1,908	\$ 853,338
Subtotal	Influent Trunk Sewer from Moore and Fiddymont Road					Base Construction Costs:			\$ 6,615,000
						Construction Estimating Contingency @ 35%			\$ 2,315,000
						Total Construction Costs:			\$ 8,930,000
						Engineering, CM, and Admin @ 30%			\$ 2,679,000
						Total Project Costs:			\$ 11,609,000



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ENR: 14,158

CAPACITY IMPROVEMENT PROJECTS 1 TO 11

Moore Road Trunk Sewer - Phase I

Project No. 6

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
V5P07_13	SW259SS04	SW259SS01	28.9	30.7	421	29.8	42	\$ 1,708	\$ 719,790
V5P07_12	SW259SS05	SW259SS04	26.6	28.9	421	27.8	42	\$ 1,633	\$ 688,120
V5P07_11	SW259SS06	SW259SS05	24.3	26.6	421	25.5	42	\$ 1,520	\$ 640,616
V5P07_10	SW259SS07	SW259SS06	23.8	24.3	421	24.1	42	\$ 1,451	\$ 611,546
V5P07_1	SW259SS08	SW259SS07	14.1	23.8	421	18.9	42	\$ 2,532	\$ 1,067,051
V5P07_9	SW259SS09	SW259SS08	20.1	14.1	467	17.1	42	\$ 2,473	\$ 1,155,976
V5P07_8	SW225SS01	SW259SS09	14.6	20.1	467	17.4	42	\$ 1,236	\$ 577,988
V5P07_6	SW225SS03	SW225SS02	15.5	14.9	467	15.2	42	\$ 1,177	\$ 550,157
V5P07_7	SW225SS02	SW225SS01	14.9	14.6	467	14.7	42	\$ 1,147	\$ 536,242
V5P07_3	NW191SS01	SW225SS05	16.0	15.4	467	15.7	42	\$ 1,177	\$ 550,158
V5P07_4	SW225SS05	SW225SS04	15.4	14.1	467	14.7	42	\$ 1,147	\$ 536,242
V5P07_5	SW225SS04	SW225SS03	14.1	15.5	467	14.8	42	\$ 1,147	\$ 536,243

Subtotal Moore Road Trunk Sewer - Phase I

Base Construction Costs: \$ 8,170,000

Note: Italicized pipe segments include trenchless install and casing.

Construction Estimating Contingency @ 35% \$ 2,860,000

Total Construction Costs: \$ 11,030,000

Engineering, CM, and Admin @ 30% \$ 3,309,000

Total Project Costs: \$ 14,339,000

Virginiatown Road Bypass - Epick Upsizing

Project No. 7

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_31	MPU26_34	MPU26_30	20.0	16.9	333	18.4	10	\$ 456	\$ 151,855
MPU26_37	MPU26_37	MPU26_36	12.3	12.8	85	12.5	10	\$ 381	\$ 32,396
MPU26_36	MPU26_36	MPU26_34	12.8	20.0	245	16.4	10	\$ 444	\$ 108,765
V4	H14024	H14025	26.5	25.8	502	26.2	12	\$ 587	\$ 294,574
V3	H14025	V13	25.8	20.8	400	23.3	12	\$ 515	\$ 206,085
MPU26_41	MPU26_40	MPU26_37	21.1	12.3	283	16.7	10	\$ 444	\$ 125,801
MPU26_39	MPU26_38	MPU26_39	25.0	25.7	283	25.3	10	\$ 560	\$ 158,702
MPU26_38	V13	MPU26_44	20.8	25.1	357	22.9	10	\$ 500	\$ 178,506
MPU26_45	MPU26_44	MPU26_45	25.1	25.9	357	25.5	10	\$ 560	\$ 200,190
MPU26_40	MPU26_39	MPU26_40	25.7	21.1	283	23.4	10	\$ 515	\$ 145,998
MPU26_46	MPU26_45	MPU26_38	25.9	25.0	358	25.4	10	\$ 560	\$ 200,225

Subtotal Virginiatown Road Bypass - Epick Upsizing

Base Construction Costs: \$ 1,803,000

Construction Estimating Contingency @ 35% \$ 631,000

Total Construction Costs: \$ 2,434,000

Engineering, CM, and Admin @ 30% \$ 730,000

Total Project Costs: \$ 3,164,000



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CAPACITY IMPROVEMENT PROJECTS 1 TO 11

Nelson Lane Trunk Sewer

Project No. 8

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
V5P02_10	SW258SS02	SW259SS01	29.9	30.7	454	30.3	36	\$ 1,517	\$ 688,251
V5P02_9	SW258SS01	SW258SS02	28.8	29.9	454	29.4	36	\$ 1,471	\$ 667,602
V5P01_10	NW289SS02	NW289SS03	29.0	28.5	485	28.7	36	\$ 1,424	\$ 690,787
V5P02_8	SW292SS01	SW258SS01	24.9	28.8	453	26.9	36	\$ 1,332	\$ 603,889
V5P01_9	NW289SS01	NW289SS02	28.6	29.0	488	28.8	36	\$ 1,424	\$ 694,519
V5P02_7	SW291SS03	SW292SS01	25.6	24.9	451	25.3	36	\$ 1,239	\$ 559,330
V5P01_8	NW288SS03	NW289SS01	29.9	28.6	485	29.2	36	\$ 1,471	\$ 713,030
V5P02_6	SW291SS02	SW291SS03	26.0	25.6	453	25.8	36	\$ 1,286	\$ 582,316
V5P01_7	NW288SS02	NW288SS03	32.0	29.9	487	31.0	36	\$ 1,517	\$ 739,532
V5P01_5	NW287SS03	NW288SS01	31.2	30.9	491	31.0	36	\$ 1,563	\$ 767,180
V5P01_6	NW288SS01	NW288SS02	30.9	32.0	488	31.4	36	\$ 1,563	\$ 763,420
V5P02_4	NW290SS03	SW291SS01	23.1	24.3	455	23.7	36	\$ 2,304	\$ 1,047,134
V5P02_5	SW291SS01	SW291SS02	24.3	26.0	455	25.2	36	\$ 2,478	\$ 1,127,208
V5P02_11	NW289SS04	NW290SS01	28.8	27.5	415	28.2	36	\$ 1,424	\$ 591,073
V5P02_12	NW290SS01	NW290SS02	27.5	28.1	417	27.8	36	\$ 1,378	\$ 574,109
V5P02_2	NW289SS03	NW289SS04	28.5	28.8	414	28.6	36	\$ 1,424	\$ 589,844
V5P02_3	NW290SS02	NW290SS03	28.1	23.1	454	25.6	36	\$ 1,286	\$ 584,198
V5P01_2	NW285SS09	NW285SS07	24.4	22.9	441	23.6	36	\$ 1,152	\$ 507,734
V5P01_11	NW285SS07	NW285SS08	22.9	18.0	441	20.4	36	\$ 2,180	\$ 961,049
V5P01_13	NW286SS01	NW286SS02	25.7	28.6	441	27.1	36	\$ 1,378	\$ 608,260
V5P01_12	NW285SS08	NW286SS01	18.0	25.7	441	21.8	36	\$ 2,222	\$ 979,801
V5P01_14	NW286SS02	NW286SS03	28.6	28.2	441	28.4	36	\$ 1,424	\$ 627,868
V5P01_3	NW287SS01	NW287SS02	30.3	31.9	487	31.1	36	\$ 1,563	\$ 761,391
V5P22_11	NW285SS02	NW285SS09	23.0	24.4	483	23.7	36	\$ 1,152	\$ 556,116
V5P01_15	NW286SS03	NW287SS01	28.2	30.3	441	29.3	36	\$ 1,471	\$ 648,760
V5P01_4	NW287SS02	NW287SS03	31.9	31.2	490	31.5	36	\$ 1,610	\$ 789,172
V5P22_10	NW285SS03	NW285SS02	20.7	23.0	445	21.9	36	\$ 1,111	\$ 494,791
V5P22_9	NW285SS04	NW285SS03	18.3	20.7	521	19.5	36	\$ 1,071	\$ 558,400

Subtotal Nelson Lane Trunk Sewer

Base Construction Costs: \$ 19,480,000

Note: Italicized pipe segments include trenchless install and casing.

Construction Estimating Contingency @ 35% \$ 6,818,000

Total Construction Costs: \$ 26,298,000

Engineering, CM, and Admin @ 30% \$ 7,889,000

Total Project Costs: \$ 34,187,000

Lincoln Square LS Bypass to Nelson Lane

Project No. 9

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_21	MPU26_23	NW287SS03	22.0	31.2	1651	26.6	15	\$ 648	\$ 1,070,084
Subtotal	Lincoln Square LS Bypass to Nelson Lane								

Base Construction Costs: \$ 1,070,000

Construction Estimating Contingency @ 35% \$ 375,000

Total Construction Costs: \$ 1,445,000

Engineering, CM, and Admin @ 30% \$ 434,000

Total Project Costs: \$ 1,879,000



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CAPACITY IMPROVEMENT PROJECTS 1 TO 11

NRPS Bypass to Nelson Lane

Project No. 10

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_264	I08024	MPU26_171	16.5	18.8	72	17.7	10	\$ 450	\$ 32,449
MPU26_337	MPU26_256	NW285SS09	20.9	24.4	400	22.6	18	\$ 640	\$ 256,169
MPU26_214	I08002	MPU26_101	15.0	14.8	894	14.9	15	\$ 970	\$ 866,750
MPU26_336	MPU26_171	MPU26_256	18.8	20.9	400	19.8	18	\$ 601	\$ 240,287
MPU26_334	MPU26_101	MPU26_155	14.8	16.8	400	15.8	18	\$ 563	\$ 225,097
MPU26_335	MPU26_155	MPU26_171	16.8	18.8	400	17.8	18	\$ 582	\$ 232,692
MPU26_258	I08029	MPU26_101	12.5	14.8	243	13.6	18	\$ 1,087	\$ 264,513
Subtotal NRPS Bypass to Nelson Lane					Base Construction Costs:				\$ 2,118,000
Note: Italicized pipe segments include trenchless install and casing.					Construction Estimating Contingency @ 35%				\$ 741,000
					Total Construction Costs:				\$ 2,859,000
					Engineering, CM, and Admin @ 30%				\$ 858,000
					Total Project Costs:				\$ 3,717,000

Moore Road Trunk Sewer - Phase II

Project No. 11

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
V5P08_2	NW191SS05	NW191SS04	8.2	10.2	516	9.2	36	\$ 776	\$ 400,574
V5P08_3	NW191SS04	NW191SS03	10.2	11.7	516	10.9	36	\$ 812	\$ 419,279
V5P08_4	NW191SS03	NW191SS02	11.7	12.9	516	12.3	36	\$ 885	\$ 456,685
V5P08_5	NW191SS02	NW191SS01	12.9	16.0	516	14.4	36	\$ 976	\$ 503,890
V5P08_1	NW157SS01	NW191SS05	8.2	8.2	516	8.2	36	\$ 776	\$ 400,574
Subtotal	Moore Road Trunk Sewer - Phase II					Base Construction Costs:			\$ 2,181,000
						Construction Estimating Contingency @ 35%		\$ 763,000	
						Total Construction Costs:		\$ 2,944,000	
						Engineering, CM, and Admin @ 30%		\$ 883,000	
						Total Project Costs:		\$ 3,827,000	



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CAPACITY IMPROVEMENT PROJECT 12

N. Village 5/SUD-A PS (7.2 MGD) and Force Main Project No. 12

Item	Description	Cost
1	Pump Station	\$3,865,000
2	Diversion Structure and Related Yard Structures	\$159,000
3	Emergency Storage or Power	\$1,262,000
4	Yard Piping	\$445,000
5	Biofilter/Odor Control	\$207,000
6	SCADA & PLC Instrumentation	\$222,000
7	Site Restoration, Clean-up, and Start-up	\$272,000
Pump Station Subtotal		\$6,432,000
8	Bonds, Insurance, Overhead, Supervision (5.5%)	\$353,760
9	Contractor Profit (10%)	\$643,200
Pump Station Construction Costs		\$7,430,000
10	Force Main Casing Trenchless Install (Hwy 65), 2,000 LF	\$2,486,000
11	Dual 18-inch Force Main, 9,045 LF	\$10,081,000
Base Construction Costs		\$20,000,000
12	Construction Estimating Contingency @ 35%	\$7,000,000
Total Construction Costs:		\$27,000,000
13	Engineering, CM, and Admin @ 30%	\$8,100,000
Total Project Costs:		\$35,100,000
14	Property Acquisition	Unknown



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BUILDOUT IMPROVEMENT PROJECTS - SOUTHWEST

30-inch Sewer

Project No. V6/SUDC-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_386	MPU26_391	MPU26_392	22.5	19.7	489	21.1	30	\$ 957	\$ 468,110
MPU26_392	MPU26_392	V6/SUDC	19.7	20.0	109	19.9	30	\$ 922	\$ 100,869
Subtotal 30-inch Sewer									Base Construction Costs: \$ 570,000
									Construction Estimating Contingency @ 35% \$ 200,000
									Total Construction Costs: \$ 770,000
									Engineering, CM, and Admin @ 30% \$ 231,000
									Total Project Costs: \$ 1,001,000

18-inch Sewer

Project No. SUDC-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_363	MPU26_368	MPU26_387	25.9	28.6	489	27.2	18	\$ 766	\$ 374,823
MPU26_382	MPU26_387	MPU26_388	28.6	24.6	489	26.6	18	\$ 746	\$ 364,972
MPU26_383	MPU26_388	MPU26_389	24.6	25.1	489	24.8	18	\$ 686	\$ 335,420
MPU26_384	MPU26_389	MPU26_390	25.1	23.8	489	24.4	18	\$ 670	\$ 328,032
MPU26_385	MPU26_390	MPU26_391	23.8	22.5	489	23.1	18	\$ 655	\$ 320,644
Subtotal 18-inch Sewer									Base Construction Costs: \$ 1,724,000
									Construction Estimating Contingency @ 35% \$ 603,000
									Total Construction Costs: \$ 2,327,000
									Engineering, CM, and Admin @ 30% \$ 698,000
									Total Project Costs: \$ 3,025,000

18-inch Sewer

Project No. SUDC-2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_376	MPU26_381	MPU26_382	19.4	17.5	492	18.4	18	\$ 591	\$ 291,061
MPU26_377	MPU26_382	MPU26_383	17.5	15.8	492	16.6	18	\$ 572	\$ 281,713
MPU26_378	MPU26_383	MPU26_384	15.8	19.5	492	17.6	18	\$ 582	\$ 286,386
MPU26_379	MPU26_384	MPU26_385	19.5	17.8	492	18.7	18	\$ 591	\$ 291,061
MPU26_380	MPU26_385	MPU26_386	17.8	20.4	492	19.1	18	\$ 601	\$ 295,735
MPU26_381	MPU26_386	MPU26_368	20.4	25.9	492	23.2	18	\$ 655	\$ 322,717
Subtotal 18-inch Sewer									Base Construction Costs: \$ 1,769,000
									Construction Estimating Contingency @ 35% \$ 619,000
									Total Construction Costs: \$ 2,388,000
									Engineering, CM, and Admin @ 30% \$ 716,000
									Total Project Costs: \$ 3,104,000



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BUILDOUT IMPROVEMENT PROJECTS - SOUTHWEST

12-inch Sewer

Project No. SUDC-3

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_366	MPU26_371	MPU26_374	18.1	15.6	492	16.8	12	\$ 444	\$ 218,614
MPU26_369	MPU26_374	MPU26_375	15.6	16.6	492	16.1	12	\$ 444	\$ 218,615
MPU26_370	MPU26_375	MPU26_376	16.6	21.2	492	18.9	12	\$ 456	\$ 224,563
MPU26_371	MPU26_376	MPU26_377	21.2	26.7	492	24.0	12	\$ 515	\$ 253,712
MPU26_372	MPU26_377	MPU26_378	26.7	28.5	492	27.6	12	\$ 600	\$ 295,616
MPU26_373	MPU26_378	MPU26_379	28.5	23.2	492	25.9	12	\$ 573	\$ 282,398
MPU26_374	MPU26_379	MPU26_380	23.2	20.0	492	21.6	12	\$ 484	\$ 238,245
MPU26_375	MPU26_380	MPU26_381	20.0	19.4	492	19.7	12	\$ 462	\$ 227,537
Subtotal 12-inch Sewer									Base Construction Costs: \$ 1,959,000
									Construction Estimating Contingency @ 35% \$ 686,000
									Total Construction Costs: \$ 2,645,000
									Engineering, CM, and Admin @ 30% \$ 794,000
									Total Project Costs: \$ 3,439,000

21-inch Sewer

Project No. V6-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_401	MPU26_404	MPU26_405	15.3	18.2	432	16.8	21	\$ 642	\$ 277,257
MPU26_402	MPU26_405	MPU26_406	18.2	21.5	432	19.9	21	\$ 686	\$ 296,263
MPU26_403	MPU26_406	MPU26_407	21.5	25.4	432	23.5	21	\$ 760	\$ 328,423
MPU26_404	MPU26_407	MPU26_408	25.4	23.9	432	24.7	21	\$ 800	\$ 345,640
MPU26_405	MPU26_408	MPU26_409	23.9	22.0	432	23.0	21	\$ 741	\$ 319,815
MPU26_406	MPU26_409	MPU26_391	22.0	22.5	432	22.2	21	\$ 741	\$ 319,815
Subtotal 21-inch Sewer									Base Construction Costs: \$ 1,887,000
									Construction Estimating Contingency @ 35% \$ 660,000
									Total Construction Costs: \$ 2,547,000
									Engineering, CM, and Admin @ 30% \$ 764,000
									Total Project Costs: \$ 3,311,000

15-inch Sewer

Project No. V6-2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_400	MPU26_403	MPU26_410	20.1	17.3	488	18.7	15	\$ 516	\$ 251,562
MPU26_407	MPU26_410	MPU26_411	17.3	17.8	488	17.5	15	\$ 508	\$ 247,776
MPU26_408	MPU26_411	MPU26_412	17.8	14.2	488	16.0	15	\$ 493	\$ 240,204
MPU26_409	MPU26_412	MPU26_413	14.2	12.7	488	13.4	15	\$ 455	\$ 222,031
MPU26_410	MPU26_413	MPU26_404	12.7	15.3	488	14.0	15	\$ 477	\$ 232,619
Subtotal 15-inch Sewer									Base Construction Costs: \$ 1,194,000
									Construction Estimating Contingency @ 35% \$ 418,000
									Total Construction Costs: \$ 1,612,000
									Engineering, CM, and Admin @ 30% \$ 484,000
									Total Project Costs: \$ 2,096,000



PROJECT: SEWER MASTER PLAN UPDATE

DATE: 4/29/2026

JOB NUMBER: 184032446

PREPARED BY: BEW

CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - SOUTHWEST

12-inch Sewer

Project No. V6-3

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_411	MPU26_414	MPU26_415	16.4	14.0	449	15.2	12	\$ 438	\$ 196,573
MPU26_412	MPU26_415	MPU26_416	14.0	13.3	449	13.6	12	\$ 426	\$ 191,150
MPU26_413	MPU26_416	MPU26_417	13.3	12.8	449	13.1	12	\$ 403	\$ 181,118
MPU26_414	MPU26_417	MPU26_418	12.8	16.8	449	14.8	12	\$ 432	\$ 193,861
MPU26_415	MPU26_418	MPU26_419	16.8	14.9	449	15.9	12	\$ 438	\$ 196,573
MPU26_416	MPU26_419	MPU26_403	14.9	20.1	449	17.5	12	\$ 450	\$ 201,995
Subtotal	12-inch Sewer				Base Construction Costs:				\$ 1,161,000
					Construction Estimating Contingency @ 35%				\$ 406,000
					Total Construction Costs:				\$ 1,567,000
					Engineering, CM, and Admin @ 30%				\$ 470,000
					Total Project Costs:				\$ 2,037,000

18-inch Sewer

Project No. V6-4

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_430	MPU26_434	MPU26_436	18.5	18.2	488	18.3	18	\$ 591	\$ 288,161
MPU26_431	MPU26_433	V6LS	22.9	23.0	170	22.9	18	\$ 640	\$ 108,681
MPU26_433	MPU26_436	MPU26_437	18.2	18.2	488	18.2	18	\$ 591	\$ 288,161
MPU26_434	MPU26_437	MPU26_438	18.2	17.4	488	17.8	18	\$ 582	\$ 283,533
MPU26_435	MPU26_438	MPU26_439	17.4	21.1	488	19.3	18	\$ 601	\$ 292,788
MPU26_436	MPU26_439	MPU26_433	21.1	22.9	488	22.0	18	\$ 625	\$ 304,777
Subtotal	18-inch Sewer					Base Construction Costs:			\$ 1,570,000
						Construction Estimating Contingency @ 35%			\$ 550,000
						Total Construction Costs:			\$ 2,120,000
						Engineering, CM, and Admin @ 30%			\$ 636,000
						Total Project Costs:			\$ 2,756,000

15-inch Sewer

Project No. V6-5

15-inch Sewer							Project No. 15-0		
Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_438	MPU26_441	MPU26_442	21.5	21.9	495	21.7	15	\$ 544	\$ 269,250
MPU26_439	MPU26_442	MPU26_443	21.9	21.6	495	21.8	15	\$ 544	\$ 269,250
MPU26_440	MPU26_443	MPU26_444	21.6	18.5	495	20.1	15	\$ 532	\$ 262,974
MPU26_441	MPU26_444	MPU26_445	18.5	17.7	495	18.1	15	\$ 516	\$ 255,290
MPU26_442	MPU26_445	MPU26_434	17.7	18.5	495	18.1	15	\$ 516	\$ 255,290
Subtotal	15-inch Sewer					Base Construction Costs:			\$ 1,312,000
						Construction Estimating Contingency @ 35%			\$ 459,000
						Total Construction Costs:			\$ 1,771,000
						Engineering, CM, and Admin @ 30%			\$ 531,000
						Total Project Costs:			\$ 2,302,000



PROJECT: SEWER MASTER PLAN UPDATE
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CLIENT: CITY OF LINCOLN
DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

DATE: 4/29/2026
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CHECKED BY: SLB
ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - SOUTHWEST

12-inch Sewer

Project No. V6-6

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_387	MPU26_420	MPU26_440	16.9	17.4	495	17.1	12	\$ 450	\$ 222,632
MPU26_417	MPU26_421	MPU26_428	16.5	19.2	454	17.9	12	\$ 450	\$ 204,215
MPU26_425	MPU26_428	MPU26_429	19.2	18.9	454	19.1	12	\$ 462	\$ 209,698
MPU26_426	MPU26_429	MPU26_430	18.9	18.5	454	18.7	12	\$ 456	\$ 206,957
MPU26_427	MPU26_430	MPU26_431	18.5	18.2	454	18.3	12	\$ 456	\$ 206,957
MPU26_428	MPU26_431	MPU26_432	18.2	16.4	454	17.3	12	\$ 450	\$ 204,216
MPU26_429	MPU26_432	MPU26_420	16.4	16.9	454	16.7	12	\$ 444	\$ 201,475
MPU26_437	MPU26_440	MPU26_441	17.4	21.5	495	19.5	12	\$ 462	\$ 228,609
Subtotal 12-inch Sewer									Base Construction Costs: \$ 1,685,000
									Construction Estimating Contingency @ 35% \$ 590,000
									Total Construction Costs: \$ 2,275,000
									Engineering, CM, and Admin @ 30% \$ 683,000
									Total Project Costs: \$ 2,958,000

15-inch Dual Force Main

Project No. V6/SUDC-FM

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Dual Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_393	MPU26_396	MPU26_397			480		15	\$ 1,820	\$ 873,475
MPU26_395	MPU26_398	MPU26_399			480		15	\$ 910	\$ 436,737
MPU26_388	MPU26_393	MPU26_394			489		15	\$ 910	\$ 445,349
MPU26_389	MPU26_394	MPU26_367			489		15	\$ 910	\$ 445,353
MPU26_396	MPU26_399	MPU26_400			480		15	\$ 910	\$ 436,737
MPU26_398	MPU26_401	NW157SS01			480		15	\$ 910	\$ 436,711
MPU26_394	MPU26_397	MPU26_398			480		15	\$ 910	\$ 436,737
MPU26_397	MPU26_400	MPU26_401			480		15	\$ 910	\$ 436,737
MPU26_390	MPU26_395	MPU26_396			480		15	\$ 910	\$ 436,737
MPU26_399	MPU26_402	MPU26_393			390		15	\$ 1,820	\$ 709,873
MPU26_346	MPU26_367	MPU26_395			191		15	\$ 910	\$ 174,132
Subtotal 15-inch Dual Force Main									Base Construction Costs: \$ 5,269,000
									Construction Estimating Contingency @ 35% \$ 1,844,000
									Total Construction Costs: \$ 7,113,000
									Engineering, CM, and Admin @ 30% \$ 2,134,000
									Total Project Costs: \$ 9,247,000

Note: Italicized pipe segments include trenchless install and casing.



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CHECKED BY: SLB
ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - SOUTHWEST

8-inch Dual Force Main

Project No. V6-FM

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Dual Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_420	MPU26_435	MPU26_446			571		8	\$ 594	\$ 339,398
MPU26_443	MPU26_446	MPU26_447			571		8	\$ 594	\$ 339,398
MPU26_444	MPU26_447	MPU26_448			571		8	\$ 594	\$ 339,398
MPU26_445	MPU26_448	MPU26_449			571		8	\$ 594	\$ 339,398
MPU26_446	MPU26_449	MPU26_450			571		8	\$ 594	\$ 339,398
MPU26_447	MPU26_450	MPU26_451			571		8	\$ 594	\$ 339,398
MPU26_448	MPU26_451	MPU26_452			571		8	\$ 594	\$ 339,398
MPU26_449	MPU26_452	MPU26_453			571		8	\$ 594	\$ 339,398
MPU26_450	MPU26_453	MPU26_454			571		8	\$ 594	\$ 339,398
MPU26_451	MPU26_454	MPU26_455			571		8	\$ 594	\$ 339,398
MPU26_452	MPU26_455	MPU26_404			571		8	\$ 594	\$ 339,398
Subtotal	8-inch Dual Force Main								
					Base Construction Costs:				\$ 3,733,000
					Construction Estimating Contingency @ 35%				\$ 1,307,000
					Total Construction Costs:				\$ 5,040,000
					Engineering, CM, and Admin @ 30%				\$ 1,512,000
					Total Project Costs:				\$ 6,552,000



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ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHWEST

30-inch Sewer

Project No. SUDA-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_120	MPU26_172	MPU26_97	18.9	18.5	352	18.7	30	\$ 908	\$ 319,179
MPU26_121	MPU26_97	MPU26_98	18.5	26.5	352	22.5	30	\$ 977	\$ 343,634
MPU26_122	MPU26_98	SUDALS	26.5	28.0	352	27.2	30	\$ 1,149	\$ 403,997
MPU26_170	MPU26_173	MPU26_172	19.9	18.9	498	19.4	30	\$ 922	\$ 458,833
MPU26_171	MPU26_174	MPU26_173	20.0	19.9	498	19.9	30	\$ 922	\$ 458,833
MPU26_172	MPU26_175	MPU26_174	21.5	20.0	498	20.8	30	\$ 936	\$ 465,918
MPU26_173	MPU26_176	MPU26_175	22.3	21.5	498	21.9	30	\$ 957	\$ 476,138
MPU26_174	MPU26_177	MPU26_176	22.2	22.3	498	22.2	30	\$ 977	\$ 486,358
MPU26_175	MPU26_178	MPU26_177	22.5	22.2	455	22.3	30	\$ 977	\$ 444,987
Subtotal 30-inch Sewer								Base Construction Costs: \$ 3,860,000	
								Construction Estimating Contingency @ 35% \$ 1,351,000	
								Total Construction Costs: \$ 5,211,000	
								Engineering, CM, and Admin @ 30% \$ 1,563,000	
								Total Project Costs: \$ 6,774,000	

24-inch Sewer

Project No. SUDA-2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_176	MPU26_179	MPU26_178	22.3	22.5	540	22.4	24	\$ 830	\$ 448,146
MPU26_177	MPU26_180	MPU26_179	22.0	22.3	498	22.2	24	\$ 830	\$ 413,014
MPU26_178	MPU26_181	MPU26_180	22.1	22.0	498	22.1	24	\$ 830	\$ 413,014
Subtotal 24-inch Sewer								Base Construction Costs: \$ 1,274,000	
								Construction Estimating Contingency @ 35% \$ 446,000	
								Total Construction Costs: \$ 1,720,000	
								Engineering, CM, and Admin @ 30% \$ 516,000	
								Total Project Costs: \$ 2,236,000	

21-inch Sewer

Project No. SUDA-3

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_279	MPU26_279	MPU26_280	23.6	22.3	530	22.9	21	\$ 1,481	\$ 784,662
MPU26_280	MPU26_280	MPU26_281	22.3	22.6	530	22.4	21	\$ 741	\$ 392,331
MPU26_281	MPU26_281	MPU26_282	22.6	22.1	530	22.3	21	\$ 741	\$ 392,331
MPU26_282	MPU26_282	MPU26_283	22.1	21.8	530	22.0	21	\$ 721	\$ 381,771
MPU26_283	MPU26_283	MPU26_178	21.8	22.5	530	22.2	21	\$ 741	\$ 392,331
Subtotal 21-inch Sewer								Base Construction Costs: \$ 2,343,000	
								Construction Estimating Contingency @ 35% \$ 820,000	
								Total Construction Costs: \$ 3,163,000	
								Engineering, CM, and Admin @ 30% \$ 949,000	
								Total Project Costs: \$ 4,112,000	

Note: Italicized pipe segments include trenchless install and casing.



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ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHWEST

21-inch Sewer

Project No. SUDA-4

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_153	MPU26_163	MPU26_156	16.6	16.2	504	16.4	21	\$ 642	\$ 323,277
MPU26_160	MPU26_164	MPU26_163	16.3	16.6	588	16.5	21	\$ 642	\$ 377,603
MPU26_161	MPU26_157	MPU26_164	17.5	16.3	456	16.9	21	\$ 642	\$ 292,914
MPU26_179	MPU26_182	MPU26_181	21.2	22.1	498	21.7	21	\$ 721	\$ 358,607
MPU26_180	MPU26_183	MPU26_182	16.0	21.2	498	18.6	21	\$ 671	\$ 334,087
MPU26_181	MPU26_156	MPU26_183	16.2	16.0	498	16.1	21	\$ 642	\$ 319,487
Subtotal	21-inch Sewer				Base Construction Costs:				\$ 2,006,000
					Construction Estimating Contingency @ 35%				\$ 702,000
					Total Construction Costs:				\$ 2,708,000
					Engineering, CM, and Admin @ 30%				\$ 812,000
					Total Project Costs:				\$ 3,520,000

18-inch Sewer

Project No. SUDA-5

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_71	MPU26_160	MPU26_74	18.0	17.9	384	17.9	18	\$ 582	\$ 223,528
MPU26_74	MPU26_74	MPU26_76	17.9	18.0	384	17.9	18	\$ 582	\$ 223,528
MPU26_75	MPU26_76	MPU26_157	18.0	17.5	384	17.8	18	\$ 582	\$ 223,528
MPU26_82	MPU26_161	MPU26_77	18.3	17.9	381	18.1	18	\$ 591	\$ 225,104
MPU26_89	MPU26_77	MPU26_86	17.9	18.0	381	17.9	18	\$ 1,163	\$ 442,980
MPU26_90	MPU26_86	MPU26_160	18.0	18.0	381	18.0	18	\$ 1,182	\$ 450,209
Subtotal	18-inch Sewer				Base Construction Costs:				\$ 1,789,000
Note: Italicized pipe segments include trenchless install and casing.					Construction Estimating Contingency @ 35%				\$ 626,000
					Total Construction Costs:				\$ 2,415,000
					Engineering, CM, and Admin @ 30%				\$ 725,000
					Total Project Costs:				\$ 3,140,000

15-inch Sewer

Project No. SUDA-6

15-inch Sewer							Project No: 000000		
Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_91	MPU26_162	MPU26_91	17.9	17.5	384	17.7	15	\$ 508	\$ 195,090
MPU26_92	MPU26_91	MPU26_92	17.5	17.4	384	17.4	15	\$ 508	\$ 195,090
MPU26_95	MPU26_92	MPU26_161	17.4	18.3	384	17.8	15	\$ 508	\$ 195,090
MPU26_96	MPU26_158	MPU26_93	17.5	16.5	380	17.0	15	\$ 500	\$ 190,003
MPU26_97	MPU26_93	MPU26_94	16.5	14.1	380	15.3	15	\$ 985	\$ 374,109
MPU26_99	MPU26_94	MPU26_162	14.1	17.9	380	16.0	15	\$ 500	\$ 190,003
Subtotal		15-inch Sewer				Base Construction Costs:			\$ 1,339,000
Note: Italicized pipe segments include trenchless install and casing.					Construction Estimating Contingency @ 35%			\$ 469,000	
					Total Construction Costs:			\$ 1,808,000	
					Engineering, CM, and Admin @ 30%			\$ 542,000	
					Total Project Costs:			\$ 2,350,000	



PROJECT: SEWER MASTER PLAN UPDATE

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CLIENT: CITY OF LINCOLN

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DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHWEST

12-inch Sewer

Project No. SUDA-7

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_100	MPU26_121	MPU26_108	14.1	16.4	609	15.2	12	\$ 438	\$ 266,542
MPU26_118	MPU26_122	MPU26_121	16.0	14.1	622	15.0	12	\$ 438	\$ 272,340
MPU26_119	MPU26_123	MPU26_122	14.9	16.0	623	15.4	12	\$ 438	\$ 272,822
MPU26_155	MPU26_108	MPU26_158	16.4	17.5	495	16.9	12	\$ 444	\$ 219,739
Subtotal 12-inch Sewer									Base Construction Costs: \$ 1,031,000
									Construction Estimating Contingency @ 35% \$ 361,000
									Total Construction Costs: \$ 1,392,000
									Engineering, CM, and Admin @ 30% \$ 418,000
									Total Project Costs: \$ 1,810,000

12-inch Sewer

Project No. SUDA-8

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_312	MPU26_311	MPU26_313	18.1	19.6	495	18.8	12	\$ 456	\$ 225,506
MPU26_313	MPU26_313	MPU26_314	19.6	19.6	495	19.6	12	\$ 462	\$ 228,493
MPU26_314	MPU26_314	MPU26_315	19.6	20.7	495	20.1	12	\$ 468	\$ 231,479
MPU26_315	MPU26_315	MPU26_316	20.7	21.6	495	21.1	12	\$ 484	\$ 239,245
MPU26_316	MPU26_316	MPU26_279	21.6	23.6	495	22.6	12	\$ 500	\$ 247,011
Subtotal 12-inch Sewer									Base Construction Costs: \$ 1,170,000
									Construction Estimating Contingency @ 35% \$ 410,000
									Total Construction Costs: \$ 1,580,000
									Engineering, CM, and Admin @ 30% \$ 474,000
									Total Project Costs: \$ 2,054,000

12-inch Sewer

Project No. SUDA-9

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_263	MPU26_262	MPU26_275	20.1	21.9	530	21.0	12	\$ 484	\$ 256,331
MPU26_275	MPU26_275	MPU26_276	21.9	20.2	530	21.1	12	\$ 484	\$ 256,327
MPU26_276	MPU26_276	MPU26_277	20.2	20.6	530	20.4	12	\$ 468	\$ 248,007
MPU26_277	MPU26_277	MPU26_278	20.6	22.7	530	21.7	12	\$ 484	\$ 256,327
MPU26_278	MPU26_278	MPU26_279	22.7	23.6	530	23.2	12	\$ 515	\$ 272,975
Subtotal 12-inch Sewer									Base Construction Costs: \$ 1,290,000
									Construction Estimating Contingency @ 35% \$ 452,000
									Total Construction Costs: \$ 1,742,000
									Engineering, CM, and Admin @ 30% \$ 523,000
									Total Project Costs: \$ 2,265,000



PROJECT: SEWER MASTER PLAN UPDATE

DATE: 4/29/2026

JOB NUMBER: 184032446

PREPARED BY: BEW

CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHWEST

12-inch Sewer

Project No. SUDA-10

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_284	MPU26_312	MPU26_317	12.4	14.5	466	13.5	12	\$ 403	\$ 188,108
MPU26_317	MPU26_317	MPU26_318	14.5	16.7	466	15.6	12	\$ 438	\$ 204,159
MPU26_318	MPU26_318	MPU26_319	16.7	19.8	466	18.3	12	\$ 456	\$ 212,607
MPU26_319	MPU26_319	MPU26_320	19.8	20.8	466	20.3	12	\$ 468	\$ 218,239
MPU26_320	MPU26_320	MPU26_279	20.8	23.6	466	22.2	12	\$ 500	\$ 232,882
Subtotal 12-inch Sewer									
									Base Construction Costs: \$ 1,056,000
									Construction Estimating Contingency @ 35% \$ 370,000
									Total Construction Costs: \$ 1,426,000
									Engineering, CM, and Admin @ 30% \$ 428,000
									Total Project Costs: \$ 1,854,000

24-inch Sewer

Project No. V4-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_215	MPU26_358	MPU26_216	16.8	18.0	391	17.4	24	\$ 749	\$ 292,350
MPU26_216	MPU26_216	MPU26_217	15.5	11.6	391	13.6	24	\$ 692	\$ 270,108
MPU26_217	MPU26_217	MPU26_218	11.6	17.5	391	14.6	24	\$ 706	\$ 275,668
MPU26_218	MPU26_218	MPU26_219	17.5	15.8	391	16.7	24	\$ 734	\$ 286,789
MPU26_219	MPU26_219	V4LS	15.8	19.6	391	17.7	24	\$ 749	\$ 292,350
Subtotal 24-inch Sewer									
									Base Construction Costs: \$ 1,417,000
									Construction Estimating Contingency @ 35% \$ 496,000
									Total Construction Costs: \$ 1,913,000
									Engineering, CM, and Admin @ 30% \$ 574,000
									Total Project Costs: \$ 2,487,000

18-inch Sewer

Project No. V4-2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_339	MPU26_226	MPU26_257	17.1	17.1	433	17.1	18	\$ 582	\$ 251,768
MPU26_340	MPU26_257	MPU26_325	17.1	16.1	433	16.6	18	\$ 572	\$ 247,659
MPU26_341	MPU26_325	MPU26_326	16.1	15.4	433	15.8	18	\$ 563	\$ 243,550
MPU26_357	MPU26_326	MPU26_341	15.4	16.6	433	16.0	18	\$ 563	\$ 243,550
MPU26_364	MPU26_341	MPU26_358	16.6	16.8	433	16.7	18	\$ 572	\$ 247,659
Subtotal 18-inch Sewer									
									Base Construction Costs: \$ 1,230,000
									Construction Estimating Contingency @ 35% \$ 431,000
									Total Construction Costs: \$ 1,661,000
									Engineering, CM, and Admin @ 30% \$ 498,000
									Total Project Costs: \$ 2,159,000



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CLIENT: CITY OF LINCOLN

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ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHWEST

15-inch Sewer

Project No. V4-3

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_351	MPU26_359	MPU26_358	18.2	16.8	475	17.5	15	\$ 508	\$ 241,526
MPU26_352	MPU26_360	MPU26_359	15.2	18.2	475	16.7	15	\$ 500	\$ 237,835
MPU26_353	MPU26_361	MPU26_360	14.3	15.2	475	14.8	15	\$ 485	\$ 230,454
MPU26_354	MPU26_362	MPU26_361	15.5	14.3	475	14.9	15	\$ 485	\$ 230,454
Subtotal 15-inch Sewer									
									Base Construction Costs: \$ 940,000
									Construction Estimating Contingency @ 35% \$ 329,000
									Total Construction Costs: \$ 1,269,000
									Engineering, CM, and Admin @ 30% \$ 381,000
									Total Project Costs: \$ 1,650,000

15-inch Sewer

Project No. V4-4

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_296	MPU26_296	MPU26_297	12.1	21.0	486	16.5	15	\$ 500	\$ 243,003
MPU26_297	MPU26_297	MPU26_298	10.2	14.4	486	12.3	15	\$ 434	\$ 210,575
MPU26_309	MPU26_298	MPU26_225	14.4	15.6	433	15.0	15	\$ 485	\$ 209,931
MPU26_338	MPU26_225	MPU26_226	15.6	17.1	433	16.4	15	\$ 500	\$ 216,655
Subtotal 15-inch Sewer									
									Base Construction Costs: \$ 880,000
									Construction Estimating Contingency @ 35% \$ 308,000
									Total Construction Costs: \$ 1,188,000
									Engineering, CM, and Admin @ 30% \$ 356,000
									Total Project Costs: \$ 1,544,000

12-inch Sewer

Project No. V4-5

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_299	MPU26_355	MPU26_299	11.3	8.1	415	9.7	12	\$ 314	\$ 130,244
MPU26_300	MPU26_299	MPU26_300	8.1	6.8	415	7.4	12	\$ 314	\$ 130,244
MPU26_310	MPU26_300	MPU26_343	6.8	8.7	415	7.7	12	\$ 314	\$ 130,244
MPU26_349	MPU26_356	MPU26_357	12.5	14.9	473	13.7	12	\$ 426	\$ 201,284
MPU26_350	MPU26_357	MPU26_226	14.9	17.1	494	16.0	12	\$ 438	\$ 216,131
MPU26_418	MPU26_343	MPU26_344	8.7	9.8	415	9.2	12	\$ 314	\$ 130,244
MPU26_419	MPU26_344	MPU26_356	9.8	12.5	415	11.2	12	\$ 359	\$ 148,779
Subtotal 12-inch Sewer									
									Base Construction Costs: \$ 1,087,000
									Construction Estimating Contingency @ 35% \$ 380,000
									Total Construction Costs: \$ 1,467,000
									Engineering, CM, and Admin @ 30% \$ 440,000
									Total Project Costs: \$ 1,907,000



PROJECT: SEWER MASTER PLAN UPDATE
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DATE: 4/29/2026
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CHECKED BY: SLB
ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHWEST

12-inch Sewer

Project No. V4-6

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_183	MPU26_266	MPU26_267	15.8	14.4	394	15.1	12	\$ 438	\$ 172,720
MPU26_265	MPU26_264	MPU26_271	18.1	16.8	390	17.5	12	\$ 450	\$ 175,346
MPU26_266	MPU26_265	MPU26_269	17.2	15.8	414	16.5	12	\$ 444	\$ 183,787
MPU26_267	MPU26_267	MPU26_268	14.4	17.7	394	16.1	12	\$ 444	\$ 175,102
MPU26_268	MPU26_268	MPU26_263	17.7	17.7	394	17.7	12	\$ 450	\$ 177,484
MPU26_269	MPU26_269	MPU26_270	15.8	17.3	414	16.5	12	\$ 444	\$ 183,787
MPU26_270	MPU26_270	MPU26_266	17.3	15.8	414	16.6	12	\$ 444	\$ 183,787
MPU26_271	MPU26_271	MPU26_272	16.8	16.3	390	16.6	12	\$ 444	\$ 172,993
MPU26_272	MPU26_272	MPU26_265	16.3	17.2	390	16.8	12	\$ 444	\$ 173,000
MPU26_273	MPU26_273	MPU26_274	15.3	18.1	365	16.7	12	\$ 444	\$ 162,048
MPU26_274	MPU26_274	MPU26_264	18.1	18.1	365	18.1	12	\$ 456	\$ 166,457
MPU26_298	MPU26_263	MPU26_342	17.7	17.8	478	17.8	12	\$ 450	\$ 215,116
MPU26_365	MPU26_342	MPU26_362	17.8	15.5	478	16.7	12	\$ 444	\$ 212,229
Subtotal 12-inch Sewer					Base Construction Costs:				\$ 2,354,000
					Construction Estimating Contingency @ 35%				\$ 824,000
					Total Construction Costs:				\$ 3,178,000
					Engineering, CM, and Admin @ 30%				\$ 953,000
					Total Project Costs:				\$ 4,131,000

12-inch Sewer

Project No. V4-7

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_220	MPU26_310	MPU26_220	17.8	14.3	394	16.0	12	\$ 444	\$ 174,701
MPU26_221	MPU26_220	MPU26_221	14.3	14.8	394	14.5	12	\$ 432	\$ 169,947
MPU26_222	MPU26_221	MPU26_309	14.8	16.1	394	15.4	12	\$ 438	\$ 172,324
MPU26_223	MPU26_309	MPU26_222	16.1	14.4	344	15.3	12	\$ 438	\$ 150,664
MPU26_224	MPU26_222	MPU26_223	14.4	14.8	344	14.6	12	\$ 432	\$ 148,585
MPU26_257	MPU26_223	MPU26_224	14.8	14.2	344	14.5	12	\$ 432	\$ 148,585
MPU26_308	MPU26_224	MPU26_364	14.2	14.2	344	14.2	12	\$ 432	\$ 148,585
MPU26_355	MPU26_363	MPU26_362	14.4	15.5	475	14.9	12	\$ 432	\$ 205,236
MPU26_356	MPU26_364	MPU26_363	14.2	14.4	475	14.3	12	\$ 432	\$ 205,236
Subtotal	12-inch Sewer				Base Construction Costs:				\$ 1,520,000
					Construction Estimating Contingency @ 35%				\$ 532,000
					Total Construction Costs:				\$ 2,052,000
					Engineering, CM, and Admin @ 30%				\$ 616,000
					Total Project Costs:				\$ 2,668,000



PROJECT: SEWER MASTER PLAN UPDATE
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CLIENT: CITY OF LINCOLN
DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

DATE: 4/29/2026
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CHECKED BY: SLB
ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHWEST

15-inch Sewer

Project No. V4-8

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_292	MPU26_292	V4LS2	18.5	20.0	457	19.3	15	\$ 524	\$ 239,351
Subtotal 15-inch Sewer									
Base Construction Costs:									\$ 239,000
Construction Estimating Contingency @ 35%									\$ 84,000
Total Construction Costs:									\$ 323,000
Engineering, CM, and Admin @ 30%									\$ 97,000
Total Project Costs:									\$ 420,000

12-inch Sewer

Project No. V4-9

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_289	MPU26_289	MPU26_290	17.5	21.0	486	19.3	12	\$ 462	\$ 224,358
MPU26_290	MPU26_290	MPU26_291	17.6	18.6	486	18.1	12	\$ 456	\$ 221,426
MPU26_291	MPU26_291	MPU26_292	18.6	18.5	486	18.6	12	\$ 456	\$ 221,426
MPU26_286	MPU26_285	MPU26_287	12.3	15.0	486	13.7	12	\$ 426	\$ 206,762
MPU26_287	MPU26_287	MPU26_288	15.0	15.5	486	15.2	12	\$ 438	\$ 212,628
MPU26_288	MPU26_288	MPU26_289	15.5	17.5	486	16.5	12	\$ 444	\$ 215,561
Subtotal 12-inch Sewer									
Base Construction Costs:									\$ 1,302,000
Construction Estimating Contingency @ 35%									\$ 456,000
Total Construction Costs:									\$ 1,758,000
Engineering, CM, and Admin @ 30%									\$ 527,000
Total Project Costs:									\$ 2,285,000

12-inch Sewer

Project No. V4-10

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_126	MPU26_321	MPU26_337	10.3	12.1	458	11.2	12	\$ 359	\$ 164,425
MPU26_330	MPU26_337	MPU26_338	12.1	15.6	458	13.9	12	\$ 426	\$ 195,150
MPU26_331	MPU26_338	MPU26_339	15.6	15.6	458	15.6	12	\$ 438	\$ 200,687
MPU26_332	MPU26_339	MPU26_340	15.6	17.1	458	16.4	12	\$ 444	\$ 203,455
MPU26_333	MPU26_340	MPU26_292	17.1	18.5	458	17.8	12	\$ 450	\$ 206,223
Subtotal 12-inch Sewer									
Base Construction Costs:									\$ 970,000
Construction Estimating Contingency @ 35%									\$ 340,000
Total Construction Costs:									\$ 1,310,000
Engineering, CM, and Admin @ 30%									\$ 393,000
Total Project Costs:									\$ 1,703,000



PROJECT: SEWER MASTER PLAN UPDATE

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CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

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ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHWEST

12-inch Sewer

Project No. V4-11

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_311	MPU26_327	MPU26_328	12.1	12.8	493	12.5	12	\$ 381	\$ 188,068
MPU26_321	MPU26_328	MPU26_329	12.8	13.2	493	13.0	12	\$ 403	\$ 199,095
MPU26_322	MPU26_329	MPU26_330	13.2	13.3	493	13.3	12	\$ 403	\$ 199,095
MPU26_323	MPU26_330	MPU26_331	13.3	14.5	493	13.9	12	\$ 426	\$ 210,123
MPU26_324	MPU26_331	MPU26_332	14.5	16.7	324	15.6	12	\$ 438	\$ 141,995
MPU26_325	MPU26_332	MPU26_333	16.7	16.6	663	16.7	12	\$ 444	\$ 294,176
MPU26_326	MPU26_333	MPU26_334	16.6	16.7	493	16.6	12	\$ 444	\$ 219,065
MPU26_327	MPU26_334	MPU26_335	16.7	16.0	493	16.3	12	\$ 444	\$ 219,065
MPU26_328	MPU26_335	MPU26_336	16.0	16.9	493	16.4	12	\$ 444	\$ 219,065
MPU26_329	MPU26_336	MPU26_289	16.9	17.5	493	17.2	12	\$ 450	\$ 222,045
Subtotal 12-inch Sewer									
									Base Construction Costs: \$ 2,112,000
									Construction Estimating Contingency @ 35% \$ 739,000
									Total Construction Costs: \$ 2,851,000
									Engineering, CM, and Admin @ 30% \$ 855,000
									Total Project Costs: \$ 3,706,000

10-inch Dual Force Main

Project No. V4-FM-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Dual Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_285	MPU26_304	MPU26_284			783		10	\$ 632	\$ 494,677
V4FM01_2	1TONAME2	NW149SS01			546		10	\$ 632	\$ 345,011
MPU26_190	MPU26_284	1TONAME2			2182		10	\$ 632	\$ 1,378,163
MPU26_249	MPU26_308	MPU26_307			783		10	\$ 632	\$ 494,704
MPU26_305	MPU26_306	MPU26_305			783		10	\$ 632	\$ 494,677
MPU26_306	MPU26_307	MPU26_306			783		10	\$ 632	\$ 494,678
MPU26_304	MPU26_305	MPU26_304			783		10	\$ 632	\$ 494,676
Subtotal 10-inch Dual Force Main									
									Base Construction Costs: \$ 4,197,000
									Construction Estimating Contingency @ 35% \$ 1,469,000
									Total Construction Costs: \$ 5,666,000
									Engineering, CM, and Admin @ 30% \$ 1,700,000
									Total Project Costs: \$ 7,366,000

6-inch Dual Force Main

Project No. V4-FM-2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Dual Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_293	MPU26_293	MPU26_294			486		6	\$ 557	\$ 270,591
MPU26_294	MPU26_294	MPU26_295			486		6	\$ 557	\$ 270,592
MPU26_295	MPU26_295	MPU26_296			486		6	\$ 557	\$ 270,605
Subtotal 6-inch Dual Force Main									
									Base Construction Costs: \$ 812,000
									Construction Estimating Contingency @ 35% \$ 284,000
									Total Construction Costs: \$ 1,096,000
									Engineering, CM, and Admin @ 30% \$ 329,000
									Total Project Costs: \$ 1,425,000



PROJECT: SEWER MASTER PLAN UPDATE
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ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHEAST

21-inch Sewer

Project No. V2-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_62	NE446SS01	V2LS	19.3	19.5	164	19.4	21	\$ 686	\$ 112,329
V2P04_18	NE447SS03	NE446SS01	21.7	19.3	249	20.5	21	\$ 701	\$ 174,737
V2P04_5	NE447SS02	NE447SS03	20.9	21.7	513	21.3	21	\$ 721	\$ 369,376
V2P03_7	MPU26_72	NE449SS02	18.1	18.8	246	18.4	21	\$ 671	\$ 164,841
V2P03_4	NE449SS02	NE449SS03	18.8	18.3	506	18.5	21	\$ 671	\$ 339,507
V2P03_5	NE449SS03	NE449SS04	18.3	18.5	506	18.4	21	\$ 671	\$ 339,509
V2P04_1	NE449SS04	NE448SS01	18.5	18.9	513	18.7	21	\$ 671	\$ 344,119
V2P04_2	NE448SS01	NE448SS02	18.9	19.2	513	19.0	21	\$ 686	\$ 351,639
V2P04_3	NE448SS02	NE447SS01	19.2	18.7	513	18.9	21	\$ 671	\$ 344,119
V2P04_4	NE447SS01	NE447SS02	18.7	20.9	513	19.8	21	\$ 686	\$ 351,639
Subtotal 21-inch Sewer									
									Base Construction Costs: \$ 2,890,000
									Construction Estimating Contingency @ 35% \$ 1,012,000
									Total Construction Costs: \$ 3,902,000
									Engineering, CM, and Admin @ 30% \$ 1,171,000
									Total Project Costs: \$ 5,073,000

15-inch Sewer

Project No. V2-2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
V2P01_7	NE518SS02	MPU26_72	17.7	18.1	543	17.9	15	\$ 508	\$ 276,111
V2P02_1	NE517SS01	NE518SS03	19.5	18.8	549	19.1	15	\$ 524	\$ 287,435
V2P02_6	MPU26_75	NE483SS03	25.1	23.7	412	24.4	15	\$ 582	\$ 240,128
V2P02_2	NE517SS02	NE517SS01	20.7	19.5	549	20.1	15	\$ 532	\$ 291,697
V2P02_3	NE483SS01	NE517SS02	24.3	20.7	549	22.5	15	\$ 557	\$ 305,618
V2P02_4	NE483SS02	NE483SS01	23.6	24.3	549	24.0	15	\$ 570	\$ 312,580
V2P02_5	NE483SS03	NE483SS02	23.7	23.6	549	23.6	15	\$ 570	\$ 312,580
V2P01_8	NE518SS03	NE518SS02	18.8	17.7	542	18.2	15	\$ 516	\$ 279,690
Subtotal 15-inch Sewer									
									Base Construction Costs: \$ 2,306,000
									Construction Estimating Contingency @ 35% \$ 807,000
									Total Construction Costs: \$ 3,113,000
									Engineering, CM, and Admin @ 30% \$ 934,000
									Total Project Costs: \$ 4,047,000



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ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHEAST

12-inch Sewer

Project No. V2-3

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
V2P03_6	NE450SS02	MPU26_72	16.0	18.1	260	17.0	12	\$ 450	\$ 117,079
MPU26_64	MPU26_66	MPU26_65	16.5	14.1	467	15.3	12	\$ 438	\$ 204,454
MPU26_65	MPU26_67	MPU26_66	12.9	16.5	467	14.7	12	\$ 432	\$ 201,634
V2P03_1	NE451SS01	NE450SS01	14.6	16.0	506	15.3	12	\$ 438	\$ 221,465
MPU26_63	MPU26_65	NE451SS01	14.1	14.6	467	14.3	12	\$ 432	\$ 201,634
V2P03_2	NE450SS01	NE450SS02	16.0	16.0	506	16.0	12	\$ 444	\$ 224,520
Subtotal	12-inch Sewer					Base Construction Costs:			\$ 1,171,000
						Construction Estimating Contingency @ 35%		\$ 410,000	
						Total Construction Costs:		\$ 1,581,000	
						Engineering, CM, and Admin @ 30%		\$ 474,000	
						Total Project Costs:		\$ 2,055,000	

12-inch Sewer

Project No. V2-4

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_80	MPU26_82	MPU26_83	19.4	22.8	486	21.1	12	\$ 484	\$ 235,046
MPU26_78	MPU26_80	MPU26_81	14.3	16.3	486	15.3	12	\$ 438	\$ 212,744
MPU26_72	MPU26_73	MPU26_78	21.5	10.8	486	16.2	12	\$ 444	\$ 215,680
MPU26_76	MPU26_78	MPU26_79	10.8	17.4	486	14.1	12	\$ 432	\$ 209,810
MPU26_77	MPU26_79	MPU26_80	17.4	14.3	486	15.8	12	\$ 438	\$ 212,746
MPU26_79	MPU26_81	MPU26_82	16.3	19.4	486	17.8	12	\$ 450	\$ 218,613
MPU26_81	MPU26_83	MPU26_75	22.8	25.1	486	23.9	12	\$ 515	\$ 250,305
Subtotal	12-inch Sewer				Base Construction Costs:				\$ 1,555,000
					Construction Estimating Contingency @ 35%				\$ 544,000
					Total Construction Costs:				\$ 2,099,000
					Engineering, CM, and Admin @ 30%				\$ 630,000
					Total Project Costs:				\$ 2,729,000

12-inch Sewer

Project No. V2-5

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
V2P02_7	NE483SS05	MPU26_75	17.4	25.1	690	21.2	12	\$ 484	\$ 333,752
MPU26_66	NE552SS03	MPU26_56	17.9	14.0	390	15.9	12	\$ 438	\$ 170,819
V2P01_1	NE554SS01	NE553SS01	16.0	18.9	698	17.4	12	\$ 450	\$ 314,074
V2P01_2	NE553SS01	NE553SS02	18.9	28.6	698	23.7	12	\$ 515	\$ 359,604
V2P01_3	NE553SS02	NE552SS01	28.6	16.2	698	22.4	12	\$ 500	\$ 348,643
V2P01_4	NE552SS01	NE552SS02	16.2	13.1	698	14.7	12	\$ 432	\$ 301,429
V2P01_5	NE552SS02	NE552SS03	13.1	17.9	698	15.5	12	\$ 438	\$ 305,645
V2P02_8	MPU26_56	NE483SS05	14.0	17.4	686	15.7	12	\$ 438	\$ 300,581
Subtotal	12-inch Sewer				Base Construction Costs:				\$ 2,435,000
					Construction Estimating Contingency @ 35%				\$ 852,000
					Total Construction Costs:				\$ 3,287,000
					Engineering, CM, and Admin @ 30%				\$ 986,000
					Total Project Costs:				\$ 4,273,000



PROJECT: SEWER MASTER PLAN UPDATE

DATE: 4/29/2026

JOB NUMBER: 184032446

PREPARED BY: BEW

CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHEAST

24-inch Sewer

Project No. V3-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_210	MPU26_212	MPU26_100	18.7	31.6	267	25.2	24	\$ 913	\$ 243,547
MPU26_209	MPU26_154	MPU26_212	16.1	18.7	267	17.4	24	\$ 749	\$ 199,795
MPU26_150	MPU26_153	MPU26_154	16.0	16.1	534	16.0	24	\$ 734	\$ 391,862
MPU26_145	MPU26_148	MPU26_149	22.2	21.2	534	21.7	24	\$ 811	\$ 432,568
MPU26_146	MPU26_149	MPU26_150	21.2	25.3	534	23.3	24	\$ 849	\$ 453,197
MPU26_147	MPU26_150	MPU26_151	25.3	22.9	534	24.1	24	\$ 869	\$ 463,511
MPU26_148	MPU26_151	MPU26_152	22.9	19.4	534	21.2	24	\$ 811	\$ 432,565
MPU26_149	MPU26_152	MPU26_153	19.4	16.0	534	17.7	24	\$ 749	\$ 399,459
MPU26_98	MPU26_102	MPU26_148	27.4	22.2	534	24.8	24	\$ 888	\$ 473,797
Subtotal 24-inch Sewer									Base Construction Costs: \$ 3,490,000
									Construction Estimating Contingency @ 35% \$ 1,222,000
									Total Construction Costs: \$ 4,712,000
									Engineering, CM, and Admin @ 30% \$ 1,414,000
									Total Project Costs: \$ 6,126,000

18-inch Sewer

Project No. V3-2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_144	MPU26_147	MPU26_102	23.6	27.4	509	25.5	18	\$ 706	\$ 359,058
MPU26_142	MPU26_145	MPU26_146	23.6	22.8	509	23.2	18	\$ 655	\$ 333,448
MPU26_140	MPU26_143	MPU26_144	27.8	25.8	509	26.8	18	\$ 746	\$ 379,546
MPU26_141	MPU26_144	MPU26_145	25.8	23.6	509	24.7	18	\$ 686	\$ 348,815
MPU26_143	MPU26_146	MPU26_147	22.8	23.6	509	23.2	18	\$ 655	\$ 333,448
Subtotal 18-inch Sewer									Base Construction Costs: \$ 1,754,000
									Construction Estimating Contingency @ 35% \$ 614,000
									Total Construction Costs: \$ 2,368,000
									Engineering, CM, and Admin @ 30% \$ 710,000
									Total Project Costs: \$ 3,078,000

12-inch Sewer

Project No. V3-3

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_138	MPU26_141	MPU26_102	22.6	27.4	534	25.0	12	\$ 547	\$ 291,918
MPU26_136	MPU26_139	MPU26_140	18.1	20.1	534	19.1	12	\$ 462	\$ 246,759
MPU26_128	MPU26_103	MPU26_138	17.2	15.6	534	16.4	12	\$ 444	\$ 237,095
MPU26_135	MPU26_138	MPU26_139	15.6	18.1	534	16.9	12	\$ 444	\$ 237,082
MPU26_137	MPU26_140	MPU26_141	20.1	22.6	534	21.3	12	\$ 484	\$ 258,371
Subtotal 12-inch Sewer									Base Construction Costs: \$ 1,270,000
									Construction Estimating Contingency @ 35% \$ 445,000
									Total Construction Costs: \$ 1,715,000
									Engineering, CM, and Admin @ 30% \$ 515,000
									Total Project Costs: \$ 2,230,000



PROJECT: SEWER MASTER PLAN UPDATE

DATE: 4/29/2026

JOB NUMBER: 184032446

PREPARED BY: BEW

CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHEAST

12-inch Sewer

Project No. V3-4

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_85	MPU26_88	MPU26_87	22.6	23.3	482	22.9	12	\$ 500	\$ 240,812
MPU26_87	MPU26_90	MPU26_89	25.8	22.2	482	24.0	12	\$ 531	\$ 255,956
MPU26_101	MPU26_85	MPU26_132	23.9	21.5	535	22.7	12	\$ 500	\$ 267,359
MPU26_129	MPU26_132	MPU26_133	21.5	21.5	535	21.5	12	\$ 484	\$ 258,953
MPU26_130	MPU26_133	MPU26_134	21.5	19.4	535	20.4	12	\$ 468	\$ 250,548
MPU26_131	MPU26_134	MPU26_135	19.4	16.4	535	17.9	12	\$ 450	\$ 240,849
MPU26_132	MPU26_135	MPU26_136	16.4	15.2	535	15.8	12	\$ 438	\$ 234,384
MPU26_133	MPU26_136	MPU26_137	15.2	19.5	535	17.4	12	\$ 450	\$ 240,849
MPU26_134	MPU26_137	MPU26_103	19.5	17.2	535	18.3	12	\$ 456	\$ 244,082
MPU26_84	MPU26_87	MPU26_85	23.3	23.9	482	23.6	12	\$ 515	\$ 248,383
MPU26_86	MPU26_89	MPU26_88	22.2	22.6	482	22.4	12	\$ 500	\$ 240,812
Subtotal	12-inch Sewer				Base Construction Costs:				\$ 2,723,000
					Construction Estimating Contingency @ 35%				\$ 953,000
					Total Construction Costs:				\$ 3,676,000
					Engineering, CM, and Admin @ 30%				\$ 1,103,000
					Total Project Costs:				\$ 4,779,000

12-inch Sewer

Project No. V3-5

12-inch Sewer									
Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_139	MPU26_142	MPU26_143	22.9	27.8	509	25.3	12	\$ 560	\$ 284,959
MPU26_83	MPU26_95	MPU26_84	25.0	23.7	430	24.4	12	\$ 531	\$ 228,253
MPU26_93	MPU26_96	MPU26_95	25.5	25.0	430	25.2	12	\$ 560	\$ 240,775
MPU26_94	MPU26_84	MPU26_142	23.7	22.9	509	23.3	12	\$ 515	\$ 262,148
Subtotal	12-inch Sewer				Base Construction Costs:				\$ 1,016,000
					Construction Estimating Contingency @ 35%				\$ 356,000
					Total Construction Costs:				\$ 1,372,000
					Engineering, CM, and Admin @ 30%				\$ 412,000
					Total Project Costs:				\$ 1,784,000

24-inch Sewer

Project No. V3-6

Project No. 24-00000000									
Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_256	MPU26_255	V3PS	20.3	18.0	481	19.1	24	\$ 777	\$ 373,506
MPU26_245	MPU26_100	MPU26_249	31.6	28.7	481	30.2	24	\$ 1,064	\$ 511,488
MPU26_250	MPU26_249	MPU26_250	28.7	29.5	481	29.1	24	\$ 1,039	\$ 499,390
MPU26_251	MPU26_250	MPU26_251	29.5	25.9	481	27.7	24	\$ 989	\$ 475,195
MPU26_252	MPU26_251	MPU26_252	25.9	25.5	481	25.7	24	\$ 938	\$ 450,999
MPU26_253	MPU26_252	MPU26_253	25.5	22.1	481	23.8	24	\$ 849	\$ 408,222
MPU26_254	MPU26_253	MPU26_254	22.1	20.4	481	21.2	24	\$ 811	\$ 389,640
MPU26_255	MPU26_254	MPU26_255	20.4	20.3	481	20.3	24	\$ 791	\$ 380,349
Subtotal		24-inch Sewer					Base Construction Costs:		\$ 3,489,000
					Construction Estimating Contingency @ 35%		\$ 1,221,000		
					Total Construction Costs:		\$ 4,710,000		
					Engineering, CM, and Admin @ 30%		\$ 1,413,000		
					Total Project Costs:		\$ 6,123,000		



PROJECT: SEWER MASTER PLAN UPDATE

DATE: 4/29/2026

JOB NUMBER: 184032446

PREPARED BY: BEW

CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHEAST

12-inch Sewer

Project No. V3-9

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_247	MPU26_246	MPU26_247	21.7	22.8	437	22.2	12	\$ 500	\$ 218,306
MPU26_246	MPU26_197	MPU26_246	17.4	21.7	437	19.6	12	\$ 462	\$ 201,939
MPU26_154	MPU26_210	MPU26_193	21.7	22.7	540	22.2	12	\$ 500	\$ 269,912
MPU26_195	MPU26_198	MPU26_197	17.8	17.4	513	17.6	12	\$ 450	\$ 230,901
MPU26_196	MPU26_199	MPU26_198	15.7	17.8	511	16.7	12	\$ 444	\$ 226,907
MPU26_197	MPU26_200	MPU26_199	17.7	15.7	510	16.7	12	\$ 888	\$ 452,751
MPU26_198	MPU26_201	MPU26_200	18.4	17.7	560	18.1	12	\$ 912	\$ 510,869
MPU26_199	MPU26_202	MPU26_201	17.8	18.4	515	18.1	12	\$ 912	\$ 469,732
MPU26_200	MPU26_203	MPU26_202	17.8	17.8	514	17.8	12	\$ 450	\$ 231,337
MPU26_201	MPU26_204	MPU26_203	18.5	17.8	513	18.1	12	\$ 456	\$ 233,854
MPU26_202	MPU26_205	MPU26_204	20.2	18.5	551	19.3	12	\$ 462	\$ 254,510
MPU26_203	MPU26_206	MPU26_205	21.8	20.2	512	21.0	12	\$ 468	\$ 239,707
MPU26_204	MPU26_207	MPU26_206	22.5	21.8	513	22.1	12	\$ 500	\$ 256,297
MPU26_205	MPU26_208	MPU26_207	22.0	22.5	520	22.2	12	\$ 500	\$ 259,768
MPU26_206	MPU26_209	MPU26_208	19.9	22.0	508	20.9	12	\$ 468	\$ 237,882
MPU26_207	MPU26_193	MPU26_209	22.7	19.9	506	21.3	12	\$ 484	\$ 245,026
MPU26_225	MPU26_227	MPU26_228	21.8	20.8	490	21.3	12	\$ 484	\$ 237,257
MPU26_226	MPU26_228	MPU26_229	20.8	20.0	490	20.4	12	\$ 468	\$ 229,556
MPU26_227	MPU26_229	MPU26_230	20.0	24.6	490	22.3	12	\$ 500	\$ 244,958
MPU26_228	MPU26_230	MPU26_210	24.6	21.7	490	23.1	12	\$ 515	\$ 252,660
MPU26_248	MPU26_247	MPU26_104	22.8	25.6	437	24.2	12	\$ 531	\$ 232,032
Subtotal	12-inch Sewer				Base Construction Costs:				\$ 5,740,000

Note: Italicized pipe segments include trenchless install and casing.

Construction Estimating Contingency @ 35% \$ 2,009,000

Total Construction Costs: \$ 7,749,000

Engineering, CM, and Admin @ 30% \$ 2,325,000

Total Project Costs: \$ 10,074,000

12-inch Sewer

Project No. V3-8

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_104	MPU26_107	MPU26_104	20.6	25.6	105	23.1	12	\$ 515	\$ 54,267
MPU26_127	MPU26_131	MPU26_130	25.4	25.4	307	25.4	12	\$ 560	\$ 171,713
MPU26_105	MPU26_109	MPU26_107	19.2	20.6	675	19.9	12	\$ 462	\$ 311,796
MPU26_103	MPU26_130	MPU26_106	25.4	23.6	396	24.5	12	\$ 531	\$ 210,280
MPU26_107	MPU26_111	MPU26_110	22.4	22.8	679	22.6	12	\$ 500	\$ 339,339
MPU26_109	MPU26_113	MPU26_112	21.8	21.2	675	21.5	12	\$ 484	\$ 326,339
MPU26_111	MPU26_115	MPU26_114	22.4	23.6	702	23.0	12	\$ 500	\$ 350,817
MPU26_108	MPU26_112	MPU26_111	21.2	22.4	686	21.8	12	\$ 484	\$ 331,776
MPU26_110	MPU26_114	MPU26_113	23.6	21.8	689	22.7	12	\$ 500	\$ 344,008
MPU26_112	MPU26_106	MPU26_115	23.6	22.4	674	23.0	12	\$ 500	\$ 336,826
MPU26_106	MPU26_110	MPU26_109	22.8	19.2	698	21.0	12	\$ 468	\$ 326,545
Subtotal	12-inch Sewer				Base Construction Costs:				\$ 3,104,000

Construction Estimating Contingency @ 35% \$ 1,086,000

Total Construction Costs: \$ 4,190,000

Engineering, CM, and Admin @ 30% \$ 1,257,000

Total Project Costs: \$ 5,447,000



PROJECT: SEWER MASTER PLAN UPDATE
JOB NUMBER: 184032446
CLIENT: CITY OF LINCOLN
DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

DATE: 4/29/2026
PREPARED BY: BEW
CHECKED BY: SLB
ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHEAST

15-inch Sewer

Project No. V3-7

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_117	MPU26_120	V3PS	21.0	21.0	124	21.0	15	\$ 544	\$ 67,456
MPU26_116	MPU26_119	MPU26_120	24.0	21.0	225	22.5	15	\$ 557	\$ 125,435
MPU26_102	MPU26_104	MPU26_116	25.6	27.2	201	26.4	15	\$ 648	\$ 130,446
MPU26_113	MPU26_116	MPU26_117	27.2	26.7	211	26.9	15	\$ 648	\$ 137,081
MPU26_115	MPU26_118	MPU26_119	28.1	24.0	236	26.0	15	\$ 648	\$ 152,902
MPU26_114	MPU26_117	MPU26_118	26.7	28.1	218	27.4	15	\$ 666	\$ 144,953
Subtotal 15-inch Sewer								Base Construction Costs: \$ 758,000	
								Construction Estimating Contingency @ 35% \$ 265,000	
								Total Construction Costs: \$ 1,023,000	
								Engineering, CM, and Admin @ 30% \$ 307,000	
								Total Project Costs: \$ 1,330,000	

10-inch Dual Force Main

Project No. V2-FM

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Dual Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_58	MPU26_60	MPU26_61			57		10	\$ 632	\$ 36,227
MPU26_57	MPU26_58	MPU26_60			995		10	\$ 632	\$ 628,504
MPU26_69	MPU26_70	MPU26_58			509		10	\$ 1,263	\$ 643,489
MPU26_26	MPU26_57	MPU26_68			509		10	\$ 632	\$ 321,745
MPU26_68	MPU26_69	MPU26_70			509		10	\$ 632	\$ 321,745
MPU26_67	MPU26_68	MPU26_69			509		10	\$ 632	\$ 321,745
MPU26_70	MPU26_71	MPU26_57			238		10	\$ 632	\$ 150,121
Subtotal 10-inch Dual Force Main								Base Construction Costs: \$ 2,424,000	
								Construction Estimating Contingency @ 35% \$ 848,000	
								Total Construction Costs: \$ 3,272,000	
								Engineering, CM, and Admin @ 30% \$ 982,000	
								Total Project Costs: \$ 4,254,000	

Note: Italicized pipe segments include trenchless install and casing.

18-inch Dual Force Main

Project No. V2/V3-FM

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Dual Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_59	MPU26_61	MPU26_62	8.0	8.0	575	8.0	18	\$ 1,115	\$ 640,610
MPU26_60	MPU26_59	MPU26_63	8.0	8.0	366	8.0	18	\$ 1,115	\$ 407,822
MPU26_56	MPU26_62	MPU26_59	8.0	8.0	1296	8.0	18	\$ 1,115	\$ 1,444,230
MPU26_61	MPU26_63	MPU26_64	8.0	8.0	720	8.0	18	\$ 1,115	\$ 802,117
MPU26_73	MPU26_64	NE489SS19	8.0	14.2	58	11.1	18	\$ 1,115	\$ 64,089
Subtotal 18-inch Dual Force Main								Base Construction Costs: \$ 3,359,000	
								Construction Estimating Contingency @ 35% \$ 1,176,000	
								Total Construction Costs: \$ 4,535,000	
								Engineering, CM, and Admin @ 30% \$ 1,361,000	
								Total Project Costs: \$ 5,896,000	



PROJECT: SEWER MASTER PLAN UPDATE
JOB NUMBER: 184032446
CLIENT: CITY OF LINCOLN
DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

DATE: 4/29/2026
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CHECKED BY: SLB
ENR: 14,158

BUILDOUT IMPROVEMENT PROJECTS - NORTHEAST

15-inch Dual Force Main

Project No. V3-FM-1

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Dual Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_192	MPU26_245	MPU26_258			727		15	\$ 910	\$ 661,565
MPU26_236	MPU26_237	MPU26_238			875		15	\$ 910	\$ 796,481
MPU26_243	MPU26_244	MPU26_245			845		15	\$ 910	\$ 768,869
MPU26_244	MPU26_232	MPU26_61			469		15	\$ 910	\$ 426,664
MPU26_259	MPU26_258	MPU26_259			727		15	\$ 910	\$ 661,565
MPU26_237	MPU26_238	MPU26_239			852		15	\$ 910	\$ 775,177
MPU26_238	MPU26_239	MPU26_240			843		15	\$ 910	\$ 767,428
MPU26_242	MPU26_243	MPU26_244			844		15	\$ 910	\$ 768,191
MPU26_260	MPU26_259	MPU26_260			727		15	\$ 910	\$ 661,565
MPU26_261	MPU26_260	MPU26_261			727		15	\$ 1,820	\$ 1,323,129
MPU26_262	MPU26_261	MPU26_232			727		15	\$ 910	\$ 661,565
MPU26_240	MPU26_241	MPU26_242			844		15	\$ 910	\$ 768,252
MPU26_241	MPU26_242	MPU26_243			844		15	\$ 910	\$ 768,441
MPU26_235	MPU26_236	MPU26_237			865		15	\$ 910	\$ 787,673
MPU26_239	MPU26_240	MPU26_241			845		15	\$ 910	\$ 769,402

Subtotal 15-inch Dual Force Main

Base Construction Costs: \$ 11,366,000

Note: Italicized pipe segments include trenchless install and casing.

Construction Estimating Contingency @ 35% \$ 3,978,000

Total Construction Costs: \$ 15,344,000

Engineering, CM, and Admin @ 30% \$ 4,603,000

Total Project Costs: \$ 19,947,000

15-inch Dual Force Main

Project No. V3-FM-2

Pipeline ID	Upstream Manhole	Downstream Manhole	Upstream Depth (ft)	Downstream Depth (ft)	Total Length (LF)	Average Depth (ft)	Dual Pipe Size (in)	Unit Cost (\$/LF)	Pipe Segment Cost
MPU26_233	MPU26_234	MPU26_235			842		15	\$ 910	\$ 765,961
MPU26_230	MPU26_105	MPU26_231			714		15	\$ 910	\$ 649,523
MPU26_231	MPU26_231	MPU26_233			841		15	\$ 910	\$ 765,280
MPU26_232	MPU26_233	MPU26_234			843		15	\$ 910	\$ 767,277
MPU26_234	MPU26_235	MPU26_236			844		15	\$ 910	\$ 768,297

Subtotal 15-inch Dual Force Main

Base Construction Costs: \$ 3,716,000

Construction Estimating Contingency @ 35% \$ 1,301,000

Total Construction Costs: \$ 5,017,000

Engineering, CM, and Admin @ 30% \$ 1,505,000

Total Project Costs: \$ 6,522,000



PROJECT: WASTEWATER MASTER PLAN

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JOB NUMBER: 184032296

PREPARED BY: BEW

CLIENT: CITY OF LINCOLN

CHECKED BY: SLB

DESCRIPTION: APPENDIX D - PROJECT COST DETAILS

ENR: 14,158

BUILDOUT PUMP STATIONS

Village 2 Pump Station (2.8 MGD)

Project No. V2-PS

Item	Description	Cost
1	Pump Station	\$1,903,000
2	Diversion Structure and Related Yard Structures	\$78,000
3	Emergency Storage or Power	\$622,000
4	Yard Piping	\$219,000
5	Biofilter/Odor Control	\$102,000
6	SCADA & PLC Instrumentation	\$109,000
7	Site Restoration, Clean-up, and Start-up	\$134,000
Pump Station Subtotal:		\$3,170,000
8	Bonds, Insurance, Overhead, Supervision (5.5%)	\$174,350
9	Contractor Profit (10%)	\$317,000
Base Construction Costs:		\$3,660,000
10	Construction Estimating Contingency @ 35%	\$1,281,000
Total Construction Costs:		\$4,941,000
11	Engineering, CM, and Admin @ 30%	\$1,482,000
Total Project Costs:		\$6,423,000

Village 3 Pump Station (5.5 MGD)

Project No. V3-PS

Item	Description	Cost
1	Pump Station	\$3,158,000
2	Diversion Structure and Related Yard Structures	\$130,000
3	Emergency Storage or Power	\$1,031,000
4	Yard Piping	\$363,000
5	Biofilter/Odor Control	\$169,000
6	SCADA & PLC Instrumentation	\$181,000
7	Site Restoration, Clean-up, and Start-up	\$222,000
Pump Station Subtotal:		\$5,260,000
8	Bonds, Insurance, Overhead, Supervision (5.5%)	\$289,300
9	Contractor Profit (10%)	\$526,000
Base Construction Costs:		\$6,080,000
10	Construction Estimating Contingency @ 35%	\$2,128,000
Total Construction Costs:		\$8,208,000
11	Engineering, CM, and Admin @ 30%	\$2,462,000
Total Project Costs:		\$10,670,000



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ENR: 14,158

BUILDOUT PUMP STATIONS

Village 4 Pump Station 1 (3.2 MGD)

Project No. V4-PS-1

Item	Description	Cost
1	Pump Station	\$2,104,000
2	Diversion Structure and Related Yard Structures	\$87,000
3	Emergency Storage or Power	\$687,000
4	Yard Piping	\$242,000
5	Biofilter/Odor Control	\$112,000
6	SCADA & PLC Instrumentation	\$121,000
7	Site Restoration, Clean-up, and Start-up	\$148,000
Pump Station Subtotal:		\$3,500,000
8	Bonds, Insurance, Overhead, Supervision (5.5%)	\$192,500
9	Contractor Profit (10%)	\$350,000
Base Construction Costs:		\$4,040,000
10	Construction Estimating Contingency @ 35%	\$1,414,000
Total Construction Costs:		\$5,454,000
11	Engineering, CM, and Admin @ 30%	\$1,636,000
Total Project Costs:		\$7,090,000

Village 4 Pump Station 2 (1.1 MGD)

Project No. V4-PS-2

Item	Description	Cost
1	Pump Station	\$944,000
2	Diversion Structure and Related Yard Structures	\$39,000
3	Emergency Storage or Power	\$308,000
4	Yard Piping	\$109,000
5	Biofilter/Odor Control	\$50,000
6	SCADA & PLC Instrumentation	\$54,000
7	Site Restoration, Clean-up, and Start-up	\$66,000
Pump Station Subtotal:		\$1,570,000
8	Bonds, Insurance, Overhead, Supervision (5.5%)	\$86,350
9	Contractor Profit (10%)	\$157,000
Base Construction Costs:		\$1,810,000
10	Construction Estimating Contingency @ 35%	\$634,000
Total Construction Costs:		\$2,444,000
11	Engineering, CM, and Admin @ 30%	\$733,000
Total Project Costs:		\$3,177,000



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BUILDOUT PUMP STATIONS

Village 6/SUD-C Pump Station (5.4 MGD)

Project No. V6/SUDC-PS

Item	Description	Cost
1	Pump Station	\$3,115,000
2	Diversion Structure and Related Yard Structures	\$128,000
3	Emergency Storage or Power	\$1,017,000
4	Yard Piping	\$359,000
5	Biofilter/Odor Control	\$166,000
6	SCADA & PLC Instrumentation	\$179,000
7	Site Restoration, Clean-up, and Start-up	\$219,000
Pump Station Subtotal:		\$5,180,000
8	Bonds, Insurance, Overhead, Supervision (5.5%)	\$284,900
9	Contractor Profit (10%)	\$518,000
Base Construction Costs:		\$5,980,000
10	Construction Estimating Contingency @ 35%	\$2,093,000
Total Construction Costs:		\$8,073,000
11	Engineering, CM, and Admin @ 30%	\$2,422,000
Total Project Costs:		\$10,495,000

Village 6 Pump Station (1.6 MGD)

Project No. V6-PS

Item	Description	Cost
1	Pump Station	\$1,251,000
2	Diversion Structure and Related Yard Structures	\$52,000
3	Emergency Storage or Power	\$409,000
4	Yard Piping	\$144,000
5	Biofilter/Odor Control	\$67,000
6	SCADA & PLC Instrumentation	\$72,000
7	Site Restoration, Clean-up, and Start-up	\$88,000
Pump Station Subtotal:		\$2,080,000
8	Bonds, Insurance, Overhead, Supervision (5.5%)	\$114,400
9	Contractor Profit (10%)	\$208,000
Base Construction Costs:		\$2,400,000
10	Construction Estimating Contingency @ 35%	\$840,000
Total Construction Costs:		\$3,240,000
11	Engineering, CM, and Admin @ 30%	\$972,000
Total Project Costs:		\$4,212,000



Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

Stantec Consulting Services Inc.

209 Commerce Parkway

PO Box 128

Cottage Grove WI 53527-8955

stantec.com

