Stormwater Management Design Report

# I-77 Widening Design-Build Preparation On-Call

From Percival Road to Killian Road

*Richland County, SC*

May 2015

# Table of Contents

# 1.0

# Project Summary

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## 1.1 Project Summary

The South Carolina Department of Transportation proposes to widen I-77 from near mile point 15 (Percival Road) on the southern terminus to approximately mile point 22 (Killian Road) on the northern terminus. The project includes adding a travel lane in each direction, improving various exit ramps, and widening ten mainline bridges. The bridges include: four over I-20 and I-20 exit ramps near mile point 16; two over Windsor Lake Boulevard (S-1196) near mile point 16.3; two over Windsor Lake near mile point 16.6; and two over Edgewater Drive (S-1722) and Jackson Creek near mile point 18. The project will also include the rehabilitation of I-77 southbound lanes from the northern terminus of the widening project near mile point 22 to mile point 27. It is assumed that the project limits and construction impacts will fall within the existing right-of-way for all improvements. The Department has contracted with HDR, Inc. to complete the drainage and outfall field surveys, pipe inspections, and preliminary hydraulic design in order to support the Department with preparation of the design build package.

I-77 is a north-south interstate route that traveling along the eastern limits of Columbia and provides a direct connection from I-26 in Columbia, SC to Charlotte, NC. Within the project limits, I-77 currently ranges from a four- to six-lane divided freeway with a grassed median and a cable median barrier. The posted speed limit of the interstate varies from 60 mph to 70 mph.

CHE Surveying located and verified sizes of the existing drainage structures. AET Robotic Inspection Services evaluated the conditions of existing cross lines and cleaned drainage pipes. Topographic survey data and USGS quadrangle maps were used to identify drainage patterns. Drainage patterns show that runoff flows generally from northeast to southwest in the project limits. The larger waterbodies crossing I-77 include Crane Creek, Cumbess Creek, Little Jackson Creek, Jackson Creek (Windsor Lake), and an unnamed tributary to Gills Creek. The existing drainage infrastructure will require some field verification during construction. The infrastructure shown in the attached set of plans (See Appendix A) was put together from aerial survey data, topographic field survey, pipe video inventory survey, and field inspection. Some of the pipes shown were not field located but were drawn in by hand referencing asbuilts of past projects involving I-77 & I-20. In the plans, pipes which were drawn in per these asbuilts are assumed to still exist, and are noted as such.

It is assumed that the existing cross-line box culverts will not require extension due to construction of the project.

High-water marks were observed on the walls of the existing box culverts and on the piers of two of the existing bridges. Those structures and the approximate vertical location of their observed high-water marks are listed below:

EX-0308 (inlet of 8’ x 6’ box culvert EC-0201) – 1.5’ above culvert floor, beyond slope and side tapers

EX-0399 (inlet of 6’ x 6’ box culvert EC-0102) – 2.0’ above culvert floor, beyond slope and side tapers

I-77 NB Bridge over Windsor Lake (immediately downstream of dam) – 1.0’ below the approximate top of the north side bank (1.0’ above the normal water surface observed during the field visit)

EX-0998 (inlet of 7.5’ x 5’ box culvert EC-0906) – 1.5’ above culvert floor

I-77 SB Bridge over Little Jackson Creek / Edgewater Drive – at same elevation as the approximate top of the north side bank (3.5’ above the normal water surface observed during the field visit)

EX-1491 (inlet of 6’ x 5’ box culvert EC-) – 2.5’ above culvert floor

EX-1597 (inlet of 4’ x 4’ box culvert EC-) – 1.0’ above culvert floor

EX-1796 (inlet of triple 8’ x 6’ box culvert EC-1702, EC-1703 & EC-1704) – 2.0’ above culvert floor

EX-2196 (inlet of triple 12’ x 12’ box culvert EC-2103, EC-2105 & EC-2106) – 3.0’ above culvert floor

Six specific outfalls were studied as part of this project. Each outfall was studied in a Pre-Construction conditions versus Post-Construction conditions analysis. A summary of the pre-versus post flows for the six major basins of the project is shown below.

| Basin ID | I-77 Sta. at Outfall | Design Storm Event | Pre-Developed Flows (cfs) | Post-Developed Flows (cfs) | % Increase |
|---|---|---|---|---|---|
| 1 | 1151+00 | 2-Year | 472.17 | 474.75 | 0.55 |
| | | 10-Year | 975.83 | 979.41 | 0.37 |
| | | 50-Year | 1587.76 | 1590.90 | 0.20 |
| 2 | 1249+00 | 2-Year | 1147.79 | 1151.79 | 0.35 |
| | | 10-Year | 2178.39 | 2185.20 | 0.31 |
| | | 50-Year | 2671.44 | 2679.24 | 0.29 |
| 3 | 1272+60 | 2-Year | 138.88 | 138.88 | 0.00 |
| | | 10-Year | 258.88 | 258.88 | 0.00 |
| | | 50-Year | 397.43 | 397.43 | 0.00 |
| 4 | 1329+00 | 2-Year | 1241.63 | 1244.30 | 0.21 |
| | | 10-Year | 2329.70 | 2334.19 | 0.19 |
| | | 50-Year | 2834.70 | 2839.80 | 0.18 |
| 5 | 1407+00 | 2-Year | 313.11 | 314.16 | 0.33 |
| | | 10-Year | 547.10 | 548.16 | 0.19 |
| | | 50-Year | 813.19 | 814.31 | 0.14 |
| 6 | 1469+50 | 2-Year | 2411.48 | 2411.48 | 0.00 |
| | | 10-Year | 4328.86 | 4328.88 | 0.00 |
| | | 50-Year | 5170.91 | 5170.92 | 0.00 |

**Table 1.1: Summary of Peak Flows at Major Basin Analysis Points**

While this project will also entail minor improvements to interchange ramps along the corridor, the main hydrologic effect of the project will be to increase the impervious surface along the median. Due to the relatively minimal new impervious area (relative to the area of the total project basin) to be added by construction of the project, the increase in runoff from pre-construction conditions to post-construction conditions is nearly negligible. No detention should be necessary to mitigate post-construction flows.

Detailed discussion of the stormwater analysis is located in Section 4.0.

# 2.0

# Project Location Maps


| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |

HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

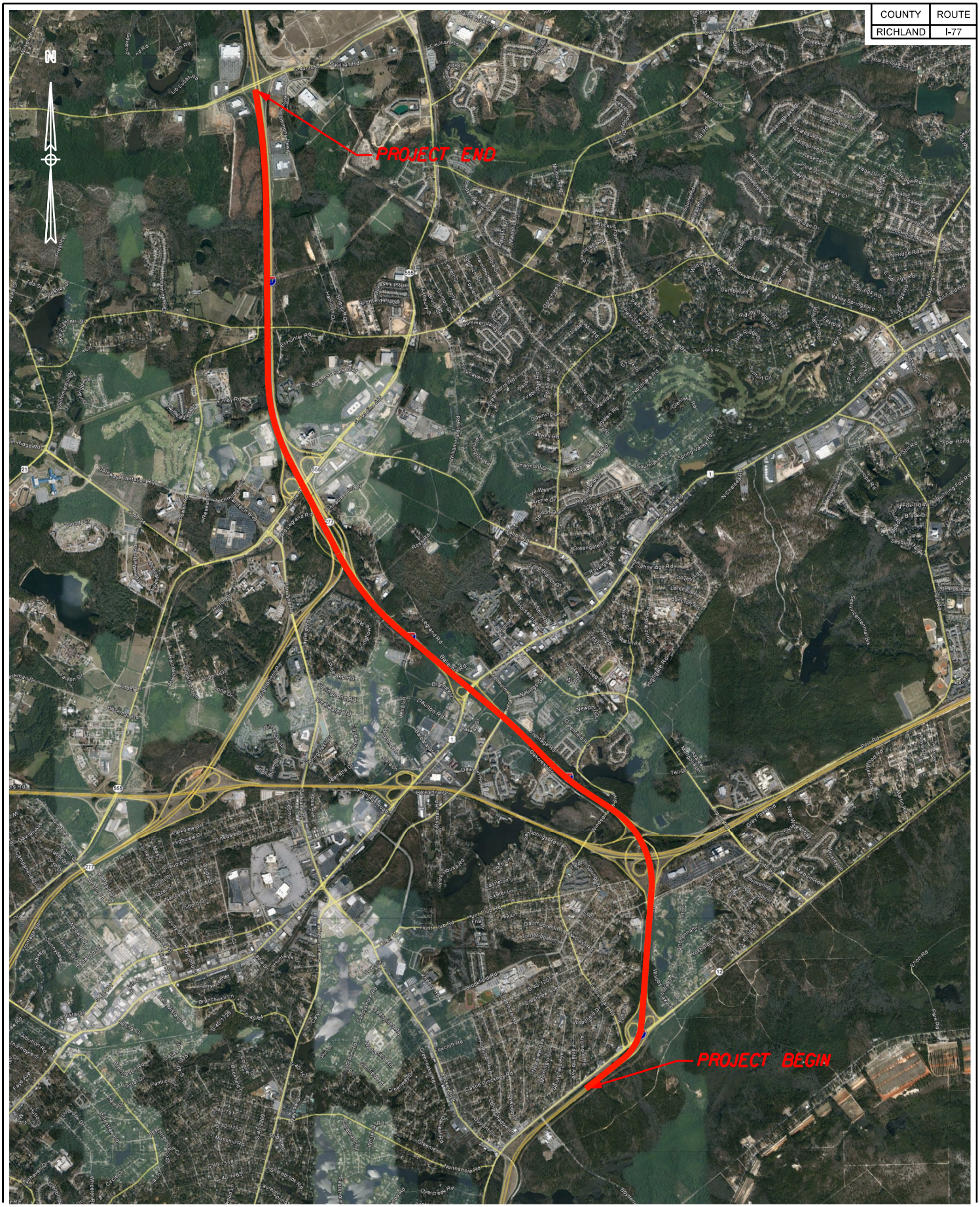
RICHLAND COUNTY, SOUTH CAROLINA

# VICINITY MAP

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | N.T.S. |

FIGURE 2.1

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |




HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

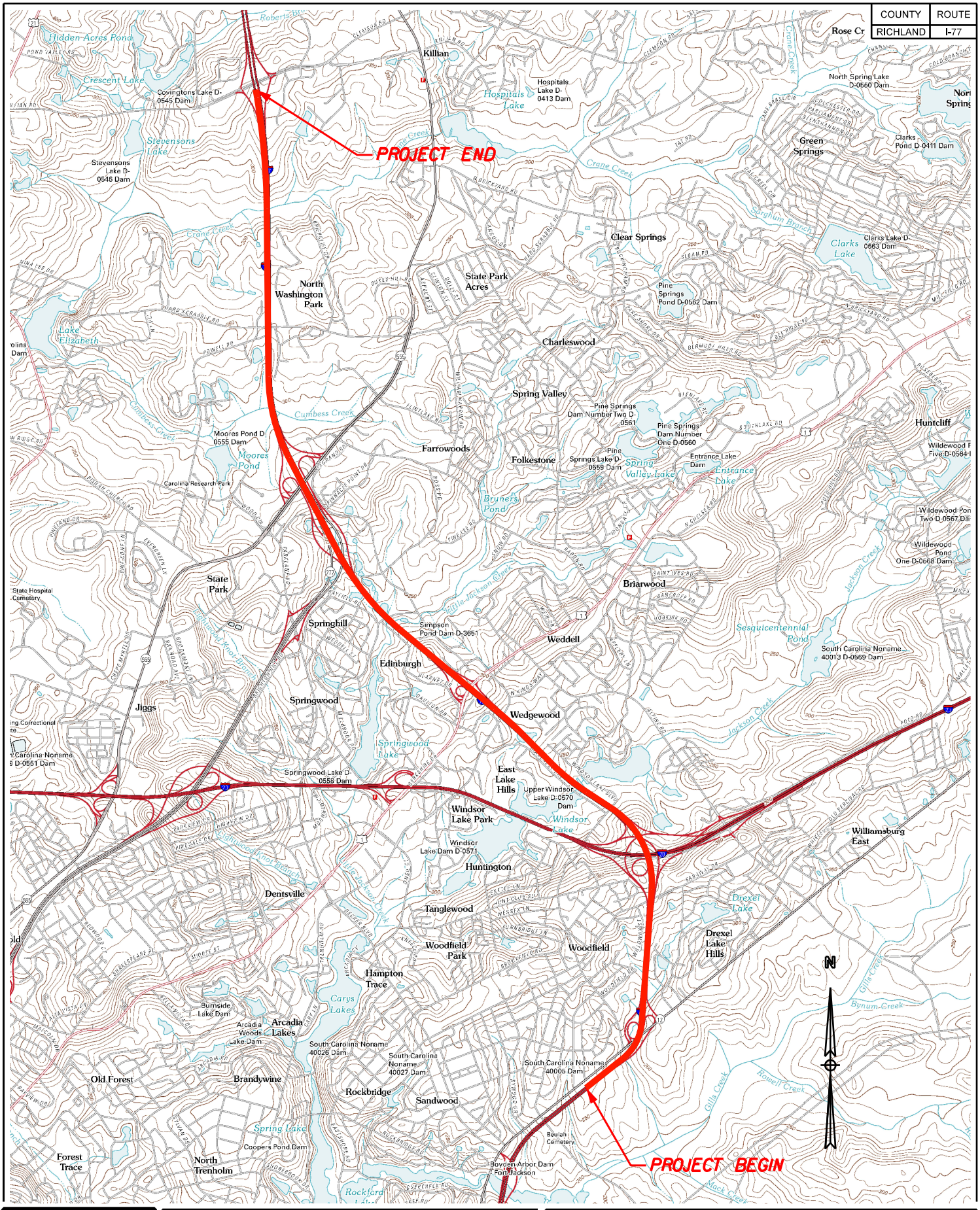
RICHLAND COUNTY, SOUTH CAROLINA

# AERIAL MAP

0 2,000' 4,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 4,000' |

FIGURE 2.2




| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |

HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

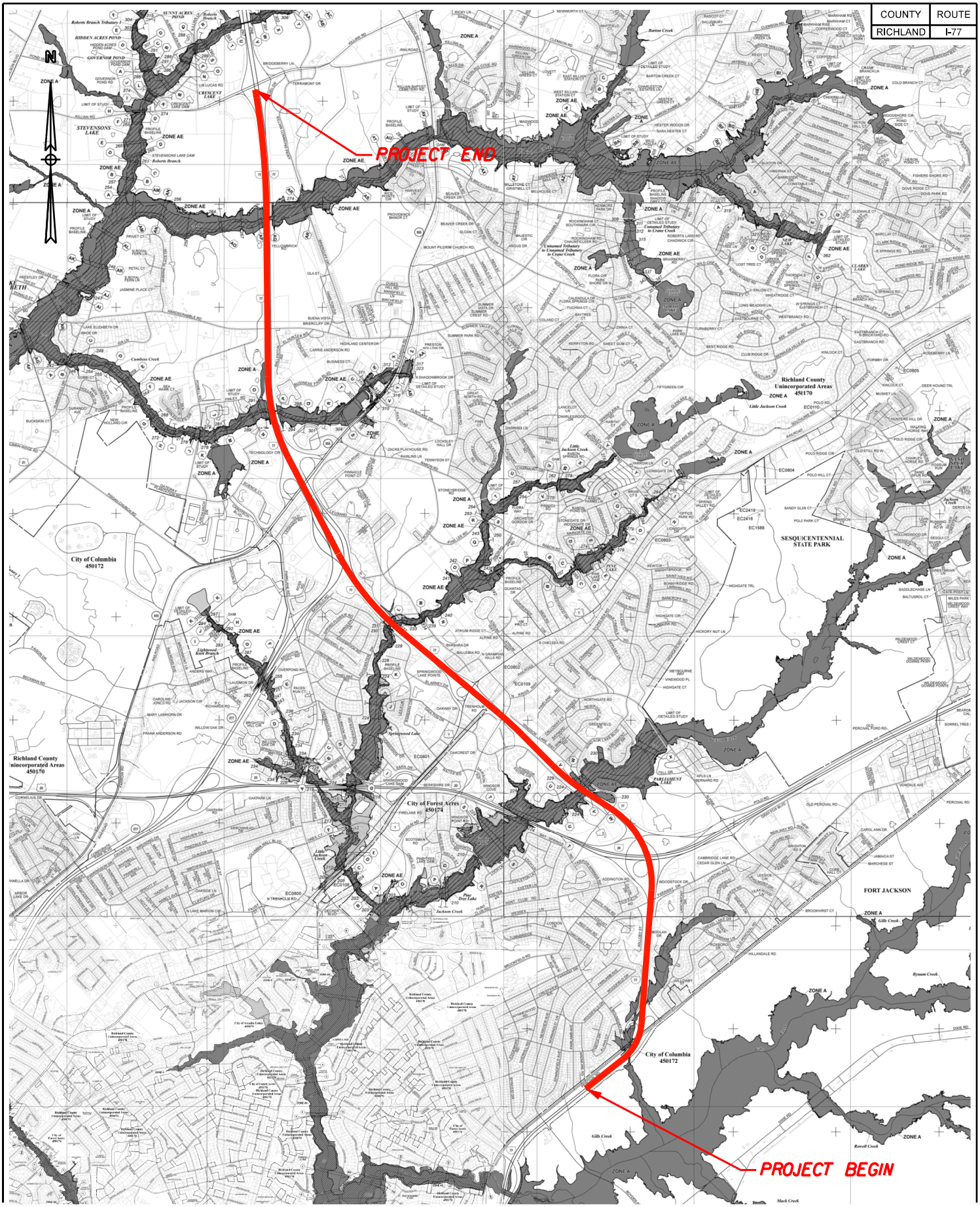
# USGS TOPOGRAPHIC QUAD MAP

0 2,000' 4,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 4,000' |

FIGURE 2.3

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |

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DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

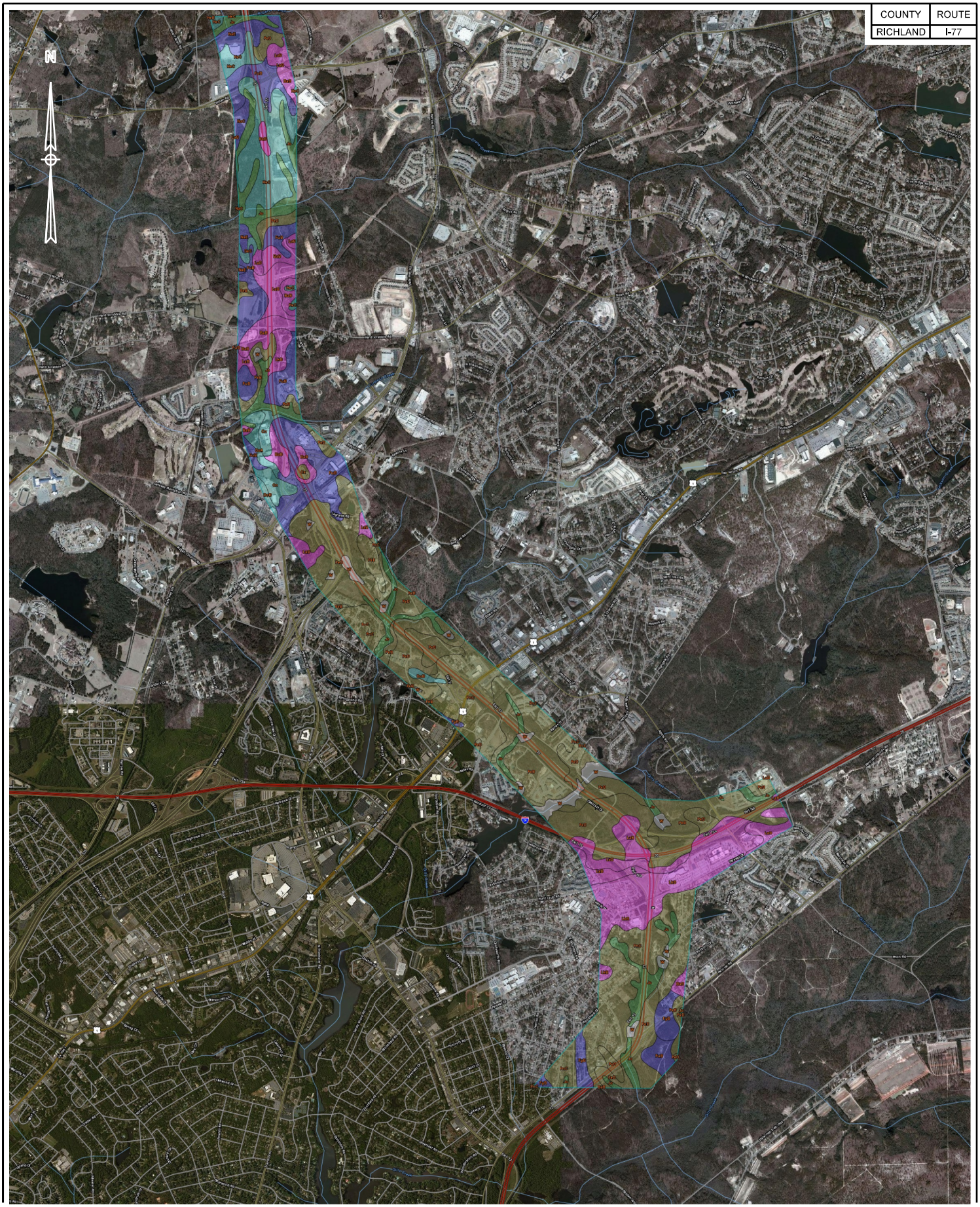
RICHLAND COUNTY, SOUTH CAROLINA

# FEMA FIRM MAP

0 2,000' 4,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 4,000' |

FIGURE 2.4




| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |

HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

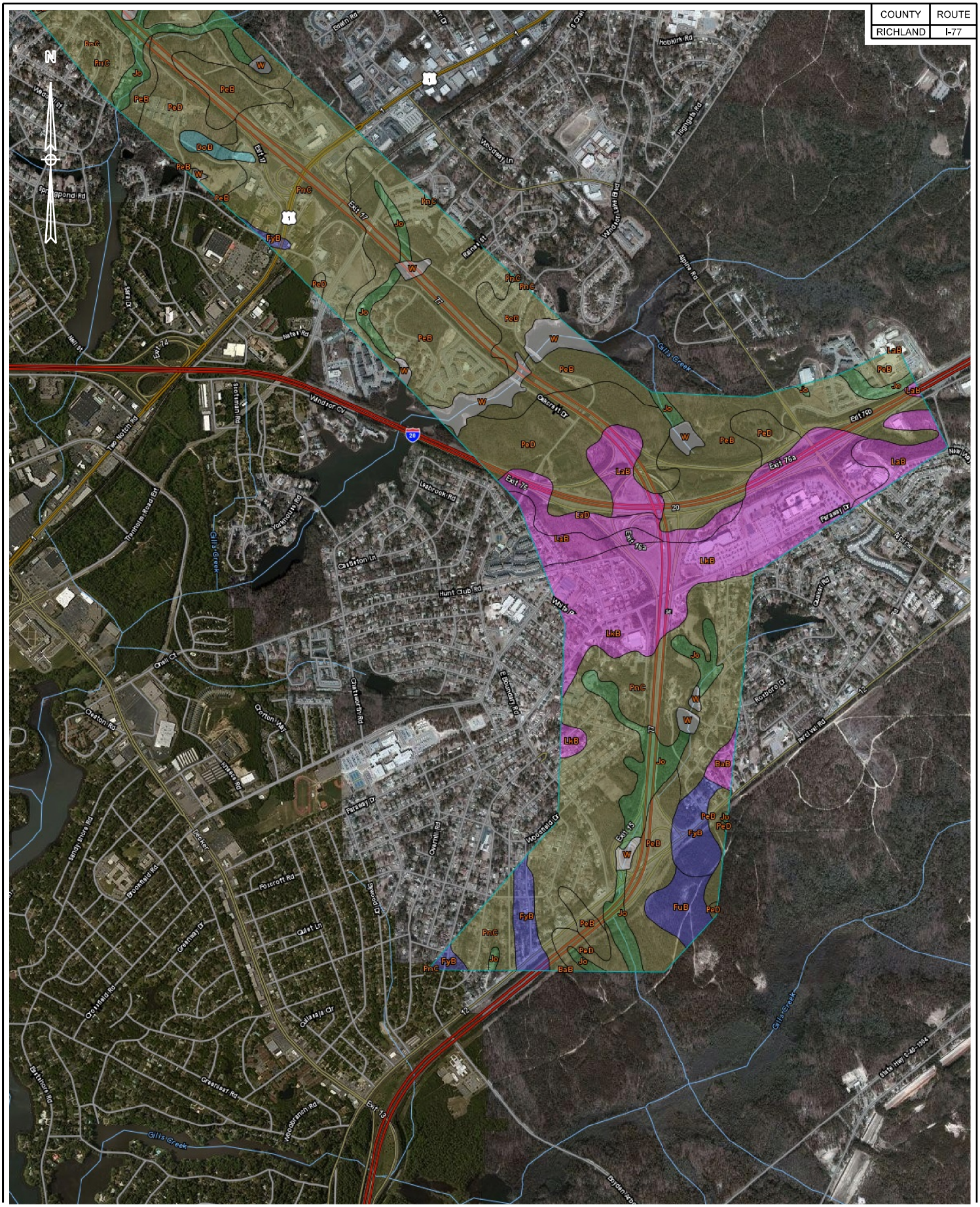
# NRCS SOILS SURVEY MAP (ENTIRE PROJECT SITE)

0 2,000' 4,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 4,000' |

FIGURE 2.5

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |

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DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

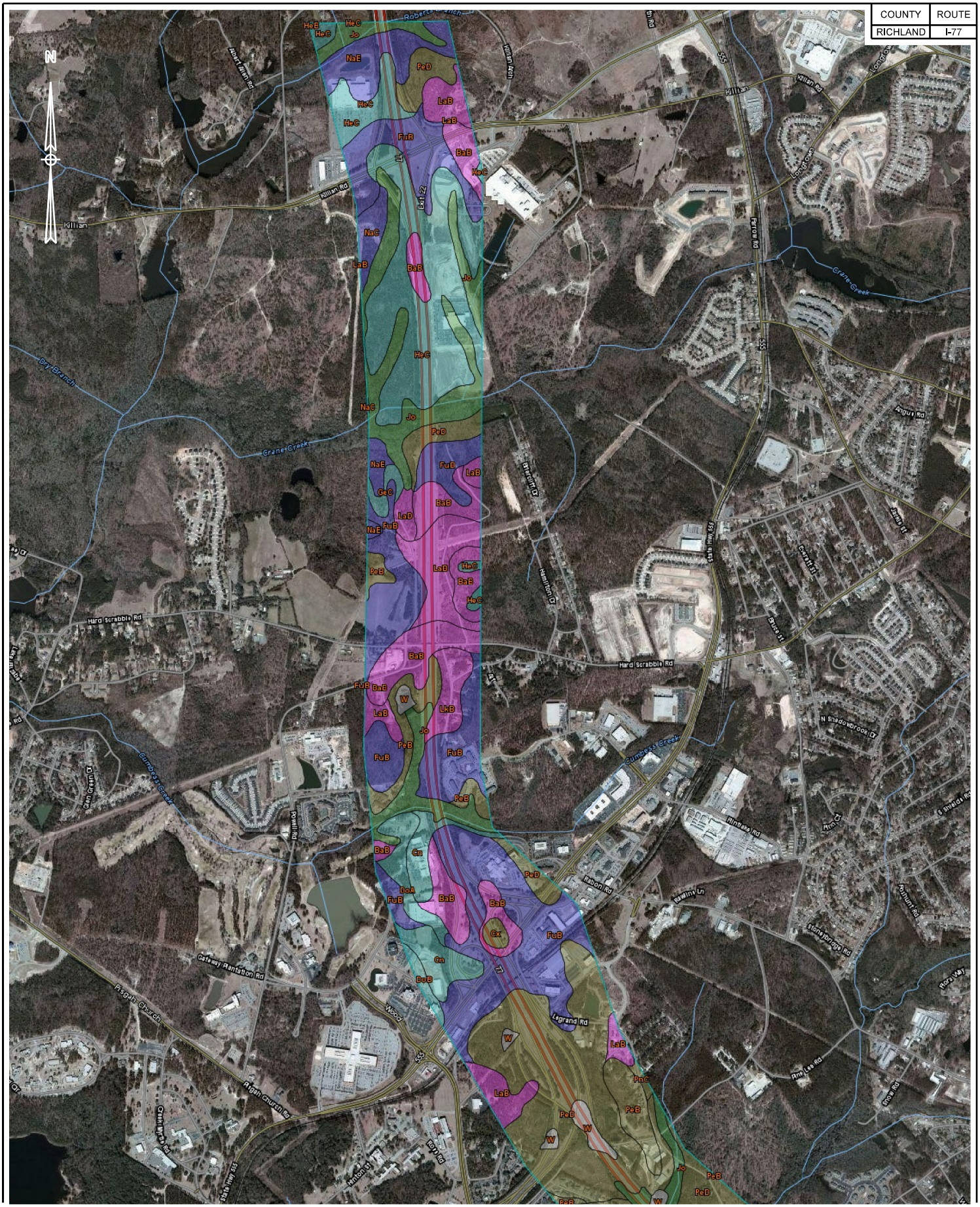
# NRCS SOILS SURVEY MAP
## (1 OF 2)

0 1,000' 2,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 2,000' |

FIGURE
**2.6.1**

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |

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DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

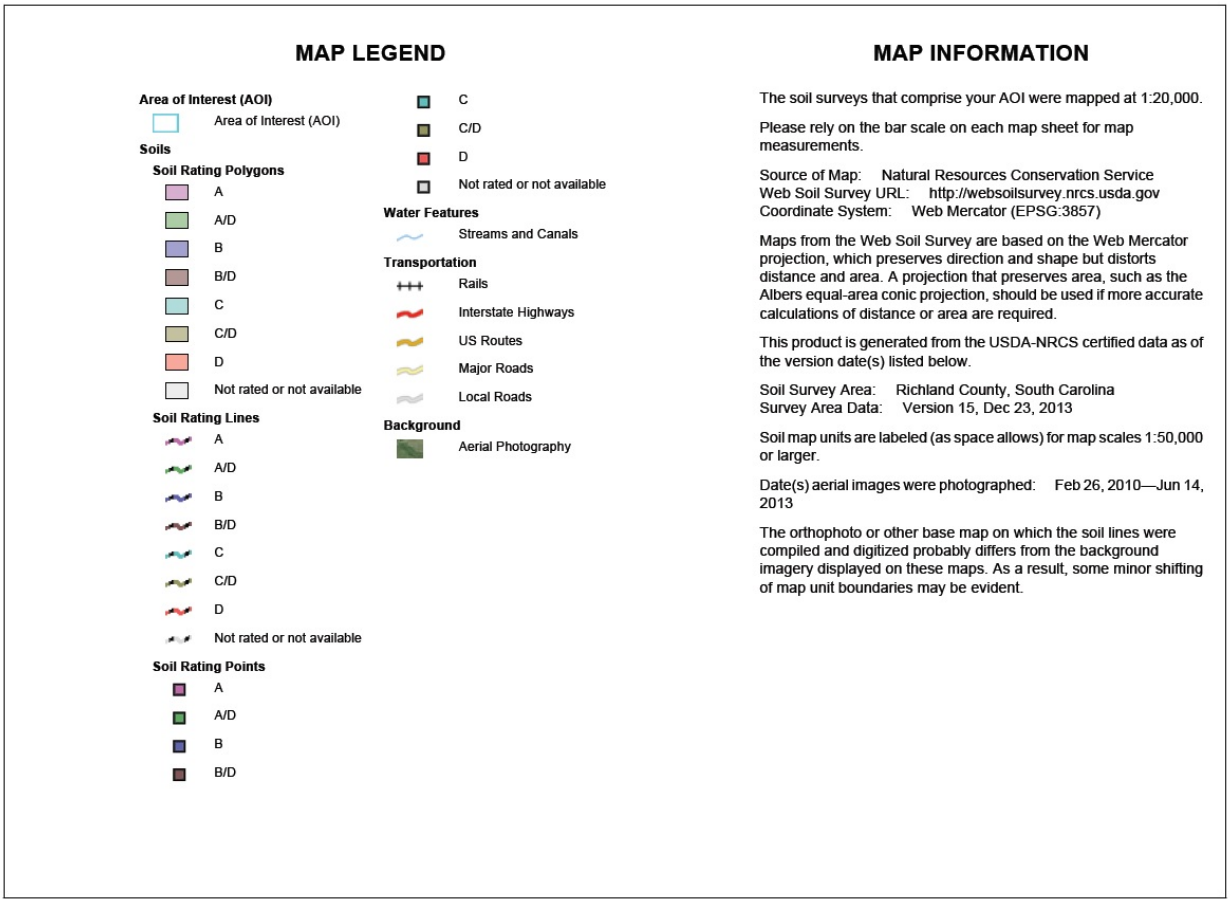
# NRCS SOILS SURVEY MAP (2 OF 2)

0 1,000' 2,000'

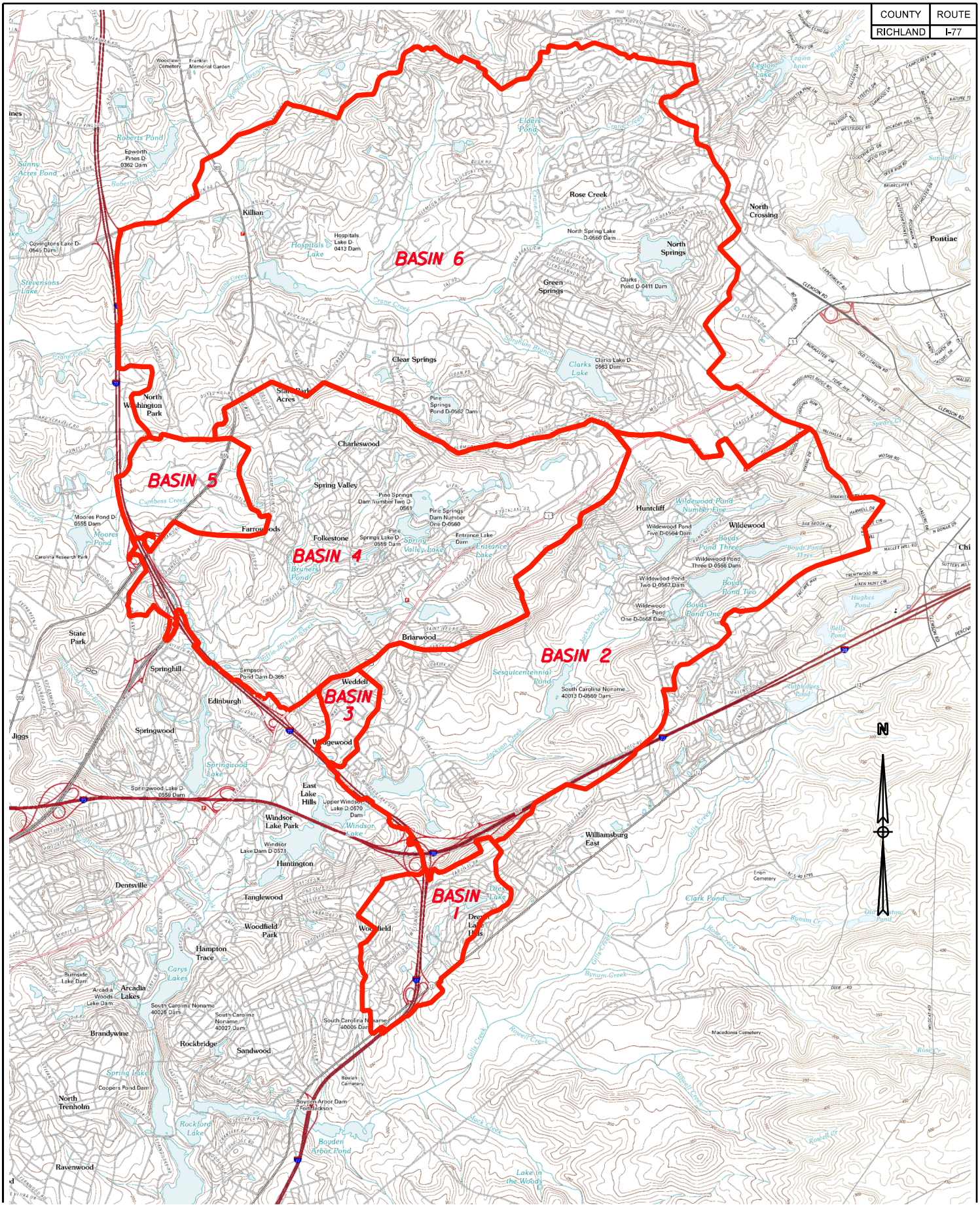
| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 2,000' |

FIGURE 2.6.2

# 2.7 NRCS Soils Survey Map Legend



| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |




HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

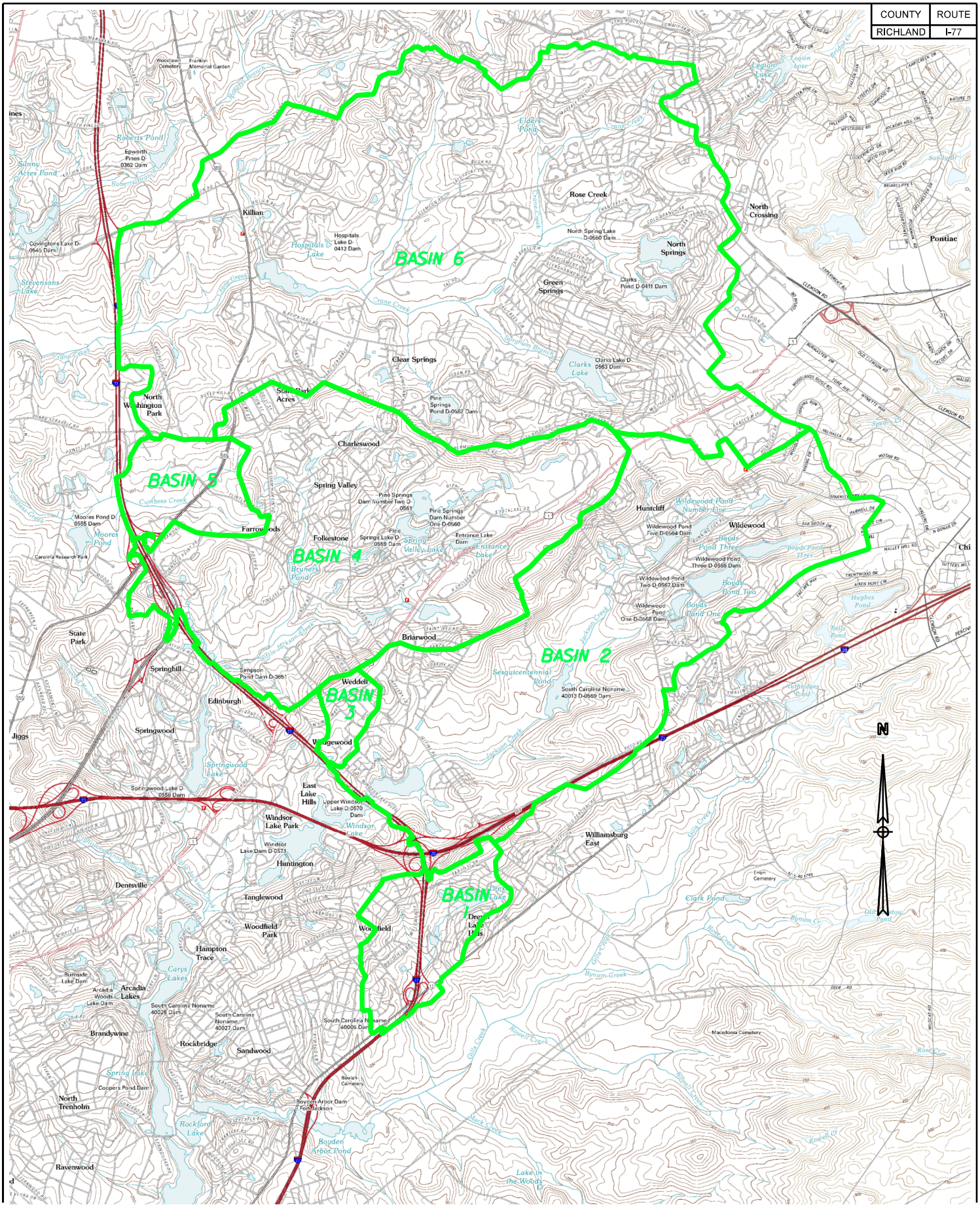
# MAJOR BASIN DELINEATION MAP – PRE-DEVELOPED CONDITIONS

0 2,500' 5,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 5,000' |

FIGURE 2.8.1

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |




HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

# MAJOR BASIN DELINEATION MAP – POST-DEVELOPED CONDITIONS

0 2,500' 5,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 5,000' |

FIGURE 2.8.2

# 3.0

# Soils Information

## 3.1 Soils Information Overview

The I-77 Widening Project is located in the Sand Hills Region of South Carolina. The land use along the project corridor is a mix of residential, commercial, and undeveloped. A soil survey for Richland County was obtained from the Natural Resources Conservation Service (NRCS) database to determine the predominate soil types along the project corridor. The survey indicates Pelion type soils comprise the relative majority, approximately 49%, of the soils throughout the project area. Pelion type soils are classified as hydrologic group C/D, whereas they have a slow to very slow infiltration rate when wet. The NRCS soil survey and soil type descriptions for this project are included in the following sections.

## 3.2 Hydrologic Soil Group

**Table 3.2: Hydrologic Soil Group Summary**

| Map Unit Symbol | Map Unit Name | Rating | Acres in AOI | Percent of AOI |
|---|---|---|---|---|
| BaB | Blanton sand, 0 to 6 percent slopes | A | 92.4 | 4.0% |
| Cn | Clarendon sandy loam | C | 29.2 | 1.3% |
| Cx | Coxville fine sandy loam | C/D | 3.5 | 0.2% |
| DoA | Dothan loamy sand, 0 to 2 percent slopes | C | 14.8 | 0.6% |
| DoB | Dothan loamy sand, 2 to 6 percent slopes | C | 10.5 | 0.5% |
| FuB | Fuquay sand, 2 to 6 percent slopes | B | 240.7 | 10.4% |
| FyB | Fuquay-Urban land complex, 0 to 6 percent slopes | B | 40.1 | 1.7% |
| GeC | Georgeville silt loam, 6 to 10 percent slopes | C | 5.0 | 0.2% |
| HeB | Herndon silt loam, 2 to 6 percent slopes | C | 0.1 | 0.0% |
| HeC | Herndon silt loam, 6 to 10 percent slopes | C | 131.1 | 5.7% |
| Jo | Johnston loam | A/D | 181.4 | 7.8% |
| LaB | Lakeland sand, 2 to 6 percent slopes | A | 124.7 | 5.4% |
| LaD | Lakeland sand, 10 to 15 percent slopes | A | 33.8 | 1.5% |
| LkB | Lakeland-Urban land complex, 2 to 6 percent slopes | A | 181.4 | 7.8% |
| NaC | Nason silt loam, 6 to 10 percent slopes | B | 10.2 | 0.4% |
| NaE | Nason complex, 10 to 30 percent slopes | B | 35.0 | 1.5% |
| PeB | Pelion loamy sand, 2 to 6 percent slopes | C/D | 353.9 | 15.3% |
| PeD | Pelion loamy sand, 6 to 15 percent slopes | C/D | 416.2 | 18.0% |
| PnC | Pelion-Urban land complex, 2 to 10 percent slopes | C/D | 355.1 | 15.4% |
| W | Water | | 53.6 | 2.3% |
| **Totals for Area of Interest** | | | **2,312.7** | **100.0%** |

## 3.3 Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

**Group A**. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

**Group B**. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

**Group C**. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

**Group D**. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

## 3.4 Rating Options

**Aggregation Method:** Dominant Condition
**Component Percent Cutoff:** None Specified
**Tie-break Rule:** Higher

## 3.5 Map Unit Description (Brief, Generated)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

The Map Unit Description (Brief, Generated) report displays a generated description of the major soils that occur in a map unit. Descriptions of non-soil (miscellaneous areas) and minor map unit components are not included. This description is generated from the underlying soil attribute data.

Additional information about the map units described in this report is available in other Soil Data Mart reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the Soil Data Mart reports define some of the properties included in the map unit descriptions.

Minor map unit components are excluded from this report.

## 3.6 Report – Map Unit Description (Brief, Generated)

**Richland County, South Carolina**

**Map Unit:** BaB—Blanton sand, 0 to 6 percent slopes

**Component:** Blanton (100%)

The Blanton component makes up 100 percent of the map unit. Slopes are 0 to 6 percent. This component is on marine terraces on sandhills. The parent material consists of sandy and loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 48 inches during January, February, March, and December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3s. This soil does not meet hydric criteria.

**Map Unit:** Cn—Clarendon sandy loam

**Component:** Clarendon (100%)

The Clarendon component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on marine terraces on coastal plains. The parent material consists of loamy marine

deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 24 inches during January, February, March, and December. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 2w. This soil does not meet hydric criteria.

**Map Unit:** Cx—Coxville fine sandy loam

**Component:** Coxville (100%)

The Coxville component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on depressions, flats, marine terraces on coastal plains. The parent material consists of clayey marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 3 percent. Nonirrigated land capability classification is 3w. This soil meets hydric criteria.

**Map Unit:** DoA—Dothan loamy sand, 0 to 2 percent slopes

**Component:** Dothan (100%)

The Dothan component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on marine terraces on coastal plains. The parent material consists of plinthic loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 36 inches during January, February, March, April. Organic matter content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 1. This soil does not meet hydric criteria.

**Map Unit:** DoB—Dothan loamy sand, 2 to 6 percent slopes

**Component:** Dothan (100%)

The Dothan component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces on coastal plains. The parent material consists of plinthic loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 36 inches during January, February, March, April. Organic matter

content in the surface horizon is about 0 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Map Unit:** FuB—Fuquay sand, 2 to 6 percent slopes

**Component:** Fuquay (100%)

The Fuquay component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces on coastal plains. The parent material consists of plinthic loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 60 inches during January, February, and March. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2s. This soil does not meet hydric criteria.

**Map Unit:** FyB—Fuquay-Urban land complex, 0 to 6 percent slopes

**Component:** Fuquay (60%)

The Fuquay component makes up 60 percent of the map unit. Slopes are 0 to 6 percent. This component is on marine terraces on coastal plains. The parent material consists of plinthic loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 60 inches during January, February, and March. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2s. This soil does not meet hydric criteria.

**Component:** Urban land (40%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

**Map Unit:** GeC—Georgeville silt loam, 6 to 10 percent slopes

**Component:** Georgeville (100%)

The Georgeville component makes up 100 percent of the map unit. Slopes are 6 to 10 percent. This component is on hillslopes on uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Map Unit:** HeB—Herndon silt loam, 2 to 6 percent slopes

**Component:** Herndon (100%)

The Herndon component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on hillslopes on uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer 62 inches, bedrock, paralithic. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Map Unit:** HeC—Herndon silt loam, 6 to 10 percent slopes

**Component:** Herndon (100%)

The Herndon component makes up 100 percent of the map unit. Slopes are 6 to 10 percent. This component is on hillslopes on uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer 62 inches, bedrock, paralithic. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches is high. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Map Unit:** Jo—Johnston loam

**Component:** Johnston (100%)

The Johnston component makes up 100 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains, coastal plains. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is very poorly drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is low. This soil is frequently flooded. It is not ponded. A seasonal zone of water saturation is at 0 inches during January, February, March, April, May, June, July, August, September, October, November, and December. Organic matter content in the surface horizon is about 6 percent. Nonirrigated land capability classification is 7w. This soil meets hydric criteria.

**Map Unit:** LaB—Lakeland sand, 2 to 6 percent slopes

**Component:** Lakeland (100%)

The Lakeland component makes up 100 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces on sandhills. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is

low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4s. This soil does not meet hydric criteria.

**Map Unit:** LaD—Lakeland sand, 10 to 15 percent slopes

**Component:** Lakeland (100%)

The Lakeland component makes up 100 percent of the map unit. Slopes are 10 to 15 percent. This component is on marine terraces on sandhills. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 7s. This soil does not meet hydric criteria.

**Map Unit:** LkB—Lakeland-Urban land complex, 2 to 6 percent slopes

**Component:** Lakeland (55%)

The Lakeland component makes up 55 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces on sandhills. The parent material consists of sandy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is excessively drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4s. This soil does not meet hydric criteria.

**Component:** Urban land (45%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

**Map Unit:** NaC—Nason silt loam, 6 to 10 percent slopes

**Component:** Nason (100%)

The Nason component makes up 100 percent of the map unit. Slopes are 6 to 10 percent. This component is on hillslopes on uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer, bedrock, paralithic, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 3e. This soil does not meet hydric criteria.

**Map Unit:** NaE—Nason complex, 10 to 30 percent slopes

**Component:** Nason (100%)

The Nason component makes up 100 percent of the map unit. Slopes are 10 to 30 percent. This component is on hillslopes on uplands. The parent material consists of clayey residuum weathered from slate. Depth to a root restrictive layer, bedrock, paralithic, is 40 to 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

**Map Unit:** PeB—Pelion loamy sand, 2 to 6 percent slopes

**Component:** Pelion (90%)

The Pelion component makes up 90 percent of the map unit. Slopes are 2 to 6 percent. This component is on marine terraces on sandhills. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 2e. This soil does not meet hydric criteria.

**Component:** Rains (2%)

Generated brief soil descriptions are created for major components. The Rains soil is a minor component.

**Component:** Johnston (1%)

Generated brief soil descriptions are created for major components. The Johnston soil is a minor component.

**Map Unit:** PeD—Pelion loamy sand, 6 to 15 percent slopes

**Component:** Pelion (100%)

The Pelion component makes up 100 percent of the map unit. Slopes are 6 to 15 percent. This component is on marine terraces on sandhills. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water

saturation is at 12 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria.

**Map Unit:** PnC—Pelion-Urban land complex, 2 to 10 percent slopes

**Component:** Pelion (60%)

The Pelion component makes up 60 percent of the map unit. Slopes are 2 to 10 percent. This component is on marine terraces on sandhills. The parent material consists of loamy marine deposits. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 1 percent. Nonirrigated land capability classification is 4e. This soil does not meet hydric criteria.

**Component:** Urban land (40%)

Generated brief soil descriptions are created for major soil components. The Urban land is a miscellaneous area.

**Map Unit:** W—Water

**Component:** Water (100%)

Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

## 3.7 Data Source Information

**Soil Survey Area:** Richland County, South Carolina

**Survey Area Data:** Version 15, Dec 23, 2013

# 4.0

# Stormwater Analysis

## 4.1 Stormwater Analysis Overview

The hydrologic analysis for this project was performed in accordance with SCDOT's *Requirements for Hydraulic Design Studies*, dated May 26, 2009. This project includes the widening of existing interstate roadway and minor improvements to associated interchange ramps. The proposed construction will not significantly alter or impact existing drainage patterns.

Drainage areas were delineated using survey data provided by both SCDOT & CHE Surveying, USGS Quad maps for Richland County, Google Earth aerial imaging, and field visits to verify offsite flow patterns. The hydrologic methods used to determine peak discharges were selected upon watershed area and consisted of the Rational Method, the modified NRCS WinTR-55 Method, and USGS Regression Equations. Times of concentrations were computed using the SCS methodology outlined in the WinTR-55 manual, with a minimum time of concentration of 5 minutes. SCDOT-published Rainfall Intensity Value Charts for Columbia, SC were used to determine rainfall intensities (in/hr).

Drainage areas, drainage paths, flow lengths, and watercourse slopes were determined using surveyed contours and the USGS 7.5' Quadrangles for Blythewood, Elgin, Fort Jackson North and Messers Pond. Runoff coefficients and Manning's *n* values were estimated from aerial photography. Table 4.1 outlines the hydrologic methods used.

## 4.2 Drainage Design Criteria

| | | | I-77 | SOURCE |
|---|---|---|---|---|
| | | | | Req. For Hydr. Design Studies |
| | | | | Section |
| Hydrologic Method | Drainage Area | 0 - 100 AC | Rational Method | 2.2.15.1 |
| | | 100 AC - 640 AC | NRCS WinTR-55 Method | 2.2.15.2 |
| | | > 640 AC | USGS Regression Equations | 2.2.15.3 |
| Freeboard For Road Subgrades | | | 1' Above Design High-Water Level | 2.2.1 |
| Design Storm | Cross-Line Pipes | | 50 year | 2.2.2 |
| | | | 100 year | |
| | Closed Storm Sewer Systems | 0 - 40 AC | 10 year | 2.2.3 |
| | | 40 - 500 AC | 25 year | |
| | | > 500 AC | 50 year | |
| | Median Overtopping | | 50 year | 2.2.4 |
| Preferred Headwater to Culvert Barrel Height Ratio | | | 1.2 | 2.3 (Step 6, Sec. D, pg. 61) |

## 4.3 Rainfall Depths (SCS Method)

Rainfall depths used in determining peak discharges through the SCS Method were obtained from the South Carolina DHEC Storm Water Management BMP Handbook. The 24-hour storm event rainfall depths for Richland County are shown below.

**Table 4.3: 24-Hour Rainfall Depths for Richland County**

| Return Period (years) | Depth (inches) |
|---|---|
| 1 | 3.1 |
| 2 | 3.6 |
| 5 | 4.5 |
| 10 | 5.3 |
| 25 | 6.4 |
| 50 | 7.3 |
| 100 | 8.3 |

## 4.4 Rainfall Intensity Values (Rational Method)

Coefficients used in the rational method for calculating rainfall intensity values were provided by SCDOT. The coefficients for Columbia are shown below.

TABLE 4.3: RAINFALL INTENSITY COEFFICIENTS

| Frequency (years) | a | b | c |
|---|---|---|---|
| 2 | 244.34492 | 34.95806 | 1.03155 |
| 5 | 258.50572 | 32.75684 | 1.01773 |
| 10 | 267.54247 | 31.39986 | 1.00904 |
| 25 | 279.77346 | 29.59043 | 0.99735 |
| 50 | 288.71309 | 28.26125 | 0.98879 |
| 100 | 296.66217 | 27.04859 | 0.98111 |

The coefficients are utilized in the following equation to calculate rainfall intensities.

Rainfall intensity equation: $i = \frac{a}{(b+tc)^c}$

## 4.5 Zoning Groups of Similar Surface Cover

In determining runoff flows from offsite areas, fully-developed conditions were assumed. A second assumption was that there will be no upstream detention upon development of the offsite areas. This method yields relatively large flows for those basins with substantial offsite areas (Major Basins 1-6).

In order to simulate fully-developed conditions, offsite areas were delineated based on Richland County zoning. Using the Richland County GIS website (http://www.richlandmaps.com/apps/gmap/), zoning maps for the offsite drainage basin areas were developed, scaled and overlaid upon the project survey area in Microstation. For ease of calculations, some zoning districts were assumed to have similar surface cover, and were grouped together accordingly. Those groups are listed below:

**Zoning Group 1**
Residential, Single Family - Medium Density District
Residential, Multi-Family - Medium Density District
Manufactured Home District
Light Industrial District

**Zoning Group 2**
Planned Development District
Residential, Single Family - Low Density District

**Zoning Group 3**
General Commercial District
Heavy Industrial District
Office & Institutional District

**Zoning Group 4**
Traditional Recreation Open Space District
Rural District

Surface cover characteristics were assigned to each of the zoning groups based on district ordinances and on aerial photography of representative developed areas within each group. Areas outside of the zoning groups were assigned surface cover designations based on provided surveys and aerial photography (See Figure 2.2).

## 4.6 Impervious Area by Zoning Group

Basins 2, 4 & 6 were modeled using the urban regression calculations detailed in USGS Water-Resources Investigations Report 92-4040 "Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds." The equations in Table 9 and Supplement A of said report calculate flows based on two parameters: *A* (drainage area, in square miles) and *TIA* (total impervious area, in percent of total drainage area). *TIA* was calculated based on the assigned percentage of impervious area for each zoning group and from the provided surveys. A breakdown of the impervious area assigned to each zoning group is shown below:

**Table 4.6:**

| Zoning Group # | % Impervious Area |
|---|---|
| 1 | 27 |
| 2 | 53 |
| 3 | 68 |
| 4 | 15 |

A breakdown of the composite *TIA* for Basins 2, 4 & 6 can be found in Appendix B.

## 4.7 NRCS Method by Zoning Group

Basins 1, 3, 5 (NRCS Basins) were modeled using the modified NRCS WinTR-55 method. In accordance with NRCS methods, curve numbers (*CN*s) were determined for each drainage basin by delineating areas of different soil type and surface cover, for Pre-Construction conditions and Post-Construction conditions alike.

The soil classifications were determined through maps obtained from the Richland County GIS Website, which were overlaid onto the project area. See Appendix C for soil class delineation maps of the NRCS basins.

Composite *CN*s were calculated for each of the NRCS Basins based on surface cover and soil class. For offsite areas, the zoning groups described earlier were assigned *CN*s for each soil type (see Table 4.7 below).

| | Curve Number per Hydrologic Soil Group | | | |
|---|---|---|---|---|
| Zoning Group # | A | B | C | D |
| 1 | 77 | 85 | 90 | 92 |
| 2 | 57 | 72 | 81 | 86 |
| 3 | 89 | 92 | 94 | 95 |
| 4 | 49 | 69 | 79 | 84 |

**Table 4.7: Curve Number per Zoning Group / Hydrologic Soil Group**

A breakdown of the composite *CN*s for Basins 1, 3, & 5 can be found in Appendix C.

## 4.8 Pre- and Post-Construction Development Analysis

An analysis was performed to evaluate potential peak discharge rate increases of the major basins within the project limits based on Pre- and Post-Construction conditions related to the widening of I-77.

As previously discussed in Section 1, the increase in flow from the project's construction will be nearly negligible. Drainage basin delineation areas and flow paths are not expected to change as a result of this project's construction. The small increases in total impervious area and in composite curve numbers account for the increases in flows from Pre-Construction conditions to Post-Construction conditions.

**Basin 1**
Analysis Point = Outlet OP-0100 (Downstream end of Box Culverts EC-0102, EC-0103, & EC-0211)
I-77 Approx. Sta. 1151+00 RT
(See Plan Sheet 01)

Basin 1 is comprised of land on both sides of I-77 from approximate Sta. 1140+75 (immediately south of the I-77 NB off-ramp to Percival Road) to approximate Sta. 1212+00 (near the I-77 / I-20 interchange). Offsite areas to the east of I-77 generally drain to the southwest towards the Percival Road interchange. Likewise, offsite areas to the west of I-77 generally drain to the southeast towards the Percival Road interchange. The outfall point for Basin 1 is at the downstream end of three box culverts which pass

beneath the Percival Road interchange and terminate to the south of I-77 into an unnamed tributary to Gills Creek.

The total drainage area is approximately 571 acres of roadway and off-site areas. The most remote point in the watershed is approximately 7,975 feet from the outfall. Soils in this watershed are primarily classified as being in hydrologic soil groups A & B, with some D soils.

Peak flows in Basin 1 were estimated using the NRCS Method. The addition of new impervious area to the drainage basin by the construction of the proposed project will increase the Composite Curve Number from 74.02 to 74.14. Table 4.8.1 below shows a summary of Pre-Construction flows versus Post-Construction flows for Basin 1.

| Design Storm Event | Pre-Developed Flows (cfs) | Post-Developed Flows (cfs) | % Increase |
|---|---|---|---|
| 2-Year | 472.17 | 474.75 | 0.55 |
| 5-Year | 729.70 | 732.73 | 0.41 |
| 10-Year | 975.83 | 979.41 | 0.37 |
| 25-Year | 1303.35 | 1306.68 | 0.25 |
| 50-Year | 1587.76 | 1590.90 | 0.20 |
| 100-Year | 1871.84 | 1875.14 | 0.18 |

**Table 4.8.1: Summary of Basin 1 Pre-Construction Flows vs. Post-Construction Flows**

See Appendix C for NRCS Delineation by Zoning Group / Surface Cover, Composite Curve Number, and Peak Flow calculations for Pre-Construction conditions vs. Post-Construction conditions, and for Time of Concentration calculations.

**Basin 2**
Analysis Point = I-77 NB Bridge Over Windsor Lake / Jackson Creek
I-77 Approx. Sta. 1249+00 RT
(See Plan Sheet 08)

Basin 2 is comprised of land to the northeast of I-20 and of I-77, including a large portion of Sesquicentennial State Park. The limits of the basin along I-77 are from approximate Sta. 1212+00 (prior to the I-77 / I-20 interchange) to approximate Sta. 1270+30. Flows generally drain to the west and south via Jackson Creek and its many connected lakes. The analysis point for this basin is the I-77 NB bridge over Windsor Lake / Jackson Creek.

The total drainage area is approximately 3,703 acres of roadway and off-site areas. The most remote point in the watershed is approximately 23,648 feet from the bridge. Soils in this watershed are generally classified as being in hydrologic soil groups A, B, & D.

Peak flows in Basin 2 were estimated using the USGS Rural Regression Equations. Due to construction of the proposed project, the basin's Total Impervious Area percentage will increase from 32.14% to 32.23%. Table 4.8.2 below shows a summary of Pre-Construction flows versus Post-Construction flows for Basin 2.

| Design Storm Event | Pre-Developed Flows (cfs) | Post-Developed Flows (cfs) | % Increase |
|---|---|---|---|
| 2-Year | 1147.79 | 1151.79 | 0.35 |
| 5-Year | 1758.25 | 1764.03 | 0.33 |
| 10-Year | 2178.39 | 2185.20 | 0.31 |
| 25-Year | 2671.44 | 2679.24 | 0.29 |
| 50-Year | 3036.95 | 3045.36 | 0.28 |
| 100-Year | 3409.43 | 3418.34 | 0.26 |

**Table 4.8.2: Summary of Basin 2 Pre-Construction Flows vs. Post-Construction Flows**

See Appendix B for USGS Regression Equation and associated Total Basin Impervious Area calculations for Pre-Construction conditions vs. Post-Construction conditions.

**Basin 3**
Analysis Point = EX-0998 (Inlet of Box Culvert EC-0906)
I-77 Approx. Sta. 1272+60 RT
(See Plan Sheet 09)

Basin 3 is comprised of land to the east of I-77 and to the southeast of Two Notch Road. Runoff from I-77 approximate Sta. 1270+30 to approximate Sta. 1278+50 flows to this basin. Flows generally drain to the southwest in this basin. The analysis point for Basin 3 is the inlet of existing 7.5' x 5' box culvert EC-0906.

The total drainage area is approximately 140 acres of roadway and off-site areas. The most remote point in the watershed is approximately 3,944 feet from the outfall. Soils in this watershed are primarily classified as being in hydrologic soil group B, with some A & D soils.

Peak flows in Basin 3 were estimated using the NRCS Method. The conceptual design files provided by the Department show no new impervious area added within this basin. Thus, the Composite Curve Number remains a constant 80.90, and there is no increase in flows due to construction of the project. Table 4.8.3 below shows a summary of Pre-Construction flows versus Post-Construction flows for Basin 3.

| Design Storm Event | Pre-Developed Flows (cfs) | Post-Developed Flows (cfs) | % Increase |
|---|---|---|---|
| 2-Year | 138.88 | 138.88 | 0.00 |

| | | | |
|---|---|---|---|
| 5-Year | 200.67 | 200.67 | 0.00 |
| 10-Year | 258.88 | 258.88 | 0.00 |
| 25-Year | 333.50 | 333.50 | 0.00 |
| 50-Year | 397.43 | 397.43 | 0.00 |
| 100-Year | 461.14 | 461.14 | 0.00 |

**Table 4.8.3: Summary of Basin 3 Pre-Construction Flows vs. Post-Construction Flows**

See Appendix C for NRCS Delineation by Zoning Group / Surface Cover, Composite Curve Number, and Peak Flow calculations for Pre-Construction conditions vs. Post-Construction conditions, and for Time of Concentration calculations.

**Basin 4**
Analysis Point = I-77 NB Bridge Over Little Jackson Creek
I-77 Approx. Sta. 1329+00
(See Plan Sheet 13)

Basin 4 is comprised of land to the northeast of I-77 roughly between Two-Notch Road and Hard Scrabble Road. A not insignificant offsite land area to the west of the I-77 / I-277 interchange flows into this basin. Drainage patterns generally flow to the west and south via Little Jackson Creek and its many connected lakes. The analysis point for this basin is the I-77 NB bridge over Little Jackson Creek.

The total drainage area is approximately 3,302 acres of roadway and off-site areas. The most remote point in the watershed is approximately 18,647 feet from the outfall. Soils in this watershed are generally classified as being in hydrologic soil groups A, B, & D.

Peak flows in Basin 4 were estimated using the USGS Rural Regression Equations. Due to construction of the proposed project, the basin's Total Impervious Area percentage will increase from 36.84% to 36.90%. Table 4.8.4 below shows a summary of Pre-Construction flows versus Post-Construction flows for Basin 4.

| Design Storm Event | Pre-Developed Flows (cfs) | Post-Developed Flows (cfs) | % Increase |
|---|---|---|---|
| 2-Year | 1241.63 | 1244.30 | 0.21 |
| 5-Year | 1890.95 | 1894.77 | 0.20 |
| 10-Year | 2329.70 | 2334.19 | 0.19 |
| 25-Year | 2834.70 | 2839.80 | 0.18 |
| 50-Year | 3202.79 | 3208.25 | 0.17 |
| 100-Year | 3573.97 | 3579.73 | 0.16 |

**Table 4.8.4: Summary of Basin 4 Pre-Construction Flows vs. Post-Construction Flows**

See Appendix B for USGS Regression Equation and associated Total Basin Impervious Area calculations for Pre-Construction conditions vs. Post-Construction conditions.

**Basin 5**
Analysis Point = EX-1796 (Inlet of Box Culvert EC-1702)
I-77 Approx. Sta. 1407+00 RT
(See Plan Sheet 17)

Basin 5 is comprised of land to the east of I-77 beyond its interchange with Farrow Road. Flows generally drain to the west via Cumbess Creek. Runoff from I-77 collects within this basin from approximate Sta. 1390+15 (just beyond the interchange of I-77 with Farrow Road) to approximate Sta. 1415+90. The analysis point for Basin 5 is the inlet of existing triple 8' x 6' box culvert EC-1702, where Cumbess Creek crosses I-77.

The total drainage area is approximately 431 acres of roadway and off-site areas. The most remote point in the watershed is approximately 6,089 feet from the outfall. Soils in this watershed are generally classified as being in hydrologic soil groups A, B, & D.

Peak flows in Basin 5 were estimated using the NRCS Method. The addition of new impervious area to the drainage basin by the construction of the proposed project will increase the Composite Curve Number from 86.04 to 86.15. Table 4.8.5 below shows a summary of Pre-Construction flows versus Post-Construction flows for Basin 5.

| Design Storm Event | Pre-Developed Flows (cfs) | Post-Developed Flows (cfs) | % Increase |
|---|---|---|---|
| 2-Year | 313.11 | 314.16 | 0.33 |
| 5-Year | 434.06 | 435.20 | 0.26 |
| 10-Year | 547.10 | 548.16 | 0.19 |
| 25-Year | 690.25 | 691.44 | 0.17 |
| 50-Year | 813.19 | 814.31 | 0.14 |
| 100-Year | 934.74 | 935.88 | 0.12 |

**Table 4.8.5: Summary of Basin 5 Pre-Construction Flows vs. Post-Construction Flows**

See Appendix C for NRCS Delineation by Zoning Group / Surface Cover, Composite Curve Number, and Peak Flow calculations for Pre-Construction conditions vs. Post-Construction conditions, and for Time of Concentration calculations.

**Basin 6**
Analysis Point = EX-2196 (Inlet of Box Culvert EC-2105)
I-77 Approx. Sta. 1469+50 RT
(See Plan Sheet 21)

Basin 6 is comprised of a large swath of land to the east of I-77 within the watershed of Crane Creek. Drainage patterns within this basin generally flow to the west via Crane Creek and its many lakes. Runoff from I-77 flows into Basin 6 from approximate Sta. 1459+20 to approximate Sta. 1475+45. The analysis

point for Basin 6 is the inlet of existing triple 12' x 12' box culvert EC-2105, where Crane Creek crosses I-77.

The total drainage area is approximately 7,125 acres of roadway and off-site areas. The most remote point in the watershed is approximately 27,915 feet from the outfall. Soils in this watershed are primarily classified as being in hydrologic soil groups A, B, & D, with some type C soils.

Peak flows in Basin 6 were estimated using the USGS Rural Regression Equations. The conceptual design files provided by the Department show a relatively infinitesimal increase in impervious area within this basin, with the basin's Total Impervious Area percentage increasing from 38.4776% to 38.4777%. This results in negligible increases in flow as a result of this project's construction. Table 4.8.6 below shows a summary of Pre-Construction flows versus Post-Construction flows for Basin 6.

| Design Storm Event | Pre-Developed Flows (cfs) | Post-Developed Flows (cfs) | % Increase |
|---|---|---|---|
| 2-Year | 2411.48 | 2411.48 | 0.00 |
| 5-Year | 3567.47 | 3567.48 | 0.00 |
| 10-Year | 4328.86 | 4328.88 | 0.00 |
| 25-Year | 5170.91 | 5170.92 | 0.00 |
| 50-Year | 5780.89 | 5780.90 | 0.00 |
| 100-Year | 6371.93 | 6371.94 | 0.00 |

**Table 4.8.6: Summary of Basin 6 Pre-Construction Flows vs. Post-Construction Flows**

See Appendix B for USGS Regression Equation and associated Total Basin Impervious Area calculations for Pre-Construction conditions vs. Post-Construction conditions.

## 4.9 Existing Cross-Line Culvert Analysis

HY-8 version 7.2 (build date January 17, 2012) was used to analyze the headwaters at existing box culverts and open-ended pipe culverts. Culvert analyses were based on a maximum 1.2 headwater to depth (HW/D) ratio for the 50-year rainfall event.

For those box culverts which connect to a downstream structure, tailwater elevations were estimated as the elevation of the normal depth in the pipe immediately prior to the downstream structure. Normal depth of flow in these cases was estimated using the FHWA Hydraulic Toolbox 2.1. For those pipes which connect to a downstream structure, tailwater elevation was assumed as the soffit elevation of the pipe at the downstream structure.

For those culverts that did not connect to a downstream structure but rather outfall into a stream or ditch, the outfall characteristics were used for tailwater elevation estimation. A Manning's "n" value of 0.04 was used for the outfall ditches.

The geometries of the existing inlet openings and head walls were measured in the field and applied accordingly in the HY-8 program.

The analysis results for each culvert opening are listed in Table 4.9 below.

| I-77 Station | Pipe ID | Basin | Culvert Shape | Diam-eter (ft) | Span (ft) | Rise (ft) | 50-yr HW / D | Over-topping Elev. (ft) | 50-yr HW Elev. (ft.) | 100-yr HW Elev. (ft.) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1168+32 | EC-0102 | EX-0399 | Box | | 6 | 6 | 1.41 | 255.00 | 244.55 | 247.99 |
| 1172+32 | EC-0211 | EX-0308 | Box | | 8 | 6 | 0.79 | 256.00 | 249.73 | 251.31 |
| 1272+60 | EC-0906 | EX-0998 (3) | Box | | 7.5 | 5 | 1.53 | 254.00 | 249.52 | 250.79 |
| 1279+53 | EP-0908 | EX-0993 | Circ. | 3 | | | 1.79 | 259.00 | 253.79 | 254.33 |
| 1342+08 | EP-1303 | EX-1395 | Circ. | 1.5 | | | 1.76 | 259.00 | 257.74 | 258.05 |
| 1360+01 | EC-1407 | EX-1491 | Box | | 6 | 5 | 0.58 | 284.00 | 271.78 | 271.94 |
| 1369+17 | EC-1503 | EX-1597 | Box | | 4 | 4 | 0.88 | 303.50 | 295.47 | 295.68 |
| 1395+12 | EP-1799 | EX-1798 | Circ. | 2 | | | 0.93 | 316.80 | 315.35 | 315.46 |
| 1407+01 | EC-1702 | EX-1796 (5) | Box | | 8 | 6 | 0.89 | 308.50 | 291.32 | 291.84 |
| 1424+12 | EP-1804 | EX-1894 | Circ. | 2.5 | | | 2.08 | 312.50 | 312.53 | 312.57 |
| 1434+60 | EP-1999 | EX-1997 | Circ. | 2 | | | 0.91 | 321.50 | 319.71 | 319.80 |
| 1434+63 | EP-1998 | EX-1996 | Circ. | 2.5 | | | 1.33 | 321.50 | 321.23 | 321.51 |
| 1458+57 | EP-2101 | EX-2198 | Circ. | 3 | | | 1.45 | 310.80 | 308.56 | 308.94 |
| 1469+54 | EC-2103 | EX-2196 (6) | Box | | 12 | 12 | 1.26 | 292.50 | 274.82 | 276.19 |

**Table 4.9: HY-8 Results for Existing Open-Ended Pipes & Box Culverts**

As can be seen in the table above, Culverts EC-0102, EC-0906, EP-0908, EP-1303, EP-1804, EP-1998, EP-2101, & EC-2103 have headwater to depth (HW/D) ratios for the 50-year event that are above the maximum design standard of 1.2. Construction of this project, however, will not affect upstream headwater elevations significantly, and will not have a detrimental effect on upstream properties.

There are potential subgrade issues with freeboard at the inlets of Culverts EP-1303, EP-1709, EP-1999 & EP-1998, and overtopping concerns with EP-1804 & EP-1998. These culverts may need abandoning and replacement.

More detailed HY-8 analysis results can be found in Appendix D.

## 4.10 Existing Closed Drainage System Analysis

Existing storm drainage systems were analyzed using GEOPak Drainage. The 10-year design storm was used to analyze all storm drainage systems whose elevations were known or which could be reasonably estimated. GEOPak Drainage Area, Link and Node calculations can be found in Appendix E.

Based on preliminary analysis, some of the pipes are flowing at greater than 94% flow depth for the 10-year storm event.

Median ditch inlets located in sag areas were analyzed for the 50-year storm event to determine if there were hydraulic gradeline blowouts that would overtop the roadway shoulder. Table 4.10 lists the sag inlets, the 10-year and 50-year storm event hydraulic gradeline elevations, and the highway shoulder elevation at the inlet.

| Inlet ID | 10-Year Upstream Hydraulic Gradeline Elevation (ft) | 50-Year Upstream Hydraulic Gradeline Elevation (ft) | Highway Shoulder Elevation (ft) |
|---|---|---|---|
| EX-0302 | 254.58 | 259.39 | 256.50 |
| EX-0601 | 334.42 | 334.74 | 338.50 |
| EX-0605 | 319.37 | 320.33 | 323.00 |
| EX-0701 | 276.03 | 277.62 | 280.00 |
| EX-0702 | 242.17 | 243.60 | 245.75 |
| EX-0801 | 239.48 | 242.54 | 242.90 |
| EX-0803 | 244.59 | 245.48 | 249.00 |
| EX-0901 | 248.42 | 249.45 | 254.50 |
| EX-1202 | 247.59 | 248.05 | 253.90 |
| EX-1301 | 251.94 | 252.50 | 256.00 |
| EX-1501 | 283.87 | 284.94 | 290.50 |
| EX-1801 | 302.58 | 304.11 | 309.00 |
| EX-2102 | 287.04 | 291.91 | 291.70 |

**Table 4.10: Summary of 10-Year & 50-Year Storm Events HGL Elevations at Median Sag Inlet Locations**

Inlets EX-0302 and EX-2102 are showing to overtopping of the shoulder during the 50-year storm event. These locations also have possible hydraulic gradeline concerns during the 10-year storm event. These inlets could have potential freeboard issues regarding the subgrade.

While it is expected that water at inlet EX-0801 would overtop the median embankment at the bridge instead of overtopping the shoulder, the hydraulic gradeline during the 50-year storm event is a concern. There could be potential freeboard issues at the subgrade in the vicinity of this inlet.

Existing median inlets were also visually inspected at the surface level for structural integrity. The inlets were all Type 112, and most appeared to be in good condition. Those inlets found to have structural or other concerns are listed below.

Median Inlet EX-0801
I-77 Sta. 1252+01 (See Plan Sheet 8)
The surrounding ground adjacent to EX-0801 appears to have sunken in to roughly 4” to 6” below the rim of the inlet. No evidence of this issue was found in the video survey inspection (detailed in the next section) of connecting existing pipe EP-0801, which was in good condition.

If this inlet is to be retained, the existing ground should be brought up to the rim elevation in order to reduce ponding. A paved apron could also be installed at this inlet.

**EX-0801**

Median Inlet EX-0901
I-77 Sta. 1270+50 (See Plan Sheet 9)
The paved apron for EX-0901 has some minor cracking. If this inlet is retained, the apron should be repaired or replaced.

**EX-0901**

Median Inlet EX-1404
I-77 Sta. 1355+38 (See Plan Sheet 14)

A severe collapse of the paved apron and subgrade has occurred at EX-1404, and a large cavity is visible adjacent to the box. No evidence of this issue was found in the video survey inspection of connecting existing pipes EP-1404 & EP-1405, which were in good condition at the inlet. In the video inspection of EP-1406, it appears that the first segment of pipe (upstream from the inlet) is slightly offset from the second segment. This offset appears to be related to the apron collapse.

If this inlet is to be retained, the subgrade adjacent to the box should be excavated and replaced, and the paved apron should be removed and replaced. The pipe video inventory survey detailed in the next section contains recommendations for the connecting pipe.

**EX-1404**

Median Inlet EX-1501
I-77 Sta. 1362+46 (See Plan Sheet 15)
The paved apron of EX-1501 has a significant hole in its northeast corner, where the subgrade has apparently collapsed. No evidence of this issue was found in the video survey of connecting existing pipe EP-1501, which was in good condition.

If this inlet is to be retained, the subgrade adjacent to the box should be excavated and replaced, and the paved apron should be removed and replaced, at least in the northeast corner where the hole was found.

**EX-1501**

Median Inlet EX-1607
I-77 Sta. 1383+64 (See Plan Sheet 16)
There has been significant vegetative growth adjacent to EX-1607 that could possibly impede flow to the inlet. In the pipe video survey, major root issues were found in connecting existing pipes EP-1608 & EP-1609 on either side of the box.

If this inlet is to be retained, the area adjacent to the inlet should be cleared and grubbed. A paved apron could also be installed at this inlet. The pipe video inventory survey detailed in the next section contains recommendations for the connecting pipes.

**EX-1607**

Median Inlet EX-1701
I-77 Sta. 1399+91 (See Plan Sheet 17)

A significant collapse of the paved apron and subgrade has occurred at EX-1404. No evidence of this issue was found in the video survey inspection of connecting existing pipe EP-1701, which was in good condition at the inlet.

If this inlet is to be retained, the subgrade adjacent to the box should be excavated and replaced, and the paved apron should be removed and replaced.

**EX-1701**

## 4.11 Video Inventory Survey of Existing Pipes & Culverts

AET Robotic Inspection Services performed a video inventory survey of all accessible pipes which crossed I-77 or crossed any of the associated ramps. Evaluations and recommendations are based on visual review of the videos. A detailed structural inspection has not been performed. The findings of the survey and subsequent evaluations are listed in Table 4.11 below:

See Appendix F for reports of individual pipes.

| File No. | Pipe ID | I-77 Station | Pipe / Culvert Type | Measured Footage (ft) | Evaluation of Pipe |
|---|---|---|---|---|---|
| | EC-0102 | 1152+00 | 6' x 6' Conc. Box Culvert | 1660 | Patch cracks in culvert (approximately 94 locations). |
| | EC-0103 | 1152+00 | 6' x 6' Conc. Box Culvert | 596 | Clean sediment buildup throughout. Patch cracks in culvert (approximately 17 locations). |
| | EC-0211 | 1152+00 | 8' x 6' Conc. Box Culvert | 2087 | Headwall in good condition. Patch cracks in culvert (approximately 140 locations). Clean sediment buildup from 2080' to end. |
| | EP-0302 | 1173+55 | 18" RCP | 153.1 | If existing pipe is to remain, repair last joint located 8' prior to downstream end. Preliminary hydro analysis indicates that additional capacity may be needed at this location. |

| | | | | | |
|---|---|---|---|---|---|
| | EP-0305 | 1181+00 | 18" RCP | 124.3 | Pipe in good condition. |
| | EP-0306 | 1187+35 | 48" RCP | 673.3 | Pipe in good condition. |
| | EP-0401 | 1187+80 | 24" RCP | 79.7 | Remove root issue at first joint 5' from downstream end. |
| | EP-0402 | 1192+50 | 42" RCP | 512.9 | Remove medium root issue at joint approx. 323' from downstream end. Remove and replace cracked pipe from approx. 387'-403' from downstream end. |
| | EP-0403 | 1187+65 | 18" RCP | 101.9 | Pipe in good condition. |
| | EP-0404 | 1201+10 | 42" RCP | 376.7 | Slip line existing pipe due to joint deficiencies and minor root issues. |
| | EP-0405 | 1198+00 | 18" RCP | 133.4 | Pipe in good condition. |
| | EP-0406 | 1198+60 | 18" RCP | 136.9 | Repair first joint of existing pipe 8' from upstream end. |
| | EP-0407 | 1192+85 | 18" RCP | 111.4 | 8' of existing pipe prior to downstream end shall be replaced. |
| | EP-0408 | 1197+40 | 42" RCP | 492.6 | Slip line existing pipe due to joint deficiencies and minor root issues. |
| | EP-0503 | 1204+40 | 42" RCP | 332 | Slip line existing pipe due to joint deficiencies. |
| | EP-0504 | 1204+25 | 36" RCP | 30.9 | Pipe in good condition. |
| | EP-0505 | 1204+70 | 24" RCP | 85.3 | Slip line existing pipe due to cracks and joint separations. |
| | EP-0506 | 1205+05 | 18" RCP | 107 | Pipe in good condition. |
| | EP-0507 | 1206+10 | 18" RCP | 129.9 | Pipe in good condition. |
| | EP-0508 | 1205+90 | 18" RCP | 68.5 | Pipe in good condition. Clean debris from both ends. |
| | EP-0613 | 1229+50 | 18" RCP | 101.2 | Replace existing pipe section between approx. 23' and 31' from upstream end and repair separated/broken joint at approx. 88' from upstream end. |
| | EP-0614 | 1230+00 | 18" RCP | 69.3 | Pipe in good condition. |
| | EP-0701 | 1236+00 | 18" RCP | 195.6 | Slip line existing pipe due to joint deficiencies and cracks |
| | EP-0702 | 1246+60 | 18" RCP | 104.1 | 76' of existing pipe prior to outlet shall be replaced due to cracks in pipe and major joint separations. |
| | EP-0801 | 1252+00 | 18" RCP | 180 | Pipe in good condition. |
| | EP-0802 | 1253+25 | 24" RCP | 242.8 | Slip line existing pipe due to joint separations. |
| | EP-0803 | 1261+45 | 18" RCP | 199.2 | Pipe in good condition. Clean out. |
| | EP-0901 | 1270+50 | 18" RCP | 167.7 | 8' of existing pipe prior to outlet shall be replaced due to cracked pipe with hole in it. |
| | EC-0906 | 1273+15 | 7.5' x 5' Conc. Box Culvert | 240 | Patch cracks in culvert (approximately 13 locations). |
| | EP-1002 | 1286+60 | 30" RCP | 367.3 | Pipe in good condition. |
| | EP-1003 | 1286+45 | 24" RCP | 84.9 | Pipe in good condition. |
| | EP-1004 | 1286+35 | 24" RCP | 84.8 | Pipe in good condition. |
| | EP-1005 | 1286+40 | 24" RCP | 62.2 | Pipe in good condition. |

| | | | | | |
|---|---|---|---|---|---|
| | EP-1006 | 1289+60 | 24" RCP | 305 | Replace first 32' of existing pipe from upstream end due to root issues and broken pipe. |
| | EP-1007 | 1290+50 | 18" RCP | 108 | Pipe in good condition. |
| | EP-1008 | 1290+05 | 18" RCP | 99.5 | Pipe in good condition. |
| | EP-1010 | 1283+70 | 30" RCP | 384.5 | Clean out. |
| | EP-1101 | 1297+50 | 18" RCP | 97.7 | Slip line existing pipe due to joint separations. |
| | EP-1102 | 1297+50 | 24" RCP | 91.3 | Pipe in good condition. |
| | EP-1103 | 1296+55 | 18" RCP | 16.8 | 20' of existing pipe from upstream end shall be replaced due to collapse and deficiencies. Clean pipe. |
| | EP-1104 | 1297+45 | 24" RCP | 111.7 | Replace pipe due to cracks, major root issues, and joint separations. |
| | EP-1105 | 1298+55 | 24" RCP | 65.8 | Replace pipe due to joint deficiencies and major root issues. |
| | EP-1106 | 1299+15 | 24" RCP | 53.9 | Pipe in good condition. Clean downstream pipe end and drop inlet. |
| | EP-1111 | 1304+40 | 24" RCP | 266.9 | Pipe in good condition. |
| | EP-1114 | 1303+60 | 24" RCP | 312.6 | Pipe in good condition. |
| | EP-1201 | 1320+10 | 24" RCP | 108.2 | Clean out. |
| | EP-1202 | 1320+00 | 18" RCP | 110.5 | Pipe in good condition. |
| | EP-1203 | 1323+40 | 36" RCP | 686 | Pipe in good condition. |
| | EP-1204 | 1327+70 | 36" RCP | 93.4 | Slip line existing pipe due to joint deficiencies. |
| | EP-1301 | 1332+20 | 24" RCP | 171.5 | Pipe in good condition. |
| | EP-1302 | 1341+90 | 24" RCP | 116.1 | Pipe in good condition. |
| | EP-1303 | 1342+10 | 18" RCP | 115.8 | If retained, clean pipe (large debris item near 75' from upstream end). Preliminary hydro analysis indicates that additional capacity may be needed at this location. |
| | EP-1401 | 1350+05 | 18" RCP | 264.6 | Pipe in good condition. |
| | EP-1402 | 1352+05 | 18" RCP | 224.7 | Pipe in good condition. |
| | EP-1403 | 1353+85 | 30" RCP | 127.8 | Pipe in good condition. |
| | EP-1404 | 1355+00 | 30" RCP | 101.6 | Pipe in good condition. |
| | EP-1405 | 1355+40 | 36" RCP | 187.8 | Clean out. |
| | EP-1406 | 1357+50 | 24" RCP | 363.4 | Replace first section of pipe due to major joint offset. Pipe in good condition otherwise. Clean out. |
| | EC-1407 | 1358+00 | 6' x 5' Conc. Box Culvert | 440 | Headwalls in good condition. Patch cracks in culvert (approximately 35 locations). Clean downstream sediment buildup. |
| | EP-1408 | 1357+85 | 18" RCP | 180.5 | Slip line existing pipe due to joint deficiencies and major root issues. |
| | EP-1409 | 1358+25 | 18" RCP | 214.8 | Slip line existing pipe due to joint separations. |
| | EP-1501 | 1362+45 | 18" RCP | 136.7 | Pipe in good condition. |
| | EC-1503 | 1366+80 | 4' x 4' Conc. Box Culvert | 680.5 | Patch cracks in culvert (approximately 41 locations). Repair connection with EP-1599 at approx. 385' from downstream end. |

| | | | | | |
|---|---|---|---|---|---|
| | EP-1506 | 1372+00 | 18" RCP | 134.5 | Pipe in good condition. |
| | EP-1507 | 1372+00 | 18" RCP | 51.1 | Pipe in good condition. |
| | EP-1601 | 1379+80 | 18" RCP | 35.9 | Pipe in good condition. Clean debris from pipe and box catch basin at upstream end. |
| | EP-1602 | 1379+80 | 18" RCP | 106.2 | Remove root issues at first joint approx. 8' from downstream end and second joint approx. 16' from downstream end. Clean pipe. |
| | EP-1603 | 1379+85 | 18" RCP | 121.9 | Pipe in good condition. |
| | EP-1604 | 1379+85 | 24" RCP | 50.1 | Pipe in good condition. |
| | EP-1606 | 1383+85 | 30" RCP | 400.6 | Pipe in good condition. |
| | EP-1607 | 1383+45 | 18" RCP | 39.8 | Slip line existing pipe due to joint separations. |
| | EP-1608 | 1383+50 | 18" RCP | 105.4 | Remove and replace pipe 13' from downstream end to repair major root issues in joints. Clean pipe. |
| | EP-1609 | 1383+65 | 18" RCP | 122.1 | Remove and replace pipe between 30' from upstream end to repair major root issues in joints. Clean pipe. |
| | EP-1610 | 1383+80 | 24" RCP | 53.5 | Pipe in good condition. |
| | EP-1701 | 1399+90 | 18" RCP | 171 | 10' of existing pipe prior to downstream end shall be replaced due to joint separations and offsets. |
| | EC-1702 | 1407+70 | 8' x 6' Conc. Box Culvert | 280 | Headwall in good condition. From upstream end, repair top of culvert where square block of concrete is giving way at approx. 70'. Patch cracks in culvert (approximately 6 locations). |
| | EC-1703 | 1407+70 | 8' x 6' Conc. Box Culvert | 280 | Headwalls in good condition. Patch cracks in culvert (approximately 8 locations). |
| | EC-1704 | 1407+70 | 8' x 6' Conc. Box Culvert | 280 | Headwalls in good condition. Patch cracks in culvert (approximately 4 locations). Clean sediment buildup at downstream end. |
| | EP-1801 | 1416+20 | 24" RCP | 147.9 | Pipe in good condition. Clean pipe. Standing water and sediment in pipe from outfall OP-1896 silting in. |
| | EP-1802 | 1416+50 | 24" RCP | 115.5 | Repair joint separations at approx. 16' and 24' from upstream end. |
| | EP-1803 | 1423+70 | 30" RCP | 154.5 | Pipe in good condition. Clean pipe. Standing water and sediment in pipe from outfall OP-1895 silting in. |
| | EP-1804 | 1424+10 | 30" RCP | 122.2 | Pipe in good condition. Preliminary hydro analysis indicates that additional capacity may be needed at this location. |
| | EP-1806 | 1410+75 | 24" RCP | 130.4 | Pipe in good condition. |
| | EP-2101 | 1458+55 | 36" RCP | 133.7 | Pipe in good condition. Preliminary hydro analysis indicates that additional capacity may be needed at this location. |
| | EP-2102 | 1459+00 | 36" RCP | 101.4 | Pipe in good condition. If retained, clean pipe. Standing water and sediment in pipe from outfall OP-2199 silting in. Preliminary hydro analysis indicates that additional capacity may be needed at this location. |

| | | | | | |
|---|---|---|---|---|---|
| | EC-2103 | 1468+95 | 12' x 12' Conc. Box Culvert | 288 | Headwall in good condition. Patch cracks in culvert (approximately 6 locations). |
| | EP-2104 | 1471+90 | 18" RCP | 156.2 | Repair joint separations at approx. 4' and 12' from downstream end. |
| | EC-2105 | 1468+95 | 12' x 12' Conc. Box Culvert | 288 | Headwall in good condition. Patch cracks in culvert (approximately 9 locations). |
| | EC-2106 | 1468+95 | 12' x 12' Conc. Box Culvert | 288 | Headwall in good condition. Patch cracks in culvert (approximately 7 locations). Clean sediment buildup throughout culvert. |
| | EP-2201 | 1475+65 | 24" RCP | 159.2 | Pipe in good condition. |
| | EP-2202 | 1476+70 | 24" RCP | 152.2 | Pipe in good condition. |
| | EP-2203 | 1485+00 | 36" RCP | 145.8 | Pipe in good condition. |
| | EP-2204 | 1485+95 | 36" RCP | 138.9 | Pipe in good condition. Large HDPE pipe debris inside of drop inlet EX-2204 and upstream end of EP-2204. If retained, clean entire pipe of sediment and debris. |
| | EP-2301 | 1500+90 | 24" RCP | 43.5 | Pipe in good condition. Clean pipe. Standing water and sediment in pipe from outfall OP-2399 silting in. |
| | EP-2303 | 1503+95 | 18" RCP | 142.3 | 8' of existing pipe prior to outlet shall be replaced due to collapse. Slip line existing pipe due to joint separations and deficiencies. |
| | EP-2403 | 1499+95 | 24" RCP | 21.3 | Pipe in good condition. Clean pipe. Standing water in pipe. |
| | EP-2404 | 1522+40 | 18" RCP | 61.7 | Remove and replace last segment of pipe at downstream end to repair major root issues in joint. |

**Table 4.11 Pipe Video Inventory Survey Results / Evaluation**

## 4.12 Existing Outfalls

Existing pipe outfalls were inspected in the field. Most of the outfalls were clear of debris.

The following outfalls will some amount of need cleaning / clearing:

OP-0100 (Outfall of existing 8’ x 6’ concrete box culvert EC-0211)
Approx. Sta. 1151+85, Offset 188’ RT

The inlet of box culvert EC-0211 is adjacent to the WB Percival Road ramp onto I-77 NB. This culvert and two others (EC-0102 & EC-0103) outfall at OP-0100 into an unnamed tributary of Gill’s Creek to the south of the interchange. At the time of a field visit, the existing outfall beyond the culvert was clear, but the box itself had accumulated sediment for approximately 75’ into the culvert, and should be cleaned out as noted in the previous section.

**OP-0100**

OP-0286 (Outfall of existing 18" RCP EP-0289)
Approx. Sta. 1167+30, Offset 146' RT

EP-0289 crosses the I-77 NB off-ramp loop to WB Percival Road. At the time of the field visit, the end of the pipe was buried. The outfall should be excavated for several feet to ensure positive drainage from the pipe. There are no concerns associated with right-of-way for this outfall as it is located within the interchange loop.

**OP-0286**

OP-0394 (Outfall of existing 48” RCP EP-0303)
Approx. Sta. 1177+35, Offset 118’ LT

EP-0303 parallels I-77 SB and outfalls approximately 200' after the beginning of the taper for the Percival Road exit. At the time of the field visit, standing water was observed. The existing ditch that parallels I-77 SB, into which EP-0303 outfalls, should be cleared of debris as necessary to restore downstream flow. There should not be any right-of-way issues associated with clearing the ditch.

**OP-0394**

OP-0398 (Outfall of existing 18” RCP EP-0301)
Approx. Sta. 1171+30, Offset 200’ RT

EP-0301 crosses the WB Percival Road ramp onto I-77 NB and outfalls just to the southeast of EX-0308 (inlet of EC-0211). At the time of the field visit, the pipe was mostly buried and the outfall ditch was covered in vegetation. The outfall should be excavated and cleared of debris for several feet to ensure positive drainage from the pipe. Right-of-way issues may exist downstream of this outfall.

**OP-0398**

OP-0683 (Outfall of existing 18” RCP EP-0612)
Approx. Sta. 1224+45, Offset 115’ RT

EP-0612 parallels the loop ramp from I-20 WB / Alpine Road onto I-77 SB beneath the I-77 NB bridge overpass. The outfall was not located in the field and is assumed to be buried. The outfall needs to be located. If the outfall location is where the asbuilts imply, the outfall should be excavated to ensure positive drainage. There are no concerns with right-of-way for this outfall as it is located well within the interchange.

**OP-0683 (not located, assumed as buried)**

OP-0798 (Outfall of existing 18” RCP EP-0702)
Approx. Sta. 1246+60, Offset 155’ RT

EP-0702 crosses I-77 NB approximately 50' before the I-77 bridge over Windsor Lake. The pipe has collapsed, and therefore the outfall was not located. The pipe should be replaced due to the collapse and other issues found during the video inspection. There should not be any right-of-way issues associated with the pipe replacement.

**OP-0798 (not located, collapsed)**

OP-0897 (Outfall of existing 18” RCP EP-0803)
Approx. Sta. 1259+70, Offset 93’ RT

EP-0803 crosses I-77 NB approximately 1,000' after the I-77 bridge over Windsor Lake. At the time of the field visit, the existing concrete channel downstream of the outfall had accumulated sediment, causing water to pond. The concrete channel should be cleaned for approximately 470’. There should not be any right-of-way issues associated with clearing the channel.

**OP-0897**

OP-0995 (Outfall of existing 36” RCP EP-0907)
Approx. Sta. 1278+00, Offset 119’ LT

EP-0907 crosses I-77 SB approximately 500' before the Trenholm Road bridge over I-77. At the time of the field visit, the pipe outfall and associated ditch were fill with vegetation and debris and will require cleaning. The ditch should be cleared and re-excavated to the edge of the right-of-way.

**OP-0995**

OP-0999 (Outfall of existing 18” RCP EP-0901)
Approx. Sta. 1271+65, Offset 118’ LT

EP-0901 crosses I-77 SB approximately 1,250' before the Trenholm Road bridge over I-77. At the time of the field visit, standing water was observed. The pipe outfall and associated ditch were partially silted in and will require cleaning. The ditch should be cleared and re-excavated to the edge of the right-of-way.

**OP-0999**

OP-1010 (Outfall of existing 30” RCP EP-1010)
Approx. Sta. 1281+80, Offset 117’ LT

EP-1010 parallels I-77 SB beneath the Trenholm Road bridge overpass and outfalls approximately 75’ south of the bridge. At the time of the field visit, the pipe outfall and associated ditch were partially silted in and had accumulated debris. Cleaning will be required and re-excavate the ditch as necessary. Clearing can take place within the existing right-of-way.

**OP-1010**

OP-1396 (Outfall of existing 24” RCP EP-1301)
Approx. Sta. 1332+10, Offset 166’ RT

EP-1301 crosses I-77 NB approximately 50' after the I-77 bridge over Little Jackson Creek / Edgewater Drive. At the time of the field visit, a tree was growing immediately downstream of the outfall. This tree should be removed to prevent future damage and/or blockage to the pipe. There should not be any right-of-way issues associated with removing the tree.

**OP-1396**

OP-1499 (Outfall of existing 18” RCP EP-1401)
Approx. Sta. 1347+75, Offset 134’ LT

EP-1401 crosses I-77 SB in the merging lane from the EB Farrow Road onramp. At the time of the field visit, the outfall ditch for the pipe was overgrown with vegetation and will need to be cleared to re-establish positive drainage from the outfall. Clearing can take place within the existing right-of-way.

**OP-1499**

OP-1598 (Outfall of existing 4’ x 4’ concrete box culvert EC-1503)
Approx. Sta. 1364+80, Offset 129’ RT

EC-1503 outfalls between I-77 NB and the ramp from SC-277 EB. At the time of the field visit, debris had collected at the baffles along the concrete outlet apron of this box culvert and could further accumulate to impede flow. The baffles should be cleared of debris. This outfall is within the I-77 / SC-277 interchange area, and all clearing can take place within the existing right-of-way.

**OP-1598**

OP-1699 (Outfall of existing 36” RCP EP-1605)
Approx. Sta. 1379+05, Offset 263’ RT

There is some uncertainty regarding the location of this outfall. EP-1605 is assumed to cross under Legrand Road approximately 100' after the railroad bridge over I-77. It was not located in the field and is assumed to be buried. The outfall needs to be located. If the outfall location is where assumed, the outfall should be excavated to ensure positive drainage. Right-of-way issues may exist near this outfall.

**OP-1698 (not located, assumed as buried)**

OP-1799 (Outfall of existing 24” RCP EP-1799)
Approx. Sta. 1396+05, Offset 201’ RT

EP-1799 crosses the ramp from Farrow Road to I-77 NB. At the time of the field visit, the end of the pipe was partially buried and the outfall ditch was silted in. The ditch should be excavated for approximately 25’ between the pipe end and the concrete lined channel downstream. There should not be any right-of-way issues associated with clearing the ditch.

**OP-1799**

OP-1895 (Outfall of existing 30” RCP EP-1803)
Approx. Sta. 1423+20, Offset 148’ LT

EP-1803 crosses I-77 SB approximately 1,050' before the Hard Scrabble Road bridge over I-77. At the time of the field visit, the outfall was silted in and retaining water at the pipe end. The outfall ditch should be excavated for approximately 20’ between the pipe end and the receiving ditch downstream. There should not be any right-of-way issues associated with clearing the ditch.

**OP-1895**

OP-1896 (Outfall of existing 24” RCP EP-1801)
Approx. Sta. 1451+70, Offset 170’ LT

EP-1801 crosses I-77 SB approximately 1,800' before the Hard Scrabble Road bridge over I-77. At the time of the field visit, the outfall ditch was silted in and retaining water at the pipe end. The outfall should be excavated to ensure positive drainage from the pipe. The pipe outfall is located only a couple of feet from right-of-way and permissions may be needed for excavation.

**OP-1896**

OP-1998 (Outfall of existing 30” RCP EP-1998)
Approx. Sta. 1433+15, Offset 123’ RT

EP-1998 parallels I-77 NB beneath the Hard Scrabble Road overpass and outfalls approximately 75' south of the bridge. At the time of the field visit, the outfall ditch was filled with debris and needs to be cleaned to promote positive drainage. Right-of-way is not an issue in this area.

**OP-1998**

OP-1999 (Outfall of existing 24” RCP EP-1999)
Approx. Sta. 1433+10, Offset 121’ LT

EP-1999 parallels I-77 SB beneath the Hard Scrabble Road overpass and outfalls approximately 75' south of the bridge. At the time of the field visit, the pipe was partially buried and the outfall ditch was covered in vegetation and debris. The outfall should be excavated and cleared of debris to ensure positive drainage from the pipe. Right-of-way is not an issue in this area.

**OP-1999**

OP-2199 (Outfall of existing 36” RCP EP-2102)
Approx. Sta. 1459+55, Offset 162’ LT

EP-2102 crosses I-77 SB approximately 2,550' after the Hard Scrabble Road bridge over I-77. At the time of the field visit, standing water was observed. The outfall was partially buried and the downstream channel was filled with silt. The outfall needs to be excavated to ensure positive drainage. Right-of-way issues may exist downstream of this outfall.

**OP-2199**

OP-2298 (Outfall of existing 36” RCP EP-2203)
Approx. Sta. 1459+55, Offset 162’ LT

EP-2203 crosses I-77 SB approximately 2,650' before the Killian Road bridge over I-77. At the time of the field visit, the outfall was slightly silted in with minimal positive drainage. The outfall ditch should be excavated as necessary to restore downstream flow. Right-of-way may be a concern if excavation occurs for several feet.

**OP-2298**

OP-2299 (Outfall of existing 24” RCP EP-2201)
Approx. Sta. 1474+60, Offset 114’ LT

EP-2201 crosses I-77 SB approximately 3,600' before the Killian Road bridge over I-77. A fallen tree limb is currently draped over the outfall ditch of this pipe. While it is not currently impeding flow, it should be cleared from the outfall. Clearing can take place within the existing right-of-way.

**OP-2299**

OP-2396 (Outfall of existing 18" RCP EP-2305)
Approx. Sta. 1505+50, Offset 310' LT

EP-2305 crosses the onramp from Killian Road to I-77 SB, approximately 570' before Killian Road bridge. At the time of the field visit, standing water was observed and the downstream channel was silted and established with grass. The channel should be excavated for several feet to restore downstream flow. There are no concerns associated with right-of-way in this area.

**OP-2396**

OP-2397 (Outfall of existing 18" RCP EP-2303)
Approx. Sta. 1503+15, Offset 239' LT

EP-2303 crosses the onramp from Killian Road to I-77 SB, approximately 800' before Killian Road bridge. At the time of the field visit, standing water was observed and the downstream channel was silted and filled with vegetation. In addition, the pipe end is slightly damaged. The outfall should be excavated for to restore positive drainage and the last pipe joint may need to be repaired or replaced. There are no concerns associated with right-of-way at this outfall.

**OP-2397**

OP-2398 (Outfall of existing 18" RCP EP-2304)
Approx. Sta. 1499+65, Offset 175' LT

EP-2304 crosses the onramp from Killian Road to I-77 SB, approximately 1,150' before the Killian Road bridge. The outfall was not located in the field and is assumed to be buried. The outfall needs to be located. If the outfall location is where assumed, the pipe end should be excavated to ensure positive drainage. There are no concerns associated with right-of-way at this outfall.

**OP-2398 (not located, assumed as buried)**

OP-2399 (Outfall of existing 24" RCP EP-2301)
Approx. Sta. 1500+30, Offset 147' RT

EP-2301 crosses the Killian Road exit off-ramp from I-77 NB, approximately 1,090' before Killian Road bridge. At the time of the field visit, the outfall was partially buried and the downstream ditch was silted had accumulated sediment, causing water to pond. The outfall and ditch should be excavated and cleaned to promote positive drainage. There should be no right-of-way issues in this area.

**OP-2399**

## 4.13 HEC-RAS Analysis

Four Federal Emergency Management Agency (FEMA) regulated streams cross I-77 within the project limits. These four streams have detailed studies. The streams lie in the Upper Coastal Plains physiographic province.

A Flood Insurance Study (FIS) for Richland County, South Carolina and incorporated areas, dated September 29, 2010, was obtained from FEMA. Volume 1 of the FIS is numbered 45079CV001A and volume 2 is numbered 45079CV002A. Pages of the FEMA FIS that pertain to each of the streams crossing I-77 within the project limits can be found in the individual stream sections below. The corresponding Flood Insurance Rate Maps (FIRM) are numbered 45079C0140K, 45079C0255K, 45079C0260K, and 45079C0270K. The maps have been merged into one map that can be seen in Figure 2.4.

FEMA provided HEC-2 models for each of the streams. These models were produced in the NGVD 29 datum and included input data for the existing conditions and output data for the flood plains runs and encroachment runs. The HEC-2 data was input into HEC-RAS Version 4.1.0 and then analyzed to compare pre- and post- construction conditions.

It was determined that the modeling of I-77 at the triple barrel culvert crossings located at Crane Creek and Cumbess Creek will not need to be extended since no widening will occur to the outside of I-77. Also, the bridge widenings at Jackson Creek and Little Jackson Creek will not impact the water surface elevations because the widening is only occurring on the inside towards the median.

The stream crossings at Crane Creek, Cumbess Creek, Jackson Creek, and Little Jackson Creek are all located in special flood hazard zone AE. Each of these crossings should be eligible for “No-Rise” certifications since there will be no anticipated change in the 100-year flood elevations.

# 5.0

# Appendix

# Appendix A

Plan Sheets

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 1 |

N

PERCIVAL RD.

1140

1145

1150

SIGN

EP-0199

24" RCP
APPROX. FROM
ASB 40.761-12

SEE SHEET 2

I-77 SB

EX-0101

18" RCP

EP-0101

MANHOLE ASSUMED

I-77 NB

SIGN

O/H

SIGN

EC-0103

EC-0102

EC-0211

OP-0100

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 1

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 2 |

N

E. BOUNDARY RD.

(FROM I-77 SB)

PERCIVAL RD.

I-77 SB

I-77 NB

SEE SHEET 1

SEE SHEET 3

EX-0218
EP-0213
EX-0219
EP-0214
EX-0295
EP-0296
EX-0296
EP-0297
EX-0297
EP-0298
EX-0299
EP-0299
EP-0294
EX-0294
EX-0298
EX-0201
EP-0199
EP-0295
EP-0215
EX-0221
EC-0103
EX-0293
EP-0293
EX-0291
EC-0103
EC-0102
EC-0211
EP-0101
EX-0292
EX-0202
EP-0201
EX-0203
EX-0204
EP-0202
EX-0222
EX-0216
EX-0220
EX-0205
EP-0203
EX-0289
EX-0206
EP-0205
EP-0204
EX-0290
EX-0207
EX-0216
EP-0212
EX-0215
EX-0214
EC-0102
EX-0217
EC-0211
EP-0292
EX-0208
EP-0206
EX-0209
EP-0207
EX-0288
EP-0291
EP-0210
EX-0210
EP-0290
EX-0211
EP-0209
EX-0212
EP-0208
EX-0213
0P-0286
EP-0289
EX-0287

18" RCP APPROX. FROM ASB 40.761-12
36" RCP APPROX. FROM PIPE VIDEOS
42" RCP APPROX. PER SURVEY, ASBUILTS & VIDEOS
42" RCP ASSUMED
18" RCP APPROX. PER SURVEY & PIPE VIDEOS
24" RCP APPROX. FROM ASB 40.761-14
SIGN
O/H
1165
1160

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 2

77_drn_plan_sheets.dgn
5/5/2015

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 3 |

N

EC-0102

EX-0399

(TO PERCIVAL RD.)

1170

SIGN

0P-0397

EP-0302

1175

18" RCP

I-77 SB

0P-0394

EP-0303

48" RCP

EX-0396

2x 24" RCP
# BARRELS BY AE

EX-0306

EP-0304

1180

SIGN

EP-0306

48" RCP

APPROX. FROM
ASB LOCATIONS
(OPD SHOWN)

EP-0305

18" RCP

I-77 SB

SEE SHEET 2

EC-0211

I-77 NB

EX-0302

EX-0307

I-77 NB

SEE SHEET 4

8' x 8' SC APPROX PER SURVEY, ASBUILTS & VIDEOS

EX-0301

EP-0301

6" RCP

EX-0308

0P-0398

EX-0303

(FROM PERCIVAL RD.)

EX-0305

EX-0304

0P-0393

EP-0307

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 3

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 4 |

N

SEE SHEET 3

SEE SHEET 5

WILLOBY ST.

WILLOBY ST.

PARKING

PARKING

SIGN

SIGN

SIGN

SIGN

O/H

EX-0401

EP-0401

EP-0306

1185

48" RCP

EX-0402

42" RCP

EP-0402

1190

EX-0408

EP-0408

42" RCP

1195

EX-0404

EP-0404

42" RCP

12

I-77 SB

I-77 SB

EP-0403

18" RCP

EP-0407

18" RCP APPROX. PER PIPE VIDEO INVERT UP 3'

EP-0405

18" RCP

EX-0403

EX-0407

EX-0405

I-77 NB

I-77 NB

EP-0406

18" RCP

EX-0406

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 4

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 5 |

N

SEE SHEET 4

SEE SHEET 6

(FROM I-20)

(TO I-20)

I-77 SB

I-77 NB

FARAWAY DR.

OLD SATCHELFORD RD.

EX-0501

EP-0501

EP-0404

EX-0502

EP-0503

0P-0599

EP-0509

EX-0504

EP-0504

EX-0505

EP-0505

EX-0506

EP-0506

EX-0507

EP-0507

EX-0508

EP-0508

EX-0509

0P-0597

EP-0599

EX-0598

42" RCP

18" RCP

24" RCP

SIGN

O/H

PARKING

1205

1210

1215



INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 5

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 6 |

N

I-20 EB

I-20 WB

(TO I-77 SB)

(FROM I-77 NB / TO I-20 WB)

(FROM I-20 / FROM APLINE RD.)

I-77 SB

I-77 NB

SEE SHEET 5

SEE SHEET 7

EX-0699
EP-0699
0P-0698
EP-0695
EX-0694
EP-0694
EX-0693
EP-0693
EX-0692
EP-0696
EP-0690
EP-0692
EX-0690
0P-0689
EP-0691
EX-0691
EX-0695
EP-0697
EX-0696
EX-0697
EP-0698
0P-0688
EP-0689
APPROX. FROM ASB 40.761-20
100 O/H
EX-0687
EX-0602
EP-0601
EX-0601
EP-0602
EX-0603
18" RCP
EP-0603
EX-0604
EX-0686
EP-0688
EP-0687
EX-0685
EX-0684
EP-0604
0P-0611
EX-0606
EP-0608
EX-0607
EP-0610
EX-0605
EP-0611
EX-0608
EP-0612
0P-0683
0P-0681
EP-0686
EX-0682
EX-0609
EP-0613
EX-0610
EP-0614
0P-0680
1230
1225
1220
SIGN
ASSUMED
APPROX. FROM ASB 40.761-61
APPROX. FROM ASB 40.761-10
APPROX. FROM ASB 40.761-30
APPROX. FROM ASB 40.761-40
APPROX. FROM ASB 40.761-50
APPROX. FROM ASB 40.761-60
APPROX. FROM ASB 40.761-61

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 6

77_dtm_plan_sheets.dgn
5/5/2015

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 7 |

N

OAKCRUST RD.

WINDSOR LAKE BLVD.

1245

1240

1235

I-77 SB

I-77 NB

SIGN

SIGN

EX-0702

EP-0702

0P-0798

EX-0701

EP-0701

0P-0799

POND
WE
226.2

SEE SHEET 6

SEE SHEET 8

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 7

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 8 |

N

WINDSOR LAKE

OAKCRUST RD.

OAKCRUST RD.

PARKING

SIGN

SIGN

SIGN

1260

1255

1250

EX-0802

EP-0802

I-77 SB

EX-0803

EP-0803

EX-0801

EP-0801

18" RCP

I-77 SB

POND WE 220.8

I-77 NB

OP-0897

18" RCP

I-77 NB

OP-0898

OP-0899

SIGN

SIGN

POND 224.8 WE

POND WE 220.8

POND WE 226.2

WINDSOR LAKE

WINDSOR LAKE BLVD.

SEE SHEET 7

SEE SHEET 9

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 8

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 9 |

N

PARKING

OAKCRUST RD.

1265

1270

1275

I-77 SB

I-77 NB

FRONTAGE RD.

0P-0999

0P-0997

0P-0995

EP-0901

EX-0901

EC-0906

7.5 x 5' BOX

EX-0998

EP-0907

EX-0907

SHEET PILE SUPPORTED SOIL NAIL WALL PER AECOM

EP-0908

EX-0993

EX-0902

EX-0903

EP-0904

EP-0905

EX-0904

EP-0902

EX-0996

EX-0905

EX-0906

SEE SHEET 8

SEE SHEET 10

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 10 |

N

SEE SHEET 9

SEE SHEET 11

TRENHOLM RD.

RAILROAD BRIDGE

TWO NOTCH RD.

OAKWAY DR.

I-77 SB

I-77 NB

(TO TWO NOTCH RD.)

OUTFALL NOT FOUND IN FIELD

18" RCP

30" RCP SIZE PER AET

24" RCP SIZE PER AET

30" RCP APPROX. FROM PIPE VIDEO SURVEY MARKUPS

APPROX. FROM ASB 40.973-41

1280

1285

1290

1295

EX-1010

EX-1011 ASSUMED

EP-1009 EX-1097 OP-1099

EP-1010 EX-1001 SOUTH OP-1010

EP-1002 EX-1001 EP-1006

EX-1095

EP-1003 EX-1002

EP-1004

EX-1003

EP-1005

EP-1001

EP-1011 EX-1004

EX-1008 EP-1012 EX-1009

EP-1008

EX-1005

EP-1007

EX-1007

EX-1006

EX-1094 EP-1099

SIGN

PARKING

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 10

77_drn_plan_sheets.dgn
5/5/2015

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 11 |

SEE SHEET 10

SEE SHEET 12

BLARNEY Dr.

(TO TWO NOTCH RD.)

TWO NOTCH RD.

TRENHOLM RD. EXT.

I-77 SB

I-77 NB

PARKING

POOL

SIGN

EX-1196

EX-1199

EP-1115

EX-1192

EX-1198

EP-1116

EP-1114

EP-1107

EP-1106

EP-1110

EX-1107

EX-1102

EP-1104

EP-1103

EX-1106

EX-1107A

EP-1105

EX-1105

EP-1102

EP-1111

EX-1101

EP-1101

EP-1117

EX-1191

EX-1103

EX-1193

EP-1113

EX-1108

EP-1112

EX-1109

EX-1195

EP-1198

EX-1194

EP-1197

1310

1305

1300

N

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 11

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 12 |

N

LITTLE JACKSON CREEK

BARBARA DR.

SEE SHEET 11

SEE SHEET 13

EP-1205

EX-1205

24" RCP

1320

1315

1325

SIGN

EX-1204

EP-1201

I-77 SB

EX-1201

EP-1203

EP-1204

36" RCP

EX-1202

EP-1202

I-77 NB

EX-1203

LITTLE JACKSON CREEK

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 12

77_drn_plan_sheets.dgn
5/5/2015

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 13 |

N

LITTLE JACKSON CREEK

BAYFIELD RD.

EDGEWATER DR.

BARBARA DR.

0P-1397

EX-1398

EP-1399

2x 64" RCPs
APPROX. FROM
ASB 40.973-47

1330

1335

1340

0P-1394

I-77 SB

EP-1302

EX-1302

EP-1204

0P-1399

EX-1301

I-77 NB

EP-1303

EX-1395

EP-1301

0P-1396

SIGN

BB

EDGEWATER DR.

CHRIST UNITY CHURCH

SEE SHEET 12

SEE SHEET 14

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 13

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 14 |

N

277 EB

277 WB

EP-1497

EX-1495

APPROX. FROM ASB 40.973-49

EX-1497

EP-1499

EX-1498

APPROX. FROM ASB 40.973-49

APPROX. FROM ASB 40.973-49

EP-1498

EX-1410

APPROX. FROM ASB 40.973-49

(FROM FARROW RD.)

EX-1494

EP-1496

SIGN

EP-1411

EX-1496

24" RCP

EX-1409

30" RCP SEE PLAN & PROF.

24" RCP SEE PLAN & PROF.

EP-1403

1355

EX-1403

SIGN

EX-1406

1360

1350

1345

OP-1499

SIGN

EP-1401

18" RCP

EP-1404

30" RCP

EP-1406

EP-1409

I-77 SB

I-77 SB

EX-1401

EX-1404

EP-1405

I-77 NB

EP-1402

18" RCP

EX-1402

SIGN

EX-1408

EP-1408

I-77 NB

SIGN

SEE SHEET 13

SEE SHEET 15

EX-1491

30" RCP

24" RCP SEE PLAT & PROF.

EX-1405

EC-1407

POOL

POND

WE 254.3

POND

WE 258.3

ROSS RD.

(TO FARROW RD.)

OP-1493

OP-1492

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 14

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 15 |

SEE SHEET 14

SEE SHEET 16

N

OLD LEGRAND RD.

RAMP

RAMP

WIRE

(TO I-77 SB)

EX-1597

EX-1596

EP-1599

APPROX. FROM I-77 EB

EX-1503

EC-1503

(TO 277 WB)

(FROM FARROW RD.)

1365

1370

1375

O/H

SIGN

I-77 SB

I-77 SB

EX-1501

EP-1501

EX-1505

I-77 NB

I-77 NB

EP-1506

EX-1506

EP-1507

EX-1507

EP-1505

EP-1508

EX-1508

EP-1509

EX-1509

(TO FARROW RD.)

LEGRAND RD.

0P-1599

0P-1598

0P-1595

(FROM 277 EB)

EX-1504

EP-1504

EP-1502

EX-1502

(FROM I-77 NB)

EP-1598

EX-1592

EP-1597

0P-1593

EX-1594

LEGRAND RD.

PINNACLE POINT DR.

PARKING

PARKING

UNIVERSITY OF PHOENIX

30" RCP

24" RCP

24" ASE AGP SLOPE DRAIN

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 15

77_drn_plan_sheets.dgn
5/5/2015

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 16 |

SEE SHEET 15

SEE SHEET 17

EP-I698

OP-I696

EX-I697

EP-I699

APPROX. FROM
STA. 40.761+42

FARROW RD.

EX-I698

EP-I601

EX-I601

1380

SIGN

I-77 SB

EP-I602

EX-I602

RAILROAD BRIDGE

I-77 NB

EP-I603

EX-I603

EP-I604

EX-I604

30" RCP

LEGRAND RD.

EP-I605

OP-I699

SIGN

PARKING

UNIVERSITY OF PHOENIX

EP-I606

30" RCP SIZE PER AET

EX-I605

EP-I607

EX-I606

1385

SIGN

EP-I608

EX-I607

FARROW RD.

EP-I609

EX-I608

EP-I610

EX-I609

15" RCP AS PER PLANS

EP-I611

EX-I610

1390

SIGN

I-77 SB

I-77 NB

SIGN

SIGN

(TO FARROW RD.)

(FROM FARROW RD.)

FARROW RD.

LEGRAND RD.

PARKING

PARKING

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 16

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 17 |

N

PARKING

PARKING

SIGN

SIGN

SIGN

O/H

1400

1405

1395

(TO FARROW RD.)

I-77 SB

I-77 NB

EX-1701

EP-1701

OP-1795

EC-1702

EC-1703

EC-1704

EX-1796

OP-1797

EX-1798

APPROX. FROM ASS'T PLAN

OP-1799

EP-1799

(FROM FARROW RD.)

SEE SHEET 16

SEE SHEET 18

CUMBESS CREEK

CUMBESS CREEK

PARKING

PARKING

PARKING

PARKING

PROVIDENCE HOSPITAL NE

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 17

77_drn_plan_sheets.dgn
5/5/2015

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 18 |

N

1410

1415

1420

1425

0P-1896

0P-1895

0P-1899

EX-1801

EP-1806

EP-1801

EX-1802

EP-1802

EP-1803

EX-1803

EP-1804

EX-1897

EX-1807

EP-1807

EX-1894

I-77 SB

I-77 NB

I-77 SB

I-77 NB

24" RCP

30" RCP

30" RCP

30" RCP

30" RCP

PARKING

PARKING

BALLENTON RD.

SEE SHEET 17

SEE SHEET 19

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 18

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 19 |

N

SEE SHEET 18

I-77 SB

I-77 NB

1430

1435

1440

SIGN

0P-1999

EP-1999

EX-1997

APPROX. FROM
ASB 40-774-54

HARDSCRABBLE RD.

I-77 SB

I-77 NB

0P-1998

EP-1998

EX-1996

APPROX. FROM
ASB 40-774-54

SEE SHEET 20

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 19

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 20 |

N

SEE SHEET 19

SEE SHEET 21

I-77 SB

I-77 NB

SIGN

BB

1445

1450

1455

I-77 77_drn_plan_sheets.dgn 5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 20

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 21 |

N

SEE SHEET 20

SEE SHEET 22

CRANE CREEK

CRANE CREEK

I-77 SB

I-77 NB

I-77 SB

I-77 NB

1460

1465

1470

BB

SIGN

36" RCP

18" RCP

36" RCP

5'x 12' x 12'

OP-2199

EP-2102

EX-2101

EX-2198

EP-2101

OP-2197

EC-2103

EC-2105

EC-2106

EX-2196

OP-2195

EP-2104

EX-2102

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 21

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 22 |

N

SEE SHEET 21

SEE SHEET 23

OP-2299

OP-2298

1475

1480

1485

1490

EP-2201

24" RCP

I-77 SB

EP-2203

36" RCP

EX-2201

EX-2203

I-77 NB

I-77 SB

24" RCP

16" RCP

EP-2202

EP-2204

EX-2202

EX-2204

SIGN

SIGN

SIGN

SIGN

PARKING

PARKING

PARKING

PARKING

I-77 NB

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 22

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 23 |

N

SEE SHEET 22

SEE SHEET 24

I-77 SB

I-77 NB

PARKING

SIGN

0P-2396

EP-2303

0P-2397

(FROM KILLIAN RD.)

EP-2305

EX-2305

0P-2398

EP-2304

EX-2301

EX-2303

1495

1500

1505

EX-2302

EP-2302

EP-2301

0P-2399

EX-2304

(TO KILLIAN RD.)

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

0 50' 100'

SHT 23

| FED. RD. DIV. NO. | STATE | COUNTY | ROUTE NO. | SHEET NO. |
|---|---|---|---|---|
| 3 | S.C. | RICHLAND | I-77 | 24 |

N

SEE SHEET 23

(TO I-77 SB)

KILLIAN RD.

KILLIAN RD.

PARKING

SIGN

(FROM I-77 SB)

1510

1515

1520

I-77 SB

I-77 NB

0P-2499

EX-2404

EP-2403

18" RCP

EP-2402

EX-2402

I-77 SB

I-77 NB

EP-2401

EX-2403

EX-2401

18" RCP

EP-2404

(TO I-77 NB)

KILLIAN RD.

(FROM I-77 NB)

SIGN

PARKING

77_drn_plan_sheets.dgn
5/5/2015

INTERSTATE 77 WIDENING DESIGN / BUILD

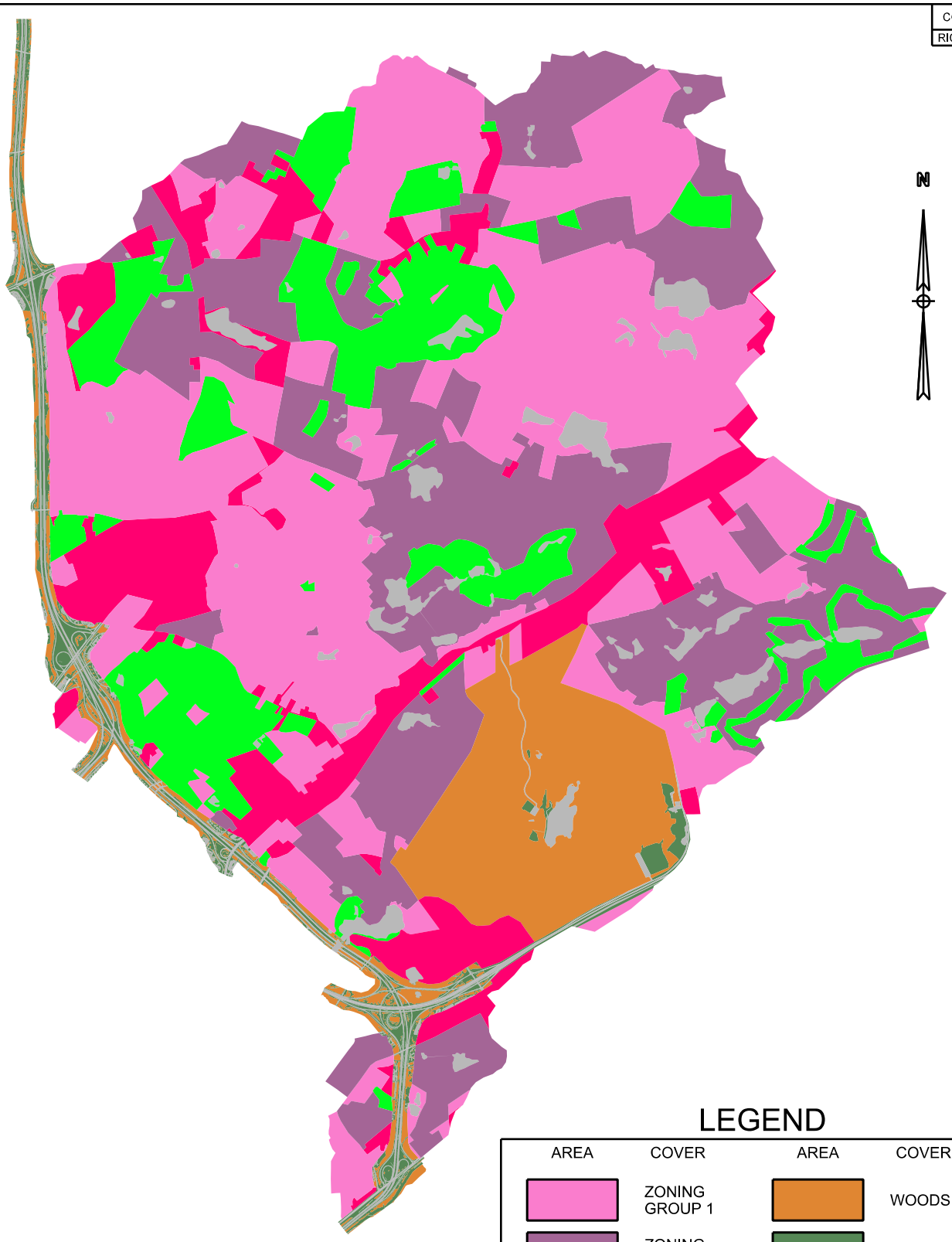
0 50' 100'

SHT 24

# Appendix B

USGS Regression Calculations

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |




## LEGEND

| AREA | COVER | AREA | COVER |
|---|---|---|---|
| | ZONING GROUP 1 | | WOODS |
| | ZONING GROUP 2 | | OPEN SPACE |
| | ZONING GROUP 3 | | IMPERVIOUS / WATER |
| | ZONING GROUP 4 | | |

HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

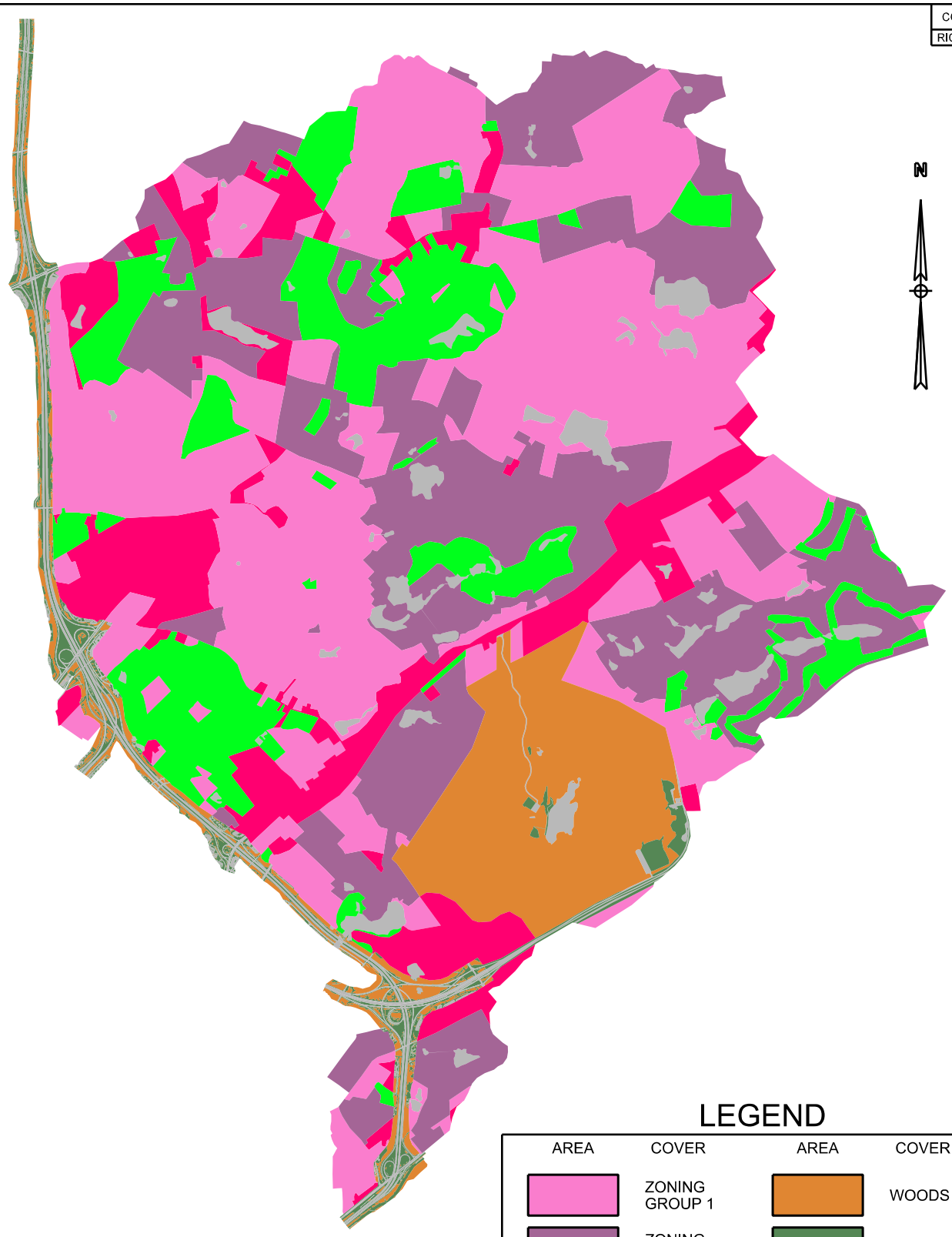
# MAJOR BASIN COVER / ZONING GROUP DELINEATION MAP – PRE-DEVELOPED CONDITIONS

0 2,500' 5,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 5,000' |

FIGURE
**B1**

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |




## LEGEND

| AREA | COVER | AREA | COVER |
|---|---|---|---|
| | ZONING GROUP 1 | | WOODS |
| | ZONING GROUP 2 | | OPEN SPACE |
| | ZONING GROUP 3 | | IMPERVIOUS / WATER |
| | ZONING GROUP 4 | | |

HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

# MAJOR BASIN COVER / ZONING GROUP DELINEATION MAP – PRE-DEVELOPED CONDITIONS

0 2,500' 5,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 5,000' |

FIGURE B2

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Pre-Developed Conditions, Total Basin Impervious Area %

| | Basin 2 | Basin 4 | Basin 6 |
|---|---|---|---|
| Zone Group 1 Area (ac) | 519.78 | 1,279.86 | 3,207.07 |
| Zone Group 1 % Impervious | 27% | 27% | 27% |
| Zone Group 1 Impervious Area (ac) | 140.34 | 345.56 | 865.91 |
| Zone Group 2 Area (ac) | 1,028.75 | 613.01 | 2,105.51 |
| Zone Group 2 % Impervious | 53% | 53% | 53% |
| Zone Group 2 Impervious Area (ac) | 545.24 | 324.90 | 1,115.92 |
| Zone Group 3 Area (ac) | 319.42 | 489.87 | 564.26 |
| Zone Group 3 % Impervious | 68% | 68% | 68% |
| Zone Group 3 Impervious Area (ac) | 217.20 | 333.11 | 383.70 |
| Zone Group 4 Area (ac) | 215.64 | 630.41 | 1,010.40 |
| Zone Group 4 % Impervious | 15% | 15% | 15% |
| Zone Group 4 Impervious Area (ac) | 32.35 | 94.56 | 151.56 |
| Non-Zone Impervious / Water Area (ac) | 254.99 | 118.37 | 224.35 |
| Total Basin Impervious Area (ac) | 1,190.12 | 1,216.51 | 2,741.43 |
| Total Basin Area (ac) | 3,703.42 | 3,302.14 | 7,124.75 |
| Total Basin Area (sq. mi) | 5.79 | 5.16 | 11.13 |
| Total Basin % Impervious | 32.14% | 36.84% | 38.4776% |

Post-Developed Conditions, Total Basin Impervious Area %

| | Basin 2 | Basin 4 | Basin 6 |
|---|---|---|---|
| Zone Group 1 Area (ac) | 519.78 | 1,279.86 | 3,207.07 |
| Zone Group 1 % Impervious | 27% | 27% | 27% |
| Zone Group 1 Impervious Area (ac) | 140.34 | 345.56 | 865.91 |
| Zone Group 2 Area (ac) | 1,028.75 | 613.01 | 2,105.51 |
| Zone Group 2 % Impervious | 53% | 53% | 53% |
| Zone Group 2 Impervious Area (ac) | 545.24 | 324.90 | 1,115.92 |
| Zone Group 3 Area (ac) | 319.42 | 489.87 | 564.26 |
| Zone Group 3 % Impervious | 68% | 68% | 68% |
| Zone Group 3 Impervious Area (ac) | 217.20 | 333.11 | 383.70 |
| Zone Group 4 Area (ac) | 215.64 | 630.41 | 1,010.40 |
| Zone Group 4 % Impervious | 15% | 15% | 15% |
| Zone Group 4 Impervious Area (ac) | 32.35 | 94.56 | 151.56 |
| Non-Zone Impervious / Water Area (ac) | 258.33 | 120.47 | 224.35 |
| Total Basin Impervious Area (ac) | 1,193.46 | 1,218.61 | 2,741.44 |
| Total Basin Area (ac) | 3,703.42 | 3,302.14 | 7,124.75 |
| Total Basin Area (sq. mi) | 5.79 | 5.16 | 11.13 |
| Total Basin % Impervious | 32.23% | 36.90% | 38.4777% |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Urban Regression Equations, Discharges — Basin ID: 2
Physiographic Region: Upper Coastal Plain — Conditions: Pre-Developed

Drainage Area = 3,703 Acres > 640 Acres, use USGS Urban Regression Equations

## USGS Regression Equations

Refer to USGS Water-Resources Investigations Report 92-4040 titled Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds

See Supplement A for Estimation of Equivalent Rural Drainage Basin Peak Discharge, RQ

Drainage Area, A = 3,703 Acres = 5.79 Square Miles

| Event | RQ (cfs) | | |
|---|---|---|---|
| 2-year | $25\ A^{0.74}$ | = | 91.65 |
| 5-year | $44\ A^{0.72}$ | = | 155.74 |
| 10-year | $59\ A^{0.71}$ | = | 205.20 |
| 25-year | $80\ A^{0.70}$ | = | 273.39 |
| 50-year | $97\ A^{0.70}$ | = | 331.49 |
| 100-year | $116\ A^{0.69}$ | = | 389.52 |
| 500-year | $179\ A^{0.66}$ | = | 570.23 |

See Table 9 for Estimation of Peak Discharges in Urban Streams, Q

Total Impervious Area, TIA, in % = 32.14 %

| Event | Q (cfs) | | |
|---|---|---|---|
| 2-year | $1.36\ A^{0.554}\ TIA^{1.241}\ RQ_2^{0.323}$ | = | 1,148 |
| 5-year | $2.58\ A^{0.544}\ TIA^{1.170}\ RQ_5^{0.299}$ | = | 1,758 |
| 10-year | $3.77\ A^{0.536}\ TIA^{1.115}\ RQ_{10}^{0.291}$ | = | 2,178 |
| 25-year | $5.84\ A^{0.524}\ TIA^{1.041}\ RQ_{25}^{0.284}$ | = | 2,671 |
| 50-year | $7.76\ A^{0.514}\ TIA^{0.987}\ RQ_{50}^{0.283}$ | = | 3,037 |
| 100-year | $10.4\ A^{0.506}\ TIA^{0.932}\ RQ_{100}^{0.280}$ | = | 3,409 |
| 500-year | $18.8\ A^{0.484}\ TIA^{0.800}\ RQ_{500}^{0.281}$ | = | 4,200 |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Urban Regression Equations, Discharges — Basin ID: 2
Physiographic Region: Upper Coastal Plain — Conditions: Post-Developed

Drainage Area = 3,703 Acres > 640 Acres, use USGS Urban Regression Equations

## USGS Regression Equations

Refer to USGS Water-Resources Investigations Report 92-4040 titled Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds

See Supplement A for Estimation of Equivalent Rural Drainage Basin Peak Discharge, RQ

Drainage Area, A = 3,703 Acres = 5.79 Square Miles

| Event | RQ (cfs) | | |
|---|---|---|---|
| 2-year | $25\ A^{0.74}$ | = | 91.65 |
| 5-year | $44\ A^{0.72}$ | = | 155.74 |
| 10-year | $59\ A^{0.71}$ | = | 205.20 |
| 25-year | $80\ A^{0.70}$ | = | 273.39 |
| 50-year | $97\ A^{0.70}$ | = | 331.49 |
| 100-year | $116\ A^{0.69}$ | = | 389.52 |
| 500-year | $179\ A^{0.66}$ | = | 570.23 |

See Table 9 for Estimation of Peak Discharges in Urban Streams, Q

Total Impervious Area, TIA, in % = 32.23 %

| Event | Q (cfs) | | |
|---|---|---|---|
| 2-year | $1.36\ A^{0.554}\ TIA^{1.241}\ RQ_2^{0.323}$ | = | 1,152 |
| 5-year | $2.58\ A^{0.544}\ TIA^{1.170}\ RQ_5^{0.299}$ | = | 1,764 |
| 10-year | $3.77\ A^{0.536}\ TIA^{1.115}\ RQ_{10}^{0.291}$ | = | 2,185 |
| 25-year | $5.84\ A^{0.524}\ TIA^{1.041}\ RQ_{25}^{0.284}$ | = | 2,679 |
| 50-year | $7.76\ A^{0.514}\ TIA^{0.987}\ RQ_{50}^{0.283}$ | = | 3,045 |
| 100-year | $10.4\ A^{0.506}\ TIA^{0.932}\ RQ_{100}^{0.280}$ | = | 3,418 |
| 500-year | $18.8\ A^{0.484}\ TIA^{0.800}\ RQ_{500}^{0.281}$ | = | 4,209 |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Urban Regression Equations, Discharges — Basin ID: 4
Physiographic Region: Upper Coastal Plain — Conditions: Pre-Developed

Drainage Area = 3,302 Acres > 640 Acres, use USGS Urban Regression Equations

## USGS Regression Equations

Refer to USGS Water-Resources Investigations Report 92-4040 titled Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds

See Supplement A for Estimation of Equivalent Rural Drainage Basin Peak Discharge, RQ

Drainage Area, A = 3,302 Acres = 5.16 Square Miles

| Event | RQ (cfs) | | |
|---|---|---|---|
| 2-year | $25\ A^{0.74}$ | = | 84.19 |
| 5-year | $44\ A^{0.72}$ | = | 143.40 |
| 10-year | $59\ A^{0.71}$ | = | 189.15 |
| 25-year | $80\ A^{0.70}$ | = | 252.30 |
| 50-year | $97\ A^{0.70}$ | = | 305.92 |
| 100-year | $116\ A^{0.69}$ | = | 359.88 |
| 500-year | $179\ A^{0.66}$ | = | 528.66 |

See Table 9 for Estimation of Peak Discharges in Urban Streams, Q

Total Impervious Area, TIA, in % = 36.84 %

| Event | Q (cfs) | | |
|---|---|---|---|
| 2-year | $1.36\ A^{0.554}\ TIA^{1.241}\ RQ_2^{0.323}$ | = | 1,242 |
| 5-year | $2.58\ A^{0.544}\ TIA^{1.170}\ RQ_5^{0.299}$ | = | 1,891 |
| 10-year | $3.77\ A^{0.536}\ TIA^{1.115}\ RQ_{10}^{0.291}$ | = | 2,330 |
| 25-year | $5.84\ A^{0.524}\ TIA^{1.041}\ RQ_{25}^{0.284}$ | = | 2,835 |
| 50-year | $7.76\ A^{0.514}\ TIA^{0.987}\ RQ_{50}^{0.283}$ | = | 3,203 |
| 100-year | $10.4\ A^{0.506}\ TIA^{0.932}\ RQ_{100}^{0.280}$ | = | 3,574 |
| 500-year | $18.8\ A^{0.484}\ TIA^{0.800}\ RQ_{500}^{0.281}$ | = | 4,338 |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Urban Regression Equations, Discharges — Basin ID: 4
Physiographic Region: Upper Coastal Plain — Conditions: Post-Developed

Drainage Area = 3,302 Acres > 640 Acres, use USGS Urban Regression Equations

## USGS Regression Equations

Refer to USGS Water-Resources Investigations Report 92-4040 titled Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds

See Supplement A for Estimation of Equivalent Rural Drainage Basin Peak Discharge, RQ

Drainage Area, A = 3,302 Acres = 5.16 Square Miles

| Event | RQ (cfs) | | |
|---|---|---|---|
| 2-year | $25\ A^{0.74}$ | = | 84.19 |
| 5-year | $44\ A^{0.72}$ | = | 143.40 |
| 10-year | $59\ A^{0.71}$ | = | 189.15 |
| 25-year | $80\ A^{0.70}$ | = | 252.30 |
| 50-year | $97\ A^{0.70}$ | = | 305.92 |
| 100-year | $116\ A^{0.69}$ | = | 359.88 |
| 500-year | $179\ A^{0.66}$ | = | 528.66 |

See Table 9 for Estimation of Peak Discharges in Urban Streams, Q

Total Impervious Area, TIA, in % = 36.90 %

| Event | Q (cfs) | | |
|---|---|---|---|
| 2-year | $1.36\ A^{0.554}\ TIA^{1.241}\ RQ_2^{0.323}$ | = | 1,244 |
| 5-year | $2.58\ A^{0.544}\ TIA^{1.170}\ RQ_5^{0.299}$ | = | 1,895 |
| 10-year | $3.77\ A^{0.536}\ TIA^{1.115}\ RQ_{10}^{0.291}$ | = | 2,334 |
| 25-year | $5.84\ A^{0.524}\ TIA^{1.041}\ RQ_{25}^{0.284}$ | = | 2,840 |
| 50-year | $7.76\ A^{0.514}\ TIA^{0.987}\ RQ_{50}^{0.283}$ | = | 3,208 |
| 100-year | $10.4\ A^{0.506}\ TIA^{0.932}\ RQ_{100}^{0.280}$ | = | 3,580 |
| 500-year | $18.8\ A^{0.484}\ TIA^{0.800}\ RQ_{500}^{0.281}$ | = | 4,344 |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Urban Regression Equations, Discharges — Basin ID: 6
Physiographic Region: Upper Coastal Plain — Conditions: Pre-Developed

Drainage Area = 7,125 Acres > 640 Acres, use USGS Urban Regression Equations

## USGS Regression Equations

Refer to USGS Water-Resources Investigations Report 92-4040 titled Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds

See Supplement A for Estimation of Equivalent Rural Drainage Basin Peak Discharge, RQ

Drainage Area, A = 7,125 Acres = 11.13 Square Miles

| Event | RQ (cfs) | | |
|---|---|---|---|
| 2-year | $25\ A^{0.74}$ | = | 148.74 |
| 5-year | $44\ A^{0.72}$ | = | 249.46 |
| 10-year | $59\ A^{0.71}$ | = | 326.54 |
| 25-year | $80\ A^{0.70}$ | = | 432.22 |
| 50-year | $97\ A^{0.70}$ | = | 524.06 |
| 100-year | $116\ A^{0.69}$ | = | 611.79 |
| 500-year | $179\ A^{0.66}$ | = | 878.22 |

See Table 9 for Estimation of Peak Discharges in Urban Streams, Q

Total Impervious Area, TIA, in % = 38.48 %

| Event | Q (cfs) | | |
|---|---|---|---|
| 2-year | $1.36\ A^{0.554}\ TIA^{1.241}\ RQ_2^{0.323}$ | = | 2,411 |
| 5-year | $2.58\ A^{0.544}\ TIA^{1.170}\ RQ_5^{0.299}$ | = | 3,567 |
| 10-year | $3.77\ A^{0.536}\ TIA^{1.115}\ RQ_{10}^{0.291}$ | = | 4,329 |
| 25-year | $5.84\ A^{0.524}\ TIA^{1.041}\ RQ_{25}^{0.284}$ | = | 5,171 |
| 50-year | $7.76\ A^{0.514}\ TIA^{0.987}\ RQ_{50}^{0.283}$ | = | 5,781 |
| 100-year | $10.4\ A^{0.506}\ TIA^{0.932}\ RQ_{100}^{0.280}$ | = | 6,372 |
| 500-year | $18.8\ A^{0.484}\ TIA^{0.800}\ RQ_{500}^{0.281}$ | = | 7,517 |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Urban Regression Equations, Discharges — Basin ID: 6
Physiographic Region: Upper Coastal Plain — Conditions: Post-Developed

Drainage Area = 7,125 Acres > 640 Acres, use USGS Urban Regression Equations

## USGS Regression Equations

Refer to USGS Water-Resources Investigations Report 92-4040 titled Determination Of Flood Hydrographs For Streams In South Carolina: Volume 2 Estimation Of Peak-Discharge Frequency, Runoff Volumes, And Flood Hydrographs For Urban Watersheds

See Supplement A for Estimation of Equivalent Rural Drainage Basin Peak Discharge, RQ

Drainage Area, A = 7,125 Acres = 11.13 Square Miles

| Event | RQ (cfs) | | |
|---|---|---|---|
| 2-year | $25\ A^{0.74}$ | = | 148.74 |
| 5-year | $44\ A^{0.72}$ | = | 249.46 |
| 10-year | $59\ A^{0.71}$ | = | 326.54 |
| 25-year | $80\ A^{0.70}$ | = | 432.22 |
| 50-year | $97\ A^{0.70}$ | = | 524.06 |
| 100-year | $116\ A^{0.69}$ | = | 611.79 |
| 500-year | $179\ A^{0.66}$ | = | 878.22 |

See Table 9 for Estimation of Peak Discharges in Urban Streams, Q

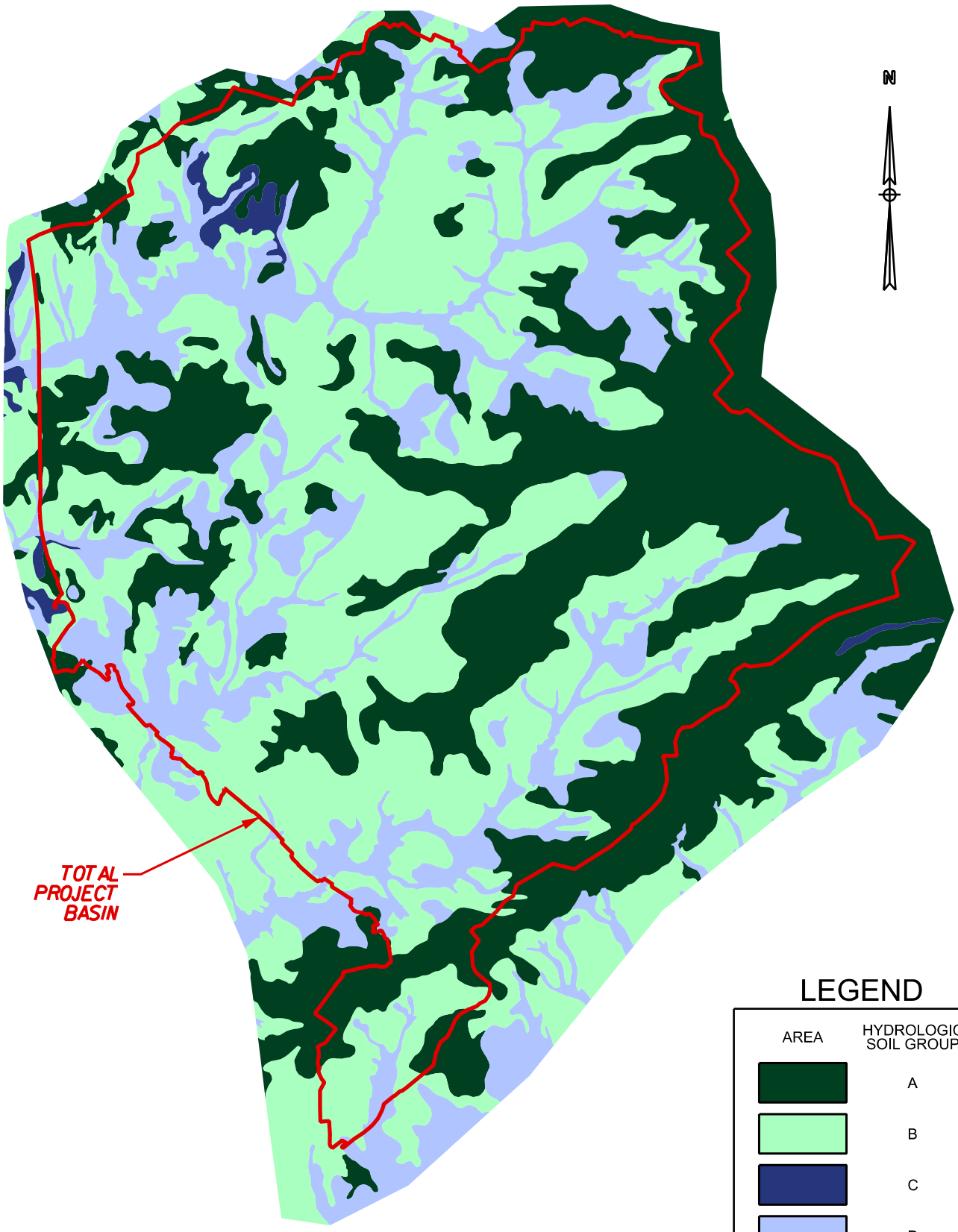
Total Impervious Area, TIA, in % = 38.48 %

| Event | Q (cfs) | | |
|---|---|---|---|
| 2-year | $1.36\ A^{0.554}\ TIA^{1.241}\ RQ_2^{0.323}$ | = | 2,411 |
| 5-year | $2.58\ A^{0.544}\ TIA^{1.170}\ RQ_5^{0.299}$ | = | 3,567 |
| 10-year | $3.77\ A^{0.536}\ TIA^{1.115}\ RQ_{10}^{0.291}$ | = | 4,329 |
| 25-year | $5.84\ A^{0.524}\ TIA^{1.041}\ RQ_{25}^{0.284}$ | = | 5,171 |
| 50-year | $7.76\ A^{0.514}\ TIA^{0.987}\ RQ_{50}^{0.283}$ | = | 5,781 |
| 100-year | $10.4\ A^{0.506}\ TIA^{0.932}\ RQ_{100}^{0.280}$ | = | 6,372 |
| 500-year | $18.8\ A^{0.484}\ TIA^{0.800}\ RQ_{500}^{0.281}$ | = | 7,517 |

# Appendix C

NRCS Calculations

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |




## LEGEND

| AREA | HYDROLOGIC SOIL GROUP |
|---|---|
| | A |
| | B |
| | C |
| | D |

HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

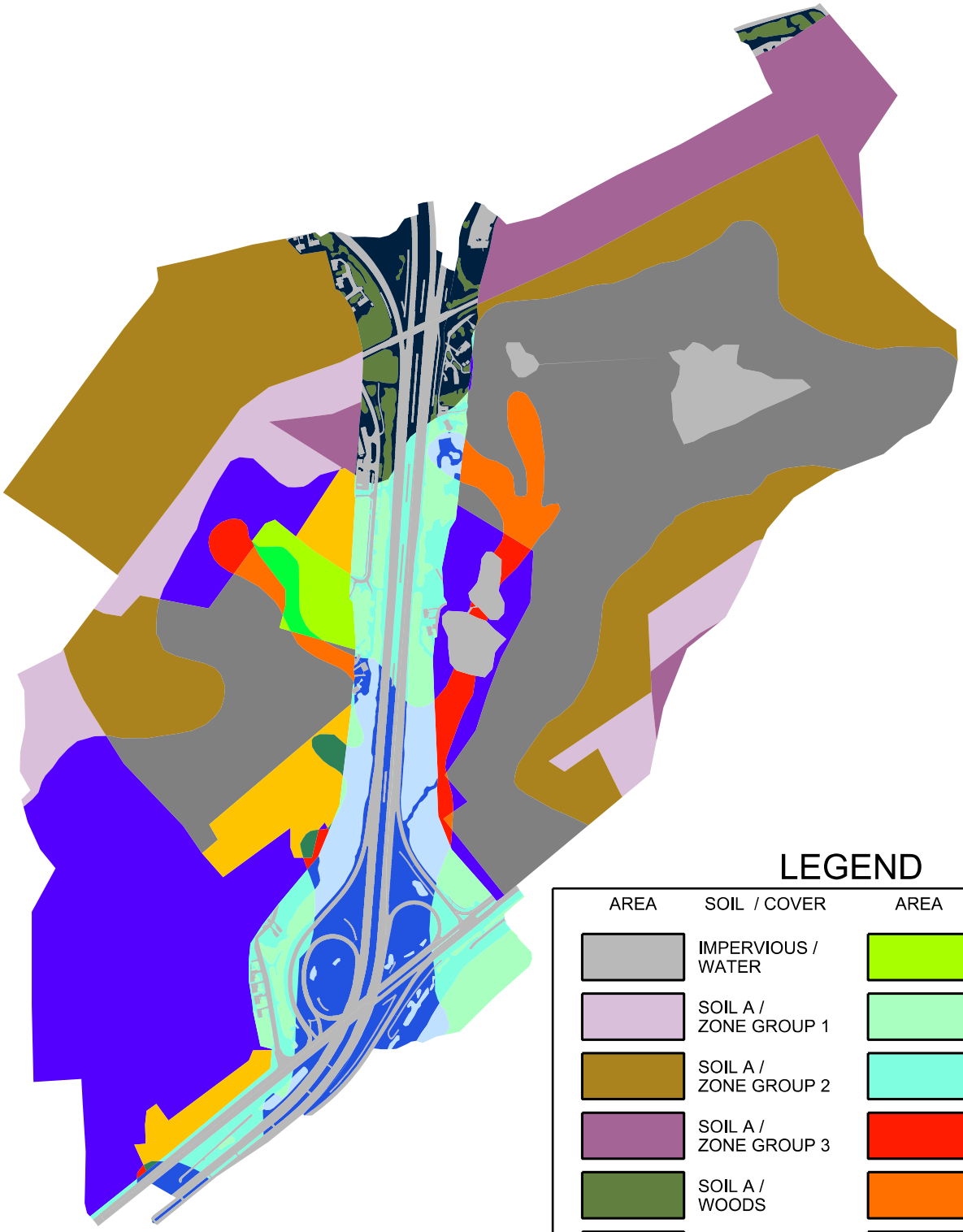
# SOIL GROUP DELINEATION MAP

0 2,500 5,000

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 5,000' |

FIGURE C1

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |



N

## LEGEND

| AREA | SOIL / COVER | AREA | SOIL / COVER |
|---|---|---|---|
| | IMPERVIOUS / WATER | | SOIL B / ZONE GROUP 4 |
| | SOIL A / ZONE GROUP 1 | | SOIL B / WOODS |
| | SOIL A / ZONE GROUP 2 | | SOIL B / OPEN SPACE |
| | SOIL A / ZONE GROUP 3 | | SOIL D / ZONE GROUP 1 |
| | SOIL A / WOODS | | SOIL D / ZONE GROUP 2 |
| | SOIL A / OPEN SPACE | | SOIL D / ZONE GROUP 3 |
| | SOIL B / ZONE GROUP 1 | | SOIL D / ZONE GROUP 4 |
| | SOIL B / ZONE GROUP 2 | | SOIL D / WOODS |
| | SOIL B / ZONE GROUP 3 | | SOIL D / OPEN SPACE |

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I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

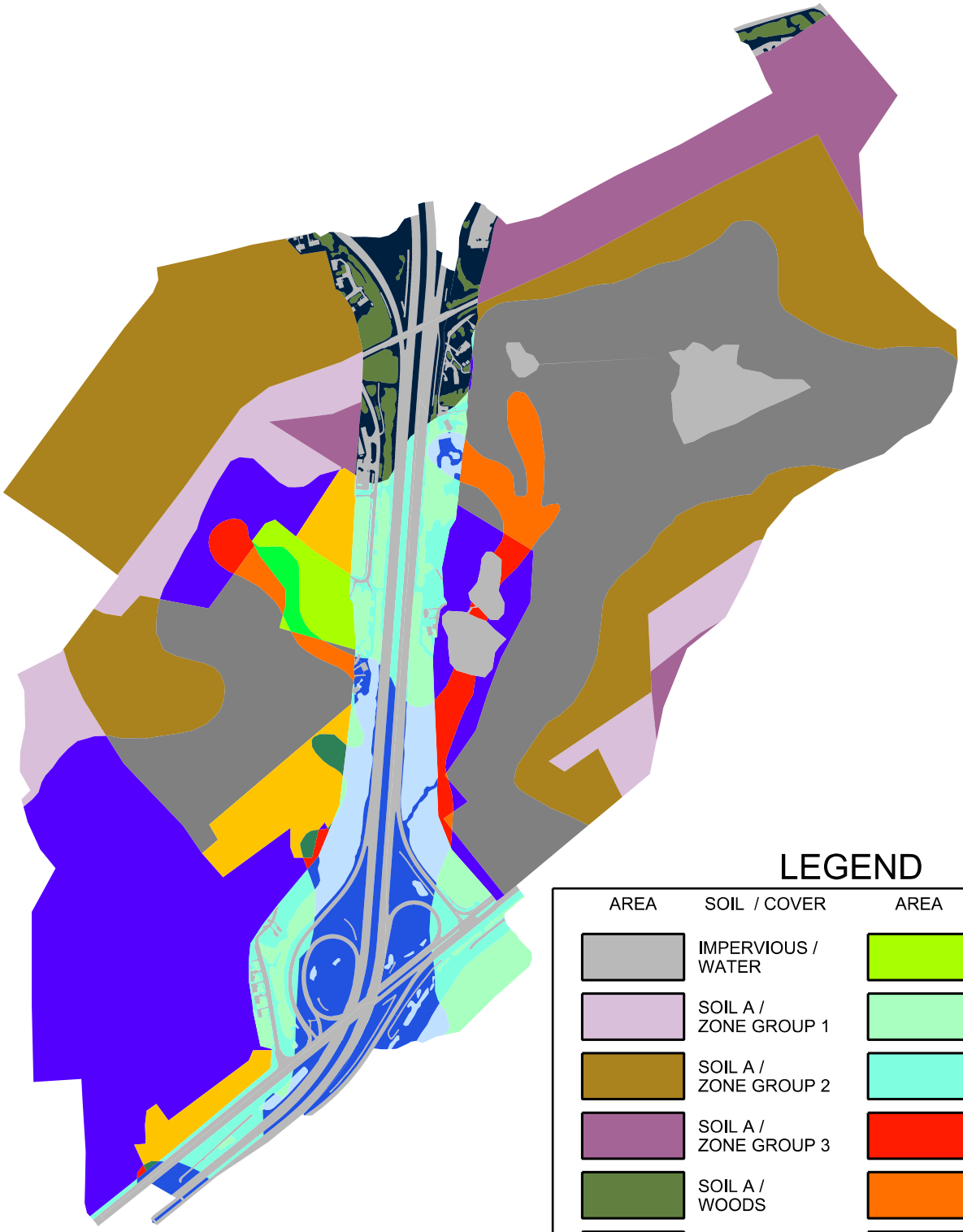
# BASIN 1 – NRCS SOIL / COVER DELINEATION MAP – PRE-DEVELOPED CONDITIONS

0 500' 1,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 1,000' |

FIGURE C2

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |



N

## LEGEND

| AREA | SOIL / COVER | AREA | SOIL / COVER |
|---|---|---|---|
| | IMPERVIOUS / WATER | | SOIL B / ZONE GROUP 4 |
| | SOIL A / ZONE GROUP 1 | | SOIL B / WOODS |
| | SOIL A / ZONE GROUP 2 | | SOIL B / OPEN SPACE |
| | SOIL A / ZONE GROUP 3 | | SOIL D / ZONE GROUP 1 |
| | SOIL A / WOODS | | SOIL D / ZONE GROUP 2 |
| | SOIL A / OPEN SPACE | | SOIL D / ZONE GROUP 3 |
| | SOIL B / ZONE GROUP 1 | | SOIL D / ZONE GROUP 4 |
| | SOIL B / ZONE GROUP 2 | | SOIL D / WOODS |
| | SOIL B / ZONE GROUP 3 | | SOIL D / OPEN SPACE |

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DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

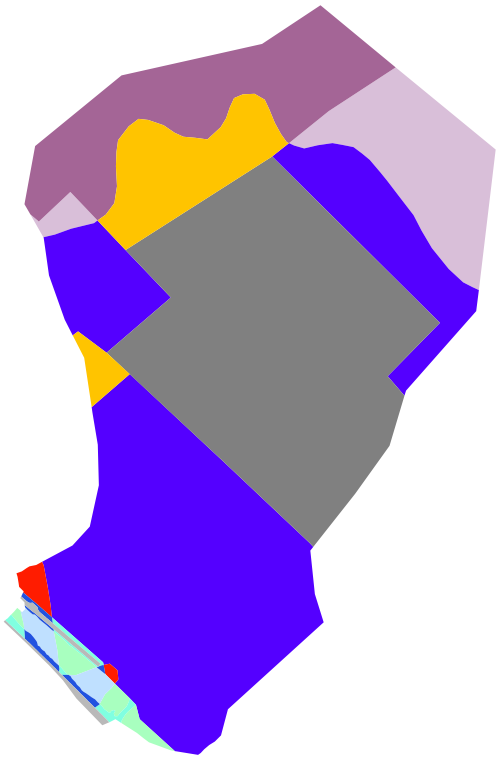
# BASIN 1 – NRCS SOIL / COVER DELINEATION MAP – POST-DEVELOPED CONDITIONS

0 500' 1,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 1,000' |

FIGURE C3

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |



N

## LEGEND

| AREA | SOIL / COVER | AREA | SOIL / COVER |
|---|---|---|---|
| | IMPERVIOUS / WATER | | SOIL B / WOODS |
| | SOIL A / ZONE GROUP 1 | | SOIL B / OPEN SPACE |
| | SOIL A / ZONE GROUP 3 | | SOIL D / ZONE GROUP 1 |
| | SOIL B / ZONE GROUP 1 | | SOIL D / ZONE GROUP 3 |
| | SOIL B / ZONE GROUP 2 | | SOIL D / ZONE GROUP 4 |
| | SOIL B / ZONE GROUP 3 | | SOIL D / WOODS |
| | SOIL B / ZONE GROUP 4 | | SOIL D / OPEN SPACE |

HDR Engineering, Inc.

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DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

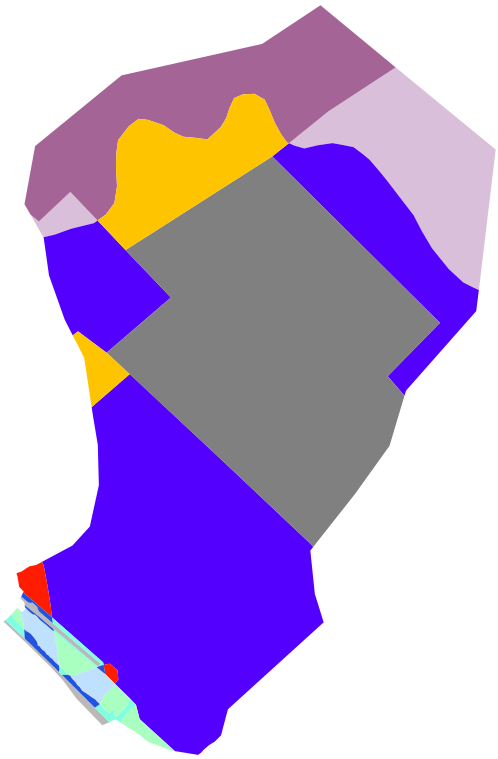
# BASIN 3 – NRCS SOIL / COVER DELINEATION MAP – PRE-DEVELOPED CONDITIONS

0 500' 1,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 1,000' |

FIGURE C4

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |



N

## LEGEND

| AREA | SOIL / COVER | AREA | SOIL / COVER |
|---|---|---|---|
| | IMPERVIOUS / WATER | | SOIL B / WOODS |
| | SOIL A / ZONE GROUP 1 | | SOIL B / OPEN SPACE |
| | SOIL A / ZONE GROUP 3 | | SOIL D / ZONE GROUP 1 |
| | SOIL B / ZONE GROUP 1 | | SOIL D / ZONE GROUP 3 |
| | SOIL B / ZONE GROUP 2 | | SOIL D / ZONE GROUP 4 |
| | SOIL B / ZONE GROUP 3 | | SOIL D / WOODS |
| | SOIL B / ZONE GROUP 4 | | SOIL D / OPEN SPACE |

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DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

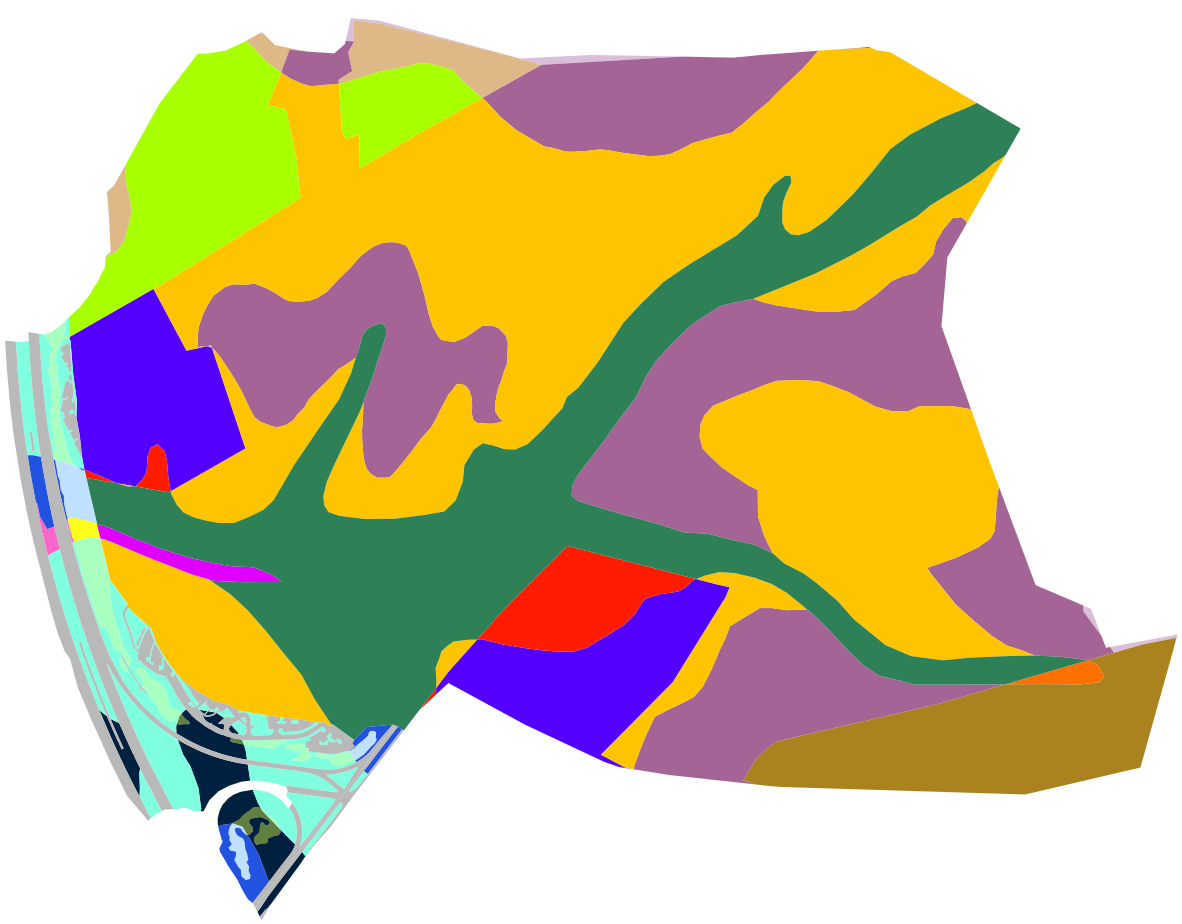
# BASIN 3 – NRCS SOIL / COVER DELINEATION MAP – POST-DEVELOPED CONDITIONS

0 500' 1,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 1,000' |

FIGURE C5

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |




## LEGEND

| AREA | SOIL / COVER | AREA | SOIL / COVER | AREA | SOIL / COVER | AREA | SOIL / COVER |
|---|---|---|---|---|---|---|---|
| | IMPERVIOUS / WATER | | SOIL A / WOODS | | SOIL B / WOODS | | SOIL D / ZONE GROUP 1 |
| | SOIL A / ZONE GROUP 1 | | SOIL A / OPEN SPACE | | SOIL B / OPEN SPACE | | SOIL D / ZONE GROUP 2 |
| | SOIL A / ZONE GROUP 2 | | SOIL B / ZONE GROUP 1 | | SOIL C / ZONE GROUP 3 | | SOIL D / ZONE GROUP 3 |
| | SOIL A / ZONE GROUP 3 | | SOIL B / ZONE GROUP 3 | | SOIL C / WOODS | | SOIL D / WOODS |
| | SOIL A / ZONE GROUP 4 | | SOIL B / ZONE GROUP 4 | | SOIL C / OPEN SPACE | | SOIL D / OPEN SPACE |

HDR Engineering, Inc.

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

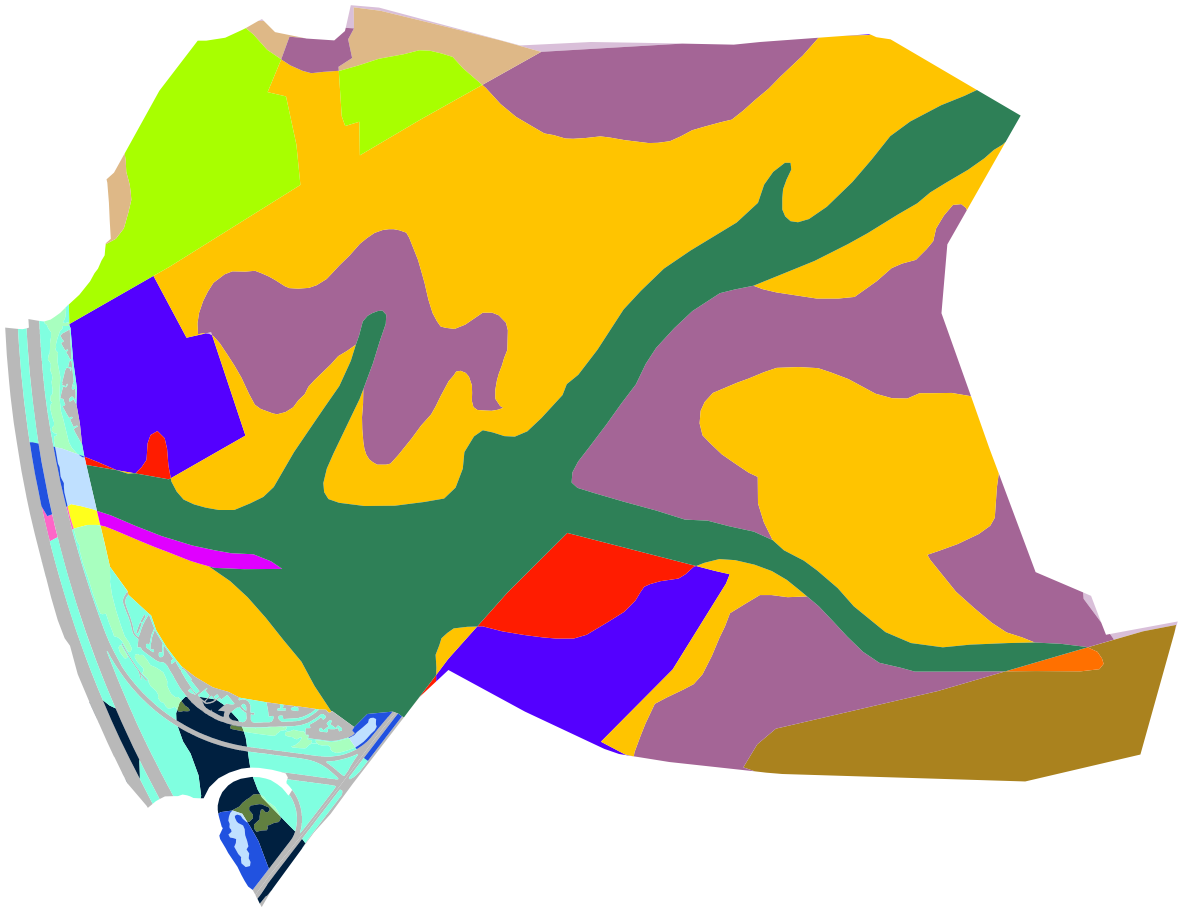
# BASIN 5 – NRCS SOIL / COVER DELINEATION MAP – PRE-DEVELOPED CONDITIONS

0 500' 1,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 1,000' |

FIGURE C6

| COUNTY | ROUTE |
|---|---|
| RICHLAND | I-77 |




## LEGEND

| AREA | SOIL / COVER | AREA | SOIL / COVER | AREA | SOIL / COVER | AREA | SOIL / COVER |
|---|---|---|---|---|---|---|---|
| | IMPERVIOUS / WATER | | SOIL A / WOODS | | SOIL B / WOODS | | SOIL D / ZONE GROUP 1 |
| | SOIL A / ZONE GROUP 1 | | SOIL A / OPEN SPACE | | SOIL B / OPEN SPACE | | SOIL D / ZONE GROUP 2 |
| | SOIL A / ZONE GROUP 2 | | SOIL B / ZONE GROUP 1 | | SOIL C / ZONE GROUP 3 | | SOIL D / ZONE GROUP 3 |
| | SOIL A / ZONE GROUP 3 | | SOIL B / ZONE GROUP 3 | | SOIL C / WOODS | | SOIL D / WOODS |
| | SOIL A / ZONE GROUP 4 | | SOIL B / ZONE GROUP 4 | | SOIL C / OPEN SPACE | | SOIL D / OPEN SPACE |

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SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION

I-77 WIDENING (PERCIVAL RD. TO KILLIAN RD.)

RICHLAND COUNTY, SOUTH CAROLINA

# BASIN 5 – NRCS SOIL / COVER DELINEATION MAP – POST-DEVELOPED CONDITIONS

0 500' 1,000'

| FILENAME | 77_drn_exhibits |
|---|---|
| SCALE | 1" = 1,000' |

FIGURE C7

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Pre-Developed Conditions, NRCS Basins - Composite Curve Numbers

| | Basin 1 | Basin 3 | Basin 5 |
|---|---|---|---|
| Impervious / Water Area (ac) | 47.57 | 0.63 | 12.89 |
| Impervious / Water CN | 98 | 98 | 98 |
| Soil Class A / Zone Group 1 Area (ac) | 30.77 | 12.70 | 0.98 |
| Soil Class A / Zone Group 1 CN | 77 | 77 | 77 |
| Soil Class A / Zone Group 2 Area (ac) | 117.66 | 0.00 | 22.00 |
| Soil Class A / Zone Group 2 CN | 57 | 57 | 57 |
| Soil Class A / Zone Group 3 Area (ac) | 33.97 | 17.01 | 89.42 |
| Soil Class A / Zone Group 3 CN | 89 | 89 | 89 |
| Soil Class A / Zone Group 4 Area (ac) | 0.00 | 0.00 | 5.51 |
| Soil Class A / Zone Group 4 CN | 49 | 49 | 49 |
| Soil Class A / Woods Area (ac) | 5.71 | 0.00 | 0.53 |
| Soil Class A / Woods CN | 36 | 36 | 36 |
| Soil Class A / Open Space Area (ac) | 13.12 | 0.00 | 4.41 |
| Soil Class A / Open Space CN | 39 | 39 | 39 |
| Soil Class B / Zone Group 1 Area (ac) | 86.34 | 52.34 | 28.09 |
| Soil Class B / Zone Group 1 CN | 85 | 85 | 85 |
| Soil Class B / Zone Group 2 Area (ac) | 132.75 | 43.83 | 0.00 |
| Soil Class B / Zone Group 2 CN | 72 | 72 | 72 |
| Soil Class B / Zone Group 3 Area (ac) | 16.56 | 9.74 | 138.91 |
| Soil Class B / Zone Group 3 CN | 92 | 92 | 92 |
| Soil Class B / Zone Group 4 Area (ac) | 5.01 | 0.00 | 24.86 |
| Soil Class B / Zone Group 4 CN | 69 | 69 | 69 |
| Soil Class B / Woods Area (ac) | 16.85 | 1.34 | 3.45 |
| Soil Class B / Woods CN | 60 | 60 | 60 |
| Soil Class B / Open Space Area (ac) | 15.92 | 0.51 | 12.12 |
| Soil Class B / Open Space CN | 61 | 61 | 61 |
| Soil Class C / Zone Group 1 Area (ac) | 0.00 | 0.00 | 0.00 |
| Soil Class C / Zone Group 1 CN | 90 | 90 | 90 |
| Soil Class C / Zone Group 2 Area (ac) | 0.00 | 0.00 | 0.00 |
| Soil Class C / Zone Group 2 CN | 81 | 81 | 81 |
| Soil Class C / Zone Group 3 Area (ac) | 0.00 | 0.00 | 1.57 |
| Soil Class C / Zone Group 3 CN | 94 | 94 | 94 |
| Soil Class C / Zone Group 4 Area (ac) | 0.00 | 0.00 | 0.00 |
| Soil Class C / Zone Group 4 CN | 79 | 79 | 79 |
| Soil Class C / Woods Area (ac) | 0.00 | 0.00 | 0.34 |
| Soil Class C / Woods CN | 73 | 73 | 73 |
| Soil Class C / Open Space Area (ac) | 0.00 | 0.00 | 0.26 |
| Soil Class C / Open Space CN | 74 | 74 | 74 |
| Soil Class D / Zone Group 1 Area (ac) | 5.65 | 0.74 | 8.17 |
| Soil Class D / Zone Group 1 CN | 92 | 92 | 92 |
| Soil Class D / Zone Group 2 Area (ac) | 8.51 | 0.00 | 0.78 |
| Soil Class D / Zone Group 2 CN | 86 | 86 | 86 |
| Soil Class D / Zone Group 3 Area (ac) | 1.24 | 0.00 | 73.17 |
| Soil Class D / Zone Group 3 CN | 95 | 95 | 95 |
| Soil Class D / Zone Group 4 Area (ac) | 1.80 | 0.00 | 0.00 |
| Soil Class D / Zone Group 4 CN | 84 | 84 | 84 |
| Soil Class D / Woods Area (ac) | 12.69 | 1.07 | 1.55 |
| Soil Class D / Woods CN | 79 | 79 | 79 |
| Soil Class D / Open Space Area (ac) | 19.30 | 0.43 | 2.00 |
| Soil Class D / Open Space CN | 80 | 80 | 80 |
| Total Basin Area (ac) | 571.42 | 140.34 | 431.01 |
| Basin Composite CN | 74.02 | 80.90 | 86.04 |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Post-Developed Conditions, NRCS Basins - Composite Curve Numbers

| | Basin 1 | Basin 3 | Basin 5 |
|---|---|---|---|
| Impervious / Water Area (ac) | 49.16 | 0.63 | 14.13 |
| Impervious / Water CN | 98 | 98 | 98 |
| Soil Class A / Zone Group 1 Area (ac) | 30.77 | 12.70 | 0.98 |
| Soil Class A / Zone Group 1 CN | 77 | 77 | 77 |
| Soil Class A / Zone Group 2 Area (ac) | 117.66 | 0.00 | 22.00 |
| Soil Class A / Zone Group 2 CN | 57 | 57 | 57 |
| Soil Class A / Zone Group 3 Area (ac) | 33.97 | 17.01 | 89.42 |
| Soil Class A / Zone Group 3 CN | 89 | 89 | 89 |
| Soil Class A / Zone Group 4 Area (ac) | 0.00 | 0.00 | 5.51 |
| Soil Class A / Zone Group 4 CN | 49 | 49 | 49 |
| Soil Class A / Woods Area (ac) | 5.71 | 0.00 | 0.53 |
| Soil Class A / Woods CN | 36 | 36 | 36 |
| Soil Class A / Open Space Area (ac) | 12.30 | 0.00 | 4.24 |
| Soil Class A / Open Space CN | 39 | 39 | 39 |
| Soil Class B / Zone Group 1 Area (ac) | 86.34 | 52.34 | 28.09 |
| Soil Class B / Zone Group 1 CN | 85 | 85 | 85 |
| Soil Class B / Zone Group 2 Area (ac) | 132.75 | 43.83 | 0.00 |
| Soil Class B / Zone Group 2 CN | 72 | 72 | 72 |
| Soil Class B / Zone Group 3 Area (ac) | 16.56 | 9.74 | 138.91 |
| Soil Class B / Zone Group 3 CN | 92 | 92 | 92 |
| Soil Class B / Zone Group 4 Area (ac) | 5.01 | 0.00 | 24.86 |
| Soil Class B / Zone Group 4 CN | 69 | 69 | 69 |
| Soil Class B / Woods Area (ac) | 16.85 | 1.34 | 3.45 |
| Soil Class B / Woods CN | 60 | 60 | 60 |
| Soil Class B / Open Space Area (ac) | 15.35 | 0.51 | 11.33 |
| Soil Class B / Open Space CN | 61 | 61 | 61 |
| Soil Class C / Zone Group 1 Area (ac) | 0.00 | 0.00 | 0.00 |
| Soil Class C / Zone Group 1 CN | 90 | 90 | 90 |
| Soil Class C / Zone Group 2 Area (ac) | 0.00 | 0.00 | 0.00 |
| Soil Class C / Zone Group 2 CN | 81 | 81 | 81 |
| Soil Class C / Zone Group 3 Area (ac) | 0.00 | 0.00 | 1.57 |
| Soil Class C / Zone Group 3 CN | 94 | 94 | 94 |
| Soil Class C / Zone Group 4 Area (ac) | 0.00 | 0.00 | 0.00 |
| Soil Class C / Zone Group 4 CN | 79 | 79 | 79 |
| Soil Class C / Woods Area (ac) | 0.00 | 0.00 | 0.34 |
| Soil Class C / Woods CN | 73 | 73 | 73 |
| Soil Class C / Open Space Area (ac) | 0.00 | 0.00 | 0.16 |
| Soil Class C / Open Space CN | 74 | 74 | 74 |
| Soil Class D / Zone Group 1 Area (ac) | 5.65 | 0.74 | 8.17 |
| Soil Class D / Zone Group 1 CN | 92 | 92 | 92 |
| Soil Class D / Zone Group 2 Area (ac) | 8.51 | 0.00 | 0.78 |
| Soil Class D / Zone Group 2 CN | 86 | 86 | 86 |
| Soil Class D / Zone Group 3 Area (ac) | 1.24 | 0.00 | 73.17 |
| Soil Class D / Zone Group 3 CN | 95 | 95 | 95 |
| Soil Class D / Zone Group 4 Area (ac) | 1.80 | 0.00 | 0.00 |
| Soil Class D / Zone Group 4 CN | 84 | 84 | 84 |
| Soil Class D / Woods Area (ac) | 12.69 | 1.07 | 1.55 |
| Soil Class D / Woods CN | 79 | 79 | 79 |
| Soil Class D / Open Space Area (ac) | 19.11 | 0.43 | 1.83 |
| Soil Class D / Open Space CN | 80 | 80 | 80 |
| Total Basin Area (ac) | 571.42 | 140.34 | 431.01 |
| Basin Composite CN | 74.14 | 80.90 | 86.15 |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

NRCS Peak Flow Calculations

| Basin ID | Area (ac) | Time of Concentration (min) | Design Storm Event | Pre-Developed Flows (cfs) | Post-Developed Flows (cfs) |
|---|---|---|---|---|---|
| 1 | 571.42 | 63.06 | 2-Year | 472.17 | 474.75 |
| | | | 5-Year | 729.70 | 732.73 |
| | | | 10-Year | 975.83 | 979.41 |
| | | | 25-Year | 1303.35 | 1306.68 |
| | | | 50-Year | 1587.76 | 1590.90 |
| | | | 100-Year | 1871.84 | 1875.14 |
| 3 | 140.34 | 74.11 | 2-Year | 138.88 | 138.88 |
| | | | 5-Year | 200.67 | 200.67 |
| | | | 10-Year | 258.88 | 258.88 |
| | | | 25-Year | 333.50 | 333.50 |
| | | | 50-Year | 397.43 | 397.43 |
| | | | 100-Year | 461.14 | 461.14 |
| 5 | 431.01 | 153.35 | 2-Year | 313.11 | 314.16 |
| | | | 5-Year | 434.06 | 435.20 |
| | | | 10-Year | 547.10 | 548.16 |
| | | | 25-Year | 690.25 | 691.44 |
| | | | 50-Year | 813.19 | 814.31 |
| | | | 100-Year | 934.74 | 935.88 |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Time of Concentration ID: Basin 1

## Sheet Flow (Applicable to Tc only)

| | | | | |
|---|---|---|---|---|
| 1. Manning's roughness coefficient, n (table 3-1) | | | 0.24 | |
| 2. Flow length, L (total L + 300 ft) | | ft | 217 | |
| 3. Two-year 24-hour rainfall, $P_2$ | | in | 3.8 | |
| 4. Land slope, s | | ft/ft | 0.037 | |
| 5. Travel time, $T_t = 0.007(nL)^{0.8}/((P_2^{0.5})(s^{0.4}))$ | | hr | 0.32 | 19.20 min |

## Shallow concentrated flow

| | | | | |
|---|---|---|---|---|
| 6. Surface description (paved or unpaved) | | | Unpaved | |
| 7. Flow length, L | | ft | 227 | |
| 8. Watercourse slope, s | | ft / ft | 0.044 | |
| 9. Average velocity, V (Figure 3-1) | | ft/s | 3.39 | |
| 10. Travel time, $T_t = L / 60*V*60$ | Compute $T_t$ | hr | 0.02 | 1.12 min |

## Channel flow

| | | | | |
|---|---|---|---|---|
| 11. Cross sectional flow area, a | | $ft^2$ | 18 | |
| 12. Wetted perimeter, $p_w$ | | ft | 13 | |
| 13. Hydraulic radius, $r = a/p_w$ | | ft | 1.385 | |
| 14. Channel slope, s | | ft / ft | 0.018 | |
| 15. Manning's roughness coefficient, n | | | 0.1 | |
| 16. $V=1.49\ r^{2/3}\ s^{1/2} / n$ | Compute V | ft / s | 2.47 | |
| 17. Flow length, L | | ft | 6334 | |
| 18. Travel time, $T_t = L / 3600* V$ | Compute $T_t$ | hr | 0.71 | 42.75 min |
| 19. Watershed or subarea $T_c$ or $T_t$ | Total | hr | **1.05** | **63.06 min** |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Time of Concentration ID: Basin 3

## Sheet Flow (Applicable to Tc only)

| | | | | | |
|---|---|---|---|---|---|
| 1. Manning's roughness coefficient, n (table 3-1) | | | 0.4 | | |
| 2. Flow length, L (total L + 300 ft) | | ft | 300 | | |
| 3. Two-year 24-hour rainfall, $P_2$ | | in | 3.8 | | |
| 4. Land slope, s | | ft/ft | 0.067 | | |
| 5. Travel time, $T_t = 0.007(nL)^{0.8}/((P_2^{0.5})(s^{0.4}))$ | | hr | 0.49 | 29.40 | min |

## Shallow concentrated flow

| | | | | | |
|---|---|---|---|---|---|
| 6. Surface description (paved or unpaved) | | | Unpaved | | |
| 7. Flow length, L | | ft | 360 | | |
| 8. Watercourse slope, s | | ft / ft | 0.033 | | |
| 9. Average velocity, V (Figure 3-1) | | ft/s | 2.94 | | |
| 10. Travel time, $T_t$ = L / 60*V*60 | Compute $T_t$ | hr | 0.03 | 2.04 | min |

## Channel flow

| | | | | | |
|---|---|---|---|---|---|
| 11. Cross sectional flow area, a | | $ft^2$ | 16 | | |
| 12. Wetted perimeter, $p_w$ | | ft | 12 | | |
| 13. Hydraulic radius, $r = a/p_w$ | | ft | 1.333 | | |
| 14. Channel slope, s | | ft / ft | 0.017 | | |
| 15. Manning's roughness coefficient, n | | | 0.14 | | |
| 16. $V=1.49\ r^{2/3}\ s^{1/2} / n$ | Compute V | ft / s | 1.68 | | |
| 17. Flow length, L | | ft | 4304 | | |
| 18. Travel time, $T_t$ = L / 3600* V | Compute $T_t$ | hr | 0.71 | 42.67 | min |
| 19. Watershed or subarea $T_c$ or $T_t$ | Total | hr | **1.24** | **74.11** | **min** |

| | | | | | |
|---|---|---|---|---|---|
| **Project:** | I-77 Widening D/B | **By:** | DPH | **Date:** | 5-May-15 |
| **Location:** | Richland County, SC | **Checked:** | | **Date:** | |

Time of Concentration ID: Basin 5

## Sheet Flow (Applicable to Tc only)

| | | | | | |
|---|---|---|---|---|---|
| 1. Manning's roughness coefficient, n (table 3-1) | | | 0.4 | | |
| 2. Flow length, L (total L + 300 ft) | | ft | 300 | | |
| 3. Two-year 24-hour rainfall, $P_2$ | | in | 3.8 | | |
| 4. Land slope, s | | ft/ft | 0.017 | | |
| 5. Travel time, $T_t = 0.007(nL)^{0.8}/((P_2^{0.5})(s^{0.4}))$ | | hr | 0.85 | 51.00 | min |

## Shallow concentrated flow

| | | | | | |
|---|---|---|---|---|---|
| 6. Surface description (paved or unpaved) | | | Unpaved | | |
| 7. Flow length, L | | ft | 793 | | |
| 8. Watercourse slope, s | | ft / ft | 0.015 | | |
| 9. Average velocity, V (Figure 3-1) | | ft/s | 1.98 | | |
| 10. Travel time, $T_t = L / 60*V*60$ | Compute $T_t$ | hr | 0.11 | 6.67 | min |

## Channel flow

| | | | | | |
|---|---|---|---|---|---|
| 11. Cross sectional flow area, a | | $ft^2$ | 12.5 | | |
| 12. Wetted perimeter, $p_w$ | | ft | 11 | | |
| 13. Hydraulic radius, $r = a/p_w$ | | ft | 1.136 | | |
| 14. Channel slope, s | | ft / ft | 0.006 | | |
| 15. Manning's roughness coefficient, n | | | 0.14 | | |
| 16. $V=1.49\ r^{2/3}\ s^{1/2} / n$ | Compute V | ft / s | 0.90 | | |
| 17. Flow length, L | | ft | 5154 | | |
| 18. Travel time, $T_t = L / 3600* V$ | Compute $T_t$ | hr | 1.59 | 95.69 | min |
| 19. Watershed or subarea $T_c$ or $T_t$ | Total | hr | **2.56** | **153.35** | **min** |

# Appendix D

HY-8 Analysis Results

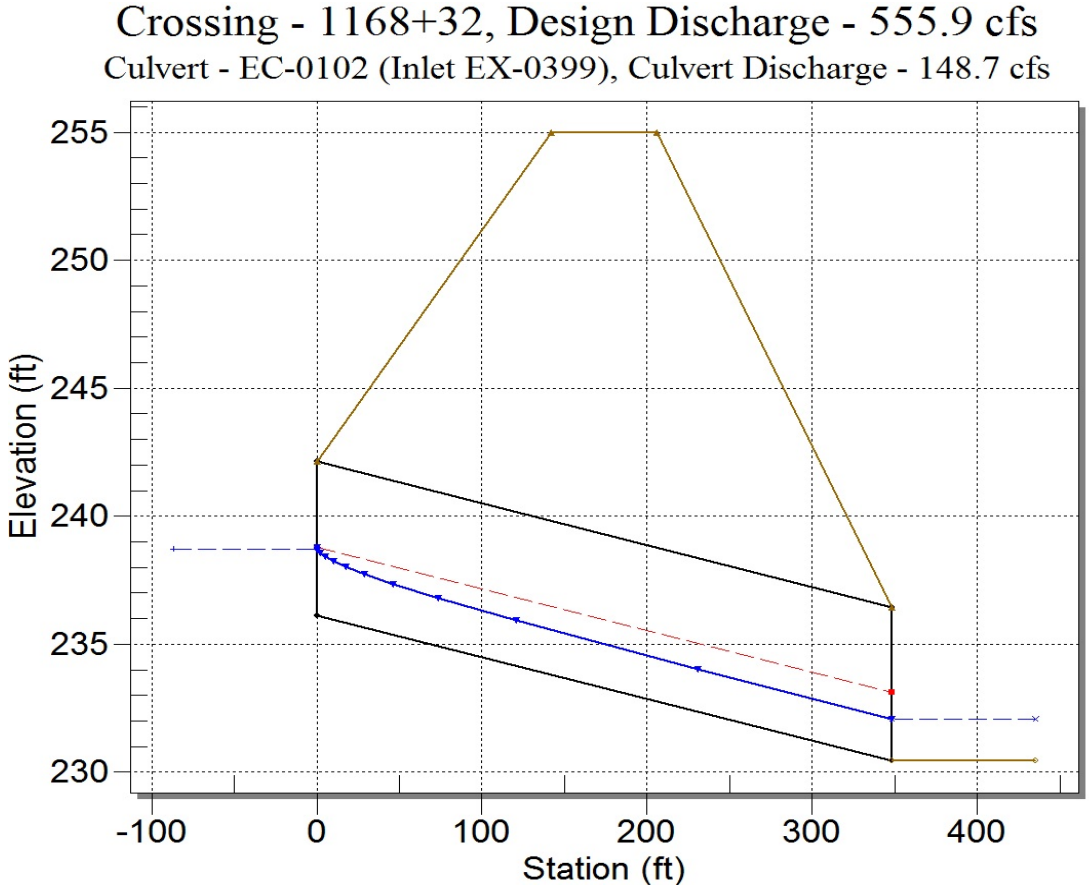
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1168+32**

Culvert Summary Table - EC-0102 (Inlet EX-0399)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 148.71 | 148.71 | 238.73 | 2.61 | 0.0* | 1-S2n | 1.62 | 2.68 | 1.63 | 1.65 | 15.23 | 15.05 |
| 200.15 | 200.15 | 239.30 | 3.18 | 0.0* | 1-S2n | 2.01 | 3.26 | 2.01 | 2.03 | 16.57 | 16.43 |
| 251.59 | 251.59 | 239.82 | 3.70 | 0.0* | 1-S2n | 2.37 | 3.80 | 2.43 | 2.40 | 17.23 | 17.50 |
| 303.03 | 303.03 | 240.31 | 4.19 | 0.0* | 1-S2n | 2.72 | 4.30 | 2.73 | 2.75 | 18.52 | 18.38 |
| 354.47 | 354.47 | 240.77 | 4.65 | 0.0* | 1-S2n | 3.06 | 4.78 | 3.16 | 3.09 | 18.68 | 19.13 |
| 405.91 | 405.91 | 241.21 | 5.09 | 0.0* | 1-S2n | 3.39 | 5.23 | 3.52 | 3.42 | 19.24 | 19.77 |
| 457.35 | 457.35 | 241.63 | 5.51 | 0.0* | 1-S2n | 3.71 | 5.66 | 3.86 | 3.75 | 19.74 | 20.33 |
| 508.79 | 508.79 | 243.23 | 5.92 | 7.11 | 6-FFc | 4.03 | 6.00 | 6.00 | 4.07 | 14.13 | 20.81 |
| 555.91 | 555.91 | 244.55 | 6.28 | 8.43 | 6-FFc | 4.32 | 6.00 | 6.00 | 4.37 | 15.44 | 21.22 |
| 611.67 | 611.67 | 246.26 | 6.71 | 10.14 | 6-FFc | 4.66 | 6.00 | 6.00 | 4.71 | 16.99 | 21.65 |
| 663.11 | 663.11 | 247.99 | 7.15 | 11.87 | 6-FFc | 4.97 | 6.00 | 6.00 | 5.02 | 18.42 | 22.01 |

Water Surface Profile Plot



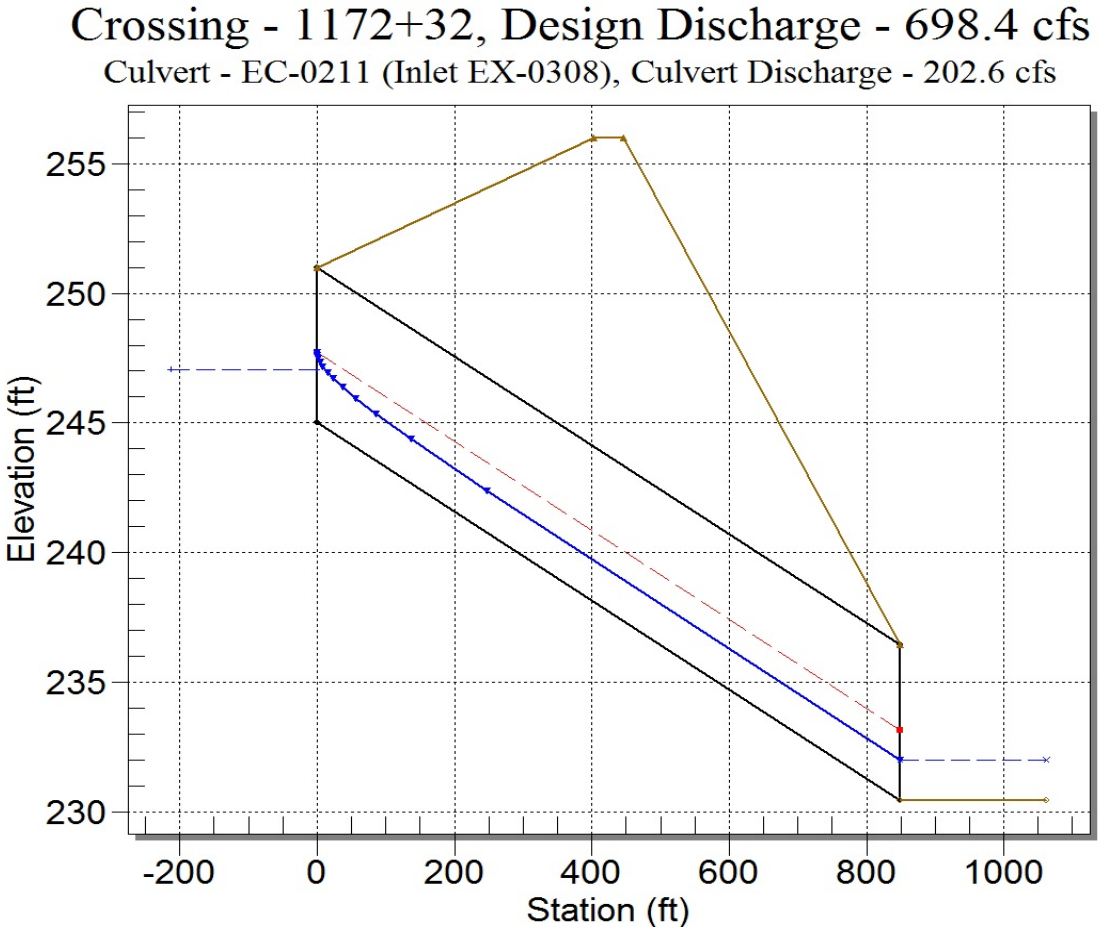
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1172+32**

Culvert Summary Table - EC-0211 (Inlet EX-0308)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 202.62 | 202.62 | 247.07 | 2.07 | 0.0* | 1-S2n | 1.55 | 2.72 | 1.56 | 1.57 | 16.27 | 16.13 |
| 265.07 | 265.07 | 247.48 | 2.48 | 0.0* | 1-S2n | 1.87 | 3.25 | 1.88 | 1.88 | 17.64 | 17.58 |
| 327.51 | 327.51 | 247.86 | 2.86 | 0.0* | 1-S2n | 2.17 | 3.74 | 2.17 | 2.18 | 18.83 | 18.76 |
| 389.96 | 389.96 | 248.21 | 3.21 | 0.0* | 1-S2n | 2.45 | 4.20 | 2.46 | 2.47 | 19.80 | 19.76 |
| 452.40 | 452.40 | 248.54 | 3.54 | 0.0* | 1-S2n | 2.72 | 4.64 | 2.73 | 2.74 | 20.71 | 20.62 |
| 514.85 | 514.85 | 248.86 | 3.86 | 0.0* | 1-S2n | 3.00 | 5.06 | 3.00 | 3.01 | 21.47 | 21.38 |
| 577.30 | 577.30 | 249.17 | 4.17 | 0.0* | 1-S2n | 3.25 | 5.46 | 3.28 | 3.27 | 21.97 | 22.05 |
| 639.74 | 639.74 | 249.46 | 4.46 | 0.0* | 1-S2n | 3.51 | 5.85 | 3.52 | 3.53 | 22.75 | 22.67 |
| 698.42 | 698.42 | 249.73 | 4.73 | 2.04 | 6-FFc | 3.75 | 6.00 | 3.75 | 3.77 | 23.27 | 23.18 |
| 764.63 | 764.63 | 250.03 | 5.03 | 4.15 | 6-FFc | 4.01 | 6.00 | 4.02 | 4.03 | 23.80 | 23.72 |
| 827.08 | 827.08 | 251.31 | 5.30 | 6.31 | 6-FFc | 4.25 | 6.00 | 6.00 | 4.27 | 17.23 | 24.18 |

Water Surface Profile Plot



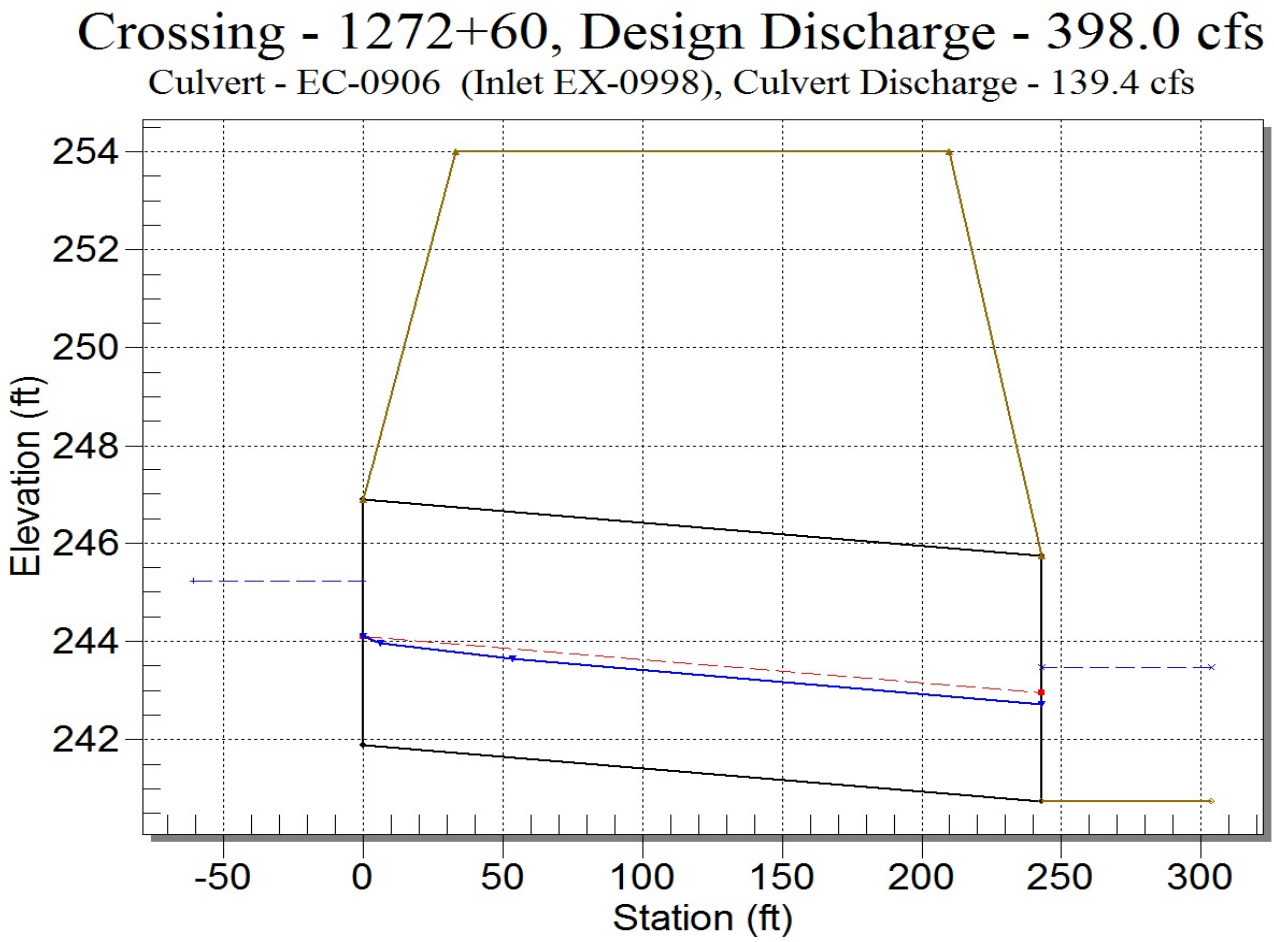
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1272+60**

Culvert Summary Table - EC-0906 (Inlet EX-0998)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 139.40 | 139.40 | 245.23 | 3.34 | 0.0* | 1-S2n | 1.98 | 2.21 | 1.98 | 2.73 | 9.37 | 1.38 |
| 171.64 | 171.64 | 245.77 | 3.88 | 0.0* | 1-S2n | 2.29 | 2.54 | 2.30 | 2.97 | 9.96 | 1.45 |
| 203.88 | 203.88 | 246.28 | 4.39 | 0.0* | 1-S2n | 2.59 | 2.85 | 2.60 | 3.19 | 10.47 | 1.52 |
| 236.13 | 236.13 | 246.79 | 4.90 | 0.0* | 1-S2n | 2.88 | 3.14 | 2.89 | 3.39 | 10.89 | 1.57 |
| 268.37 | 268.37 | 247.30 | 5.41 | 0.0* | 5-S2n | 3.17 | 3.42 | 3.17 | 3.57 | 11.29 | 1.62 |
| 300.61 | 300.61 | 247.82 | 5.93 | 0.0* | 5-S2n | 3.44 | 3.69 | 3.45 | 3.74 | 11.62 | 1.67 |
| 332.85 | 332.85 | 248.35 | 6.46 | 0.0* | 5-S2n | 3.71 | 3.95 | 3.72 | 3.89 | 11.94 | 1.72 |
| 365.09 | 365.09 | 248.91 | 7.02 | 0.0* | 5-S2n | 3.98 | 4.20 | 3.99 | 4.04 | 12.20 | 1.76 |
| 397.34 | 397.34 | 249.51 | 7.62 | 3.03 | 5-S2n | 4.25 | 4.44 | 4.25 | 4.18 | 12.46 | 1.79 |
| 398.04 | 398.04 | 249.52 | 7.63 | 3.03 | 5-S2n | 4.25 | 4.45 | 4.26 | 4.18 | 12.47 | 1.79 |
| 461.82 | 461.82 | 250.79 | 8.90 | 7.84 | 2-M2c | 5.00 | 4.91 | 4.90 | 4.44 | 12.57 | 1.86 |

Water Surface Profile Plot



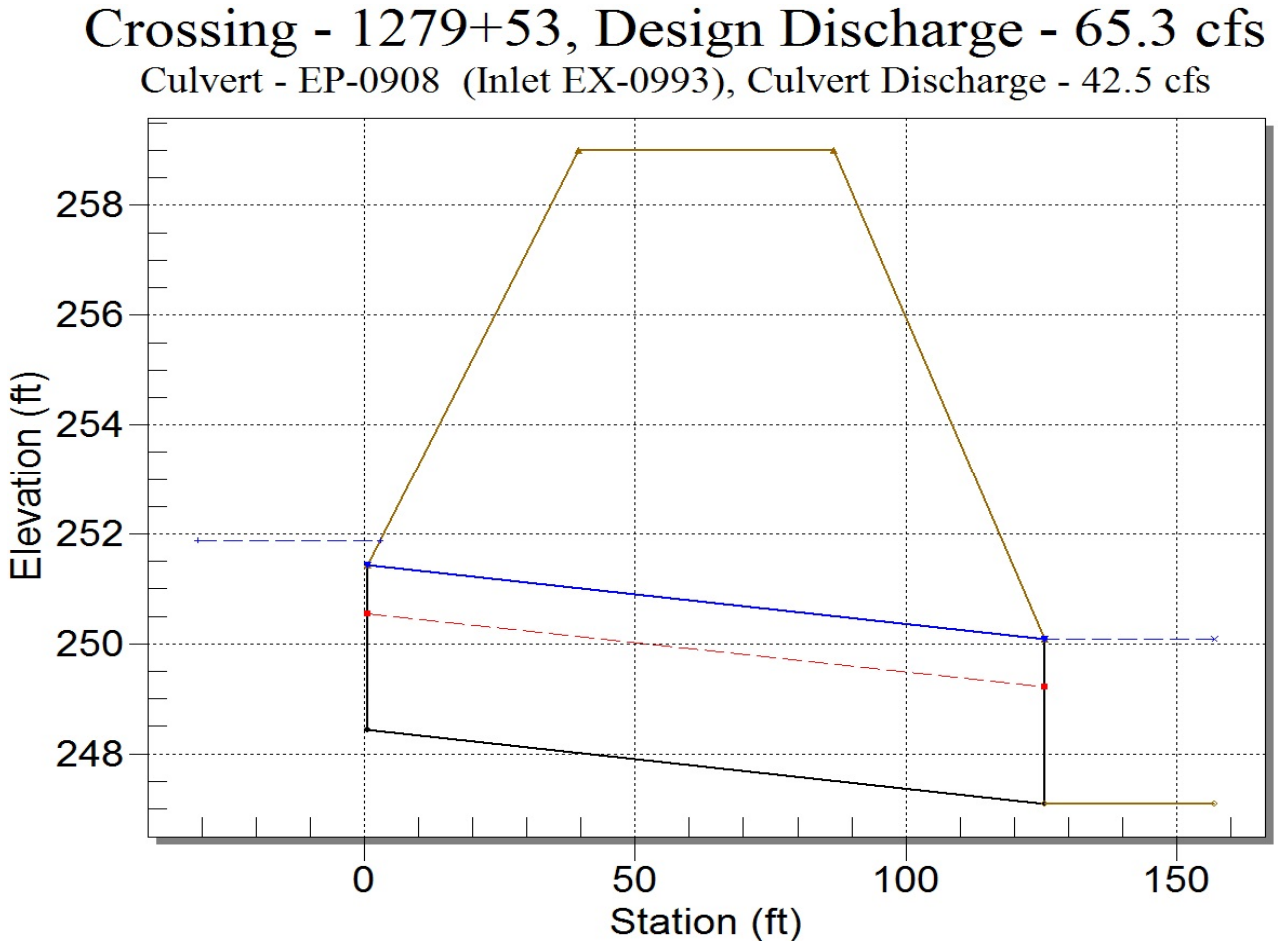
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1279+53**

Culvert Summary Table - EP-0908 (Inlet EX-0993)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 42.48 | 42.48 | 251.88 | 3.45 | 3.01 | 4-FFf | 1.70 | 2.12 | 1.70 | 3.00 | 10.29 | 0.00 |
| 45.27 | 45.27 | 252.07 | 3.64 | 3.19 | 4-FFf | 1.77 | 2.18 | 1.77 | 3.00 | 10.44 | 0.00 |
| 48.05 | 48.05 | 252.27 | 3.84 | 3.38 | 4-FFf | 1.84 | 2.25 | 1.84 | 3.00 | 10.56 | 0.00 |
| 50.84 | 50.84 | 252.48 | 4.05 | 3.59 | 4-FFf | 1.91 | 2.31 | 1.91 | 3.00 | 10.69 | 0.00 |
| 53.62 | 53.62 | 252.70 | 4.27 | 3.80 | 4-FFf | 1.99 | 2.38 | 1.99 | 3.00 | 10.81 | 0.00 |
| 56.41 | 56.41 | 252.94 | 4.51 | 4.03 | 4-FFf | 2.06 | 2.43 | 2.06 | 3.00 | 10.91 | 0.00 |
| 59.20 | 59.20 | 253.19 | 4.76 | 4.27 | 4-FFf | 2.14 | 2.47 | 2.14 | 3.00 | 10.97 | 0.00 |
| 61.98 | 61.98 | 253.46 | 5.03 | 4.52 | 4-FFf | 2.23 | 2.52 | 2.23 | 3.00 | 11.05 | 0.00 |
| 64.77 | 64.77 | 253.73 | 5.30 | 4.79 | 4-FFf | 2.31 | 2.56 | 2.31 | 3.00 | 11.10 | 0.00 |
| 65.30 | 65.30 | 253.79 | 5.36 | 4.84 | 4-FFf | 2.33 | 2.57 | 2.33 | 3.00 | 11.12 | 0.00 |
| 70.34 | 70.34 | 254.33 | 5.90 | 5.35 | 4-FFf | 2.53 | 2.65 | 2.53 | 3.00 | 11.09 | 0.00 |

Water Surface Profile Plot



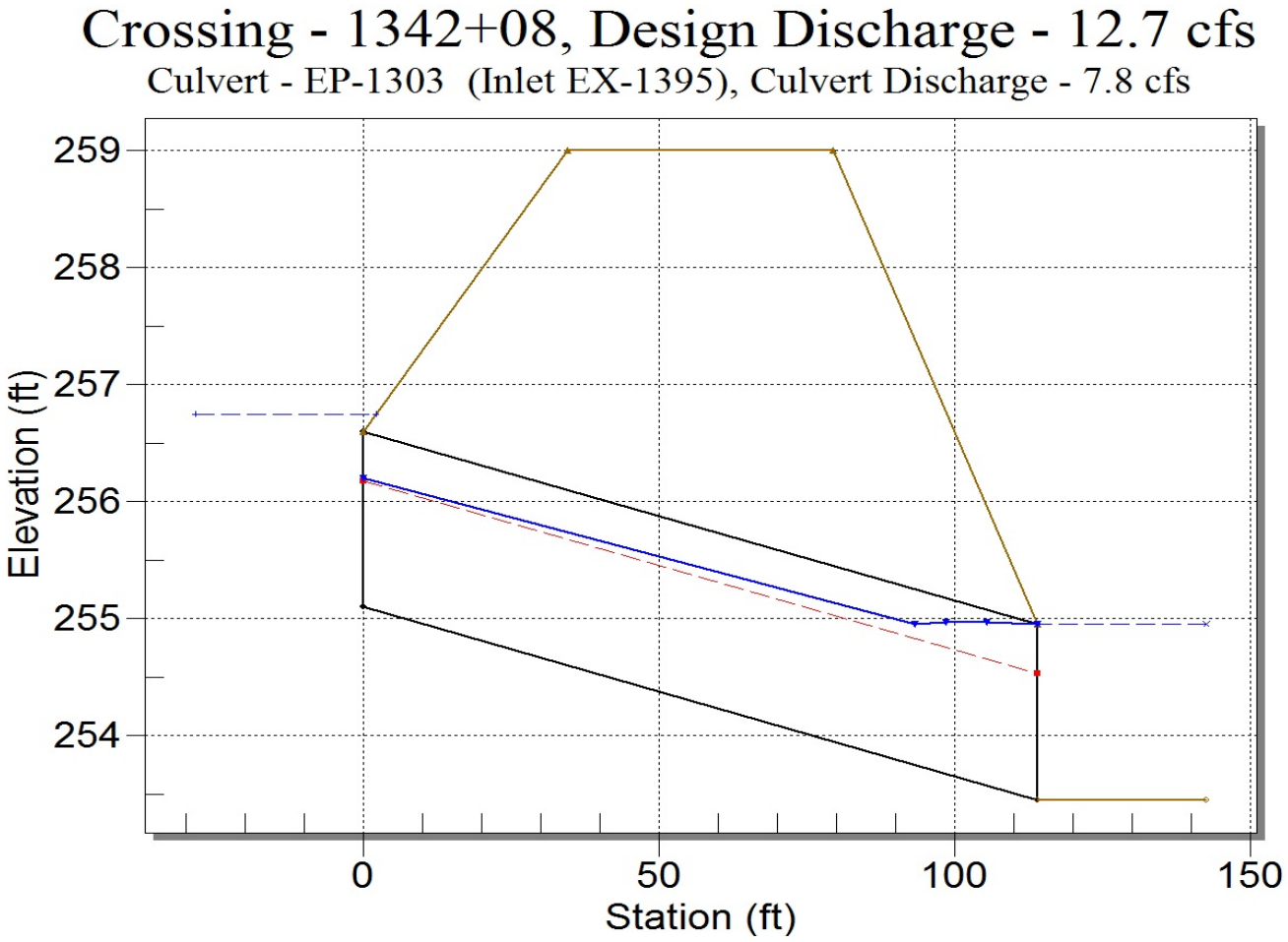
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1342+08**

Culvert Summary Table - EP-1303 (Inlet EX-1395)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.79 | 7.79 | 256.74 | 1.64 | 1.64 | 5-S1f | 0.85 | 1.08 | 1.08 | 1.50 | 5.72 | 0.00 |
| 8.39 | 8.39 | 256.84 | 1.74 | 1.74 | 5-S1f | 0.89 | 1.12 | 1.12 | 1.50 | 5.96 | 0.00 |
| 8.99 | 8.99 | 256.95 | 1.85 | 1.85 | 5-S1f | 0.93 | 1.16 | 1.16 | 1.50 | 6.16 | 0.00 |
| 9.59 | 9.59 | 257.06 | 1.96 | 1.96 | 5-S1f | 0.98 | 1.20 | 1.20 | 1.50 | 6.35 | 0.00 |
| 10.19 | 10.19 | 257.17 | 2.07 | 1.54 | 4-FFf | 1.02 | 1.22 | 1.02 | 1.50 | 7.97 | 0.00 |
| 10.79 | 10.79 | 257.30 | 2.20 | 1.74 | 4-FFf | 1.07 | 1.25 | 1.07 | 1.50 | 8.03 | 0.00 |
| 11.39 | 11.39 | 257.44 | 2.34 | 1.96 | 4-FFf | 1.12 | 1.28 | 1.12 | 1.50 | 8.09 | 0.00 |
| 11.99 | 11.99 | 257.58 | 2.48 | 2.18 | 4-FFf | 1.17 | 1.31 | 1.17 | 1.50 | 8.14 | 0.00 |
| 12.59 | 12.59 | 257.73 | 2.63 | 2.42 | 4-FFf | 1.23 | 1.33 | 1.23 | 1.50 | 8.11 | 0.00 |
| 12.65 | 12.65 | 257.74 | 2.64 | 2.45 | 4-FFf | 1.24 | 1.34 | 1.24 | 1.50 | 8.09 | 0.00 |
| 13.79 | 13.79 | 258.05 | 2.95 | 2.94 | 4-FFf | 1.50 | 1.39 | 1.50 | 1.50 | 7.80 | 0.00 |

Water Surface Profile Plot



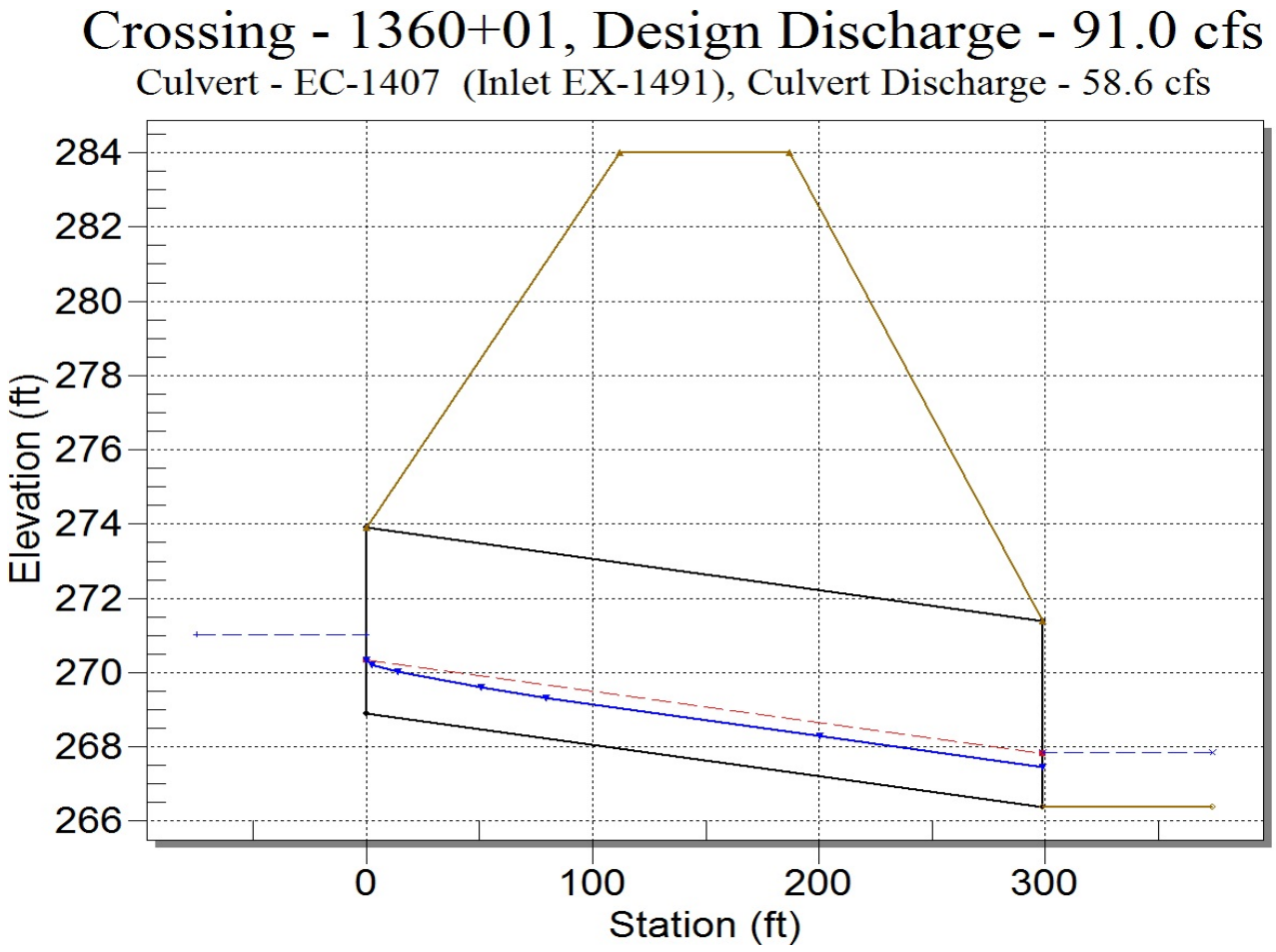
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1360+01**

Culvert Summary Table - EC-1407 (Inlet EX-1491)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 58.59 | 58.59 | 271.03 | 2.13 | 0.0* | 1-S2n | 1.08 | 1.44 | 1.08 | 1.46 | 9.02 | 0.00 |
| 62.56 | 62.56 | 271.12 | 2.22 | 0.0* | 1-S2n | 1.12 | 1.50 | 1.12 | 1.46 | 9.28 | 0.00 |
| 66.52 | 66.52 | 271.22 | 2.32 | 0.0* | 1-S2n | 1.17 | 1.57 | 1.18 | 1.46 | 9.40 | 0.00 |
| 70.48 | 70.48 | 271.31 | 2.41 | 0.0* | 1-S2n | 1.22 | 1.63 | 1.22 | 1.46 | 9.65 | 0.00 |
| 74.45 | 74.45 | 271.40 | 2.50 | 0.0* | 1-S2n | 1.26 | 1.69 | 1.28 | 1.46 | 9.71 | 0.00 |
| 78.41 | 78.41 | 271.49 | 2.59 | 0.0* | 1-S2n | 1.31 | 1.75 | 1.32 | 1.46 | 9.93 | 0.00 |
| 82.38 | 82.38 | 271.58 | 2.68 | 0.0* | 1-S2n | 1.36 | 1.81 | 1.36 | 1.46 | 10.12 | 0.00 |
| 86.34 | 86.34 | 271.68 | 2.78 | 0.0* | 1-S2n | 1.40 | 1.86 | 1.40 | 1.46 | 10.25 | 0.00 |
| 90.31 | 90.31 | 271.77 | 2.87 | 0.0* | 1-S2n | 1.45 | 1.92 | 1.45 | 1.46 | 10.36 | 0.00 |
| 91.01 | 91.01 | 271.78 | 2.88 | 0.0* | 1-S2n | 1.46 | 1.93 | 1.46 | 1.46 | 10.39 | 0.00 |
| 98.24 | 98.24 | 271.94 | 3.04 | 0.0* | 1-S2n | 1.54 | 2.03 | 1.54 | 1.46 | 10.63 | 0.00 |

Water Surface Profile Plot



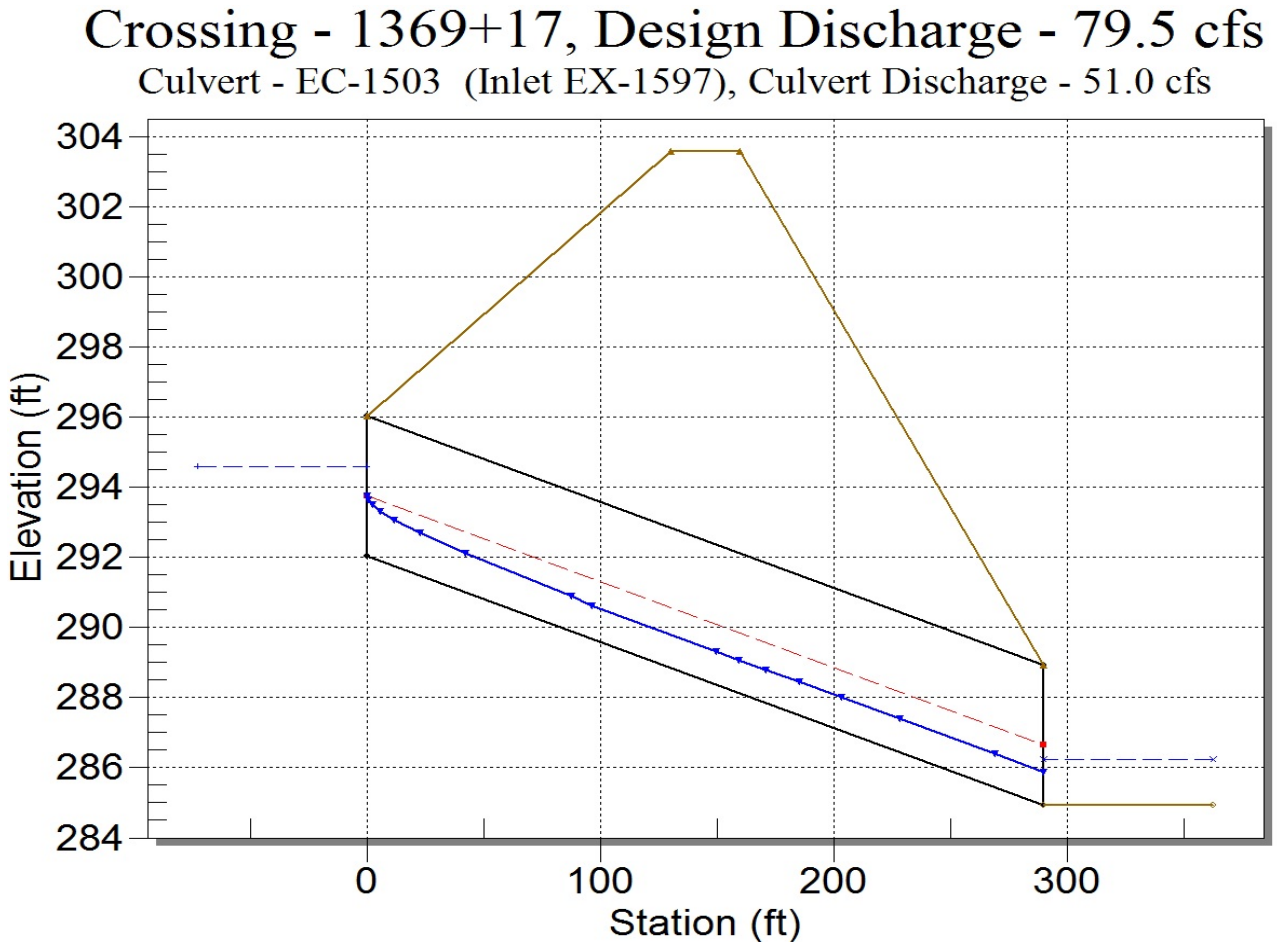
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1369+17**

Culvert Summary Table - EC-1503 (Inlet EX-1597)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 51.03 | 51.03 | 294.50 | 2.56 | 0.0* | 1-S2n | 0.95 | 1.72 | 0.95 | 1.30 | 13.37 | 0.00 |
| 54.52 | 54.52 | 294.62 | 2.68 | 0.0* | 1-S2n | 0.99 | 1.80 | 1.00 | 1.30 | 13.68 | 0.00 |
| 58.00 | 58.00 | 294.74 | 2.80 | 0.0* | 1-S2n | 1.03 | 1.87 | 1.04 | 1.30 | 13.91 | 0.00 |
| 61.49 | 61.49 | 294.86 | 2.92 | 0.0* | 1-S2n | 1.08 | 1.95 | 1.09 | 1.30 | 14.15 | 0.00 |
| 64.97 | 64.97 | 294.98 | 3.04 | 0.0* | 1-S2n | 1.12 | 2.02 | 1.13 | 1.30 | 14.38 | 0.00 |
| 68.46 | 68.46 | 295.10 | 3.16 | 0.0* | 1-S2n | 1.17 | 2.09 | 1.17 | 1.30 | 14.62 | 0.00 |
| 71.95 | 71.95 | 295.22 | 3.28 | 0.0* | 1-S2n | 1.21 | 2.16 | 1.21 | 1.30 | 14.85 | 0.00 |
| 75.43 | 75.43 | 295.34 | 3.40 | 0.0* | 1-S2n | 1.25 | 2.23 | 1.25 | 1.30 | 15.04 | 0.00 |
| 78.92 | 78.92 | 295.45 | 3.51 | 0.0* | 1-S2n | 1.29 | 2.30 | 1.30 | 1.30 | 15.19 | 0.00 |
| 79.51 | 79.51 | 295.47 | 3.53 | 0.0* | 1-S2n | 1.30 | 2.31 | 1.30 | 1.30 | 15.27 | 0.00 |
| 85.89 | 85.89 | 295.68 | 3.74 | 0.0* | 1-S2n | 1.37 | 2.43 | 1.38 | 1.30 | 15.61 | 0.00 |

Water Surface Profile Plot



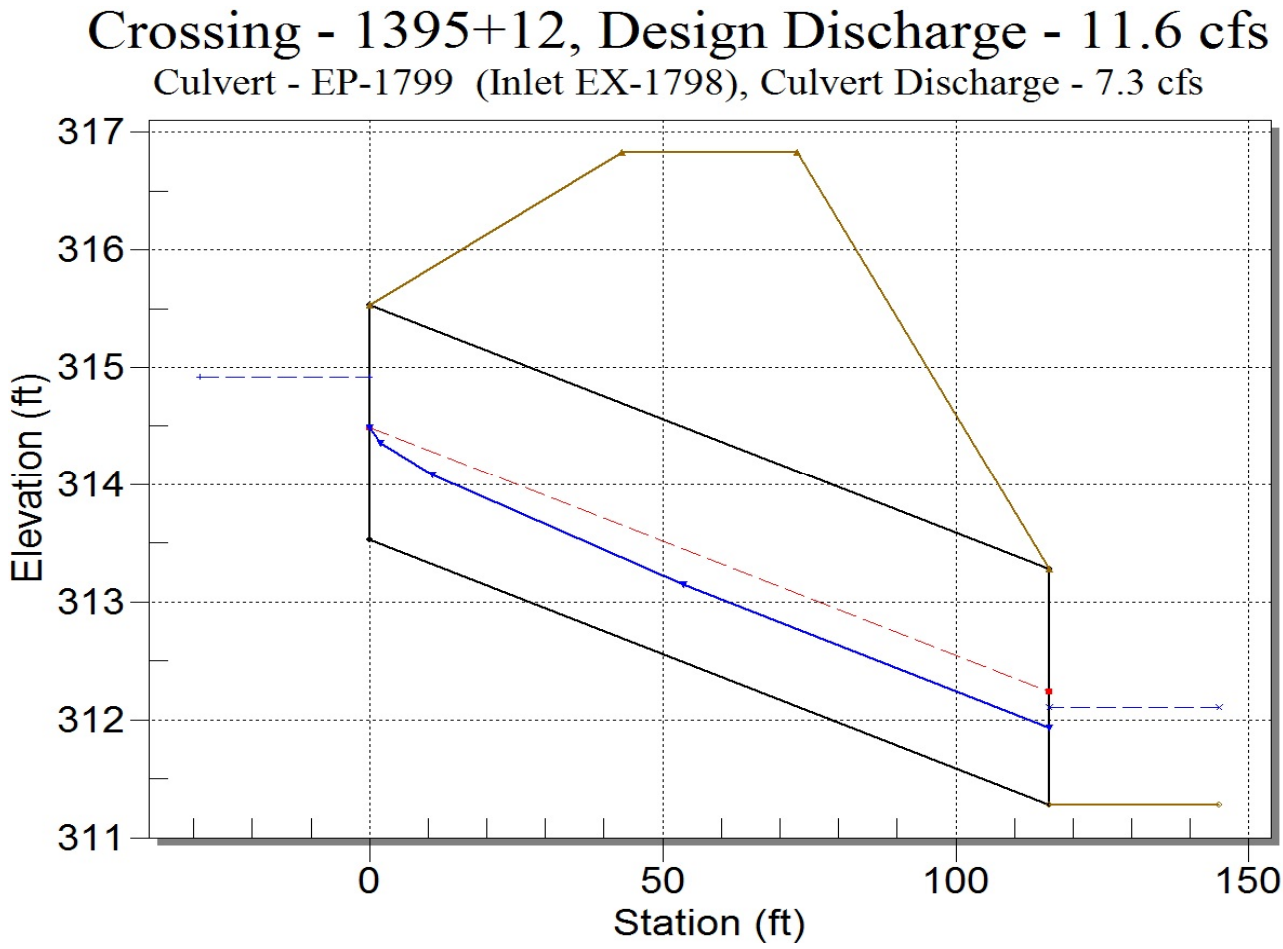
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1395+12**

Culvert Summary Table - EP-1799 (Inlet EX-1798)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.33 | 7.33 | 314.89 | 1.39 | 0.0* | 1-S2n | 0.65 | 0.96 | 0.66 | 0.83 | 8.12 | 2.15 |
| 7.85 | 7.85 | 314.95 | 1.45 | 0.0* | 1-S2n | 0.67 | 1.00 | 0.68 | 0.85 | 8.38 | 2.19 |
| 8.37 | 8.37 | 315.01 | 1.51 | 0.0* | 1-S2n | 0.70 | 1.03 | 0.70 | 0.87 | 8.47 | 2.22 |
| 8.89 | 8.89 | 315.07 | 1.57 | 0.0* | 1-S2n | 0.72 | 1.06 | 0.73 | 0.89 | 8.56 | 2.26 |
| 9.41 | 9.41 | 315.12 | 1.62 | 0.0* | 1-S2n | 0.75 | 1.09 | 0.75 | 0.91 | 8.72 | 2.29 |
| 9.93 | 9.93 | 315.18 | 1.68 | 0.0* | 1-S2n | 0.77 | 1.12 | 0.77 | 0.93 | 8.86 | 2.32 |
| 10.46 | 10.46 | 315.24 | 1.74 | 0.0* | 1-S2n | 0.79 | 1.16 | 0.79 | 0.94 | 8.99 | 2.35 |
| 10.98 | 10.98 | 315.29 | 1.79 | 0.0* | 1-S2n | 0.81 | 1.19 | 0.81 | 0.96 | 9.15 | 2.38 |
| 11.50 | 11.50 | 315.35 | 1.85 | 0.0* | 1-S2n | 0.83 | 1.22 | 0.83 | 0.98 | 9.28 | 2.41 |
| 11.57 | 11.57 | 315.35 | 1.85 | 0.0* | 1-S2n | 0.84 | 1.22 | 0.84 | 0.98 | 9.28 | 2.41 |
| 12.54 | 12.54 | 315.46 | 1.96 | 0.0* | 1-S2n | 0.87 | 1.27 | 0.88 | 1.01 | 9.44 | 2.46 |

Water Surface Profile Plot



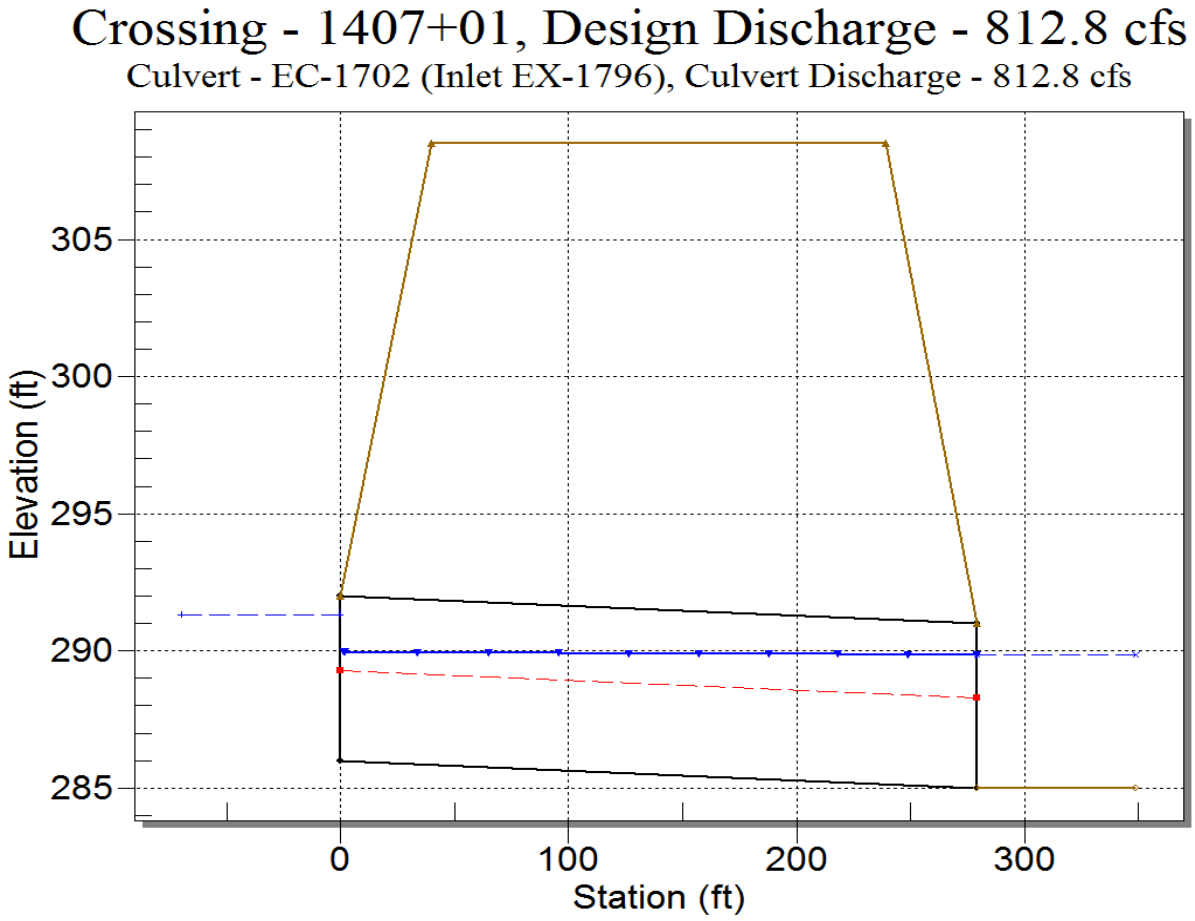
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1407+01**

Culvert Summary Table - EC-1702 (Inlet EX-1796)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 312.74 | 312.74 | 288.79 | 2.59 | 2.79 | 1-S1t | 1.69 | 1.74 | 3.00 | 3.00 | 4.34 | 4.34 |
| 374.90 | 374.90 | 289.16 | 2.93 | 3.16 | 1-S1t | 1.91 | 1.97 | 3.30 | 3.30 | 4.73 | 4.56 |
| 437.06 | 437.06 | 289.51 | 3.26 | 3.51 | 1-S1t | 2.12 | 2.18 | 3.57 | 3.57 | 5.10 | 4.76 |
| 499.23 | 499.23 | 289.84 | 3.58 | 3.84 | 1-S1t | 2.34 | 2.38 | 3.82 | 3.82 | 5.45 | 4.94 |
| 561.39 | 561.39 | 290.16 | 3.89 | 4.16 | 1-S1t | 2.54 | 2.58 | 4.05 | 4.05 | 5.77 | 5.10 |
| 623.55 | 623.55 | 290.46 | 4.19 | 4.46 | 1-S1t | 2.74 | 2.76 | 4.27 | 4.27 | 6.08 | 5.25 |
| 685.71 | 685.71 | 290.76 | 4.49 | 4.76 | 1-S1t | 2.93 | 2.94 | 4.48 | 4.48 | 6.38 | 5.39 |
| 747.87 | 747.87 | 291.04 | 4.78 | 5.04 | 3-M1t | 3.12 | 3.12 | 4.67 | 4.67 | 6.67 | 5.52 |
| 810.04 | 810.04 | 291.31 | 5.06 | 5.31 | 3-M1t | 3.31 | 3.29 | 4.86 | 4.86 | 6.95 | 5.64 |
| 812.81 | 812.81 | 291.32 | 5.07 | 5.32 | 3-M1t | 3.32 | 3.30 | 4.87 | 4.87 | 6.96 | 5.64 |
| 934.36 | 934.36 | 291.84 | 5.62 | 5.84 | 3-M1t | 3.68 | 3.62 | 5.21 | 5.21 | 7.47 | 5.85 |

Water Surface Profile Plot



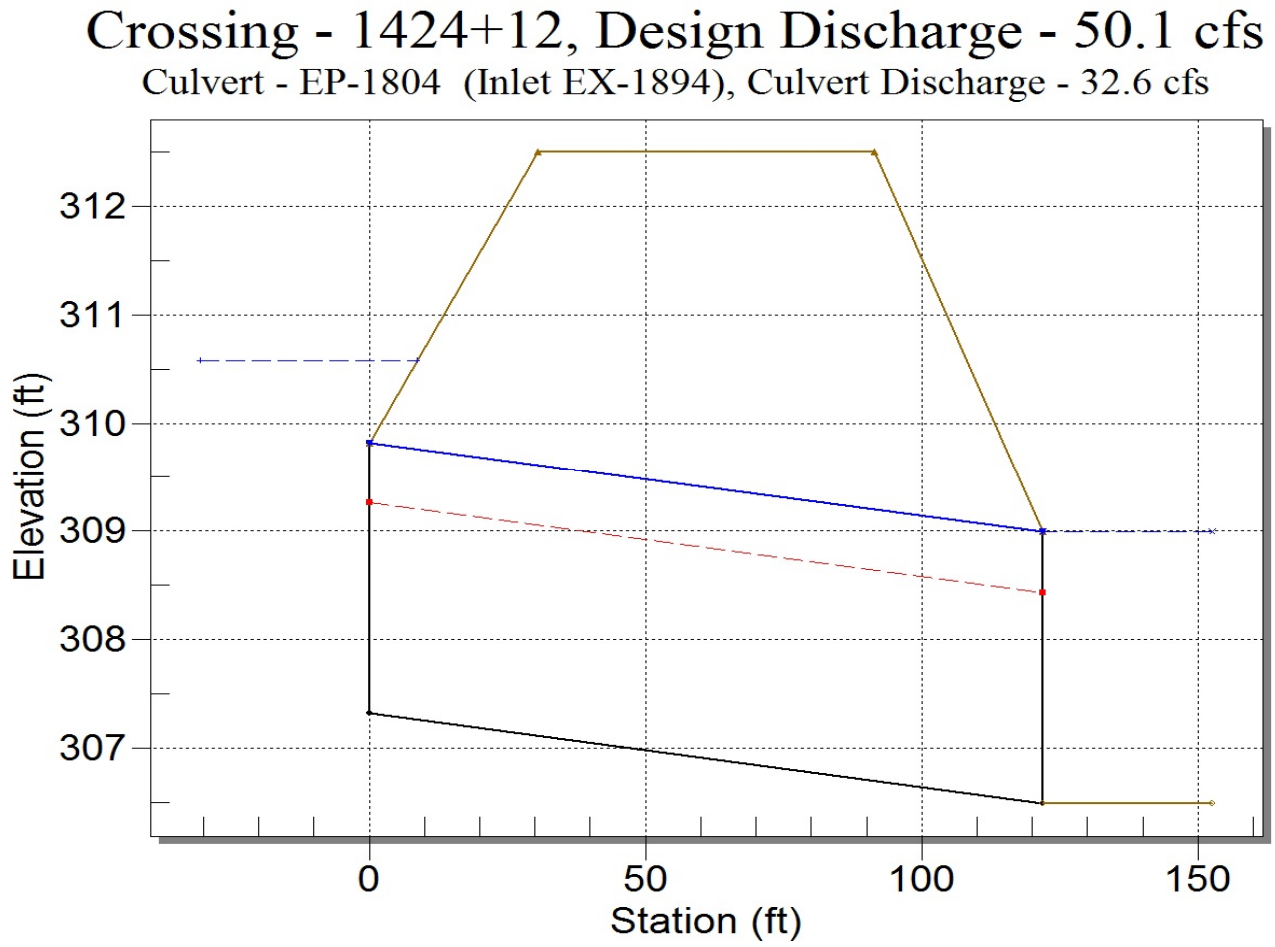
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1424+12**

Culvert Summary Table - EP-1804 (Inlet EX-1894)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 32.63 | 32.63 | 310.58 | 3.12 | 3.26 | 4-FFf | 1.97 | 1.94 | 2.50 | 2.50 | 6.65 | 0.00 |
| 34.77 | 34.77 | 310.80 | 3.30 | 3.48 | 4-FFf | 2.14 | 2.00 | 2.50 | 2.50 | 7.08 | 0.00 |
| 36.91 | 36.91 | 311.03 | 3.50 | 3.71 | 4-FFf | 2.50 | 2.05 | 2.50 | 2.50 | 7.52 | 0.00 |
| 39.05 | 39.05 | 311.27 | 3.71 | 3.95 | 4-FFf | 2.50 | 2.09 | 2.50 | 2.50 | 7.95 | 0.00 |
| 41.19 | 41.19 | 311.52 | 3.94 | 4.20 | 4-FFf | 2.50 | 2.14 | 2.50 | 2.50 | 8.39 | 0.00 |
| 43.33 | 43.33 | 311.80 | 4.18 | 4.48 | 4-FFf | 2.50 | 2.18 | 2.50 | 2.50 | 8.83 | 0.00 |
| 45.46 | 45.46 | 312.08 | 4.43 | 4.76 | 4-FFf | 2.50 | 2.23 | 2.50 | 2.50 | 9.26 | 0.00 |
| 47.60 | 47.60 | 312.38 | 4.69 | 5.06 | 4-FFf | 2.50 | 2.27 | 2.50 | 2.50 | 9.70 | 0.00 |
| 49.74 | 48.62 | 312.52 | 4.82 | 5.20 | 4-FFf | 2.50 | 2.29 | 2.50 | 2.50 | 9.90 | 0.00 |
| 50.15 | 48.66 | 312.53 | 4.83 | 5.21 | 4-FFf | 2.50 | 2.30 | 2.50 | 2.50 | 9.91 | 0.00 |
| 54.02 | 48.92 | 312.57 | 4.86 | 5.25 | 4-FFf | 2.50 | 2.30 | 2.50 | 2.50 | 9.97 | 0.00 |

Water Surface Profile Plot



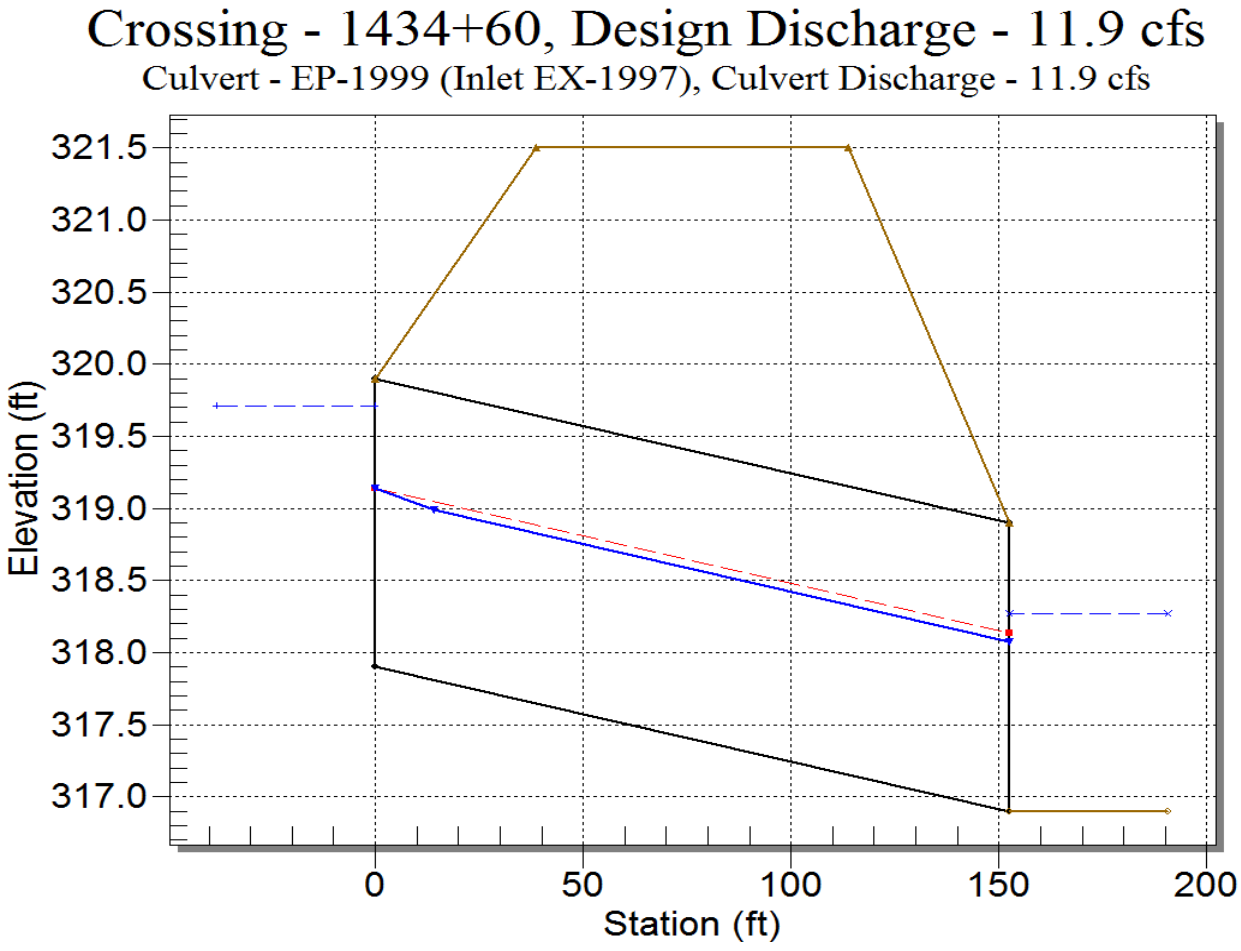
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1434+60**

Culvert Summary Table - EP-1999 (Inlet EX-1997)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 7.57 | 7.57 | 319.29 | 1.39 | 0.0* | 1-S2n | 0.89 | 0.98 | 0.90 | 1.15 | 5.56 | 1.14 |
| 8.11 | 8.11 | 319.35 | 1.45 | 0.0* | 1-S2n | 0.93 | 1.01 | 0.93 | 1.18 | 5.65 | 1.16 |
| 8.65 | 8.65 | 319.40 | 1.50 | 0.0* | 1-S2n | 0.96 | 1.05 | 0.97 | 1.21 | 5.76 | 1.18 |
| 9.18 | 9.18 | 319.45 | 1.55 | 0.0* | 1-S2n | 1.00 | 1.08 | 1.00 | 1.24 | 5.84 | 1.19 |
| 9.72 | 9.72 | 319.50 | 1.60 | 0.0* | 1-S2n | 1.03 | 1.11 | 1.03 | 1.27 | 5.93 | 1.21 |
| 10.26 | 10.26 | 319.55 | 1.65 | 0.0* | 1-S2n | 1.07 | 1.14 | 1.07 | 1.29 | 5.98 | 1.23 |
| 10.80 | 10.80 | 319.60 | 1.70 | 0.0* | 1-S2n | 1.10 | 1.18 | 1.11 | 1.32 | 6.07 | 1.24 |
| 11.34 | 11.34 | 319.65 | 1.75 | 0.0* | 1-S2n | 1.14 | 1.21 | 1.14 | 1.34 | 6.15 | 1.26 |
| 11.87 | 11.87 | 319.70 | 1.80 | 0.0* | 1-S2n | 1.17 | 1.23 | 1.17 | 1.37 | 6.20 | 1.27 |
| 11.95 | 11.95 | 319.71 | 1.81 | 0.0* | 1-S2n | 1.18 | 1.24 | 1.18 | 1.37 | 6.21 | 1.27 |
| 12.95 | 12.95 | 319.80 | 1.90 | 0.0* | 1-S2n | 1.24 | 1.29 | 1.24 | 1.41 | 6.32 | 1.30 |

Water Surface Profile Plot



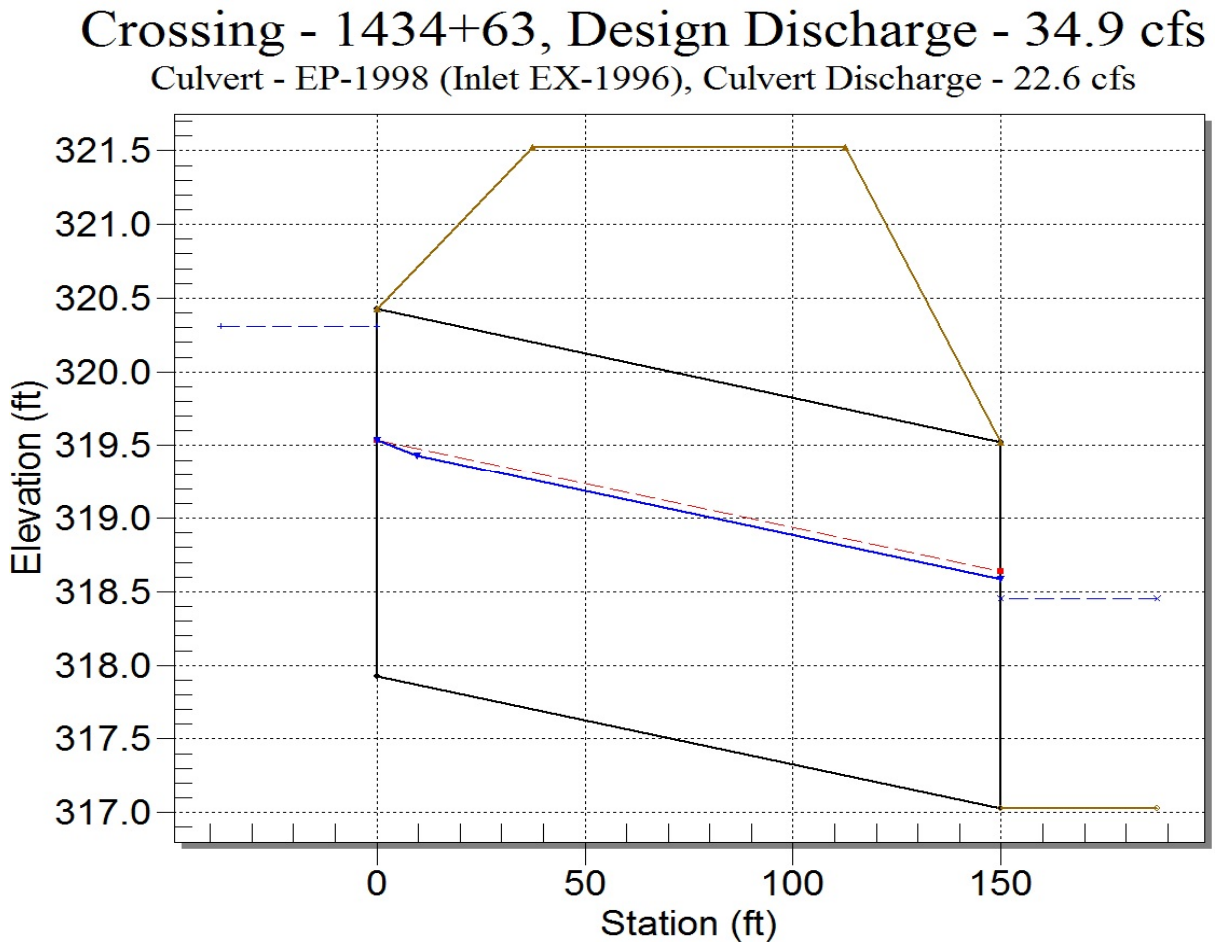
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1434+63**

Culvert Summary Table - EP-1998 (Inlet EX-1996)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 22.65 | 22.65 | 320.28 | 2.38 | 0.53 | 1-S2n | 1.56 | 1.61 | 1.56 | 1.43 | 7.02 | 3.17 |
| 24.14 | 24.14 | 320.38 | 2.48 | 0.56 | 1-S2n | 1.63 | 1.67 | 1.64 | 1.46 | 7.10 | 3.22 |
| 25.64 | 25.64 | 320.49 | 2.59 | 0.60 | 5-S2n | 1.70 | 1.72 | 1.70 | 1.50 | 7.21 | 3.27 |
| 27.13 | 27.13 | 320.66 | 2.69 | 2.76 | 2-M2c | 1.78 | 1.77 | 1.78 | 1.53 | 7.28 | 3.31 |
| 28.63 | 28.63 | 320.76 | 2.80 | 2.86 | 2-M2c | 1.86 | 1.82 | 1.82 | 1.56 | 7.46 | 3.36 |
| 30.12 | 30.12 | 320.85 | 2.92 | 2.95 | 2-M2c | 1.94 | 1.86 | 1.87 | 1.59 | 7.65 | 3.40 |
| 31.61 | 31.61 | 320.95 | 3.03 | 3.05 | 2-M2c | 2.04 | 1.91 | 1.92 | 1.62 | 7.83 | 3.44 |
| 33.11 | 33.11 | 321.07 | 3.16 | 3.17 | 2-M2c | 2.18 | 1.95 | 1.96 | 1.65 | 8.03 | 3.48 |
| 34.60 | 34.60 | 321.19 | 3.29 | 3.28 | 2-M2c | 2.50 | 2.00 | 2.00 | 1.68 | 8.22 | 3.52 |
| 34.88 | 34.88 | 321.23 | 3.32 | 3.33 | 2-M2c | 2.50 | 2.00 | 2.01 | 1.68 | 8.26 | 3.53 |
| 37.59 | 36.98 | 321.51 | 3.51 | 3.61 | 7-M2c | 2.50 | 2.05 | 2.06 | 1.73 | 8.55 | 3.60 |

Water Surface Profile Plot



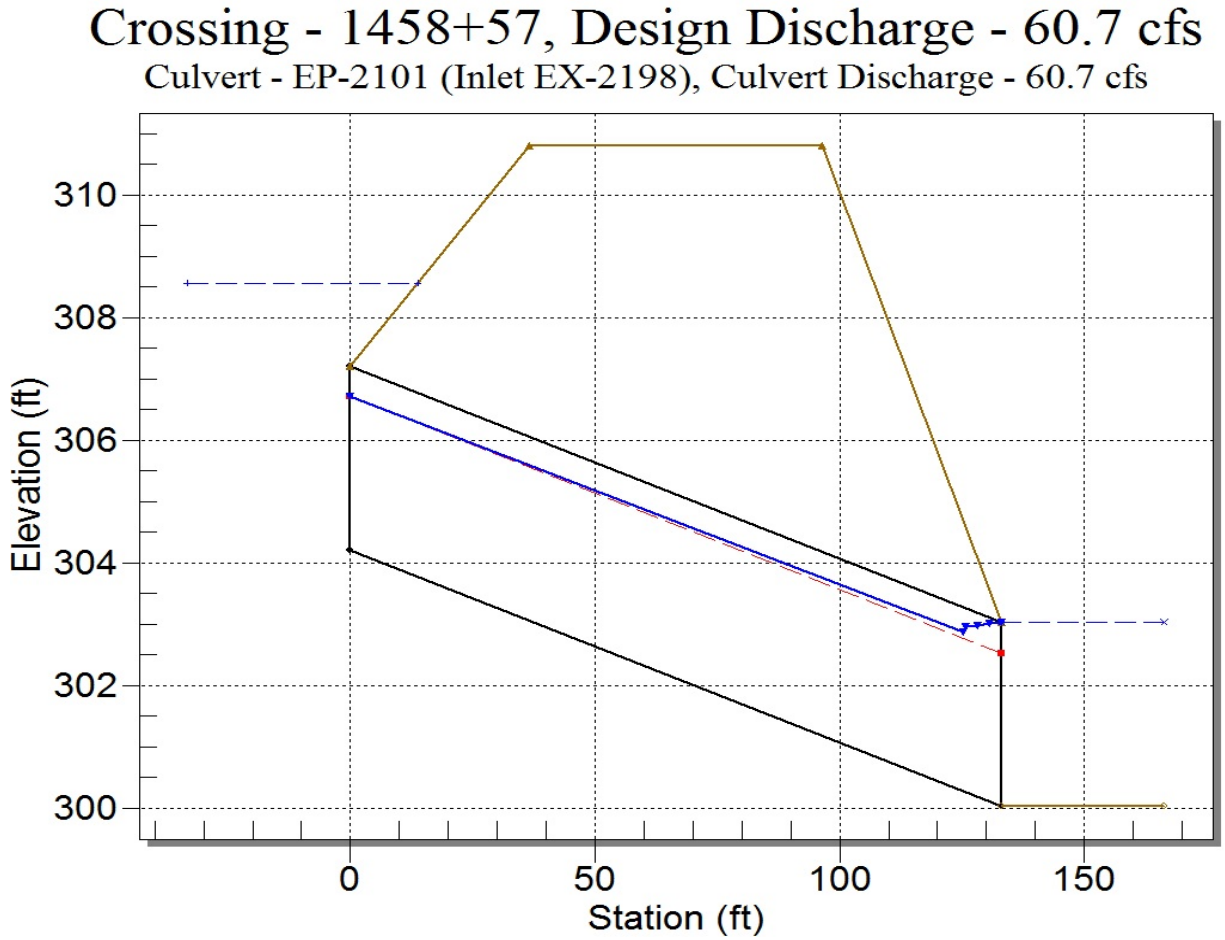
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1458+57**

Culvert Summary Table - EP-2101 (Inlet EX-2198)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 39.24 | 39.24 | 307.21 | 3.00 | 3.00 | 5-S1f | 1.19 | 2.03 | 2.03 | 3.00 | 7.70 | 0.00 |
| 41.86 | 41.86 | 307.35 | 3.14 | 3.14 | 5-S1f | 1.23 | 2.11 | 2.11 | 3.00 | 7.89 | 0.00 |
| 44.49 | 44.49 | 307.50 | 3.29 | 3.29 | 5-S1f | 1.27 | 2.17 | 2.17 | 3.00 | 8.15 | 0.00 |
| 47.11 | 47.11 | 307.65 | 3.44 | 3.44 | 5-S1f | 1.31 | 2.23 | 2.23 | 3.00 | 8.39 | 0.00 |
| 49.74 | 49.74 | 307.81 | 3.60 | 3.60 | 5-S1f | 1.35 | 2.29 | 2.29 | 3.00 | 8.62 | 0.00 |
| 52.36 | 52.36 | 307.97 | 3.76 | 3.76 | 5-S1f | 1.39 | 2.35 | 2.35 | 3.00 | 8.84 | 0.00 |
| 54.98 | 54.98 | 308.15 | 3.94 | 3.94 | 5-S1f | 1.43 | 2.41 | 2.41 | 3.00 | 9.05 | 0.00 |
| 57.61 | 57.61 | 308.33 | 4.12 | 4.12 | 5-S1f | 1.47 | 2.45 | 2.45 | 3.00 | 9.32 | 0.00 |
| 60.23 | 60.23 | 308.53 | 4.32 | 4.32 | 5-S1f | 1.51 | 2.49 | 2.49 | 3.00 | 9.63 | 0.00 |
| 60.71 | 60.71 | 308.56 | 4.35 | 4.35 | 5-S1f | 1.52 | 2.50 | 2.50 | 3.00 | 9.69 | 0.00 |
| 65.48 | 65.48 | 308.94 | 4.73 | 4.73 | 5-S1f | 1.59 | 2.57 | 2.57 | 3.00 | 10.18 | 0.00 |

Water Surface Profile Plot



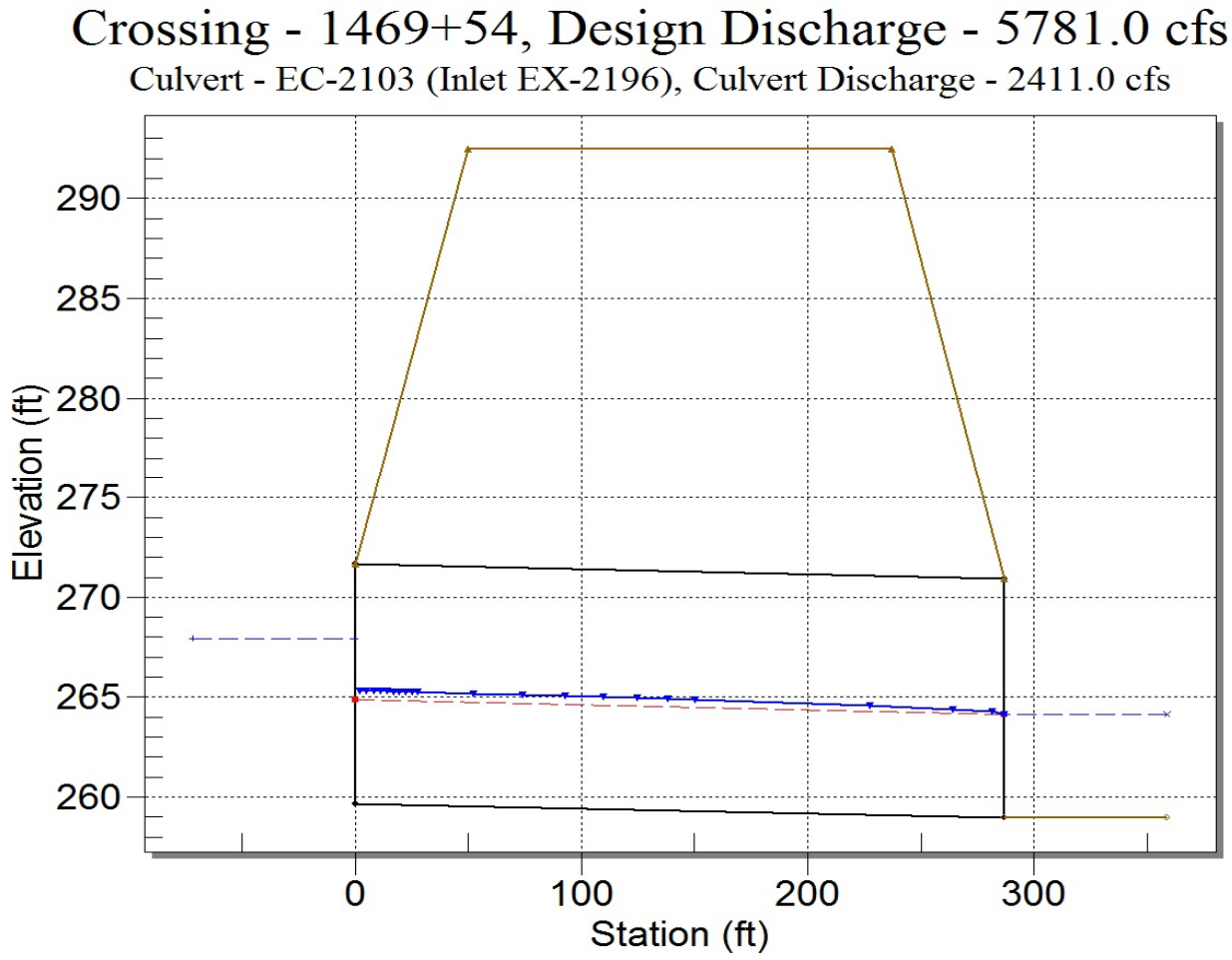
# I-77 HY-8 ANALYSIS OF EXISTING CULVERT OPENINGS

**Culvert Crossing: 1469+54**

Culvert Summary Table - EC-2103 (Inlet EX-2196)

| Total Discharge (cfs) | Culvert Discharge (cfs) | Head-water Elev. (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tail-water Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2411.00 | 2411.00 | 267.93 | 7.85 | 8.27 | 3-M2t | 5.73 | 5.19 | 5.20 | 5.20 | 12.88 | 9.16 |
| 2807.10 | 2807.10 | 268.82 | 8.75 | 9.16 | 2-M2c | 6.43 | 5.75 | 5.74 | 5.64 | 13.59 | 9.59 |
| 3203.20 | 3203.20 | 269.66 | 9.62 | 10.00 | 2-M2c | 7.11 | 6.28 | 6.26 | 6.05 | 14.21 | 9.96 |
| 3599.30 | 3599.30 | 270.48 | 10.47 | 10.82 | 2-M2c | 7.78 | 6.79 | 6.77 | 6.43 | 14.77 | 10.30 |
| 3995.40 | 3995.40 | 271.26 | 11.31 | 11.60 | 2-M2c | 8.44 | 7.27 | 7.26 | 6.80 | 15.29 | 10.61 |
| 4391.50 | 4391.50 | 272.02 | 12.15 | 12.36 | 2-M2c | 9.09 | 7.75 | 7.73 | 7.14 | 15.78 | 10.90 |
| 4787.60 | 4787.60 | 272.76 | 12.99 | 13.10 | 2-M2c | 9.74 | 8.21 | 8.19 | 7.47 | 16.24 | 11.17 |
| 5183.70 | 5183.70 | 273.50 | 13.84 | 13.82 | 2-M2c | 10.37 | 8.65 | 8.63 | 7.78 | 16.68 | 11.42 |
| 5579.80 | 5579.80 | 274.37 | 14.71 | 14.50 | 2-M2c | 12.00 | 9.09 | 9.07 | 8.08 | 17.09 | 11.66 |
| 5781.00 | 5781.00 | 274.82 | 15.16 | 14.87 | 2-M2c | 12.00 | 9.31 | 9.28 | 8.23 | 17.30 | 11.77 |
| 6372.00 | 6372.00 | 276.19 | 16.53 | 15.87 | 2-M2c | 12.00 | 9.93 | 9.91 | 8.64 | 17.87 | 12.10 |

Water Surface Profile Plot



# Appendix E

GEOPak Drainage Area, Link & Node Tables

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE
## GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - AREA (1 OF 3)

| Area ID | $T_C$ (min) | Discharge (cfs) | Intensity (in/hr) | C Value | Area (ac) | Node Station |
|---|---|---|---|---|---|---|
| EX-0301 | 7 | 8.56 | 6.74 | 0.42 | 3.05 | 1170+37.50 |
| EX-0302 | 15 | 16.81 | 5.57 | 0.64 | 4.69 | 1173+56.42 |
| EX-0307 | 7 | 5.41 | 6.74 | 0.60 | 1.33 | 1181+03.11 |
| EX-0402 | 9 | 8.83 | 6.41 | 0.45 | 3.07 | 1187+35.02 |
| EX-0403 | 5 | 4.52 | 7.12 | 0.61 | 1.04 | 1187+66.04 |
| EX-0404 | 7 | 4.15 | 6.74 | 0.55 | 1.12 | 1197+37.35 |
| EX-0405 | 9 | 5.79 | 6.41 | 0.66 | 1.37 | 1197+98.53 |
| EX-0406 | 6 | 6.27 | 6.92 | 0.58 | 1.55 | 1198+62.42 |
| EX-0407 | 5 | 4.40 | 7.12 | 0.61 | 1.02 | 1192+84.72 |
| EX-0501 | 12 | 2.86 | 5.96 | 0.32 | 1.50 | 1200+94.07 |
| EX-0502 | 7 | 3.78 | 6.74 | 0.60 | 0.94 | 1201+11.72 |
| EX-0504 | 5 | 0.83 | 7.12 | 0.30 | 0.39 | 1204+26.73 |
| EX-0505 | 7 | 7.21 | 6.74 | 0.53 | 2.04 | 1204+39.03 |
| EX-0506 | 18 | 6.06 | 5.23 | 0.39 | 2.99 | 1204+68.07 |
| EX-0507 | 8 | 8.73 | 6.57 | 0.66 | 2.00 | 1205+05.31 |
| EX-0508 | 5 | 0.55 | 7.12 | 0.39 | 0.20 | 1206+09.46 |
| EX-0509 | 5 | 2.32 | 7.12 | 0.55 | 0.60 | 1205+89.05 |
| EX-0601 | 5 | 3.65 | 7.12 | 0.66 | 0.78 | 1215+82.20 |
| EX-0603 | 9 | 5.06 | 6.41 | 0.34 | 2.34 | 1215+61.01 |
| EX-0604 | 5 | 0.77 | 7.12 | 0.35 | 0.31 | 1216+31.17 |
| EX-0605 | 7 | 7.68 | 6.74 | 0.73 | 1.56 | 1223+44.71 |
| EX-0606 | 5 | 1.29 | 7.12 | 0.30 | 0.61 | 1224+32.81 |
| EX-0607 | 5 | 0.79 | 7.12 | 0.30 | 0.37 | 1225+12.54 |
| EX-0608 | 5 | 1.76 | 7.12 | 0.30 | 0.83 | 1224+48.58 |
| EX-0609 | 6 | 4.57 | 6.92 | 0.64 | 1.03 | 1229+50.07 |
| EX-0610 | 5 | 0.19 | 7.12 | 0.32 | 0.09 | 1230+01.54 |
| EX-0701 | 6 | 9.77 | 6.92 | 0.68 | 2.09 | 1235+98.59 |
| EX-0702 | 8 | 9.36 | 6.57 | 0.66 | 2.17 | 1246+61.97 |
| EX-0801 | 11 | 13.44 | 6.10 | 0.70 | 3.15 | 1252+00.86 |
| EX-0802 | 9 | 9.47 | 6.41 | 0.43 | 3.41 | 1253+26.13 |
| EX-0803 | 10 | 6.91 | 6.25 | 0.60 | 1.84 | 1261+46.66 |
| EX-0901 | 10 | 8.02 | 6.25 | 0.65 | 1.97 | 1270+50.25 |
| EX-0907 | 9 | 7.76 | 6.41 | 0.65 | 1.87 | 1278+84.95 |
| EX-0993 | 75 | 51.23 | 2.41 | 0.60 | 35.67 | 1279+52.96 |
| EX-1001 | 8 | 2.31 | 6.57 | 0.49 | 0.71 | 1286+58.13 |
| EX-1002 | 5 | 3.14 | 7.12 | 0.60 | 0.74 | 1286+46.91 |
| EX-1003 | 5 | 1.80 | 7.12 | 0.57 | 0.44 | 1286+34.09 |
| EX-1004 | 50 | 31.03 | 3.16 | 0.53 | 18.49 | 1286+42.80 |
| EX-1005 | 8 | 5.94 | 6.57 | 0.60 | 1.51 | 1290+03.73 |
| EX-1007 | 12 | 5.25 | 5.96 | 0.46 | 1.94 | 1290+51.16 |
| EX-1008 | 8 | 2.21 | 6.57 | 0.40 | 0.85 | 1289+59.80 |
| EX-1009 | 8 | 2.94 | 6.57 | 0.44 | 1.02 | 1291+83.45 |

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE
## GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - AREA (2 OF 3)

| Area ID | $T_C$ (min) | Discharge (cfs) | Intensity (in/hr) | C Value | Area (ac) | Node Station |
|---|---|---|---|---|---|---|
| EX-1101 | 7 | 5.24 | 6.74 | 0.60 | 1.30 | 1297+48.27 |
| EX-1103 | 10 | 6.70 | 6.25 | 0.57 | 1.87 | 1297+50.24 |
| EX-1107 | 12 | 8.45 | 5.96 | 0.36 | 3.93 | 1303+59.76 |
| EX-1107A | 5 | 1.35 | 7.12 | 0.41 | 0.46 | 1299+67.58 |
| EX-1108 | 25 | 22.27 | 4.58 | 0.51 | 9.49 | 1304+38.27 |
| EX-1192 | 8 | 6.42 | 6.57 | 0.41 | 2.41 | 1297+67.75 |
| EX-1201 | 10 | 12.75 | 6.25 | 0.60 | 3.39 | 1320+48.58 |
| EX-1202 | 11 | 5.92 | 6.10 | 0.62 | 1.56 | 1327+67.60 |
| EX-1203 | 13 | 9.15 | 5.82 | 0.44 | 3.54 | 1319+99.01 |
| EX-1204 | 13 | 8.30 | 5.82 | 0.44 | 3.23 | 1320+08.68 |
| EX-1205 | 17 | 5.09 | 5.34 | 0.30 | 3.18 | 1319+68.98 |
| EX-1301 | 12 | 9.96 | 5.96 | 0.65 | 2.56 | 1332+19.25 |
| EX-1302 | 14 | 9.09 | 5.69 | 0.69 | 2.32 | 1341+91.59 |
| EX-1395 | 12 | 10.99 | 6.02 | 0.57 | 3.19 | 1342+08.30 |
| EX-1401 | 8 | 6.10 | 6.57 | 0.67 | 1.38 | 1350+03.10 |
| EX-1402 | 17 | 5.33 | 5.34 | 0.42 | 2.36 | 1352+05.10 |
| EX-1403 | 5 | 1.63 | 7.12 | 0.31 | 0.75 | 1355+02.43 |
| EX-1404 | 7 | 6.78 | 6.74 | 0.63 | 1.60 | 1355+38.26 |
| OP-1405 | 8 | 13.39 | 6.57 | 0.85 | 2.39 | 1357+22.79 |
| EX-1406 | 10 | 5.96 | 6.25 | 0.54 | 1.77 | 1358+27.31 |
| EX-1407 | 5 | 0.87 | 7.12 | 0.90 | 0.14 | n/a |
| EX-1409 | 8 | 3.43 | 6.57 | 0.41 | 1.28 | 1353+84.32 |
| EX-1410 | 10 | 3.69 | 6.25 | 0.31 | 1.93 | 1357+52.70 |
| EX-1494 | 12 | 6.31 | 5.96 | 0.38 | 2.76 | 1358+84.23 |
| EX-1497 | 10 | 9.25 | 6.25 | 0.34 | 4.34 | 1352+37.32 |
| EX-1501 | 5 | 8.10 | 7.12 | 0.60 | 1.89 | 1362+46.47 |
| EX-1502 | 6 | 2.32 | 6.92 | 0.41 | 0.81 | 1364+80.78 |
| EX-1503 | 13 | 17.61 | 5.82 | 0.59 | 5.17 | n/a |
| EX-1504 | 10 | 6.88 | 6.25 | 0.59 | 1.87 | 1367+70.48 |
| EX-1505 | 7 | 6.46 | 6.74 | 0.60 | 1.59 | 1371+97.00 |
| EX-1506 | 10 | 8.08 | 6.25 | 0.69 | 1.86 | 1371+99.99 |
| EX-1507 | 5 | 1.27 | 7.12 | 0.66 | 0.27 | 1372+01.82 |
| EX-1508 | 5 | 4.33 | 7.12 | 0.65 | 0.94 | 1372+40.91 |
| EX-1509 | 40 | 25.19 | 3.61 | 0.40 | 17.60 | 1373+11.59 |
| EX-1594 | 50 | 26.69 | 3.16 | 0.54 | 15.60 | 1369+36.36 |
| EX-1601 | 7 | 3.21 | 6.74 | 0.66 | 0.72 | 1379+82.20 |
| EX-1602 | 5 | 3.21 | 7.12 | 0.60 | 0.75 | 1379+84.09 |
| EX-1603 | 9 | 3.77 | 6.41 | 0.64 | 0.93 | 1379+86.51 |
| EX-1604 | 5 | 2.46 | 7.12 | 0.55 | 0.63 | 1379+87.52 |
| EX-1605 | 5 | 3.64 | 7.12 | 0.57 | 0.90 | 1383+46.69 |
| EX-1606 | 17 | 5.16 | 5.34 | 0.41 | 2.38 | 1383+51.50 |
| EX-1607 | 8 | 5.46 | 6.57 | 0.61 | 1.37 | 1383+64.04 |

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE
## GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - AREA (3 OF 3)

| Area ID | $T_C$ (min) | Discharge (cfs) | Intensity (in/hr) | C Value | Area (ac) | Node Station |
|---|---|---|---|---|---|---|
| EX-1608 | 12 | 5.56 | 5.96 | 0.58 | 1.60 | 1383+78.82 |
| EX-1609 | 5 | 2.63 | 7.12 | 0.61 | 0.61 | 1383+84.97 |
| EX-1610 | 6 | 1.83 | 6.92 | 0.30 | 0.88 | 1387+77.60 |
| EX-1698 | 5 | 1.40 | 7.12 | 0.50 | 0.39 | 1379+81.57 |
| EX-1701 | 11 | 11.32 | 6.10 | 0.68 | 2.73 | 1399+90.93 |
| EX-1801 | 14 | 17.53 | 5.69 | 0.68 | 4.50 | 1410+72.23 |
| EX-1802 | 10 | 8.43 | 6.25 | 0.67 | 2.00 | 1416+20.50 |
| EX-1803 | 15 | 23.05 | 5.57 | 0.67 | 6.21 | 1423+70.33 |
| EX-1894 | 76 | 40.86 | 2.39 | 0.42 | 40.69 | 1424+12.27 |
| EX-1897 | 22 | 8.51 | 4.84 | 0.30 | 5.91 | 1416+60.60 |
| EX-2101 | 11 | 11.68 | 6.10 | 0.66 | 2.88 | 1459+00.30 |
| EX-2102 | 12 | 16.80 | 5.96 | 0.67 | 4.22 | 1471+91.64 |
| EX-2198 | 46 | 54.49 | 3.31 | 0.52 | 31.63 | 1458+56.65 |
| EX-2201 | 9 | 9.69 | 6.41 | 0.64 | 2.38 | 1475+65.71 |
| EX-2202 | 10 | 6.06 | 6.25 | 0.51 | 1.90 | 1476+68.11 |
| EX-2203 | 20 | 19.54 | 5.02 | 0.57 | 6.86 | 1484+97.49 |
| EX-2204 | 20 | 26.00 | 5.02 | 0.45 | 11.49 | 1485+95.89 |
| EX-2301 | 6 | 2.61 | 6.92 | 0.60 | 0.63 | 1499+93.01 |
| EX-2302 | 5 | 2.01 | 7.12 | 0.58 | 0.49 | 1500+90.21 |
| EX-2303 | 14 | 6.28 | 5.69 | 0.36 | 3.10 | 1503+93.13 |
| EX-2304 | 15 | 6.11 | 5.57 | 0.35 | 3.12 | 1503+88.57 |

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - LINK (1 OF 3)

| Link ID | US Node | DS Node | Shape | Material | # of Barrels | Dia-meter (ft) | Length (ft) | Slope (%) | Discharge (cfs) | Capacity (cfs) | Uniform Depth (ft) | Uniform Velocity (fps) | Soffit US Elev. (ft) | HGL US Elev. (ft) | Soffit DS Elev. (ft) | HGL DS Elev. (ft) | Invert US Elev. (ft) | Invert DS Elev. (ft) | Actual US Vel. (fps) | Actual DS Vel. (fps) | Actual US Depth (ft) | Actual DS Depth (ft) | Node Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EP-0301 | EX-0301 | OP-0398 | Circ. | Conc. | 1 | 1.5 | 118.96 | 2.25 | 8.56 | 18.37 | 0.75 | 9.67 | 250.53 | 250.97 | 247.85 | 247.11 | 249.03 | 246.35 | 4.84 | 9.57 | 1.50 | 0.76 | 1170+37.50 |
| EP-0302 | EX-0302 | OP-0397 | Circ. | Conc. | 1 | 1.5 | 155.57 | 2.73 | 16.81 | 20.23 | 1.11 | 12.04 | 251.47 | 254.58 | 247.22 | 246.84 | 249.97 | 245.72 | 9.51 | 11.93 | 1.50 | 1.12 | 1173+56.42 |
| EP-0303 | EX-0306 | OP-0394 | Circ. | Conc. | 1 | 4.0 | 321.78 | 0.92 | 128.46 | 160.67 | 2.86 | 13.36 | 256.62 | 257.62 | 253.66 | 252.54 | 252.62 | 249.66 | 10.22 | 13.27 | 4.00 | 2.88 | 1180+59.01 |
| EP-0304 | EX-0396 | EX-0306 | Circ. | Conc. | 2 | 2.0 | 42.00 | 6.58 | 50.00 | 135.26 | 0.88 | 18.87 | 259.39 | 261.22 | 256.62 | 255.66 | 257.39 | 254.62 | 7.96 | 15.15 | 2.00 | 1.04 | 1180+43.59 |
| EP-0305 | EX-0307 | EX-0306 | Circ. | Conc. | 1 | 1.5 | 128.08 | 3.71 | 5.41 | 23.56 | 0.51 | 10.27 | 261.37 | 261.24 | 256.62 | 255.63 | 259.87 | 255.12 | 3.20 | 10.22 | 1.37 | 0.51 | 1181+03.11 |
| EP-0306 | EX-0402 | DN-0306 | Circ. | Conc. | 1 | 4.0 | 583.61 | 1.82 | 75.36 | 225.49 | 1.66 | 15.32 | 267.50 | 266.92 | 256.91 | 254.57 | 263.50 | 252.91 | 6.58 | 15.28 | 3.42 | 1.66 | 1187+35.02 |
| EP-0306DS | DN-0306 | EX-0306 | Circ. | Conc. | 1 | 4.0 | 95.19 | 0.30 | 75.36 | 91.69 | 2.93 | 7.63 | 256.91 | 257.94 | 256.62 | 257.62 | 252.91 | 252.62 | 6.00 | 6.00 | 4.00 | 4.00 | 1181+51.42 |
| EP-0401 | EX-0401 | EX-0402 | Circ. | Conc. | 1 | 2.0 | 145.80 | 5.89 | 25.00 | 63.97 | 0.91 | 18.11 | 278.74 | 280.58 | 270.16 | 269.09 | 276.74 | 268.16 | 7.96 | 17.52 | 2.00 | 0.93 | 1187+81.00 |
| EP-0402 | EX-0408 | EX-0402 | Circ. | Conc. | 1 | 3.5 | 515.78 | 6.10 | 40.73 | 289.47 | 0.92 | 20.18 | 300.00 | 298.61 | 268.56 | 265.98 | 296.50 | 265.06 | 6.74 | 20.15 | 2.11 | 0.92 | 1192+50.69 |
| EP-0403 | EX-0403 | EX-0402 | Circ. | Conc. | 1 | 1.5 | 106.19 | 1.77 | 4.52 | 16.29 | 0.56 | 7.47 | 269.38 | 269.10 | 267.50 | 266.56 | 267.88 | 266.00 | 2.93 | 7.44 | 1.22 | 0.56 | 1187+66.04 |
| EP-0404 | EX-0502 | EX-0404 | Circ. | Conc. | 1 | 3.5 | 374.43 | 3.42 | 26.39 | 216.78 | 0.86 | 14.50 | 312.92 | 311.37 | 300.12 | 297.48 | 309.42 | 296.62 | 4.79 | 14.46 | 1.95 | 0.86 | 1201+11.72 |
| EP-0405 | EX-0405 | EX-0404 | Circ. | Conc. | 1 | 1.5 | 137.27 | 2.15 | 11.59 | 17.95 | 0.92 | 10.18 | 302.62 | 302.49 | 299.67 | 299.10 | 301.12 | 298.17 | 6.87 | 10.11 | 1.37 | 0.93 | 1197+98.53 |
| EP-0406 | EX-0406 | EX-0405 | Circ. | Conc. | 1 | 1.5 | 137.74 | 1.82 | 6.27 | 16.52 | 0.67 | 8.24 | 305.19 | 305.20 | 302.68 | 301.85 | 303.69 | 301.18 | 3.55 | 8.22 | 1.50 | 0.67 | 1198+62.42 |
| EP-0407 | EX-0407 | EX-0408 | Circ. | Conc. | 1 | 1.5 | 117.74 | 0.30 | 4.40 | 6.71 | 0.92 | 3.85 | 300.92 | 300.62 | 300.57 | 299.87 | 299.42 | 299.07 | 2.90 | 4.56 | 1.20 | 0.81 | 1192+84.72 |
| EP-0408 | EX-0404 | EX-0408 | Circ. | Conc. | 1 | 3.5 | 486.76 | 0.30 | 38.57 | 64.22 | 2.05 | 6.57 | 301.46 | 300.39 | 300.00 | 298.61 | 297.96 | 296.50 | 5.42 | 6.38 | 2.43 | 2.11 | 1197+37.35 |
| EP-0501 | EX-0501 | EX-0502 | Circ. | Conc. | 1 | 1.5 | 182.62 | 1.00 | 2.86 | 12.24 | 0.51 | 5.38 | 313.50 | 312.92 | 311.67 | 310.68 | 312.00 | 310.17 | 2.51 | 5.38 | 0.92 | 0.51 | 1200+94.07 |
| EP-0503 | EX-0505 | EX-0503 | Circ. | Conc. | 1 | 3.5 | 228.01 | 1.29 | 21.27 | 133.17 | 0.98 | 9.62 | 317.63 | 315.91 | 314.69 | 312.18 | 314.13 | 311.19 | 4.32 | 9.56 | 1.78 | 0.99 | 1204+39.03 |
| EP-0503DS | EX-0503 | EX-0502 | Circ. | Conc. | 1 | 3.5 | 107.65 | 1.29 | 21.27 | 133.17 | 0.98 | 9.62 | 314.69 | 312.72 | 313.30 | 310.81 | 311.19 | 309.80 | 5.25 | 9.26 | 1.53 | 1.01 | 1202+11.51 |
| EP-0504 | EX-0504 | EX-0505 | Circ. | Conc. | 1 | 3.0 | 35.24 | 1.00 | 0.83 | 77.73 | 0.23 | 3.43 | 317.70 | 315.91 | 317.35 | 315.91 | 314.70 | 314.35 | 0.31 | 0.22 | 1.21 | 1.56 | 1204+26.73 |
| EP-0505 | EX-0506 | EX-0505 | Circ. | Conc. | 1 | 2.0 | 89.74 | 6.53 | 15.11 | 67.37 | 0.67 | 16.41 | 322.07 | 321.49 | 316.21 | 314.91 | 320.07 | 314.21 | 6.34 | 15.53 | 1.42 | 0.70 | 1204+68.07 |
| EP-0506 | EX-0507 | EX-0506 | Circ. | Conc. | 1 | 1.5 | 108.90 | 4.23 | 11.37 | 25.19 | 0.74 | 13.16 | 326.18 | 326.32 | 321.57 | 320.82 | 324.68 | 320.07 | 6.43 | 12.84 | 1.50 | 0.75 | 1205+05.31 |
| EP-0507 | EX-0508 | EX-0507 | Circ. | Conc. | 1 | 1.5 | 133.72 | 1.62 | 2.84 | 15.56 | 0.45 | 6.37 | 328.60 | 327.89 | 326.44 | 325.39 | 327.10 | 324.94 | 2.99 | 6.34 | 0.79 | 0.45 | 1206+09.46 |
| EP-0508 | EX-0509 | EX-0508 | Circ. | Conc. | 1 | 1.5 | 70.98 | 0.30 | 2.32 | 6.66 | 0.64 | 3.23 | 328.94 | 328.25 | 328.73 | 327.89 | 327.44 | 327.23 | 2.39 | 3.07 | 0.81 | 0.66 | 1205+89.05 |
| EP-0601 | EX-0601 | EX-0602 | Circ. | Conc. | 1 | 1.5 | 98.78 | 10.00 | 3.65 | 38.71 | 0.32 | 13.07 | 314.67 | 314.24 | 304.79 | 303.61 | 313.17 | 303.29 | 2.70 | 13.01 | 1.07 | 0.32 | 1215+82.20 |
| EP-0602 | EX-0602 | EX-0604 | Circ. | Conc. | 1 | 1.5 | 204.75 | 0.82 | 3.65 | 11.06 | 0.62 | 5.34 | 304.58 | 304.01 | 302.91 | 302.03 | 303.08 | 301.41 | 3.18 | 5.34 | 0.93 | 0.62 | 1216+80.67 |
| EP-0603 | EX-0603 | EX-0604 | Circ. | Conc. | 1 | 1.5 | 75.14 | 9.58 | 5.06 | 37.89 | 0.38 | 14.15 | 310.83 | 310.64 | 303.63 | 302.52 | 309.33 | 302.13 | 3.09 | 13.93 | 1.31 | 0.39 | 1215+61.01 |
| EP-0604 | EX-0604 | OP-0611 | Circ. | Conc. | 1 | 2.0 | 354.13 | 2.18 | 9.01 | 38.95 | 0.68 | 9.56 | 303.37 | 302.79 | 295.64 | 294.32 | 301.37 | 293.64 | 3.78 | 9.56 | 1.42 | 0.68 | 1216+31.17 |
| EP-0608 | EX-0607 | EX-0606 | Circ. | Conc. | 1 | 1.5 | 75.86 | 0.13 | 0.79 | 4.44 | 0.44 | 1.83 | 288.03 | 287.15 | 287.93 | 287.13 | 286.53 | 286.43 | 1.16 | 0.99 | 0.62 | 0.70 | 1225+12.54 |
| EP-0610 | EX-0606 | EX-0608 | Circ. | Conc. | 1 | 1.5 | 175.67 | 2.98 | 2.05 | 21.12 | 0.33 | 7.19 | 287.93 | 287.13 | 282.70 | 281.53 | 286.43 | 281.20 | 2.55 | 7.19 | 0.70 | 0.33 | 1224+32.81 |
| EP-0611 | EX-0605 | EX-0608 | Circ. | Conc. | 1 | 1.5 | 108.48 | 32.50 | 7.68 | 69.79 | 0.35 | 24.66 | 319.11 | 319.37 | 283.85 | 282.70 | 317.61 | 282.35 | 4.35 | 24.53 | 1.50 | 0.35 | 1223+44.71 |
| EP-0612 | EX-0608 | OP-0683 | Circ. | Conc. | 1 | 1.5 | 78.99 | 2.60 | 11.31 | 19.72 | 0.85 | 10.91 | 282.55 | 283.02 | 280.50 | 279.88 | 281.05 | 279.00 | 6.40 | 10.50 | 1.50 | 0.88 | 1224+48.58 |
| EP-0613 | EX-0609 | EX-0610 | Circ. | Conc. | 1 | 1.5 | 104.20 | 2.19 | 4.57 | 18.11 | 0.53 | 8.11 | 297.50 | 297.23 | 295.22 | 294.26 | 296.00 | 293.72 | 2.95 | 8.05 | 1.23 | 0.54 | 1229+50.07 |
| EP-0614 | EX-0610 | OP-0680 | Circ. | Conc. | 1 | 1.5 | 70.96 | 2.40 | 4.73 | 18.95 | 0.53 | 8.46 | 295.22 | 294.57 | 293.52 | 292.56 | 293.72 | 292.02 | 4.60 | 8.27 | 0.85 | 0.54 | 1230+01.54 |
| EP-0701 | EX-0701 | OP-0799 | Circ. | Conc. | 1 | 1.5 | 190.38 | 17.05 | 9.77 | 50.55 | 0.46 | 20.99 | 275.32 | 276.03 | 242.86 | 241.82 | 273.82 | 241.36 | 5.53 | 20.98 | 1.50 | 0.46 | 1235+98.59 |
| EP-0702 | EX-0702 | OP-0798 | Circ. | Conc. | 1 | 1.5 | 161.54 | 9.77 | 9.36 | 38.26 | 0.53 | 16.98 | 241.55 | 242.17 | 225.77 | 224.80 | 240.05 | 224.27 | 5.30 | 16.91 | 1.50 | 0.53 | 1246+61.97 |
| EP-0801 | EX-0801 | OP-0899 | Circ. | Conc. | 1 | 1.5 | 179.22 | 6.02 | 13.44 | 30.04 | 0.73 | 15.65 | 237.69 | 239.48 | 226.90 | 226.14 | 236.19 | 225.40 | 7.61 | 15.55 | 1.50 | 0.74 | 1252+00.86 |
| EP-0802 | EX-0802 | OP-0898 | Circ. | Conc. | 1 | 2.0 | 242.12 | 1.59 | 9.47 | 33.20 | 0.76 | 8.66 | 231.38 | 231.03 | 227.54 | 226.30 | 229.38 | 225.54 | 3.42 | 8.63 | 1.65 | 0.76 | 1253+26.13 |
| EP-0803 | EX-0803 | OP-0897 | Circ. | Conc. | 1 | 1.5 | 200.40 | 0.33 | 6.91 | 7.08 | 1.32 | 4.19 | 244.47 | 244.59 | 243.80 | 243.80 | 242.97 | 242.30 | 3.91 | 3.91 | 1.50 | 1.50 | 1261+46.66 |
| EP-0901 | EX-0901 | OP-0999 | Circ. | Conc. | 1 | 1.5 | 167.35 | 1.00 | 8.02 | 12.24 | 0.93 | 6.97 | 248.09 | 248.42 | 246.42 | 245.85 | 246.59 | 244.92 | 4.54 | 6.97 | 1.50 | 0.93 | 1270+50.25 |
| EP-0907 | EX-0907 | OP-0995 | Circ. | Conc. | 1 | 3.0 | 149.49 | 0.70 | 54.06 | 65.14 | 2.20 | 9.73 | 250.09 | 249.50 | 249.04 | 248.25 | 247.09 | 246.04 | 8.88 | 9.67 | 2.41 | 2.21 | 1278+84.95 |
| EP-0908 | EX-0993 | EX-0907 | Circ. | Conc. | 1 | 3.0 | 129.21 | 1.04 | 51.23 | 79.15 | 1.85 | 11.21 | 251.43 | 252.53 | 250.09 | 248.98 | 248.43 | 247.09 | 7.25 | 10.93 | 3.00 | 1.89 | 1279+52.96 |
| EP-1002 | EX-1001 | EX-1001S | Circ. | Conc. | 1 | 2.5 | 304.96 | 0.45 | 42.25 | 31.92 | 2.50 | 8.83 | 257.86 | 260.86 | 256.50 | 257.48 | 255.36 | 254.00 | 8.61 | 8.61 | 2.50 | 2.50 | 1286+58.13 |

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - LINK (2 OF 3)

| Link ID | US Node | DS Node | Shape | Material | # of Barrels | Dia-meter (ft) | Length (ft) | Slope (%) | Discharge (cfs) | Capacity (cfs) | Uniform Depth (ft) | Uniform Velocity (fps) | Soffit US Elev. (ft) | HGL US Elev. (ft) | Soffit DS Elev. (ft) | HGL DS Elev. (ft) | Invert US Elev. (ft) | Invert DS Elev. (ft) | Actual US Vel. (fps) | Actual DS Vel. (fps) | Actual US Depth (ft) | Actual DS Depth (ft) | Node Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EP-1003 | EX-1002 | EX-1001 | Circ. | Conc. | 1 | 2.0 | 86.13 | 1.02 | 33.12 | 26.65 | 2.00 | 10.82 | 258.33 | 262.46 | 257.45 | 260.86 | 256.33 | 255.45 | 10.54 | 10.54 | 2.00 | 2.00 | 1286+46.91 |
| EP-1004 | EX-1003 | EX-1002 | Circ. | Conc. | 1 | 2.0 | 87.25 | 0.67 | 31.79 | 21.50 | 2.00 | 10.38 | 258.91 | 263.94 | 258.33 | 262.46 | 256.91 | 256.33 | 10.12 | 10.12 | 2.00 | 2.00 | 1286+34.09 |
| EP-1005 | EX-1004 | EX-1003 | Circ. | Conc. | 1 | 2.0 | 60.25 | 1.10 | 31.03 | 27.59 | 2.00 | 10.13 | 259.57 | 264.91 | 258.91 | 263.94 | 257.57 | 256.91 | 9.88 | 9.88 | 2.00 | 2.00 | 1286+42.80 |
| EP-1006 | EX-1008 | EX-1001 | Circ. | Conc. | 1 | 2.0 | 301.74 | 1.00 | 15.12 | 26.36 | 1.14 | 8.20 | 260.45 | 262.20 | 257.43 | 260.86 | 258.45 | 255.43 | 4.81 | 4.81 | 2.00 | 2.00 | 1289+59.80 |
| EP-1007 | EX-1007 | EX-1005 | Circ. | Conc. | 1 | 1.5 | 110.80 | 0.92 | 5.25 | 11.75 | 0.73 | 6.13 | 263.44 | 263.32 | 262.42 | 263.10 | 261.94 | 260.92 | 3.09 | 2.97 | 1.38 | 1.50 | 1290+51.16 |
| EP-1008 | EX-1005 | EX-1008 | Circ. | Conc. | 1 | 1.5 | 102.13 | 0.95 | 10.56 | 11.95 | 1.17 | 7.16 | 262.42 | 263.10 | 261.45 | 262.20 | 260.92 | 259.95 | 5.98 | 5.98 | 1.50 | 1.50 | 1290+03.73 |
| EP-1010 | EX-1001S | OP-1010 | Circ. | Conc. | 1 | 2.5 | 187.06 | 0.40 | 42.25 | 30.27 | 2.50 | 8.83 | 256.50 | 257.48 | 255.75 | 255.75 | 254.00 | 253.25 | 8.61 | 8.61 | 2.50 | 2.50 | 1283+69.91 |
| EP-1012 | EX-1009 | EX-1008 | Circ. | Conc. | 1 | 1.5 | 223.65 | 1.00 | 2.94 | 12.24 | 0.52 | 5.41 | 263.68 | 263.12 | 261.45 | 260.47 | 262.18 | 259.95 | 2.53 | 5.40 | 0.94 | 0.52 | 1291+83.45 |
| EP-1101 | EX-1103 | EX-1101 | Circ. | Conc. | 1 | 1.5 | 95.87 | 0.34 | 6.70 | 7.18 | 1.23 | 4.31 | 269.81 | 269.89 | 269.48 | 268.98 | 268.31 | 267.98 | 3.79 | 5.34 | 1.50 | 1.00 | 1297+50.24 |
| EP-1102 | EX-1101 | EX-1102 | Circ. | Conc. | 1 | 2.0 | 91.95 | 1.13 | 11.45 | 28.04 | 0.93 | 8.03 | 269.42 | 268.66 | 268.38 | 267.32 | 267.42 | 266.38 | 5.60 | 7.89 | 1.24 | 0.94 | 1297+48.27 |
| EP-1104 | EX-1102 | EX-1105 | Circ. | Conc. | 1 | 2.0 | 110.79 | 0.30 | 11.45 | 14.44 | 1.41 | 4.85 | 268.38 | 268.58 | 268.05 | 268.20 | 266.38 | 266.05 | 3.65 | 3.65 | 2.00 | 2.00 | 1297+45.42 |
| EP-1105 | EX-1105 | EX-1106 | Circ. | Conc. | 1 | 2.0 | 67.25 | 2.17 | 11.45 | 38.81 | 0.77 | 10.21 | 268.05 | 268.20 | 266.59 | 268.00 | 266.05 | 264.59 | 3.65 | 3.65 | 2.00 | 2.00 | 1298+55.47 |
| EP-1106 | EX-1106 | EX-1107A | Circ. | Conc. | 1 | 2.0 | 55.80 | 1.60 | 17.22 | 33.29 | 1.07 | 10.10 | 266.56 | 268.00 | 265.67 | 267.37 | 264.56 | 263.67 | 5.48 | 5.48 | 2.00 | 2.00 | 1299+13.66 |
| EP-1107 | EX-1192 | EX-1106 | Circ. | Conc. | 1 | 1.5 | 209.98 | 3.47 | 6.42 | 22.79 | 0.57 | 10.51 | 276.03 | 276.07 | 268.75 | 267.82 | 274.53 | 267.25 | 3.63 | 10.50 | 1.50 | 0.57 | 1297+67.75 |
| EP-1110 | EX-1107A | EX-1107 | Circ. | Conc. | 1 | 2.5 | 392.30 | 0.56 | 18.34 | 35.88 | 1.32 | 6.97 | 265.67 | 267.37 | 263.46 | 266.65 | 263.17 | 260.96 | 3.74 | 3.74 | 2.50 | 2.50 | 1299+67.58 |
| EP-1111 | EX-1108 | EX-1107 | Circ. | Conc. | 1 | 2.0 | 262.23 | 4.70 | 22.27 | 57.15 | 0.90 | 16.17 | 275.78 | 277.10 | 263.46 | 262.37 | 273.78 | 261.46 | 7.09 | 16.11 | 2.00 | 0.91 | 1304+38.27 |
| EP-1114 | EX-1107 | OP-1196 | Circ. | Conc. | 1 | 2.0 | 313.98 | 2.58 | 42.35 | 42.35 | 1.88 | 13.83 | 262.96 | 266.65 | 254.86 | 254.86 | 260.96 | 252.86 | 13.48 | 13.48 | 2.00 | 2.00 | 1303+59.76 |
| EP-1201 | EX-1204 | EX-1201 | Circ. | Conc. | 1 | 2.0 | 102.75 | 0.91 | 12.62 | 25.12 | 1.05 | 7.57 | 255.63 | 254.96 | 254.70 | 253.76 | 253.63 | 252.70 | 5.70 | 7.51 | 1.33 | 1.06 | 1320+08.68 |
| EP-1202 | EX-1203 | EX-1201 | Circ. | Conc. | 1 | 1.5 | 113.29 | 1.00 | 9.15 | 12.24 | 1.02 | 7.17 | 255.10 | 255.67 | 253.97 | 254.91 | 253.60 | 252.47 | 5.18 | 5.18 | 1.50 | 1.50 | 1319+99.01 |
| EP-1203 | EX-1201 | EX-1202 | Circ. | Conc. | 1 | 3.0 | 719.07 | 0.90 | 31.63 | 73.73 | 1.43 | 9.52 | 255.40 | 254.91 | 248.93 | 247.36 | 252.40 | 245.93 | 5.01 | 9.50 | 2.51 | 1.43 | 1320+48.58 |
| EP-1204 | EX-1202 | OP-1399 | Circ. | Conc. | 1 | 3.0 | 90.21 | 21.85 | 35.83 | 363.33 | 0.66 | 31.08 | 248.59 | 247.59 | 228.88 | 226.58 | 245.59 | 225.88 | 7.16 | 28.46 | 2.00 | 0.70 | 1327+67.60 |
| EP-1205 | EX-1205 | EX-1204 | Circ. | Conc. | 1 | 2.0 | 104.39 | 0.91 | 5.09 | 25.11 | 0.63 | 5.95 | 256.58 | 255.71 | 255.63 | 254.27 | 254.58 | 253.63 | 2.80 | 5.93 | 1.13 | 0.64 | 1319+68.98 |
| EP-1301 | EX-1301 | OP-1396 | Circ. | Conc. | 1 | 2.0 | 169.84 | 12.81 | 9.96 | 94.36 | 0.46 | 18.53 | 252.24 | 251.94 | 230.48 | 228.94 | 250.24 | 228.48 | 3.50 | 18.46 | 1.70 | 0.46 | 1332+19.25 |
| EP-1302 | EX-1302 | OP-1394 | Circ. | Conc. | 1 | 2.0 | 119.17 | 0.82 | 19.49 | 23.91 | 1.45 | 7.98 | 255.42 | 255.02 | 254.44 | 253.89 | 253.42 | 252.44 | 7.26 | 7.97 | 1.60 | 1.45 | 1341+91.59 |
| EP-1303 | EX-1395 | EX-1302 | Circ. | Conc. | 1 | 1.5 | 117.38 | 1.41 | 10.99 | 14.51 | 1.03 | 8.51 | 256.60 | 257.63 | 254.95 | 254.48 | 255.10 | 253.45 | 6.22 | 8.46 | 1.50 | 1.03 | 1342+08.30 |
| EP-1401 | EX-1401 | OP-1499 | Circ. | Conc. | 1 | 1.5 | 264.12 | 0.59 | 10.09 | 9.41 | 1.50 | 5.86 | 270.28 | 270.81 | 268.72 | 268.72 | 268.78 | 267.22 | 5.71 | 5.71 | 1.50 | 1.50 | 1350+03.10 |
| EP-1402 | EX-1402 | EX-1401 | Circ. | Conc. | 1 | 1.5 | 227.15 | 0.33 | 5.33 | 6.99 | 1.03 | 4.10 | 271.10 | 271.31 | 270.36 | 270.81 | 269.60 | 268.86 | 3.02 | 3.02 | 1.50 | 1.50 | 1352+05.10 |
| EP-1403 | EX-1409 | EX-1403 | Circ. | Conc. | 1 | 2.5 | 130.79 | 1.10 | 12.32 | 50.16 | 0.88 | 8.04 | 273.14 | 272.17 | 271.70 | 270.08 | 270.64 | 269.20 | 3.93 | 7.95 | 1.53 | 0.88 | 1353+84.32 |
| EP-1404 | EX-1403 | EX-1404 | Circ. | Conc. | 1 | 2.5 | 103.71 | 0.78 | 13.65 | 42.24 | 1.02 | 7.27 | 271.38 | 270.47 | 270.57 | 269.09 | 268.88 | 268.07 | 4.13 | 7.21 | 1.59 | 1.02 | 1355+02.43 |
| EP-1405 | EX-1404 | OP-1493 | Circ. | Conc. | 1 | 3.0 | 325.67 | 0.84 | 28.32 | 71.16 | 1.38 | 8.96 | 270.80 | 270.11 | 268.07 | 266.45 | 267.80 | 265.07 | 4.85 | 8.96 | 2.31 | 1.38 | 1355+38.26 |
| EP-1406 | EX-1410 | EX-1404 | Circ. | Conc. | 1 | 2.0 | 363.89 | 0.94 | 9.75 | 25.52 | 0.90 | 7.16 | 276.08 | 275.47 | 272.67 | 271.57 | 274.08 | 270.67 | 4.19 | 7.16 | 1.39 | 0.90 | 1357+52.70 |
| EP-1408 | EX-1408 | OP-1405 | Circ. | Conc. | 1 | 1.5 | 182.70 | 0.44 | 5.96 | 8.14 | 1.00 | 4.75 | 274.60 | 274.20 | 273.79 | 273.79 | 273.10 | 272.29 | 4.27 | 3.37 | 1.11 | 1.50 | 1357+86.96 |
| EP-1409 | EX-1406 | EX-1408 | Circ. | Conc. | 1 | 1.5 | 210.72 | 0.44 | 5.96 | 8.14 | 1.00 | 4.75 | 275.53 | 275.49 | 274.60 | 274.20 | 274.03 | 273.10 | 3.40 | 4.27 | 1.46 | 1.11 | 1358+27.31 |
| EP-1496 | EX-1494 | EX-1410 | Circ. | Conc. | 1 | 1.5 | 131.99 | 0.80 | 6.31 | 10.91 | 0.86 | 6.04 | 277.13 | 277.15 | 276.08 | 275.44 | 275.63 | 274.58 | 3.57 | 6.04 | 1.50 | 0.86 | 1358+84.23 |
| EP-1498 | EX-1497 | EX-1409 | Circ. | Conc. | 1 | 1.5 | 277.13 | 1.00 | 9.25 | 12.24 | 1.03 | 7.17 | 275.34 | 275.93 | 272.57 | 272.10 | 273.84 | 271.07 | 5.24 | 7.17 | 1.50 | 1.03 | 1352+37.32 |
| EP-1501 | EX-1501 | OP-1599 | Circ. | Conc. | 1 | 1.5 | 137.55 | 4.65 | 8.10 | 26.41 | 0.59 | 12.45 | 283.52 | 283.87 | 277.12 | 276.22 | 282.02 | 275.62 | 4.58 | 12.36 | 1.50 | 0.60 | 1362+46.47 |
| EP-1502 | EX-1502 | OP-1595 | Circ. | Conc. | 1 | 2.5 | 175.01 | 2.14 | 62.36 | 69.88 | 1.96 | 15.09 | 281.78 | 283.22 | 278.04 | 277.55 | 279.28 | 275.54 | 12.70 | 14.74 | 2.50 | 2.01 | 1364+80.78 |
| EP-1504 | EX-1504 | EX-1502 | Circ. | Conc. | 1 | 2.5 | 295.12 | 1.59 | 61.59 | 60.19 | 2.50 | 12.87 | 286.46 | 290.05 | 281.78 | 283.22 | 283.96 | 279.28 | 12.55 | 12.55 | 2.50 | 2.50 | 1367+70.48 |
| EP-1505 | EX-1507 | EX-1504 | Circ. | Conc. | 1 | 2.0 | 439.17 | 1.62 | 36.06 | 33.59 | 2.00 | 11.78 | 294.48 | 301.05 | 287.35 | 290.05 | 292.48 | 285.35 | 11.48 | 11.48 | 2.00 | 2.00 | 1372+01.82 |
| EP-1506 | EX-1505 | EX-1506 | Circ. | Conc. | 1 | 1.5 | 136.88 | 0.17 | 6.46 | 5.02 | 1.50 | 3.75 | 295.53 | 302.33 | 295.30 | 301.89 | 294.03 | 293.80 | 3.66 | 3.66 | 1.50 | 1.50 | 1371+97.00 |
| EP-1507 | EX-1506 | EX-1507 | Circ. | Conc. | 1 | 1.5 | 52.38 | 2.27 | 14.07 | 18.45 | 1.03 | 10.83 | 295.22 | 301.89 | 294.03 | 301.05 | 293.72 | 292.53 | 7.96 | 7.96 | 1.50 | 1.50 | 1371+99.99 |
| EP-1508 | EX-1508 | EX-1507 | Circ. | Conc. | 1 | 2.0 | 54.17 | 2.23 | 27.35 | 39.40 | 1.29 | 12.80 | 297.39 | 301.76 | 296.18 | 301.05 | 295.39 | 294.18 | 8.70 | 8.70 | 2.00 | 2.00 | 1372+40.91 |

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - LINK (3 OF 3)

| Link ID | US Node | DS Node | Shape | Material | # of Barrels | Dia-meter (ft) | Length (ft) | Slope (%) | Discharge (cfs) | Capacity (cfs) | Uniform Depth (ft) | Uniform Velocity (fps) | Soffit US Elev. (ft) | HGL US Elev. (ft) | Soffit DS Elev. (ft) | HGL DS Elev. (ft) | Invert US Elev. (ft) | Invert DS Elev. (ft) | Actual US Vel. (fps) | Actual DS Vel. (fps) | Actual US Depth (ft) | Actual DS Depth (ft) | Node Station |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EP-1509 | EX-1509 | EX-1508 | Circ. | Conc. | 1 | 2.0 | 94.16 | 3.68 | 25.19 | 50.54 | 1.04 | 15.20 | 300.85 | 302.76 | 297.39 | 301.76 | 298.85 | 295.39 | 8.02 | 8.02 | 2.00 | 2.00 | 1373+11.59 |
| EP-1598 | EX-1594 | EX-1504 | Circ. | Conc. | 1 | 2.5 | 220.51 | 1.70 | 26.69 | 62.33 | 1.19 | 11.56 | 291.60 | 291.97 | 287.85 | 286.55 | 289.10 | 285.35 | 5.44 | 11.45 | 2.50 | 1.20 | 1369+36.36 |
| EP-1601 | EX-1698 | EX-1601 | Circ. | Conc. | 1 | 1.5 | 41.26 | 5.11 | 1.40 | 27.68 | 0.24 | 7.78 | 312.58 | 311.67 | 310.47 | 309.21 | 311.08 | 308.97 | 2.20 | 7.67 | 0.59 | 0.24 | 1379+81.57 |
| EP-1602 | EX-1601 | EX-1602 | Circ. | Conc. | 1 | 1.5 | 107.88 | 0.30 | 4.54 | 6.71 | 0.95 | 3.86 | 310.27 | 310.10 | 309.95 | 309.95 | 308.77 | 308.45 | 2.74 | 2.57 | 1.33 | 1.50 | 1379+82.20 |
| EP-1603 | EX-1602 | EX-1603 | Circ. | Conc. | 1 | 1.5 | 123.98 | 0.15 | 7.48 | 4.66 | 1.50 | 4.35 | 309.85 | 309.95 | 309.67 | 309.23 | 308.35 | 308.17 | 4.24 | 5.61 | 1.50 | 1.06 | 1379+84.09 |
| EP-1604 | EX-1603 | EX-1604 | Circ. | Conc. | 1 | 2.0 | 54.92 | 0.87 | 10.97 | 24.65 | 0.98 | 7.21 | 310.03 | 309.23 | 309.55 | 308.54 | 308.03 | 307.55 | 5.58 | 7.04 | 1.20 | 0.99 | 1379+86.51 |
| EP-1605 | EX-1604 | OP-1699 | Circ. | Conc. | 1 | 3.0 | 118.99 | 10.00 | 30.41 | 245.79 | 0.74 | 22.47 | 289.94 | 289.27 | 278.04 | 275.81 | 286.94 | 275.04 | 5.16 | 21.28 | 2.33 | 0.77 | 1379+87.52 |
| EP-1606 | EX-1609 | EX-1604 | Circ. | Conc. | 1 | 2.5 | 397.46 | 0.30 | 20.35 | 26.18 | 1.76 | 5.51 | 313.05 | 312.64 | 311.86 | 310.89 | 310.55 | 309.36 | 4.64 | 6.45 | 2.09 | 1.53 | 1383+84.97 |
| EP-1607 | EX-1605 | EX-1606 | Circ. | Conc. | 1 | 1.5 | 42.62 | 0.30 | 3.64 | 6.71 | 0.83 | 3.66 | 315.04 | 315.14 | 314.91 | 315.10 | 313.54 | 313.41 | 2.06 | 2.06 | 1.50 | 1.50 | 1383+46.69 |
| EP-1608 | EX-1606 | EX-1607 | Circ. | Conc. | 1 | 1.5 | 107.50 | 0.55 | 7.89 | 9.07 | 1.14 | 5.46 | 314.94 | 315.10 | 314.35 | 314.57 | 313.44 | 312.85 | 4.47 | 4.47 | 1.50 | 1.50 | 1383+51.50 |
| EP-1609 | EX-1607 | EX-1608 | Circ. | Conc. | 1 | 1.5 | 123.87 | 0.72 | 12.24 | 10.38 | 1.50 | 7.11 | 314.11 | 314.57 | 313.22 | 313.04 | 312.61 | 311.72 | 6.93 | 7.42 | 1.50 | 1.32 | 1383+64.04 |
| EP-1610 | EX-1608 | EX-1609 | Circ. | Conc. | 1 | 2.0 | 57.05 | 0.30 | 17.09 | 14.44 | 2.00 | 5.58 | 313.22 | 313.03 | 313.05 | 312.64 | 311.22 | 311.05 | 5.72 | 6.38 | 1.81 | 1.59 | 1383+78.82 |
| EP-1611 | EX-1610 | EX-1609 | Circ. | Conc. | 1 | 1.5 | 392.88 | 1.24 | 1.83 | 13.62 | 0.39 | 5.10 | 324.13 | 323.32 | 319.27 | 318.16 | 322.63 | 317.77 | 2.28 | 5.10 | 0.69 | 0.39 | 1387+77.60 |
| EP-1701 | EX-1701 | OP-1797 | Circ. | Conc. | 1 | 1.5 | 170.91 | 6.59 | 11.32 | 31.42 | 0.65 | 15.48 | 310.16 | 311.28 | 298.90 | 298.05 | 308.66 | 297.40 | 6.41 | 15.39 | 1.50 | 0.65 | 1399+90.93 |
| EP-1801 | EX-1802 | OP-1896 | Circ. | Conc. | 1 | 2.0 | 177.77 | 2.85 | 14.98 | 44.52 | 0.83 | 12.11 | 302.39 | 301.84 | 297.32 | 296.16 | 300.39 | 295.32 | 6.16 | 12.00 | 1.45 | 0.84 | 1416+20.50 |
| EP-1802 | EX-1807 | EX-1802 | Circ. | Conc. | 1 | 2.0 | 115.83 | 2.58 | 8.51 | 42.38 | 0.63 | 10.01 | 305.46 | 304.77 | 302.47 | 301.11 | 303.46 | 300.47 | 3.90 | 9.86 | 1.31 | 0.64 | 1416+52.08 |
| EP-1803 | EX-1803 | OP-1895 | Circ. | Conc. | 1 | 2.5 | 156.84 | 0.69 | 50.64 | 39.67 | 2.50 | 10.58 | 308.92 | 309.89 | 307.84 | 307.84 | 306.42 | 305.34 | 10.32 | 10.32 | 2.50 | 2.50 | 1423+70.33 |
| EP-1804 | EX-1894 | EX-1803 | Circ. | Conc. | 1 | 2.5 | 125.52 | 0.66 | 40.86 | 38.87 | 2.50 | 8.54 | 309.82 | 311.73 | 308.99 | 309.89 | 307.32 | 306.49 | 8.32 | 8.32 | 2.50 | 2.50 | 1424+12.27 |
| EP-1806 | EX-1801 | OP-1899 | Circ. | Conc. | 1 | 2.0 | 131.81 | 2.09 | 17.53 | 38.08 | 0.99 | 11.25 | 302.00 | 302.58 | 299.25 | 298.26 | 300.00 | 297.25 | 5.58 | 10.99 | 2.00 | 1.01 | 1410+72.23 |
| EP-1807 | EX-1897 | EX-1807 | Circ. | Conc. | 1 | 2.0 | 8.39 | 2.59 | 8.51 | 42.40 | 0.63 | 10.01 | 305.68 | 305.22 | 305.46 | 304.27 | 303.68 | 303.46 | 3.27 | 7.14 | 1.54 | 0.81 | 1416+60.60 |
| EP-2101 | EX-2198 | EX-2101 | Circ. | Conc. | 1 | 3.0 | 136.61 | 3.07 | 54.49 | 136.11 | 1.38 | 17.25 | 307.21 | 308.57 | 303.02 | 301.49 | 304.21 | 300.02 | 7.71 | 15.88 | 3.00 | 1.47 | 1458+56.65 |
| EP-2102 | EX-2101 | OP-2199 | Circ. | Conc. | 1 | 3.0 | 169.92 | 1.19 | 60.73 | 84.77 | 1.98 | 12.27 | 303.02 | 302.57 | 301.00 | 300.02 | 300.02 | 298.00 | 9.48 | 12.03 | 2.55 | 2.02 | 1459+00.30 |
| EP-2104 | EX-2102 | OP-2195 | Circ. | Conc. | 1 | 1.5 | 202.74 | 6.98 | 16.80 | 32.34 | 0.80 | 17.48 | 283.94 | 287.04 | 269.79 | 269.10 | 282.44 | 268.29 | 9.51 | 17.39 | 1.50 | 0.81 | 1471+91.64 |
| EP-2201 | EX-2201 | OP-2299 | Circ. | Conc. | 1 | 2.0 | 154.33 | 1.35 | 15.39 | 30.68 | 1.05 | 9.26 | 288.06 | 287.53 | 285.97 | 285.02 | 286.06 | 283.97 | 6.22 | 9.17 | 1.47 | 1.05 | 1475+65.71 |
| EP-2202 | EX-2202 | EX-2201 | Circ. | Conc. | 1 | 2.0 | 153.69 | 1.41 | 6.06 | 31.33 | 0.62 | 7.32 | 290.14 | 289.40 | 287.97 | 286.59 | 288.14 | 285.97 | 2.92 | 7.31 | 1.26 | 0.62 | 1476+68.11 |
| EP-2203 | EX-2203 | OP-2298 | Circ. | Conc. | 1 | 3.0 | 150.53 | 0.59 | 45.29 | 59.43 | 2.07 | 8.71 | 304.66 | 304.18 | 303.78 | 303.78 | 301.66 | 300.78 | 7.14 | 6.41 | 2.52 | 3.00 | 1484+97.49 |
| EP-2204 | EX-2204 | EX-2203 | Circ. | Conc. | 1 | 3.0 | 148.46 | 0.89 | 26.00 | 73.29 | 1.29 | 8.97 | 306.01 | 305.48 | 304.69 | 302.99 | 303.01 | 301.69 | 4.18 | 8.87 | 2.47 | 1.30 | 1485+95.89 |
| EP-2301 | EX-2302 | OP-2399 | Circ. | Conc. | 1 | 2.0 | 81.18 | 1.08 | 7.54 | 27.45 | 0.74 | 7.08 | 335.63 | 334.79 | 334.75 | 333.50 | 333.63 | 332.75 | 3.99 | 6.97 | 1.16 | 0.75 | 1500+90.21 |
| EP-2302 | EX-2304 | EX-2302 | Circ. | Conc. | 1 | 1.5 | 300.45 | 0.78 | 6.11 | 10.78 | 0.85 | 5.94 | 337.34 | 337.32 | 335.01 | 334.36 | 335.84 | 333.51 | 3.47 | 5.94 | 1.48 | 0.85 | 1503+88.57 |
| EP-2303 | EX-2303 | OP-2397 | Circ. | Conc. | 1 | 1.5 | 147.18 | 1.55 | 6.28 | 15.24 | 0.70 | 7.79 | 337.00 | 337.01 | 334.72 | 333.92 | 335.50 | 333.22 | 3.55 | 7.75 | 1.50 | 0.70 | 1503+93.13 |
| EP-2304 | EX-2301 | OP-2398 | Circ. | Conc. | 1 | 1.5 | 87.03 | 0.37 | 2.61 | 7.42 | 0.64 | 3.65 | 334.82 | 334.53 | 334.50 | 334.50 | 333.32 | 333.00 | 1.71 | 1.48 | 1.21 | 1.50 | 1499+93.01 |

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - NODE (1 OF 4)

| Node ID | Type | Library Item Name | Reference Chain | Station | Offset (ft) | Elevation (ft) | Depth (ft) | Junction Loss | $T_C$ Used | Cumulative $T_C$ (min) | Cumulative Discharge (cfs) | Cumulative Area (ac) | Cumulative C Value | Cumulative Intensity (in/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EX-0301 | Inlet | Ex. D.I. | I77EX | 1170+37.50 | 127.18 | 251.99 | 2.96 | 0.00 | 7.00 | 7.00 | 8.56 | 3.05 | 0.42 | 6.74 |
| EX-0302 | Inlet | Ex. D.I. | I77EX | 1173+56.42 | 0.04 | 253.45 | 3.48 | 0.00 | 15.00 | 15.00 | 16.81 | 4.69 | 0.64 | 5.57 |
| DN-0306 | Inlet | Dummy Joint | I77EX | 1181+51.42 | -97.86 | 257.91 | 5.00 | 0.10 | 20.76 | 21.40 | 75.36 | 19.81 | 0.51 | 4.95 |
| EX-0306 | Inlet | Ex. D.I. | I77EX | 1180+59.01 | -120.68 | 257.91 | 5.29 | 1.60 | 21.61 | 21.61 | 128.46 | 21.14 | 0.52 | 4.87 |
| EX-0307 | Inlet | Ex. D.I. | I77EX | 1181+03.11 | -0.43 | 262.37 | 2.50 | 0.00 | 7.00 | 7.00 | 5.41 | 1.33 | 0.60 | 6.74 |
| OP-0394 | Outlet | Ex. Outlet | I77EX | 1177+37.24 | -118.33 | 249.66 | 0.00 | 0.00 | 0.00 | 22.01 | 0.00 | 21.14 | 0.52 | 0.00 |
| EX-0396 | Inlet | Ex. D.I. | I77EX | 1180+43.59 | -159.75 | 260.39 | 3.00 | 0.00 | 0.00 | 0.00 | 50.00 | 0.00 | 0.00 | 0.00 |
| OP-0397 | Outlet | Ex. Outlet | I77EX | 1173+06.85 | -147.42 | 245.72 | 0.00 | 0.00 | 0.00 | 15.22 | 0.00 | 4.69 | 0.64 | 0.00 |
| OP-0398 | Outlet | Ex. Outlet | I77EX | 1171+32.32 | 199.03 | 246.35 | 0.00 | 0.00 | 0.00 | 7.21 | 0.00 | 3.05 | 0.42 | 0.00 |
| EX-0401 | Inlet | Ex. D.I. | I77EX | 1187+81.00 | -239.87 | 279.74 | 3.00 | 0.00 | 0.00 | 0.00 | 25.00 | 0.00 | 0.00 | 0.00 |
| EX-0402 | Inlet | Ex. D.I. | I77EX | 1187+35.02 | -101.51 | 271.16 | 7.66 | 0.80 | 20.76 | 20.76 | 75.36 | 19.81 | 0.51 | 4.95 |
| EX-0403 | Inlet | Ex. D.I. | I77EX | 1187+66.04 | 0.06 | 272.82 | 4.94 | 0.00 | 5.00 | 5.00 | 4.52 | 1.04 | 0.61 | 7.12 |
| EX-0404 | Inlet | Ex. D.I. | I77EX | 1197+37.35 | -122.02 | 301.92 | 5.30 | 0.37 | 19.10 | 19.10 | 38.57 | 14.68 | 0.51 | 5.11 |
| EX-0405 | Inlet | Ex. D.I. | I77EX | 1197+98.53 | 0.86 | 305.78 | 4.66 | 0.07 | 9.00 | 9.00 | 11.59 | 2.92 | 0.62 | 6.41 |
| EX-0406 | Inlet | Ex. D.I. | I77EX | 1198+62.42 | 122.89 | 306.52 | 2.83 | 0.00 | 6.00 | 6.00 | 6.27 | 1.55 | 0.58 | 6.92 |
| EX-0407 | Inlet | Ex. D.I. | I77EX | 1192+84.72 | 0.20 | 301.92 | 2.50 | 0.00 | 5.00 | 5.00 | 4.40 | 1.02 | 0.61 | 7.12 |
| EX-0408 | Inlet | Ex. D.I. | I77EX | 1192+50.69 | -112.51 | 301.92 | 5.42 | 0.12 | 20.34 | 20.34 | 40.73 | 15.70 | 0.52 | 4.99 |
| EX-0501 | Inlet | Ex. D.I. | I77EX | 1200+94.07 | -310.57 | 317.24 | 5.24 | 0.00 | 12.00 | 12.00 | 2.86 | 1.50 | 0.32 | 5.96 |
| EX-0502 | Inlet | Ex. D.I. | I77EX | 1201+11.72 | -128.80 | 315.01 | 5.59 | 0.37 | 18.67 | 18.67 | 26.39 | 10.64 | 0.48 | 5.16 |
| EX-0503 | Junction | Ex. M.H. | I77EX | 1202+11.51 | -169.16 | 322.27 | 11.08 | 0.12 | 18.09 | 18.49 | 21.27 | 8.21 | 0.50 | 5.22 |
| EX-0504 | Inlet | Ex. D.I. | I77EX | 1204+26.73 | -217.15 | 323.45 | 8.75 | 0.00 | 5.00 | 5.00 | 0.83 | 0.39 | 0.30 | 7.12 |
| EX-0505 | Inlet | Ex. D.I. | I77EX | 1204+39.03 | -184.12 | 322.21 | 8.08 | 0.37 | 18.09 | 18.09 | 21.27 | 8.21 | 0.50 | 5.22 |
| EX-0506 | Inlet | Ex. D.I. | I77EX | 1204+68.07 | -99.21 | 325.62 | 5.55 | 0.02 | 18.00 | 18.00 | 15.11 | 5.78 | 0.50 | 5.23 |
| EX-0507 | Inlet | Ex. D.I. | I77EX | 1205+05.31 | 3.13 | 328.32 | 3.64 | 0.35 | 8.00 | 8.00 | 11.37 | 2.79 | 0.62 | 6.57 |
| EX-0508 | Inlet | Ex. D.I. | I77EX | 1206+09.46 | 86.99 | 333.96 | 6.86 | 0.15 | 5.37 | 5.37 | 2.84 | 0.79 | 0.51 | 7.05 |
| EX-0509 | Inlet | Ex. D.I. | I77EX | 1205+89.05 | 154.97 | 329.74 | 2.30 | 0.00 | 5.00 | 5.00 | 2.32 | 0.60 | 0.55 | 7.12 |
| EX-0601 | Inlet | Ex. D.I. | I77EX | 1215+82.20 | 6.78 | 335.84 | 22.67 | 0.00 | 5.00 | 5.00 | 3.65 | 0.78 | 0.66 | 7.12 |
| EX-0602 | Junction | Ex. M.H. | I77EX | 1216+80.67 | 0.89 | 307.44 | 4.36 | 0.20 | 5.00 | 5.13 | 3.65 | 0.78 | 0.66 | 7.12 |
| EX-0603 | Inlet | Ex. D.I. | I77EX | 1215+61.01 | 201.62 | 312.20 | 2.87 | 0.00 | 9.00 | 9.00 | 5.06 | 2.34 | 0.34 | 6.41 |
| EX-0604 | Inlet | Ex. D.I. | I77EX | 1216+31.17 | 199.13 | 305.62 | 4.25 | 0.35 | 9.09 | 9.09 | 9.01 | 3.42 | 0.41 | 6.39 |
| EX-0605 | Inlet | Ex. D.I. | I77EX | 1223+44.71 | 7.63 | 322.16 | 4.55 | 0.00 | 7.00 | 7.00 | 7.68 | 1.56 | 0.73 | 6.74 |
| EX-0606 | Inlet | Ex. D.I. | I77EX | 1224+32.81 | -138.78 | 290.73 | 4.30 | 0.16 | 5.69 | 5.69 | 2.05 | 0.98 | 0.30 | 6.98 |
| EX-0607 | Inlet | Ex. D.I. | I77EX | 1225+12.54 | -140.25 | 294.35 | 7.82 | 0.00 | 5.00 | 5.00 | 0.79 | 0.37 | 0.30 | 7.12 |
| EX-0608 | Inlet | Ex. D.I. | I77EX | 1224+48.58 | 36.20 | 287.65 | 6.60 | 0.69 | 7.07 | 7.07 | 11.31 | 3.37 | 0.50 | 6.73 |
| EX-0609 | Inlet | Ex. D.I. | I77EX | 1229+50.07 | 11.29 | 300.19 | 4.19 | 0.00 | 6.00 | 6.00 | 4.57 | 1.03 | 0.64 | 6.92 |
| EX-0610 | Inlet | Ex. D.I. | I77EX | 1230+01.54 | 101.30 | 299.47 | 5.75 | 0.01 | 6.21 | 6.21 | 4.73 | 1.11 | 0.62 | 6.88 |
| OP-0611 | Outlet | Ex. Outlet | I77EX | 1215+78.21 | 548.18 | 293.64 | 0.00 | 0.00 | 0.00 | 9.71 | 0.00 | 3.42 | 0.41 | 0.00 |
| OP-0680 | Outlet | Ex. Outlet | I77EX | 1230+32.55 | 164.41 | 292.02 | 0.00 | 0.00 | 0.00 | 6.35 | 0.00 | 1.11 | 0.62 | 0.00 |
| OP-0683 | Outlet | Ex. Outlet | I77EX | 1224+44.47 | 115.07 | 282.35 | 3.35 | 0.00 | 0.00 | 7.19 | 0.00 | 3.37 | 0.50 | 0.00 |
| EX-0701 | Inlet | Ex. D.I. | I77EX | 1235+98.59 | 7.12 | 277.55 | 3.73 | 0.00 | 6.00 | 6.00 | 9.77 | 2.09 | 0.68 | 6.92 |
| EX-0702 | Inlet | Ex. D.I. | I77EX | 1246+61.97 | -6.00 | 244.76 | 4.71 | 0.00 | 8.00 | 8.00 | 9.36 | 2.17 | 0.66 | 6.57 |
| OP-0798 | Outlet | Ex. Outlet | I77EX | 1246+60.90 | 155.54 | 224.27 | 0.00 | 0.00 | 0.00 | 8.16 | 0.00 | 2.17 | 0.66 | 0.00 |

I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - NODE (2 OF 4)

| Node ID | Type | Library Item Name | Reference Chain | Station | Offset (ft) | Elevation (ft) | Depth (ft) | Junction Loss | $T_C$ Used | Cumulative $T_C$ (min) | Cumulative Discharge (cfs) | Cumulative Area (ac) | Cumulative C Value | Cumulative Intensity (in/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OP-0799 | Outlet | Ex. Outlet | I77EX | 1236+12.14 | 196.98 | 241.36 | 0.00 | 0.00 | 0.00 | 6.15 | 0.00 | 2.09 | 0.68 | 0.00 |
| EX-0801 | Inlet | Ex. D.I. | I77EX | 1252+00.86 | -6.56 | 240.19 | 4.00 | 0.00 | 11.00 | 11.00 | 13.44 | 3.15 | 0.70 | 6.10 |
| EX-0802 | Inlet | Ex. D.I. | I77EX | 1253+26.13 | -127.40 | 233.84 | 4.46 | 0.00 | 9.00 | 9.00 | 9.47 | 3.41 | 0.43 | 6.41 |
| EX-0803 | Inlet | Ex. D.I. | I77EX | 1261+46.66 | -2.56 | 245.37 | 2.40 | 0.00 | 10.00 | 10.00 | 6.91 | 1.84 | 0.60 | 6.25 |
| OP-0897 | Outlet | Ex. Outlet | I77EX | 1259+69.51 | 93.03 | 242.30 | 0.00 | 0.00 | 0.00 | 10.80 | 0.00 | 1.84 | 0.60 | 0.00 |
| OP-0898 | Outlet | Ex. Outlet | I77EX | 1253+34.79 | 114.57 | 225.54 | 0.00 | 0.00 | 0.00 | 9.47 | 0.00 | 3.41 | 0.43 | 0.00 |
| OP-0899 | Outlet | Ex. Outlet | I77EX | 1253+32.63 | 116.10 | 225.40 | 0.00 | 0.00 | 0.00 | 11.19 | 0.00 | 3.15 | 0.70 | 0.00 |
| EX-0901 | Inlet | Ex. D.I. | I77EX | 1270+50.25 | 0.89 | 250.82 | 4.23 | 0.00 | 10.00 | 10.00 | 8.02 | 1.97 | 0.65 | 6.25 |
| EX-0907 | Inlet | Ex. D.I. | I77EX | 1278+84.95 | 6.47 | 256.69 | 9.60 | 0.02 | 75.19 | 75.19 | 54.06 | 37.54 | 0.60 | 2.41 |
| EX-0993 | Inlet | Ex. C.B. | I77EX | 1279+52.96 | 116.11 | 248.43 | 0.00 | 0.00 | 75.00 | 75.00 | 51.23 | 35.67 | 0.60 | 2.41 |
| OP-0995 | Outlet | Ex. Outlet | I77EX | 1278+03.43 | -119.09 | 246.04 | 0.00 | 0.00 | 0.00 | 75.45 | 0.00 | 37.54 | 0.60 | 0.00 |
| OP-0999 | Outlet | Ex. Outlet | I77EX | 1271+67.92 | -118.10 | 244.92 | 0.00 | 0.00 | 0.00 | 10.40 | 0.00 | 1.97 | 0.65 | 0.00 |
| EX-1001 | Inlet | Ex. C.B. | I77EX | 1286+58.13 | -85.13 | 264.17 | 8.81 | 0.62 | 50.37 | 50.37 | 42.25 | 25.69 | 0.52 | 3.15 |
| EX-1001S | Inlet | Dummy Joint | I77EX | 1283+69.91 | -100.81 | 260.00 | 6.00 | 0.04 | 50.37 | 50.95 | 42.25 | 25.69 | 0.52 | 3.15 |
| EX-1002 | Inlet | Ex. D.I. | I77EX | 1286+46.91 | 0.26 | 262.00 | 5.67 | 0.02 | 50.24 | 50.24 | 33.12 | 19.67 | 0.54 | 3.15 |
| EX-1003 | Inlet | Ex. D.I. | I77EX | 1286+34.09 | 86.56 | 263.15 | 6.24 | 0.02 | 50.10 | 50.10 | 31.79 | 18.94 | 0.53 | 3.16 |
| EX-1004 | Inlet | Ex. D.I. | I77EX | 1286+42.80 | 146.26 | 261.00 | 3.43 | 0.00 | 50.00 | 50.00 | 31.03 | 18.49 | 0.53 | 3.16 |
| EX-1005 | Inlet | Ex. D.I. | I77EX | 1290+03.73 | 0.06 | 265.00 | 4.08 | 0.02 | 12.30 | 12.30 | 10.56 | 3.44 | 0.52 | 5.92 |
| EX-1007 | Inlet | Ex. D.I. | I77EX | 1290+51.16 | 100.20 | 264.44 | 2.50 | 0.00 | 12.00 | 12.00 | 5.25 | 1.94 | 0.46 | 5.96 |
| EX-1008 | Inlet | Ex. C.B. | I77EX | 1289+59.80 | -92.14 | 267.47 | 9.02 | 0.19 | 12.54 | 12.54 | 15.12 | 5.31 | 0.48 | 5.89 |
| EX-1009 | Inlet | Ex. C.B. | I77EX | 1291+83.45 | -91.79 | 269.34 | 7.16 | 0.00 | 8.00 | 8.00 | 2.94 | 1.02 | 0.44 | 6.57 |
| OP-1010 | Outlet | Ex. Outlet | I77EX | 1281+81.78 | -116.88 | 253.25 | 0.00 | 0.00 | 0.00 | 51.30 | 0.00 | 25.69 | 0.52 | 0.00 |
| EX-1101 | Inlet | Ex. D.I. | I77EX | 1297+48.27 | 0.25 | 270.81 | 3.39 | 0.03 | 10.37 | 10.37 | 11.45 | 3.17 | 0.58 | 6.19 |
| EX-1102 | Junction | Ex. M.H. | I77EX | 1297+45.42 | -91.66 | 273.83 | 7.45 | 0.14 | 10.37 | 10.56 | 11.45 | 3.17 | 0.58 | 6.19 |
| EX-1103 | Inlet | Ex. D.I. | I77EX | 1297+50.24 | 96.10 | 270.81 | 2.50 | 0.00 | 10.00 | 10.00 | 6.70 | 1.87 | 0.57 | 6.25 |
| EX-1105 | Junction | Ex. M.H. | I77EX | 1298+55.47 | -104.45 | 276.80 | 10.75 | 0.06 | 10.37 | 10.94 | 11.45 | 3.17 | 0.58 | 6.19 |
| EX-1106 | Junction | Ex. M.H. | I77EX | 1299+13.66 | -138.16 | 273.75 | 9.19 | 0.35 | 11.05 | 11.05 | 17.22 | 5.58 | 0.51 | 6.09 |
| EX-1107 | Inlet | Ex. D.I. | I77EX | 1303+59.76 | -133.40 | 264.46 | 3.50 | 2.42 | 25.27 | 25.27 | 42.35 | 19.46 | 0.48 | 4.55 |
| EX-1107A | Inlet | Ex. D.I. | I77EX | 1299+67.58 | -123.79 | 272.28 | 9.11 | 0.05 | 11.15 | 11.15 | 18.34 | 6.04 | 0.50 | 6.08 |
| EX-1108 | Inlet | Ex. D.I. | I77EX | 1304+38.27 | 116.81 | 276.78 | 3.00 | 0.00 | 25.00 | 25.00 | 22.27 | 9.49 | 0.51 | 4.58 |
| EX-1192 | Inlet | Ex. D.I. | I77EX | 1297+67.75 | -289.17 | 279.23 | 4.70 | 0.00 | 8.00 | 8.00 | 6.42 | 2.41 | 0.41 | 6.57 |
| OP-1196 | Outlet | Ex. Outlet | I77EX | 1302+99.11 | -441.46 | 261.84 | 8.98 | 0.00 | 0.00 | 25.65 | 0.00 | 19.46 | 0.48 | 0.00 |
| EX-1201 | Inlet | Ex. D.I. | I77EX | 1320+48.58 | -0.08 | 258.49 | 6.09 | 0.69 | 17.52 | 17.52 | 31.63 | 13.33 | 0.45 | 5.28 |
| EX-1202 | Inlet | Ex. D.I. | I77EX | 1327+67.60 | -2.97 | 251.09 | 5.50 | 0.05 | 18.78 | 18.78 | 35.83 | 14.89 | 0.47 | 5.15 |
| EX-1203 | Inlet | Ex. D.I. | I77EX | 1319+99.01 | 101.79 | 258.86 | 5.26 | 0.00 | 13.00 | 13.00 | 9.15 | 3.54 | 0.44 | 5.82 |
| EX-1204 | Inlet | Ex. D.I. | I77EX | 1320+08.68 | -94.77 | 259.32 | 5.69 | 0.05 | 17.29 | 17.29 | 12.62 | 6.40 | 0.37 | 5.31 |
| EX-1205 | Inlet | Ex. D.I. | I77EX | 1319+68.98 | -191.32 | 258.89 | 4.31 | 0.00 | 17.00 | 17.00 | 5.09 | 3.18 | 0.30 | 5.34 |
| EX-1301 | Inlet | Ex. D.I. | I77EX | 1332+19.25 | -3.29 | 253.35 | 3.11 | 0.00 | 12.00 | 12.00 | 9.96 | 2.56 | 0.65 | 5.96 |
| EX-1302 | Inlet | Ex. D.I. | I77EX | 1341+91.59 | -3.59 | 263.17 | 9.75 | 0.01 | 14.00 | 14.00 | 19.49 | 5.51 | 0.62 | 5.69 |
| OP-1394 | Outlet | Ex. Outlet | I77EX | 1341+76.28 | -121.75 | 252.44 | 0.00 | 0.00 | 0.00 | 14.25 | 0.00 | 5.51 | 0.62 | 0.00 |
| EX-1395 | Inlet | Dummy Joint | I77EX | 1342+08.30 | 112.61 | 255.10 | 0.00 | 0.00 | 11.55 | 11.55 | 10.99 | 3.19 | 0.57 | 6.02 |
| OP-1396 | Outlet | Ex. Outlet | I77EX | 1332+11.55 | 166.38 | 228.48 | 0.00 | 0.00 | 0.00 | 12.15 | 0.00 | 2.56 | 0.65 | 0.00 |

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - NODE (3 OF 4)

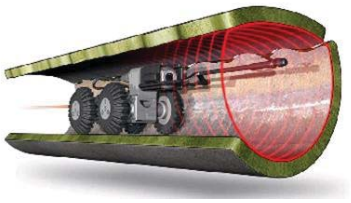
| Node ID | Type | Library Item Name | Reference Chain | Station | Offset (ft) | Elevation (ft) | Depth (ft) | Junction Loss | $T_C$ Used | Cumulative $T_C$ (min) | Cumulative Discharge (cfs) | Cumulative Area (ac) | Cumulative C Value | Cumulative Intensity (in/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OP-1399 | Outlet | Ex. Outlet | I77EX | 1328+57.76 | -0.77 | 225.88 | 0.00 | 0.00 | 0.00 | 18.83 | 0.00 | 14.89 | 0.47 | 0.00 |
| EX-1401 | Inlet | Ex. D.I. | I77EX | 1350+03.10 | -4.06 | 271.72 | 2.94 | 0.01 | 17.92 | 17.92 | 10.09 | 3.75 | 0.52 | 5.24 |
| EX-1402 | Inlet | Ex. D.I. | I77EX | 1352+05.10 | 102.24 | 271.45 | 1.85 | 0.00 | 17.00 | 17.00 | 5.33 | 2.36 | 0.42 | 5.34 |
| EX-1403 | Inlet | Ex. D.I. | I77EX | 1355+02.43 | -101.05 | 277.20 | 8.32 | 0.35 | 10.92 | 10.92 | 13.65 | 6.37 | 0.35 | 6.11 |
| EX-1404 | Inlet | Ex. D.I. | I77EX | 1355+38.26 | -3.81 | 277.69 | 9.89 | 0.59 | 13.21 | 13.21 | 28.32 | 12.67 | 0.39 | 5.80 |
| OP-1405 | Outlet | Ex. Outlet | I77EX | 1357+22.79 | 270.84 | 272.29 | 0.00 | 0.00 | 0.00 | 11.38 | 0.00 | 1.77 | 0.54 | 0.00 |
| EX-1406 | Inlet | Ex. D.I. | I77EX | 1358+27.31 | -107.05 | 280.00 | 5.97 | 0.00 | 10.00 | 10.00 | 5.96 | 1.77 | 0.54 | 6.25 |
| EX-1408 | Inlet | Ex. D.I. | I77EX | 1357+86.96 | 99.78 | 279.96 | 6.86 | 0.04 | 10.00 | 10.74 | 5.96 | 1.77 | 0.54 | 6.25 |
| EX-1409 | Inlet | Ex. D.I. | I77EX | 1353+84.32 | -153.05 | 274.55 | 3.91 | 0.35 | 10.65 | 10.65 | 12.32 | 5.62 | 0.36 | 6.15 |
| EX-1410 | Inlet | Ex. D.I. | I77EX | 1357+52.70 | -304.47 | 277.08 | 3.00 | 0.27 | 12.36 | 12.36 | 9.75 | 4.70 | 0.35 | 5.91 |
| OP-1493 | Outlet | Ex. Outlet | I77EX | 1355+52.53 | 321.56 | 265.07 | 0.00 | 0.00 | 0.00 | 13.82 | 0.00 | 12.67 | 0.39 | 0.00 |
| EX-1494 | Inlet | Ex. D.I. | I77EX | 1358+84.23 | -293.47 | 278.39 | 2.76 | 0.00 | 12.00 | 12.00 | 6.31 | 2.76 | 0.38 | 5.96 |
| EX-1497 | Inlet | Ex. D.I. | I77EX | 1352+37.32 | -384.82 | 297.89 | 24.05 | 0.00 | 10.00 | 10.00 | 9.25 | 4.34 | 0.34 | 6.25 |
| OP-1499 | Outlet | Ex. Outlet | I77EX | 1347+75.41 | -134.51 | 267.22 | 0.00 | 0.00 | 0.00 | 18.67 | 0.00 | 3.75 | 0.52 | 0.00 |
| EX-1501 | Inlet | Ex. D.I. | I77EX | 1362+46.47 | -0.35 | 287.07 | 5.05 | 0.00 | 5.00 | 5.00 | 8.10 | 1.89 | 0.60 | 7.12 |
| EX-1502 | Inlet | Ex. D.I. | I77EX | 1364+80.78 | 328.41 | 283.85 | 4.57 | 1.53 | 50.70 | 50.70 | 62.36 | 40.55 | 0.49 | 3.13 |
| EX-1504 | Inlet | Ex. D.I. | I77EX | 1367+70.48 | 272.14 | 289.10 | 5.14 | 1.15 | 50.32 | 50.32 | 61.59 | 39.73 | 0.49 | 3.15 |
| EX-1505 | Inlet | Ex. D.I. | I77EX | 1371+97.00 | 0.37 | 300.61 | 6.58 | 0.00 | 7.00 | 7.00 | 6.46 | 1.59 | 0.60 | 6.74 |
| EX-1506 | Inlet | Ex. D.I. | I77EX | 1371+99.99 | 137.22 | 299.02 | 5.30 | 0.04 | 10.00 | 10.00 | 14.07 | 3.45 | 0.65 | 6.25 |
| EX-1507 | Inlet | Ex. D.I. | I77EX | 1372+01.82 | 189.57 | 297.82 | 5.34 | 1.50 | 40.17 | 40.17 | 36.06 | 22.26 | 0.45 | 3.60 |
| EX-1508 | Inlet | Ex. C.B. | I77EX | 1372+40.91 | 227.07 | 300.09 | 4.70 | 0.04 | 40.10 | 40.10 | 27.35 | 18.54 | 0.41 | 3.60 |
| EX-1509 | Inlet | Ex. D.I. | I77EX | 1373+11.59 | 289.27 | 302.44 | 3.59 | 0.00 | 40.00 | 40.00 | 25.19 | 17.60 | 0.40 | 3.61 |
| EX-1594 | Inlet | Ex. D.I. | I77EX | 1369+36.36 | 417.43 | 289.10 | 0.00 | 0.00 | 50.00 | 50.00 | 26.69 | 15.60 | 0.54 | 3.16 |
| OP-1595 | Outlet | Ex. Outlet | I77EX | 1363+81.78 | 184.10 | 275.54 | 0.00 | 0.00 | 0.00 | 50.89 | 0.00 | 40.55 | 0.49 | 0.00 |
| OP-1599 | Outlet | Ex. Outlet | I77EX | 1362+00.72 | 129.36 | 275.62 | 0.00 | 0.00 | 0.00 | 5.18 | 0.00 | 1.89 | 0.60 | 0.00 |
| EX-1601 | Inlet | Ex. D.I. | I77EX | 1379+82.20 | -107.25 | 311.76 | 2.99 | 0.01 | 7.00 | 7.00 | 4.54 | 1.12 | 0.60 | 6.74 |
| EX-1602 | Inlet | Ex. D.I. | I77EX | 1379+84.09 | 0.61 | 311.81 | 3.46 | 0.01 | 7.47 | 7.47 | 7.48 | 1.86 | 0.60 | 6.66 |
| EX-1603 | Inlet | Ex. D.I. | I77EX | 1379+86.51 | 124.57 | 311.50 | 3.47 | 0.01 | 9.00 | 9.00 | 10.97 | 2.79 | 0.61 | 6.41 |
| EX-1604 | Inlet | Ex. C.B. | I77EX | 1379+87.52 | 179.48 | 315.69 | 28.75 | 0.54 | 18.99 | 18.99 | 30.41 | 11.15 | 0.53 | 5.13 |
| EX-1605 | Inlet | Ex. C.B. | I77EX | 1383+46.69 | -149.27 | 318.30 | 4.76 | 0.00 | 5.00 | 5.00 | 3.64 | 0.90 | 0.57 | 7.12 |
| EX-1606 | Inlet | Ex. D.I. | I77EX | 1383+51.50 | -106.92 | 317.23 | 3.82 | 0.01 | 17.00 | 17.00 | 7.89 | 3.28 | 0.45 | 5.34 |
| EX-1607 | Inlet | Ex. D.I. | I77EX | 1383+64.04 | -0.16 | 317.54 | 4.93 | 0.01 | 17.33 | 17.33 | 12.24 | 4.65 | 0.50 | 5.30 |
| EX-1608 | Inlet | Ex. D.I. | I77EX | 1383+78.82 | 122.82 | 316.58 | 5.36 | 0.01 | 17.62 | 17.62 | 17.09 | 6.25 | 0.52 | 5.27 |
| EX-1609 | Inlet | Ex. C.B. | I77EX | 1383+84.97 | 179.53 | 321.27 | 10.72 | 0.34 | 17.79 | 17.79 | 20.35 | 7.73 | 0.50 | 5.25 |
| EX-1610 | Inlet | Ex. C.B. | I77EX | 1387+77.60 | 193.67 | 326.13 | 3.50 | 0.00 | 6.00 | 6.00 | 1.83 | 0.88 | 0.30 | 6.92 |
| EX-1698 | Inlet | Dummy Joint | I77EX | 1379+81.57 | -148.51 | 311.08 | 0.00 | 0.00 | 5.00 | 5.00 | 1.40 | 0.39 | 0.50 | 7.12 |
| OP-1699 | Outlet | Ex. Outlet | I77EX | 1379+02.96 | 263.21 | 275.54 | 0.50 | 0.00 | 0.00 | 19.08 | 0.00 | 11.15 | 0.53 | 0.00 |
| EX-1701 | Inlet | Ex. D.I. | I77EX | 1399+90.93 | -3.77 | 313.10 | 4.44 | 0.00 | 11.00 | 11.00 | 11.32 | 2.73 | 0.68 | 6.10 |
| OP-1797 | Outlet | Ex. Outlet | I77EX | 1400+45.07 | 158.58 | 297.40 | 0.00 | 0.00 | 0.00 | 11.18 | 0.00 | 2.73 | 0.68 | 0.00 |
| EX-1801 | Inlet | Ex. D.I. | I77EX | 1410+72.23 | 0.61 | 305.12 | 5.12 | 0.00 | 14.00 | 14.00 | 17.53 | 4.50 | 0.68 | 5.69 |
| EX-1802 | Inlet | Ex. D.I. | I77EX | 1416+20.50 | 0.53 | 306.68 | 6.29 | 0.05 | 22.10 | 22.10 | 14.98 | 7.91 | 0.39 | 4.83 |
| EX-1803 | Inlet | Ex. D.I. | I77EX | 1423+70.33 | 0.19 | 311.38 | 4.96 | 0.01 | 76.13 | 76.13 | 50.64 | 46.90 | 0.45 | 2.39 |

# I-77 - EXISTING CLOSED SYSTEM DRAINAGE INFRASTRUCTURE GEOPAK DRAINAGE REPORTS - 10-YR STORM EVENT - NODE (4 OF 4)

| Node ID | Type | Library Item Name | Reference Chain | Station | Offset (ft) | Elevation (ft) | Depth (ft) | Junction Loss | $T_C$ Used | Cumulative $T_C$ (min) | Cumulative Discharge (cfs) | Cumulative Area (ac) | Cumulative C Value | Cumulative Intensity (in/hr) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EX-1807 | Inlet | Dummy Joint | I77EX | 1416+52.08 | 112.06 | 308.00 | 4.54 | 0.27 | 21.89 | 21.90 | 8.51 | 5.91 | 0.30 | 4.84 |
| EX-1894 | Inlet | Dummy Joint | I77EX | 1424+12.27 | 118.49 | 307.32 | 0.00 | 0.00 | 75.88 | 75.88 | 40.86 | 40.69 | 0.42 | 2.39 |
| OP-1895 | Outlet | Ex. Outlet | I77EX | 1423+18.17 | -147.72 | 305.34 | 0.00 | 0.00 | 0.00 | 76.37 | 0.00 | 46.90 | 0.45 | 0.00 |
| OP-1896 | Outlet | Ex. Outlet | I77EX | 1415+71.96 | -170.28 | 295.32 | 0.00 | 0.00 | 0.00 | 22.34 | 0.00 | 7.91 | 0.39 | 0.00 |
| EX-1897 | Inlet | Dummy Joint | I77EX | 1416+60.60 | 111.36 | 303.68 | 0.00 | 0.00 | 21.89 | 21.89 | 8.51 | 5.91 | 0.30 | 4.84 |
| OP-1899 | Outlet | Ex. Outlet | I77EX | 1410+45.30 | 129.71 | 297.25 | 0.00 | 0.04 | 0.00 | 14.20 | 0.00 | 4.50 | 0.68 | 0.00 |
| EX-2101 | Inlet | Ex. D.I. | I77EX | 1459+00.30 | -0.37 | 309.92 | 9.90 | 0.04 | 46.38 | 46.38 | 60.73 | 34.51 | 0.53 | 3.31 |
| EX-2102 | Inlet | Ex. D.I. | I77EX | 1471+91.64 | 0.23 | 287.64 | 5.20 | 0.00 | 12.00 | 12.00 | 16.80 | 4.22 | 0.67 | 5.96 |
| OP-2195 | Outlet | Ex. Outlet | I77EX | 1471+38.32 | -195.38 | 268.29 | 0.00 | 0.00 | 0.00 | 12.19 | 0.00 | 4.22 | 0.67 | 0.00 |
| EX-2198 | Inlet | Dummy Joint | I77EX | 1458+56.65 | 129.08 | 304.21 | 0.00 | 0.00 | 46.25 | 46.25 | 54.49 | 31.63 | 0.52 | 3.31 |
| OP-2199 | Outlet | Ex. Outlet | I77EX | 1459+53.18 | -161.85 | 298.00 | 0.00 | 0.00 | 0.00 | 46.61 | 0.00 | 34.51 | 0.53 | 0.00 |
| EX-2201 | Inlet | Ex. D.I. | I77EX | 1475+65.71 | 0.49 | 290.51 | 4.54 | 0.06 | 10.35 | 10.35 | 15.39 | 4.28 | 0.58 | 6.20 |
| EX-2202 | Inlet | Ex. D.I. | I77EX | 1476+68.11 | 114.86 | 291.55 | 3.41 | 0.00 | 10.00 | 10.00 | 6.06 | 1.90 | 0.51 | 6.25 |
| EX-2203 | Inlet | Ex. D.I. | I77EX | 1484+97.49 | 0.25 | 305.89 | 4.23 | 0.06 | 20.28 | 20.28 | 45.29 | 18.35 | 0.49 | 5.00 |
| EX-2204 | Inlet | Ex. D.I. | I77EX | 1485+95.89 | 111.22 | 307.34 | 4.33 | 0.00 | 20.00 | 20.00 | 26.00 | 11.49 | 0.45 | 5.02 |
| OP-2298 | Outlet | Ex. Outlet | I77EX | 1483+96.76 | -111.82 | 300.78 | 0.00 | 0.00 | 0.00 | 20.56 | 0.00 | 18.35 | 0.49 | 0.00 |
| OP-2299 | Outlet | Ex. Outlet | I77EX | 1474+61.90 | -113.95 | 283.97 | 0.00 | 0.00 | 0.00 | 10.63 | 0.00 | 4.28 | 0.58 | 0.00 |
| EX-2301 | Inlet | Ex. D.I. | I77EX | 1499+93.01 | -92.13 | 335.92 | 2.60 | 0.00 | 6.00 | 6.00 | 2.61 | 0.63 | 0.60 | 6.92 |
| EX-2302 | Inlet | Ex. D.I. | I77EX | 1500+90.21 | 91.87 | 337.63 | 4.12 | 0.18 | 15.84 | 15.84 | 7.54 | 3.61 | 0.38 | 5.47 |
| EX-2303 | Inlet | Ex. D.I. | I77EX | 1503+93.13 | -113.65 | 339.85 | 4.35 | 0.00 | 14.00 | 14.00 | 6.28 | 3.10 | 0.36 | 5.69 |
| EX-2304 | Inlet | Ex. D.I. | I77EX | 1503+88.57 | 113.11 | 338.86 | 3.02 | 0.00 | 15.00 | 15.00 | 6.11 | 3.12 | 0.35 | 5.57 |
| OP-2397 | Outlet | Ex. Outlet | I77EX | 1503+14.97 | -238.73 | 333.22 | 0.00 | 0.00 | 0.00 | 14.32 | 0.00 | 3.10 | 0.36 | 0.00 |
| OP-2398 | Outlet | Ex. Outlet | I77EX | 1499+64.98 | -174.57 | 333.00 | 0.00 | 0.00 | 0.00 | 6.40 | 0.00 | 0.63 | 0.60 | 0.00 |
| OP-2399 | Outlet | Ex. Outlet | I77EX | 1500+30.57 | 146.62 | 332.75 | 0.00 | 0.00 | 0.00 | 16.03 | 0.00 | 3.61 | 0.38 | 0.00 |

# Appendix F

Video Inspection Reports of Existing Pipes

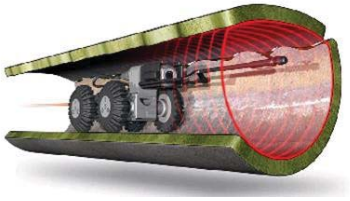


# AET Services

Robotic Inspections

# EC0102

| | | |
|---|---|---|
| **EC0102** | **6’ Culvert** | **1660’** |
| **Cracking Throughout** | | |
| **18” Lateral** | **736’** | |
| **18” Lateral** | **878’** | |
| **Infiltration** | **1002’** | |
| **18” Lateral** | **1089’** | |
| **Manhole** | **1270’** | |

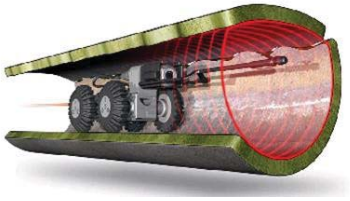


# AET Services

Robotic Inspections

# EC0103

| | | |
|---|---|---|
| **EC0103** | **6’ Culvert** | **596’** |
| **Cracking Throughout** | | |
| **42” Lateral** | | **200’** |
| **18” Lateral** | | **395”** |
| **6” x2 Lateral** | | **395’** |
| **45degree turn to left** | | **527’** |
| **Turns into 54” and 18”** | | **596** |
| **Then 42” straight ahead** | | |
| **Then 30” goes left** | | |



# AET Services

Robotic Inspections

# EC0211

| | | |
|---|---|---|
| **EC0211** | **6’ Culvert** | **2165’** |
| **Cracking Throughout** | | |
| **Manhole** | | **735’** |
| **45 degree left** | | **896”** |
| **Manhole** | | **1631’** |
| **Manhole** | | **1883’** |

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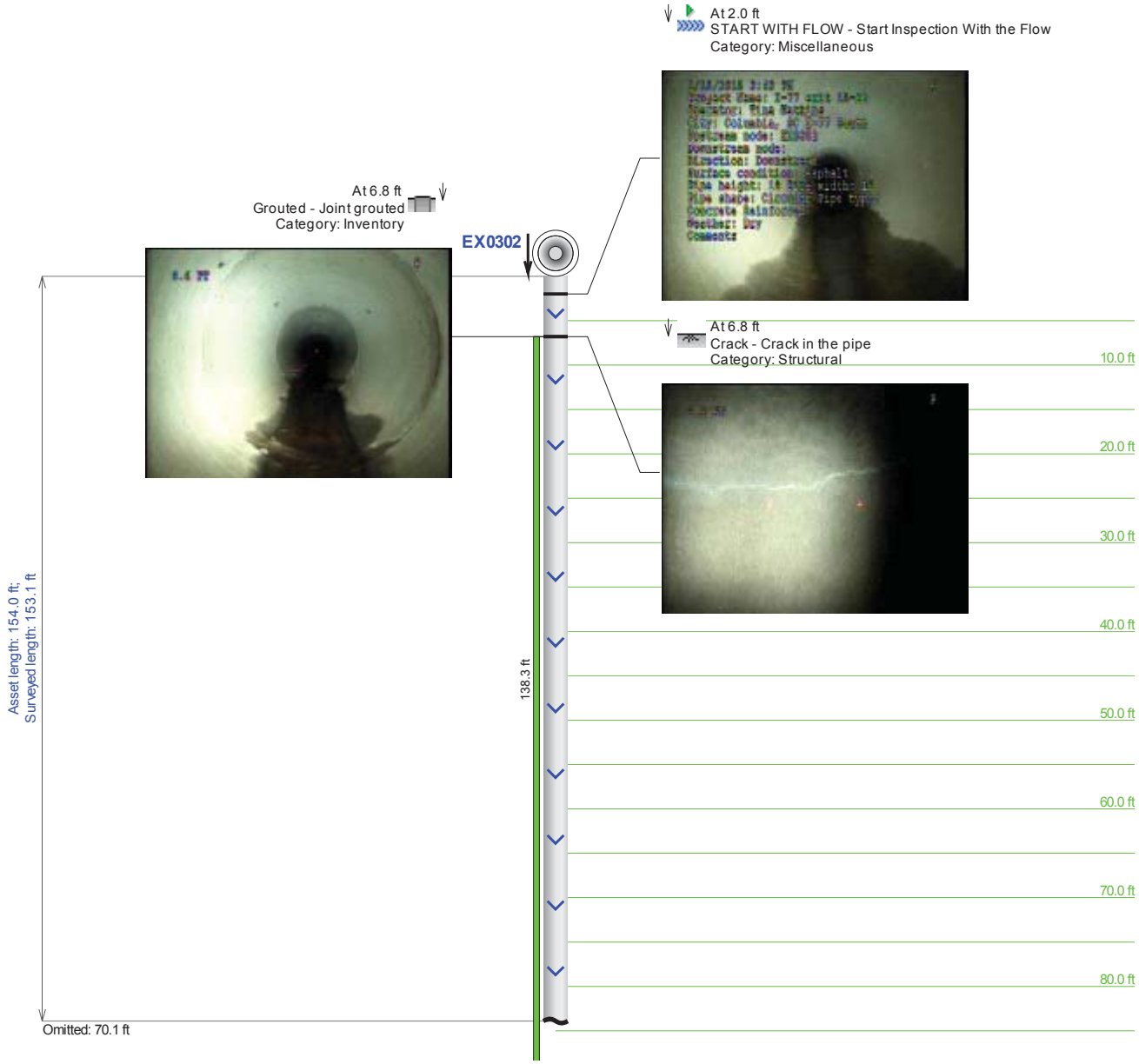
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0302 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 153.1 | Tina Watkins | |



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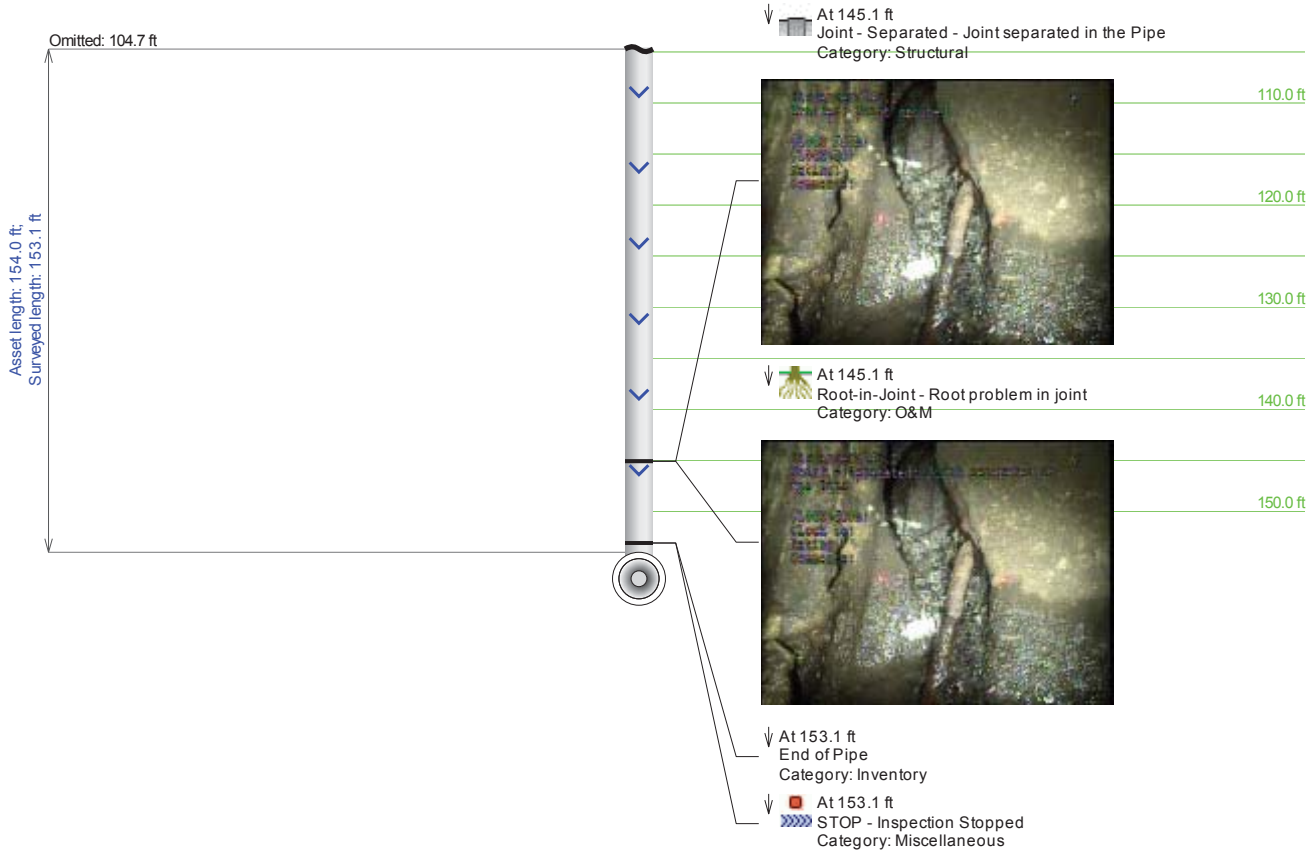
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0302 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 153.1 | Tina Watkins | |



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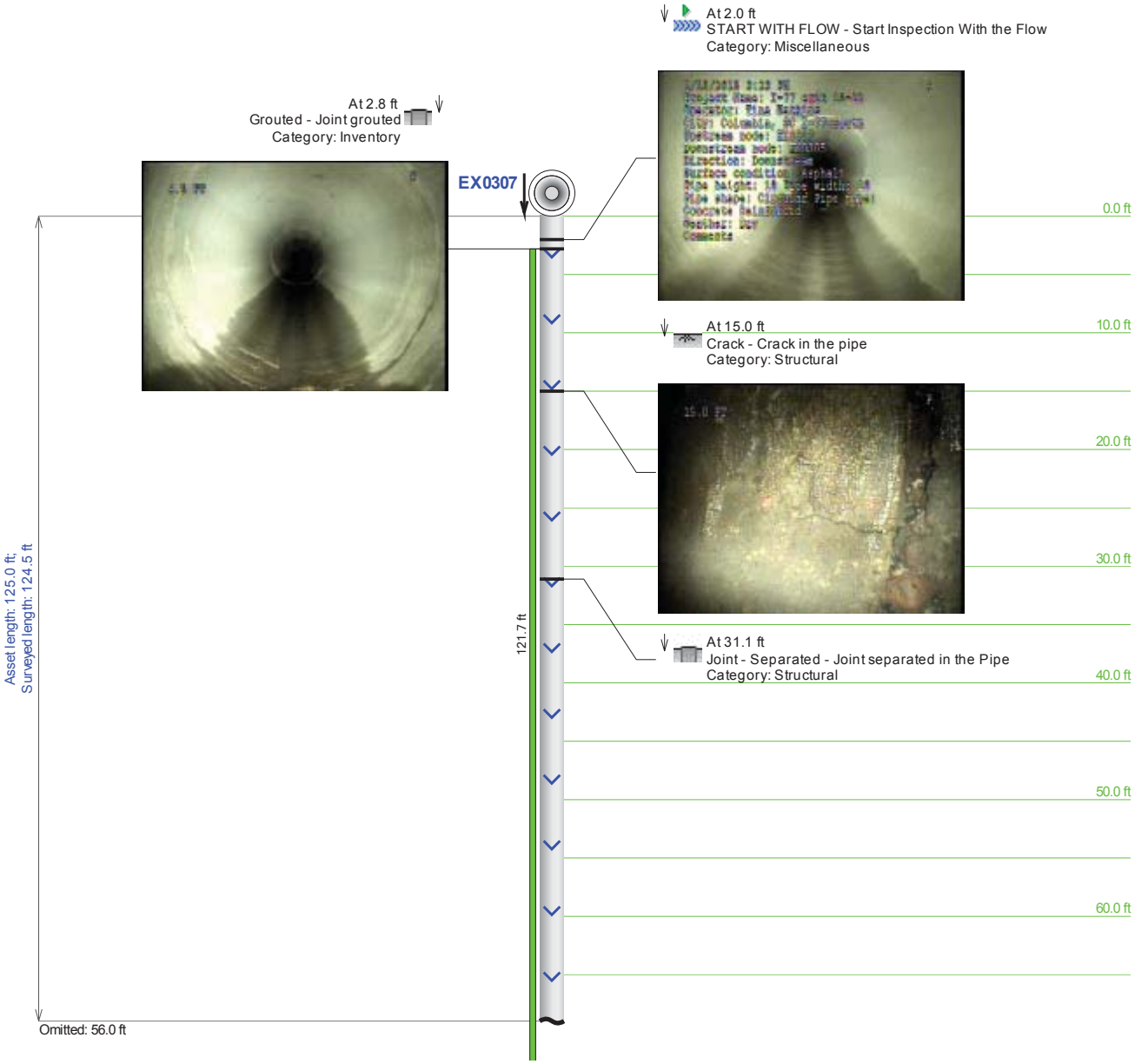
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0305 | Columbia, SC | I-77-South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 124.5 | Tina Watkins | |



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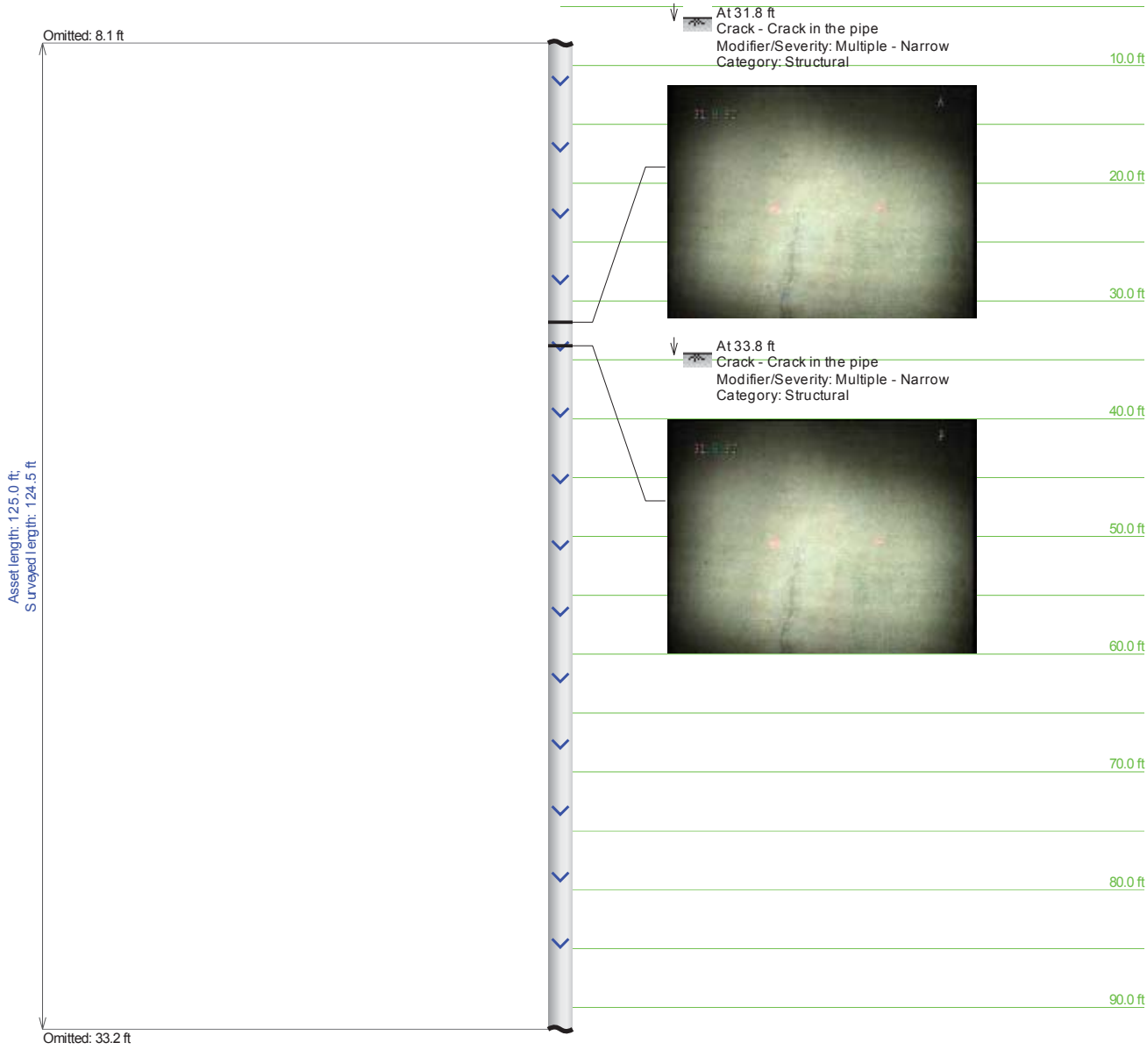
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0305 | Columbia, SC | I-77-South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 124.5 | Tina Watkins | |



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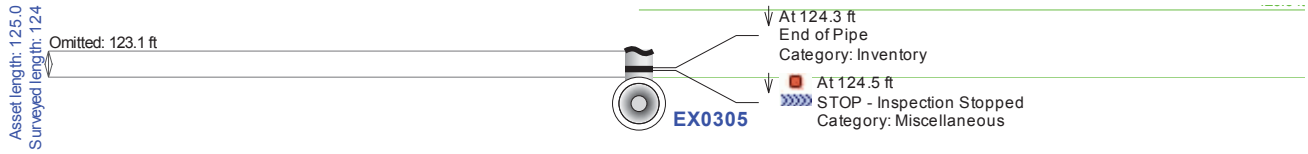
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0305 | Columbia, SC | I-77-South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 124.5 | Tina Watkins | |



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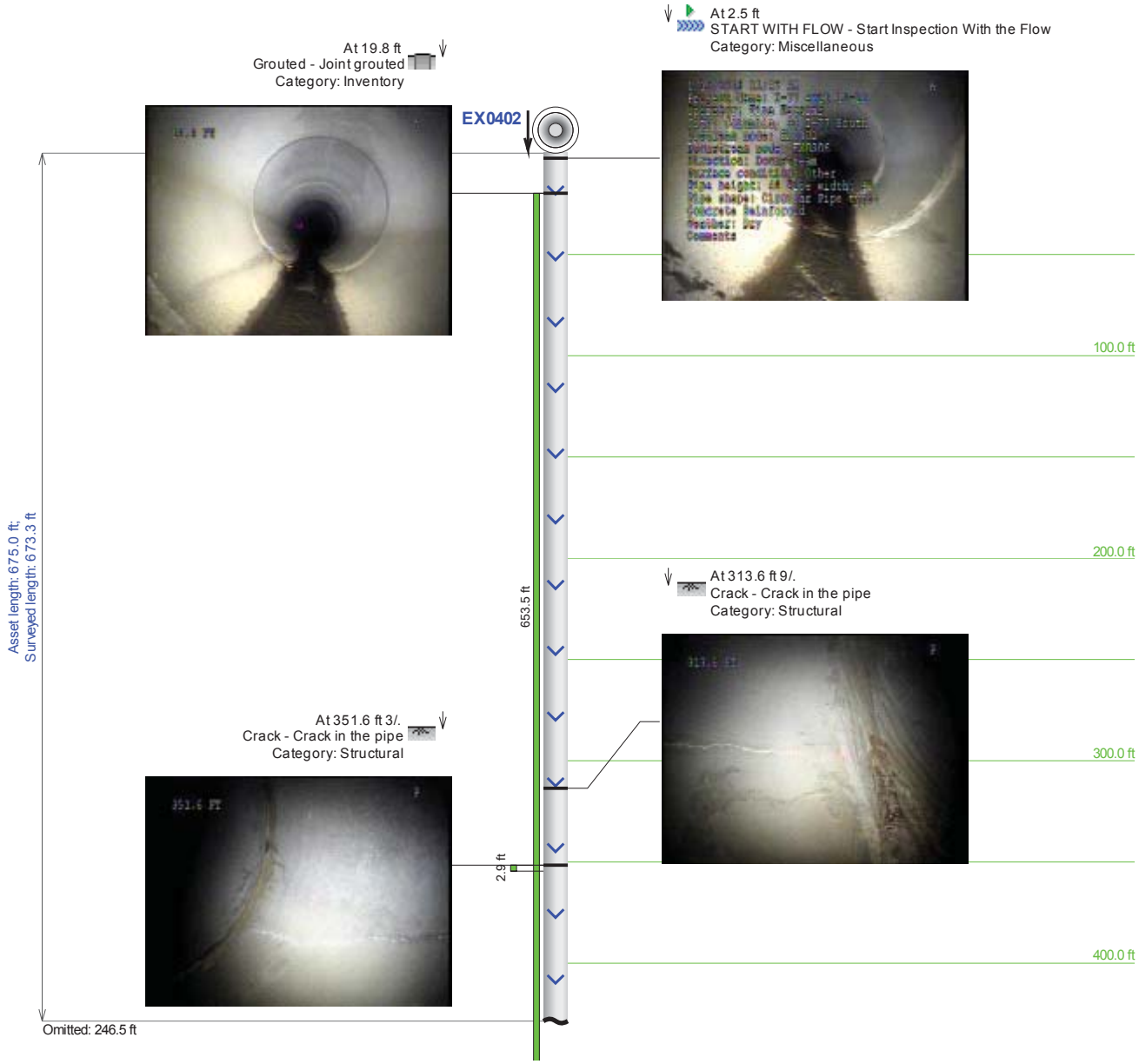
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0306 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 48 | 48 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 673.3 | Tina Watkins | |



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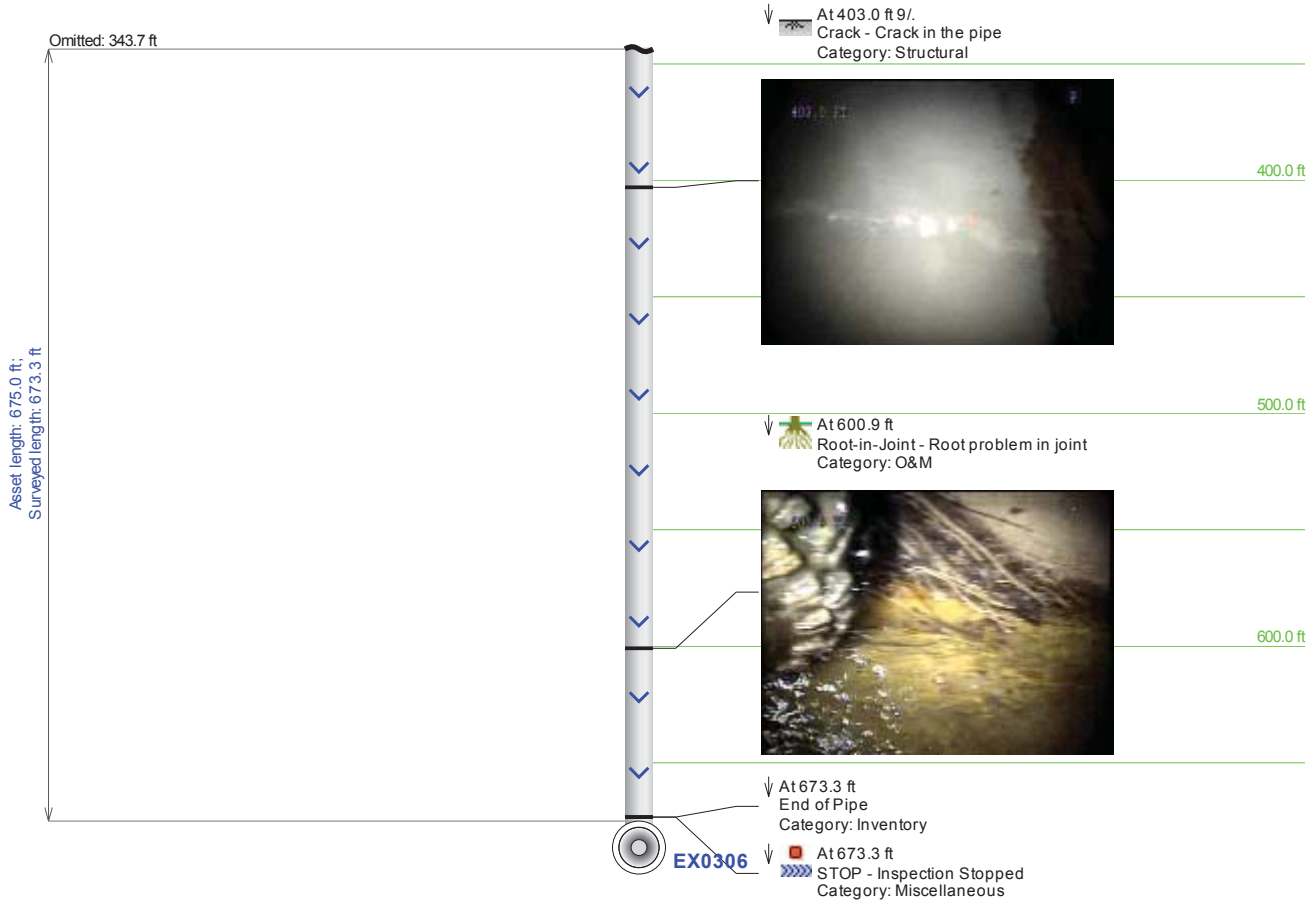
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0306 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 48 | 48 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 673.3 | Tina Watkins | |



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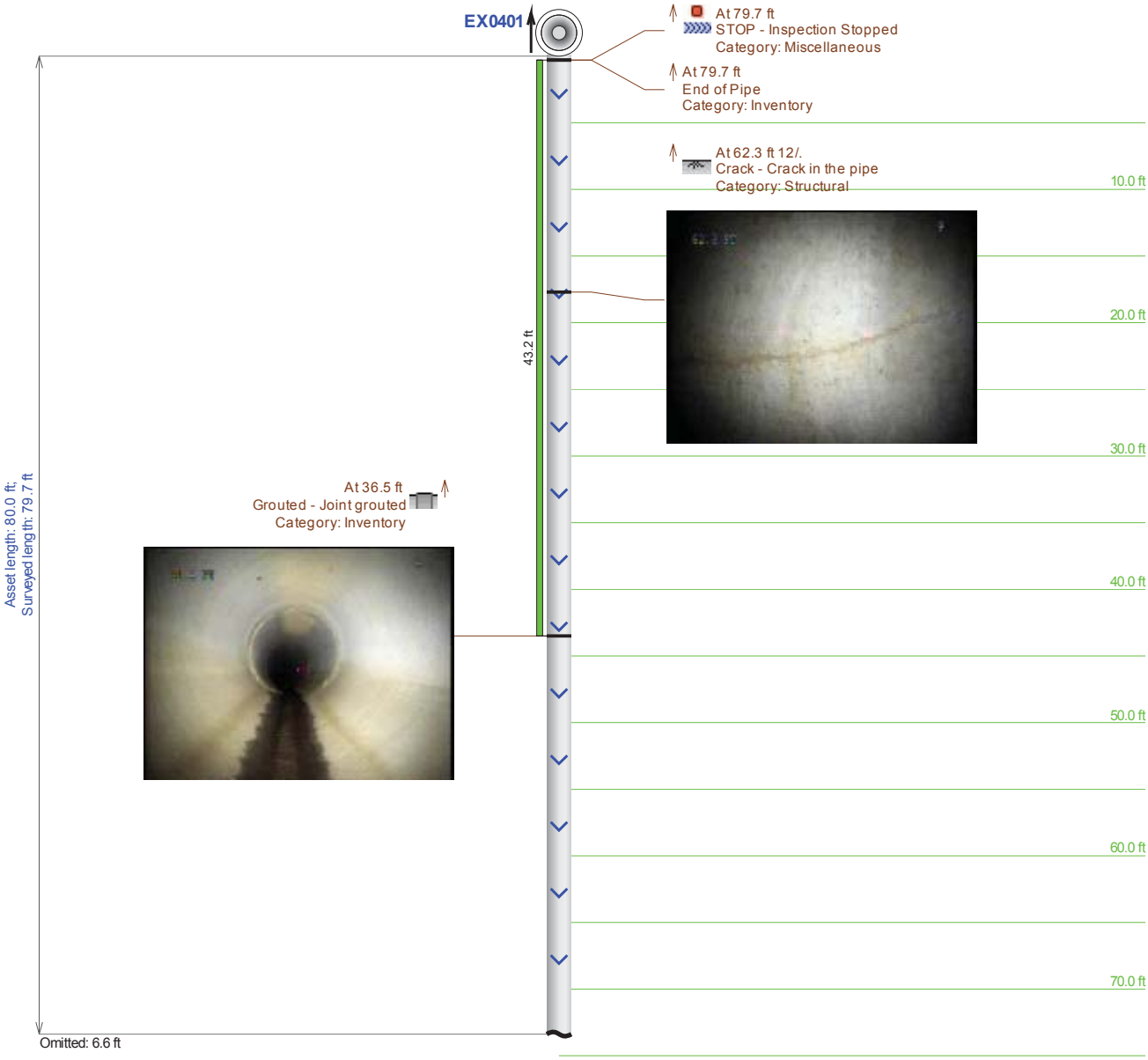
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0401 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 79.7 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0401 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 79.7 | Tina Watkins | |

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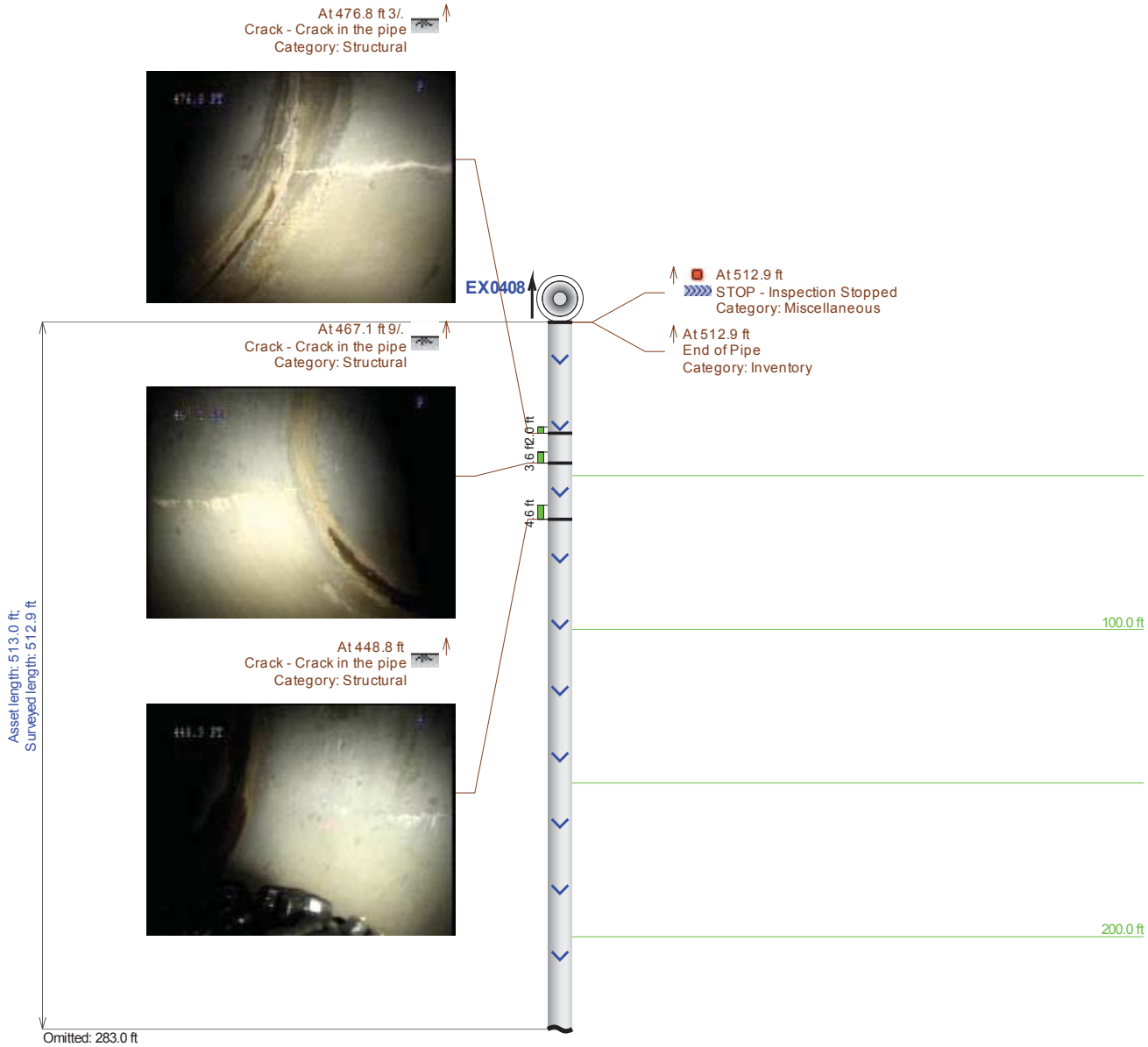
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0402 | Columbia, SC | I77-South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 512.9 | Tina Watkins | |



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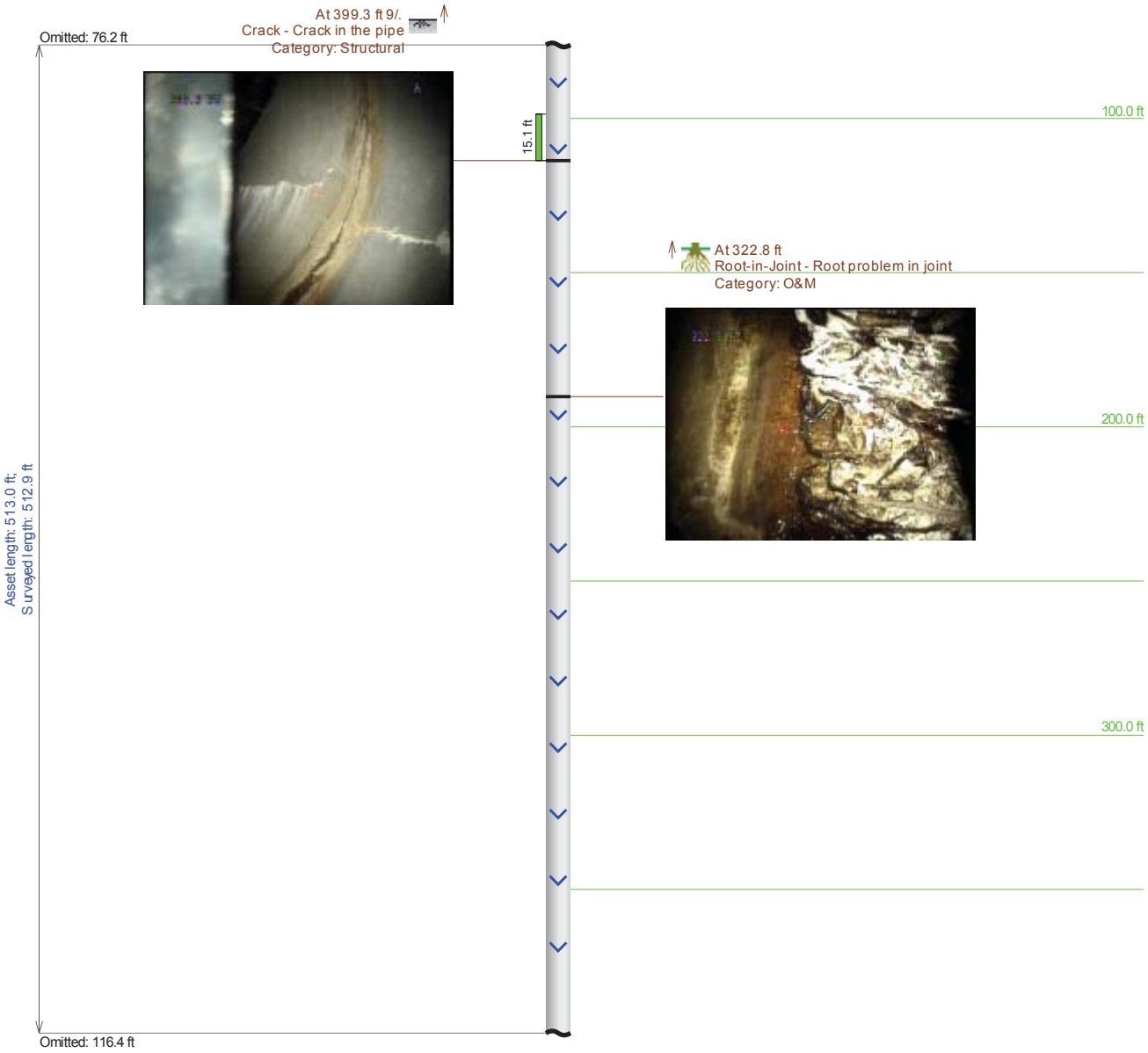
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0402 | Columbia, SC | I77-South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 512.9 | Tina Watkins | |



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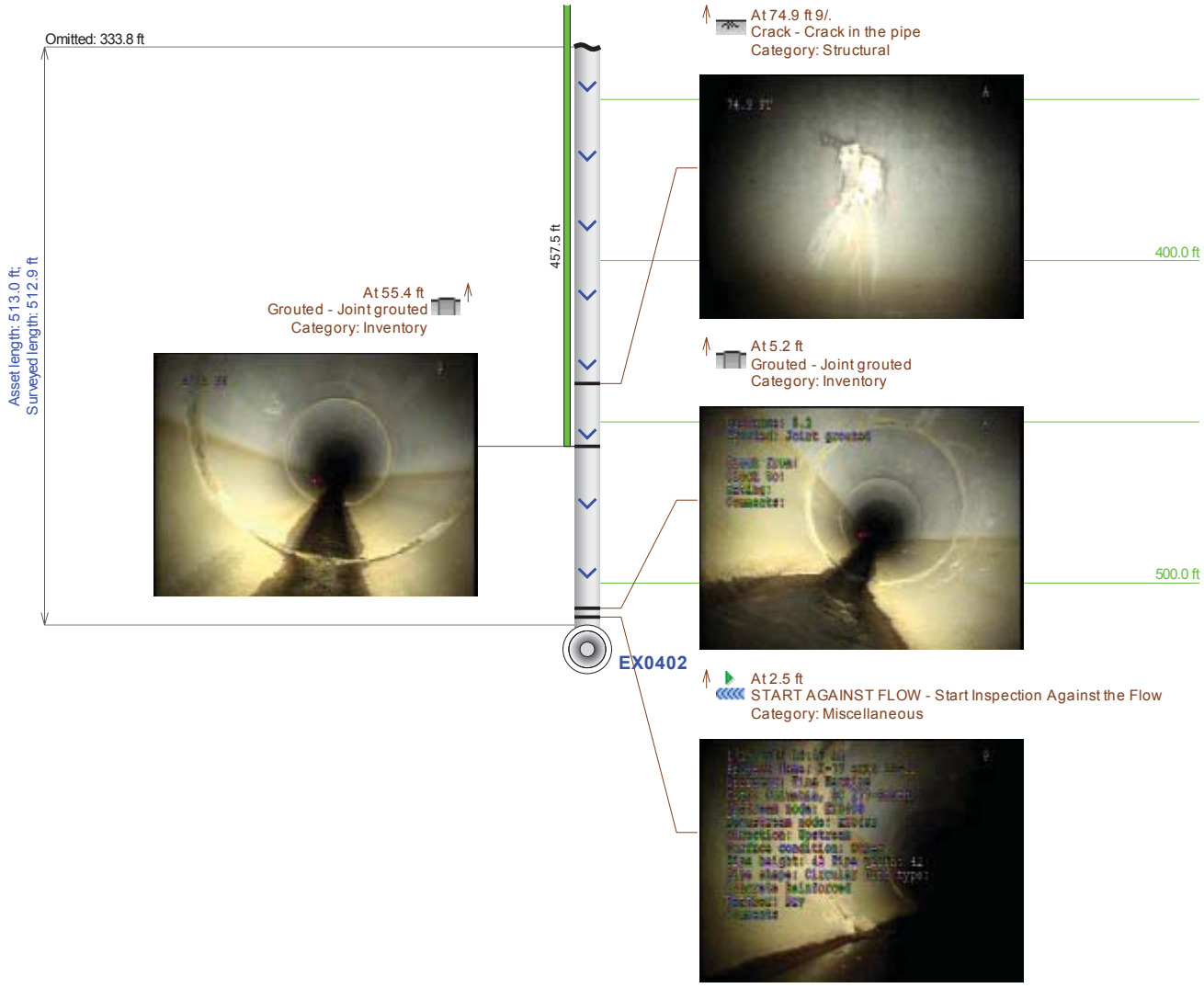
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0402 | Columbia, SC | I77-South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 512.9 | Tina Watkins | |



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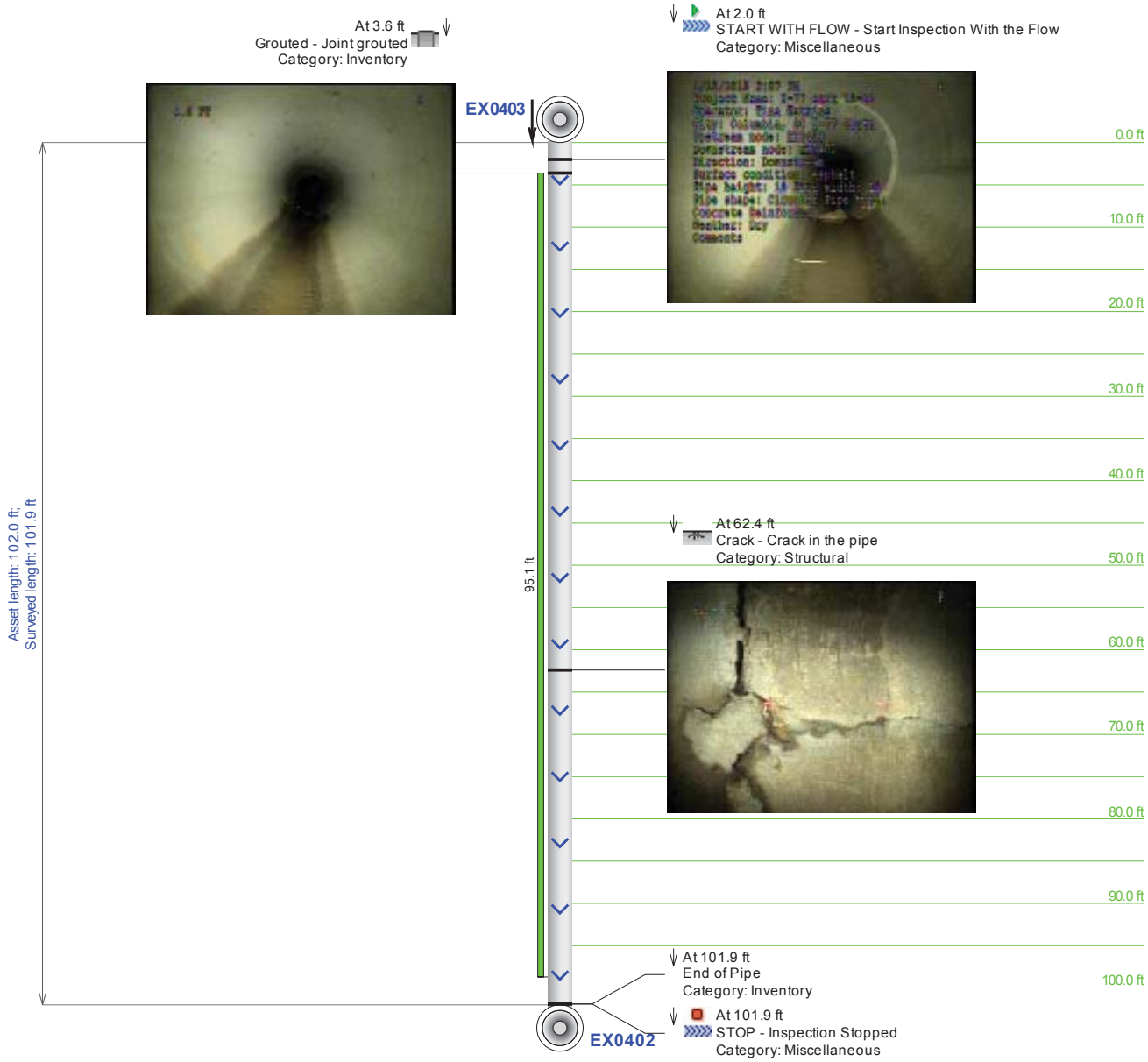
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0403 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 101.9 | Tina Watkins | |



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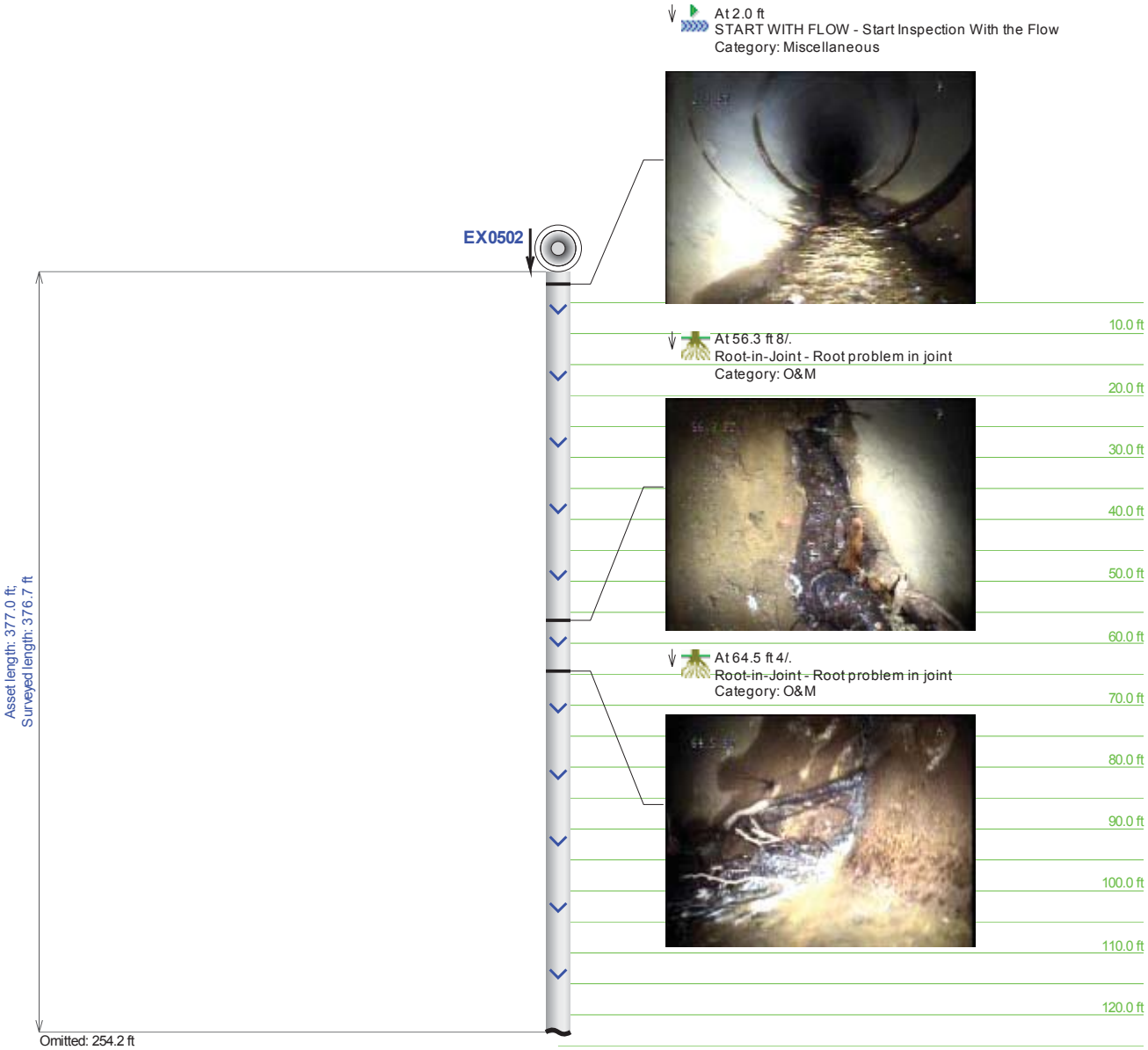
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0404 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 376.7 | Tina Watkins | |



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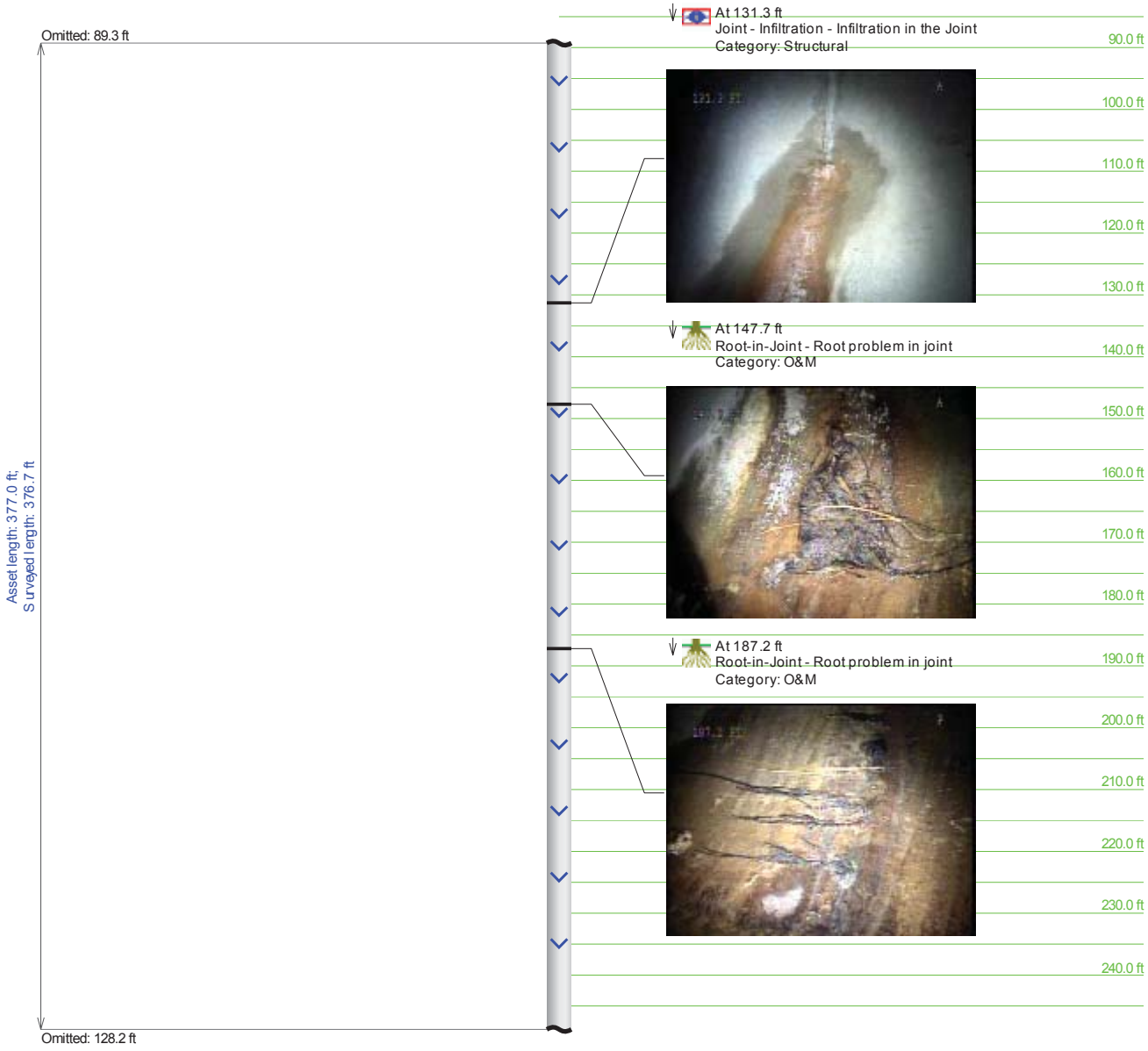
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0404 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 376.7 | Tina Watkins | |



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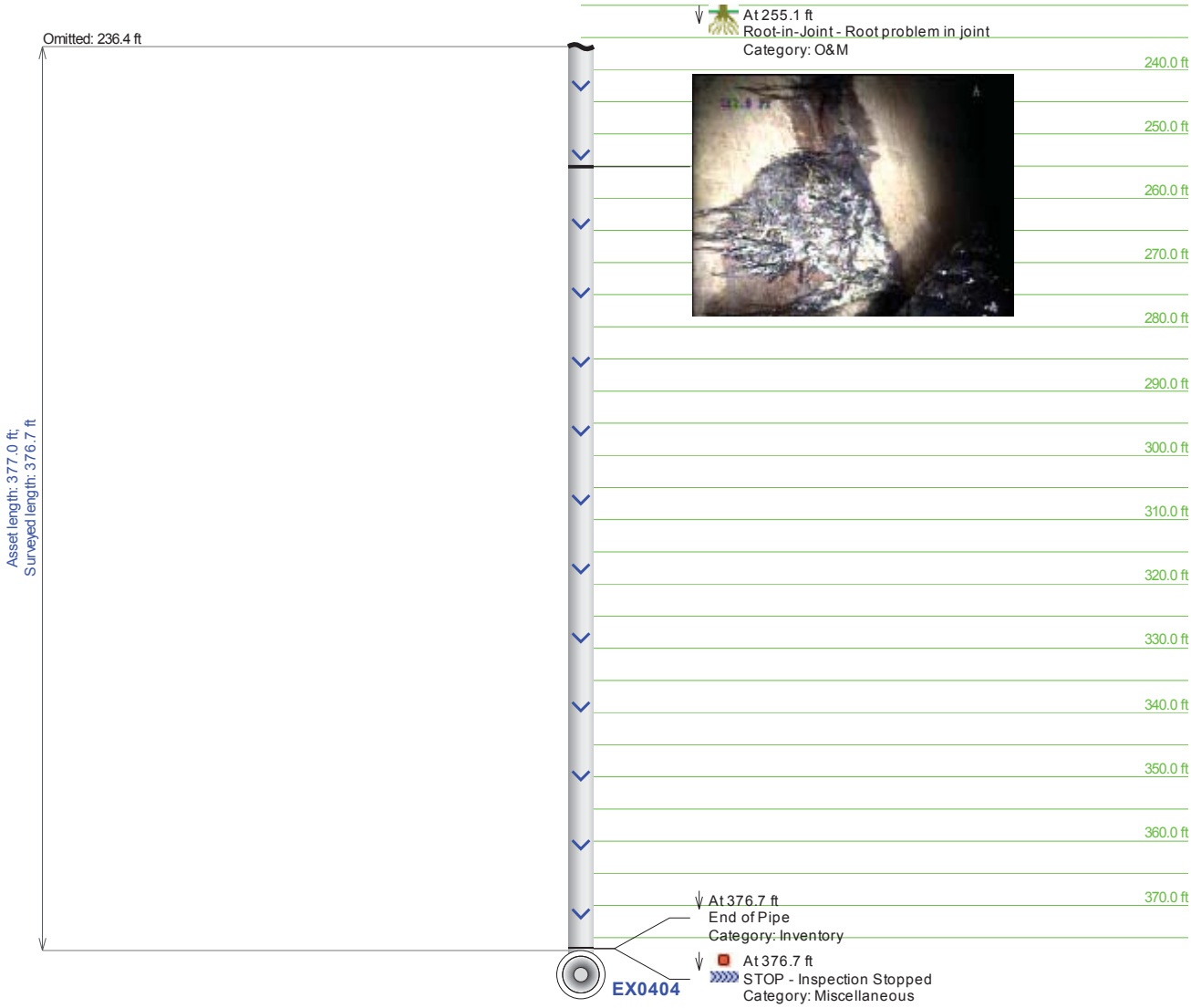
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0404 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 376.7 | Tina Watkins | |



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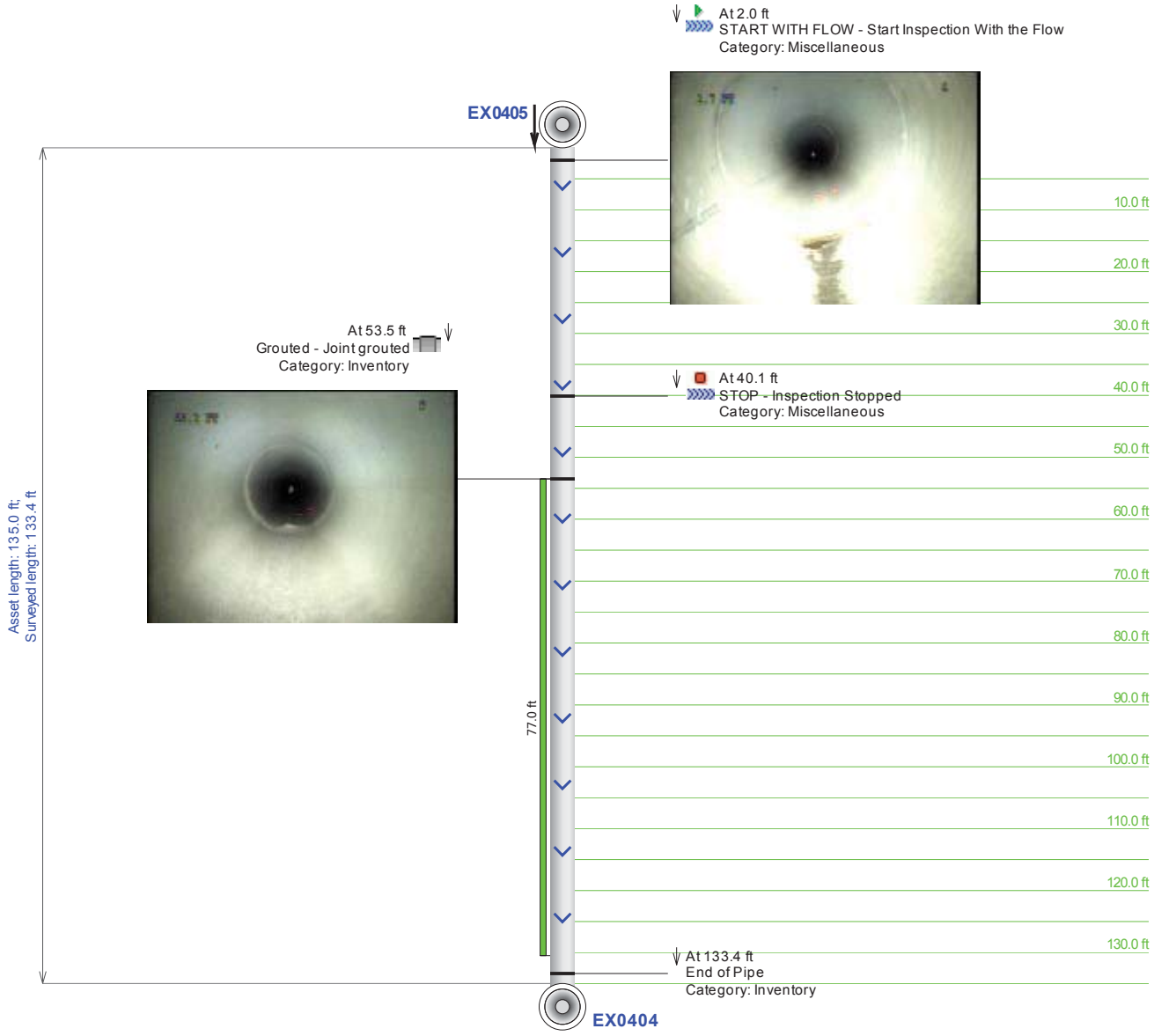
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0405 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 133.4 | Tina Watkins | |



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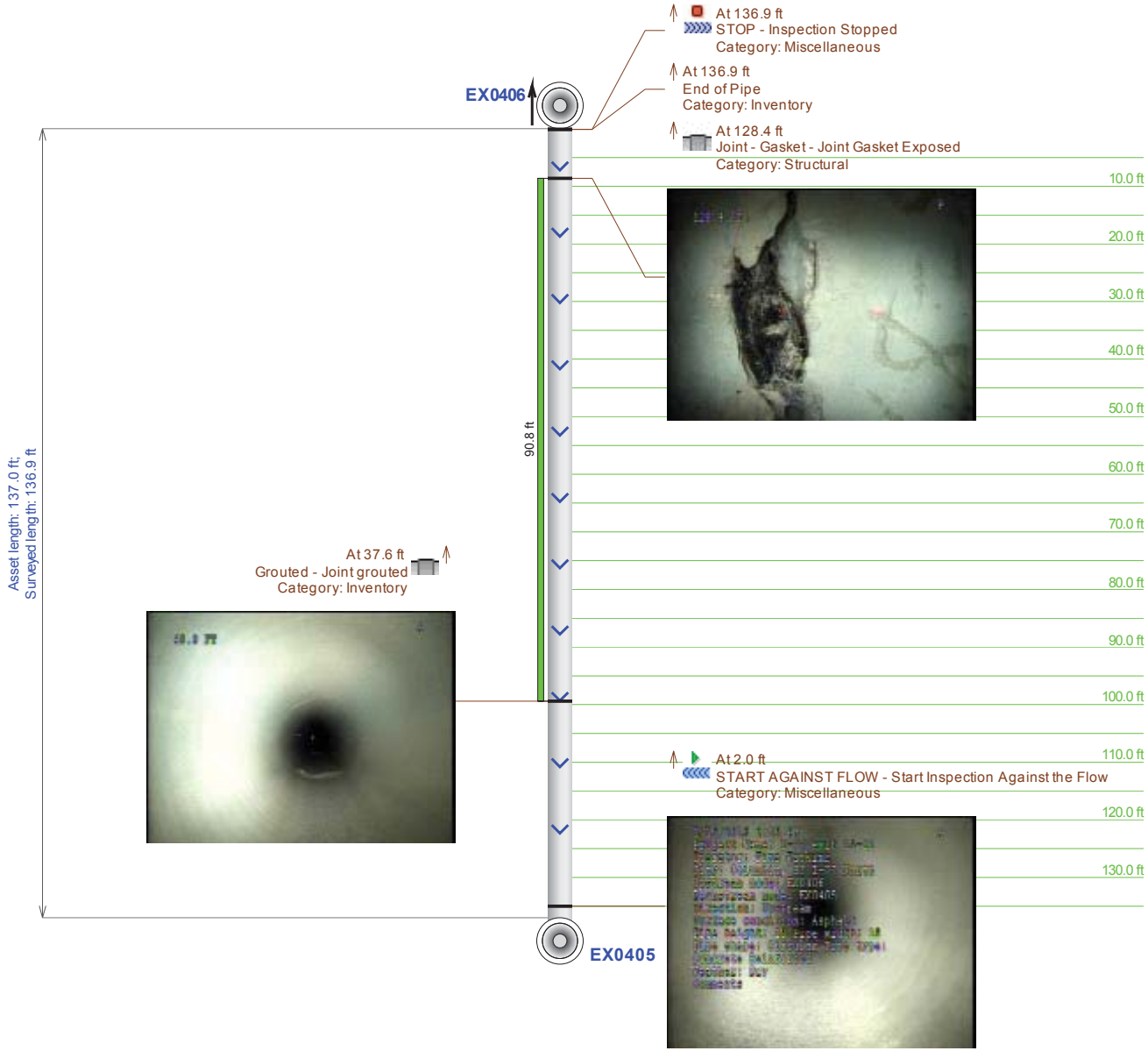
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0406 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 136.9 | Tina Watkins | |



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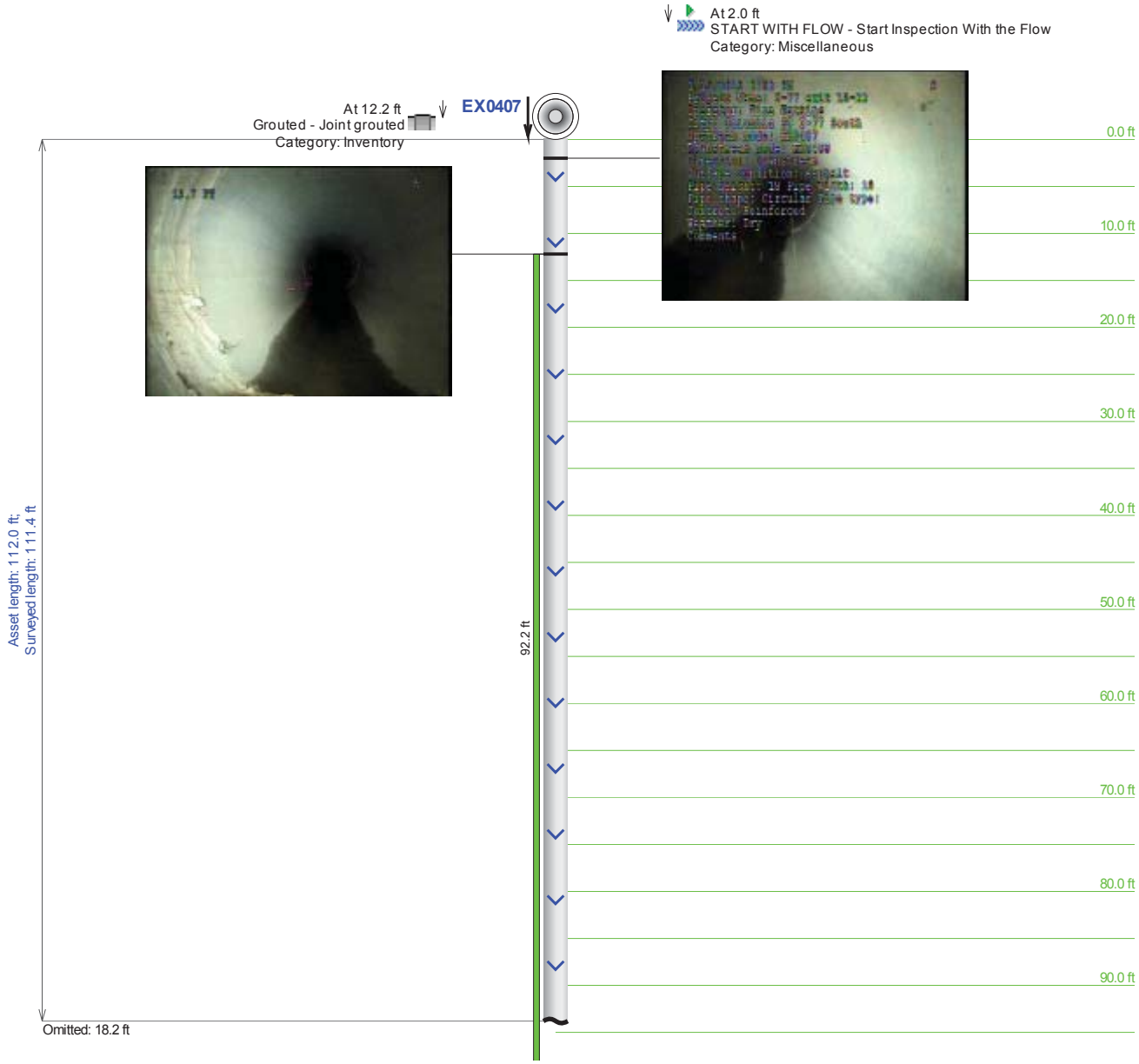
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0407 | Columbia SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 111.4 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0407 | Columbia SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 111.4 | Tina Watkins | |

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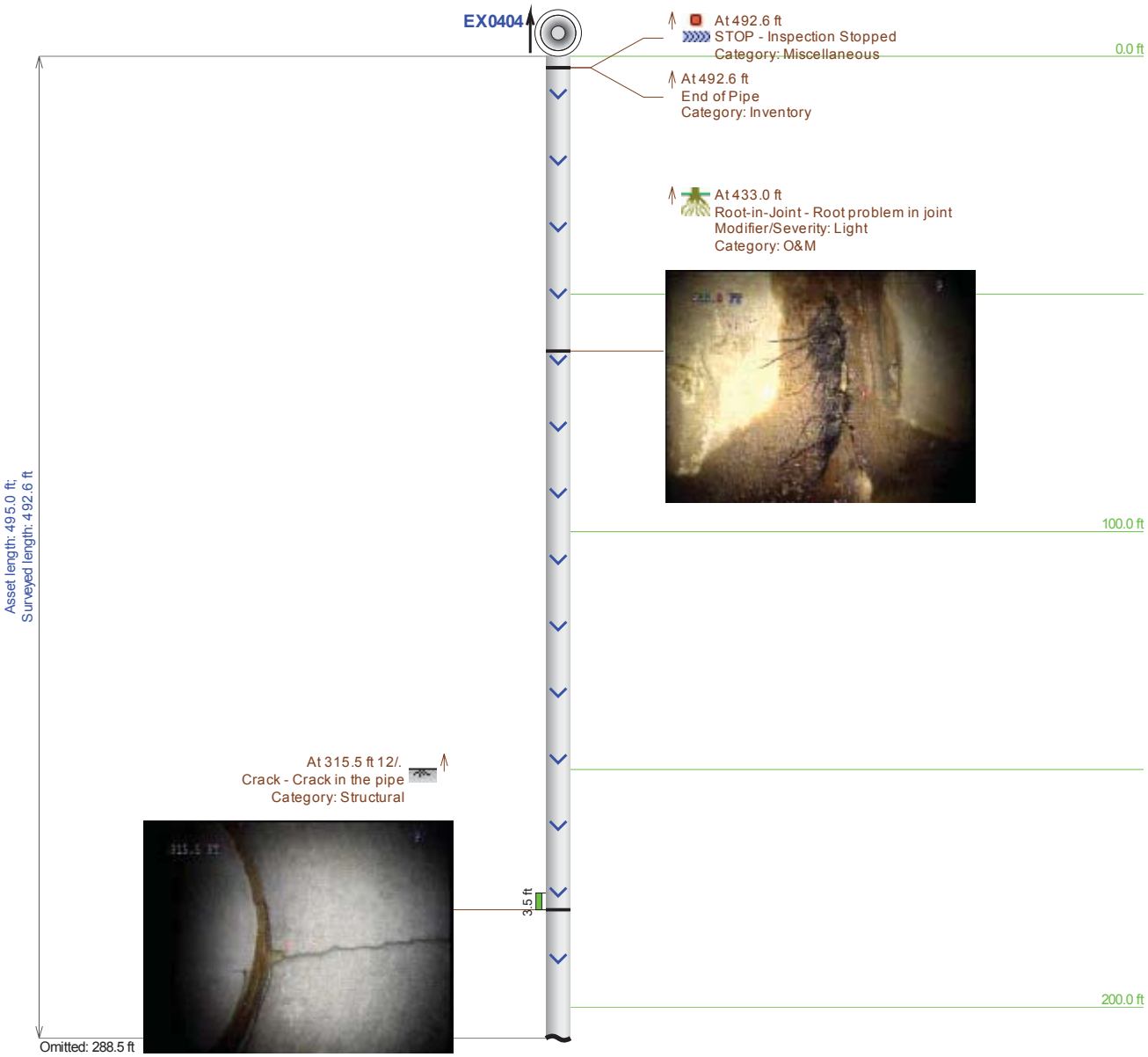
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0408 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 492.6 | Tina Watkins | |



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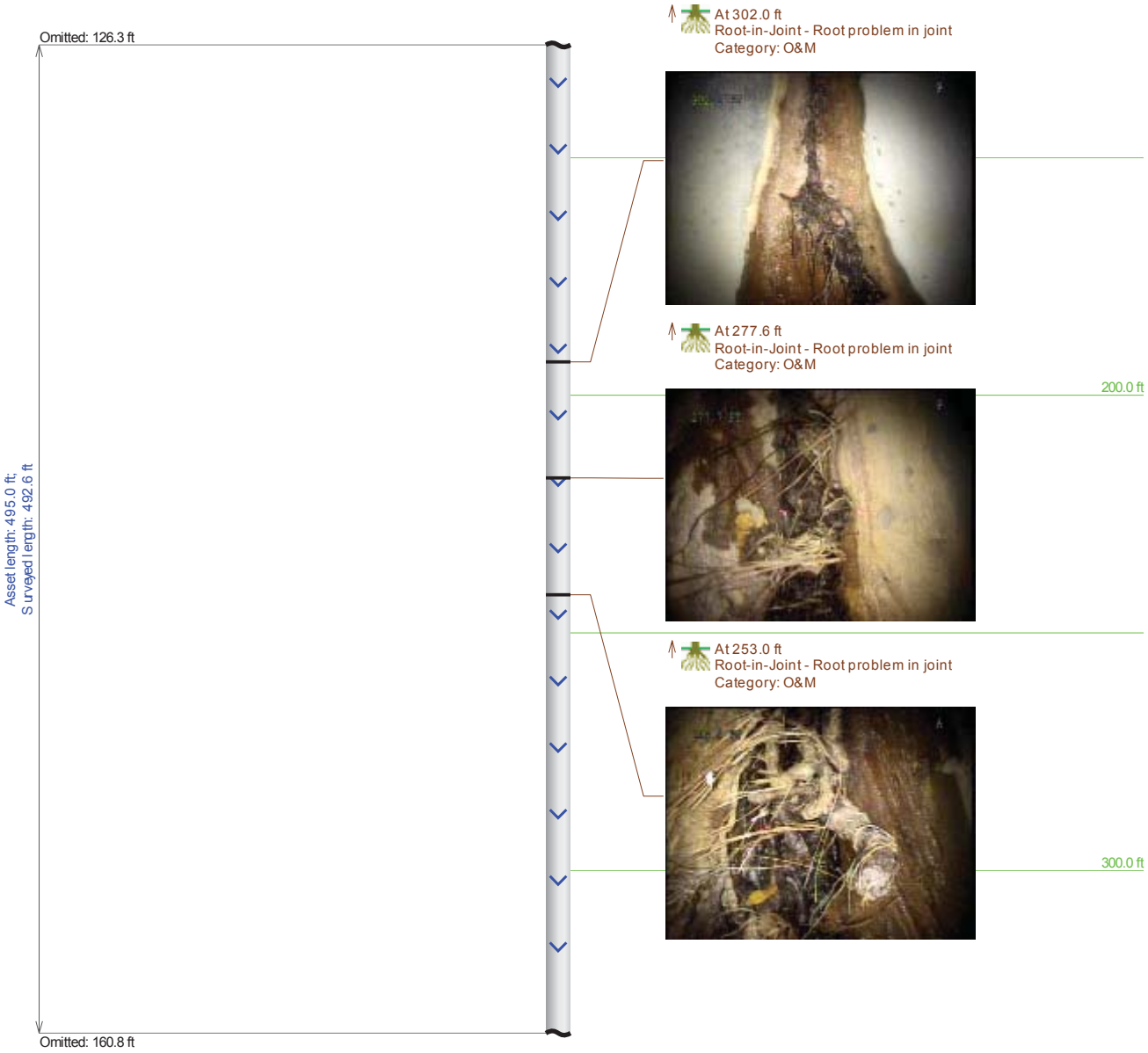
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0408 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 492.6 | Tina Watkins | |



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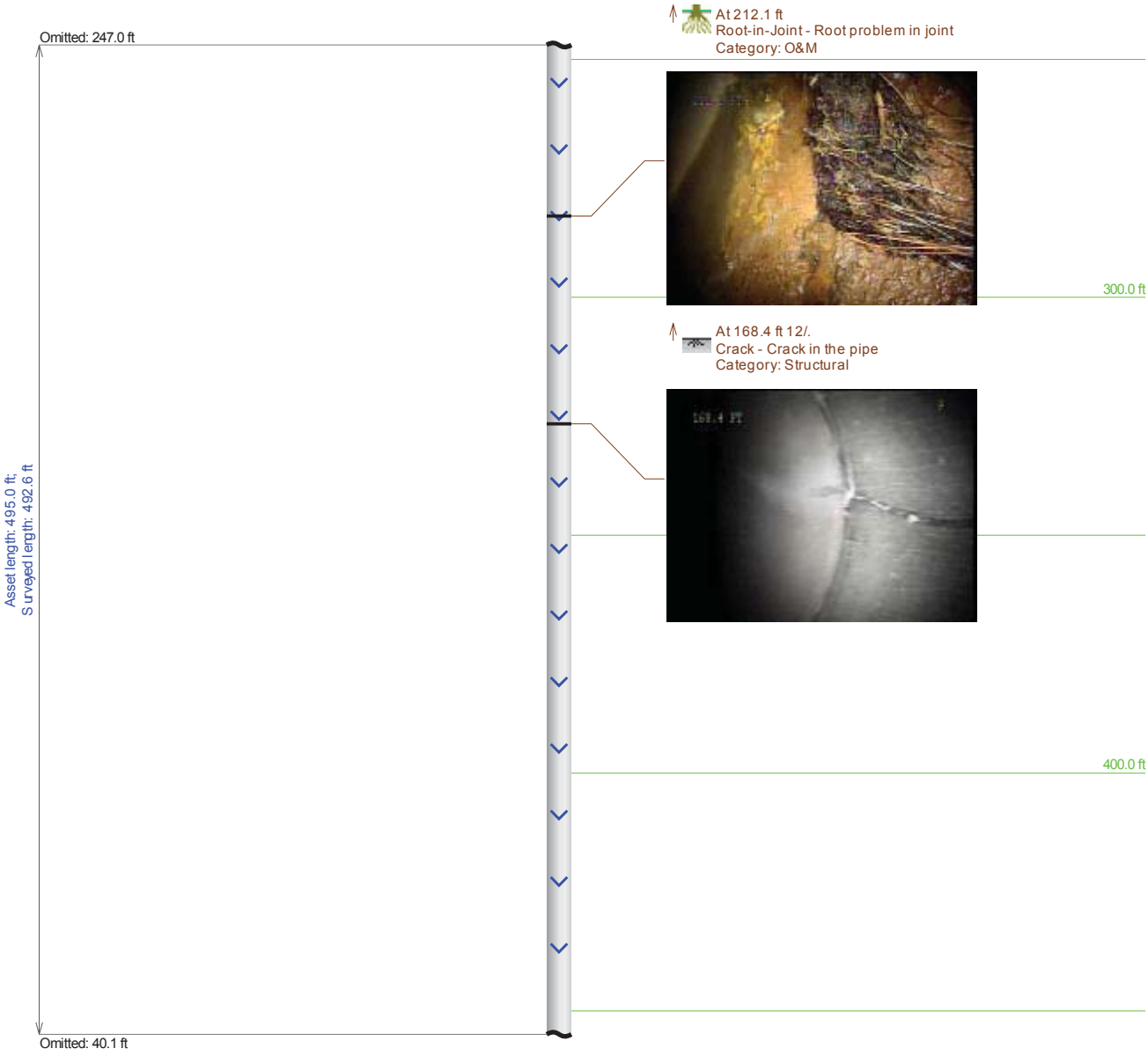
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0408 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 492.6 | Tina Watkins | |



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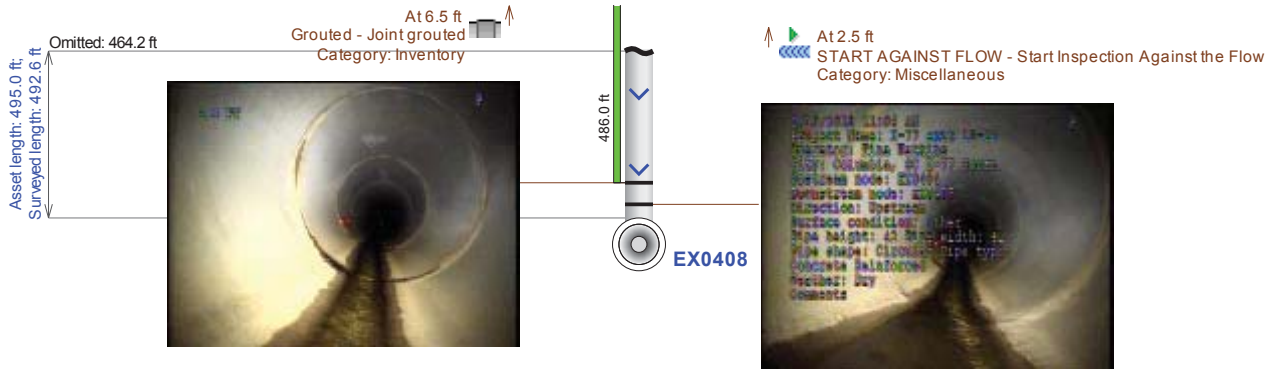
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0408 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 492.6 | Tina Watkins | |



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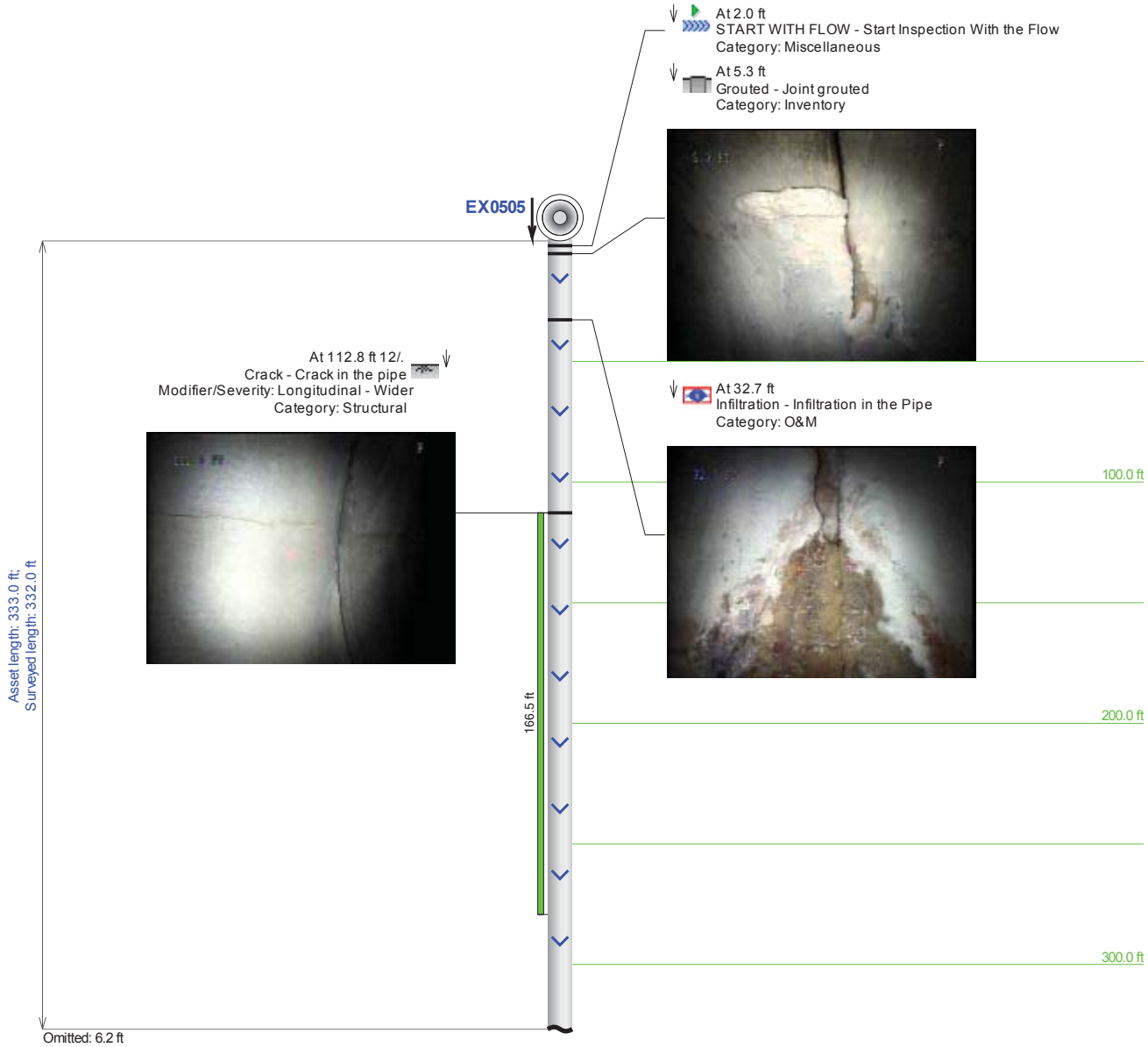
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0503 | Columbia, SC | I77- South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 332.0 | Tina Watkins | |



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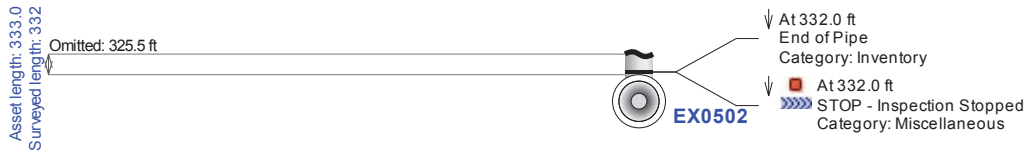
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0503 | Columbia, SC | I77- South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 42 | 42 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 332.0 | Tina Watkins | |



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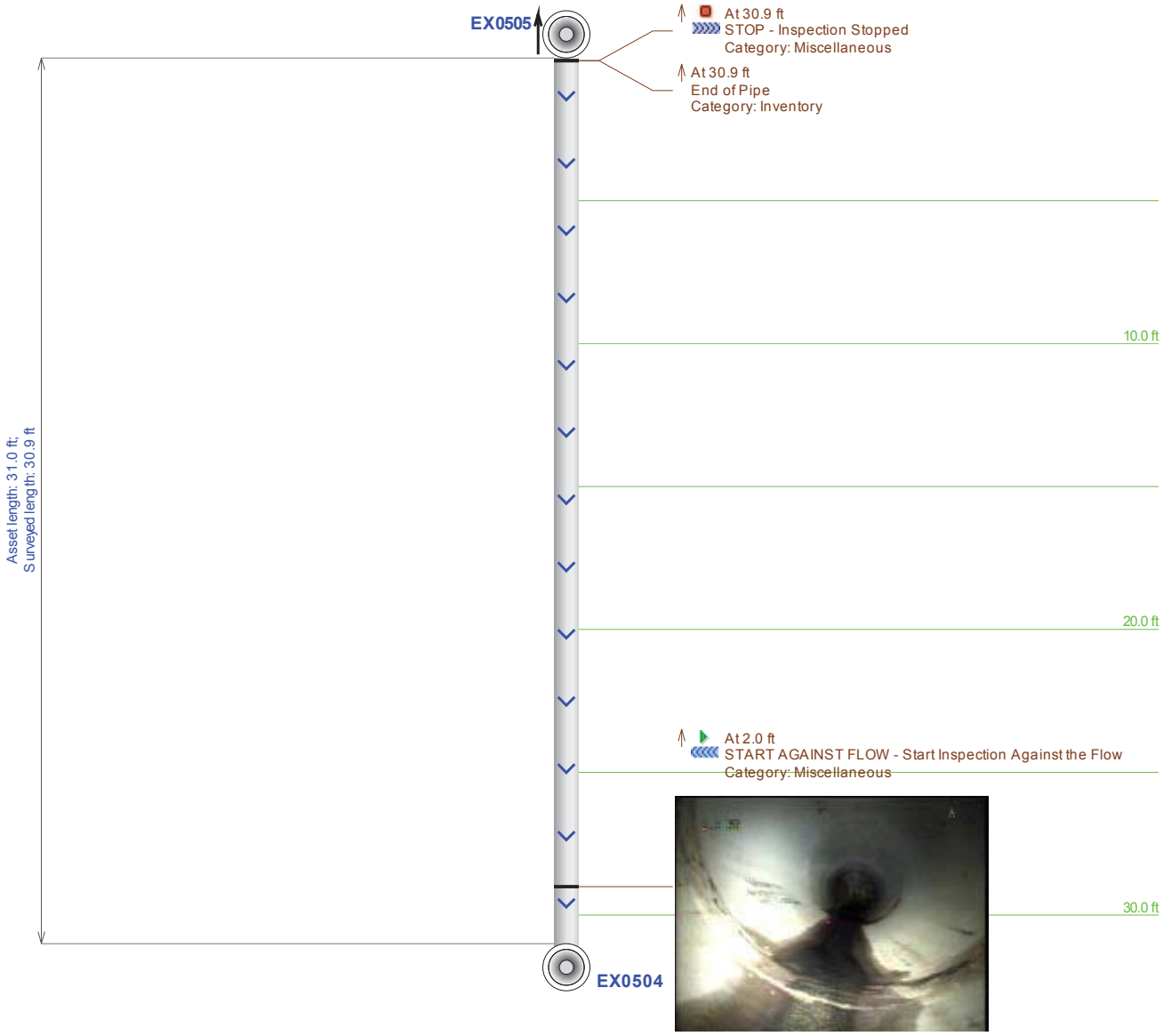
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0504 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 36 | 36 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 30.9 | Tina Watkins | |



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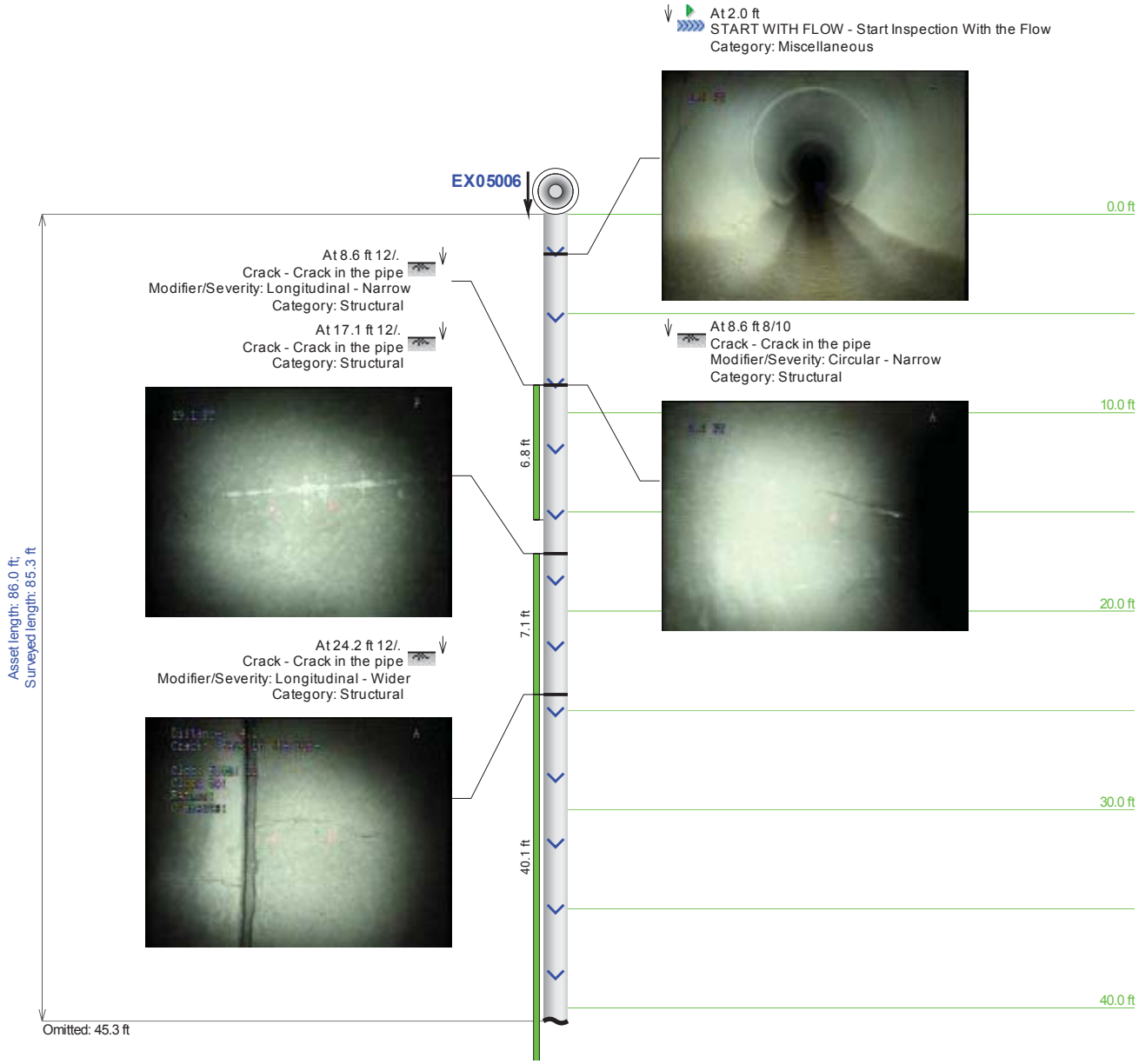
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0505 | Columbia, SC | I77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 85.3 | Tina Watkins | |



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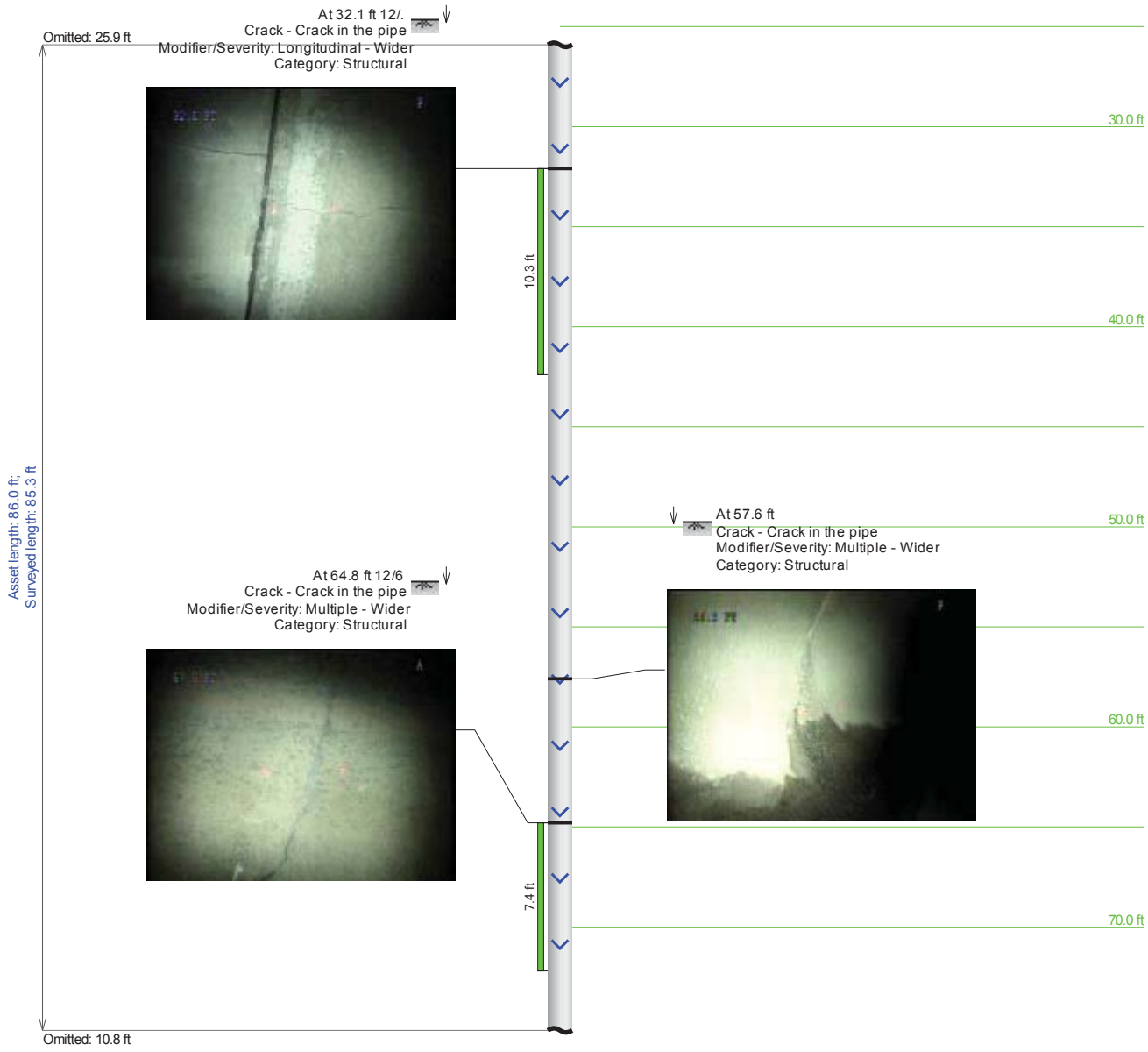
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0505 | Columbia, SC | I77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 85.3 | Tina Watkins | |



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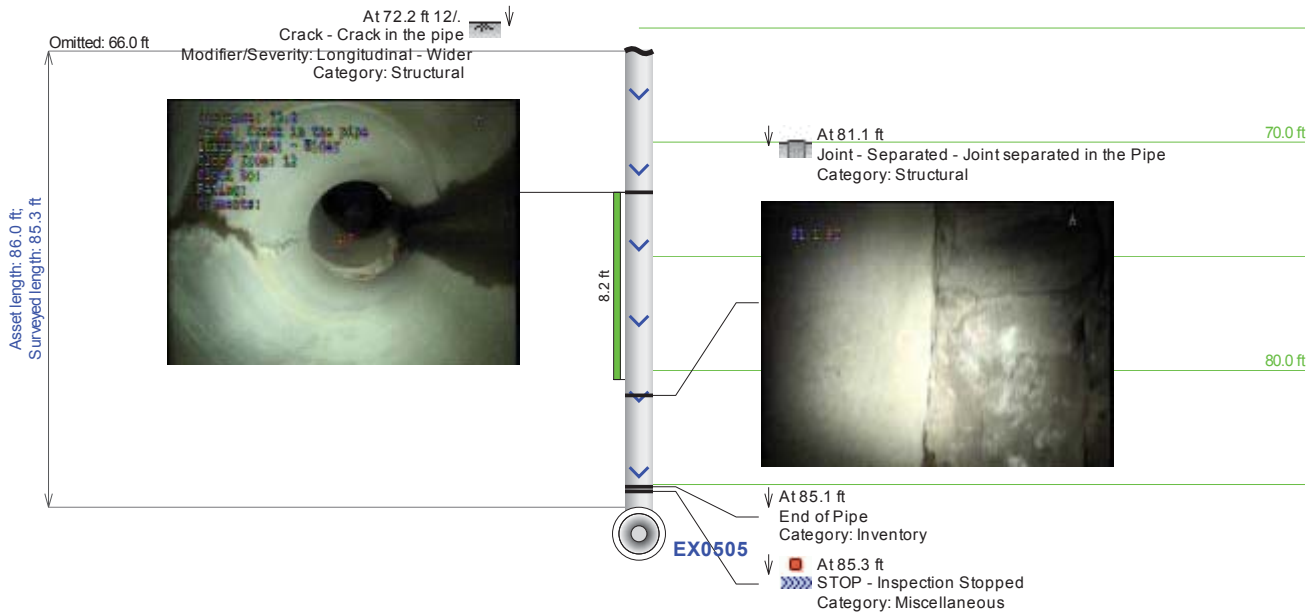
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0505 | Columbia, SC | I77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 85.3 | Tina Watkins | |



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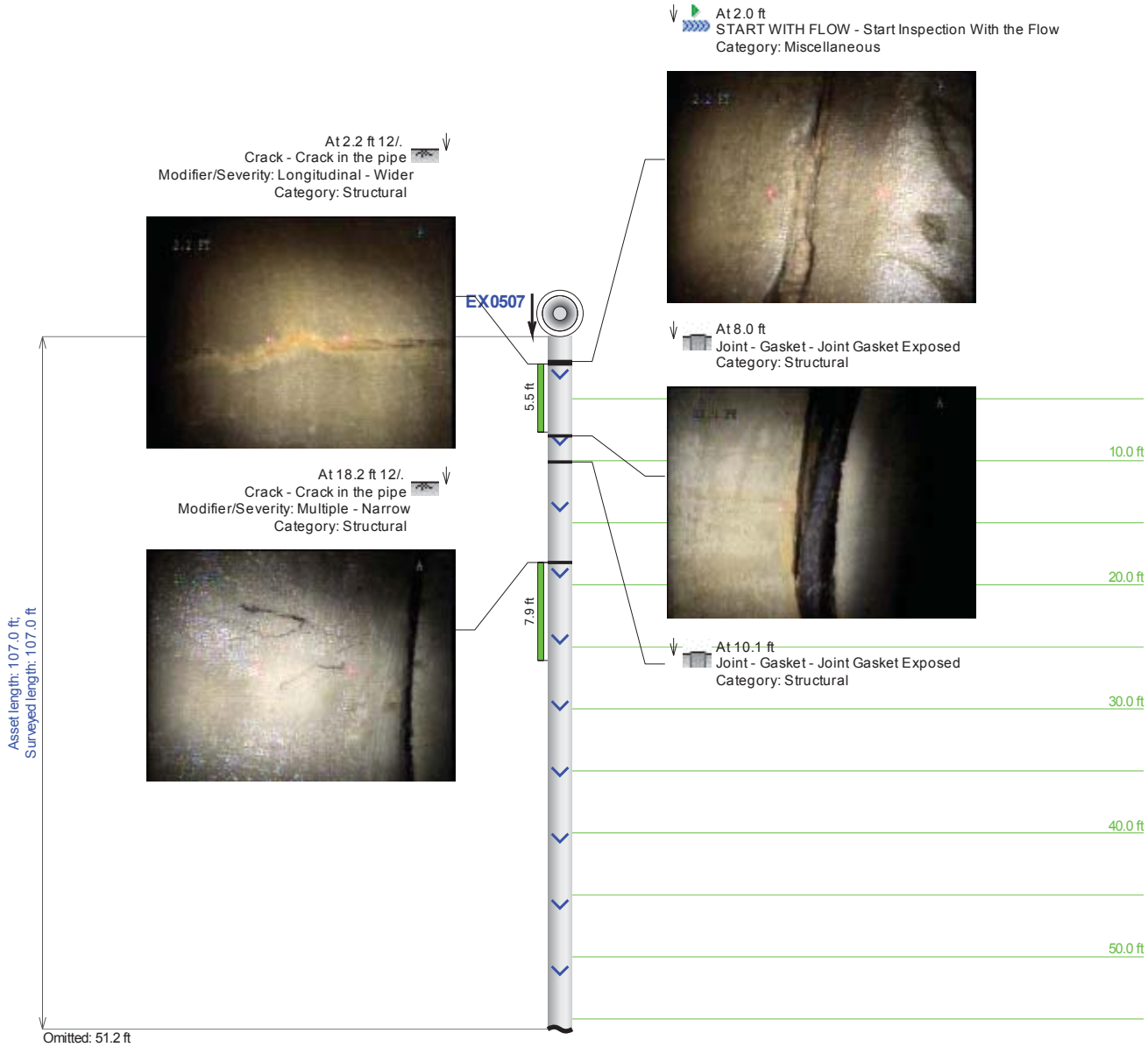
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0506 | Columbia , SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 107.0 | Tina Watkins | |



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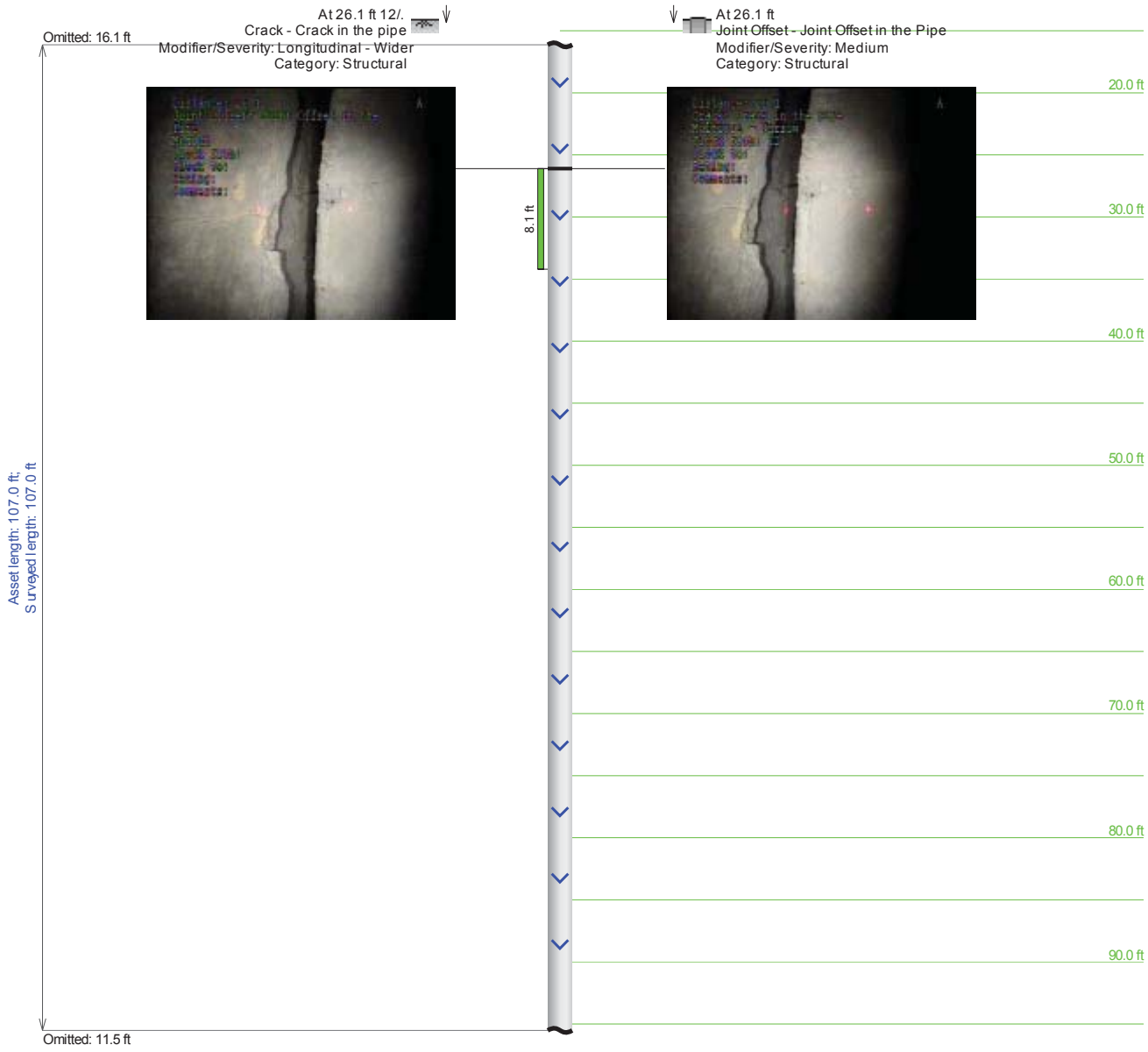
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0506 | Columbia , SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 107.0 | Tina Watkins | |



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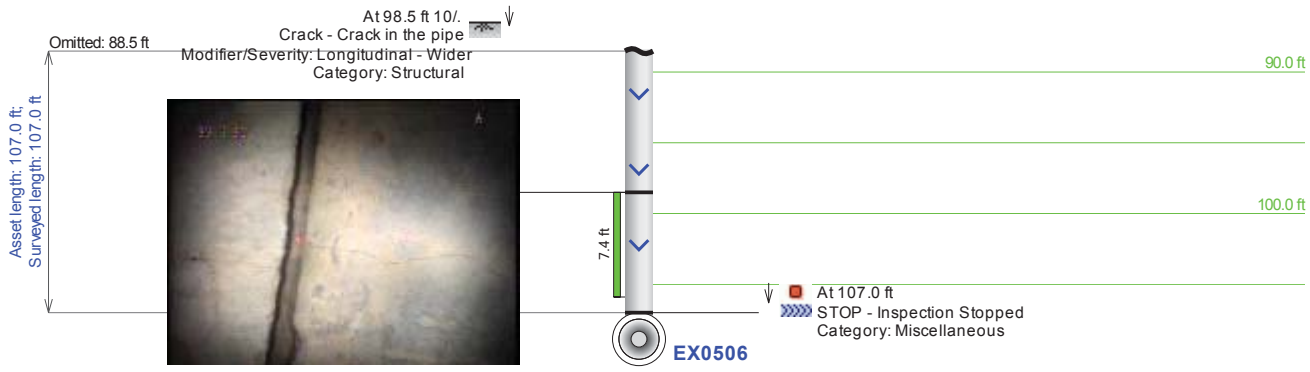
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0506 | Columbia , SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 107.0 | Tina Watkins | |



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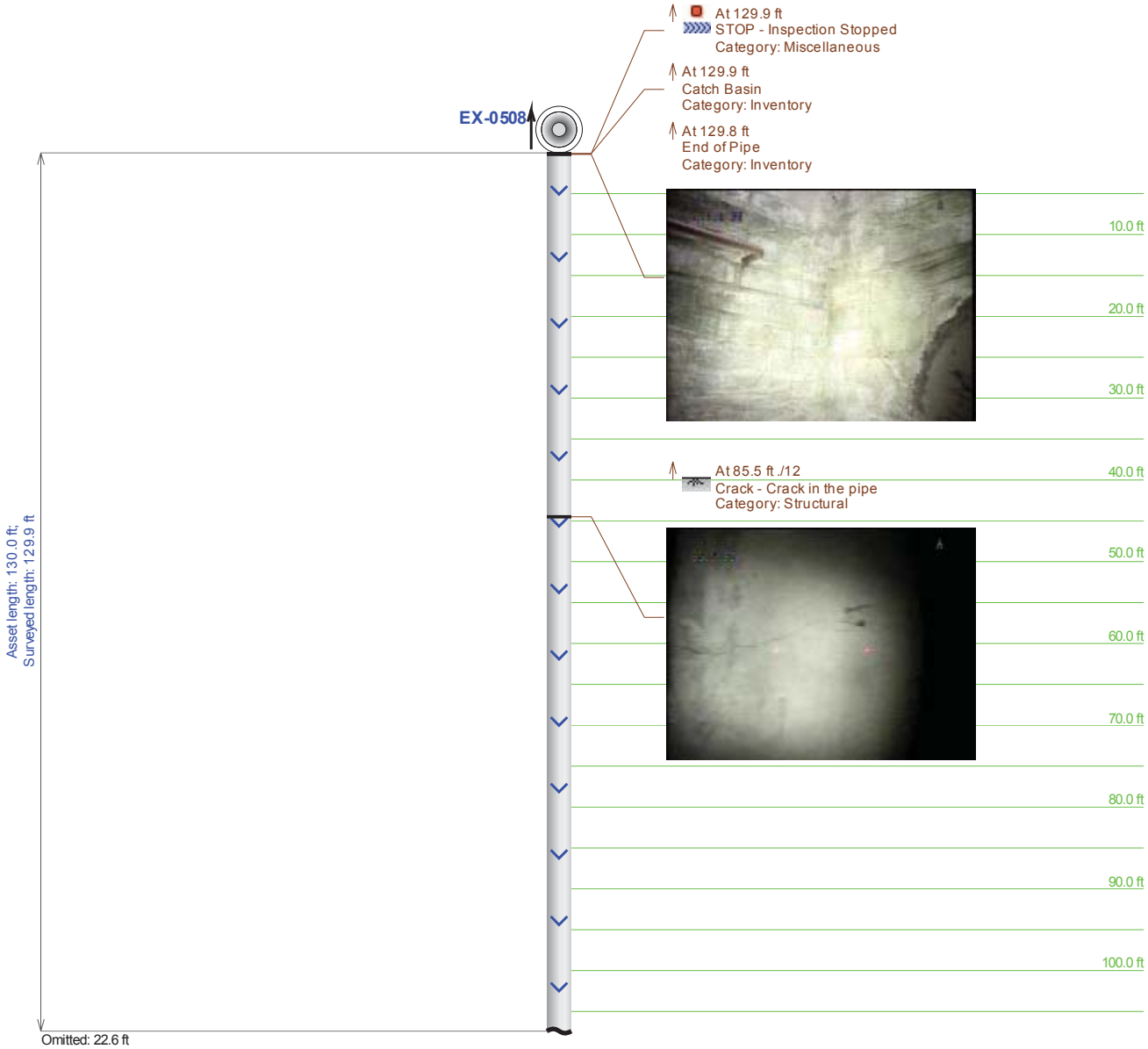
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP-0507 | Columbia, SC | I-77 |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 129.9 | Tina Watkins | |



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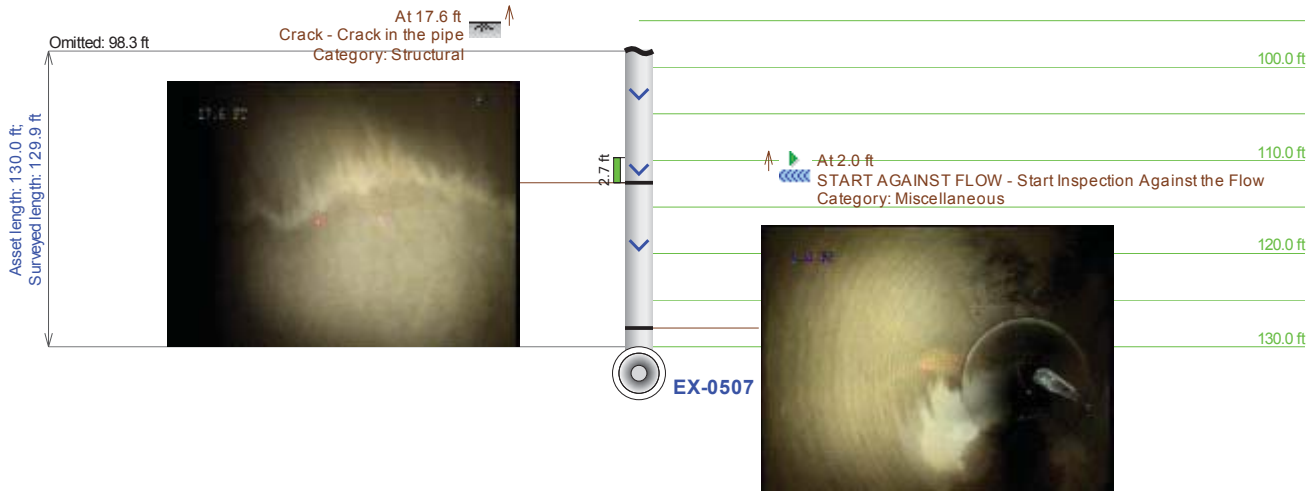
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP-0507 | Columbia, SC | I-77 |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/15/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 129.9 | Tina Watkins | |



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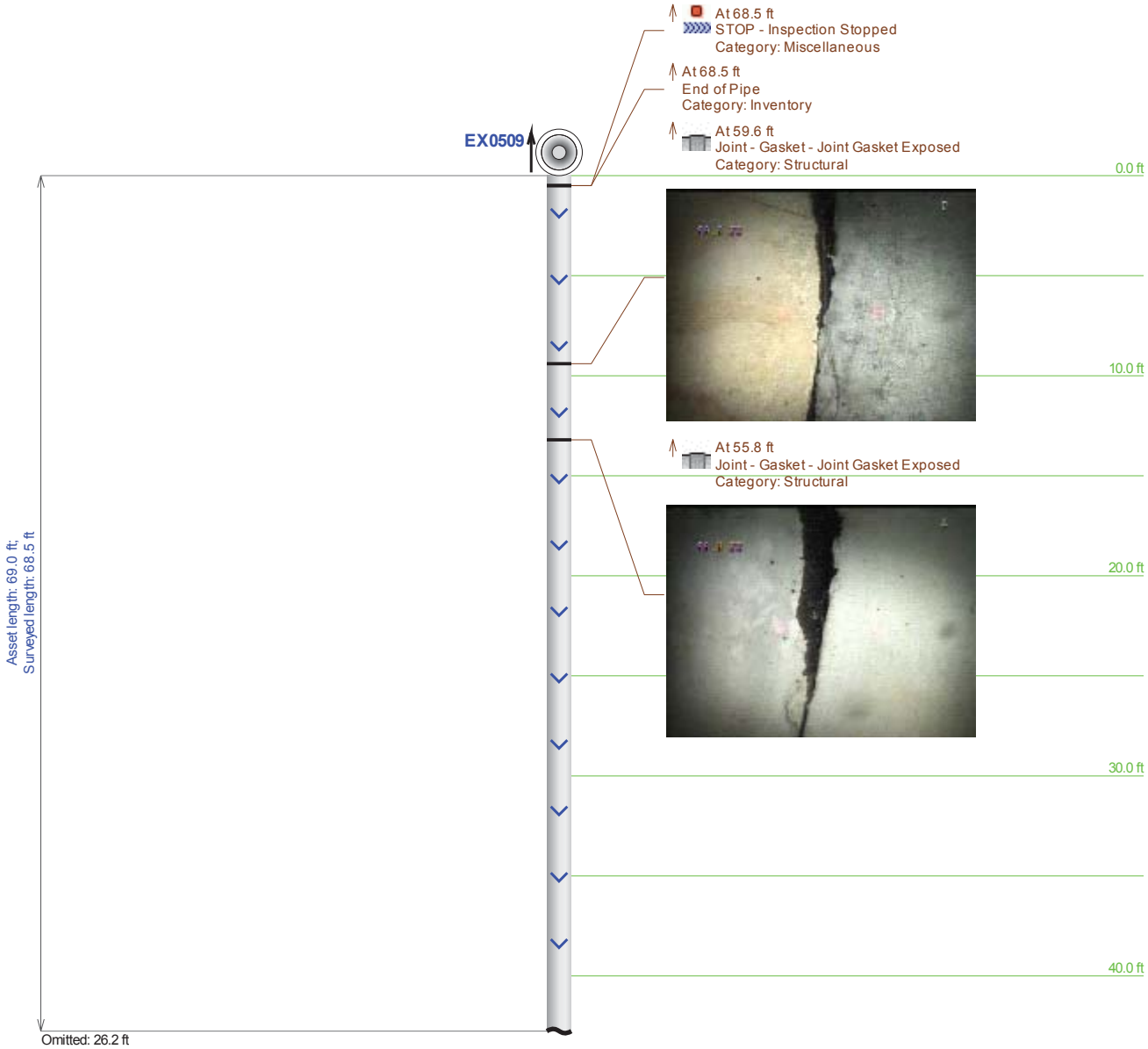
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP0508 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 68.5 | Tina Watkins | |



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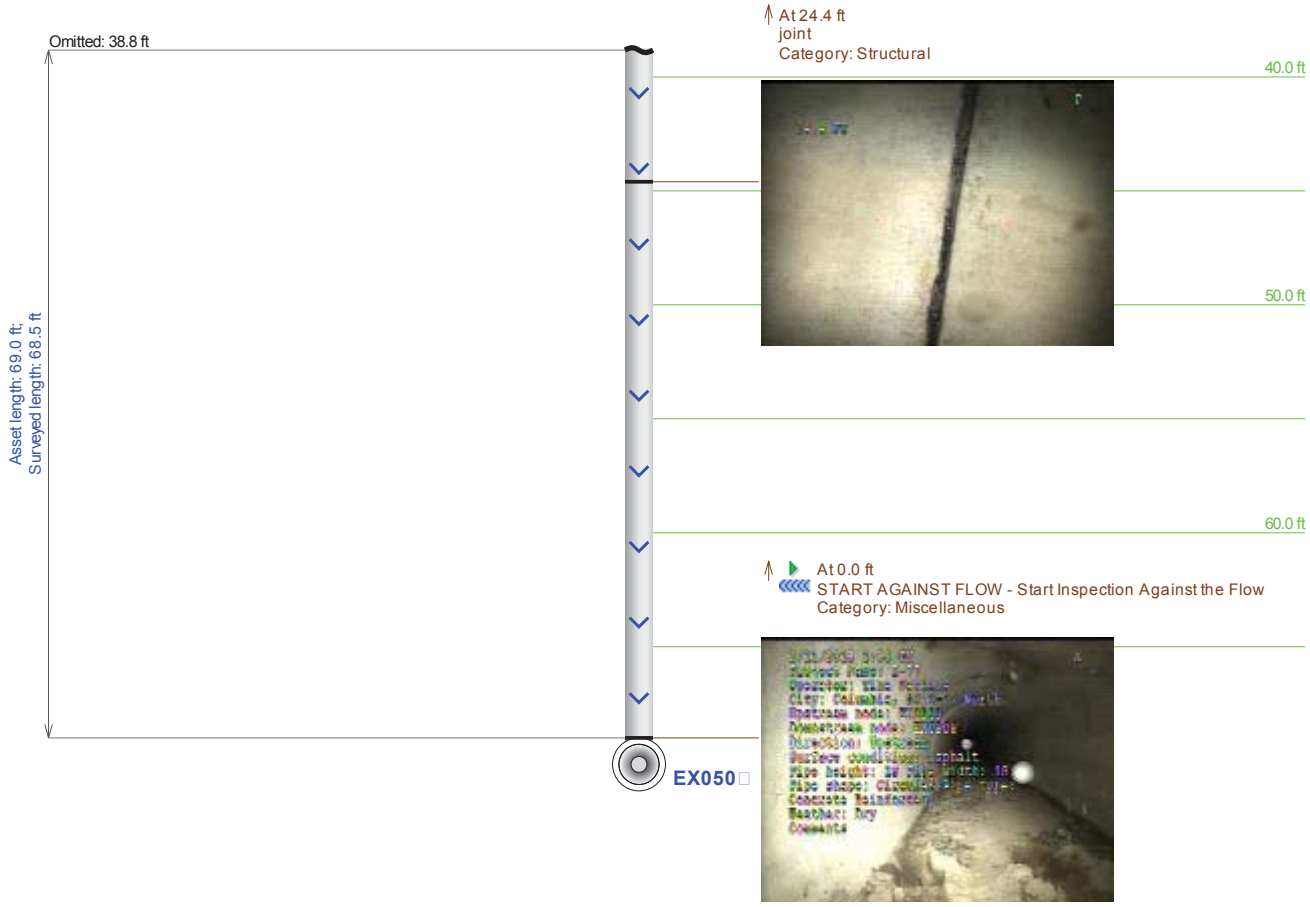
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP0508 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 68.5 | Tina Watkins | |



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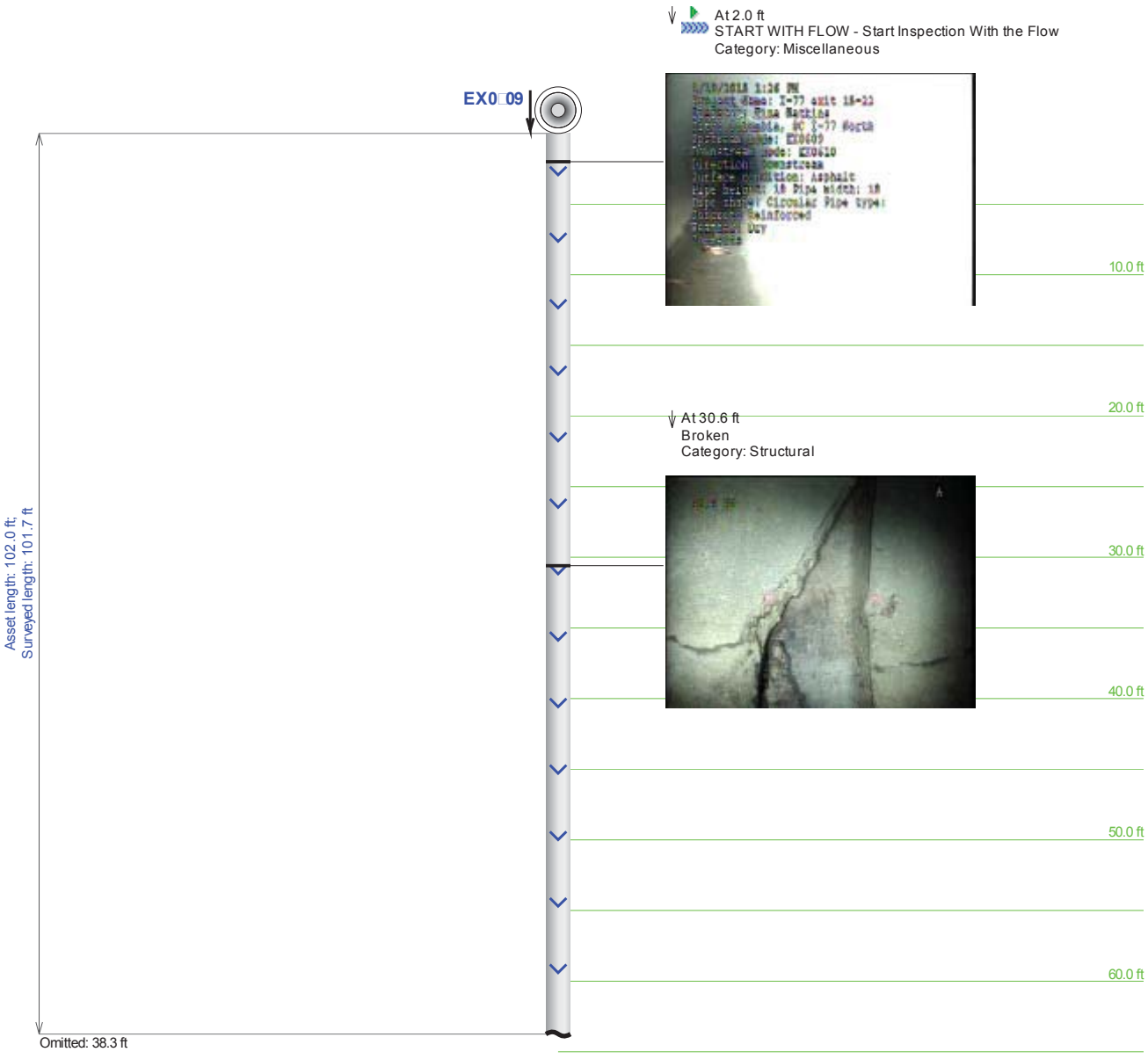
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0613 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 101.7 | Tina Watkins | |



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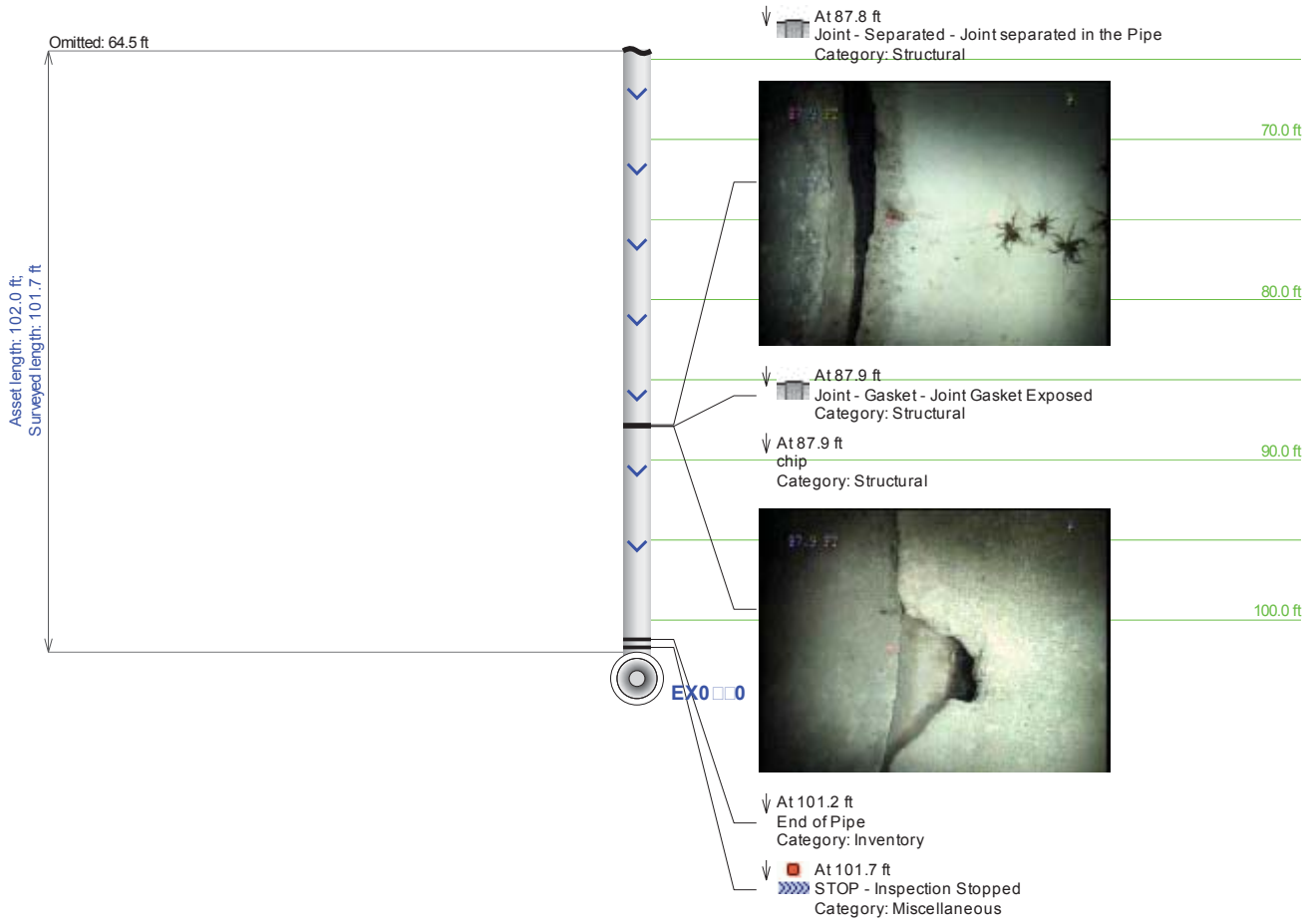
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0613 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 101.7 | Tina Watkins | |



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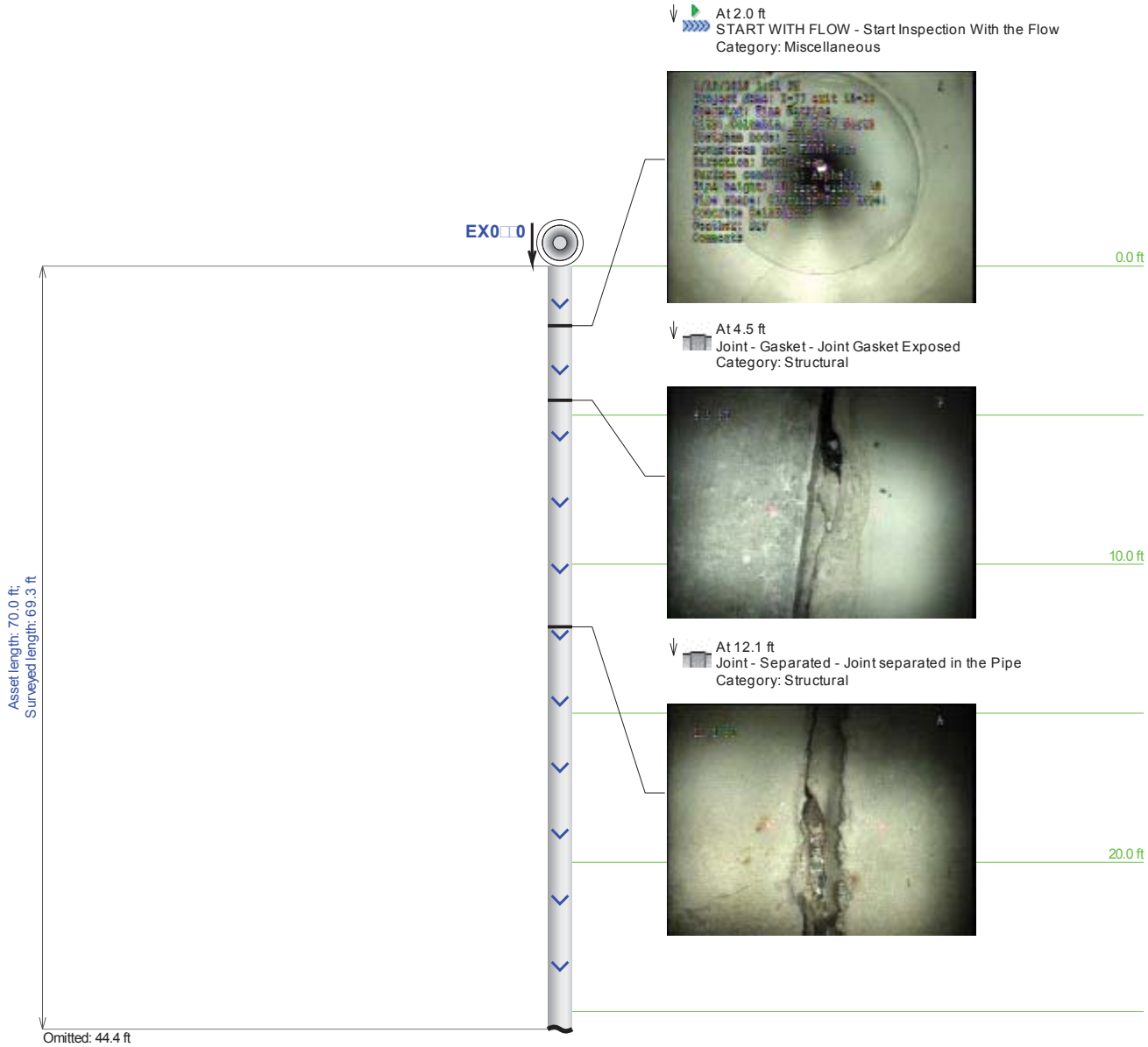
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0614 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 69.3 | Tina Watkins | |



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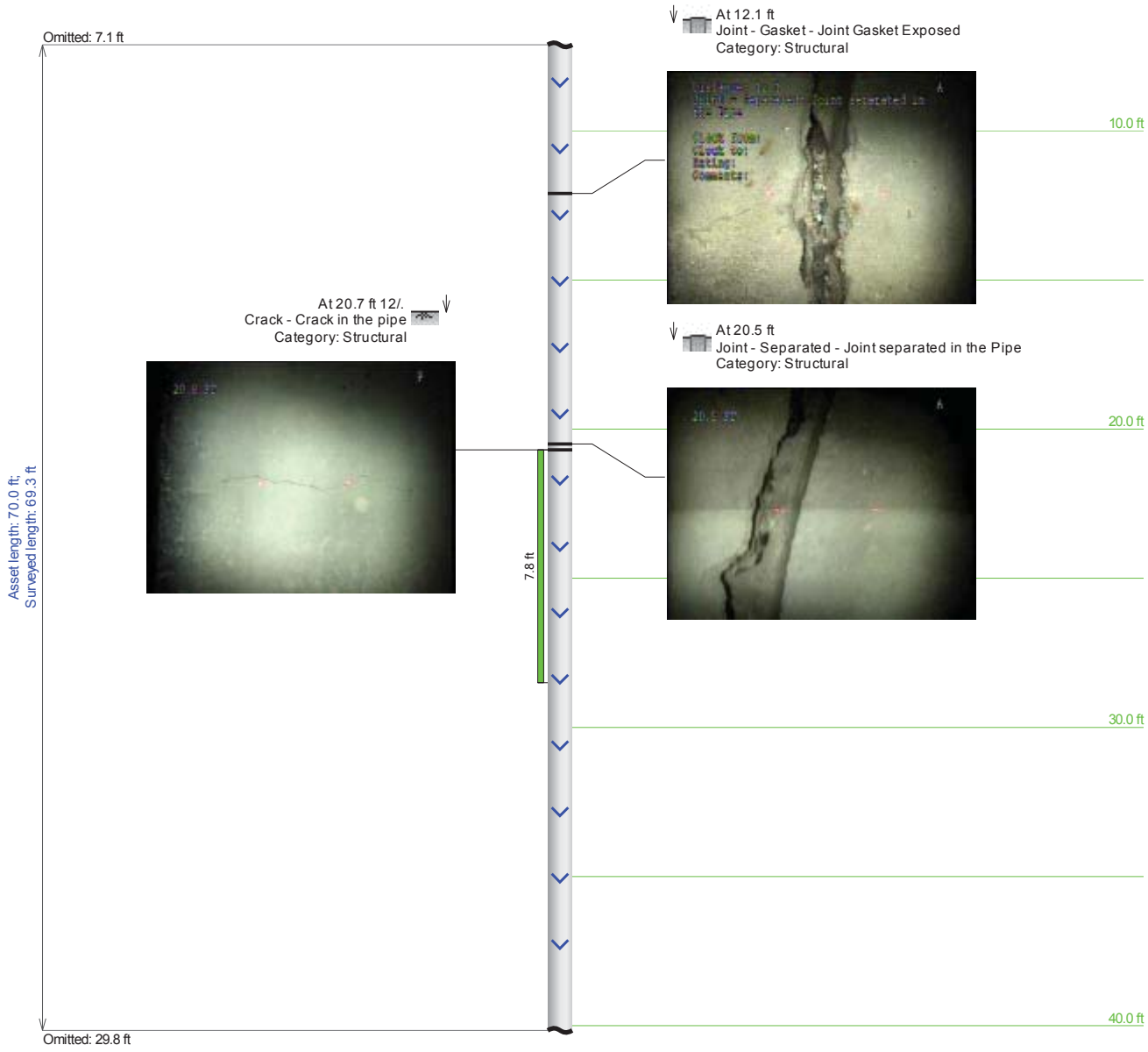
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0614 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 69.3 | Tina Watkins | |



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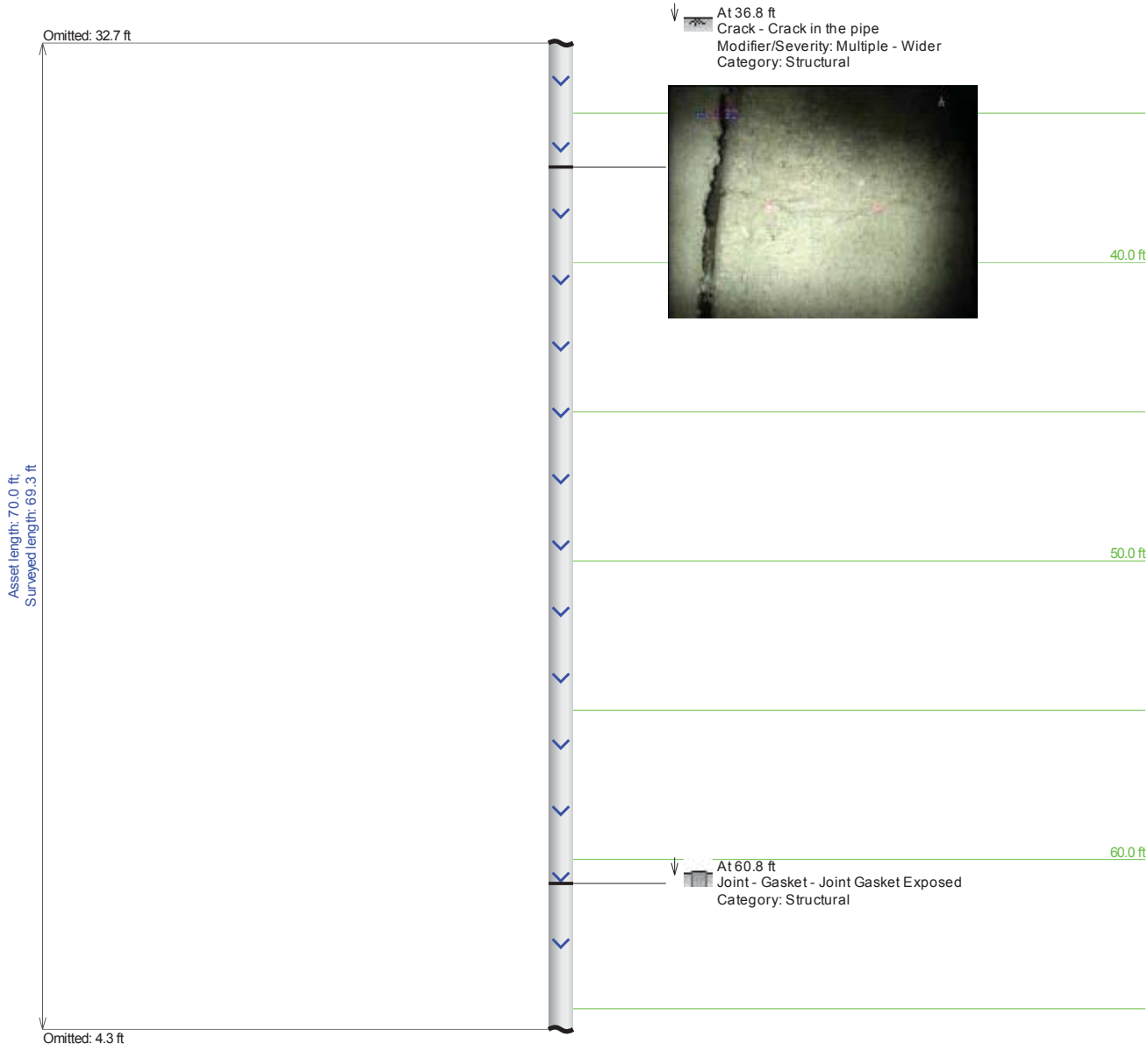
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0614 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 69.3 | Tina Watkins | |



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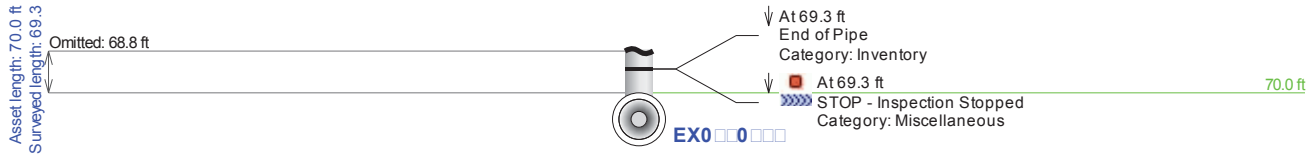
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0614 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 69.3 | Tina Watkins | |



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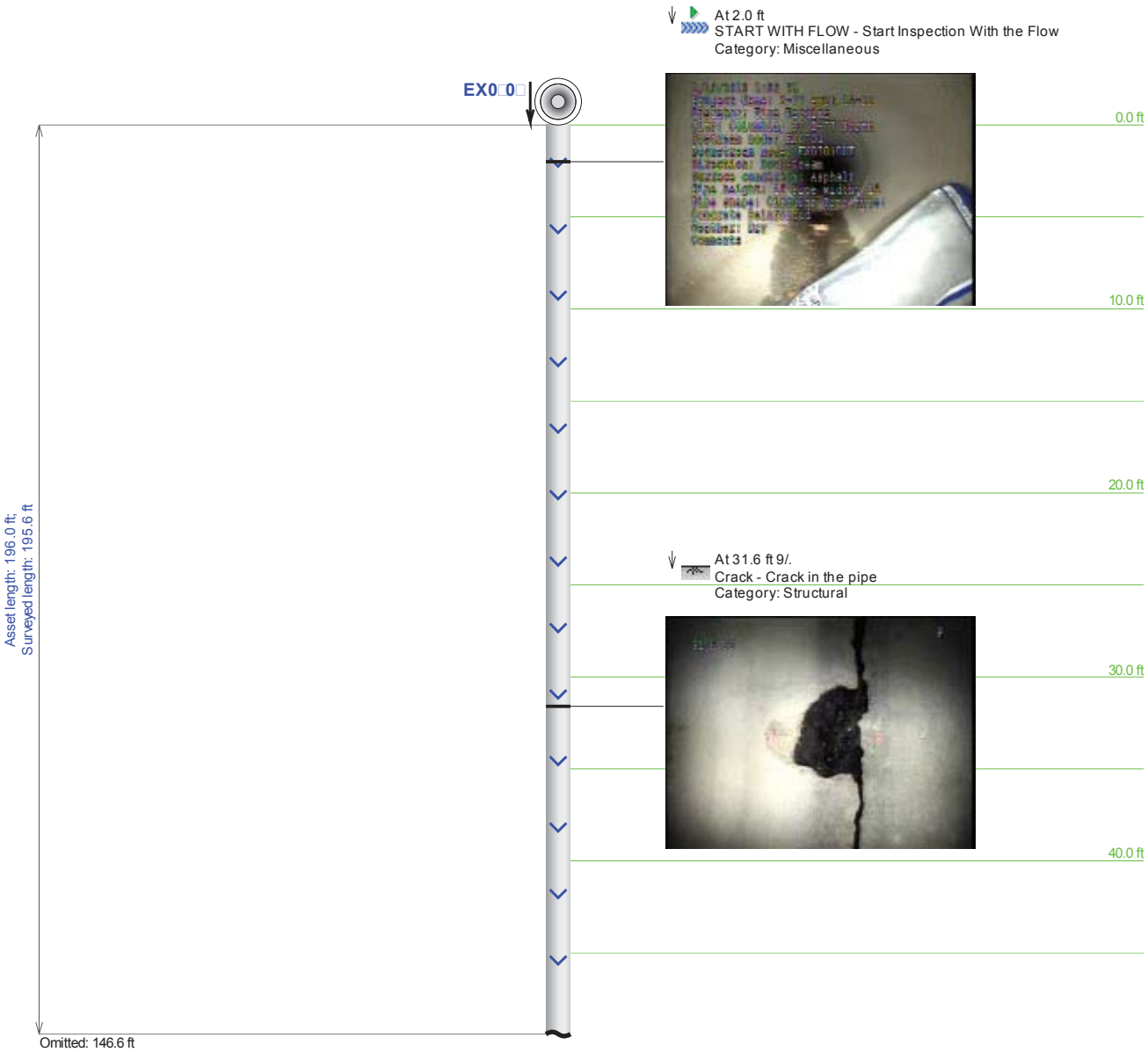
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0701 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 195.6 | Tina Watkins | |



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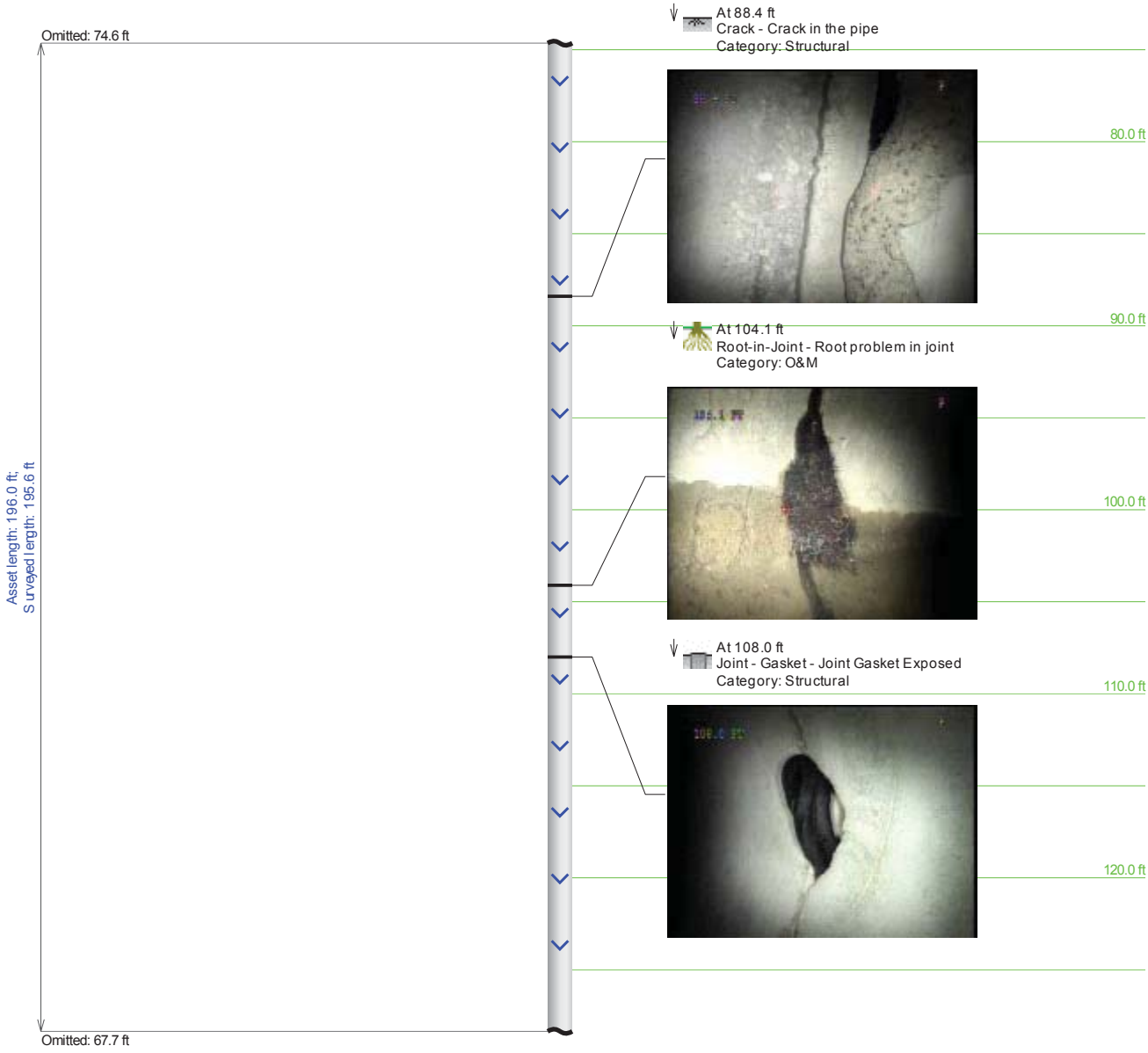
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0701 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 195.6 | Tina Watkins | |



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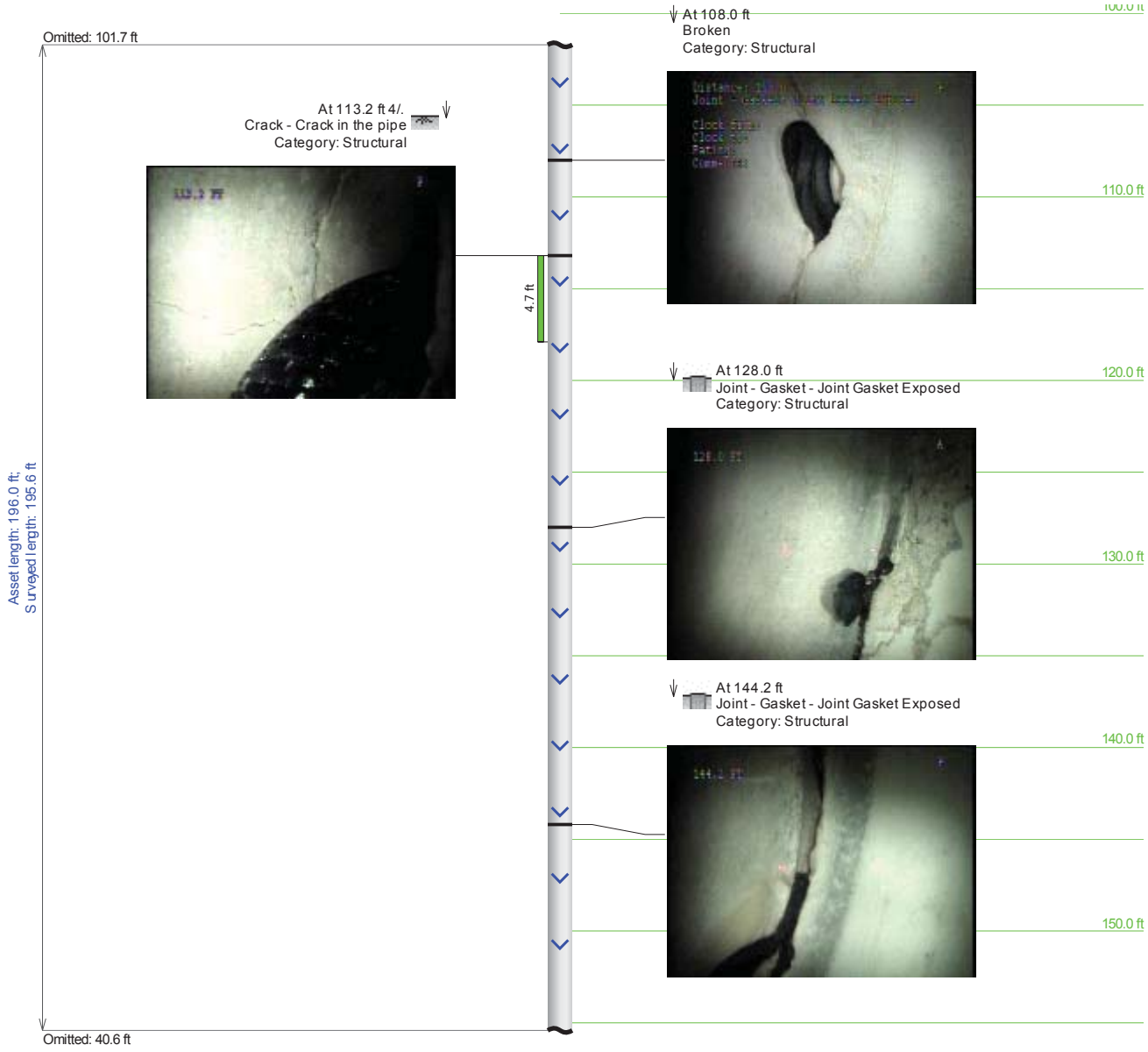
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0701 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 195.6 | Tina Watkins | |



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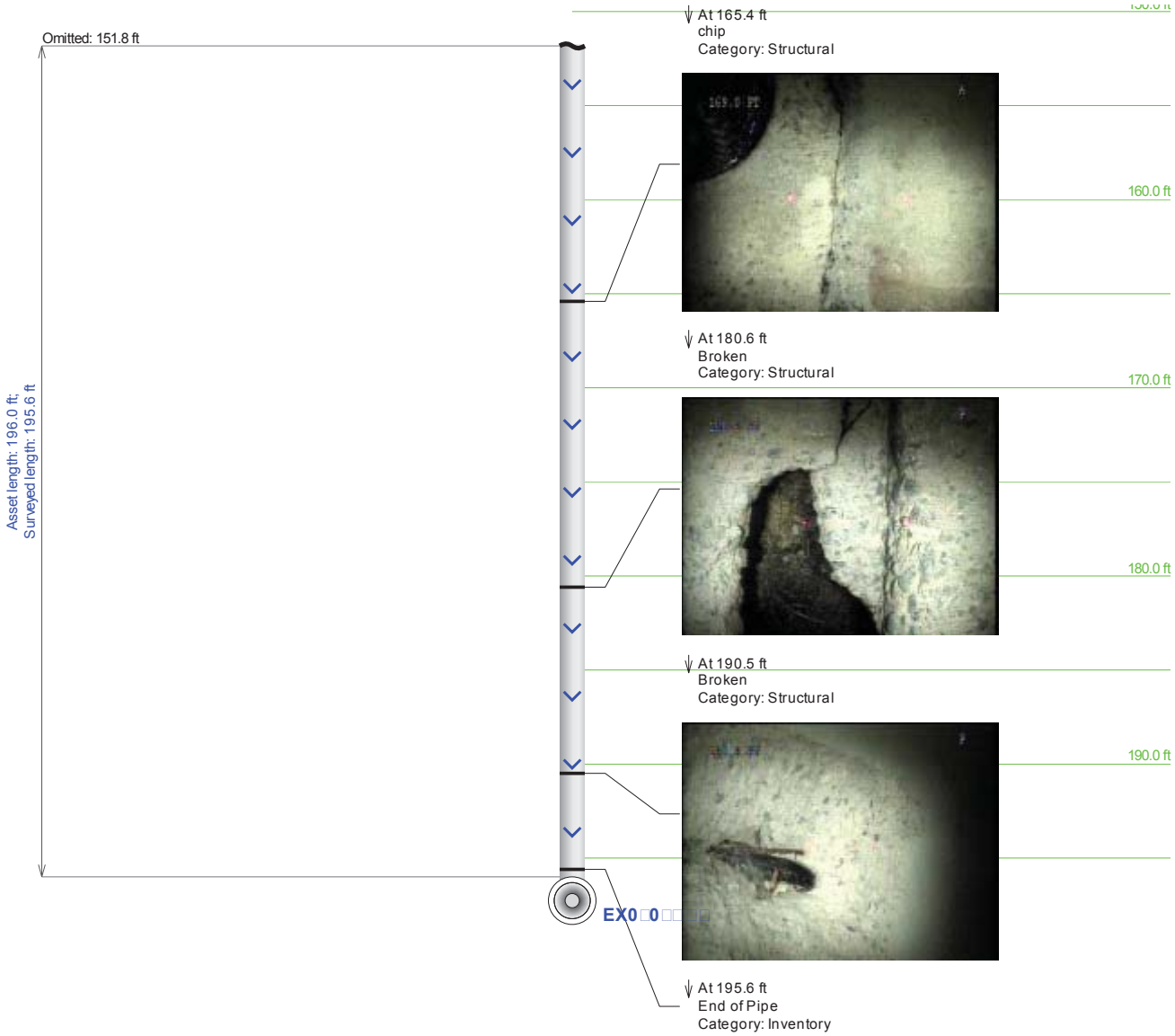
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0701 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 195.6 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0701 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 195.6 | Tina Watkins | |

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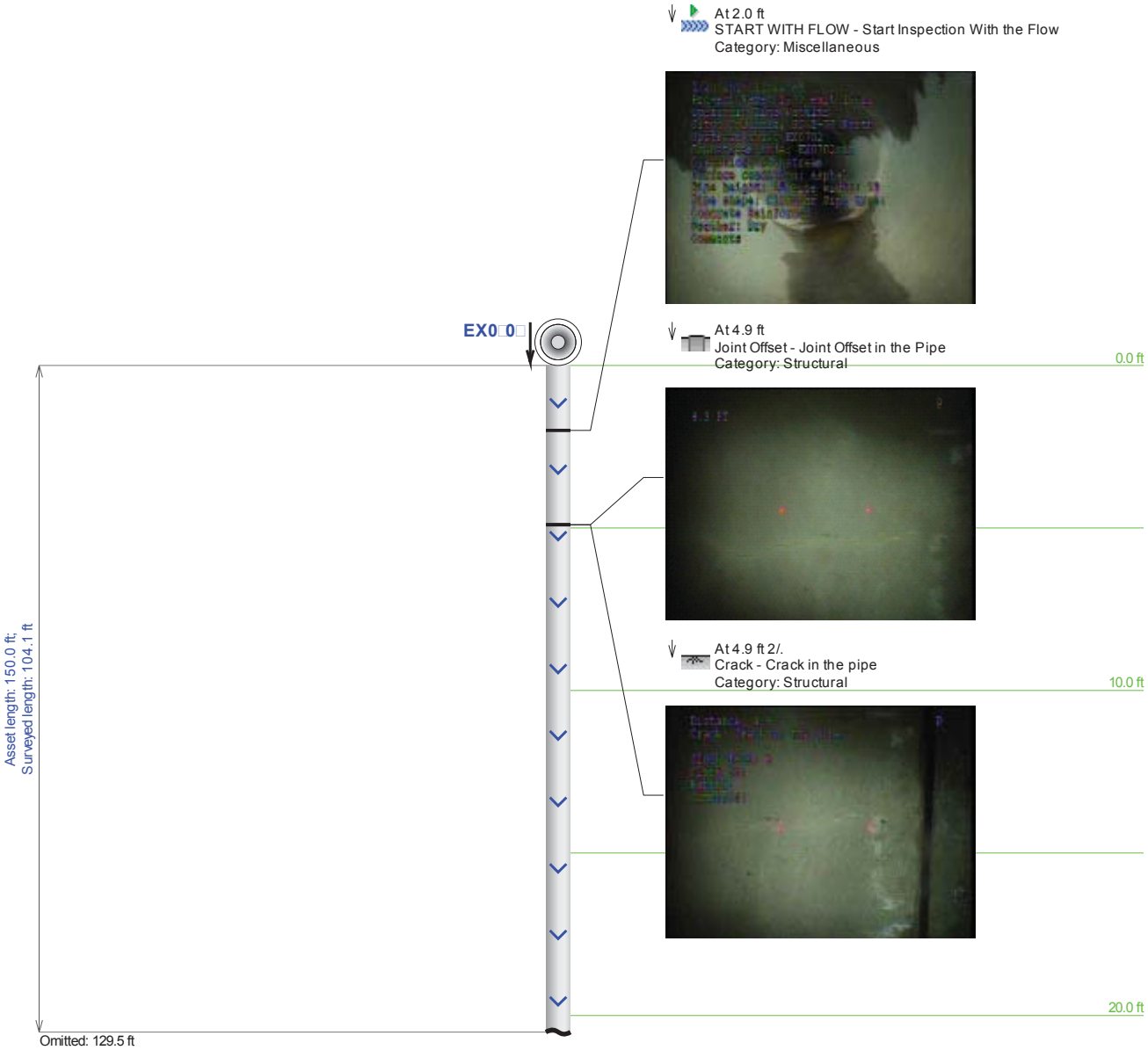
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0702 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 104.1 | Tina Watkins | |



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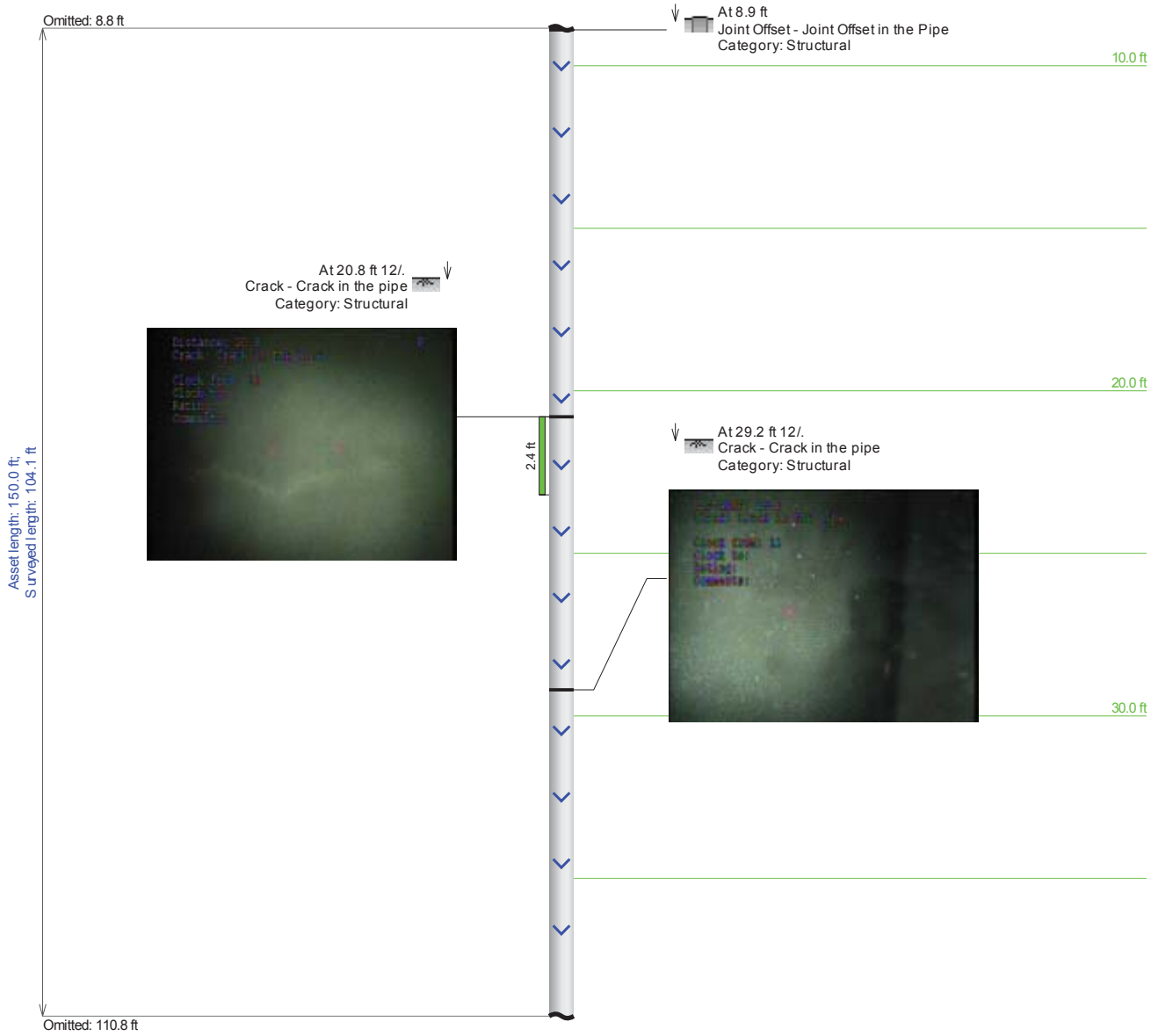
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0702 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 104.1 | Tina Watkins | |



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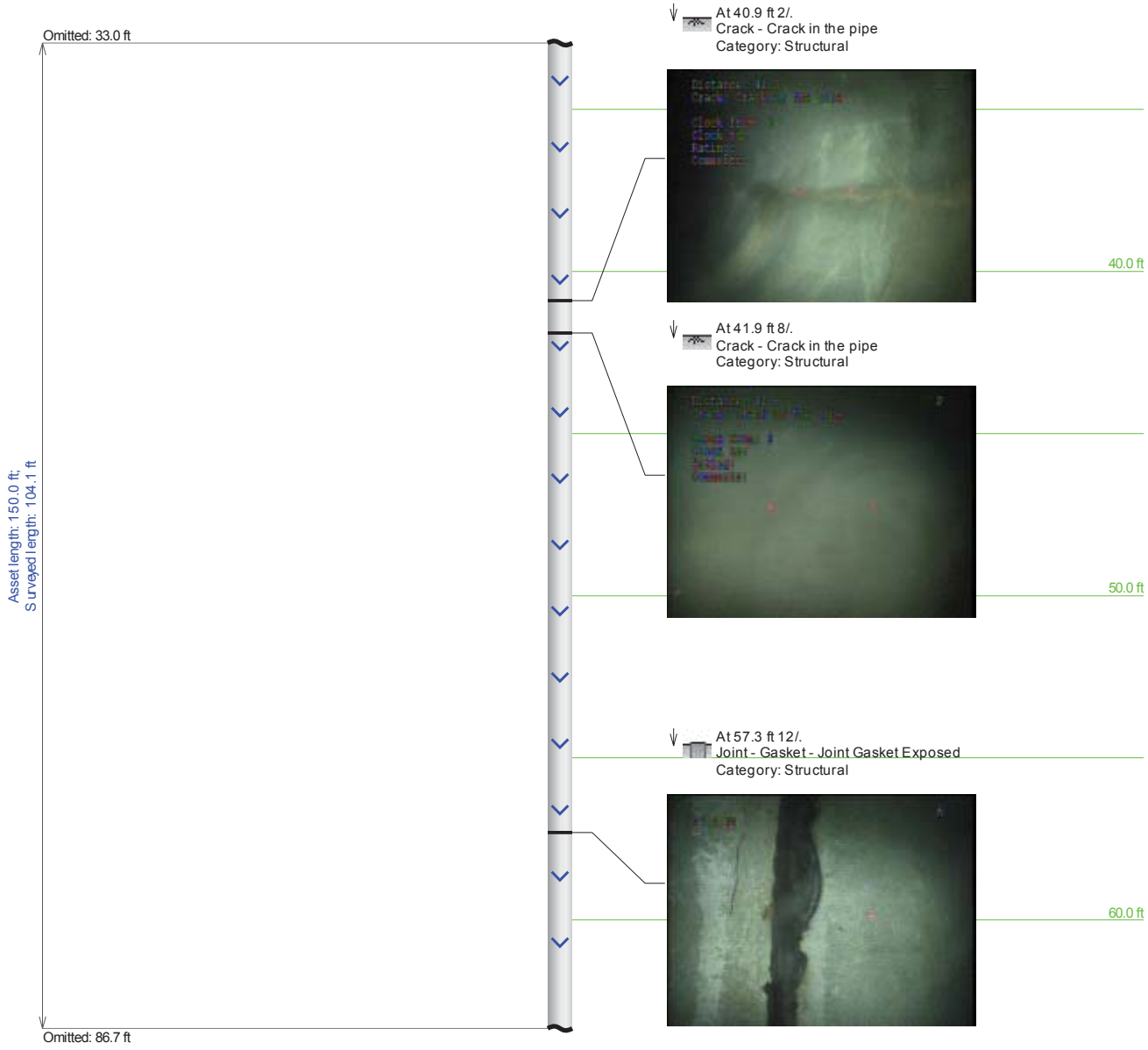
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0702 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 104.1 | Tina Watkins | |



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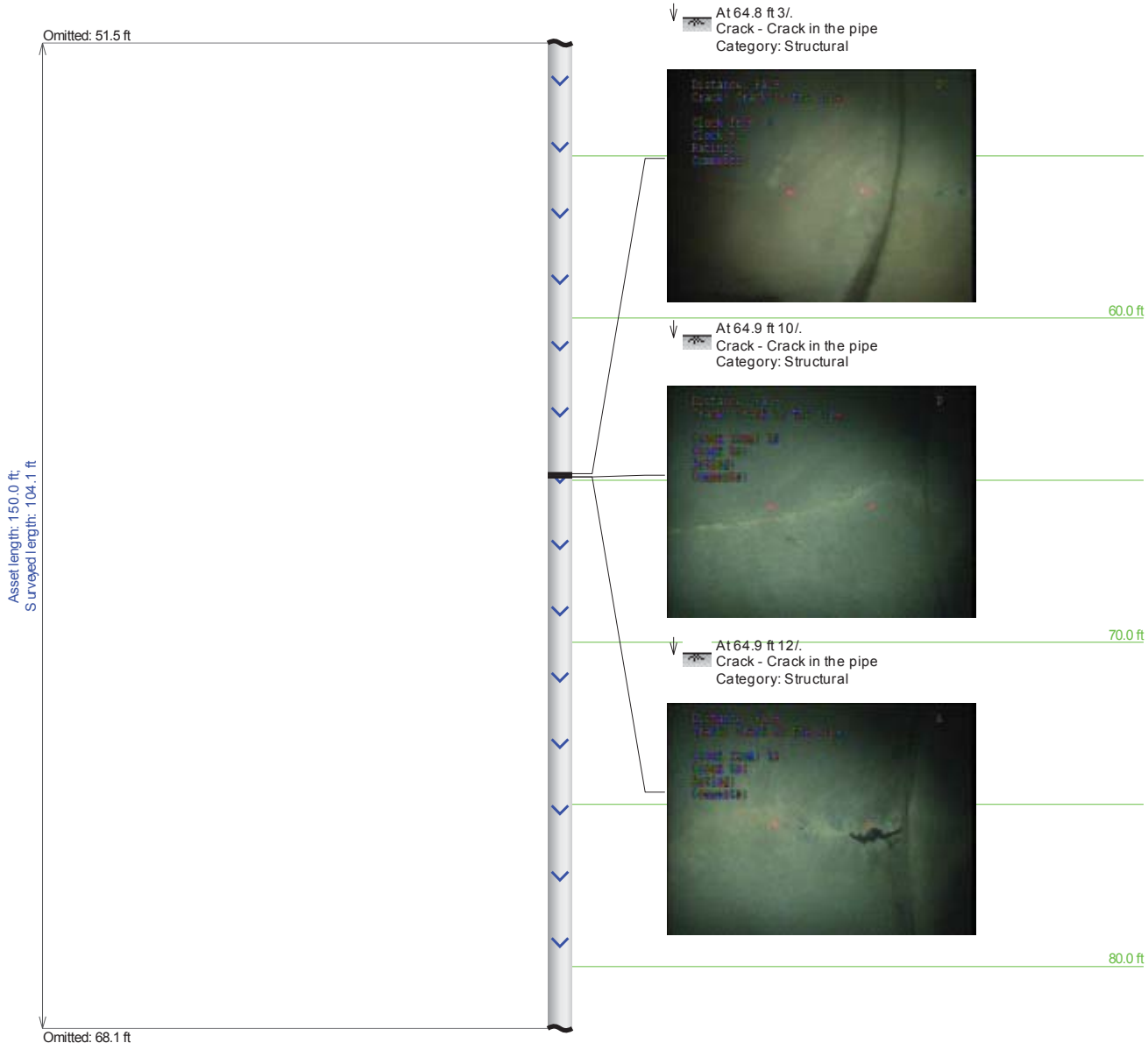
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0702 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 104.1 | Tina Watkins | |



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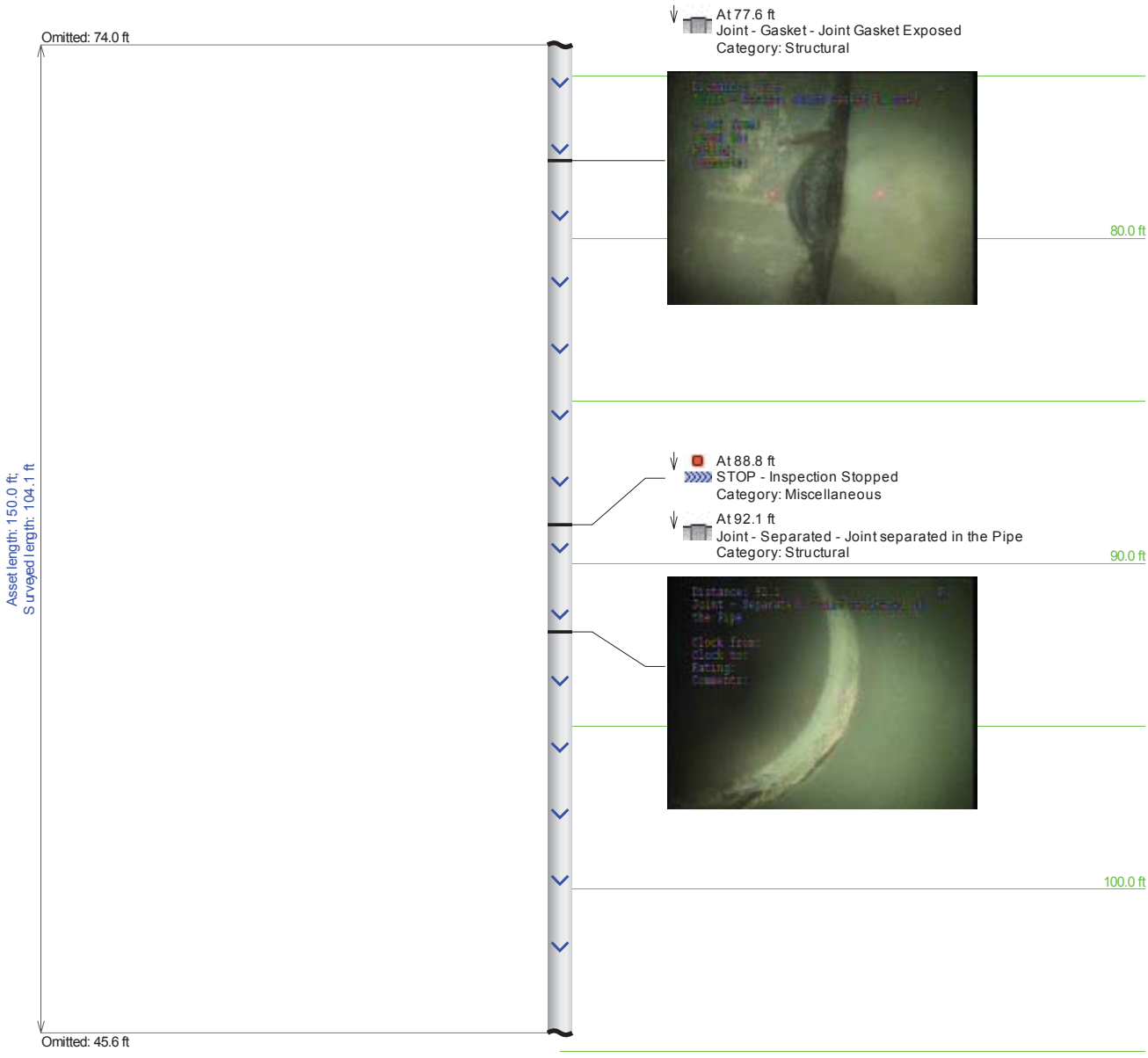
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0702 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 104.1 | Tina Watkins | |



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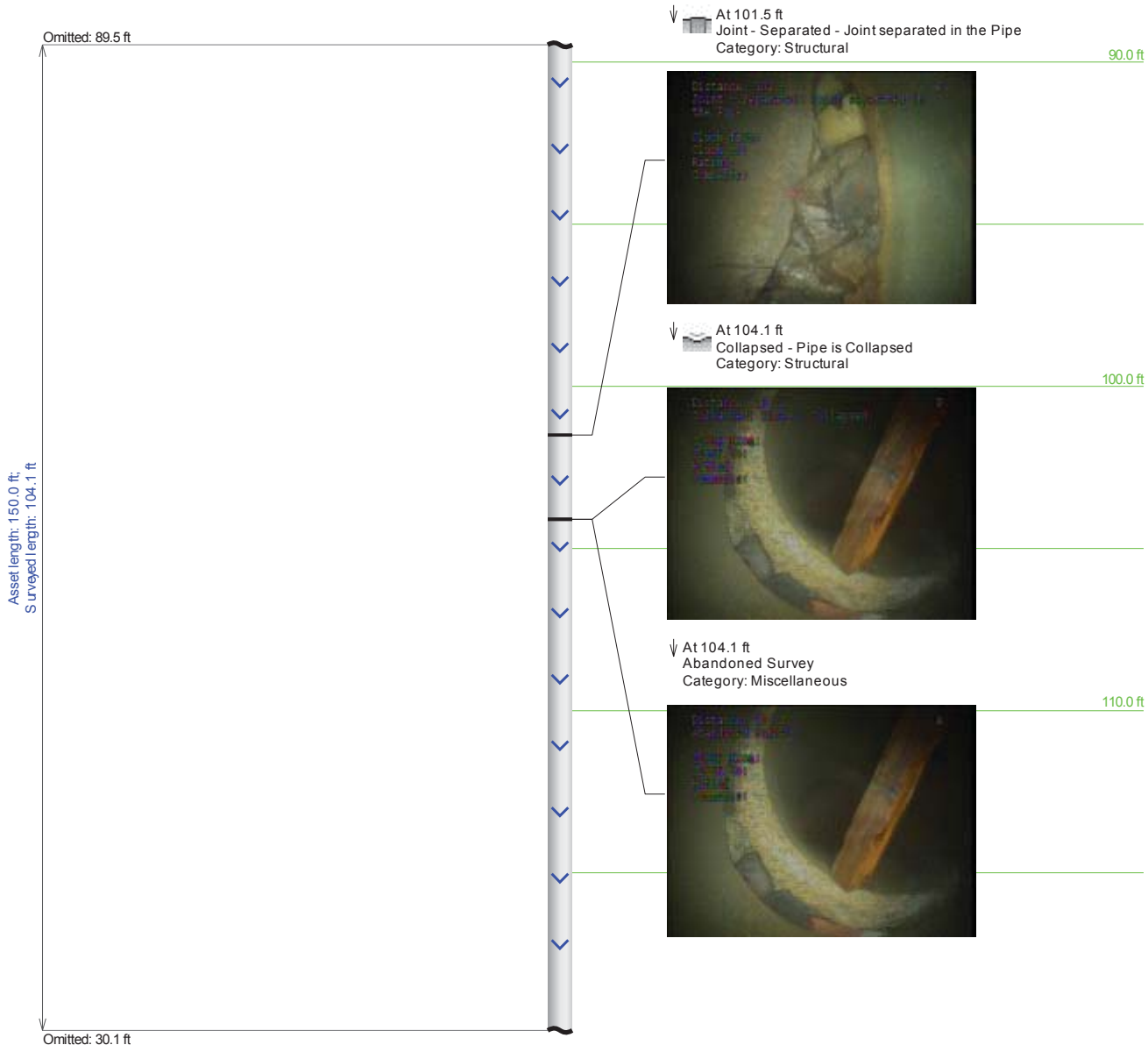
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0702 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 104.1 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0702 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 104.1 | Tina Watkins | |

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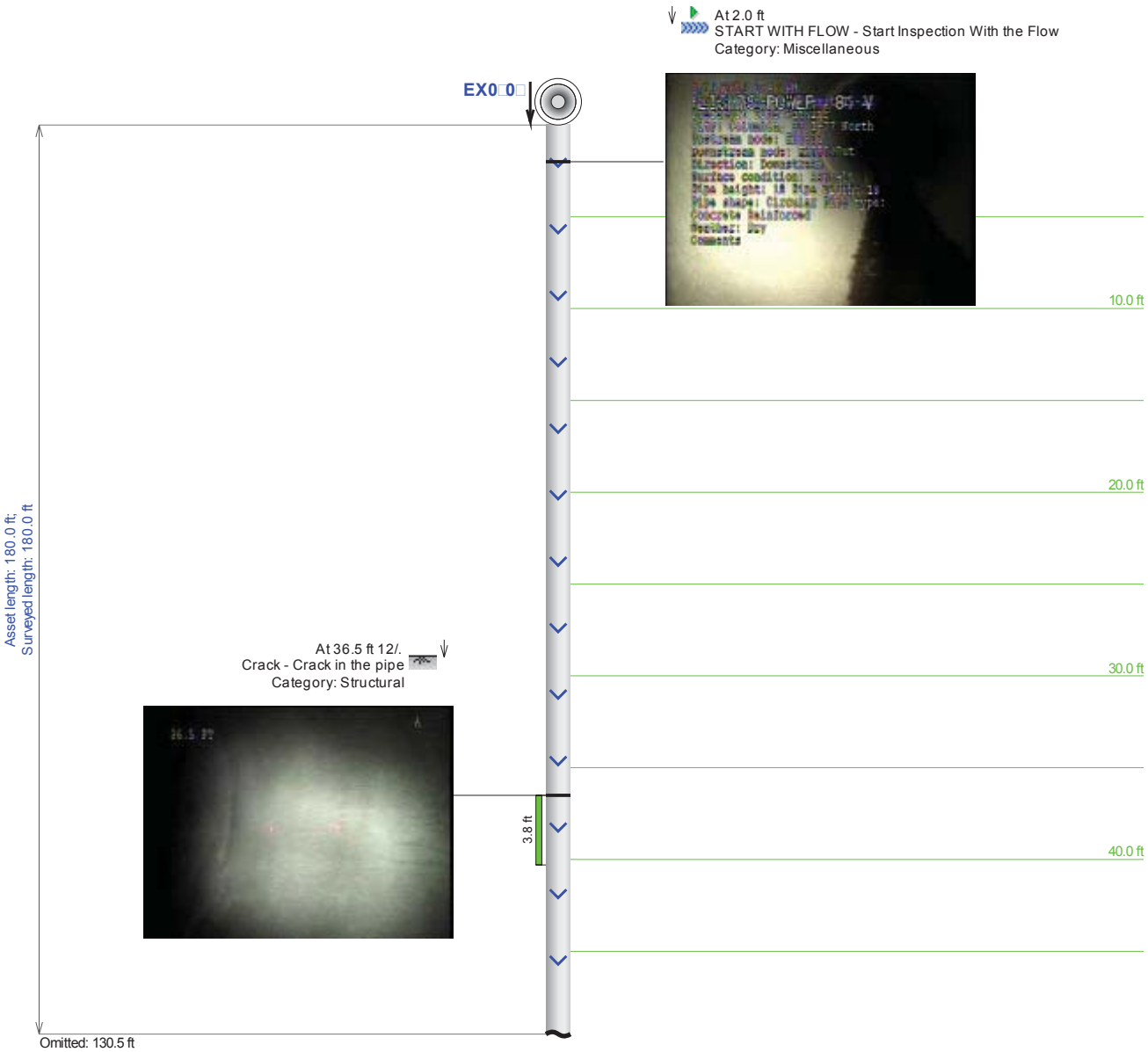
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0801 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 180.0 | Tina Watkins | |



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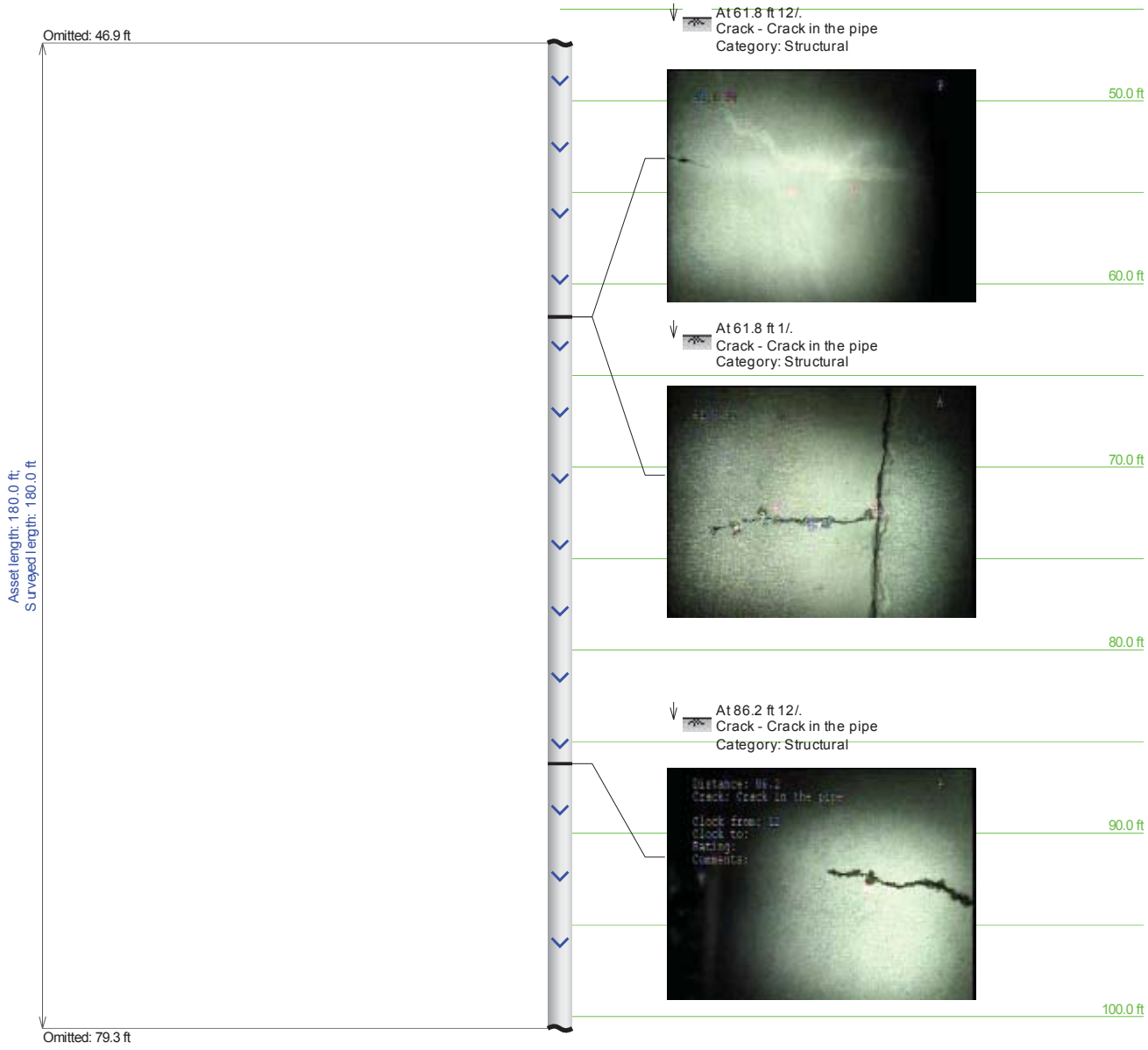
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0801 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 180.0 | Tina Watkins | |



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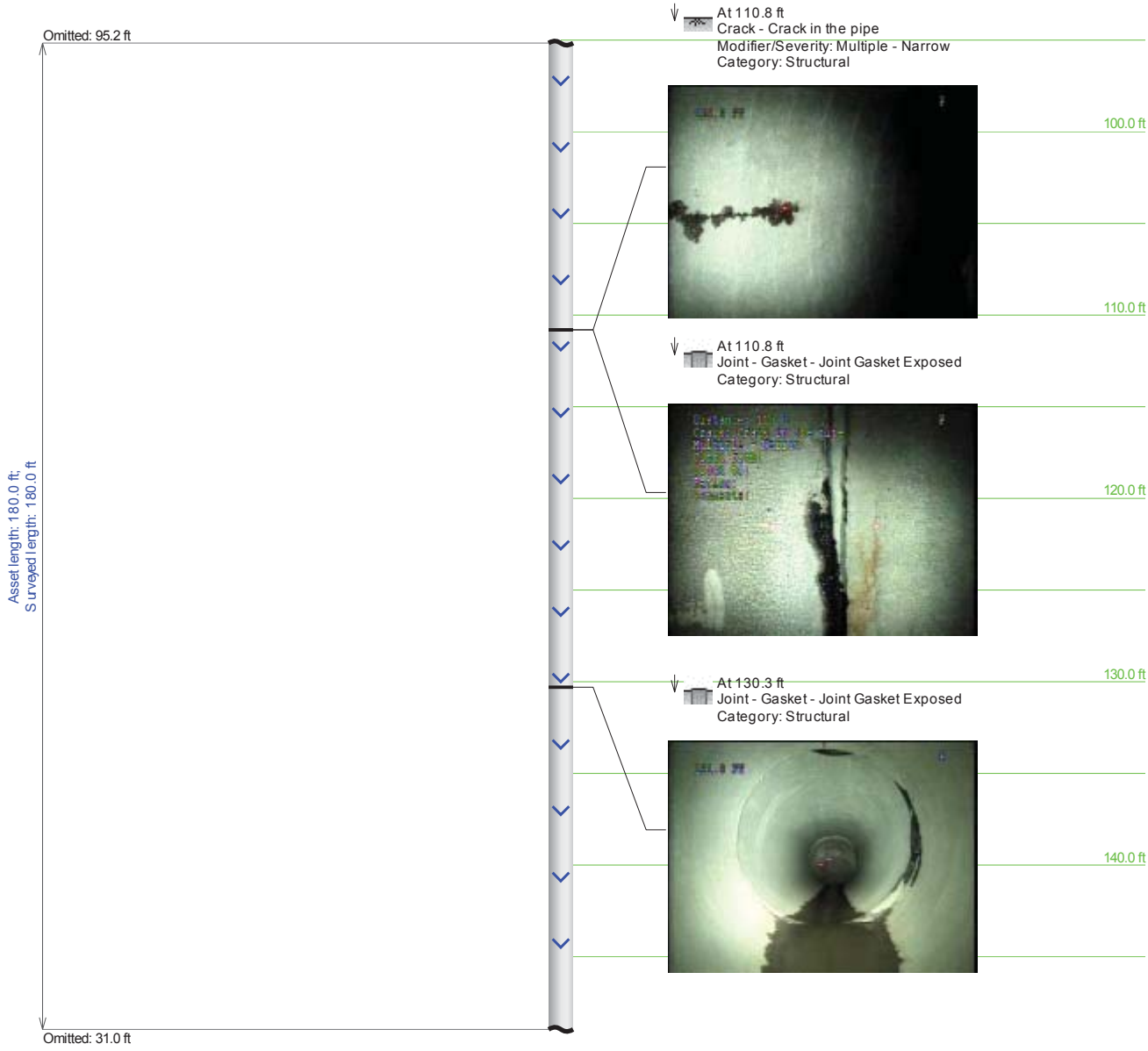
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0801 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 180.0 | Tina Watkins | |



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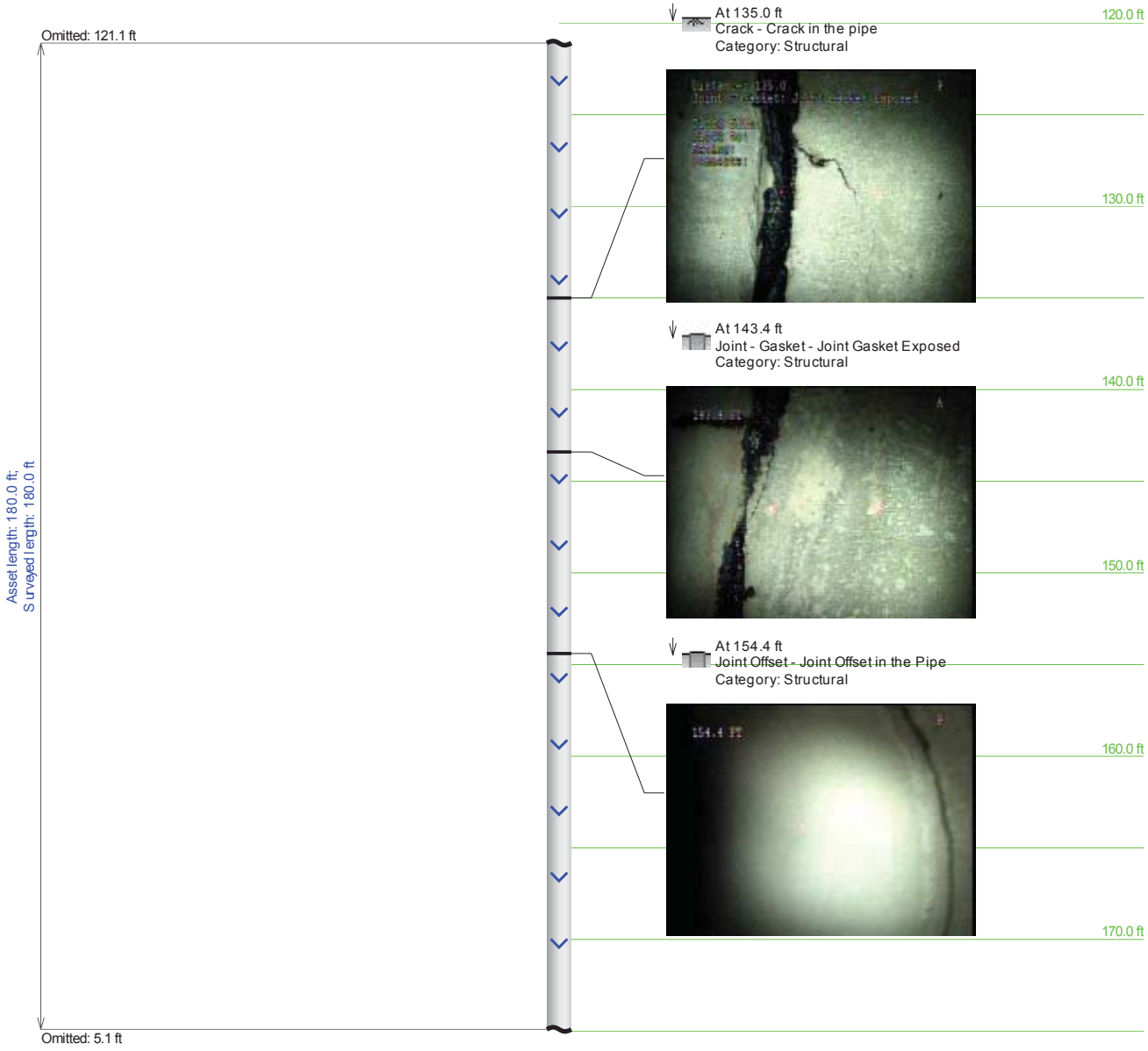
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0801 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 180.0 | Tina Watkins | |



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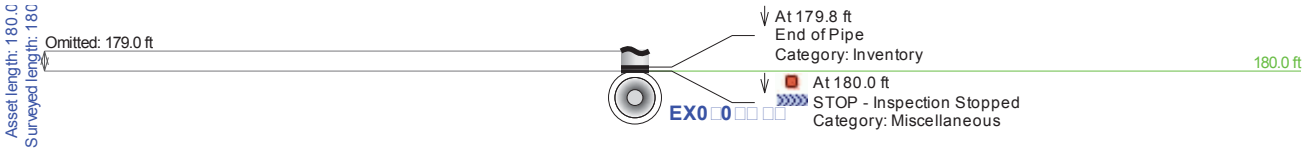
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0801 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 180.0 | Tina Watkins | |



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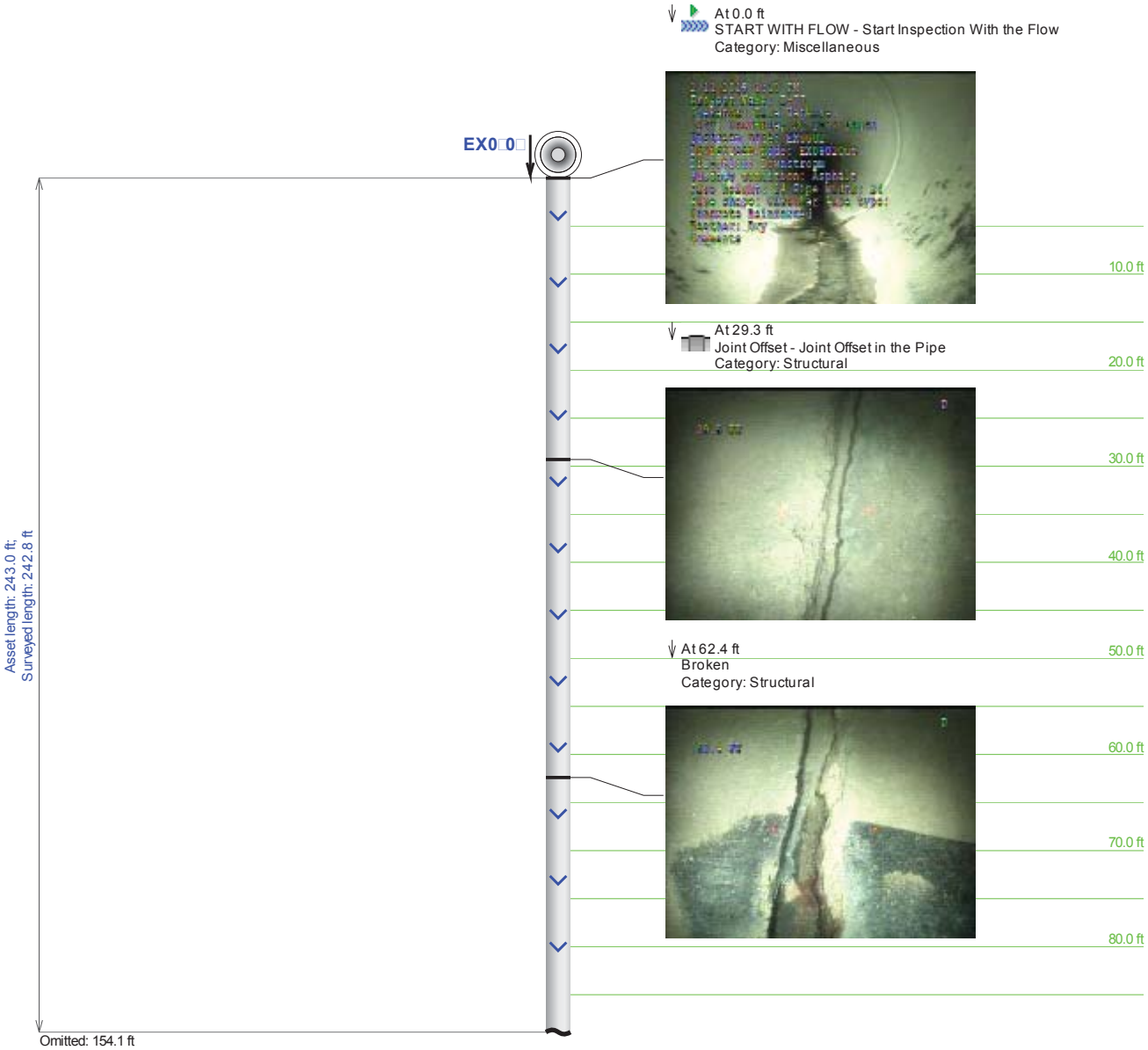
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP0802 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 242.8 | Tina Watkins | |



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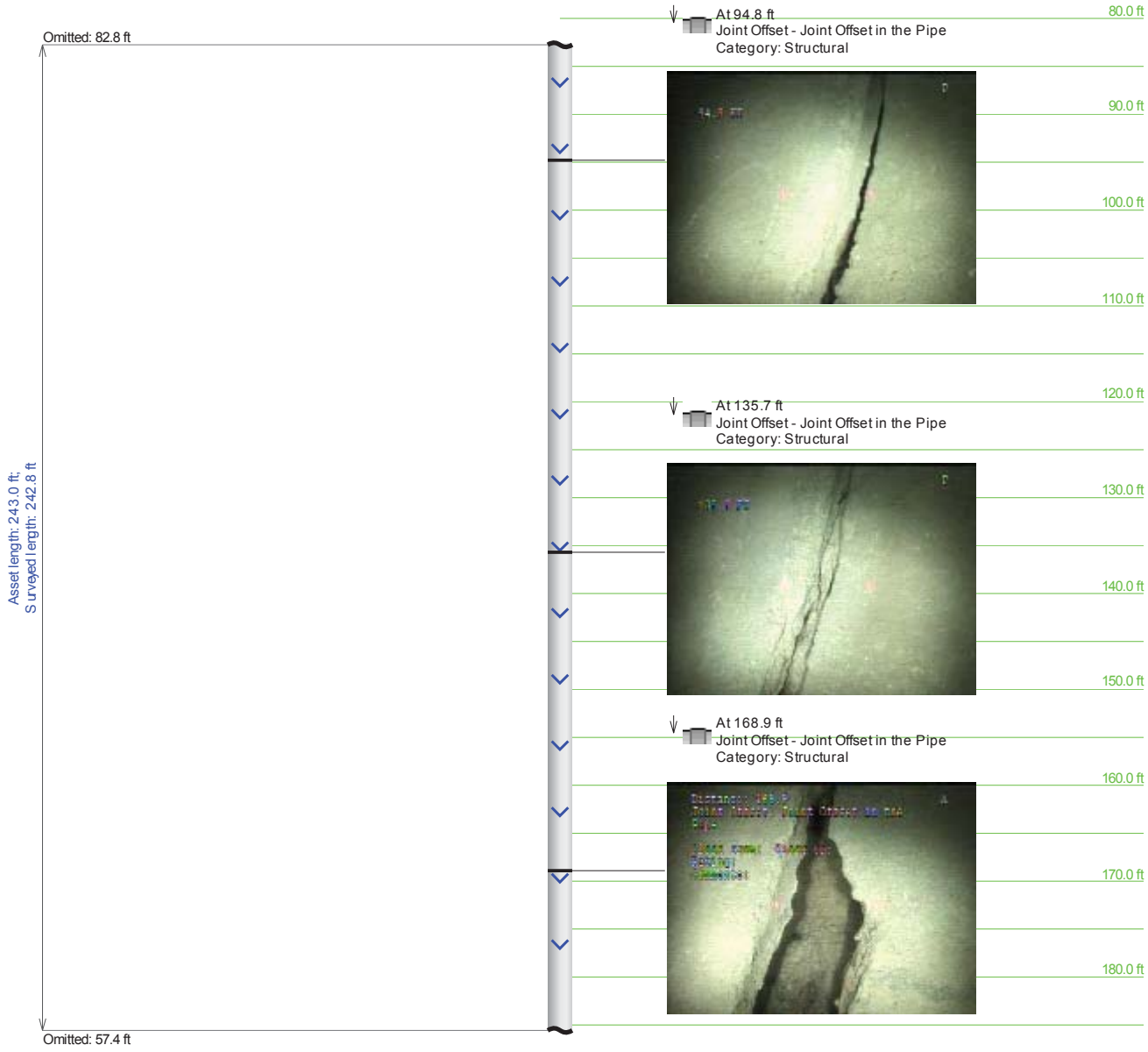
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP0802 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 242.8 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP0802 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 242.8 | Tina Watkins | |

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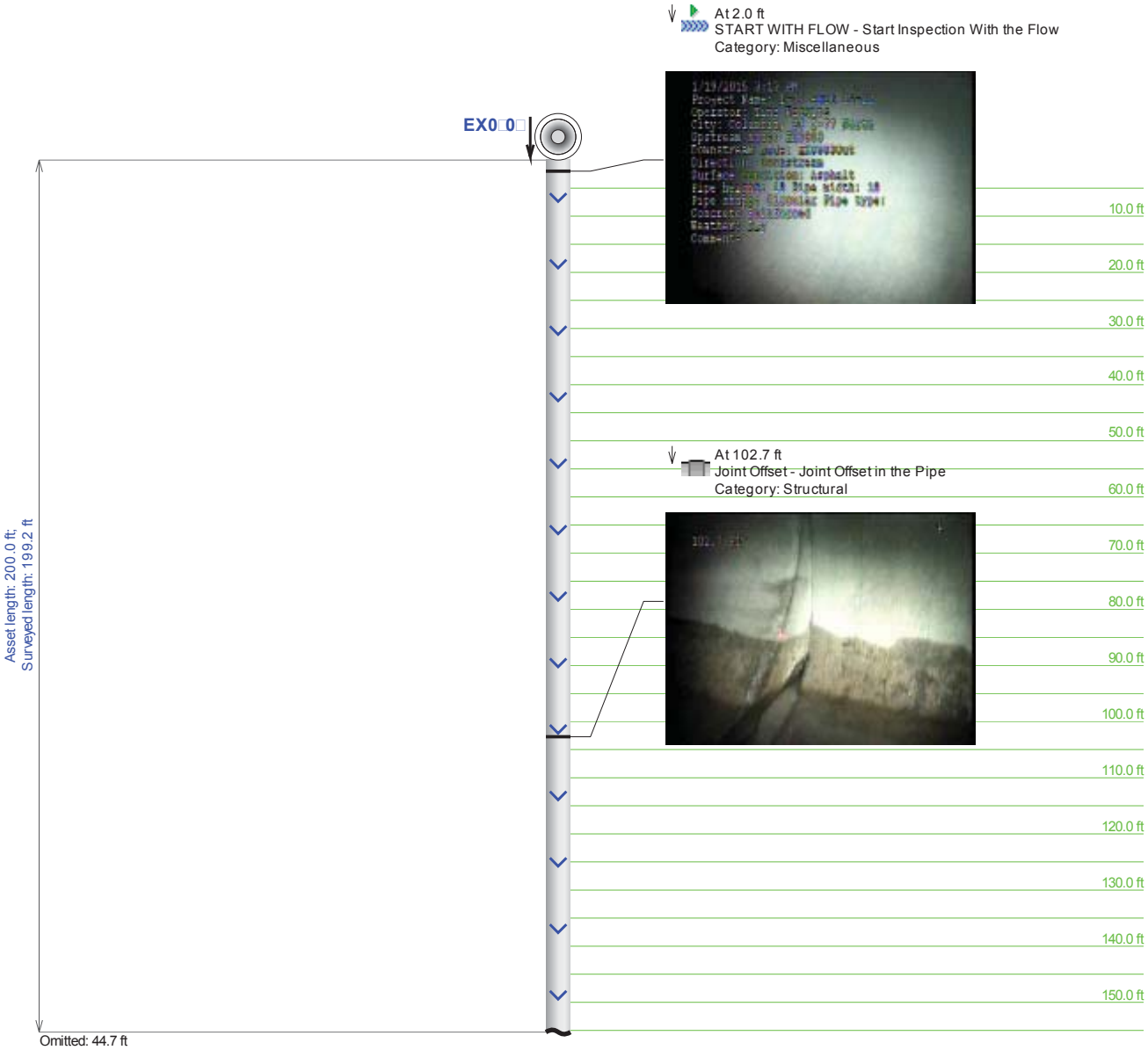
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0803 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 199.2 | Tina Watkins | |



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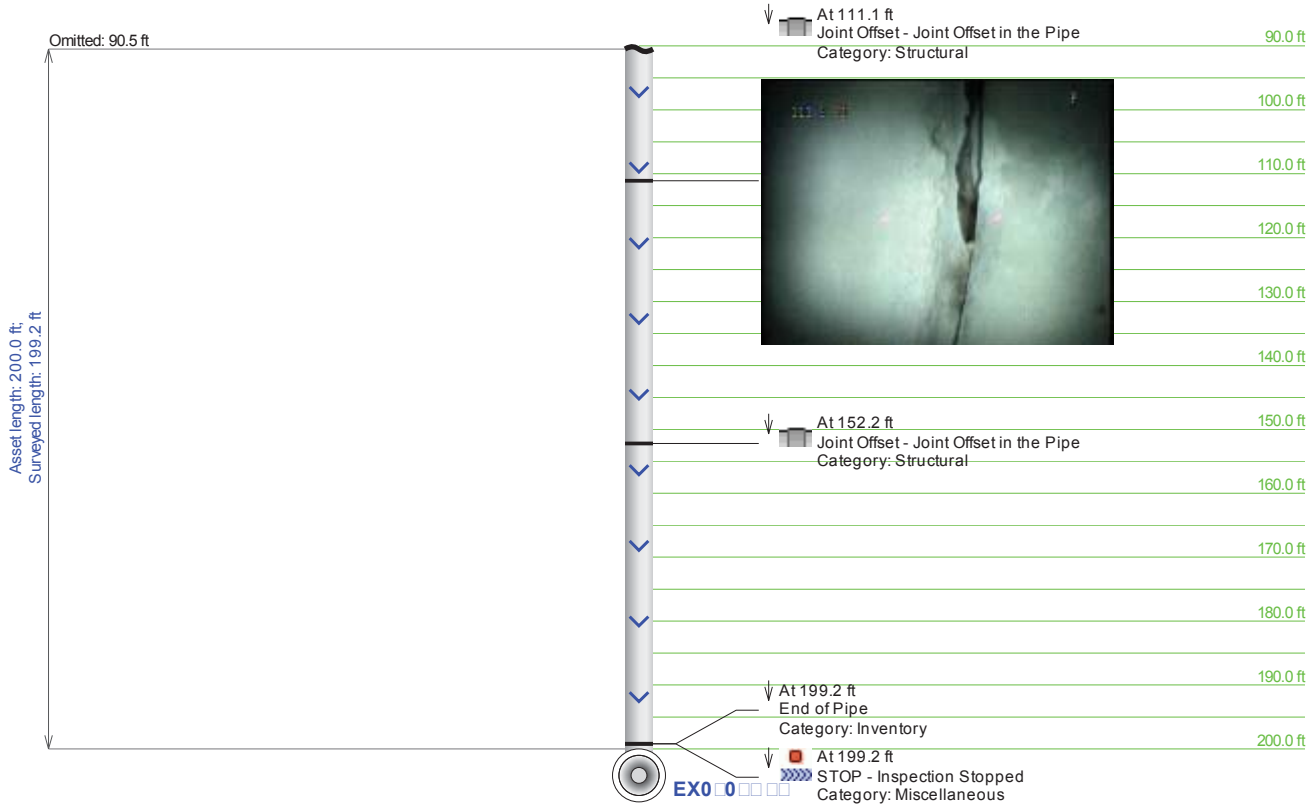
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0803 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 199.2 | Tina Watkins | |



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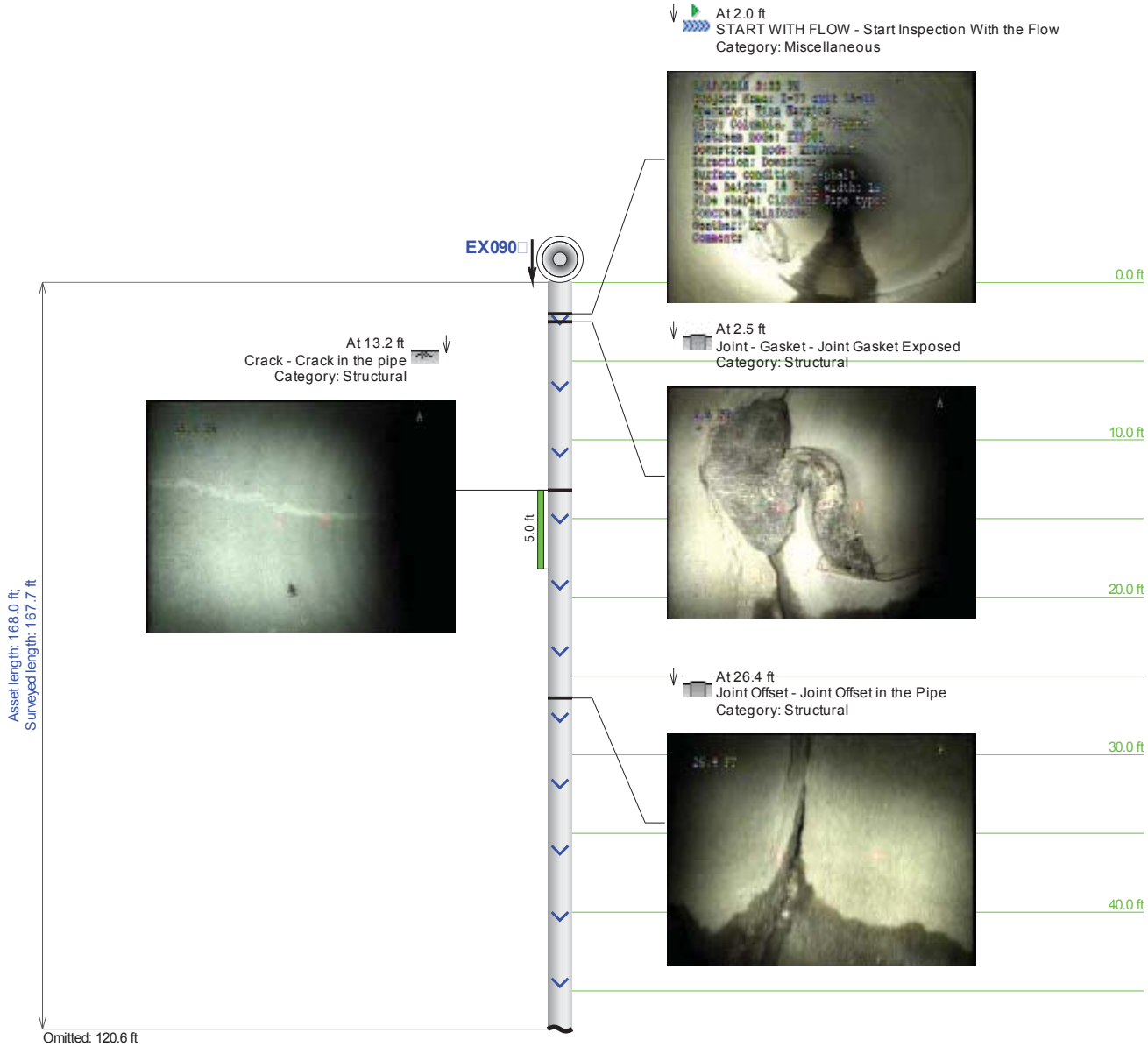
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0901 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 167.7 | Tina Watkins | |



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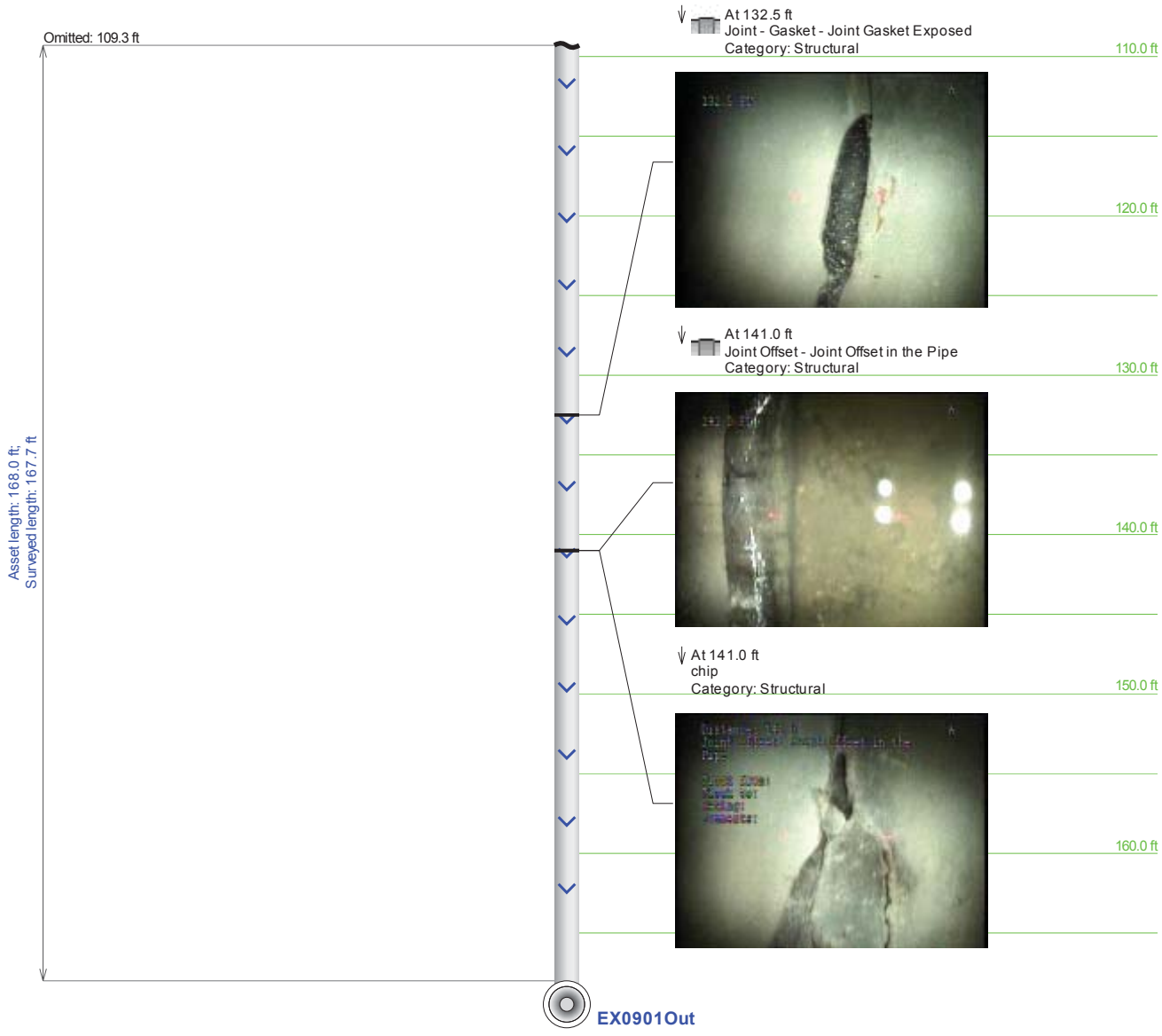
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0901 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 167.7 | Tina Watkins | |



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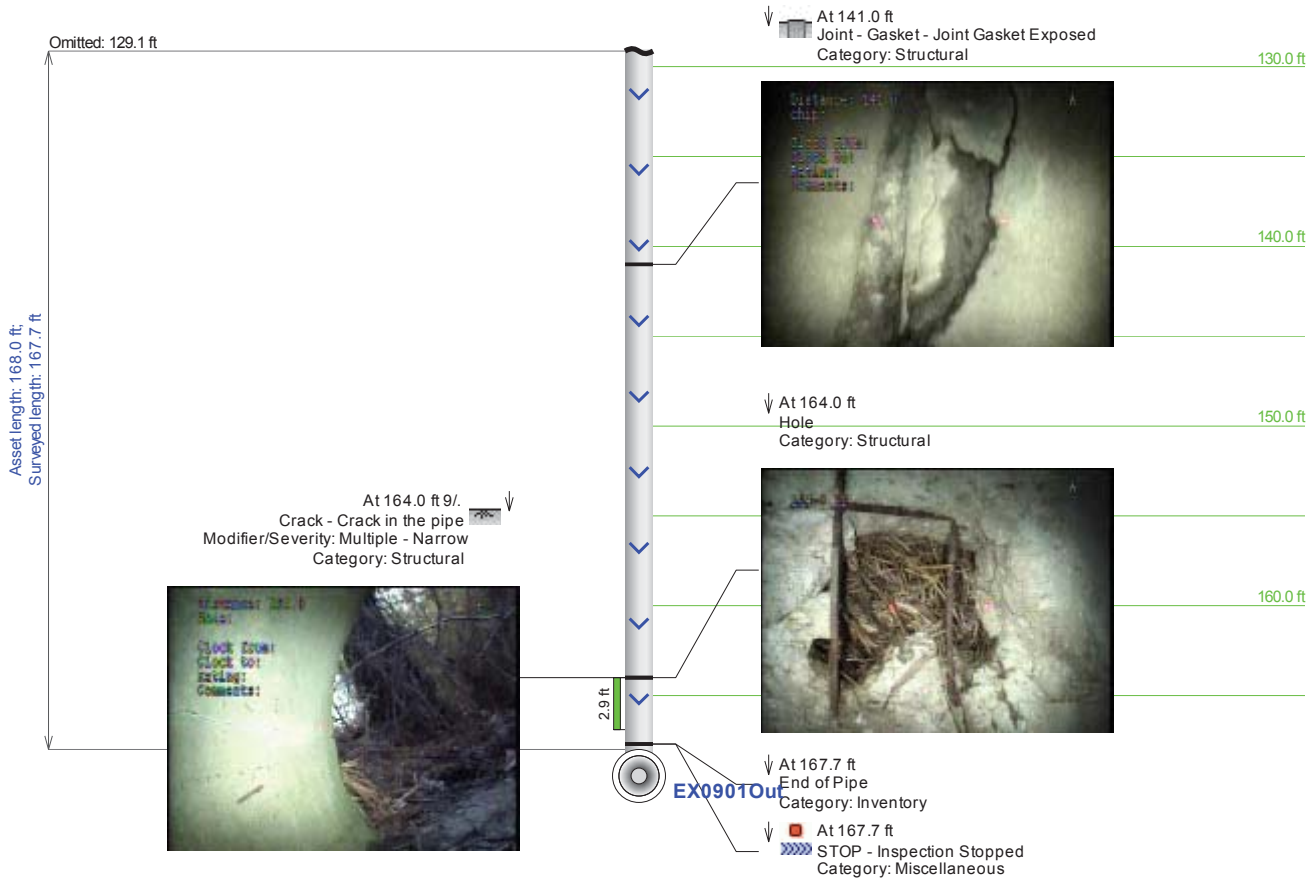
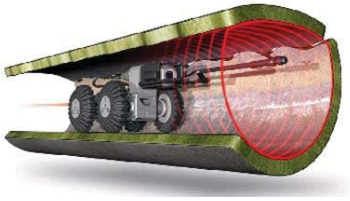
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP0901 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/19/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 167.7 | Tina Watkins | |





# AET Services

Robotic Inspections

# EC0906

**EC0906** **Culvert** **240’**

**Cracking Throughout**

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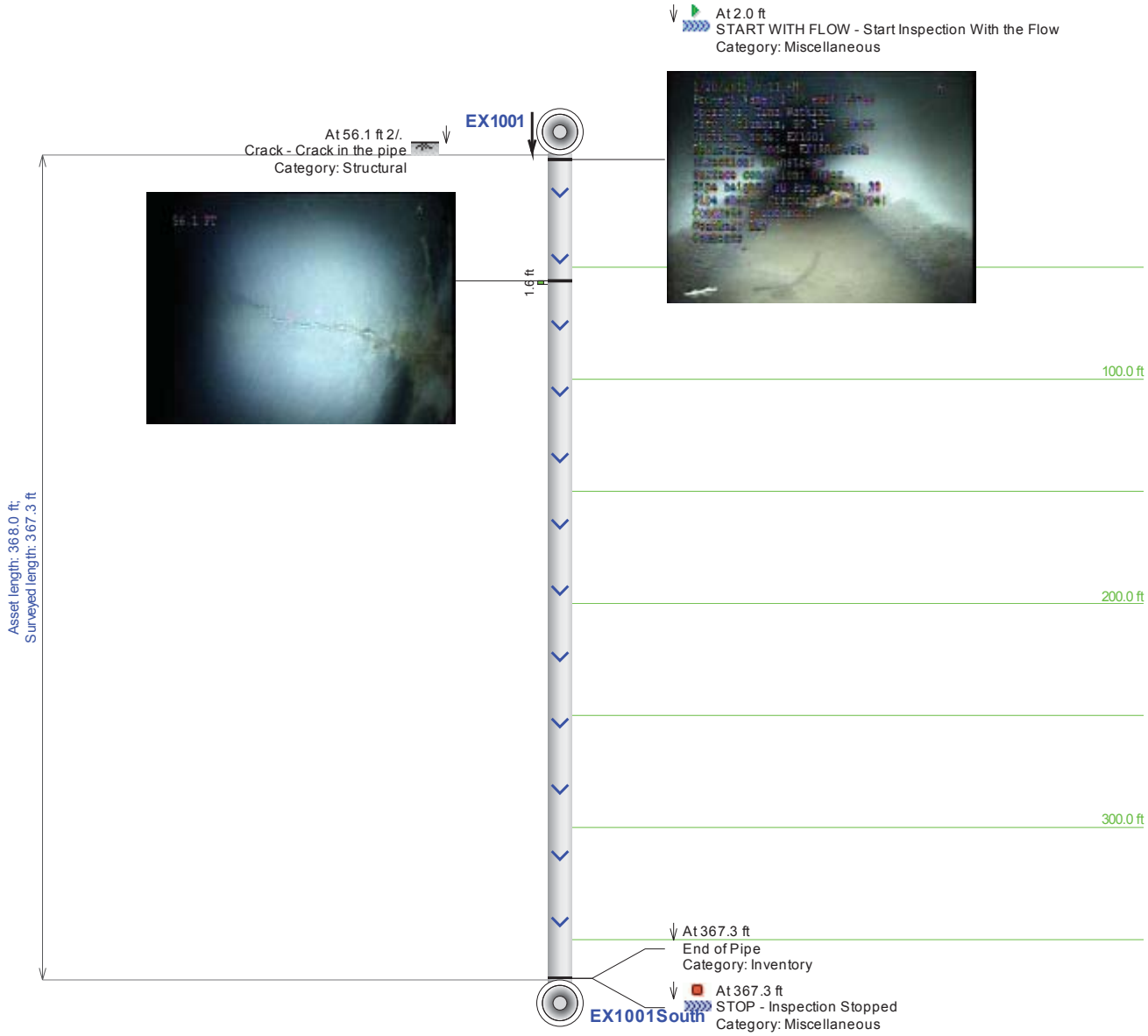
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1002 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 30 | 30 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 367.3 | Tina Watkins | |



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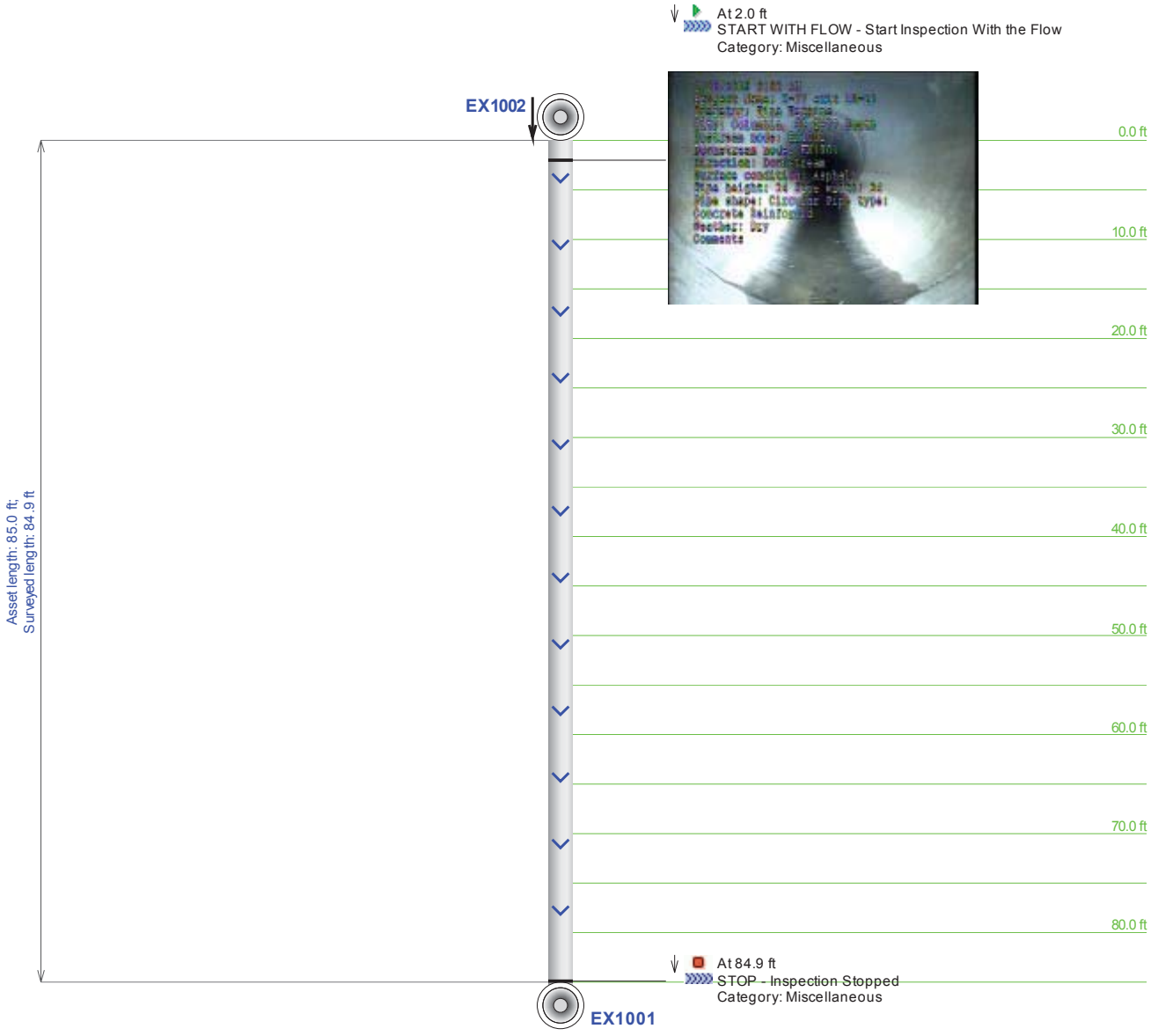
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1003 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 84.9 | Tina Watkins | |



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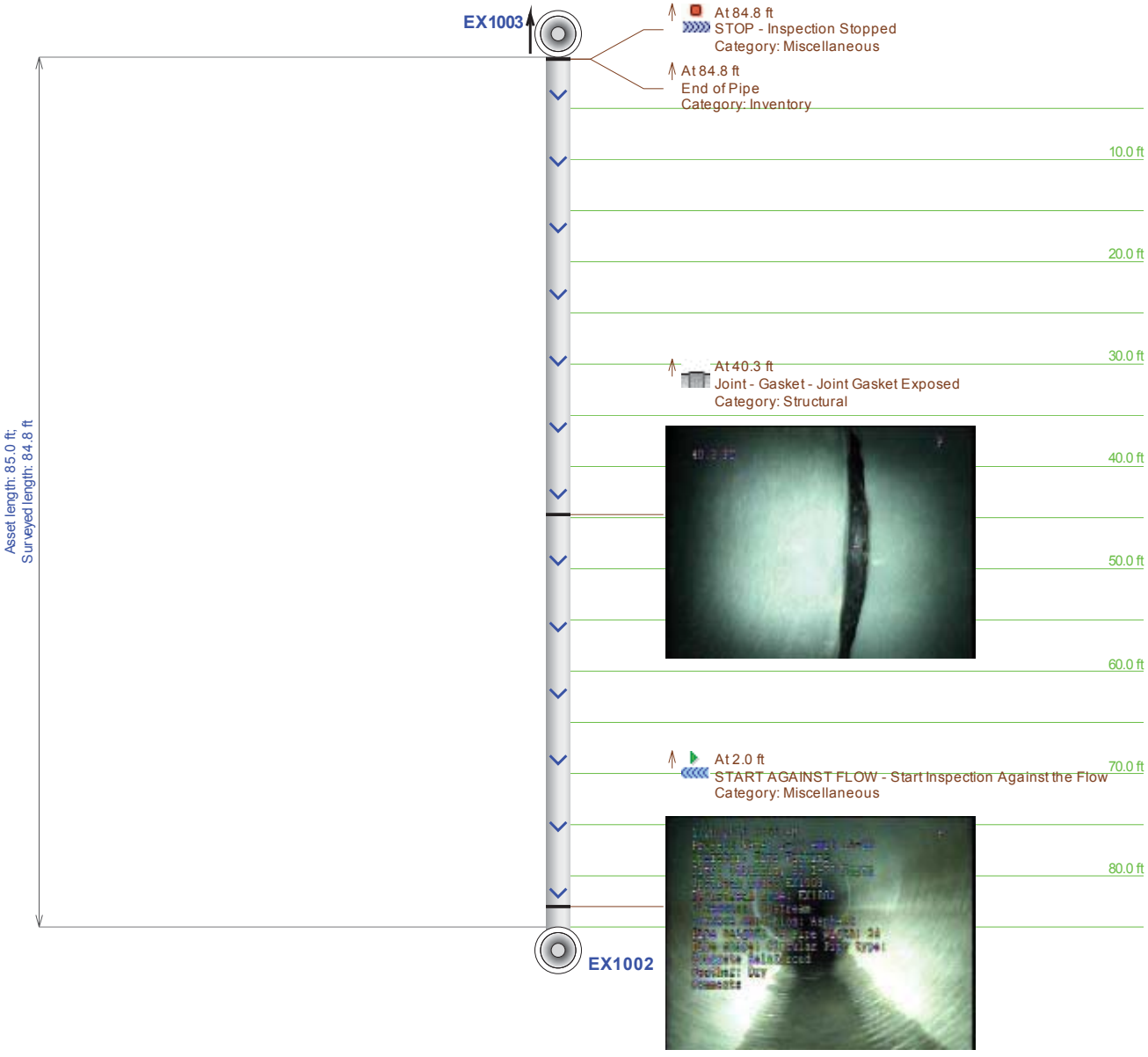
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1004 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 84.8 | Tina Watkins | |



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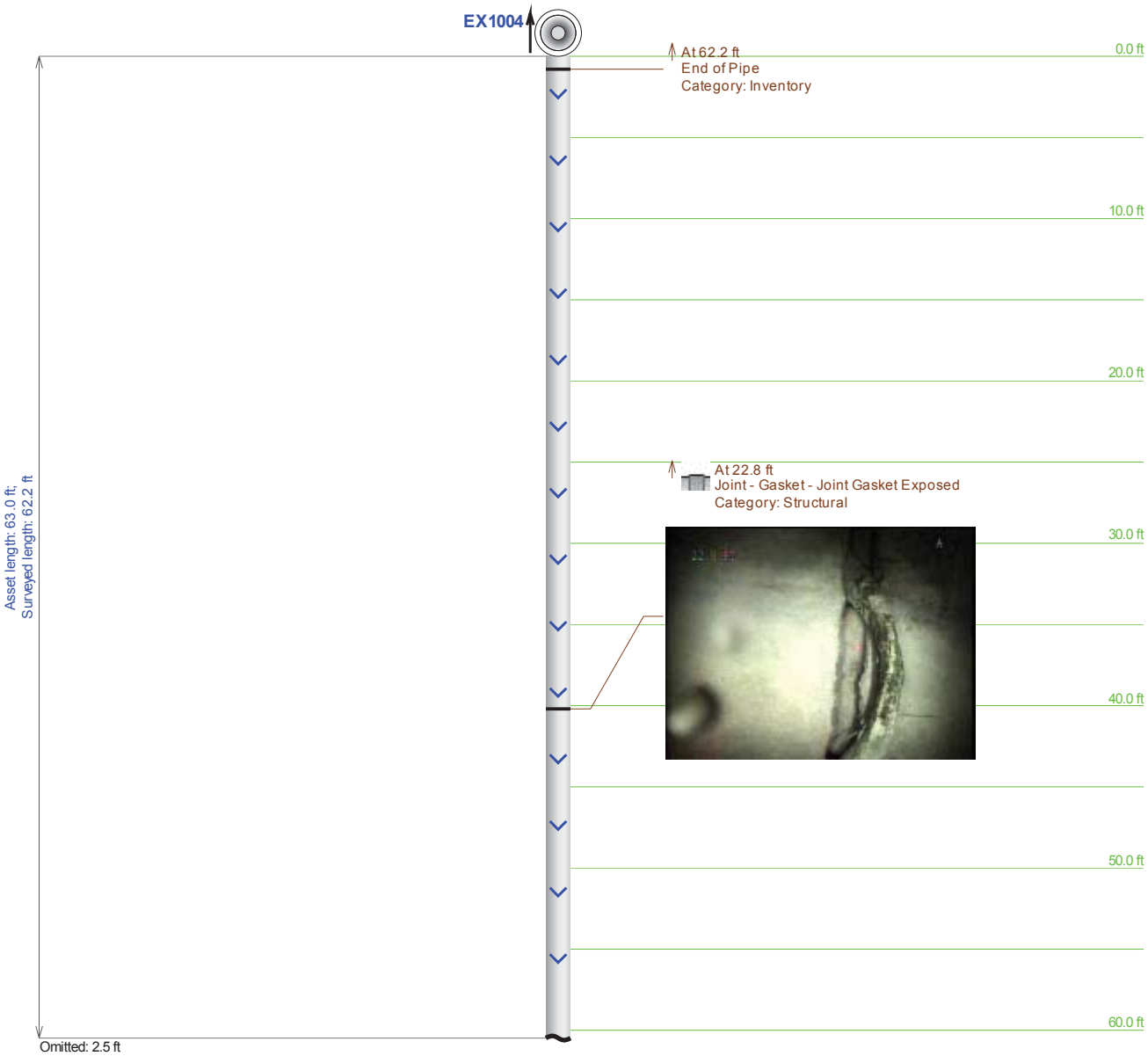
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1005 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 62.2 | Tina Watkins | |



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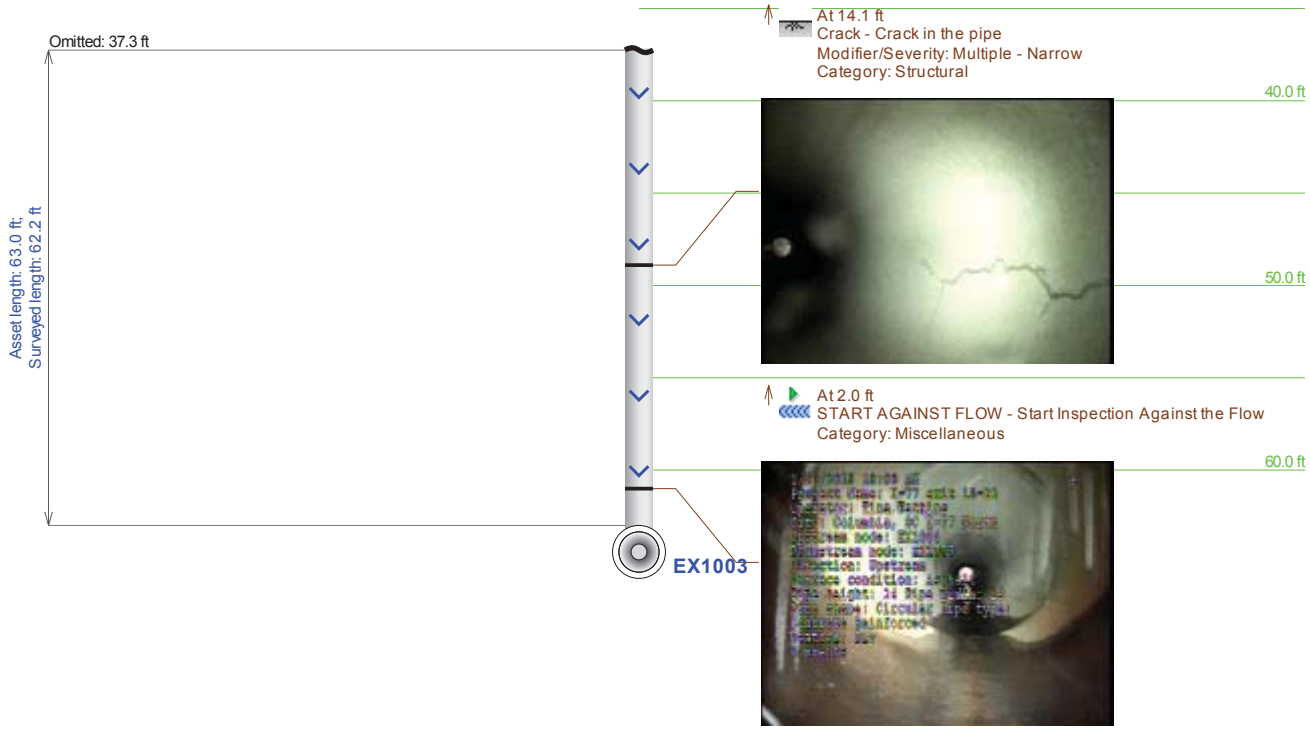
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1005 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 62.2 | Tina Watkins | |



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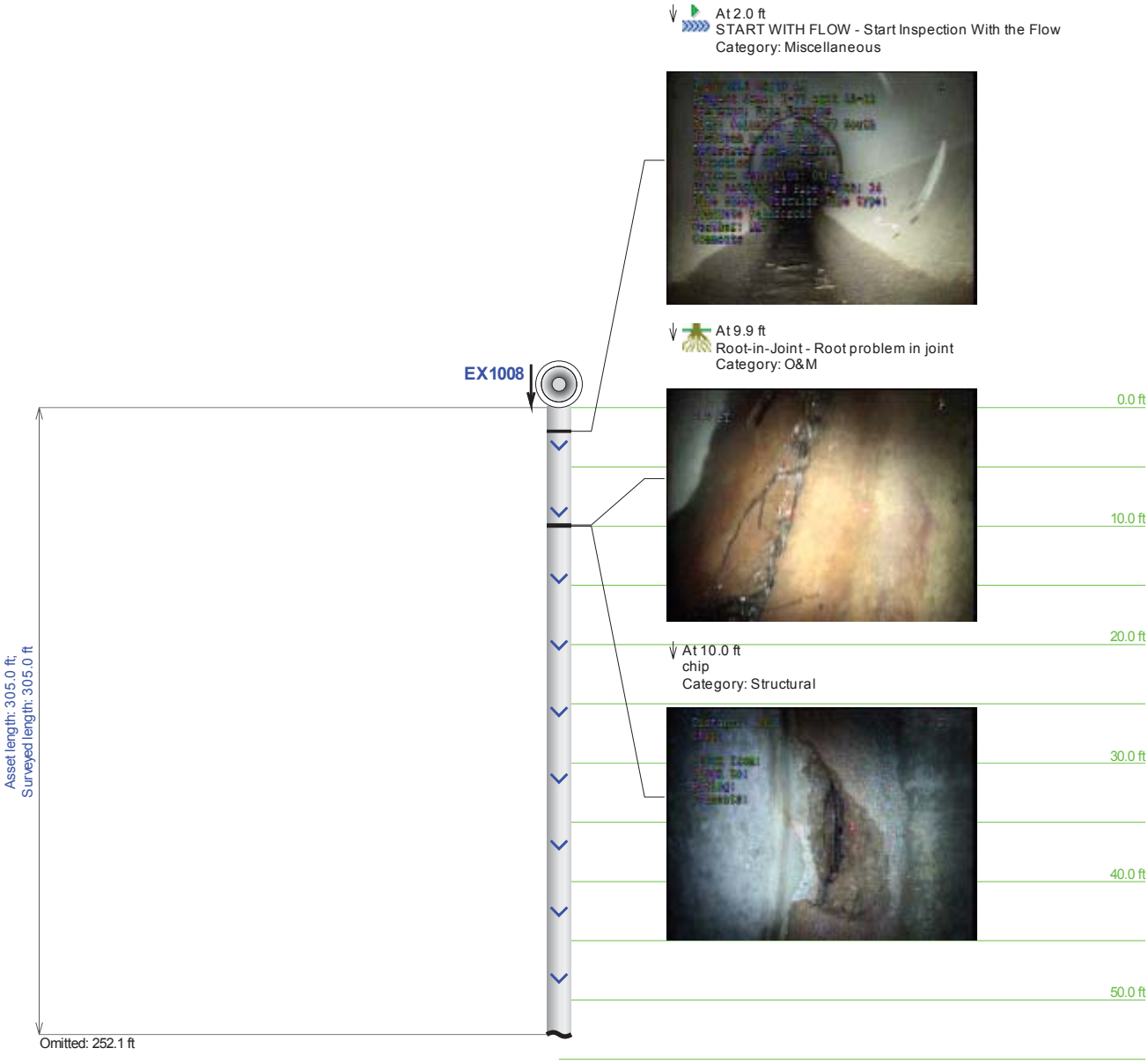
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1006 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 305.0 | Tina Watkins | |



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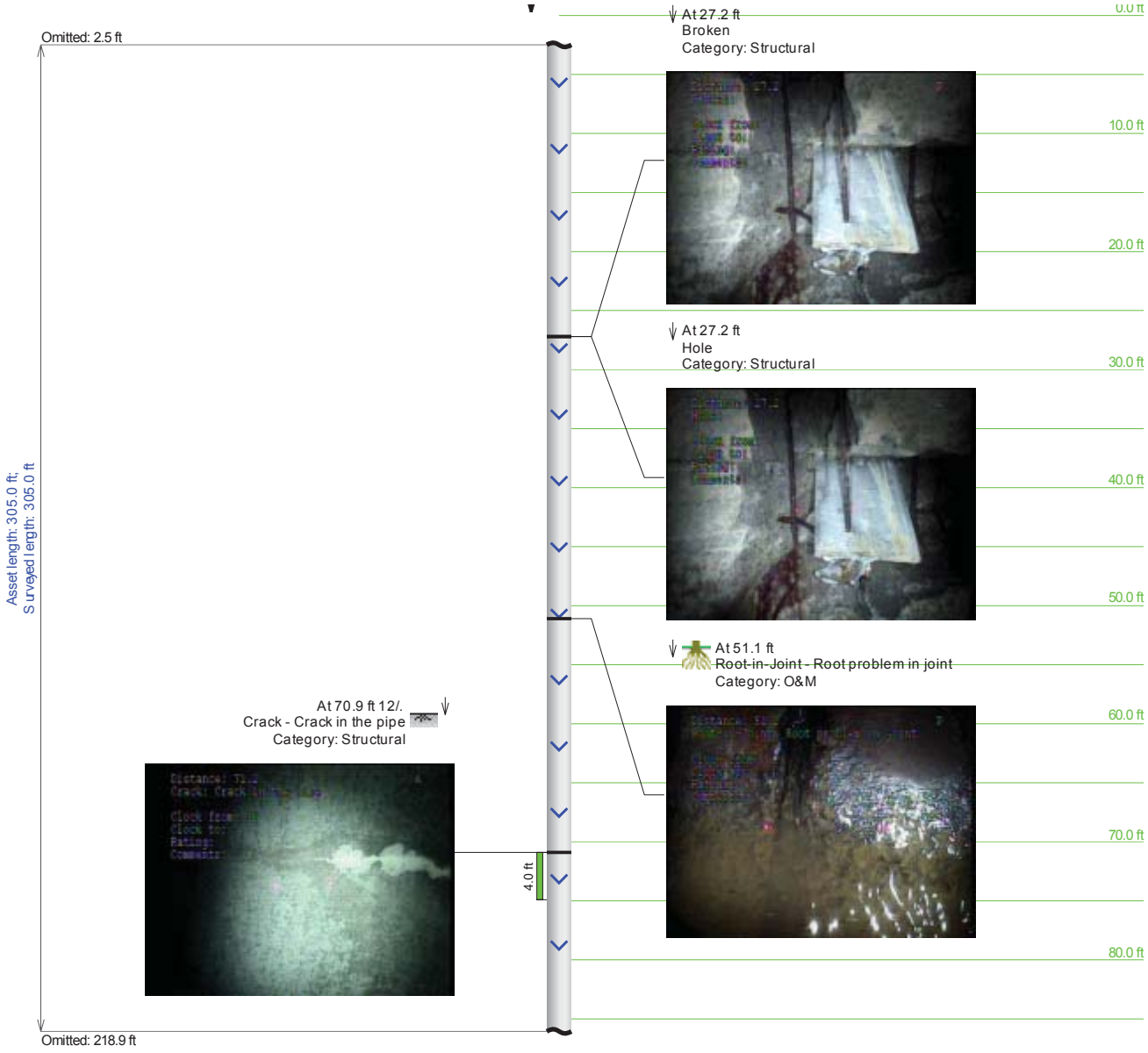
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP100 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 305.0 | Tina Watkins | |



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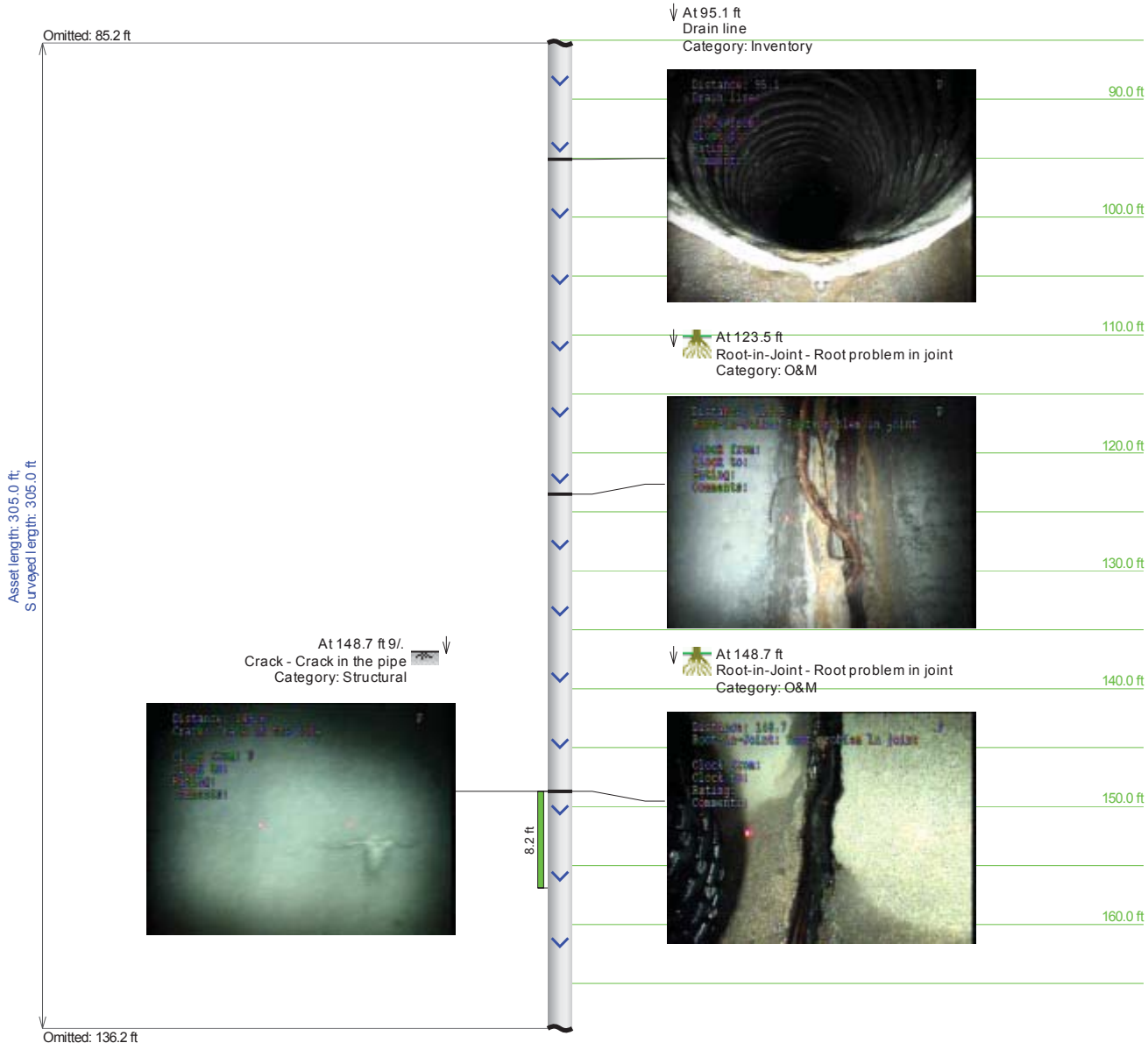
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1006 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 305.0 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1006 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 305.0 | Tina Watkins | |

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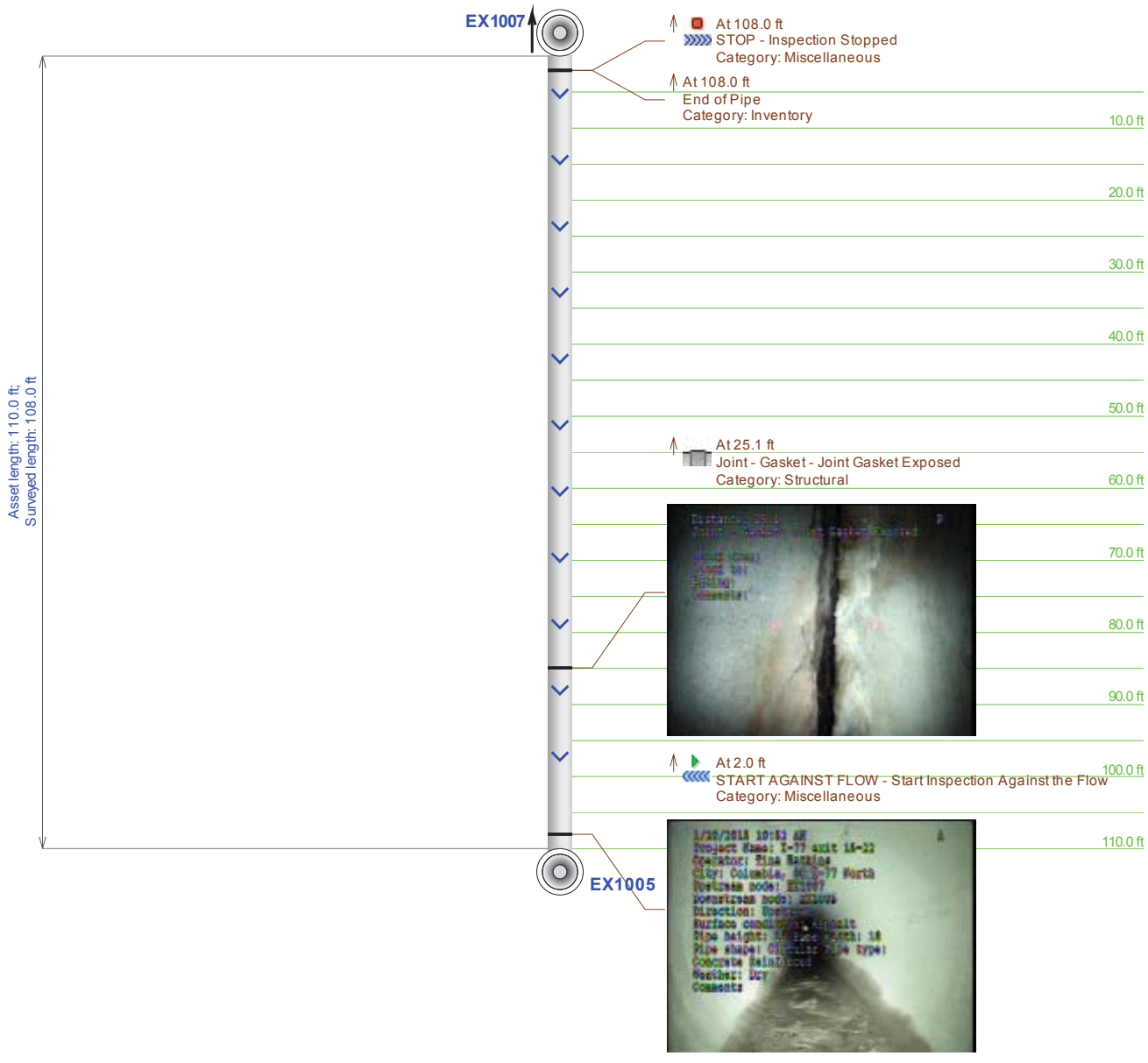
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1007 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 108.0 | Tina Watkins | |



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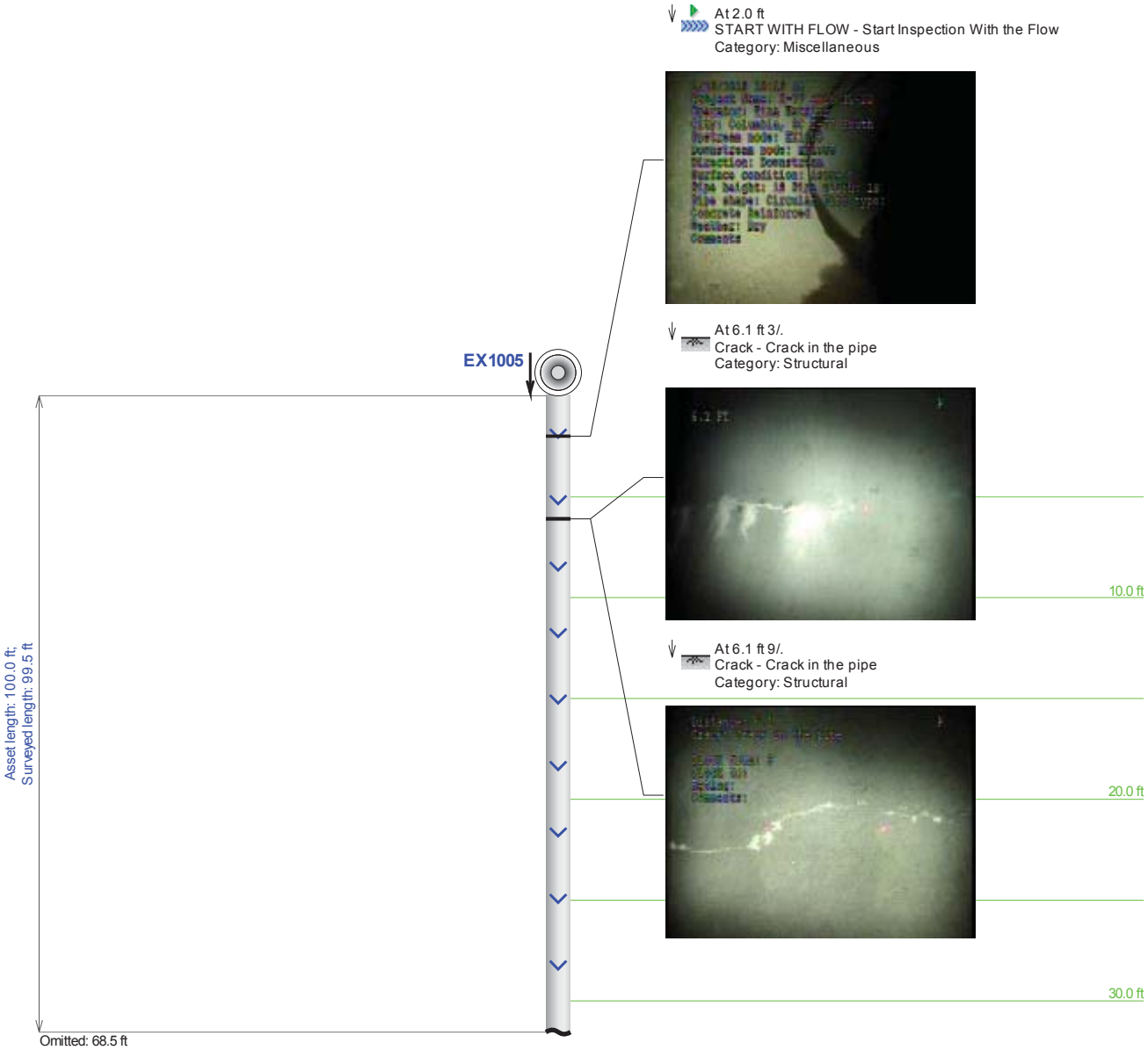
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1008 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 99.5 | Tina Watkins | |



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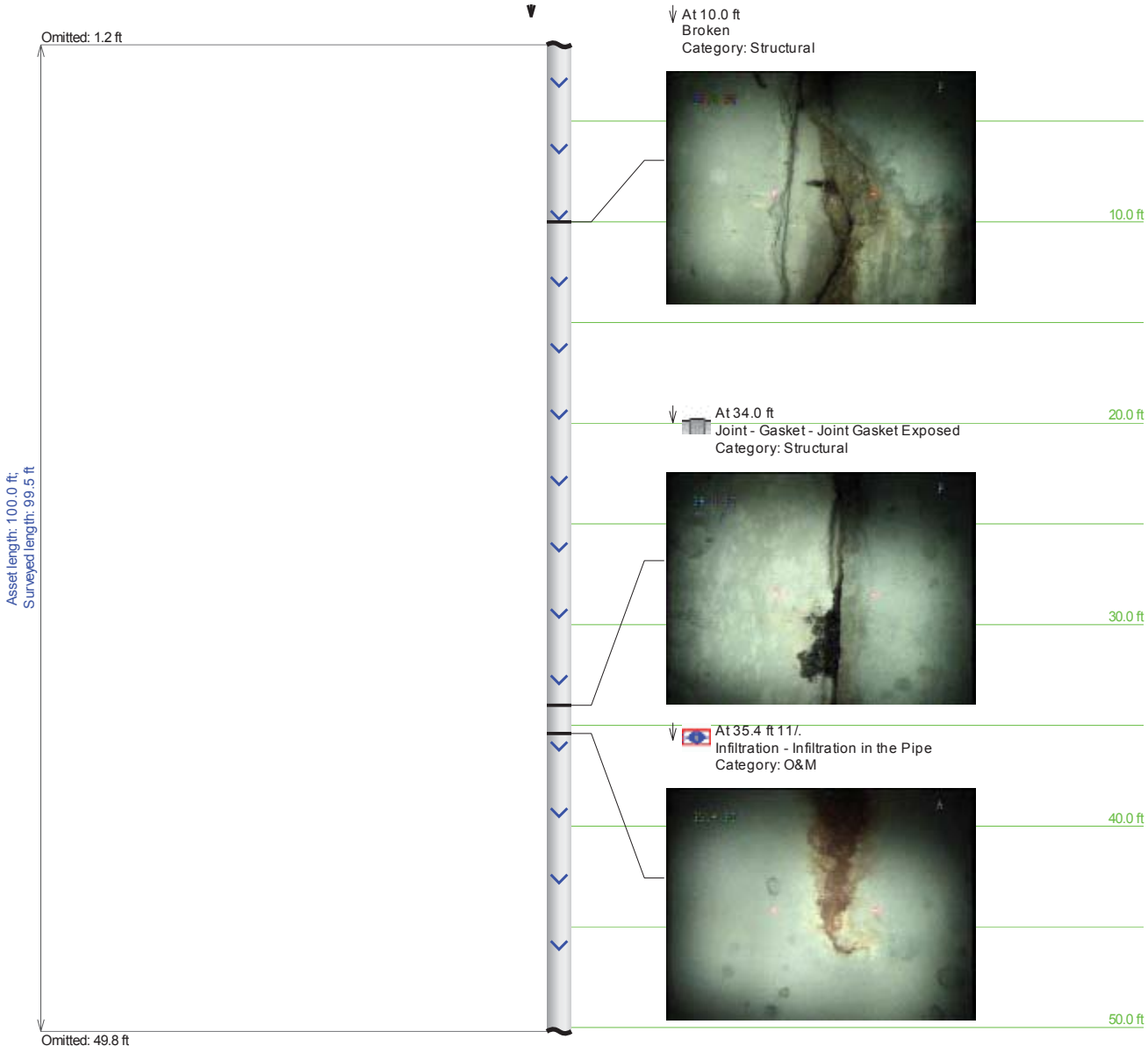
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1008 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 99.5 | Tina Watkins | |



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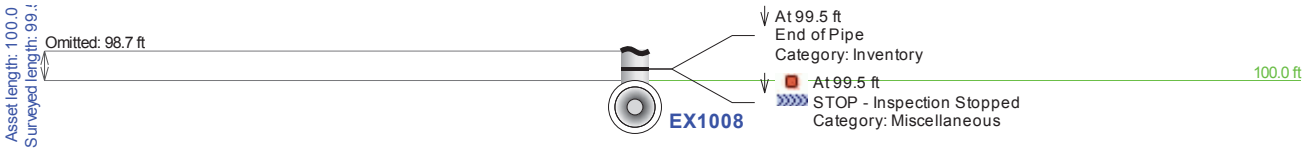
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1008 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 99.5 | Tina Watkins | |



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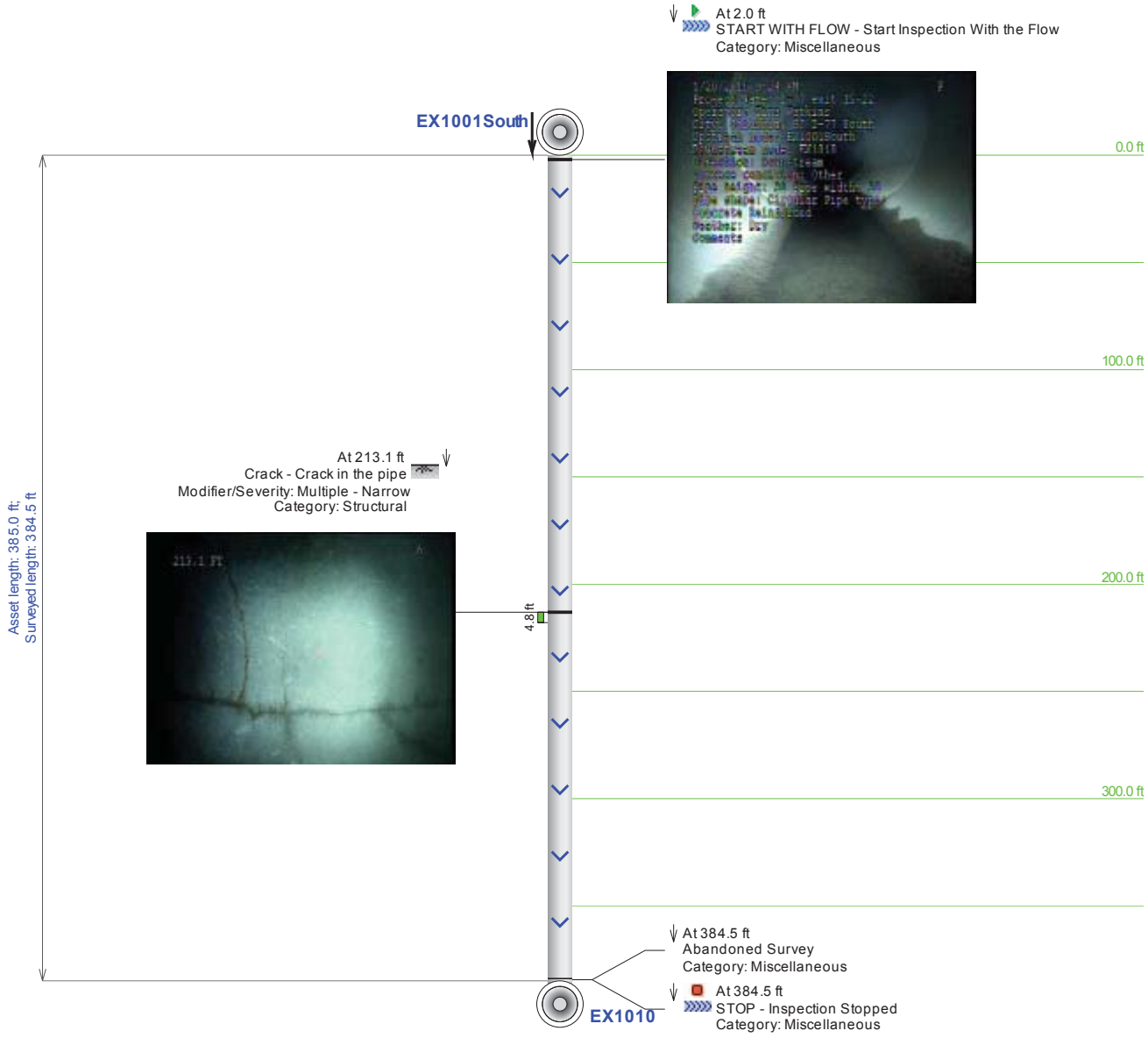
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1010 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 30 | 30 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 384.5 | Tina Watkins | |



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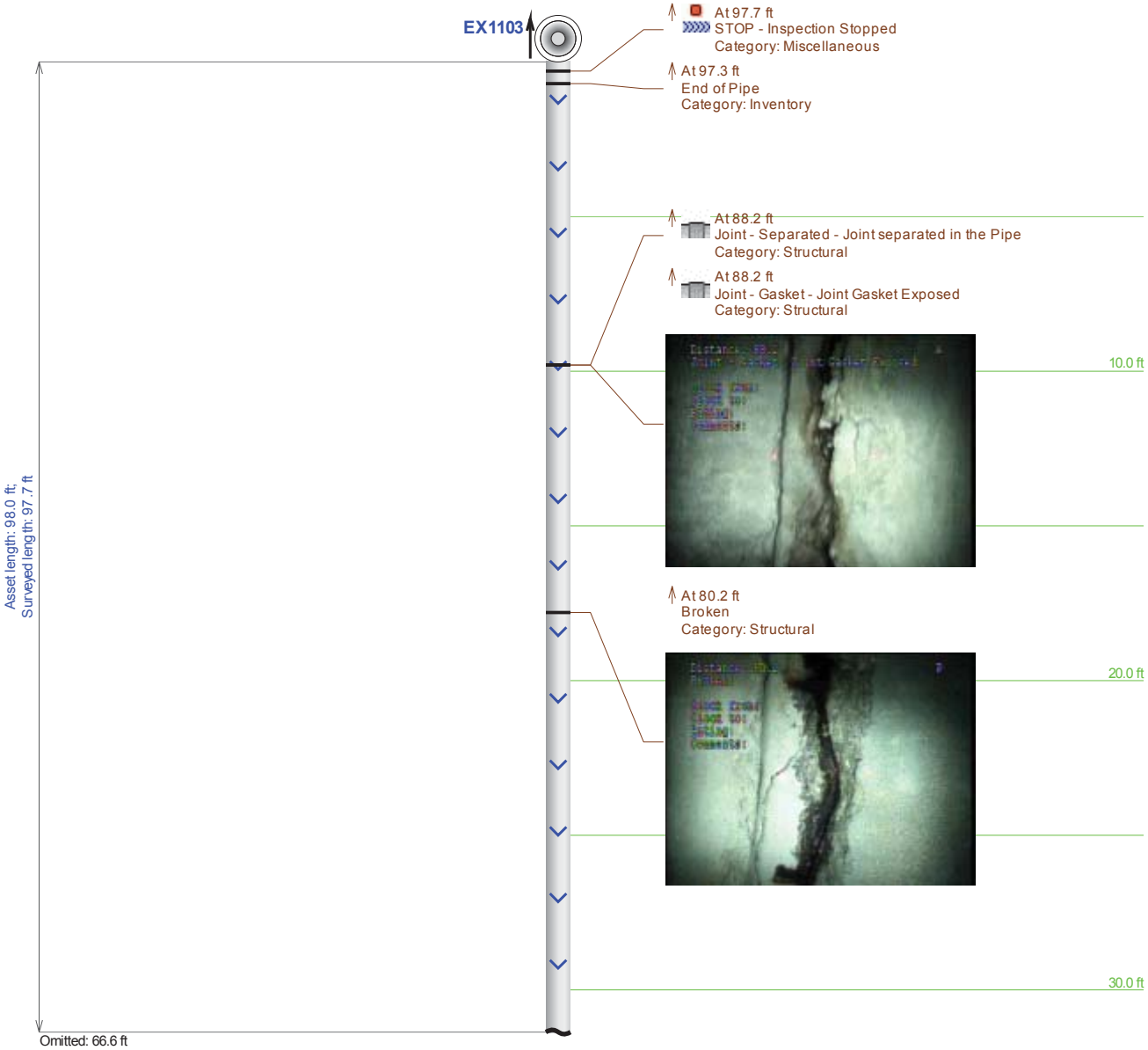
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1101 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 97.7 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1101 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 97.7 | Tina Watkins | |

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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1101 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 97.7 | Tina Watkins | |

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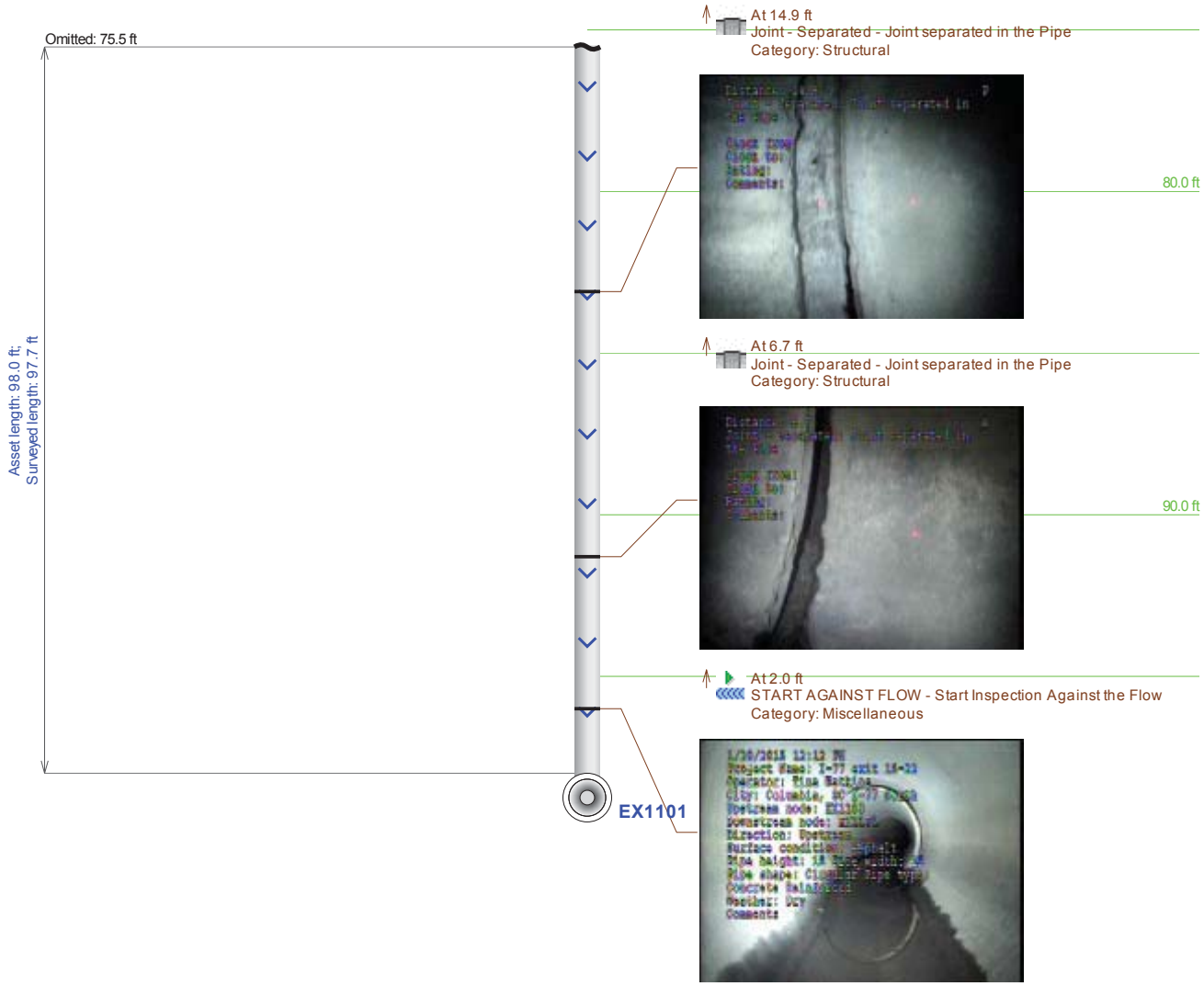
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1101 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 97.7 | Tina Watkins | |



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# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1102 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 91.3 | Tina Watkins | |

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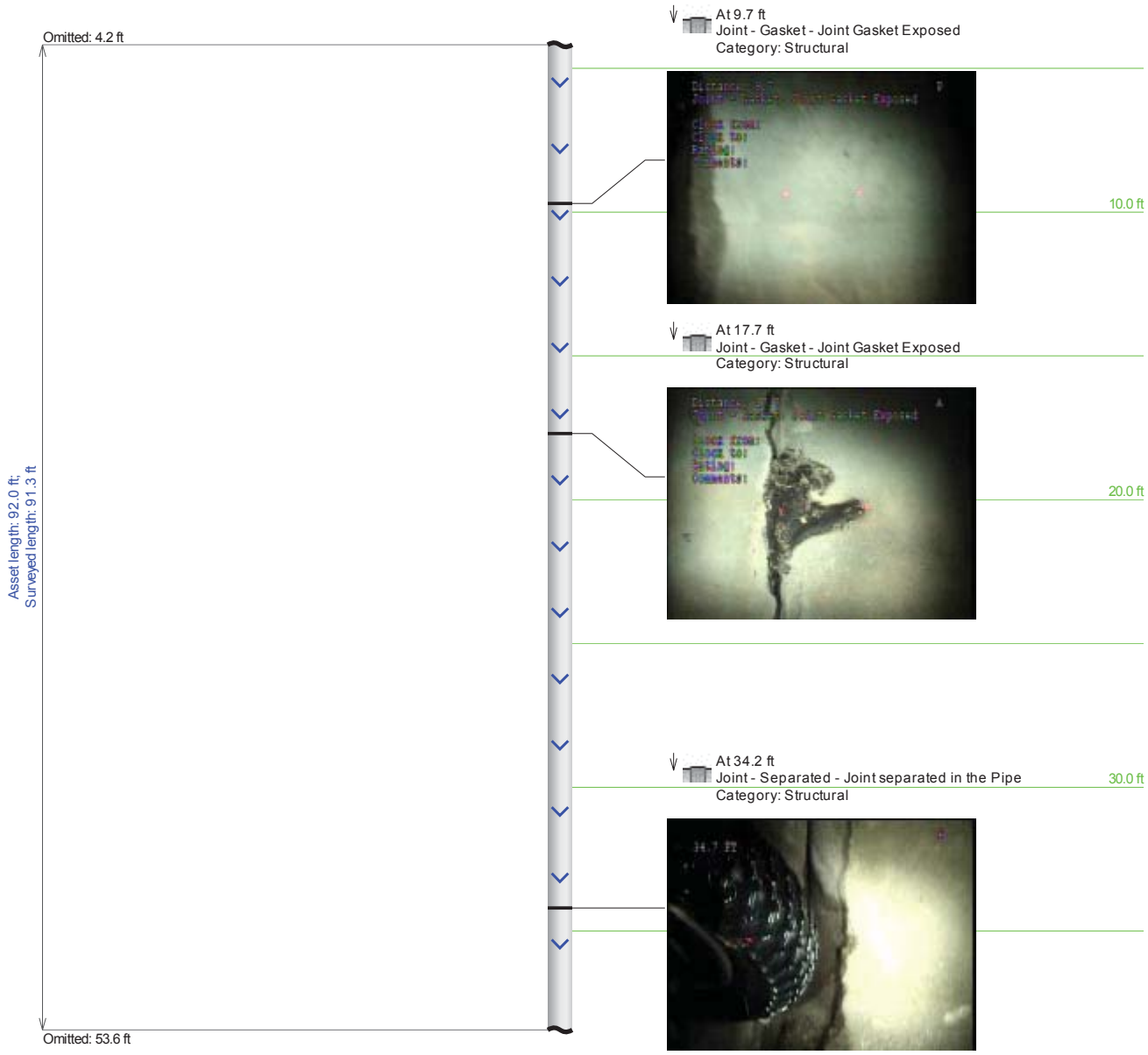
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1102 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 91.3 | Tina Watkins | |



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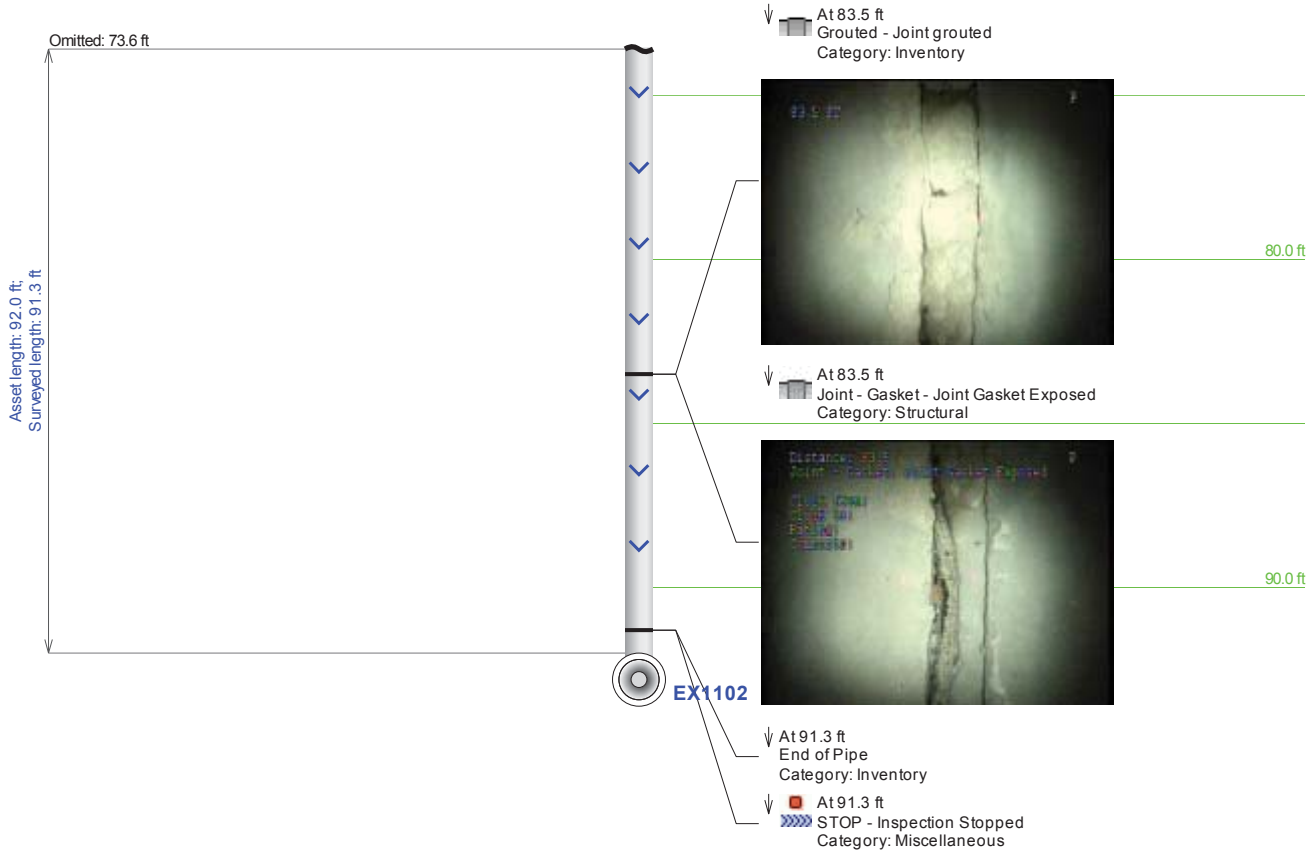
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1102 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 91.3 | Tina Watkins | |



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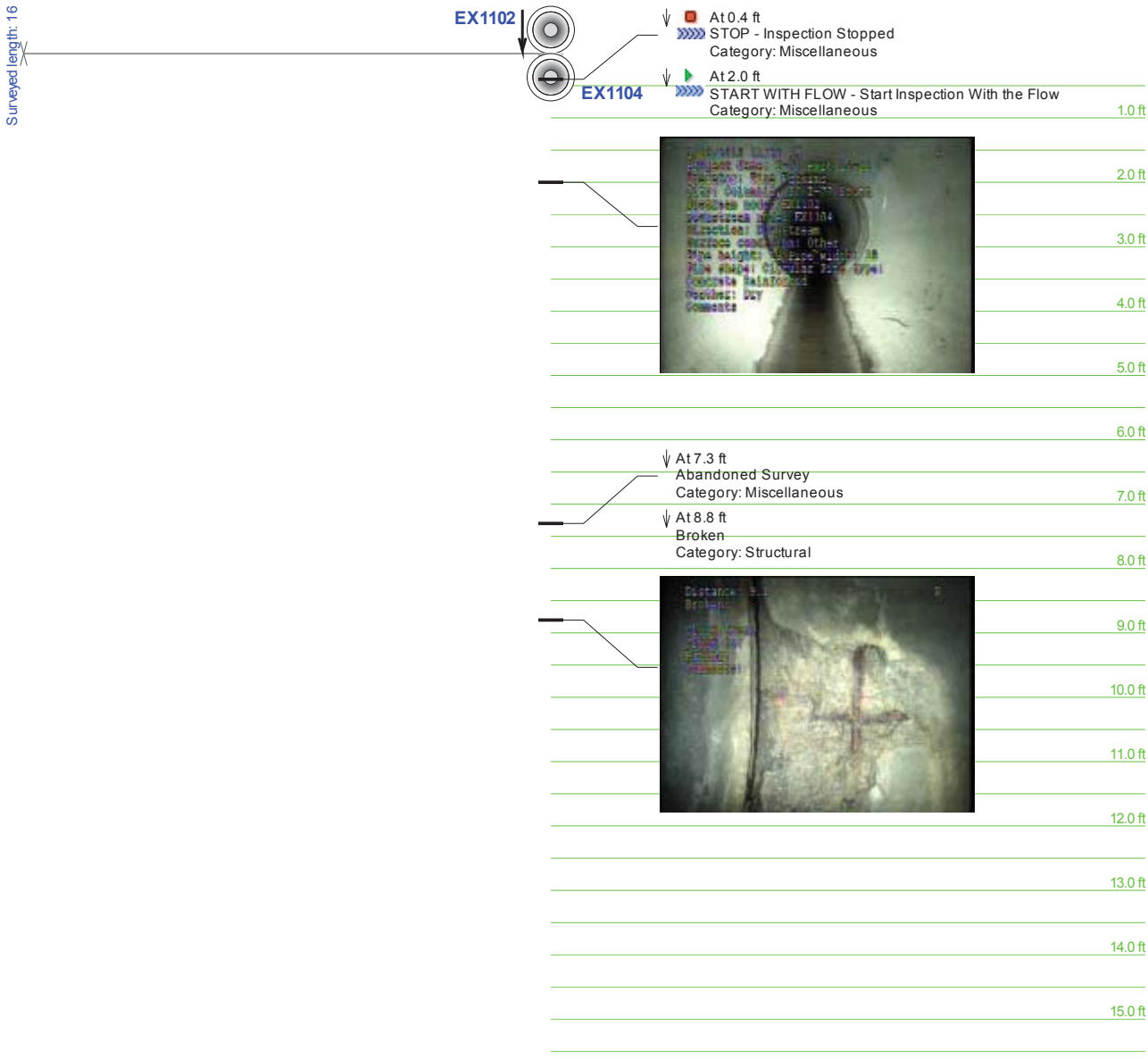
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1103 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 16.8 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1103 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 16.8 | Tina Watkins | |

At 16.8 ft
Broken
Category: Structural

15.0 ft

16.0 ft

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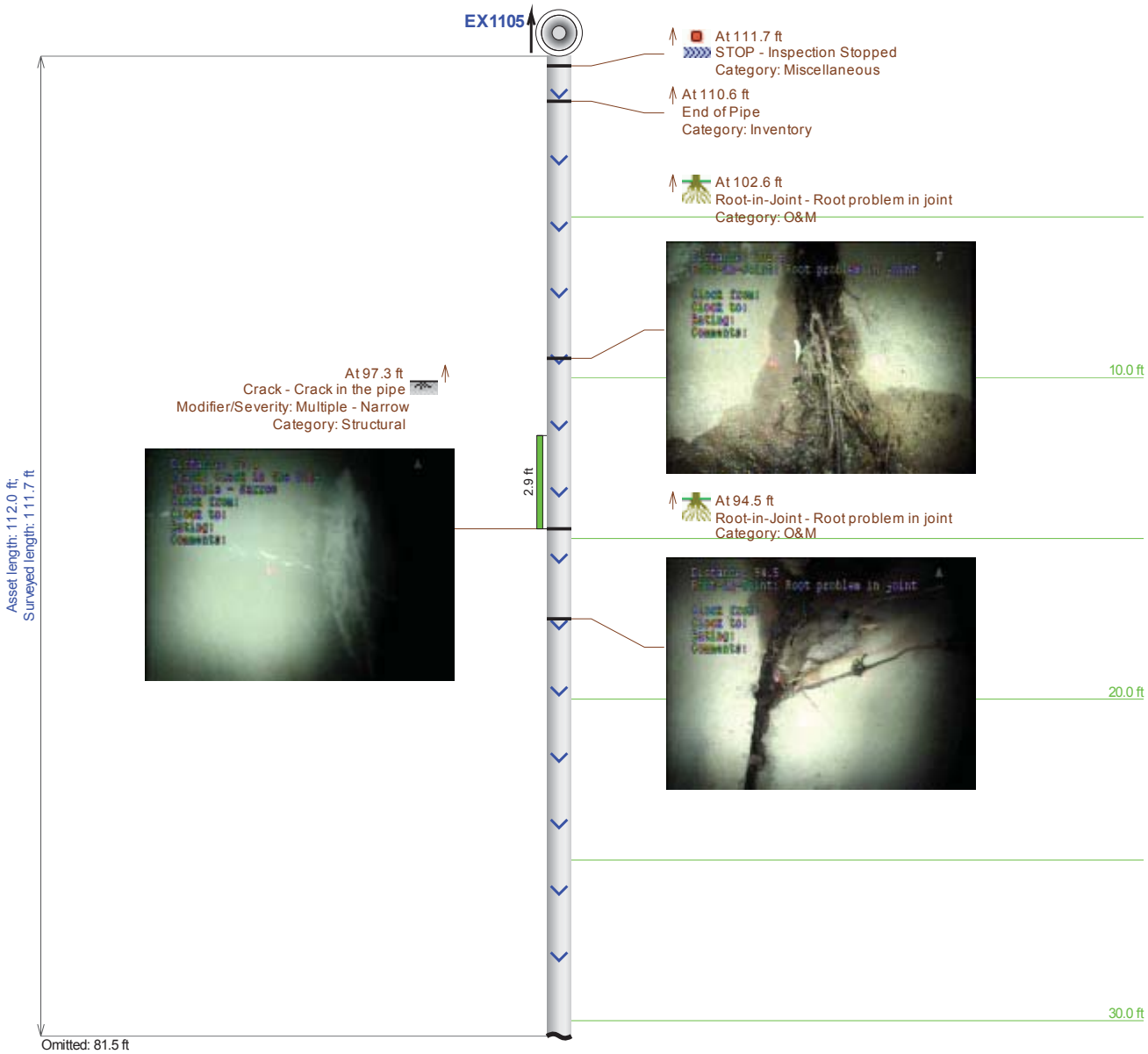
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1104 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 111.7 | Tina Watkins | |



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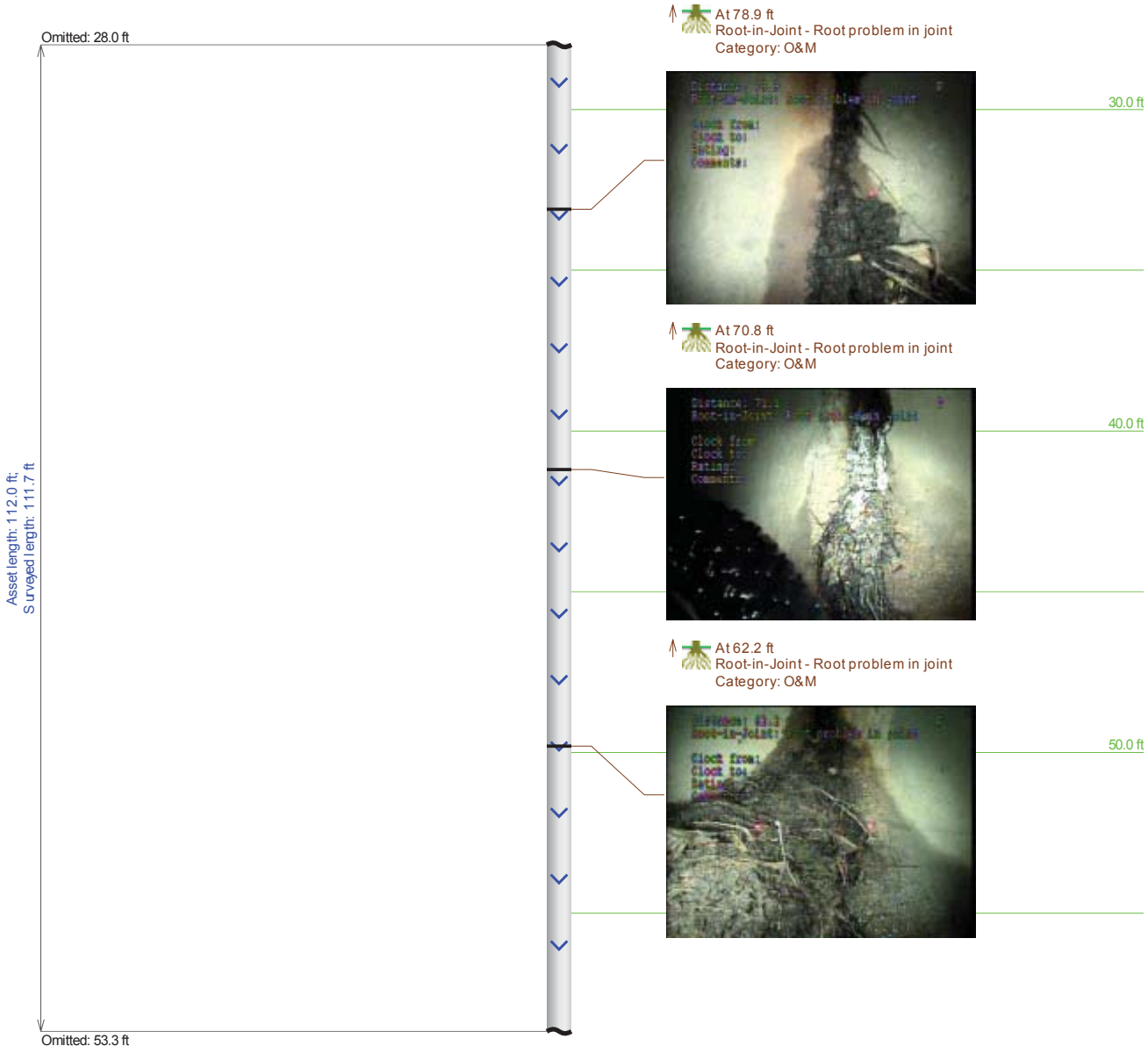
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1104 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 111.7 | Tina Watkins | |



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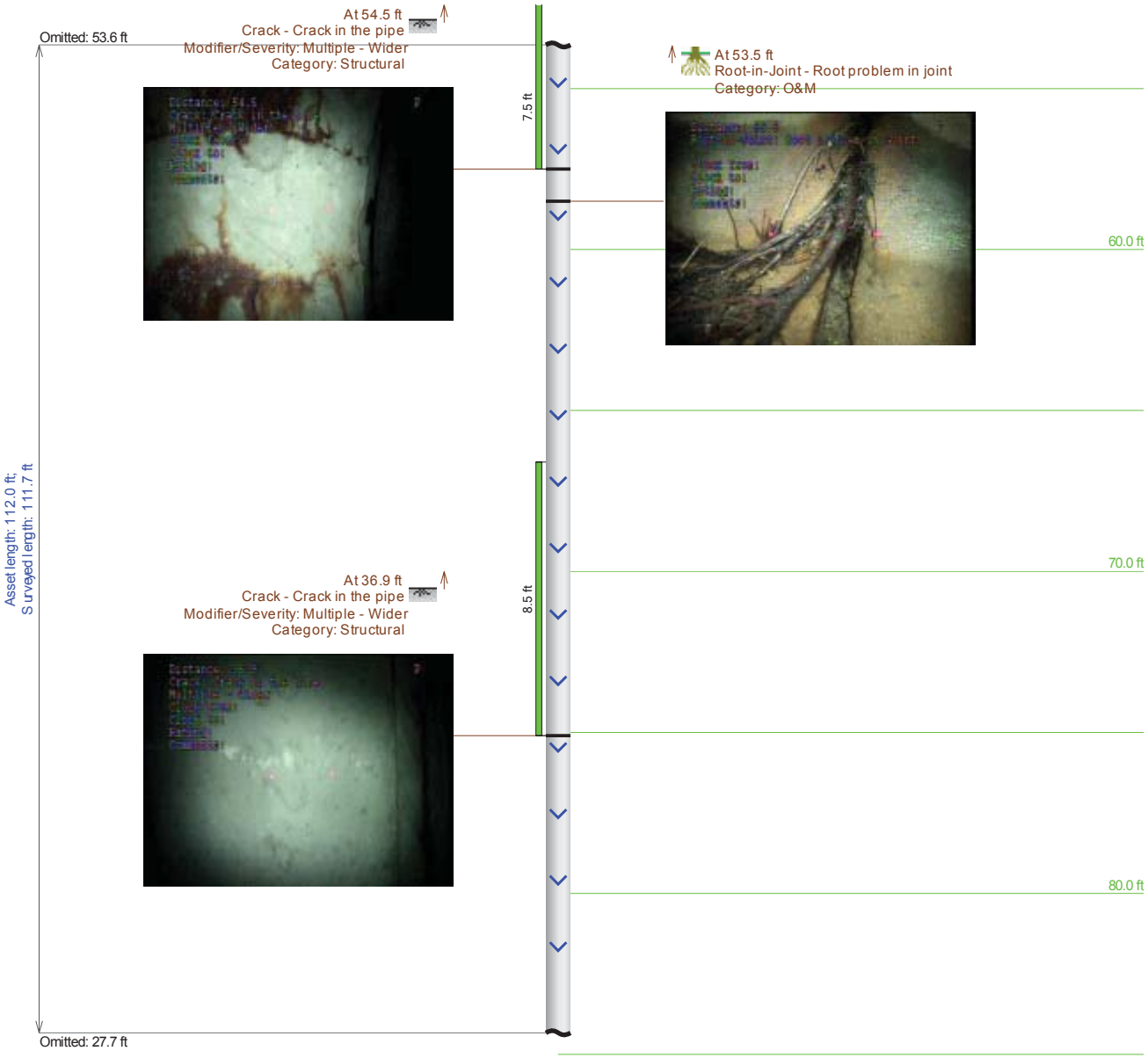
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1104 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 111.7 | Tina Watkins | |



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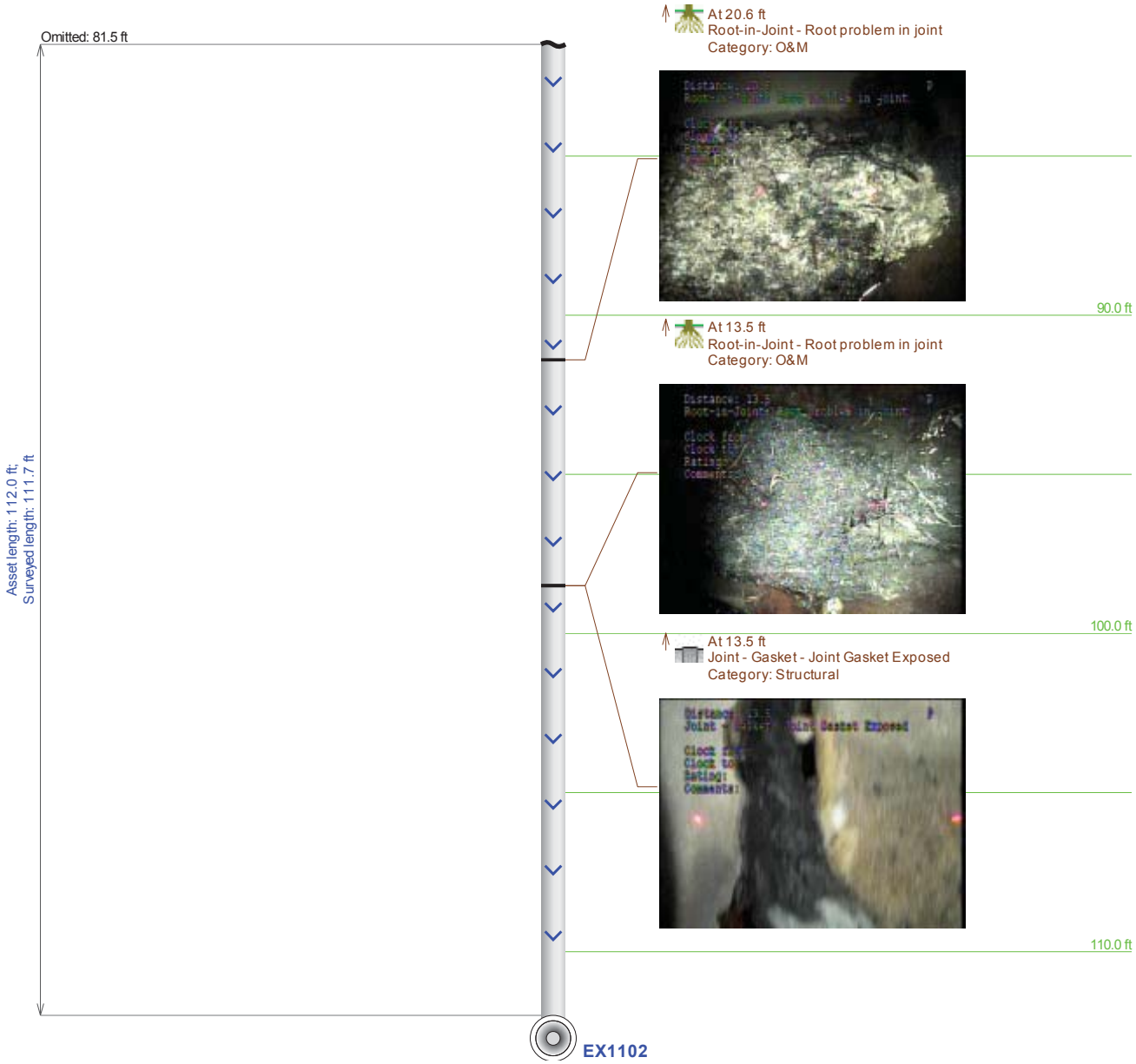
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1104 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 111.7 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1104 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 111.7 | Tina Watkins | |

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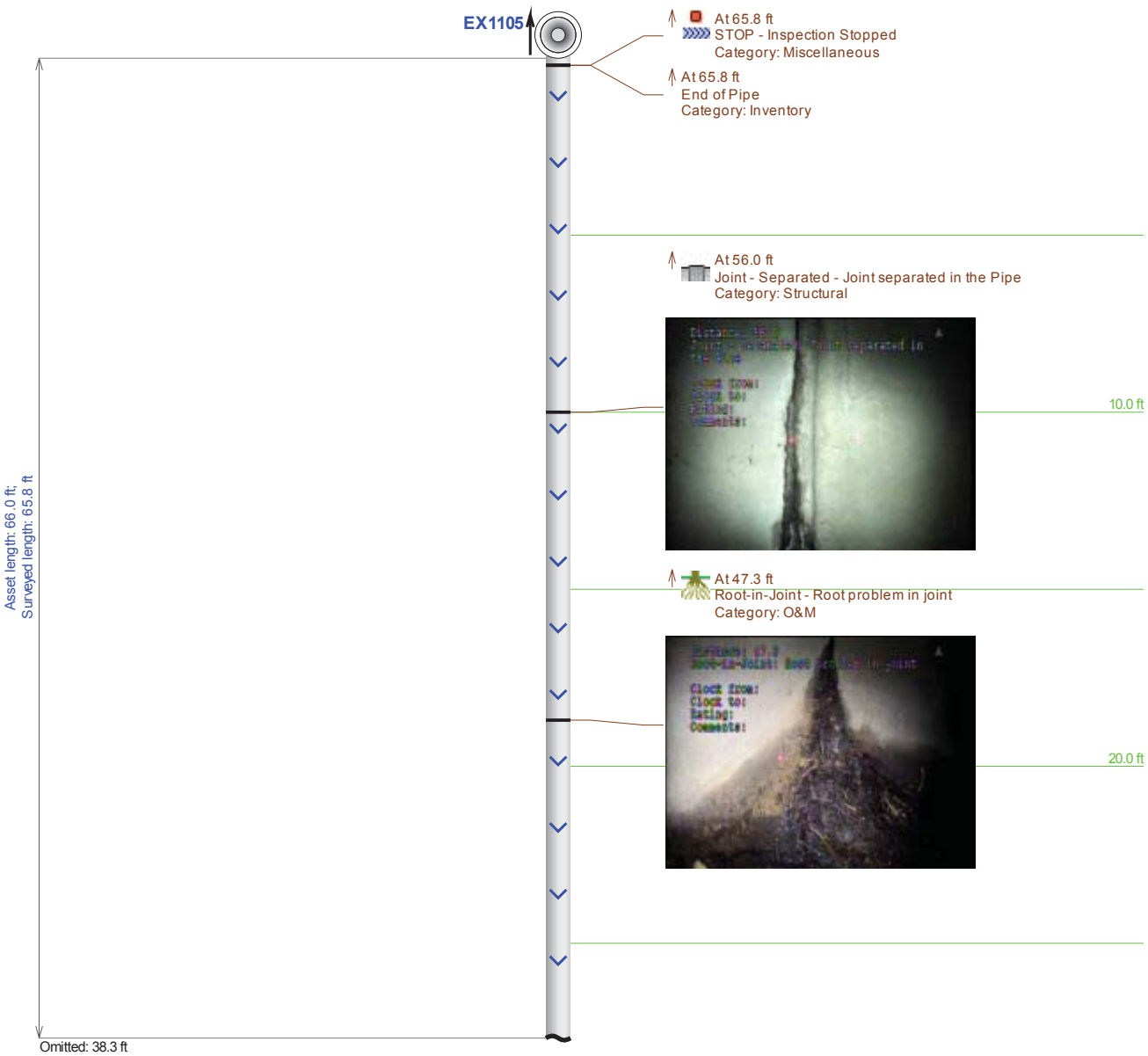
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1105 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 65.8 | Tina Watkins | |



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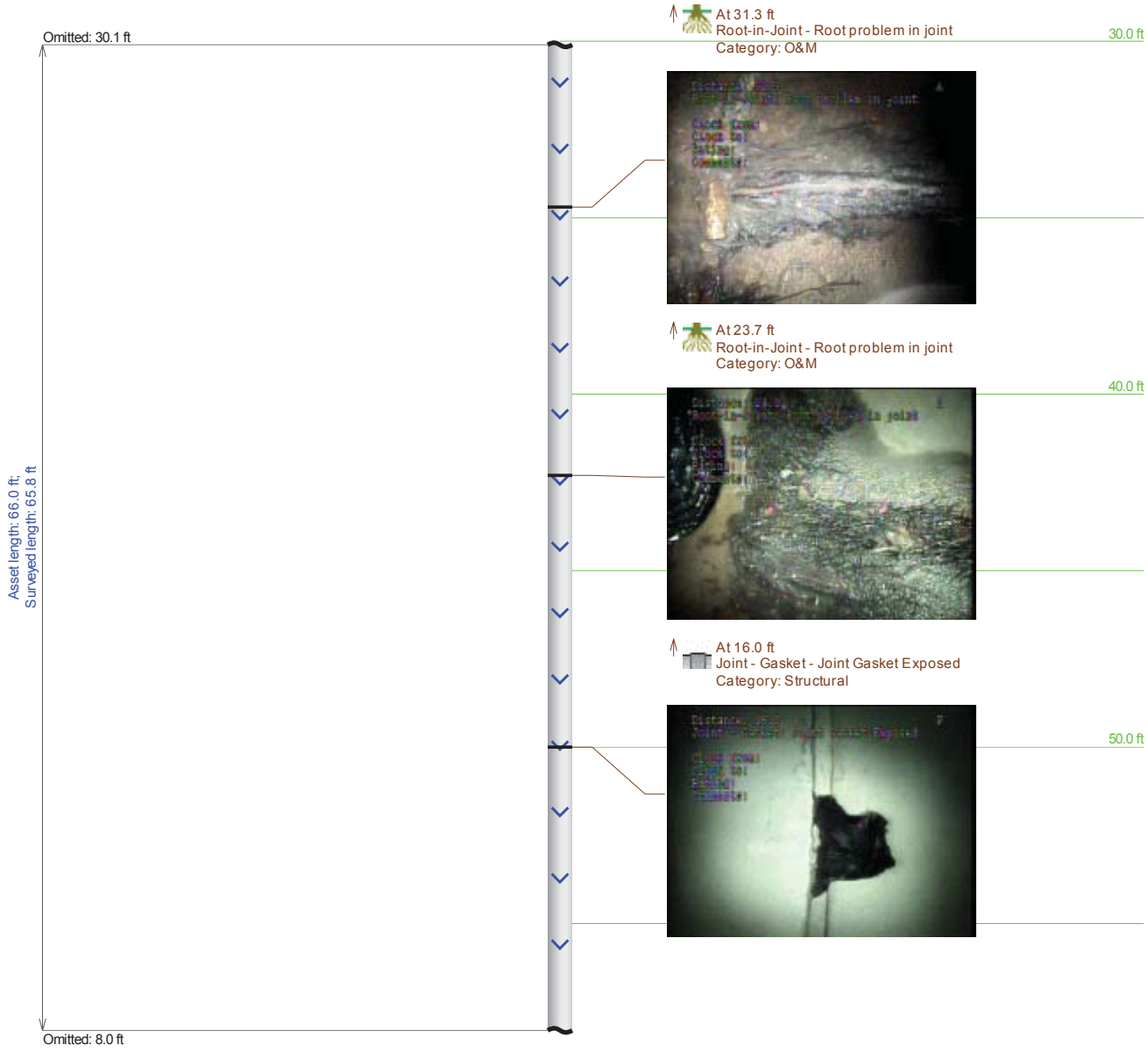
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1105 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 65.8 | Tina Watkins | |



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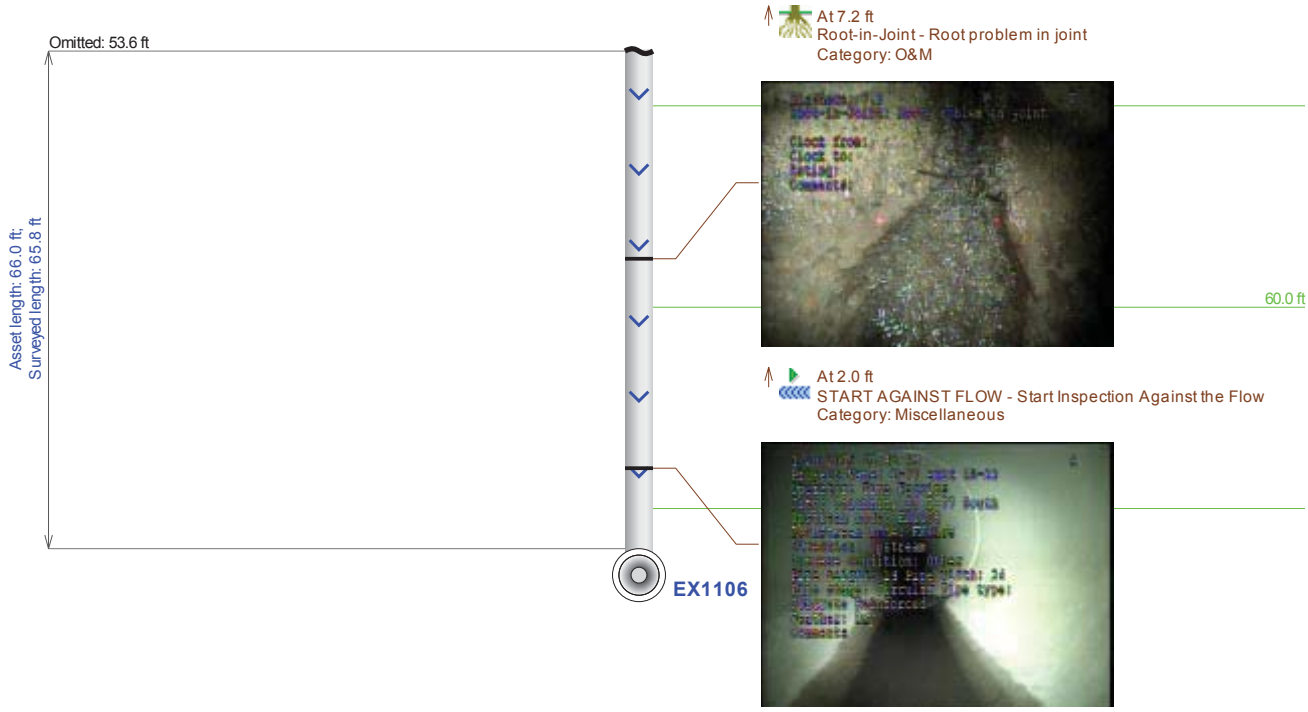
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1105 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 65.8 | Tina Watkins | |



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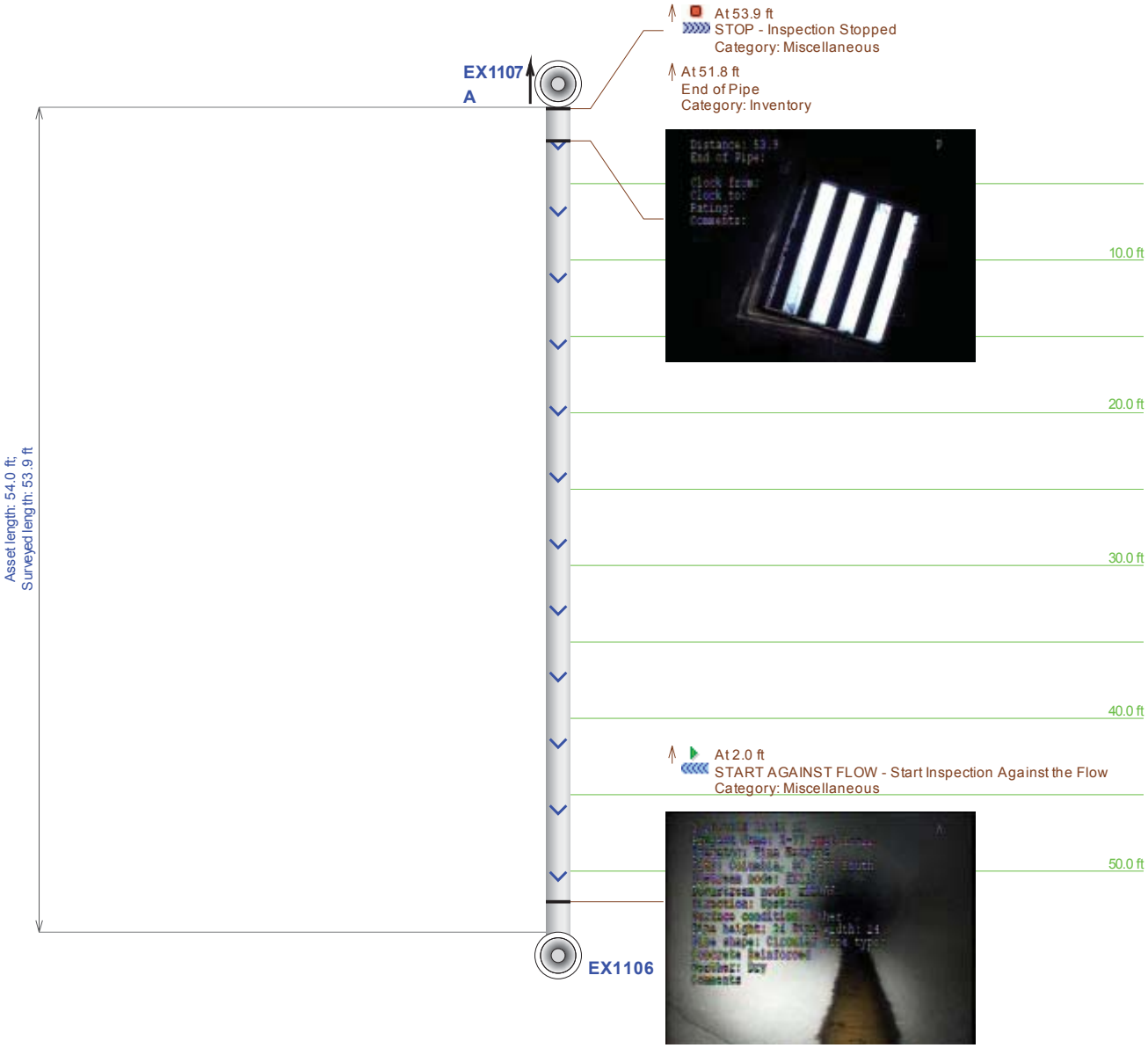
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1106 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 53.9 | Tina Watkins | |



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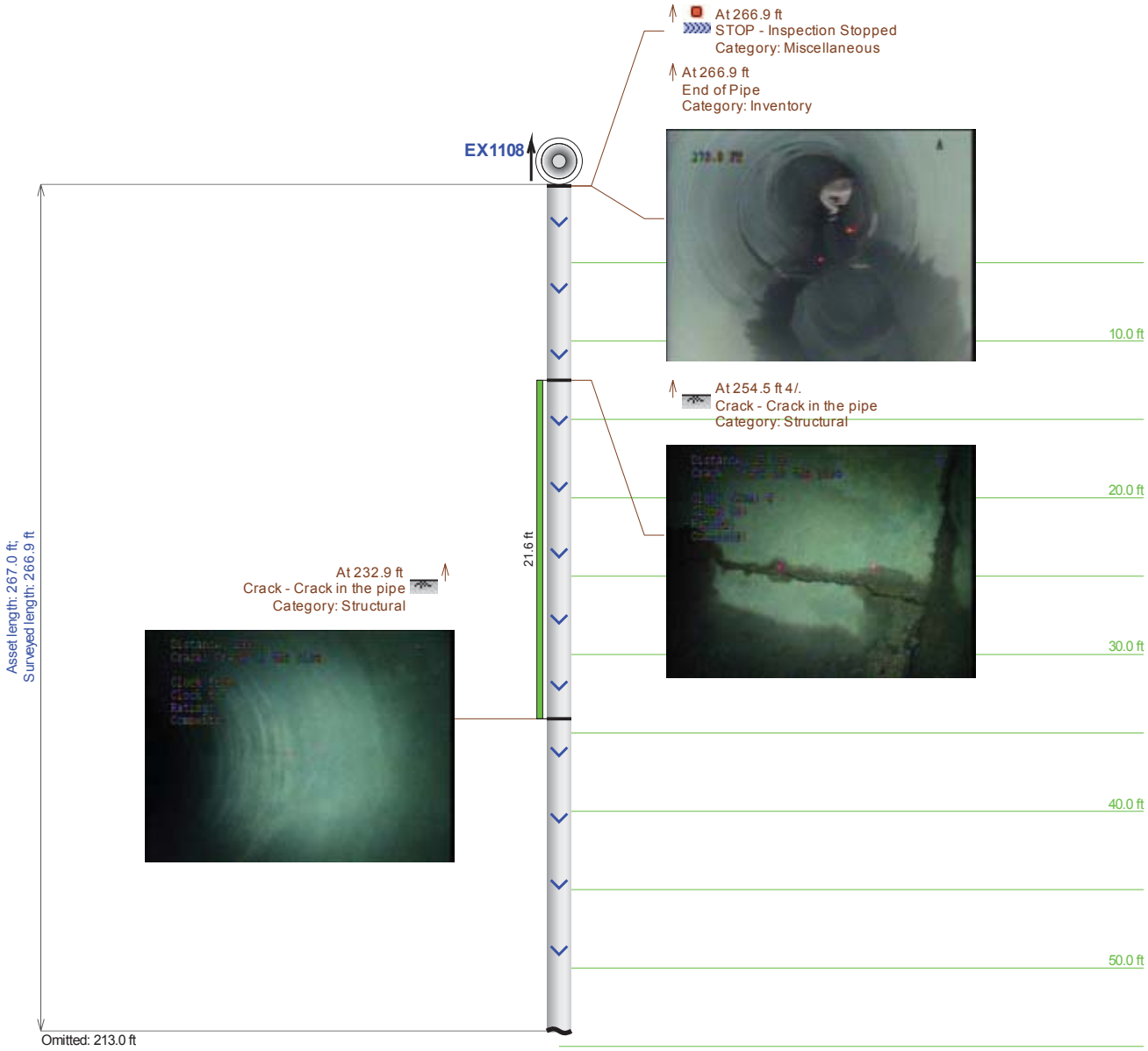
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1111 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 266.9 | Tina Watkins | |



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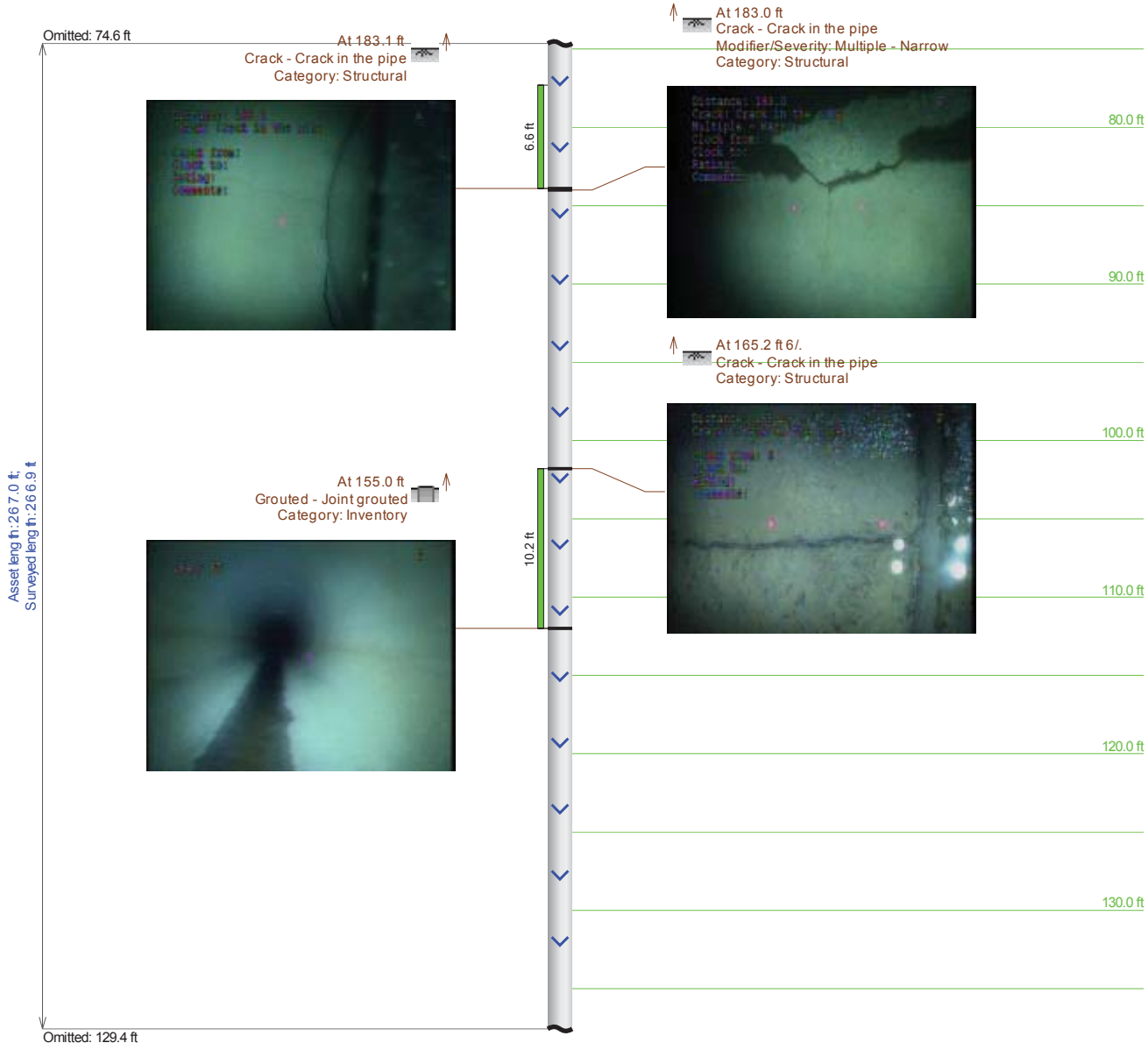
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1111 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 266.9 | Tina Watkins | |



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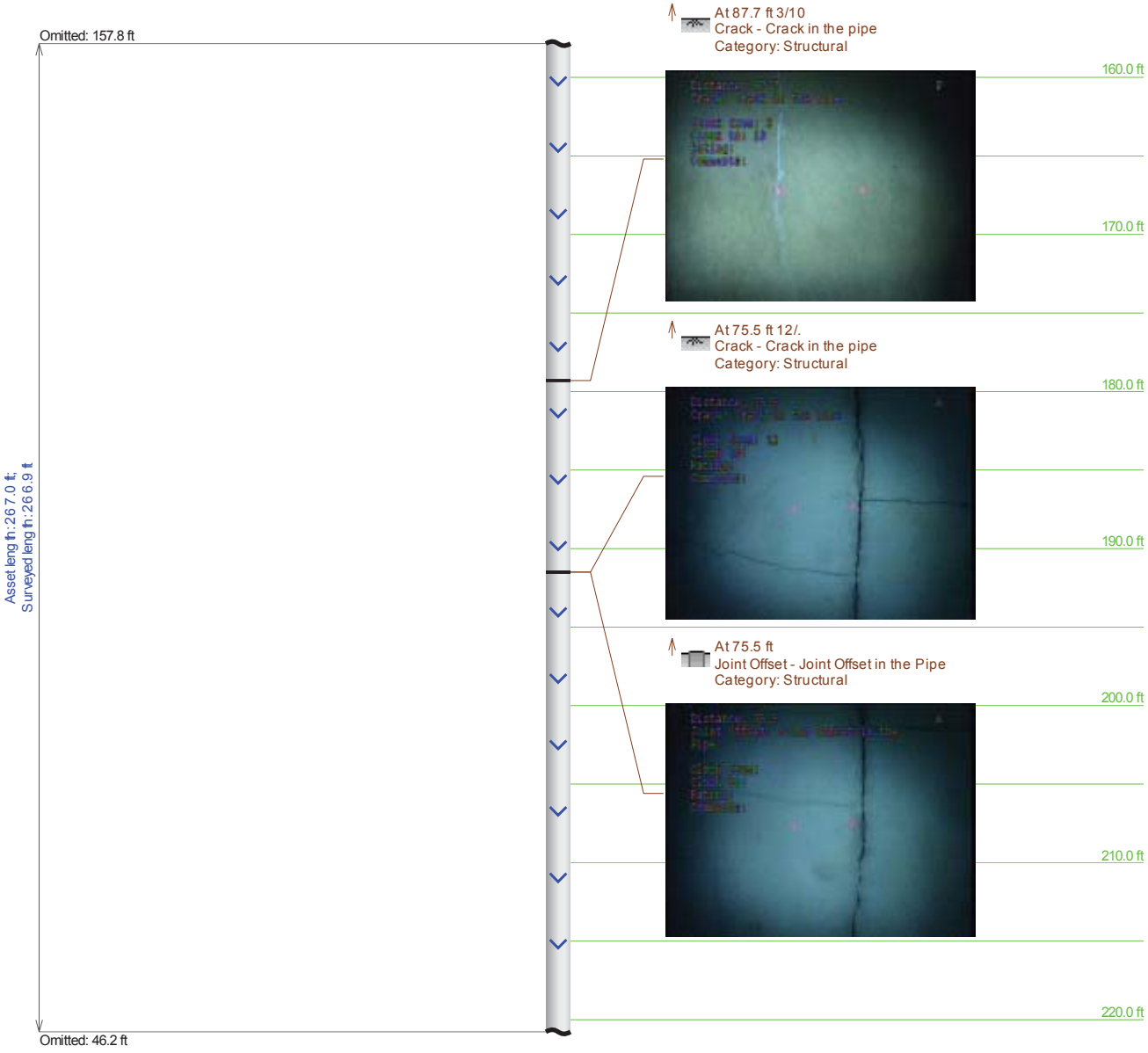
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1111 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 266.9 | Tina Watkins | |



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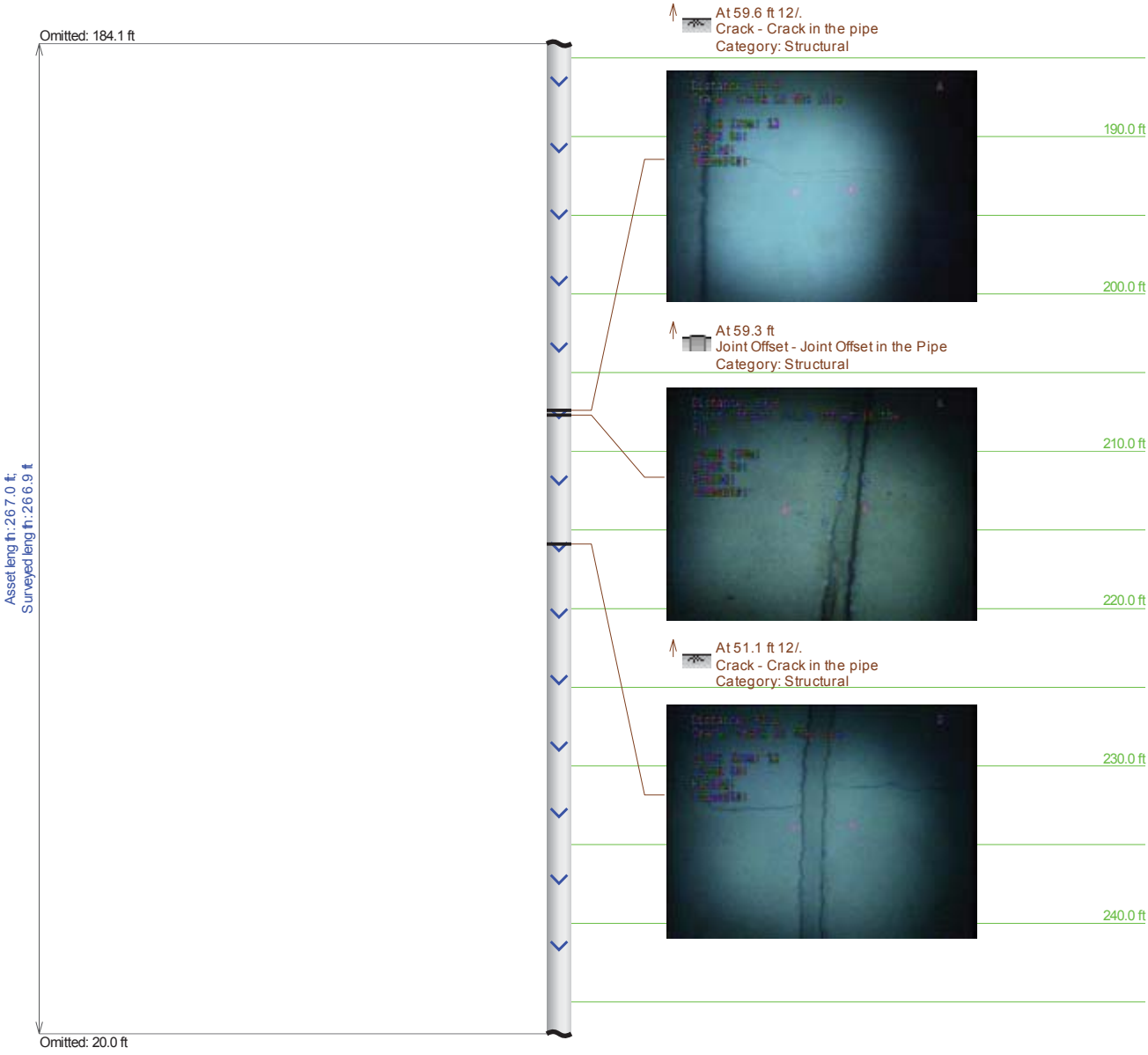
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1111 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 266.9 | Tina Watkins | |



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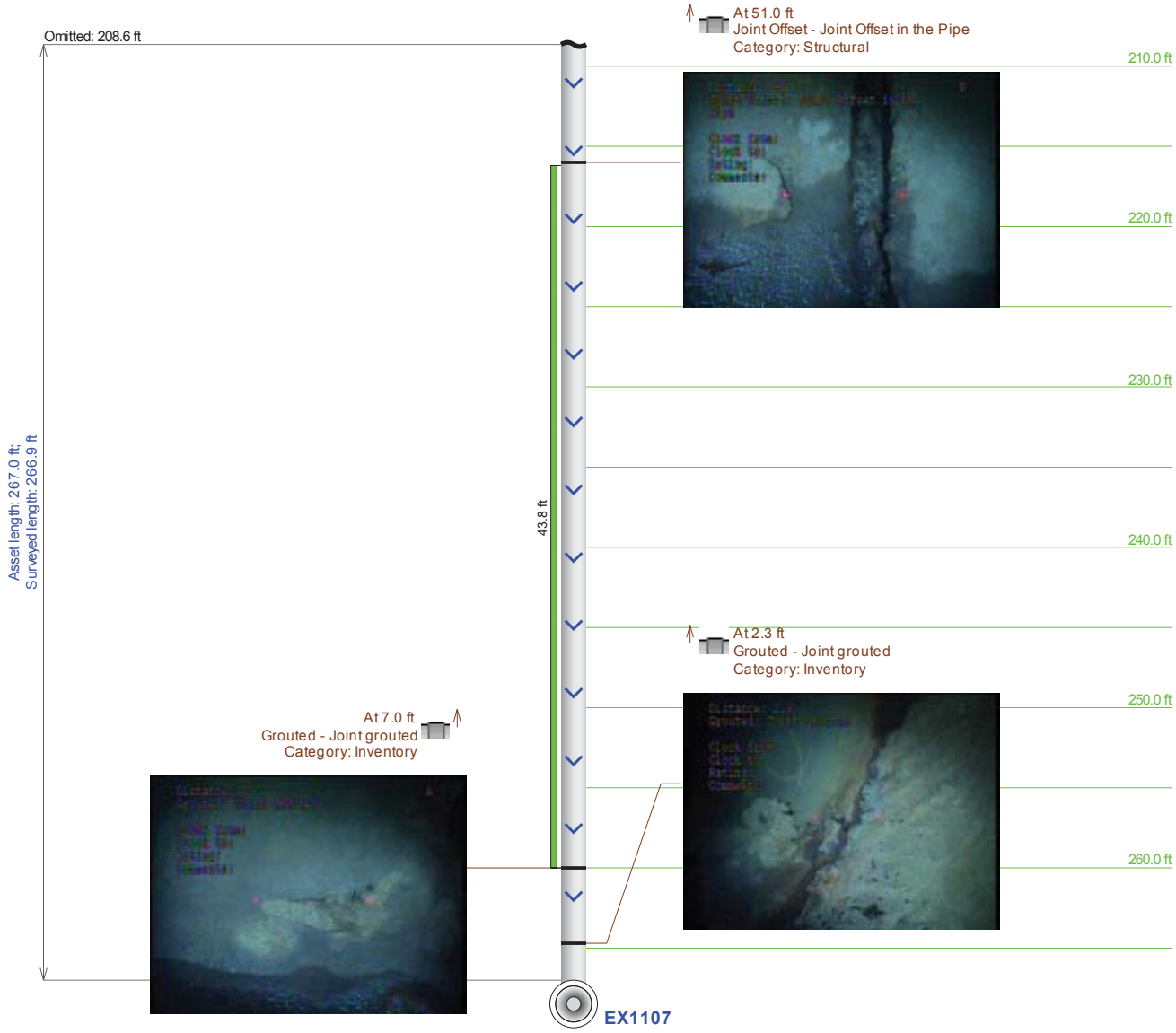
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1111 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 266.9 | Tina Watkins | |



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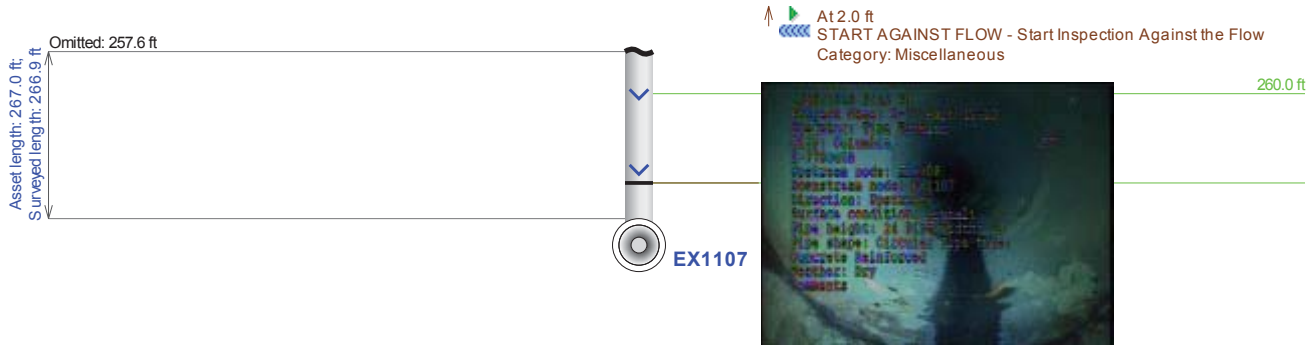
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1111 | Columbia, SC | I-77South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 266.9 | Tina Watkins | |



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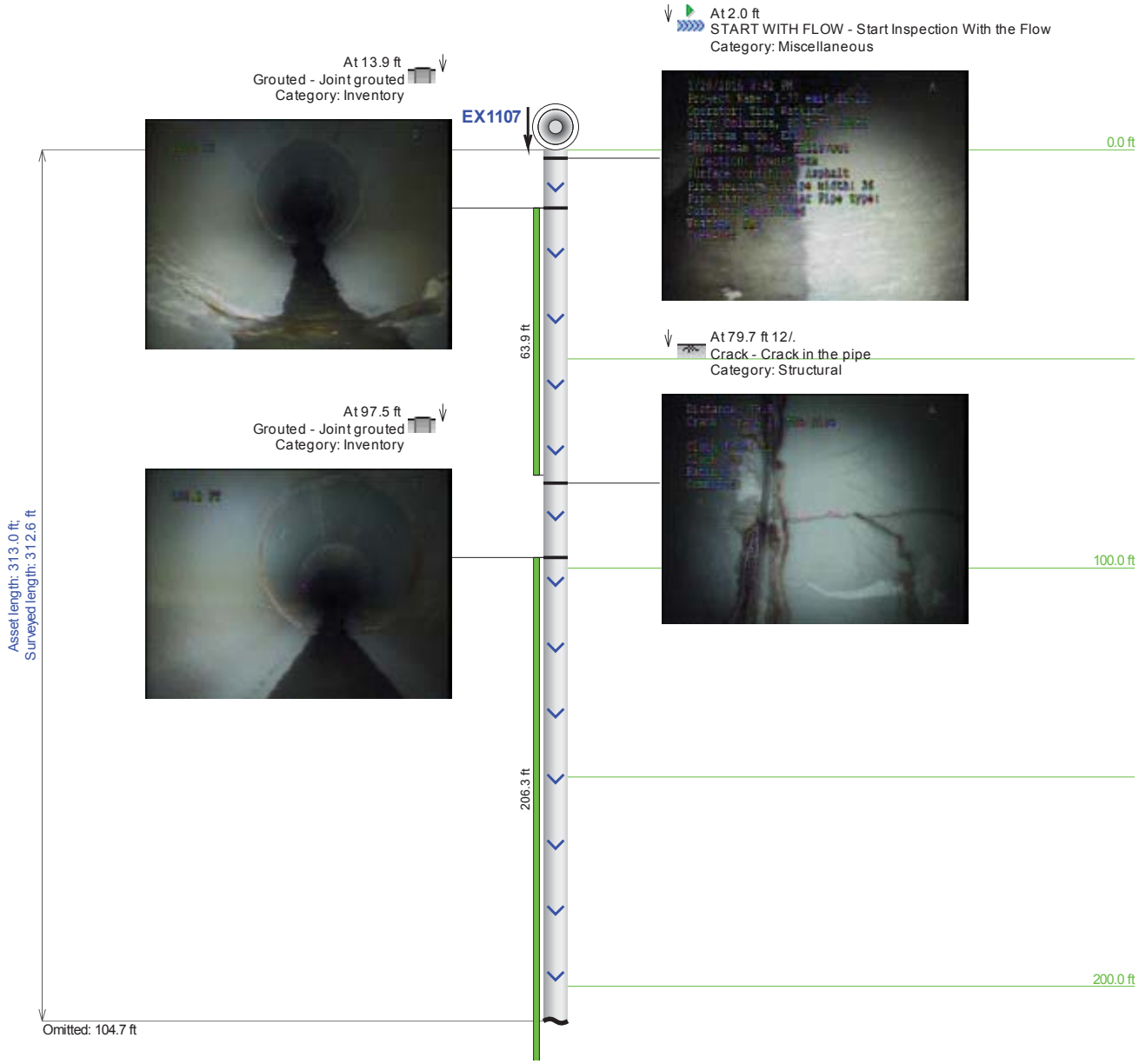
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1114 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 36 | 36 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 312.6 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1114 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 36 | 36 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 312.6 | Tina Watkins | |

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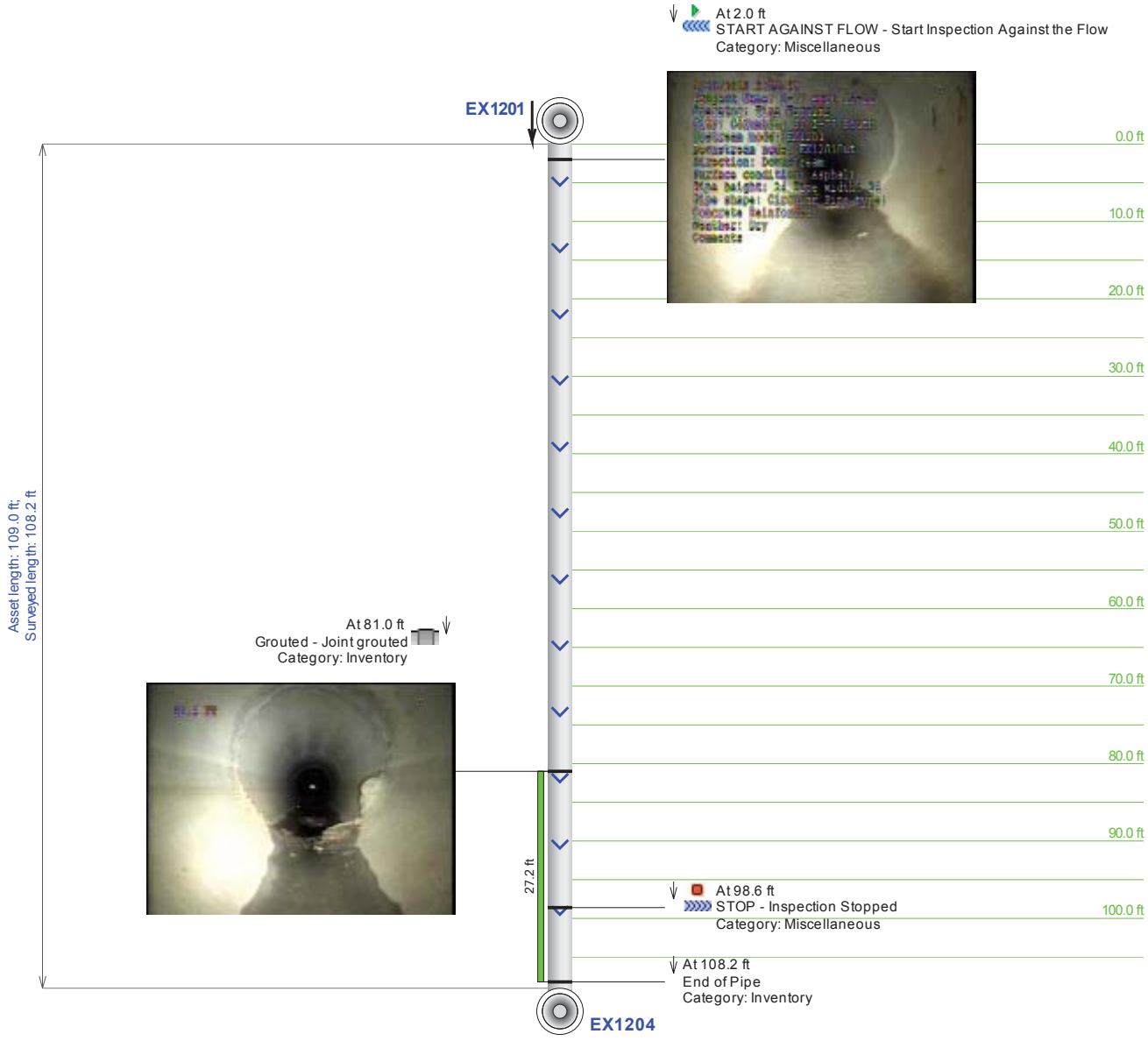
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1201 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 108.2 | Tina Watkins | |



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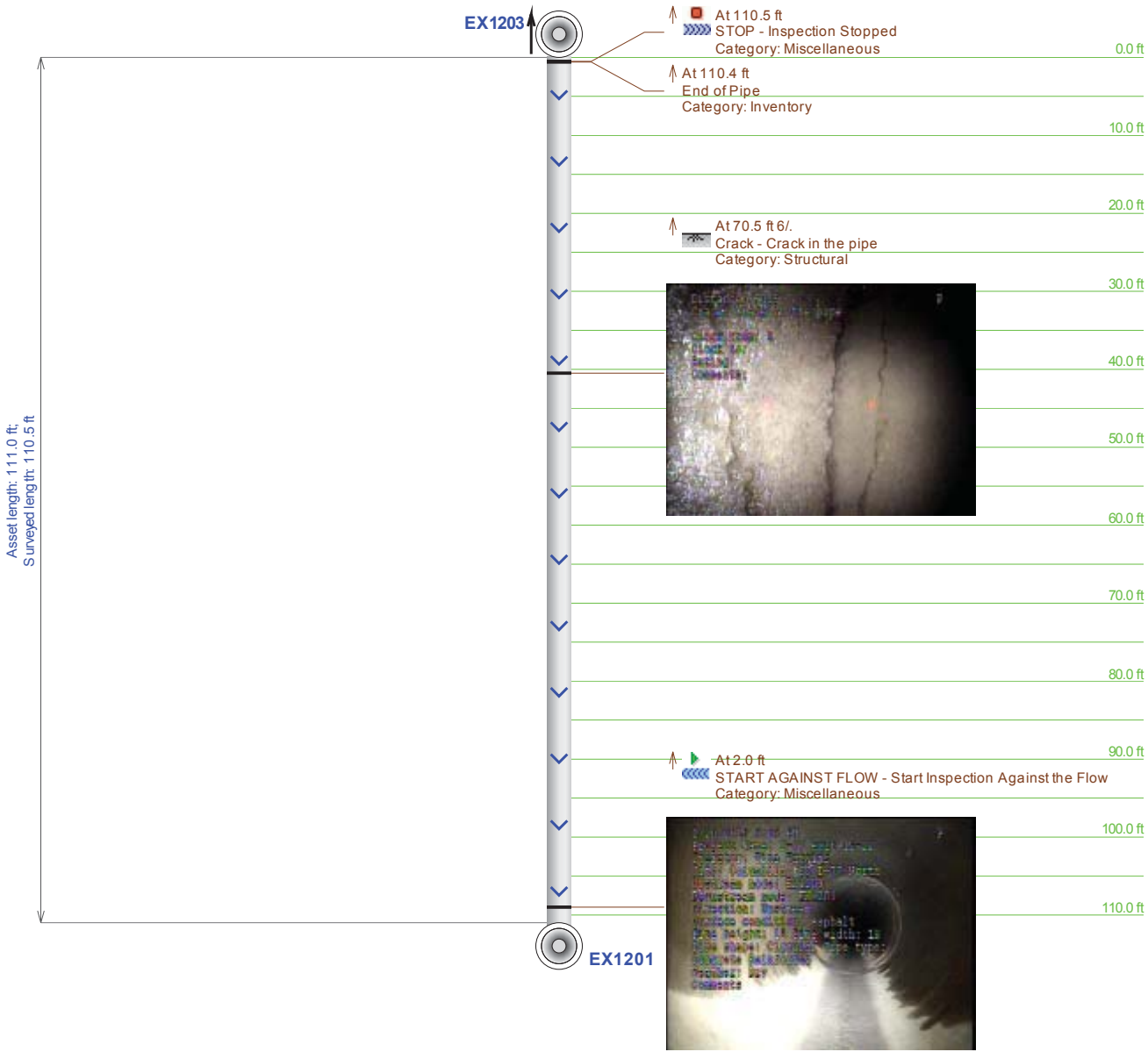
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1202 | Columbiia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 110.5 | Tina Watkins | |



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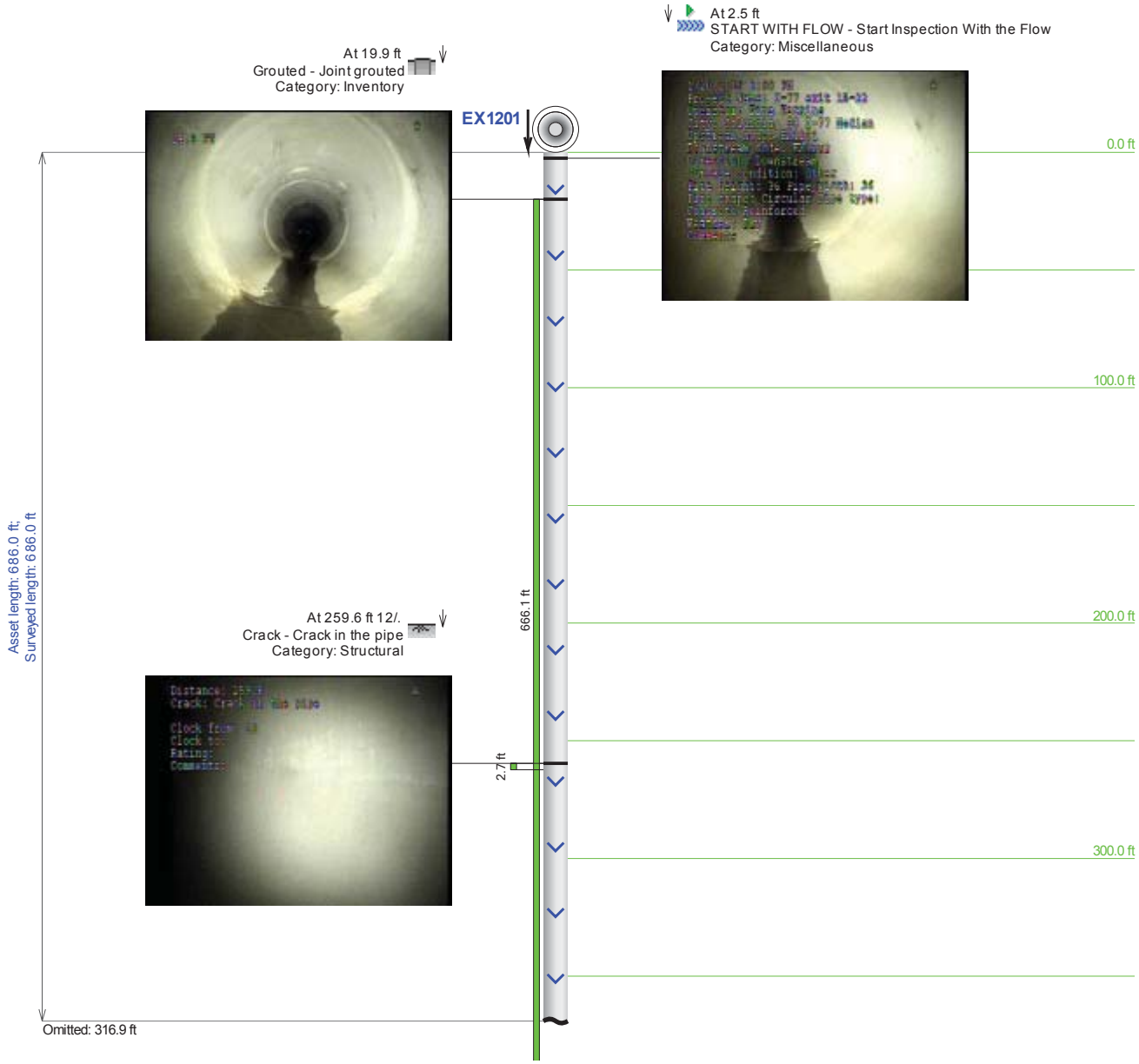
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1203 | Columbia, SC | I-77 Median |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 36 | 36 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 686.0 | Tina Watkins | |



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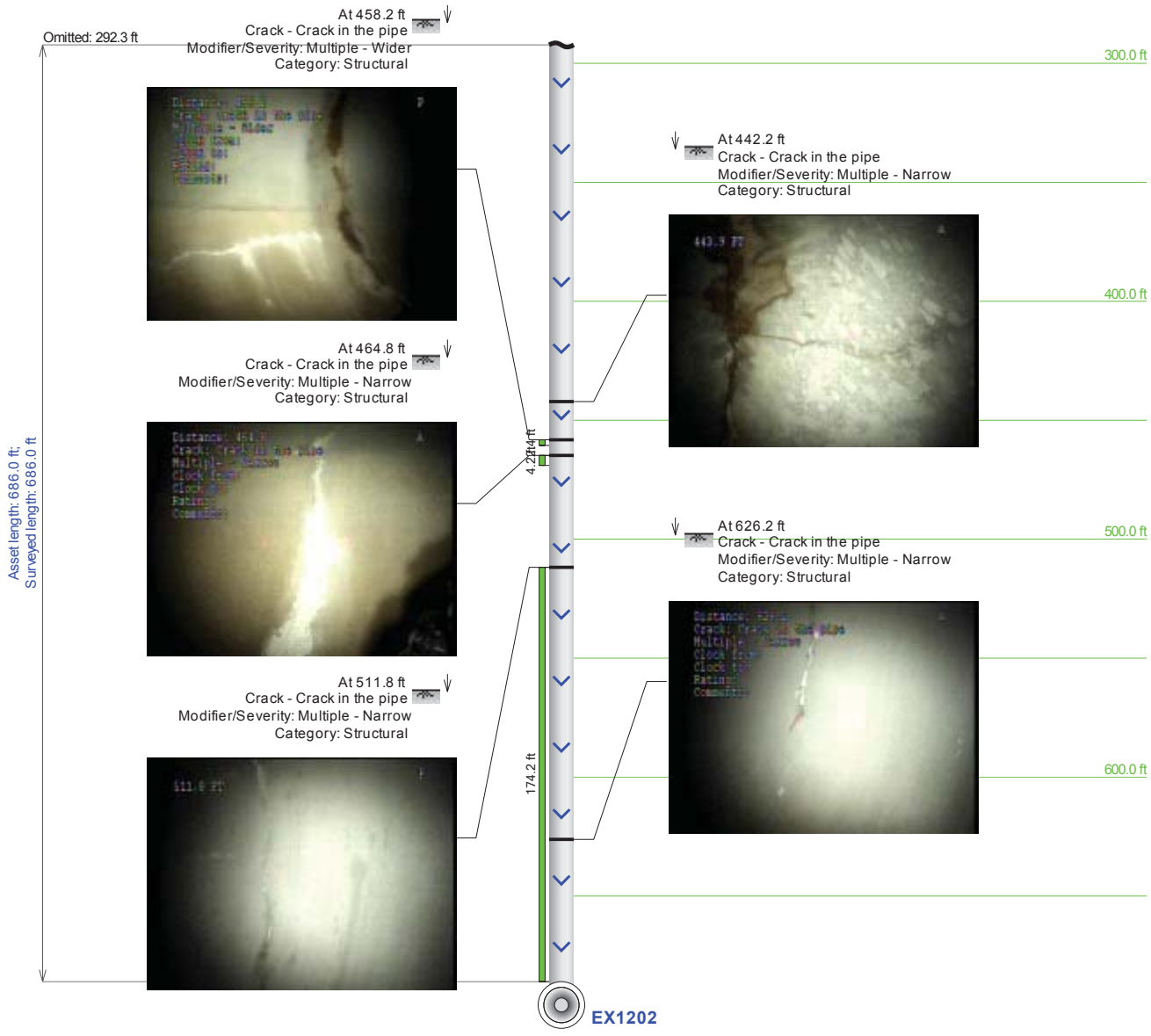
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1203 | Columbia, SC | I-77 Median |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 36 | 36 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 686.0 | Tina Watkins | |



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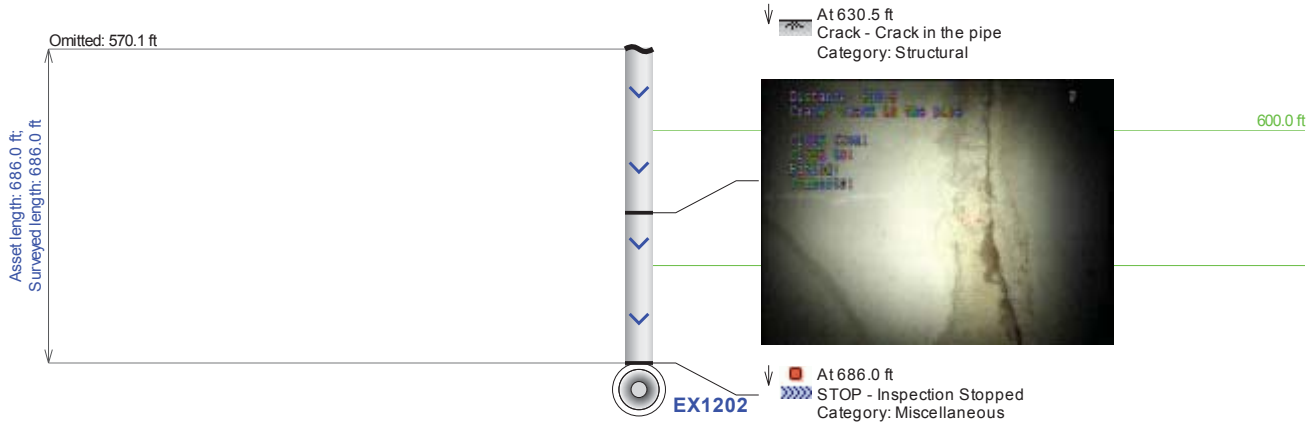
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1203 | Columbia, SC | I-77 Median |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 36 | 36 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 686.0 | Tina Watkins | |



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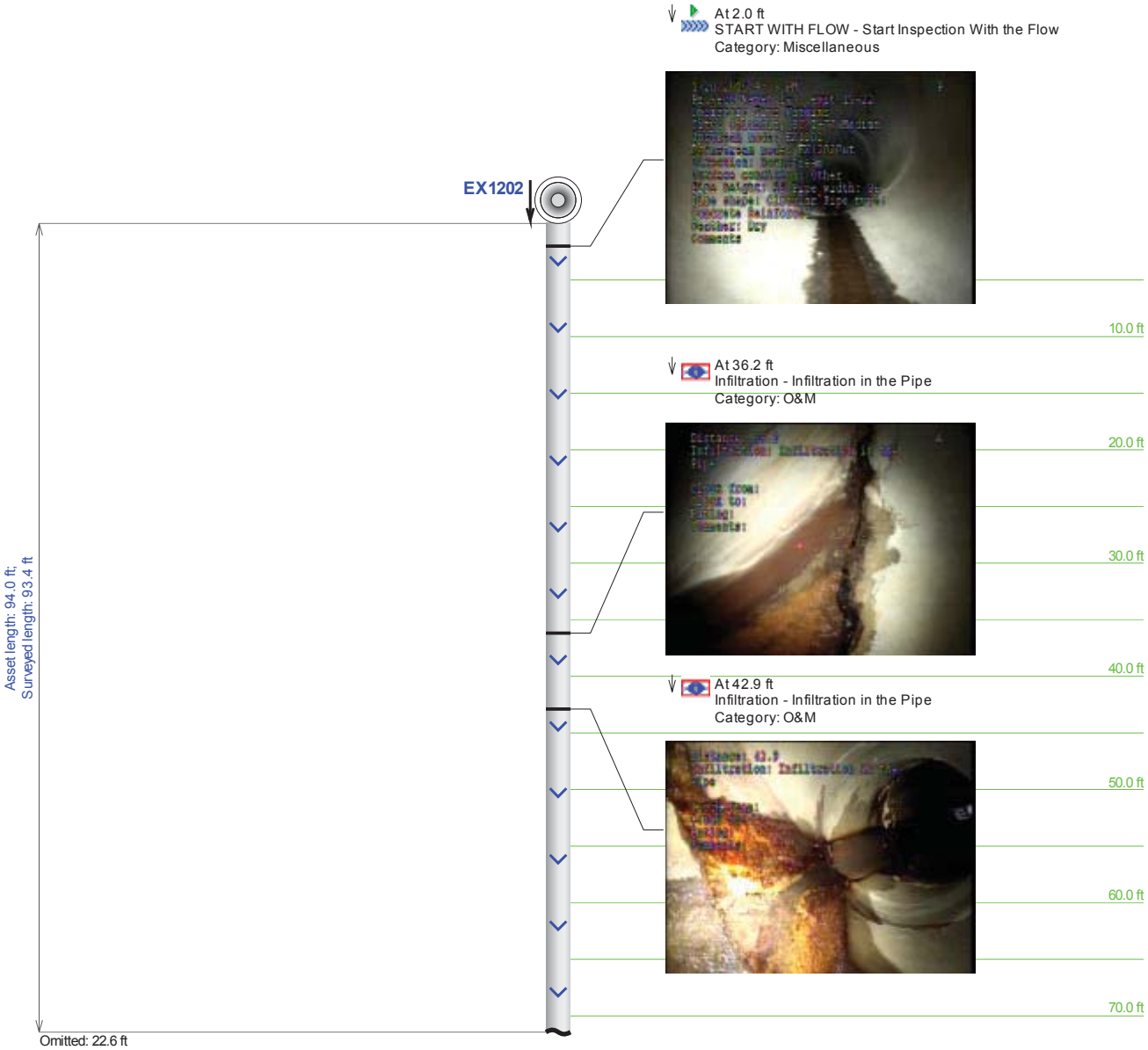
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1204 | Columbia, SC | I-77 Median |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 36 | 36 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 93.4 | Tina Watkins | |



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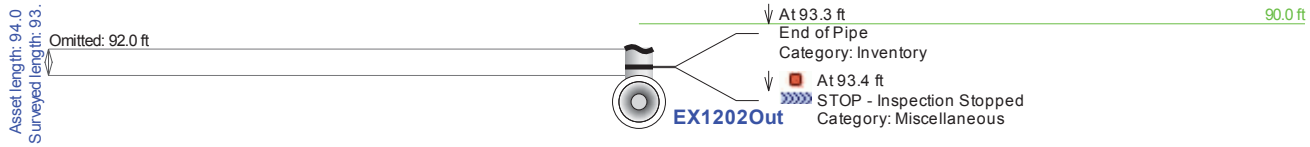
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1204 | Columbia, SC | I-77 Median |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/20/2015 | 36 | 36 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 93.4 | Tina Watkins | |



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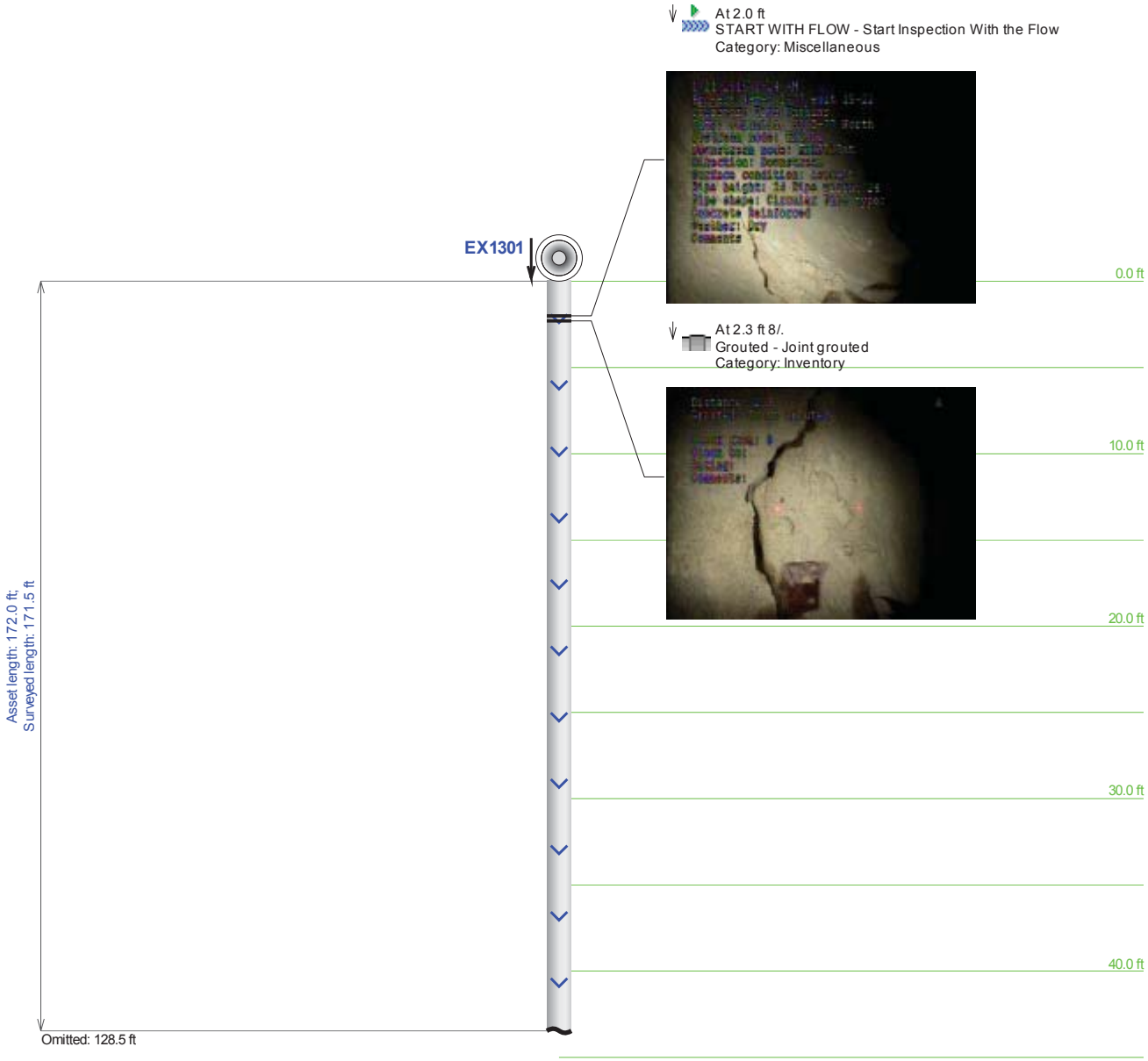
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1301 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 171.5 | Tina Watkins | |



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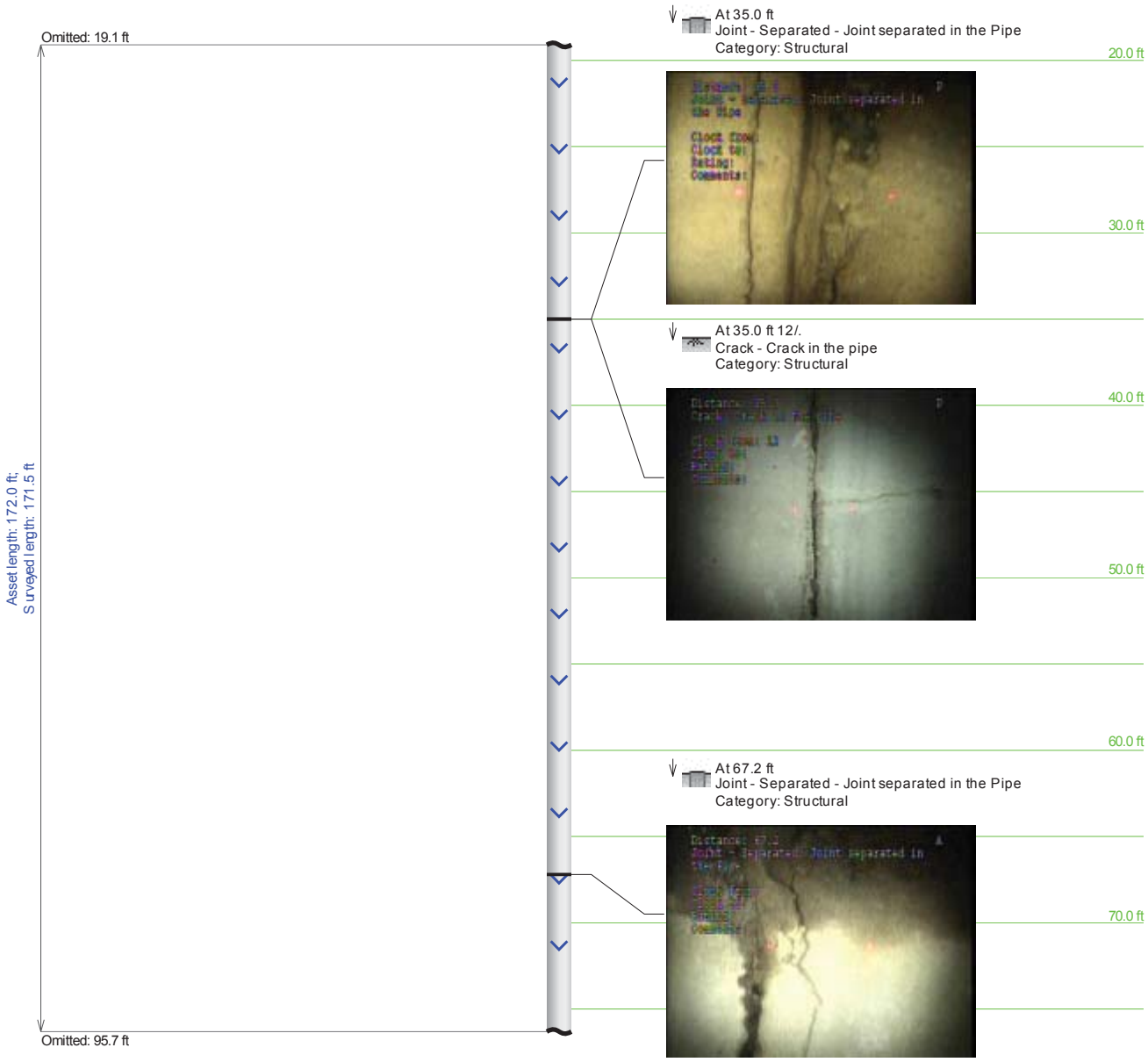
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1301 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 171.5 | Tina Watkins | |



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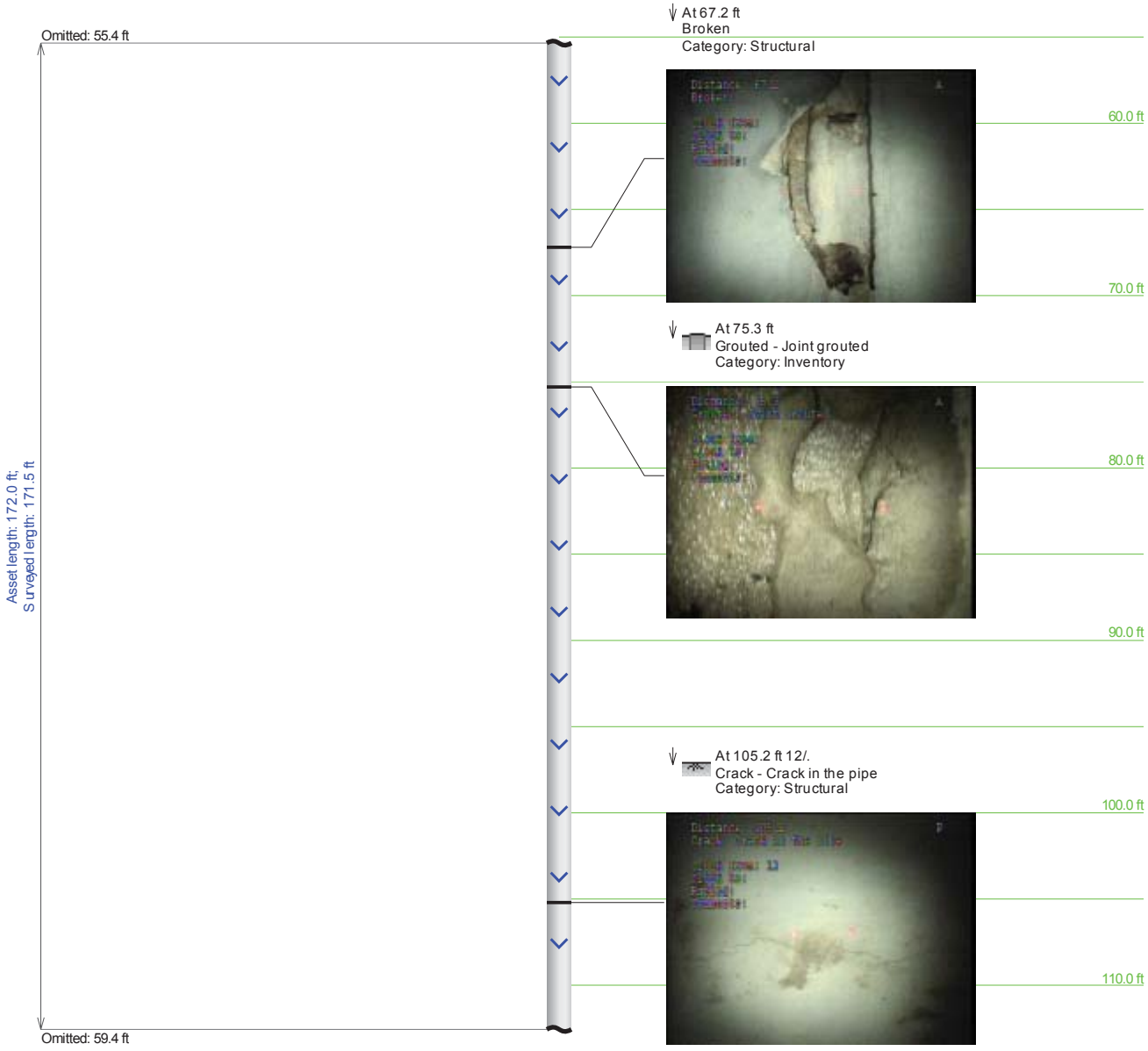
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1301 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 171.5 | Tina Watkins | |



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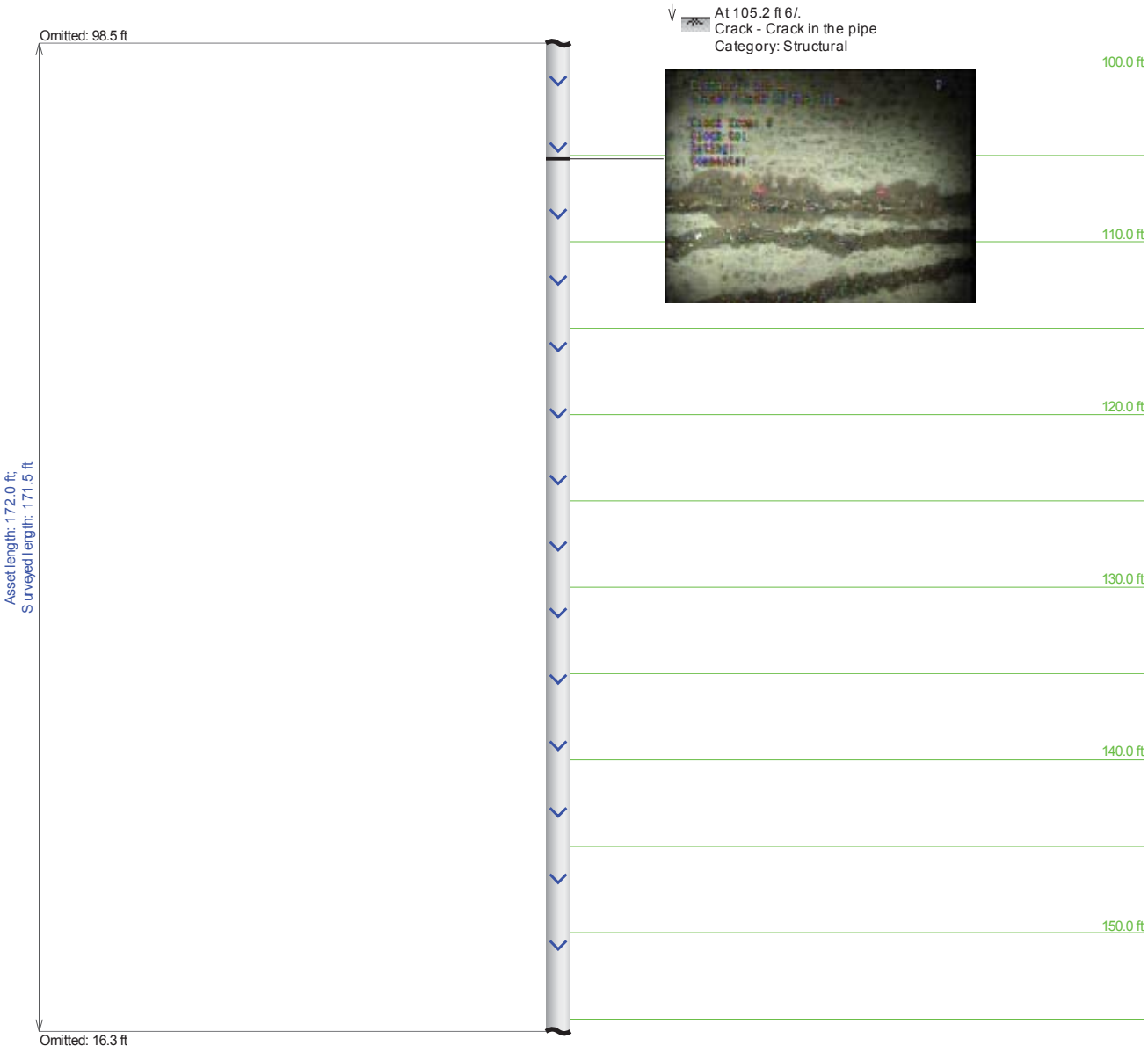
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1301 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 171.5 | Tina Watkins | |



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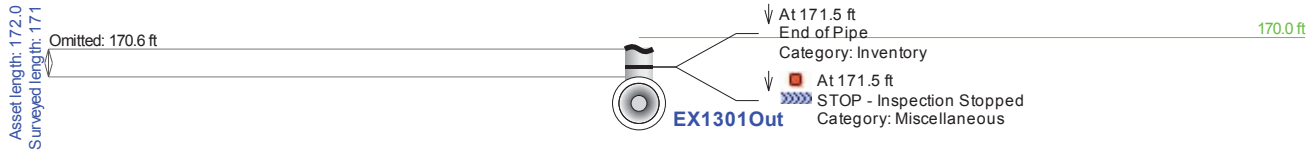
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1301 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 171.5 | Tina Watkins | |



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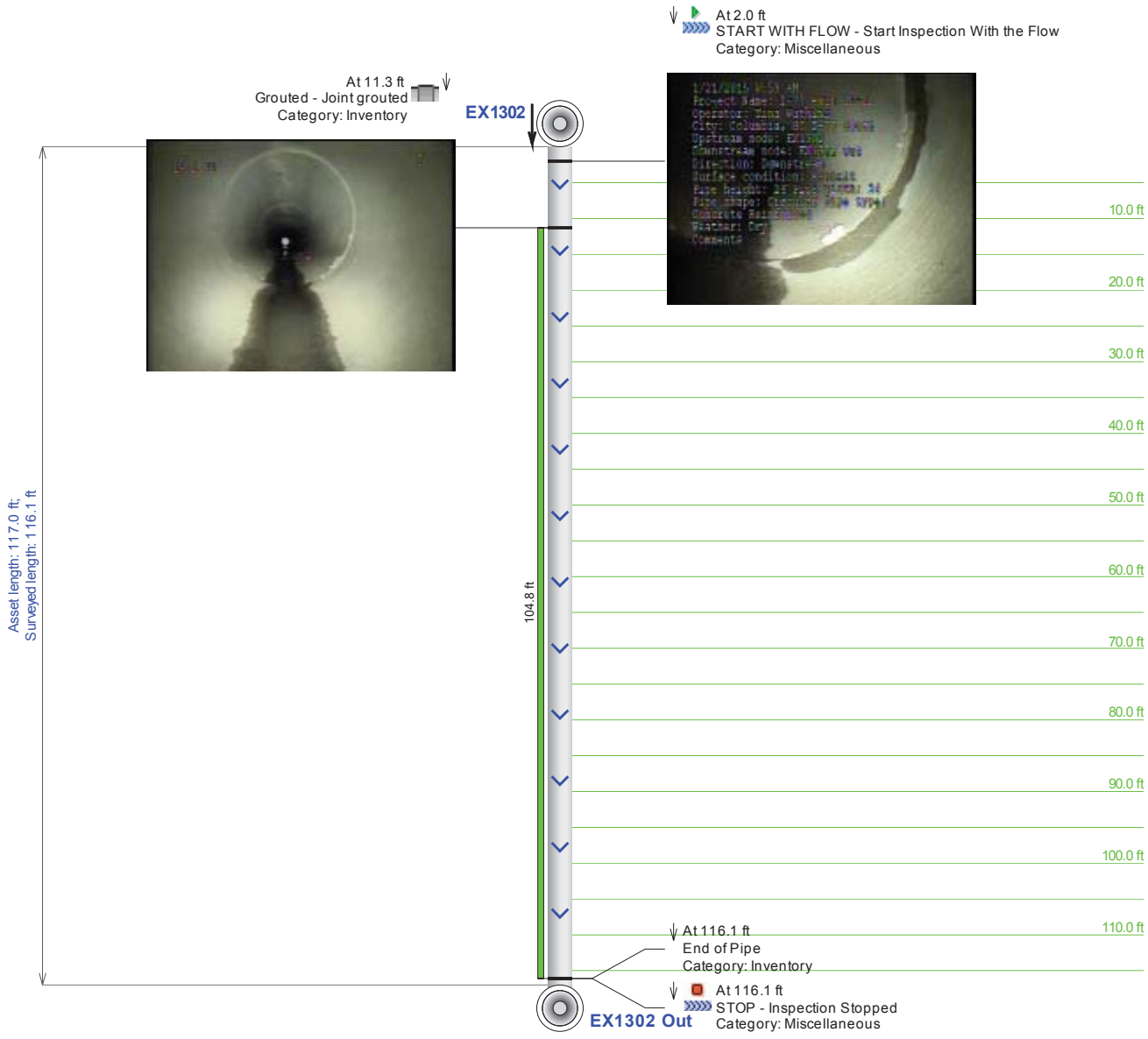
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1302 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 116.1 | Tina Watkins | |



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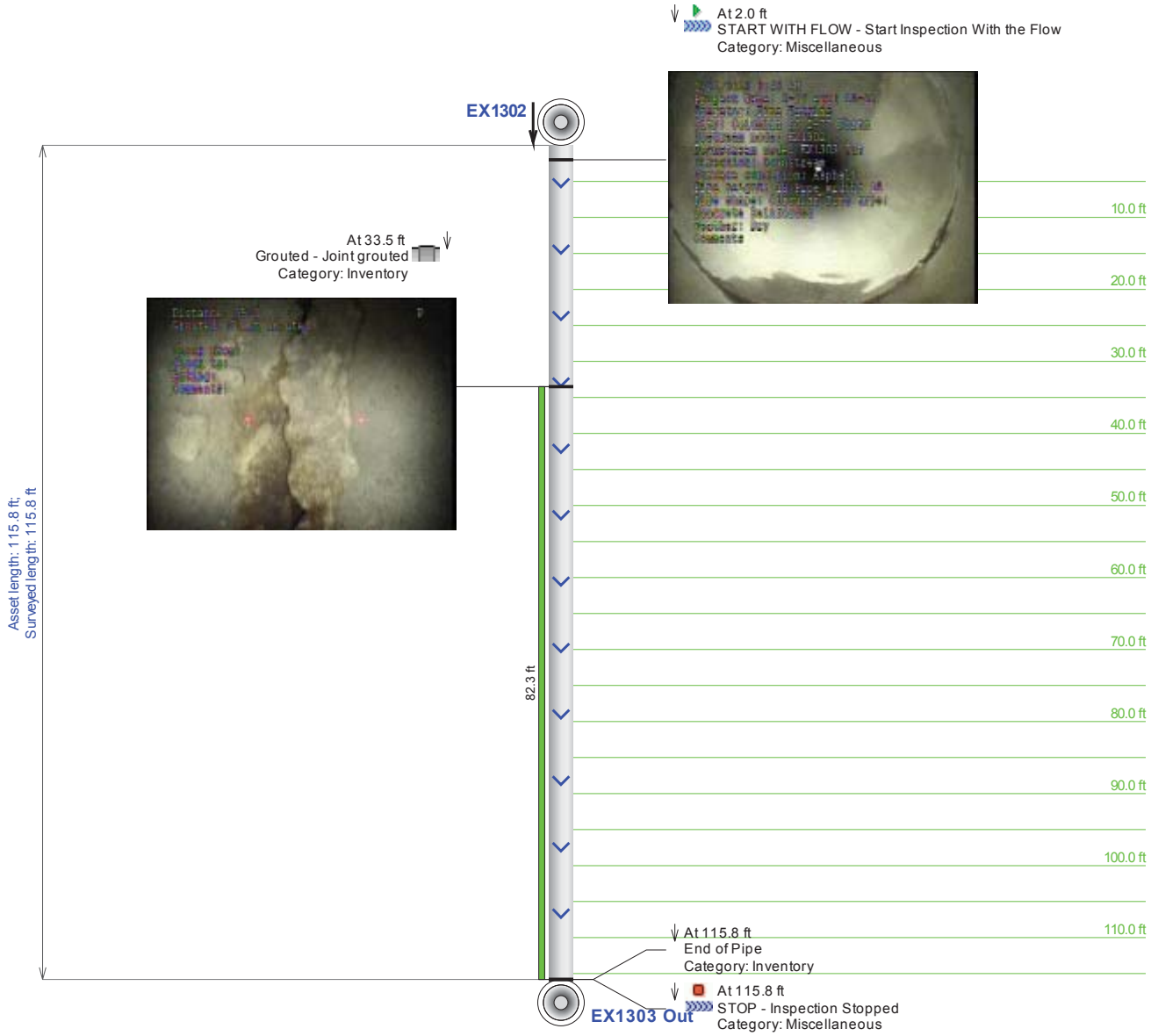
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1303 | Columbia SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 115.8 | Tina Watkins | |



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# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1401 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 264.6 | Tina Watkins | |

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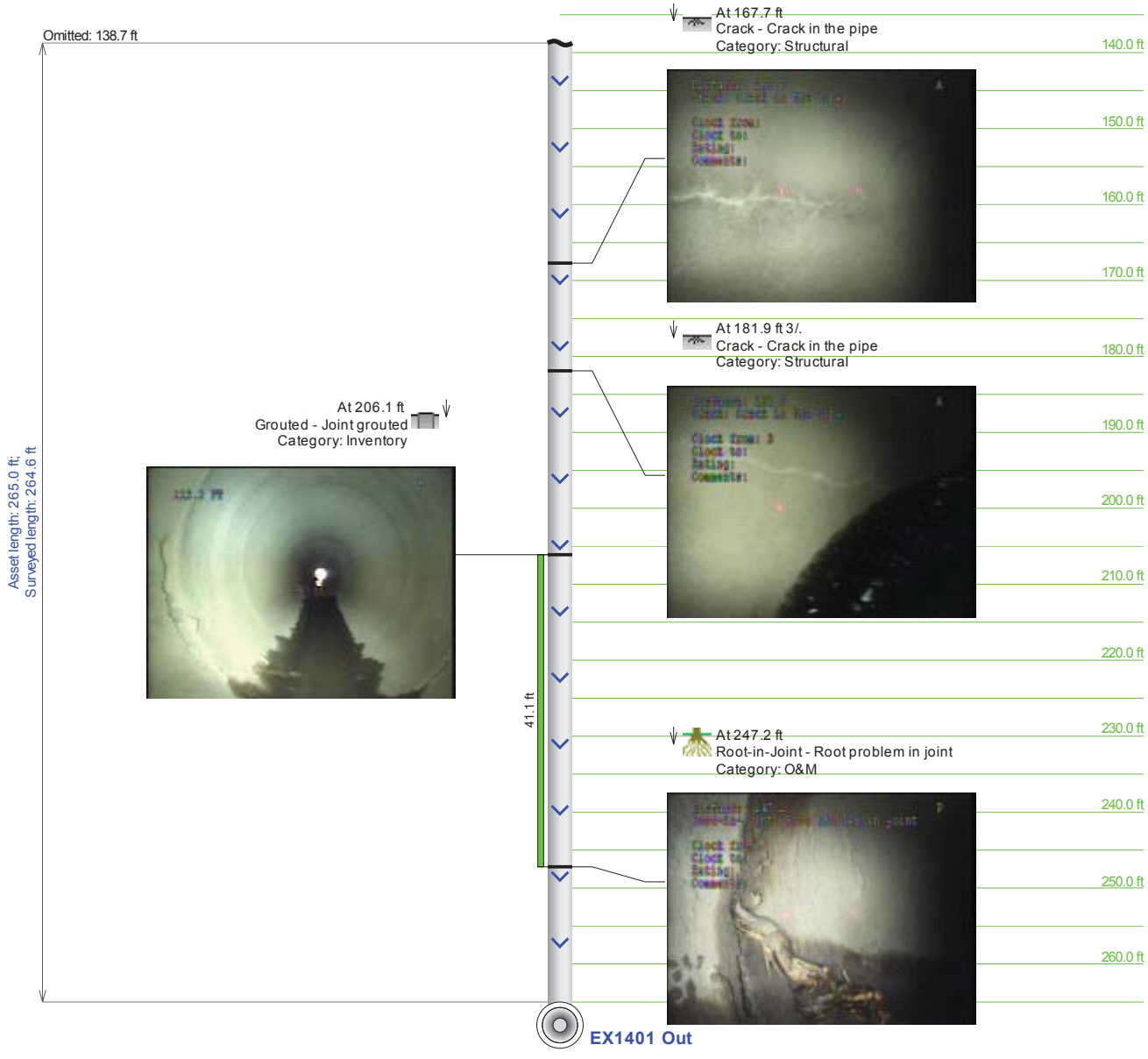
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1401 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 264.6 | Tina Watkins | |



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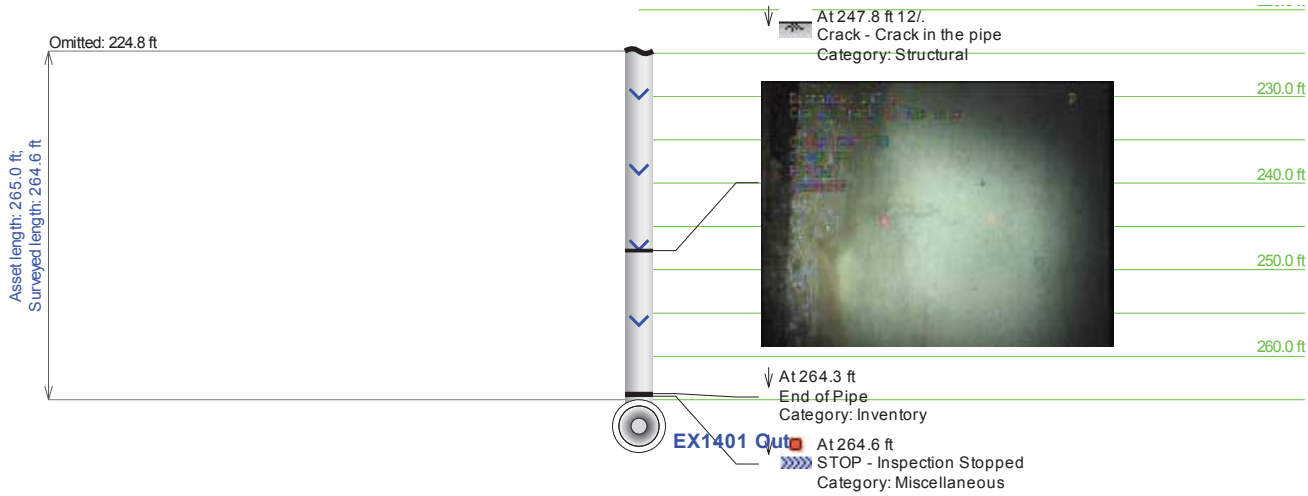
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1401 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 264.6 | Tina Watkins | |



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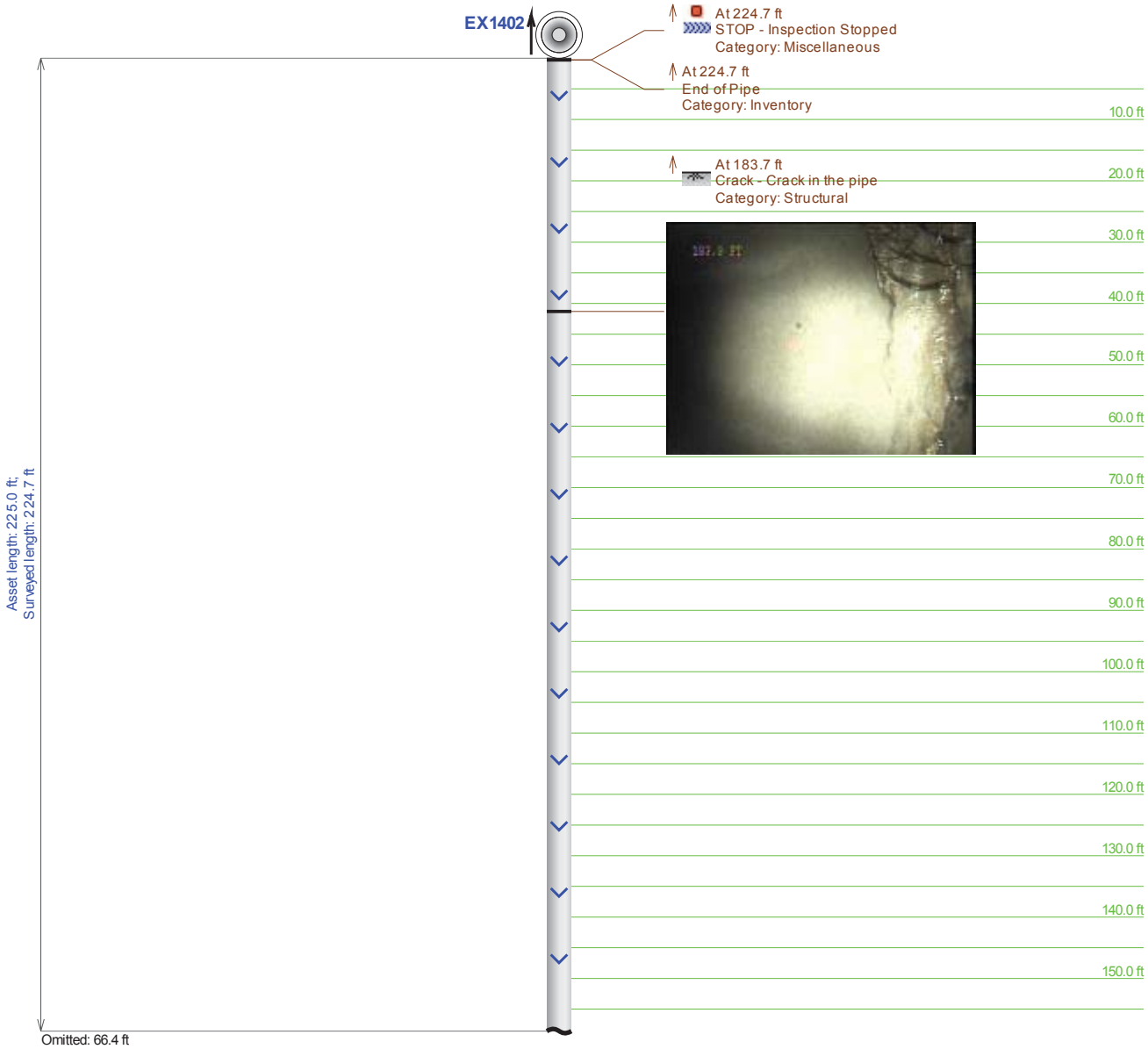
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1402 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 224.7 | Tina Watkins | |



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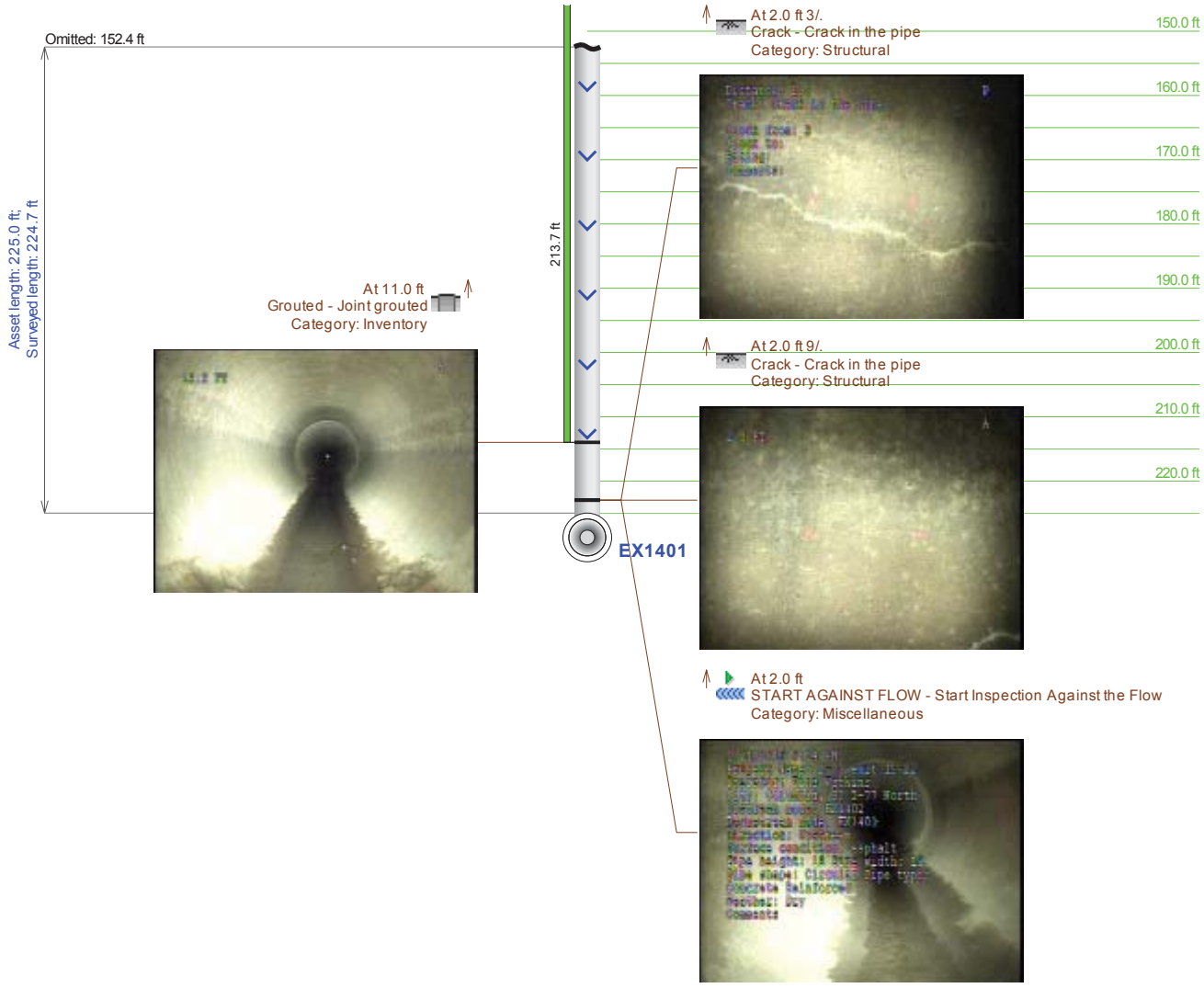
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1402 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 224.7 | Tina Watkins | |



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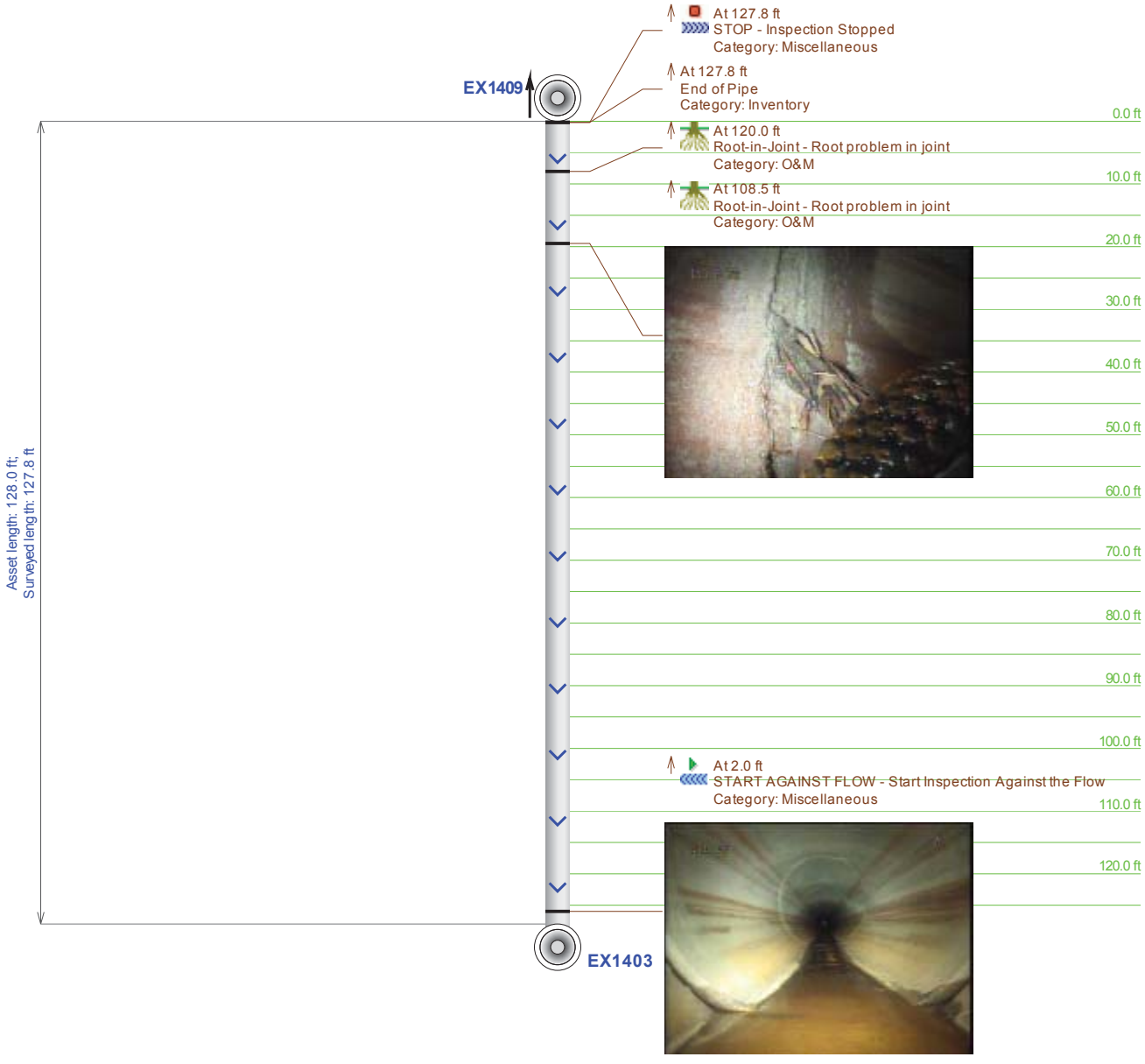
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1403 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 30 | 30 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 127.8 | Tina Watkins | |



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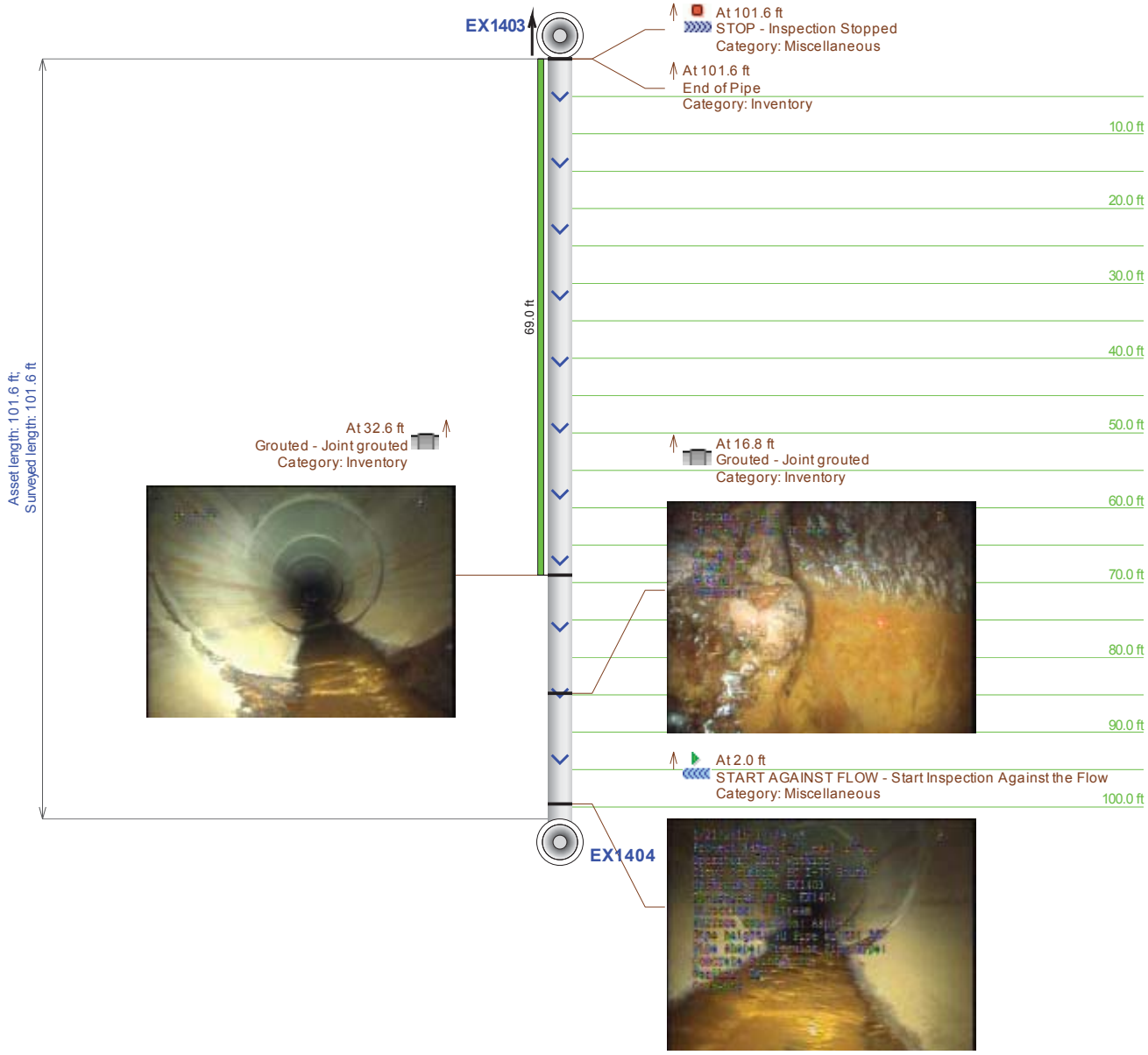
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1404 | Coumbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 30 | 30 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 101.6 | Tina Watkins | |



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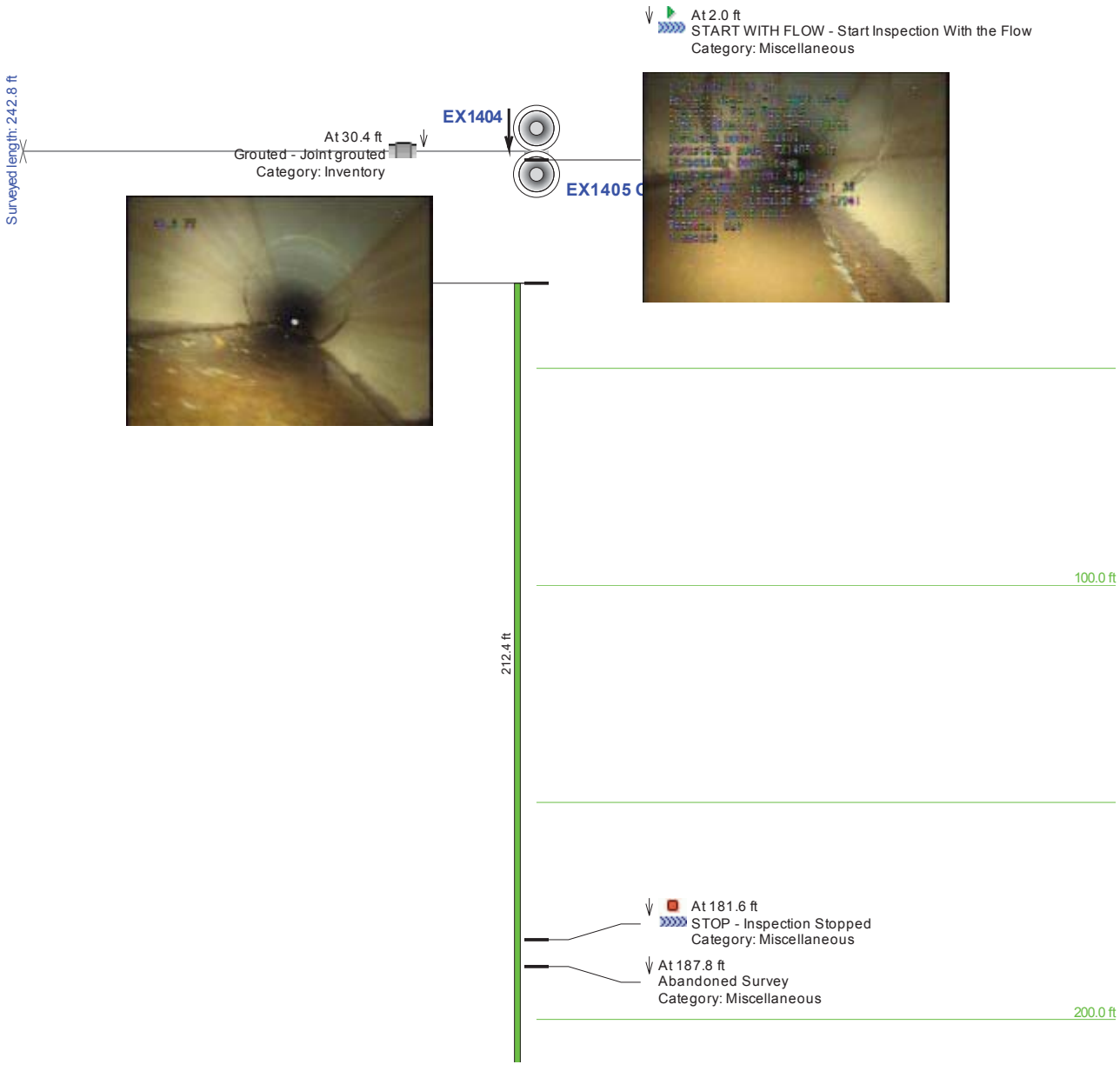
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1405 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 36 | 36 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 242.8 | Tina Watkins | |



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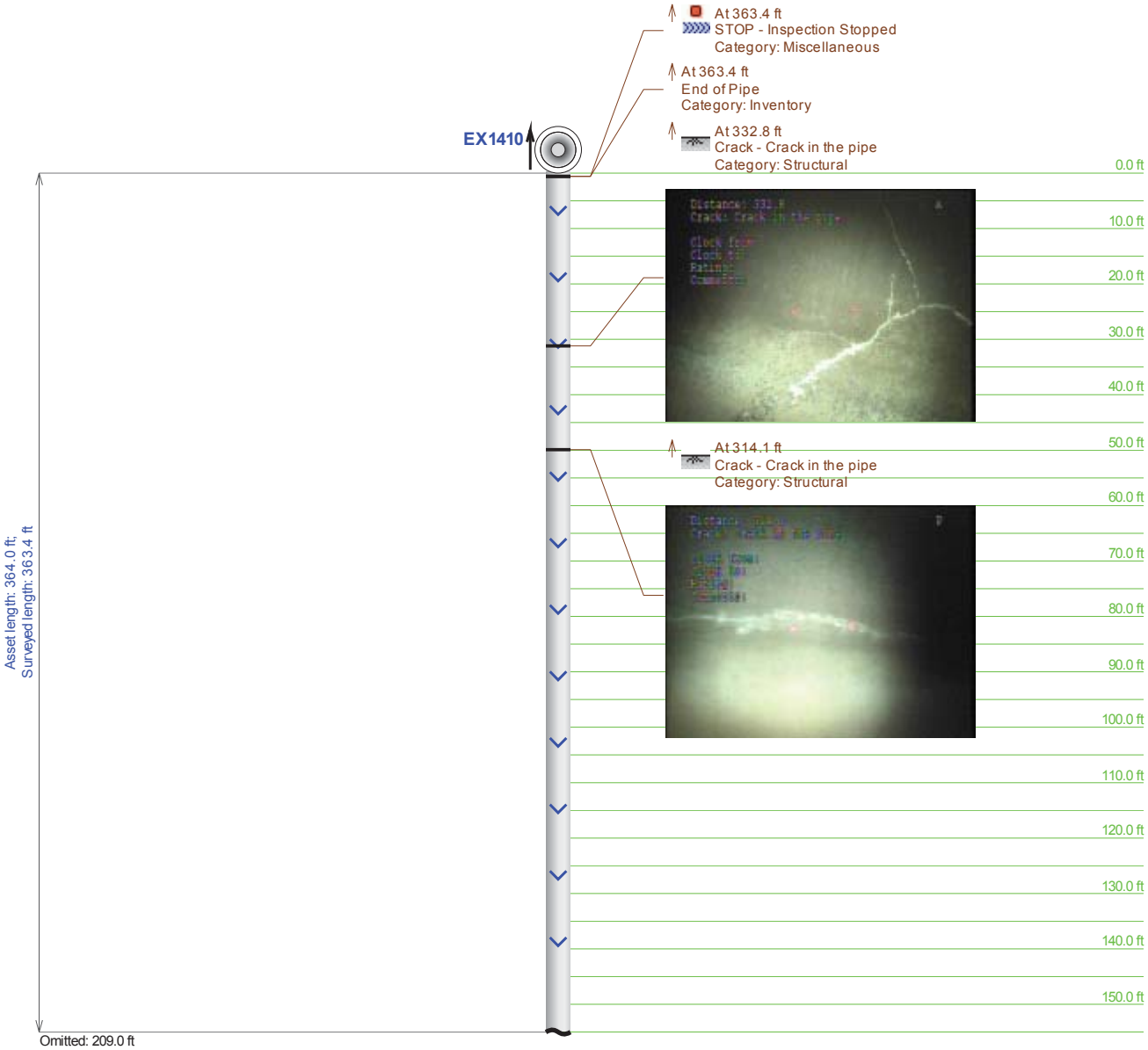
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1406 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 363.4 | Tina Watkins | |



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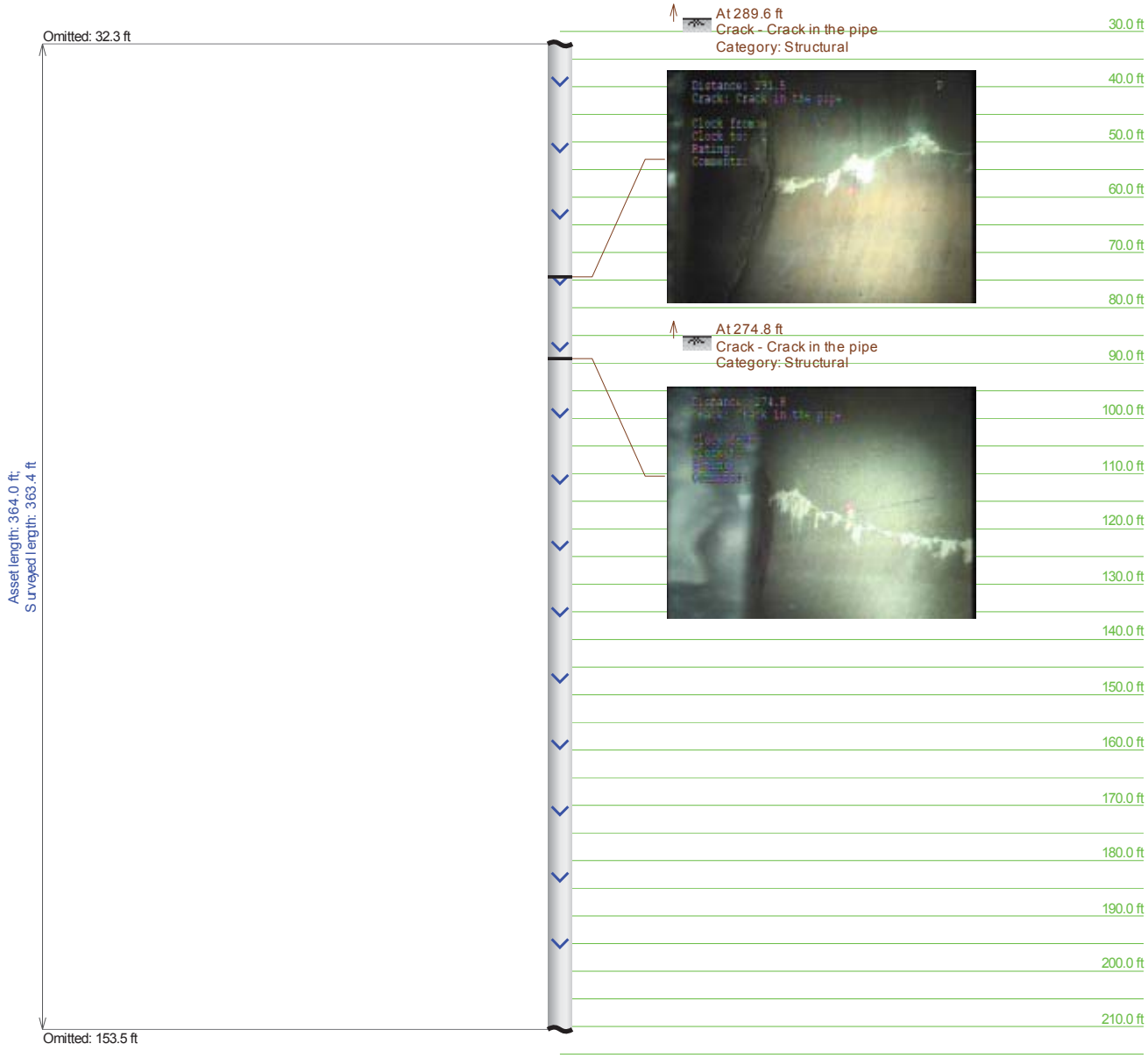
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1406 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 363.4 | Tina Watkins | |



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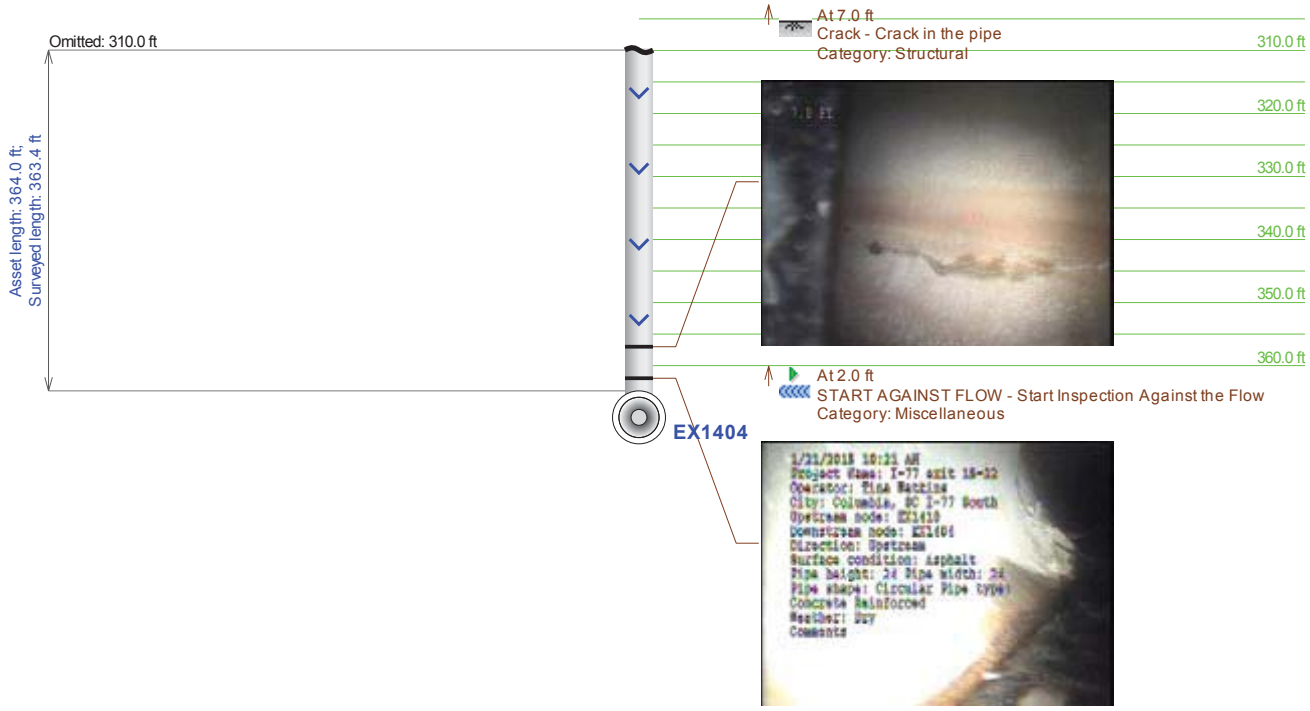
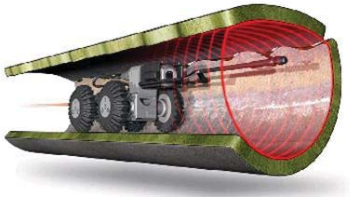
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1406 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 363.4 | Tina Watkins | |





# AET Services

Robotic Inspections

# EC1407

| | | |
|---|---|---|
| **EC1407** | **Culvert** | **440’** |
| **Cracking Throughout** | | |
| **Grate uptop 18” pipe Skewed left** | | **135’** |
| **Rebar Showing** | | **290’** |
| **Floor Crack** | | **394’** |

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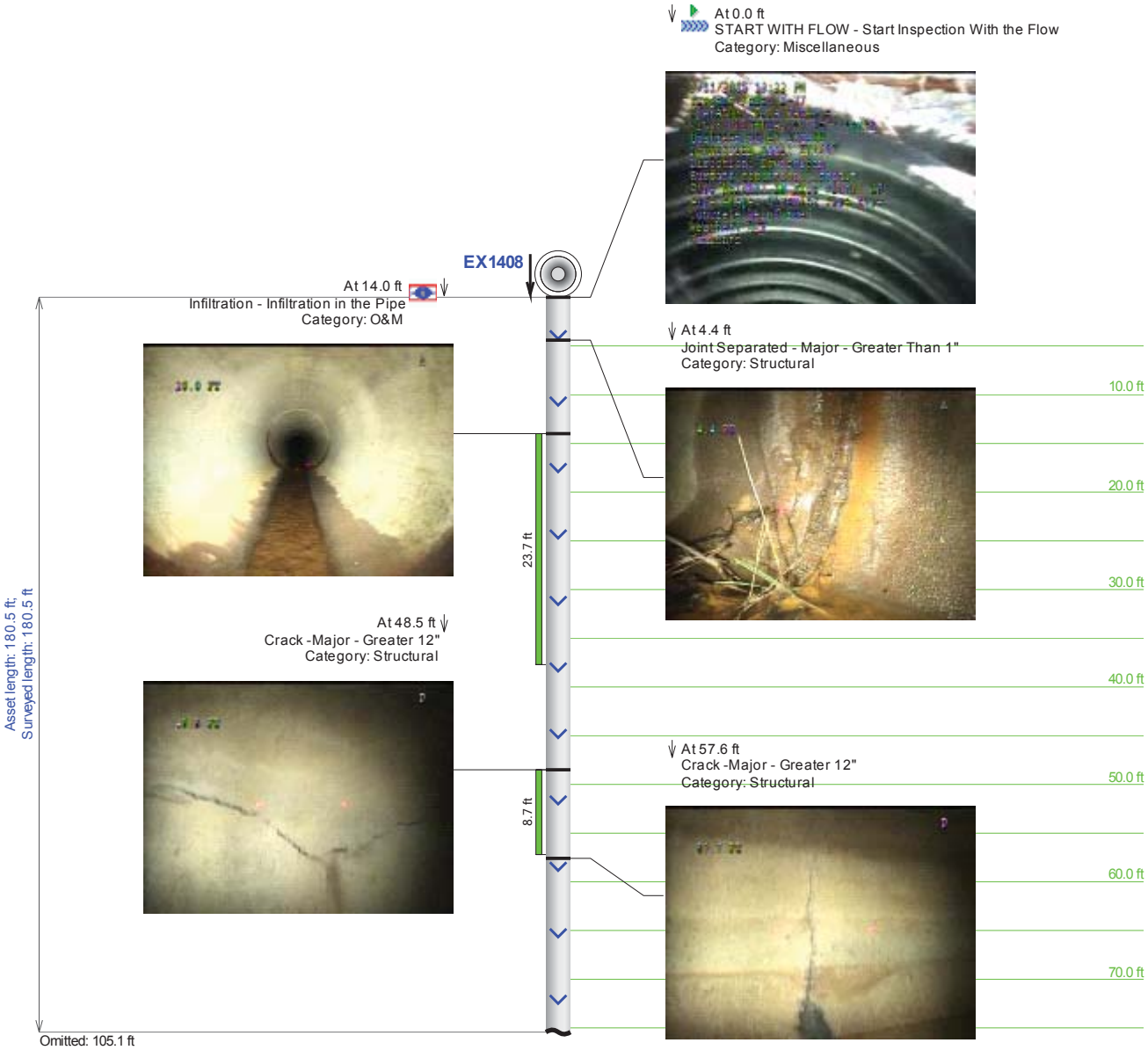
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1408 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 180.5 | Tina Watkins | |



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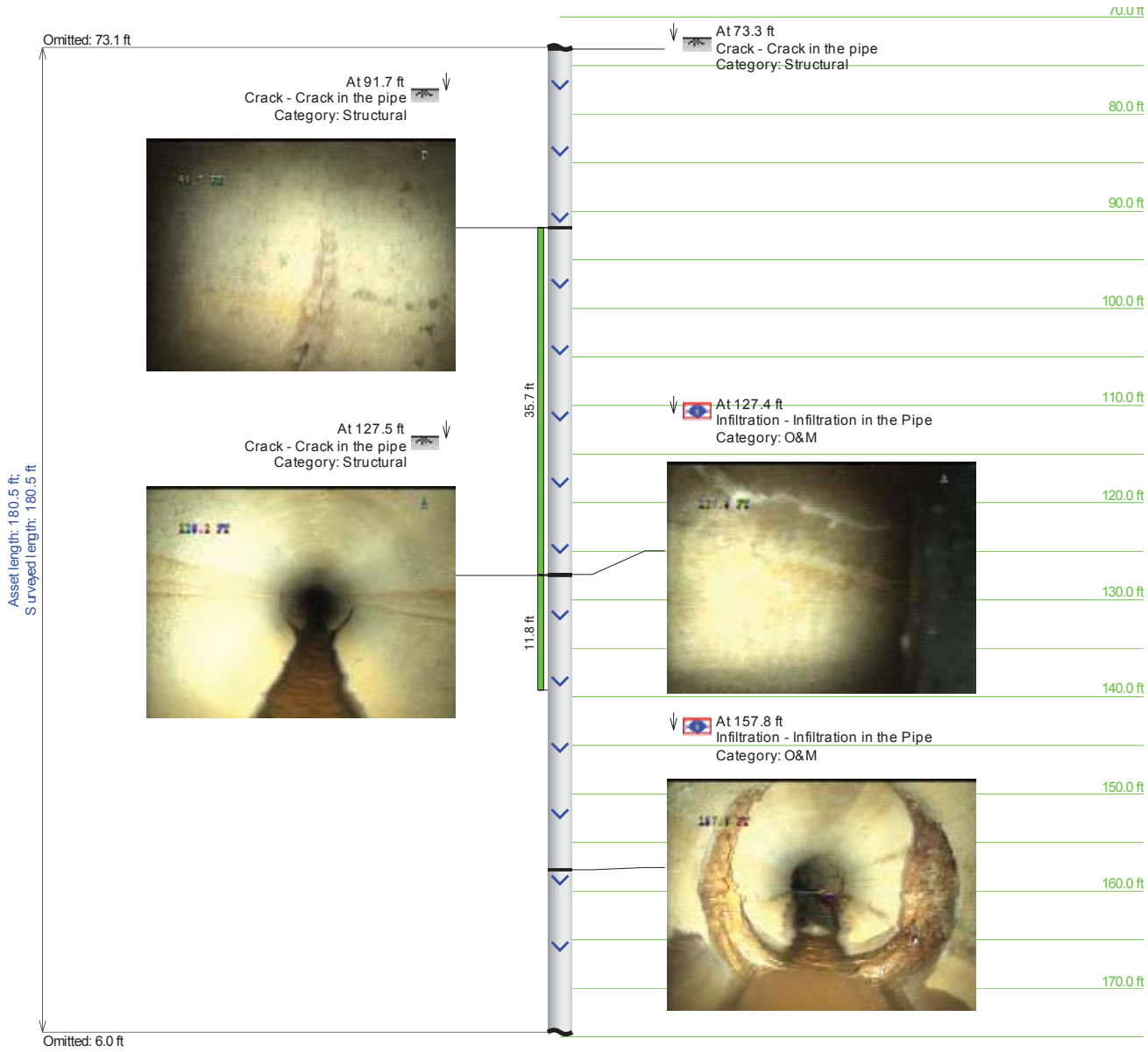
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1408 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 180.5 | Tina Watkins | |



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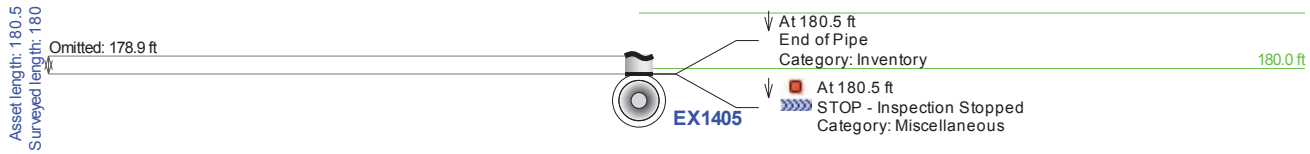
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1408 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 180.5 | Tina Watkins | |



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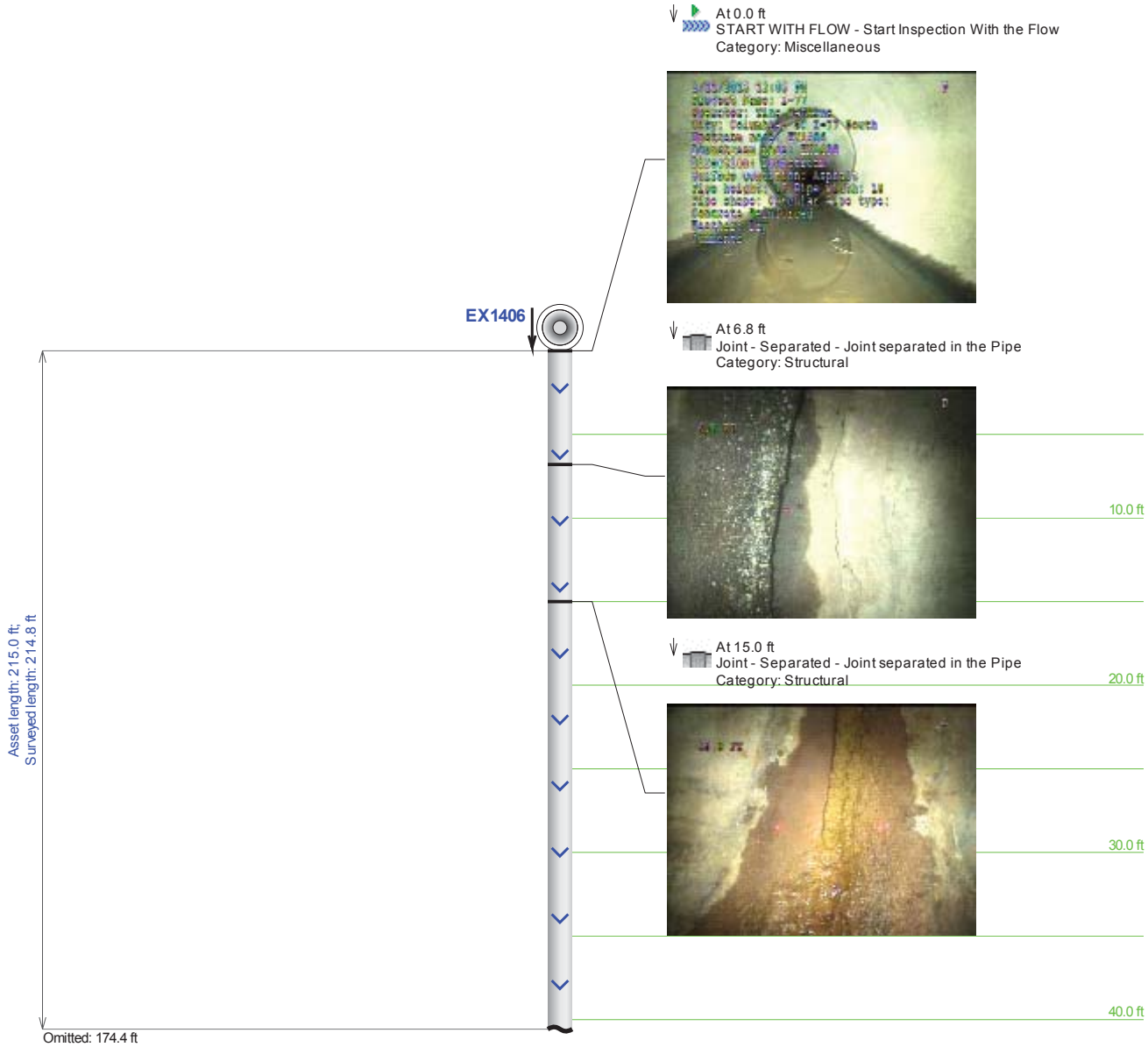
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1409 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 214.8 | Tina Watkins | |



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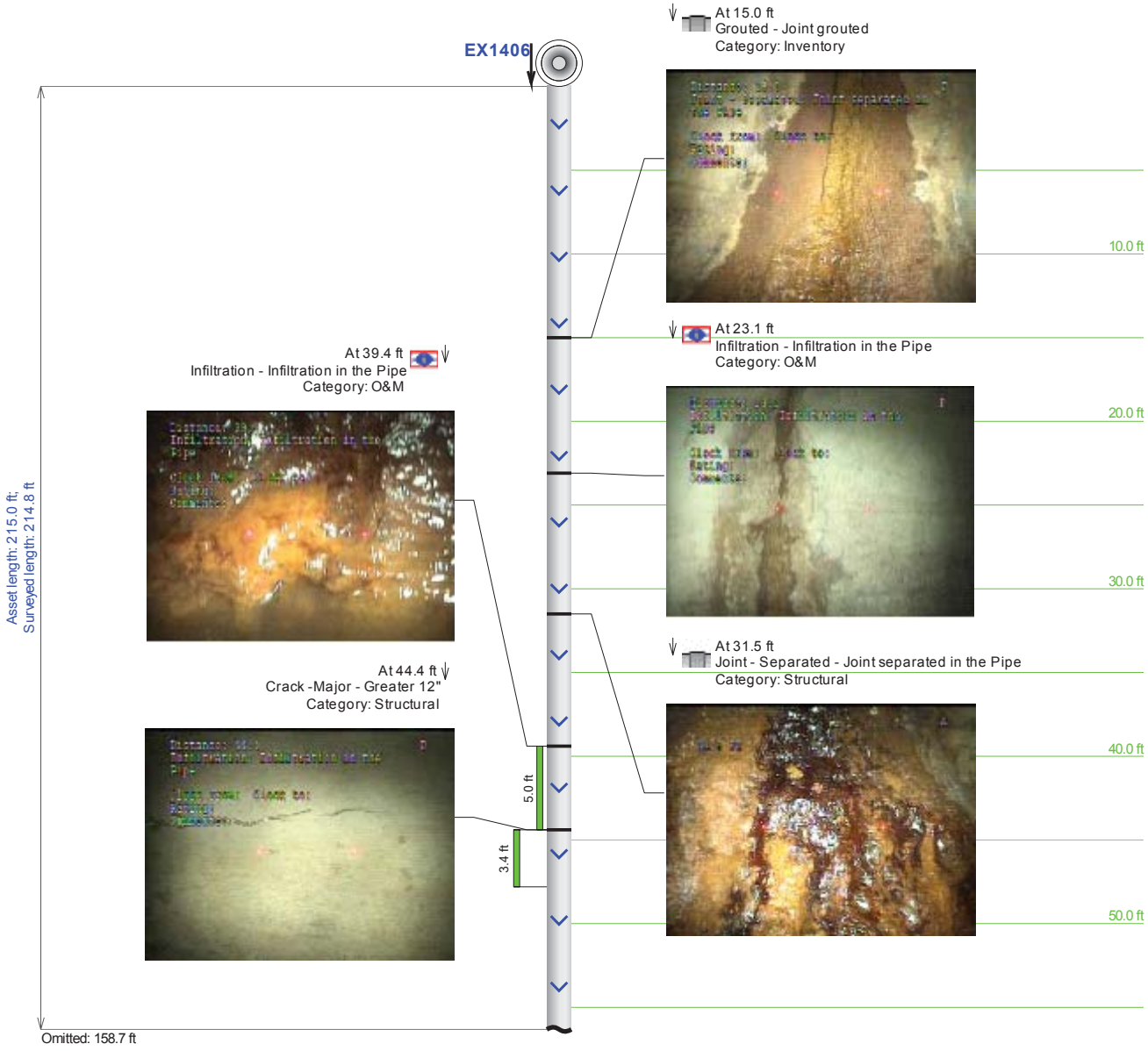
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1409 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 214.8 | Tina Watkins | |



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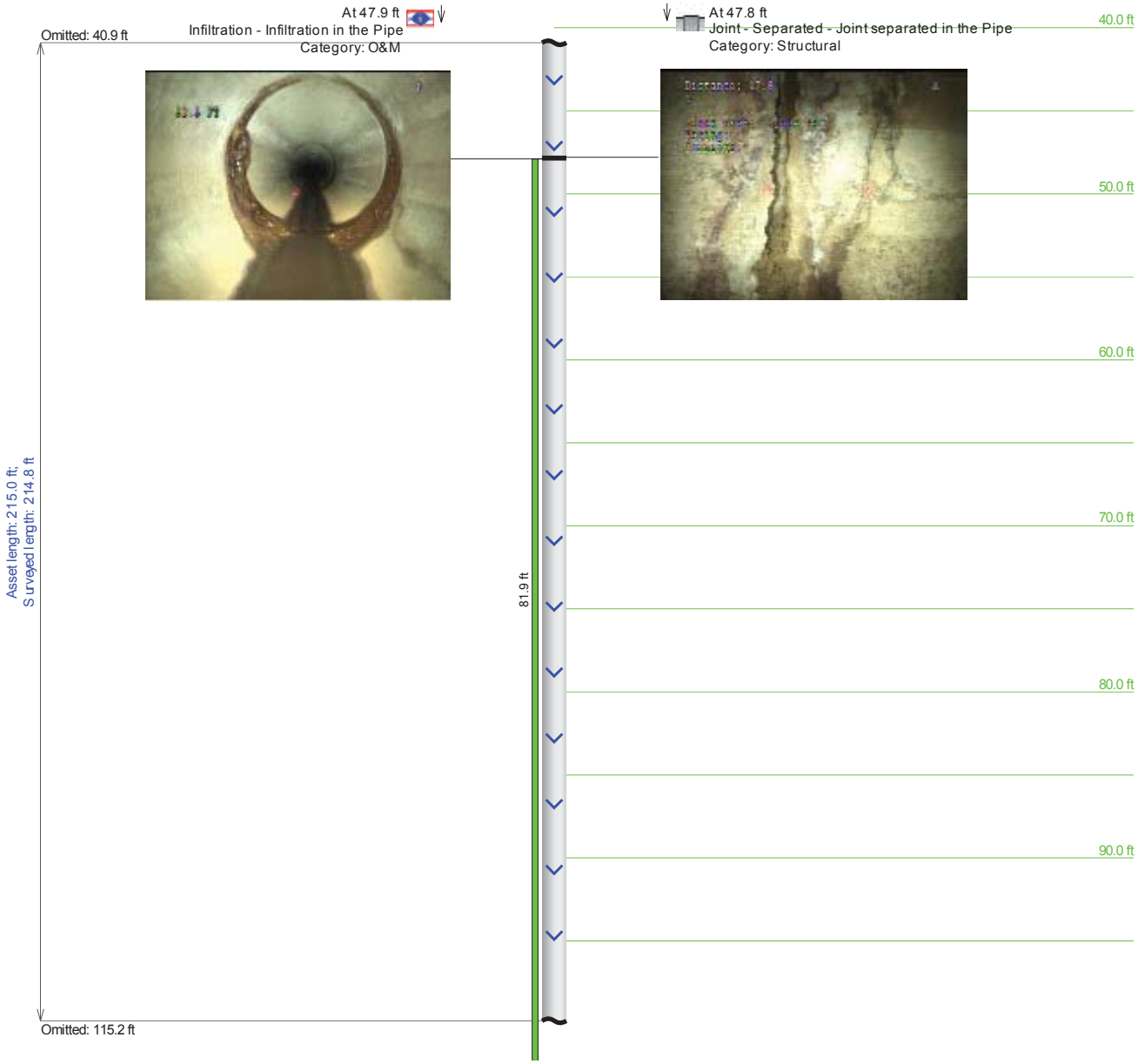
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1409 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 214.8 | Tina Watkins | |



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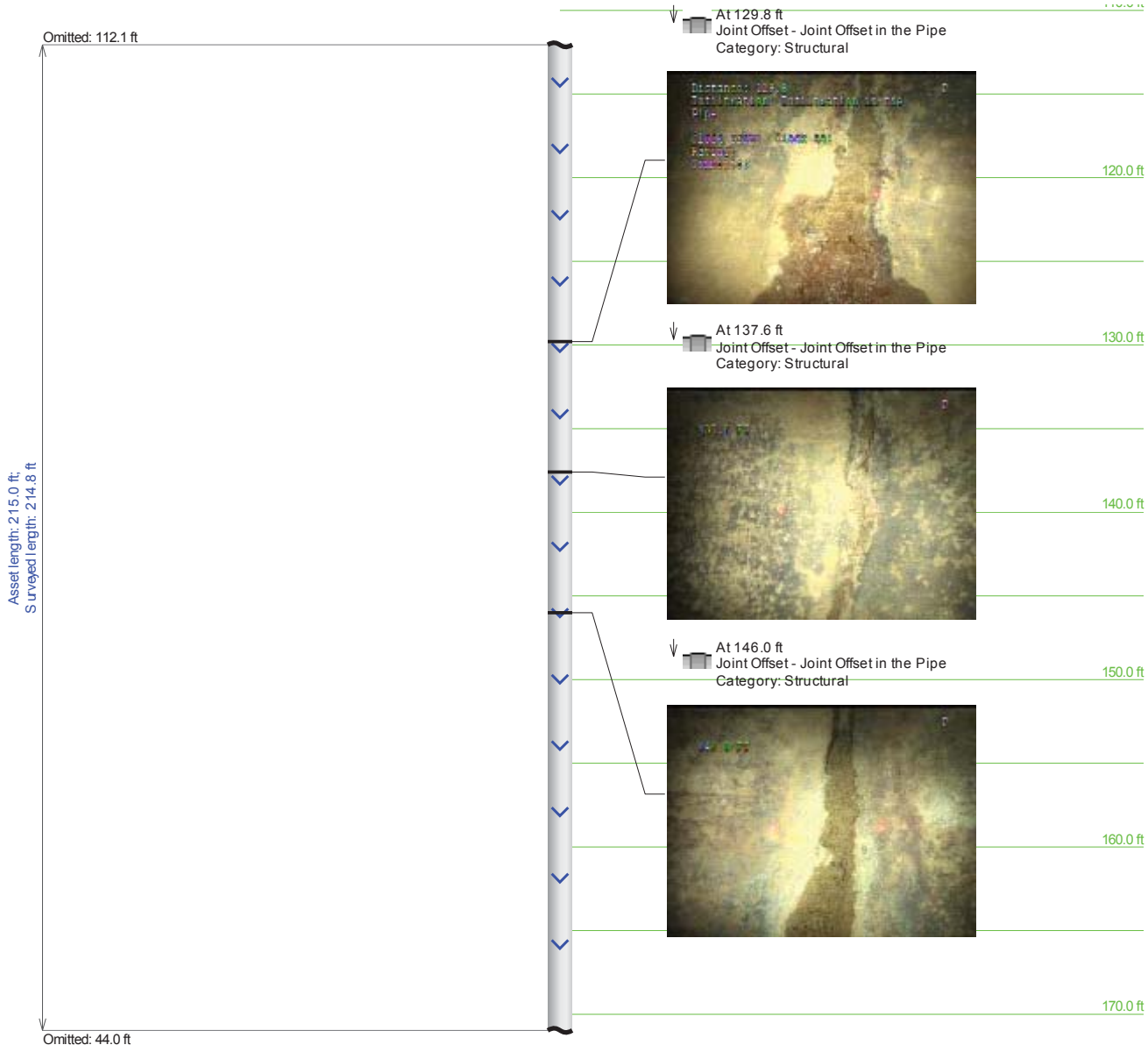
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1409 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 214.8 | Tina Watkins | |



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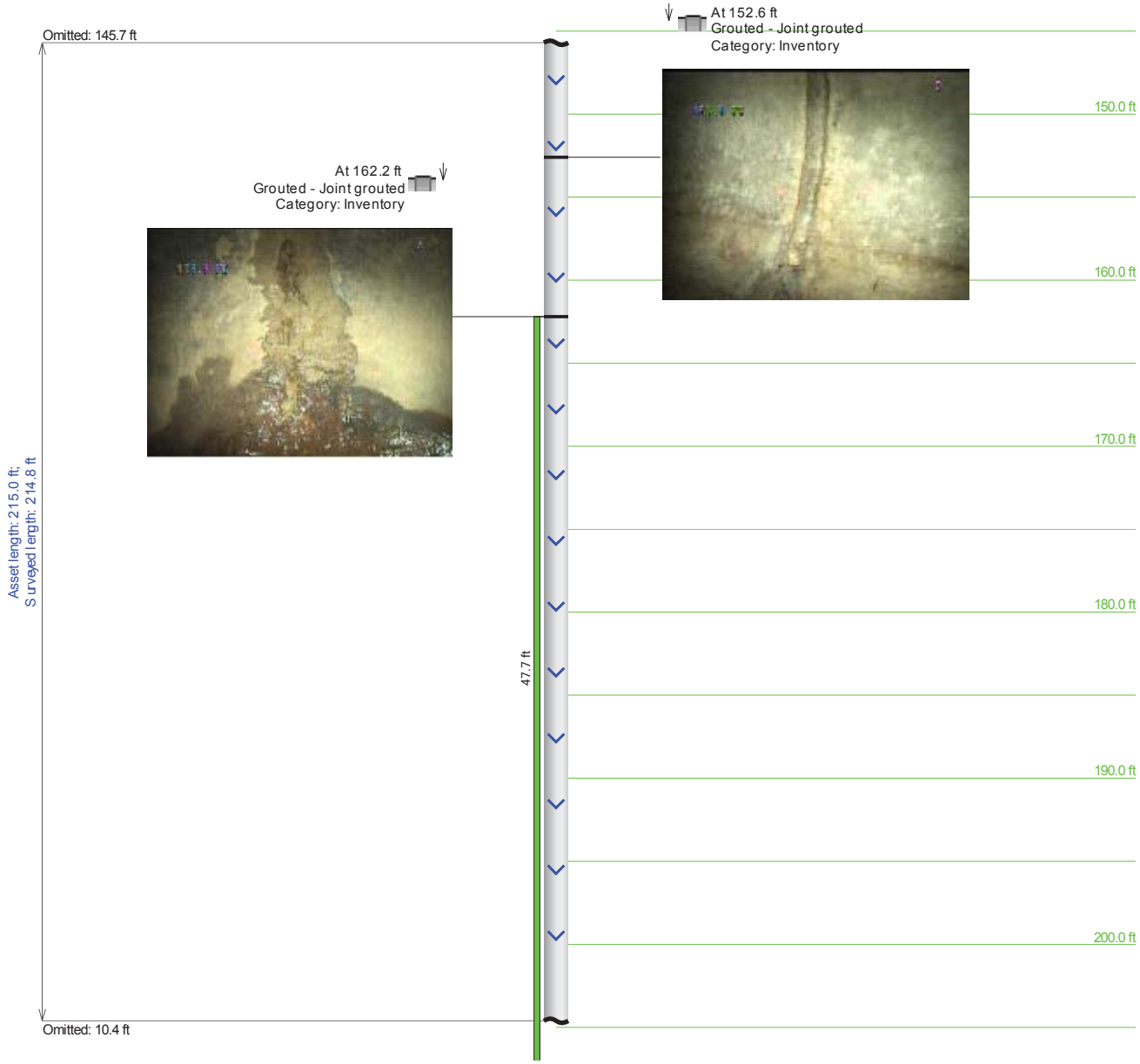
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1409 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 214.8 | Tina Watkins | |



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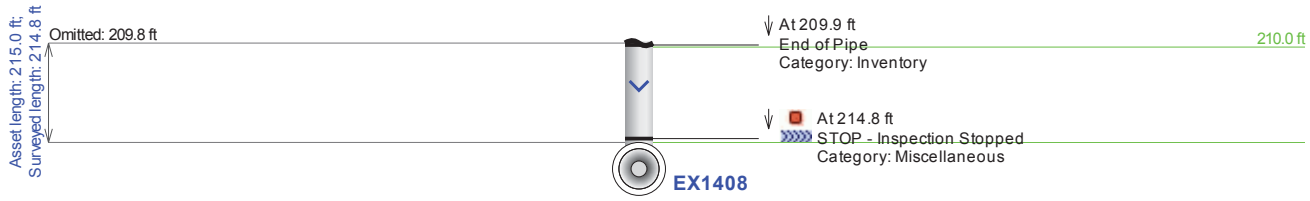
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1409 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 214.8 | Tina Watkins | |



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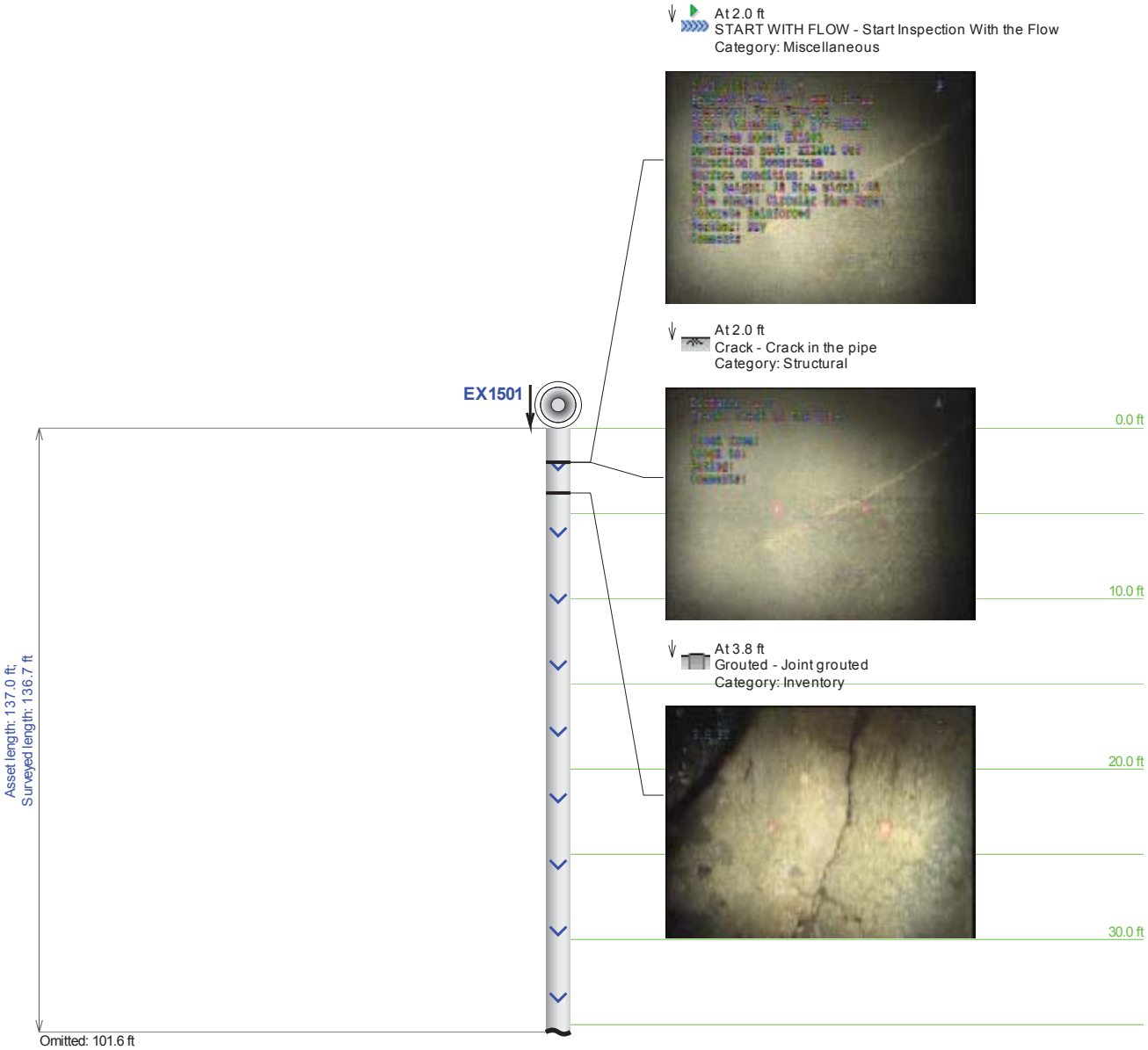
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1501 | Columbia, SC | I77-North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 136.7 | Tina Watkins | |



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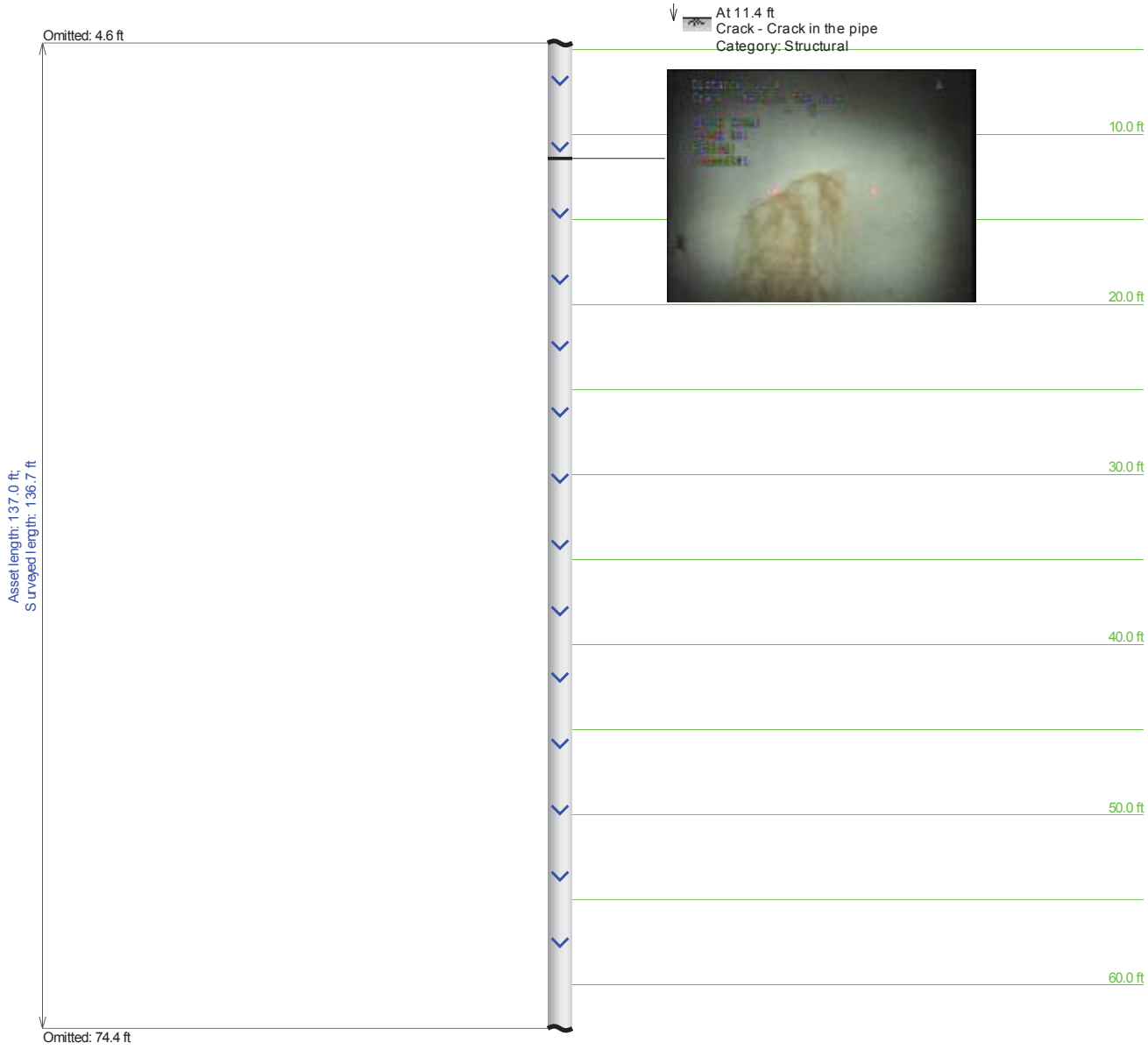
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1501 | Columbia, SC | I77-North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 136.7 | Tina Watkins | |



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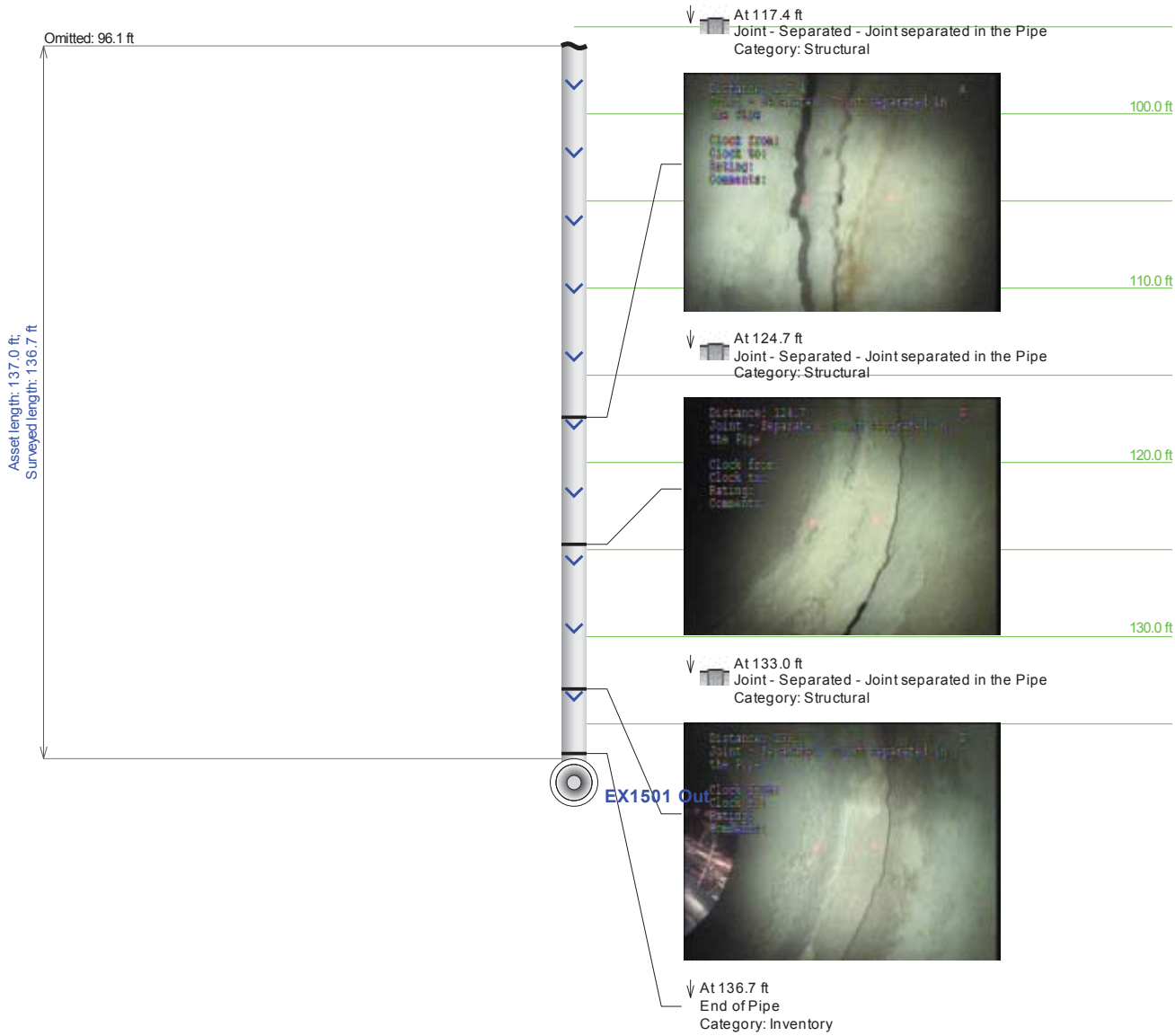
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1501 | Columbia, SC | I77-North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 136.7 | Tina Watkins | |



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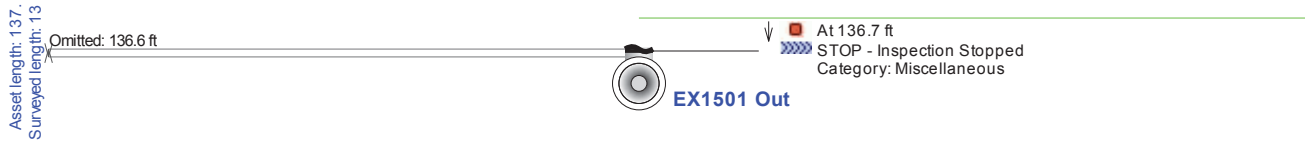
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1501 | Columbia, SC | I77-North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 136.7 | Tina Watkins | |



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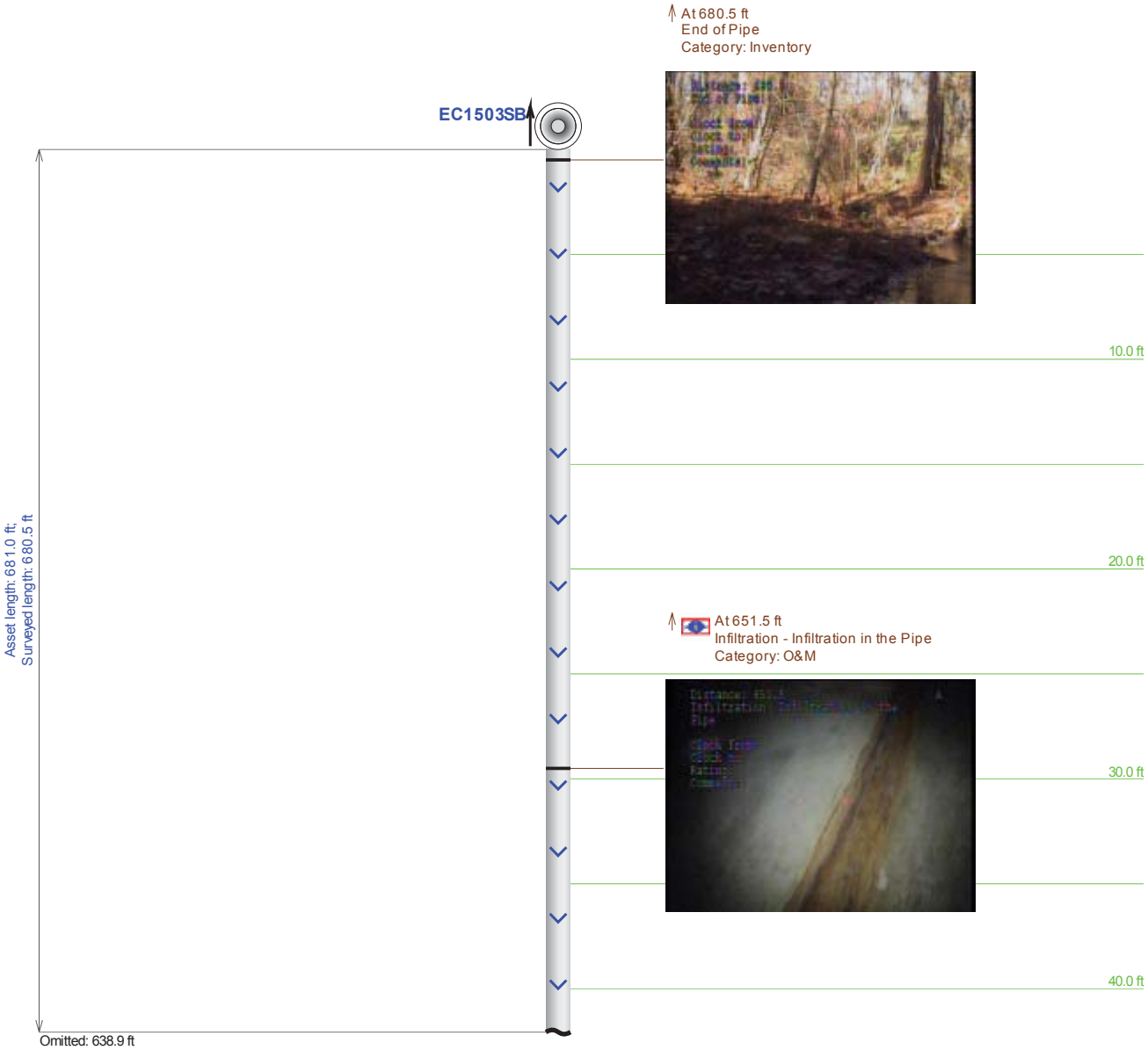
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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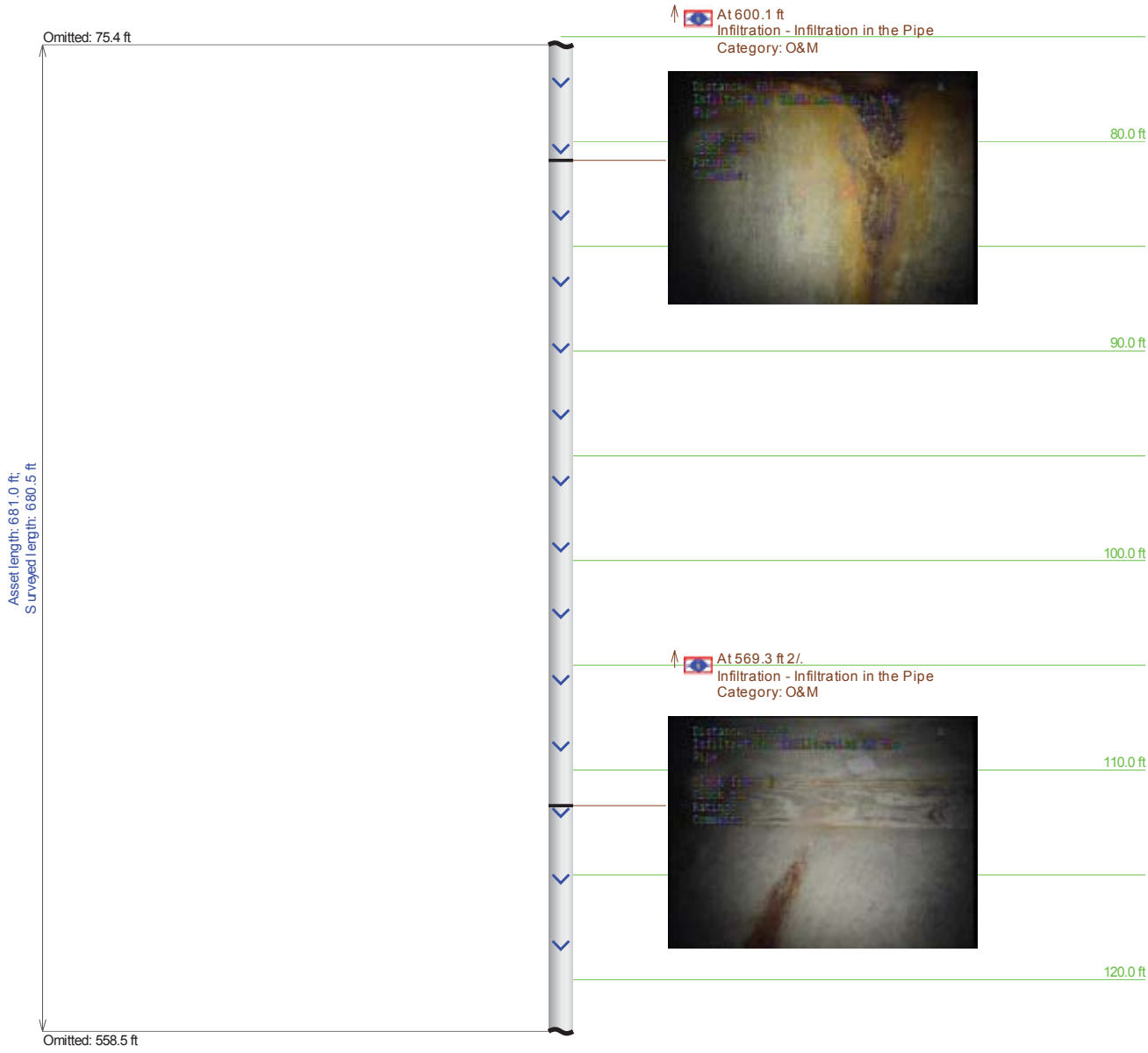
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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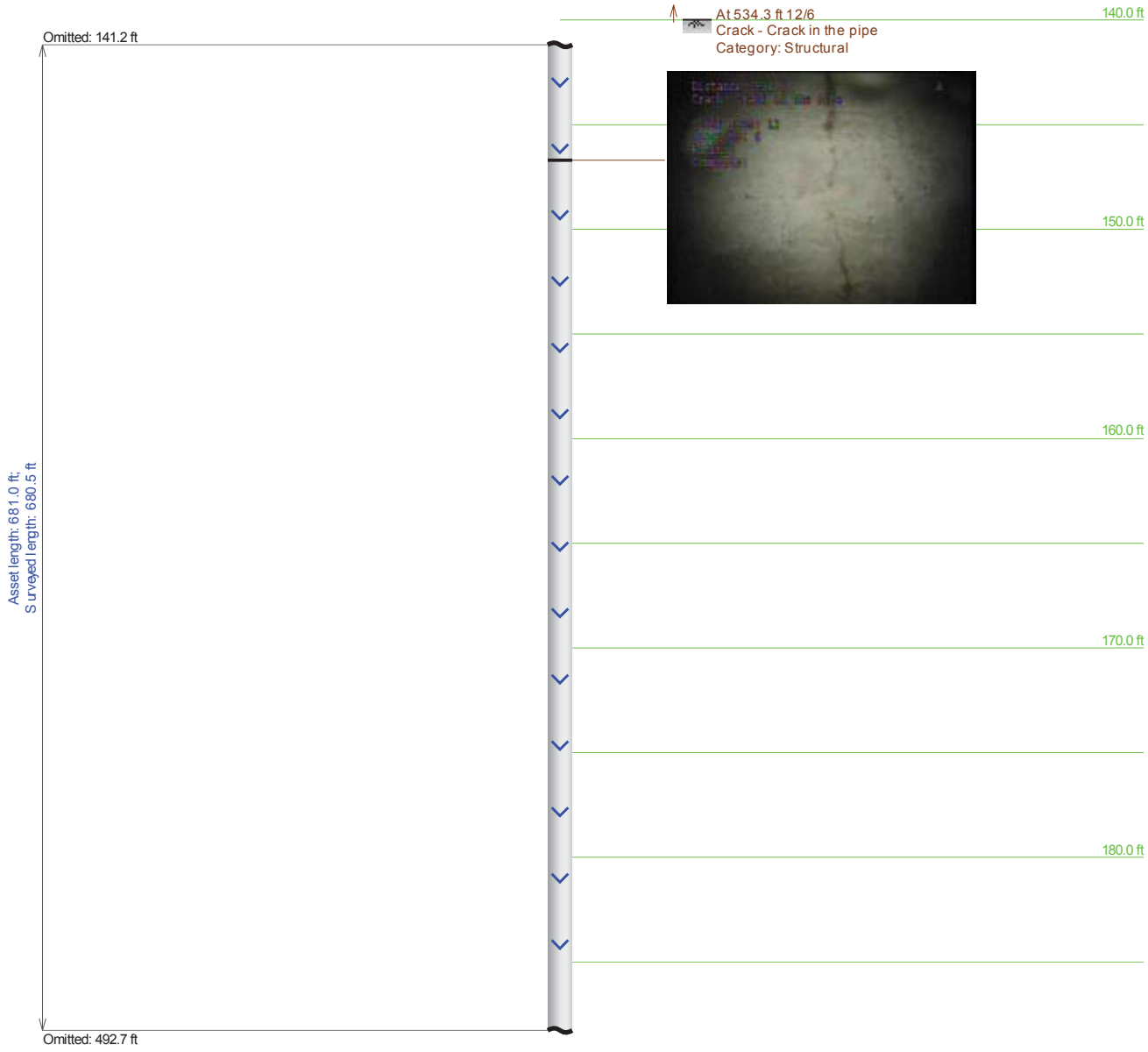
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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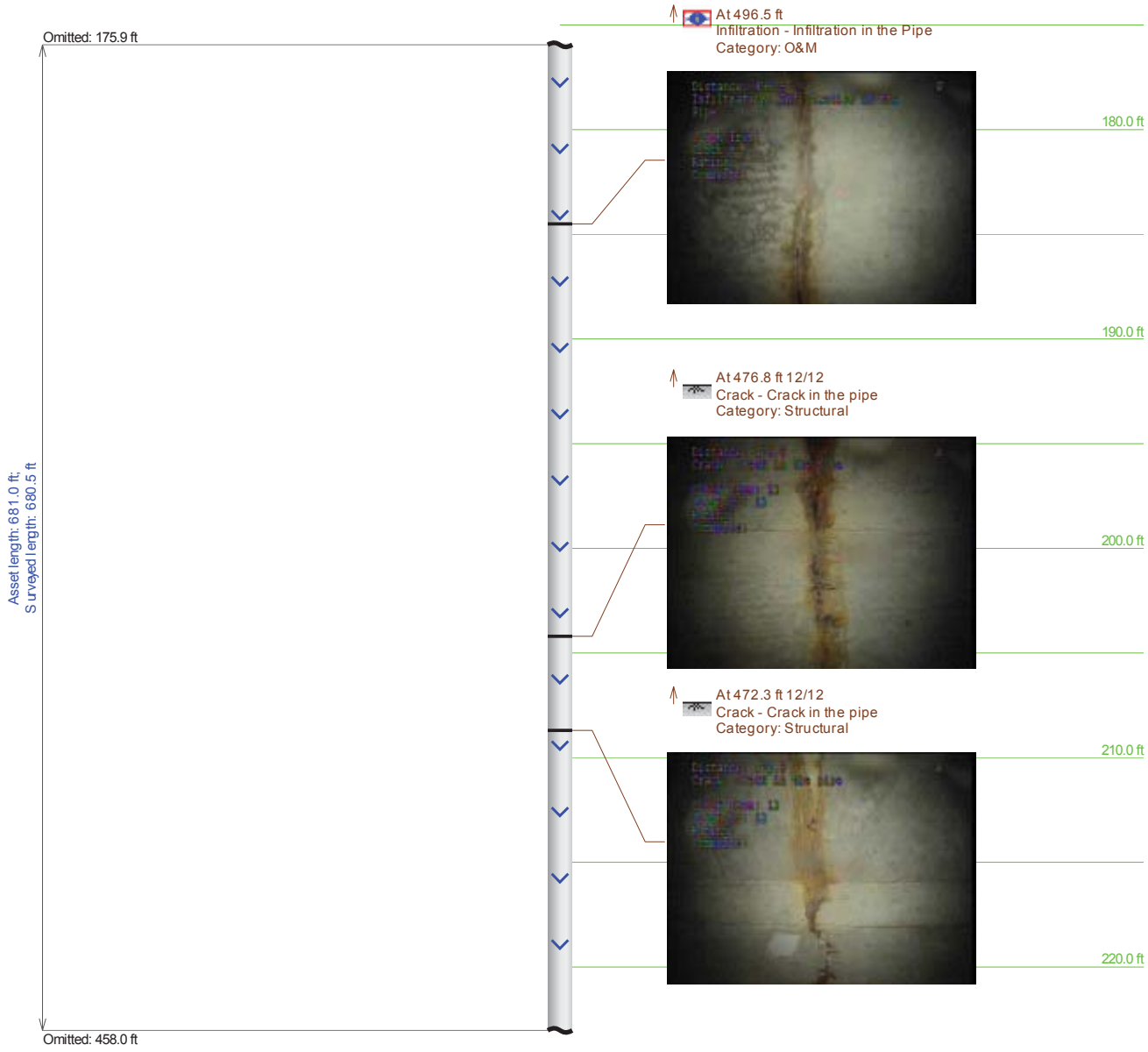
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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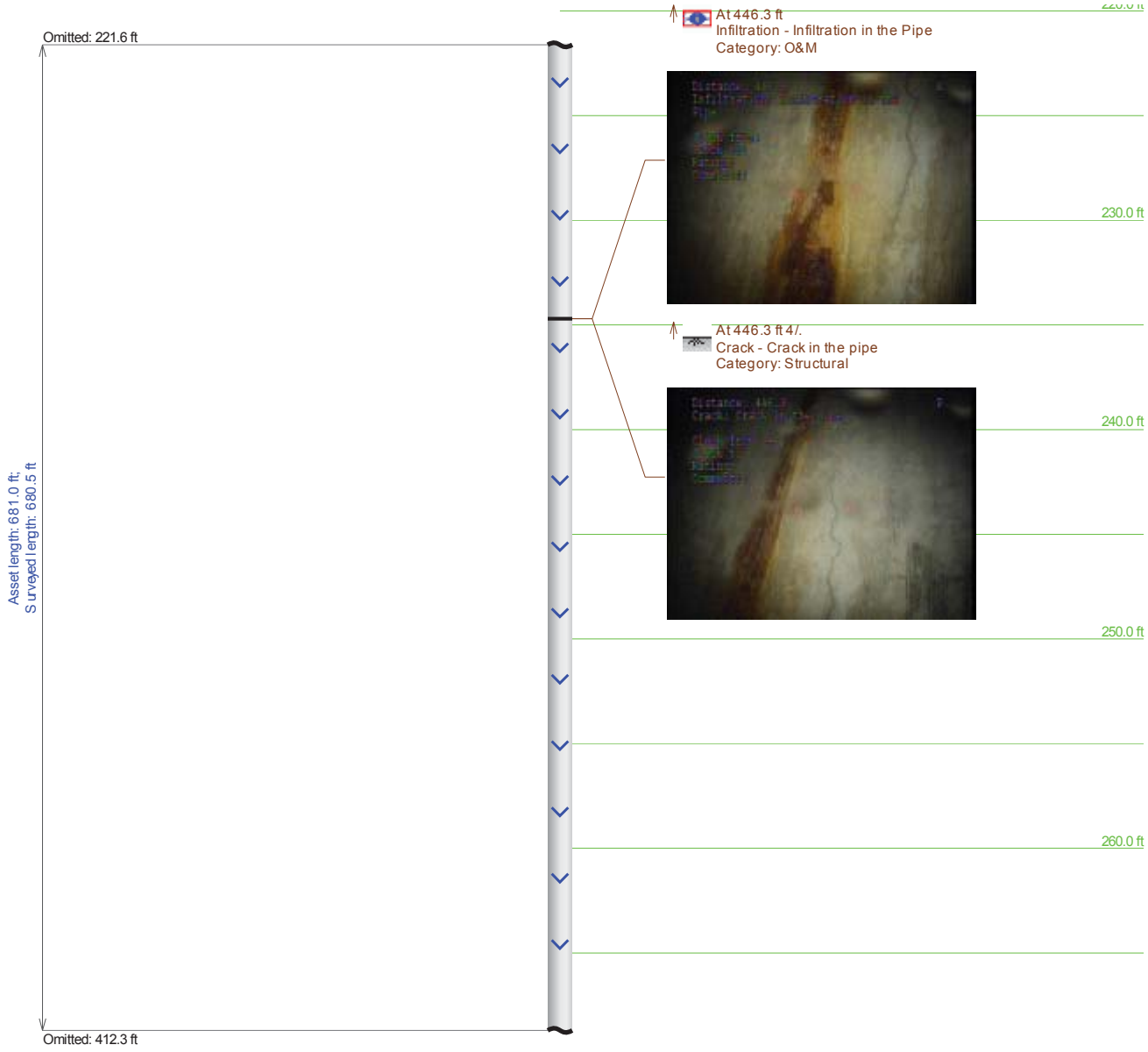
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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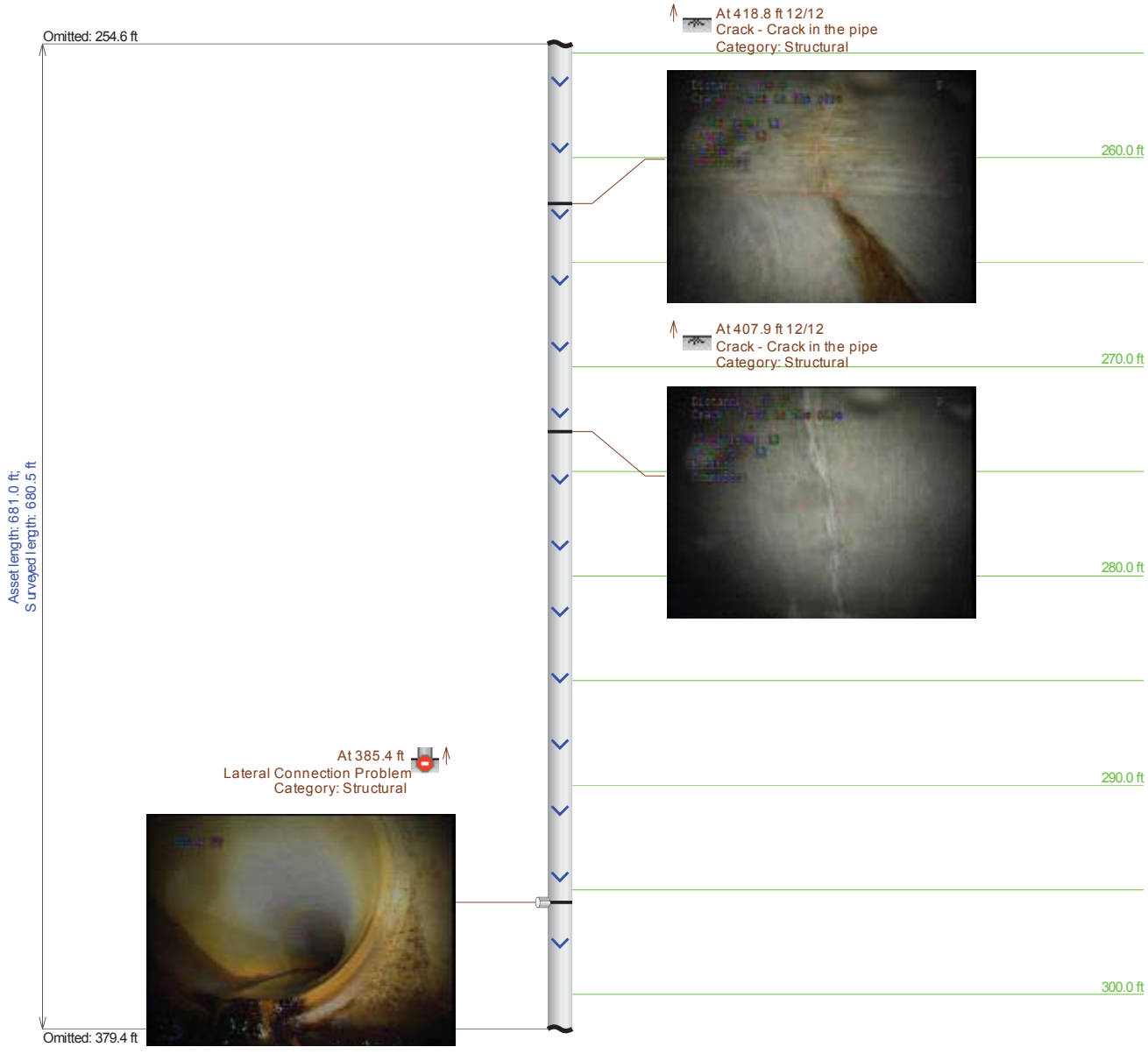
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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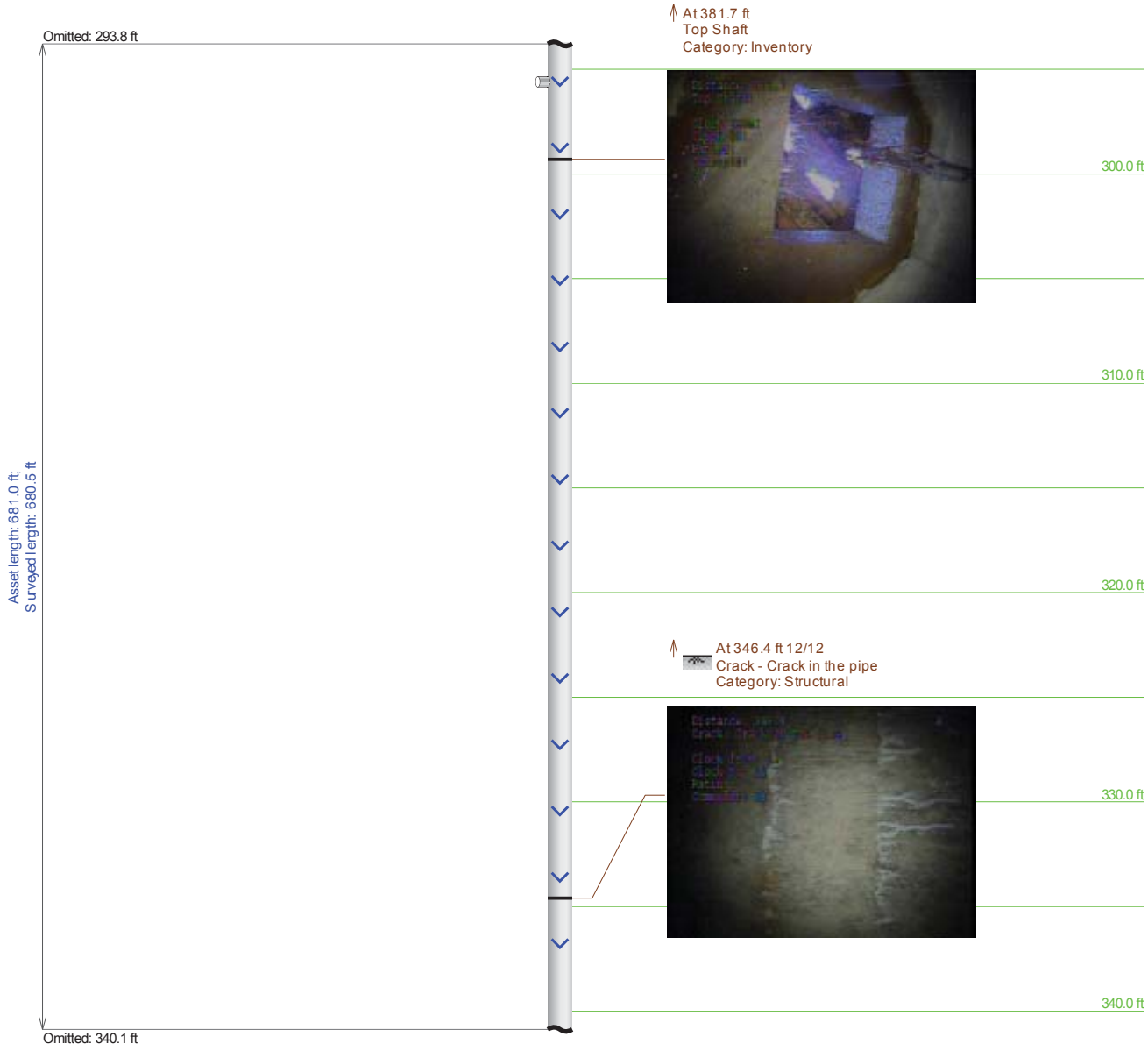
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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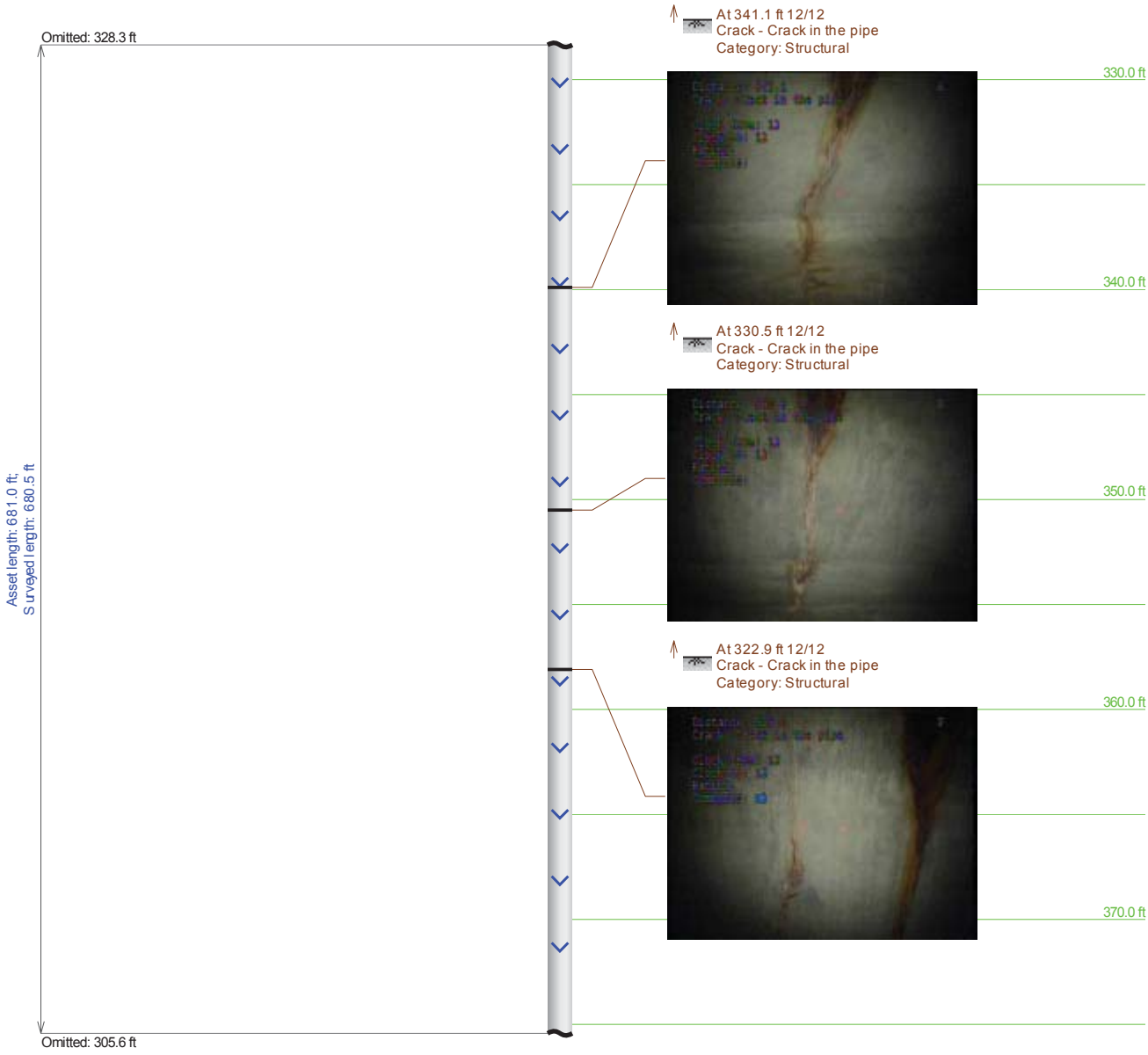
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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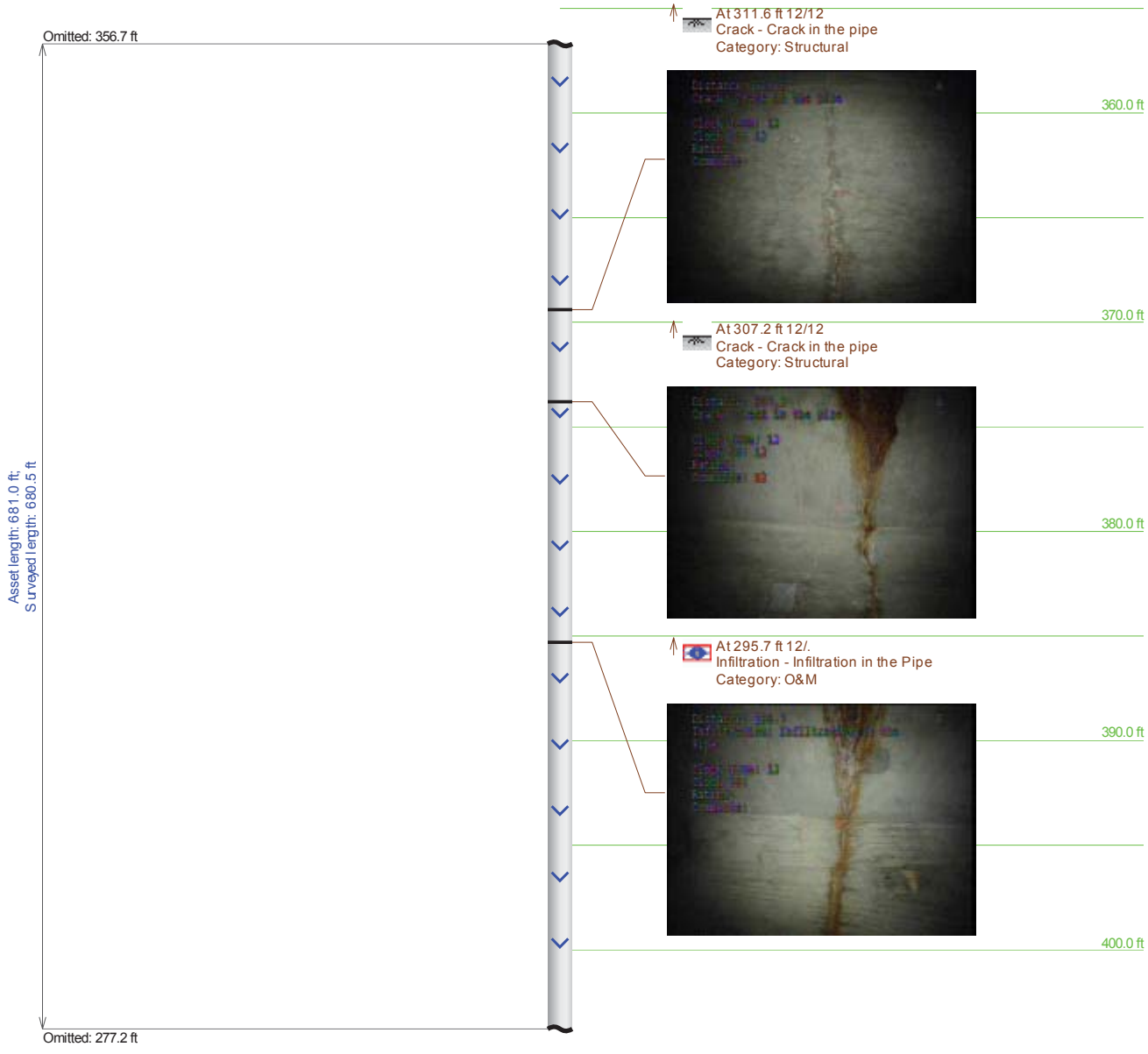
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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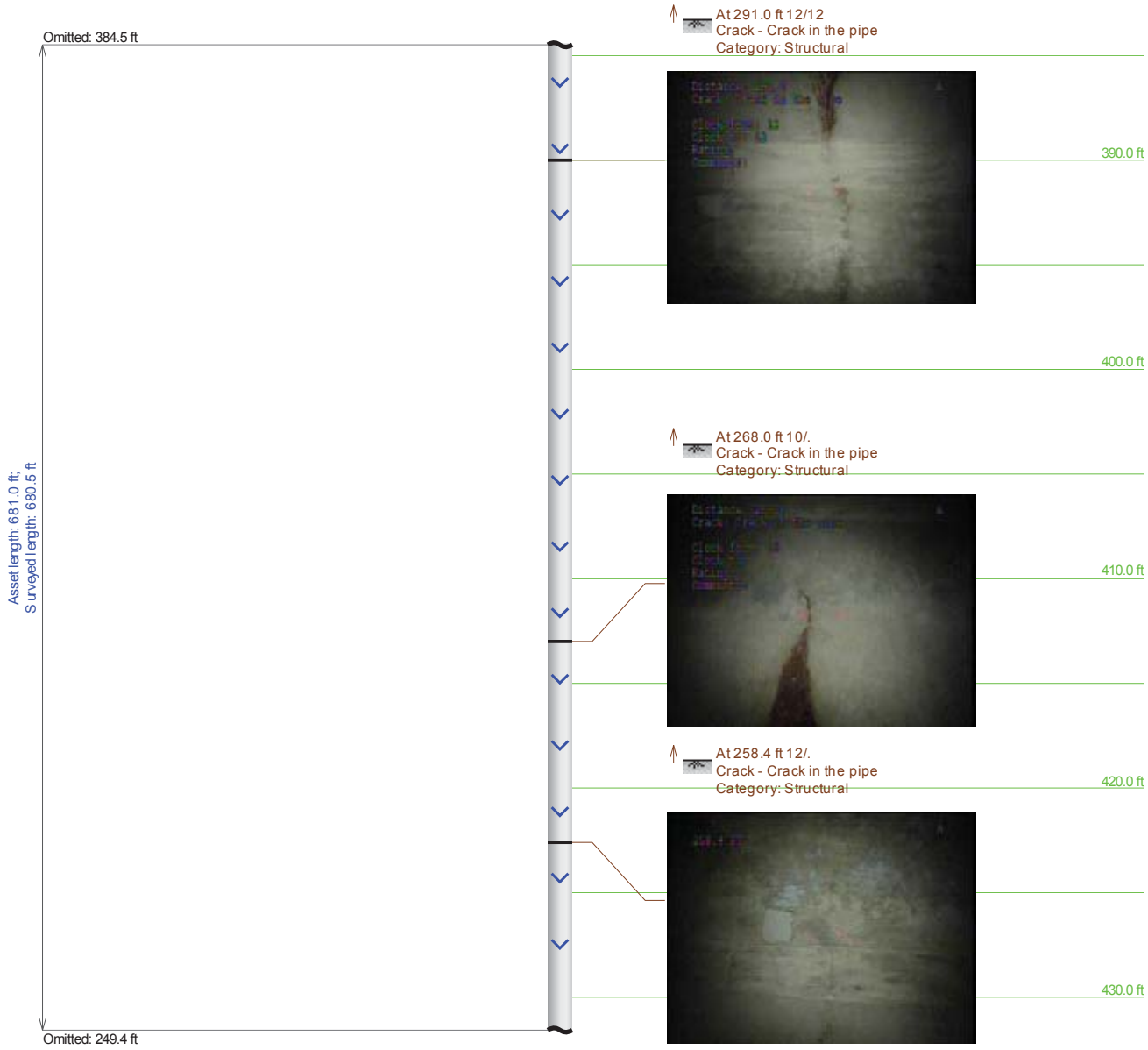
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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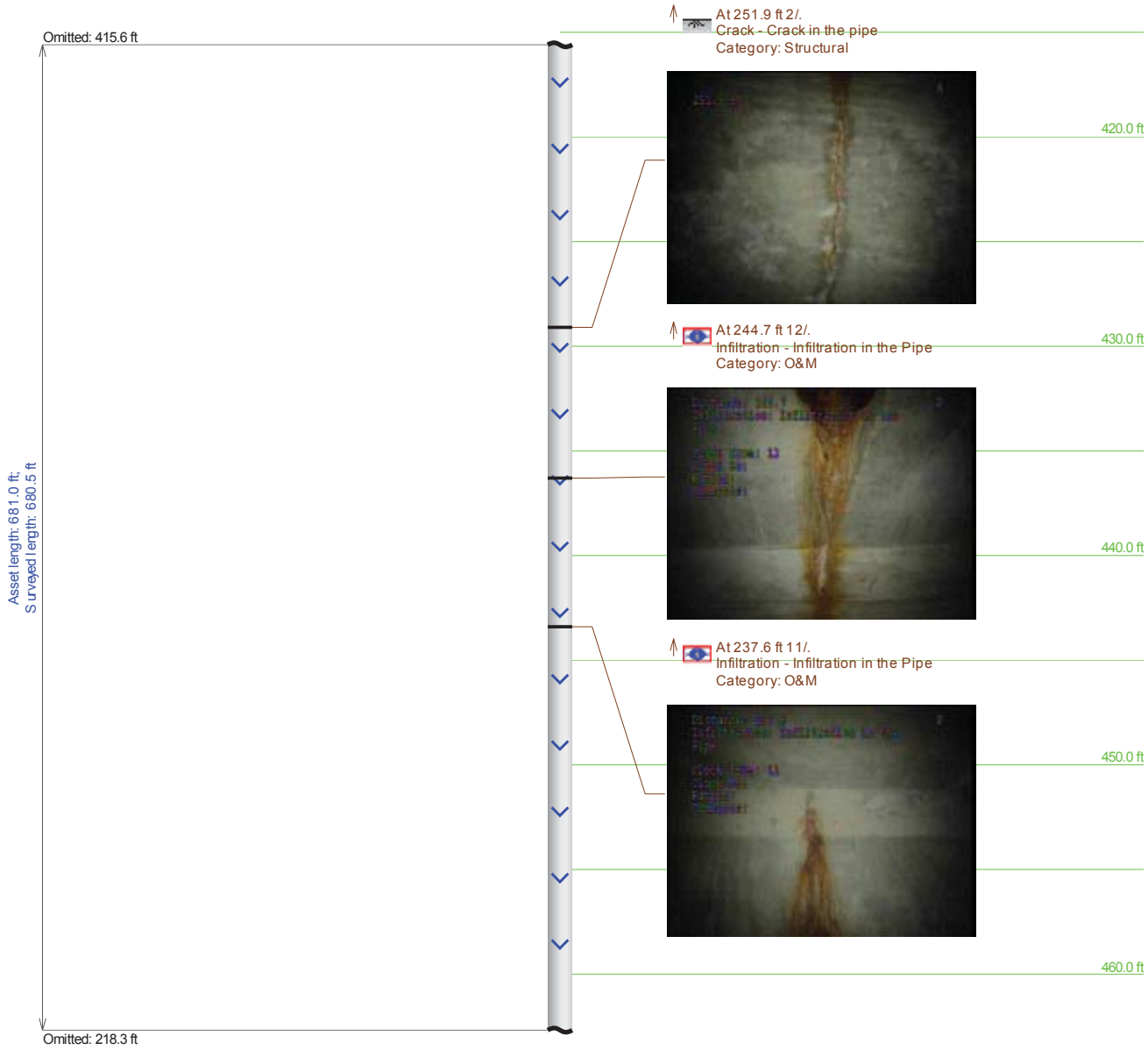
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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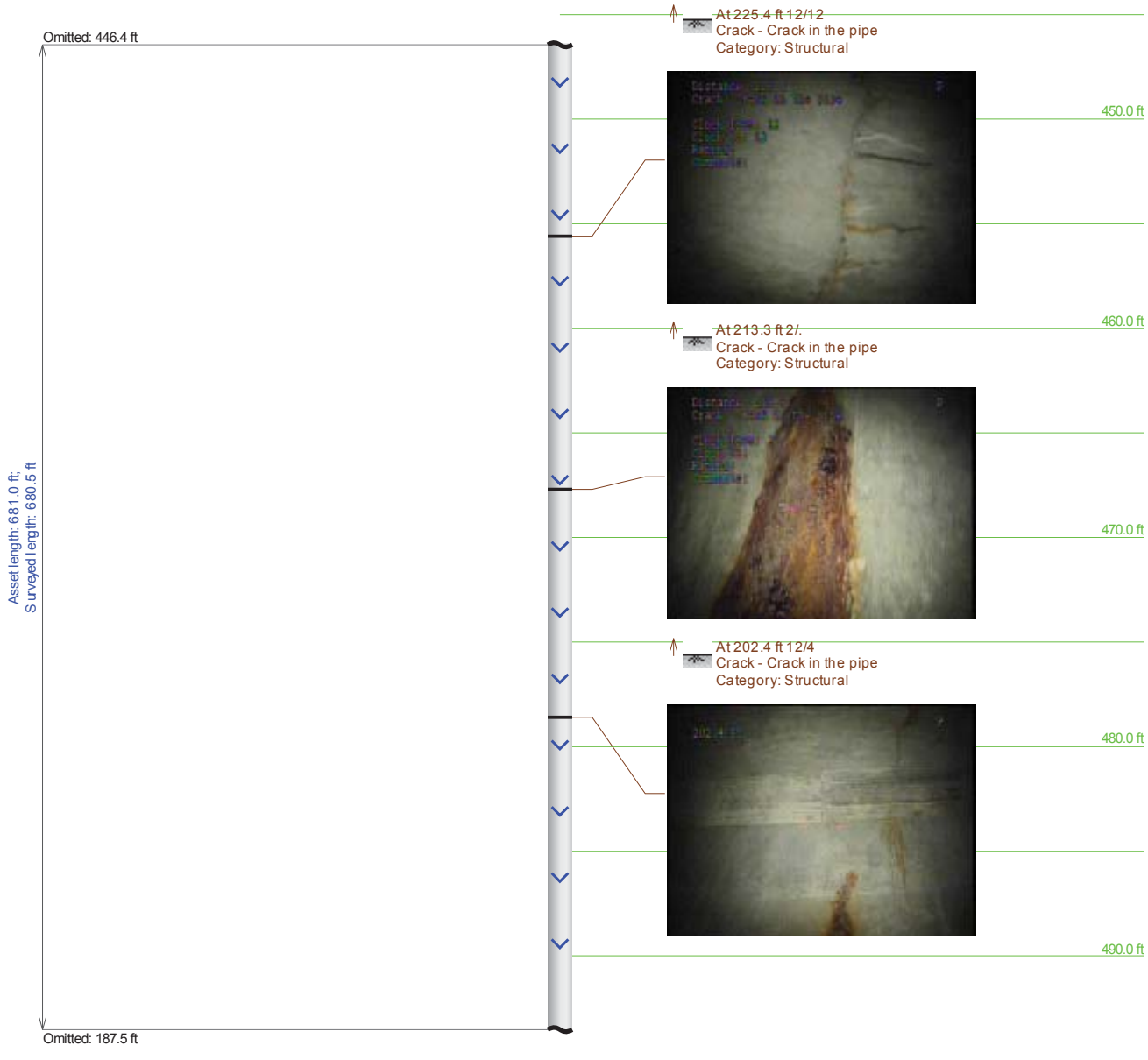
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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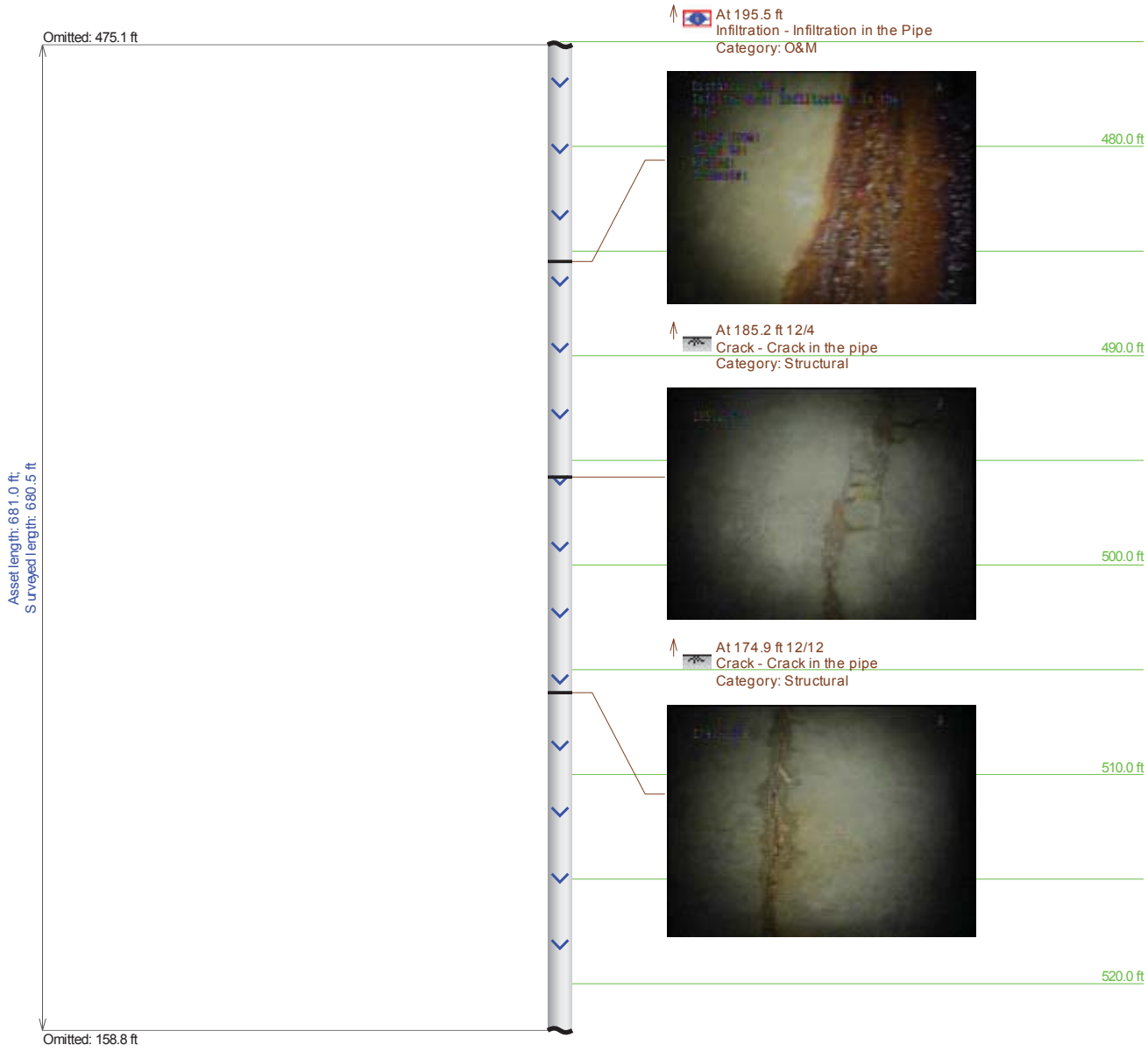
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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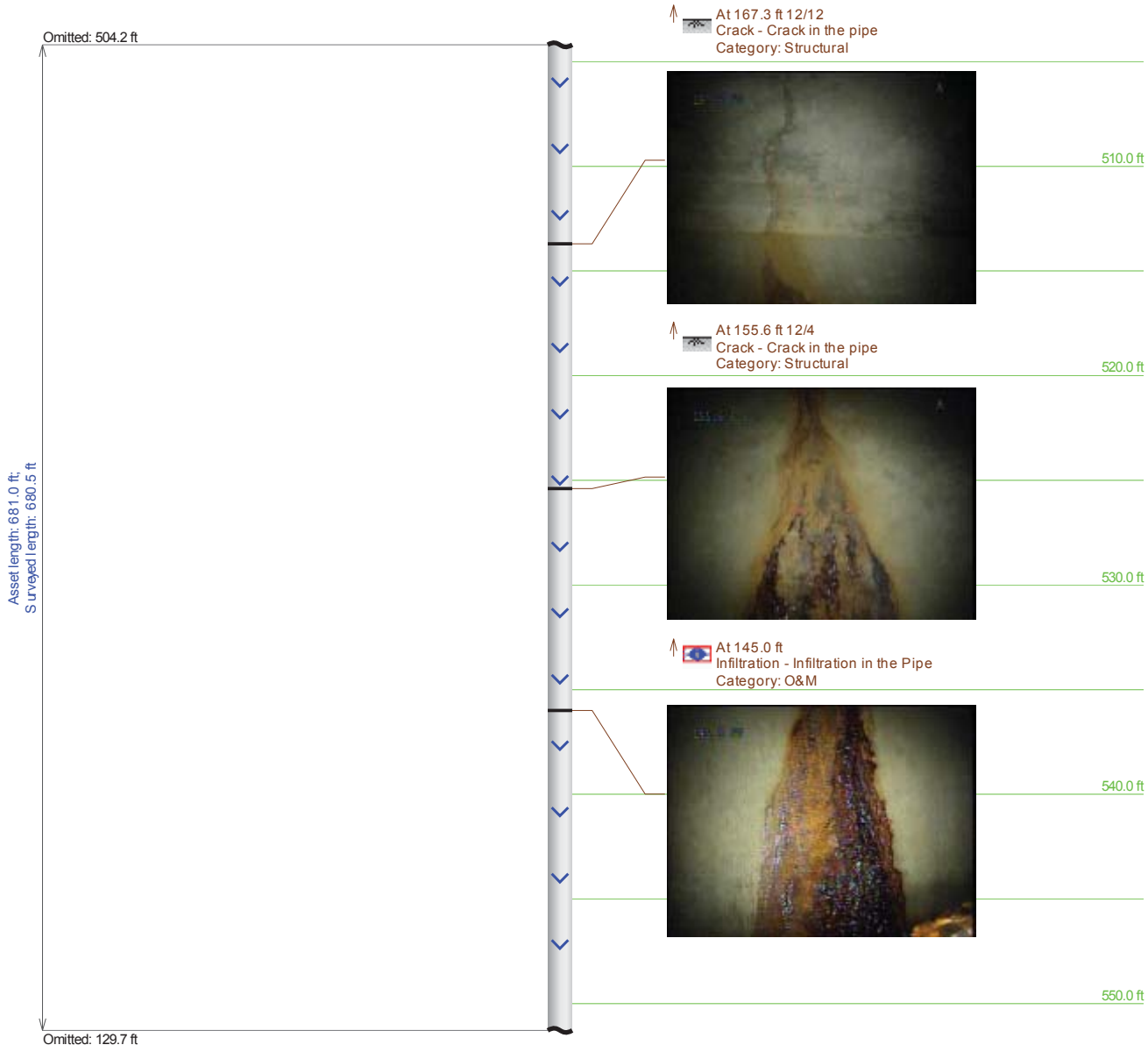
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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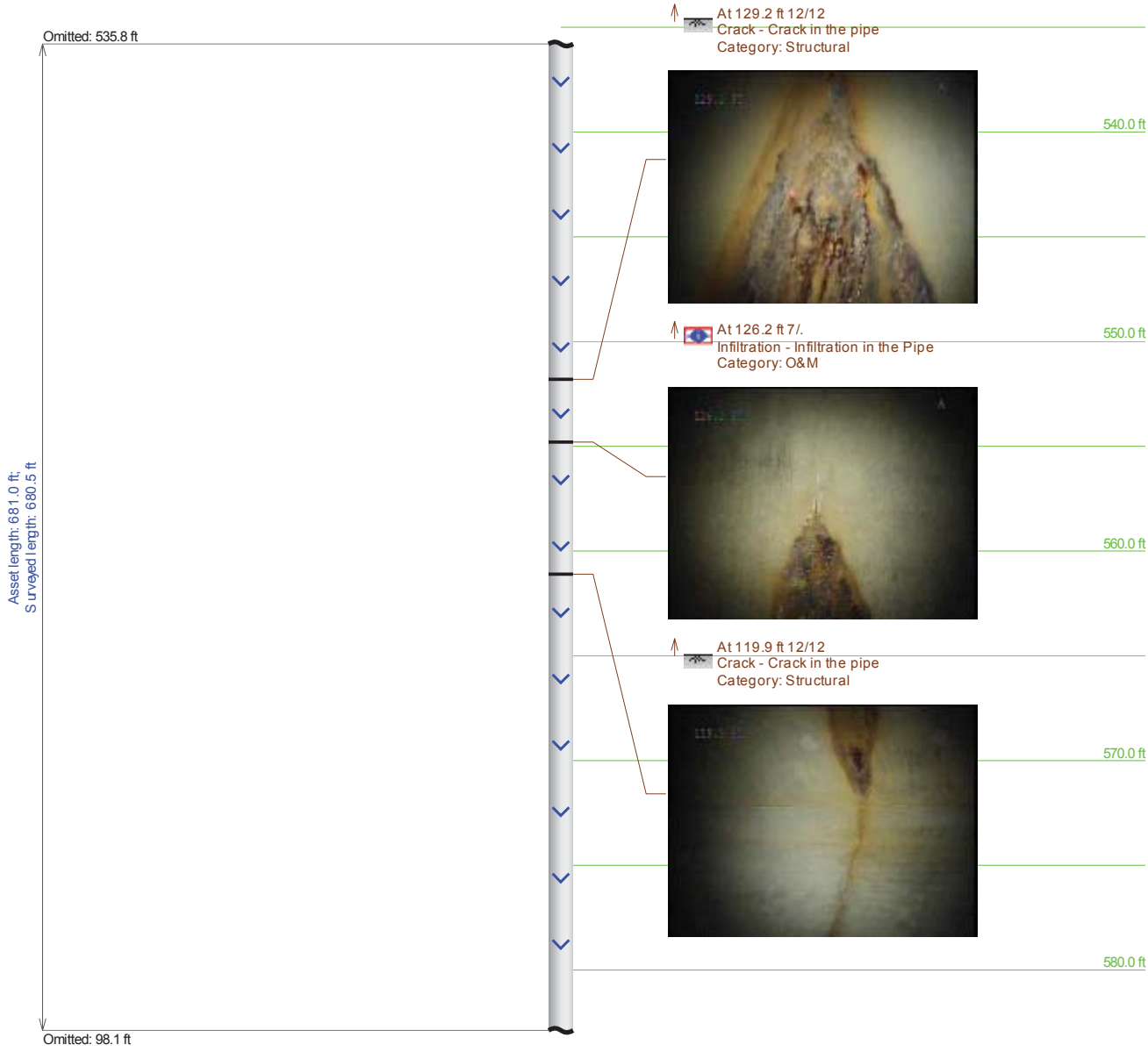
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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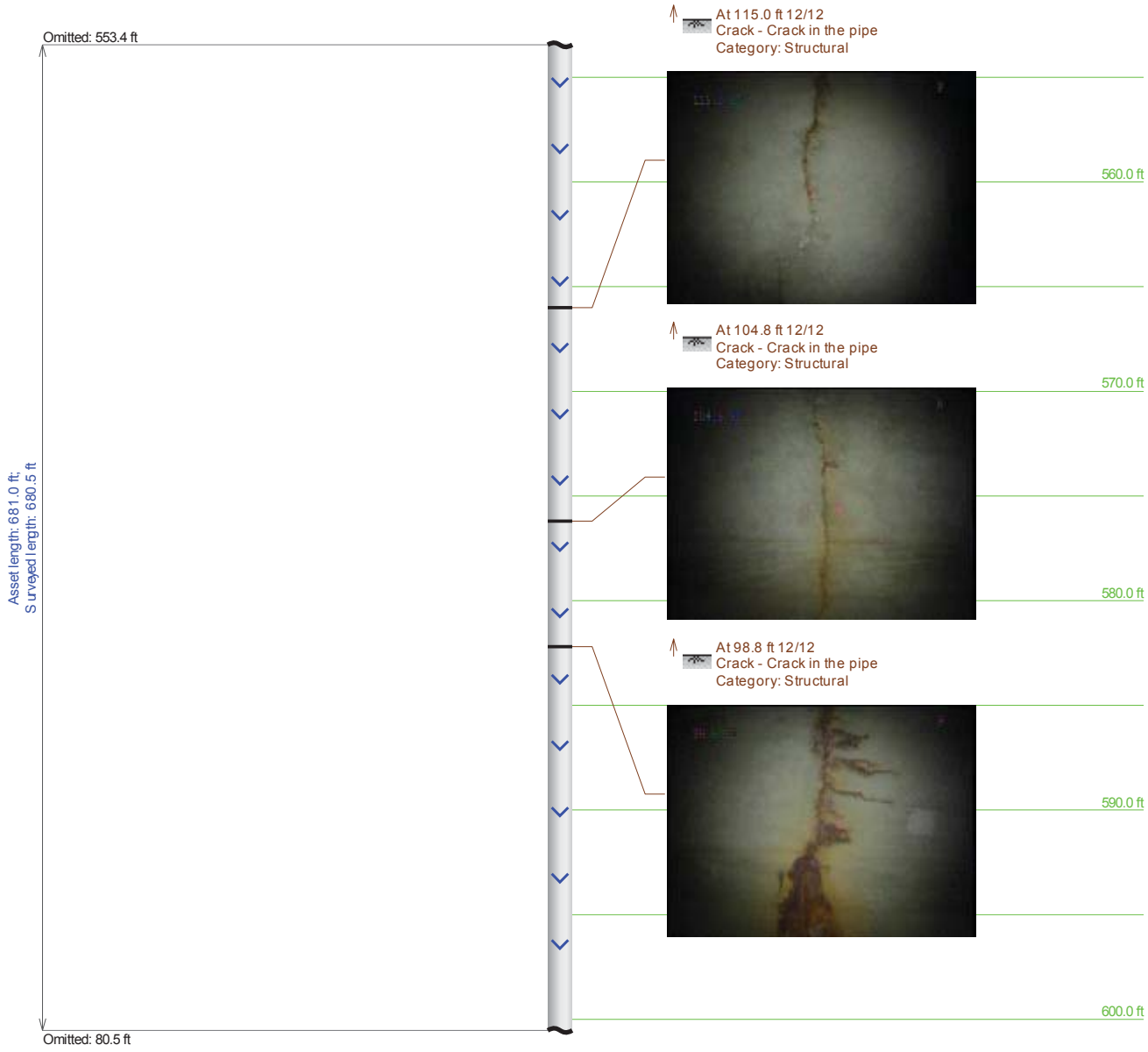
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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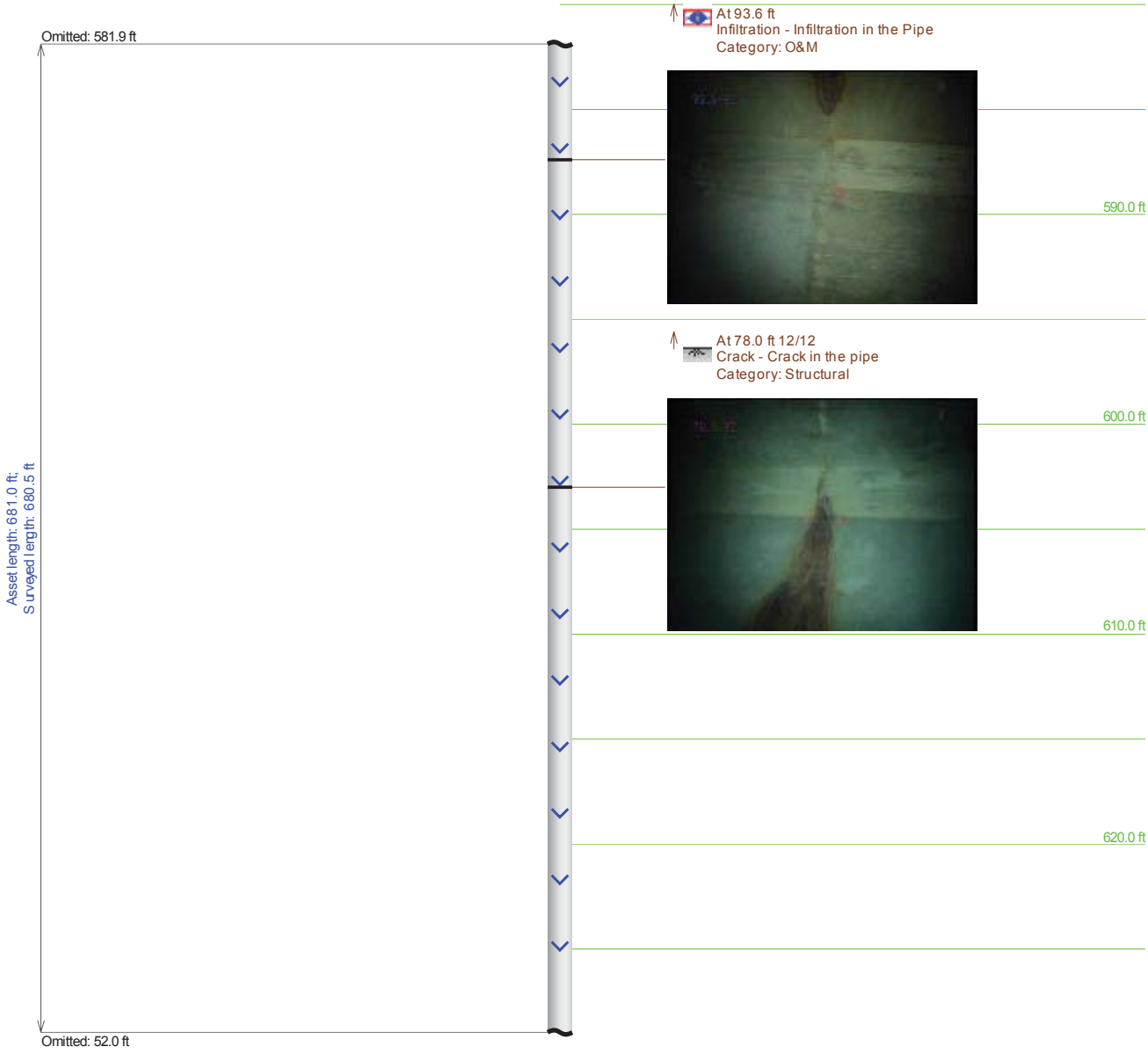
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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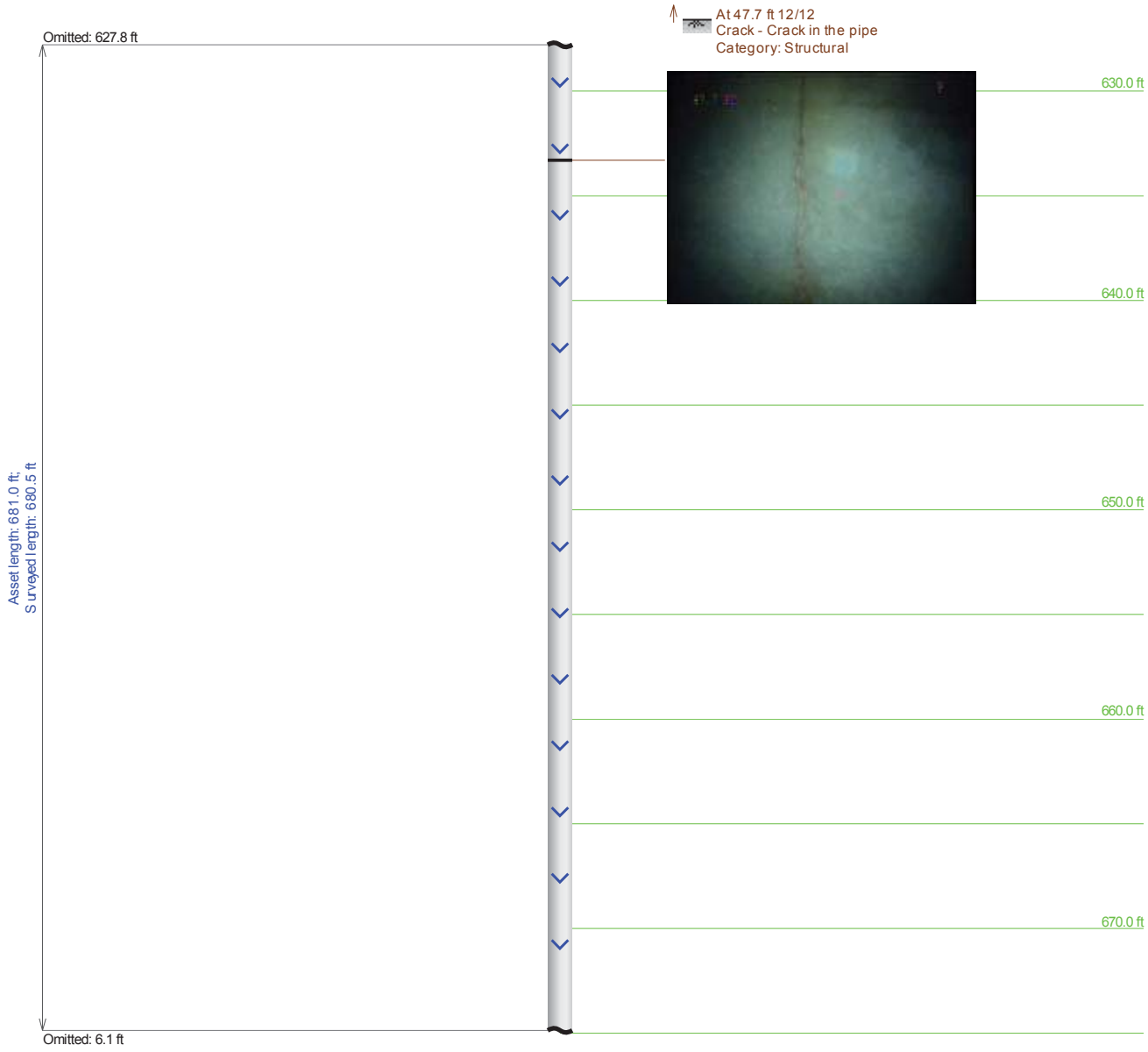
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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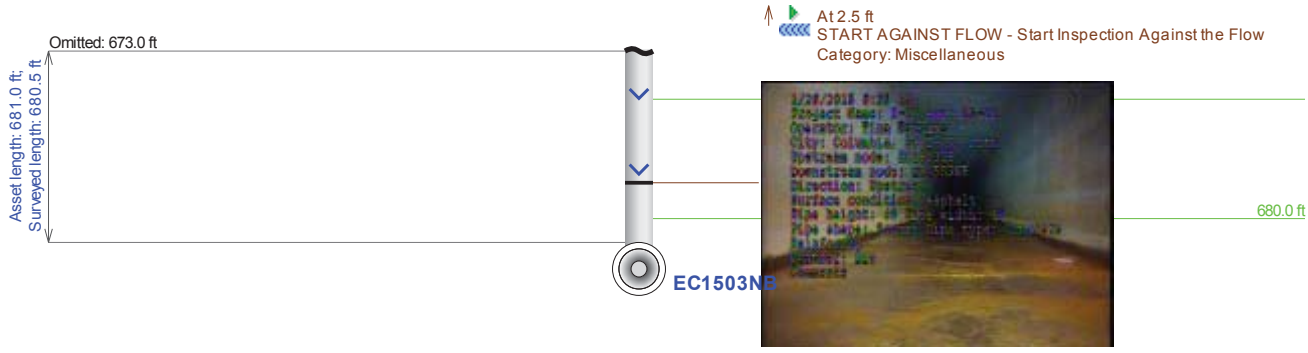
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EC1503 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 48 | 48 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 680.5 | Tina Watkins | |



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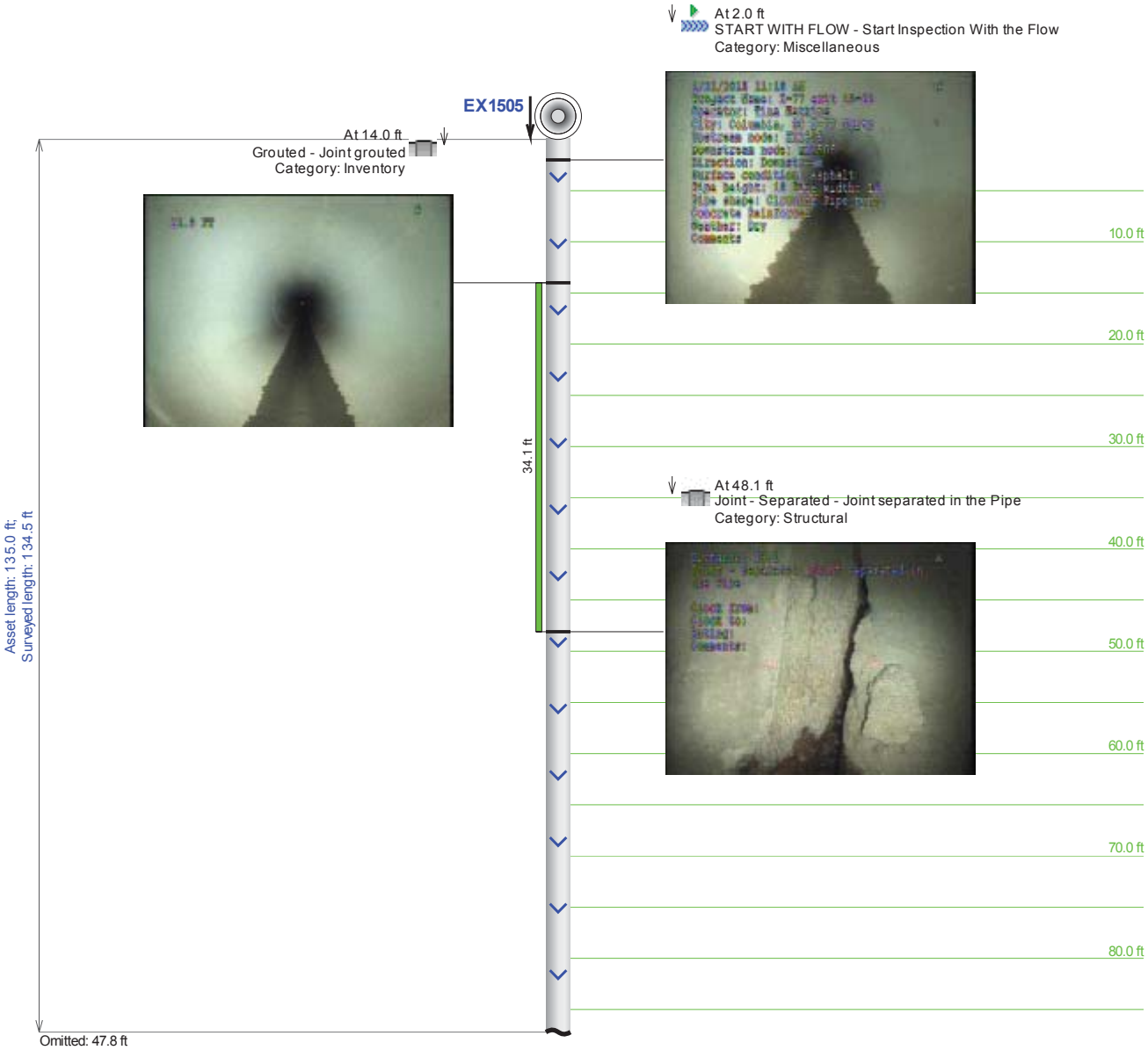
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1506 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 134.5 | Tina Watkins | |



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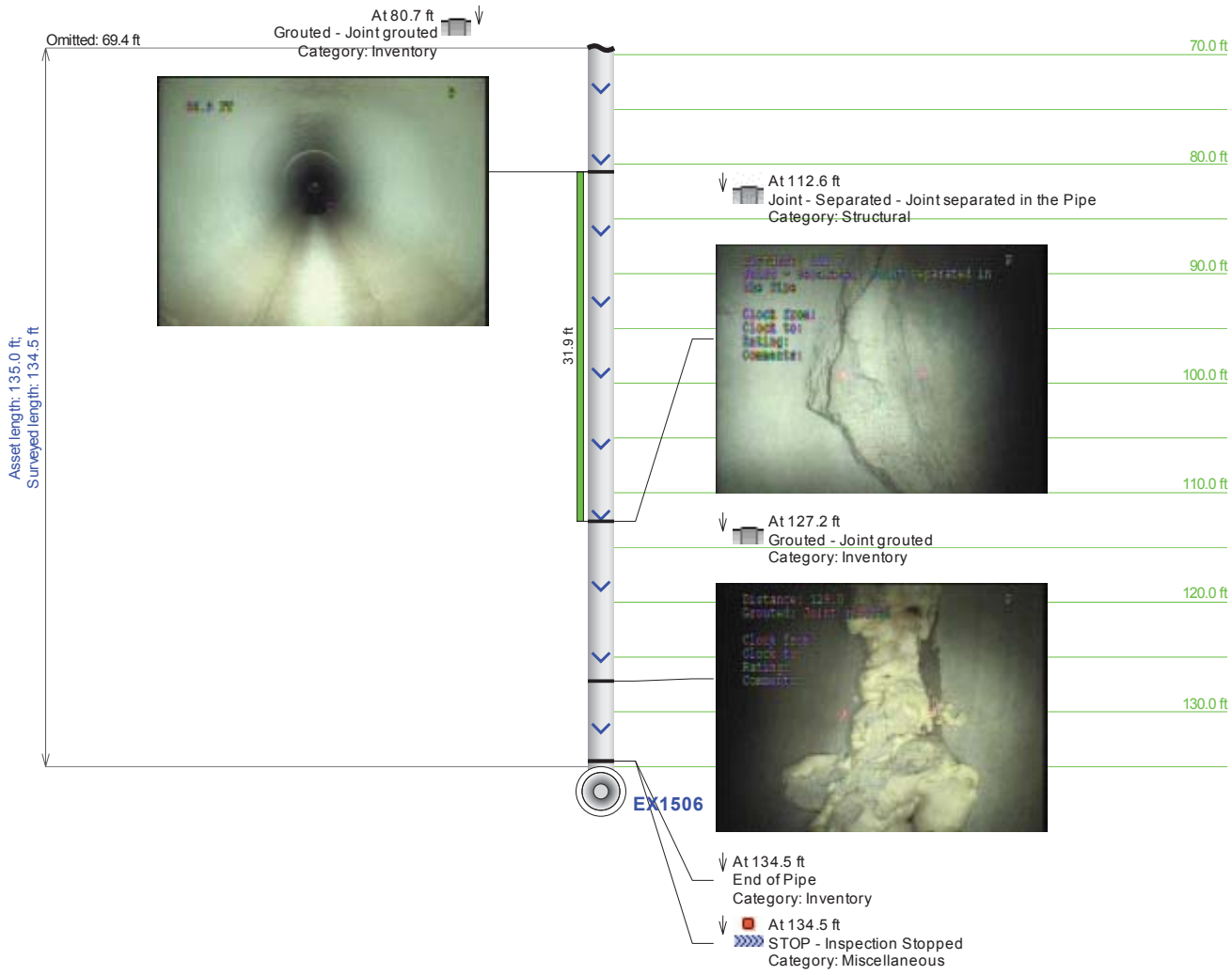
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1506 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 134.5 | Tina Watkins | |



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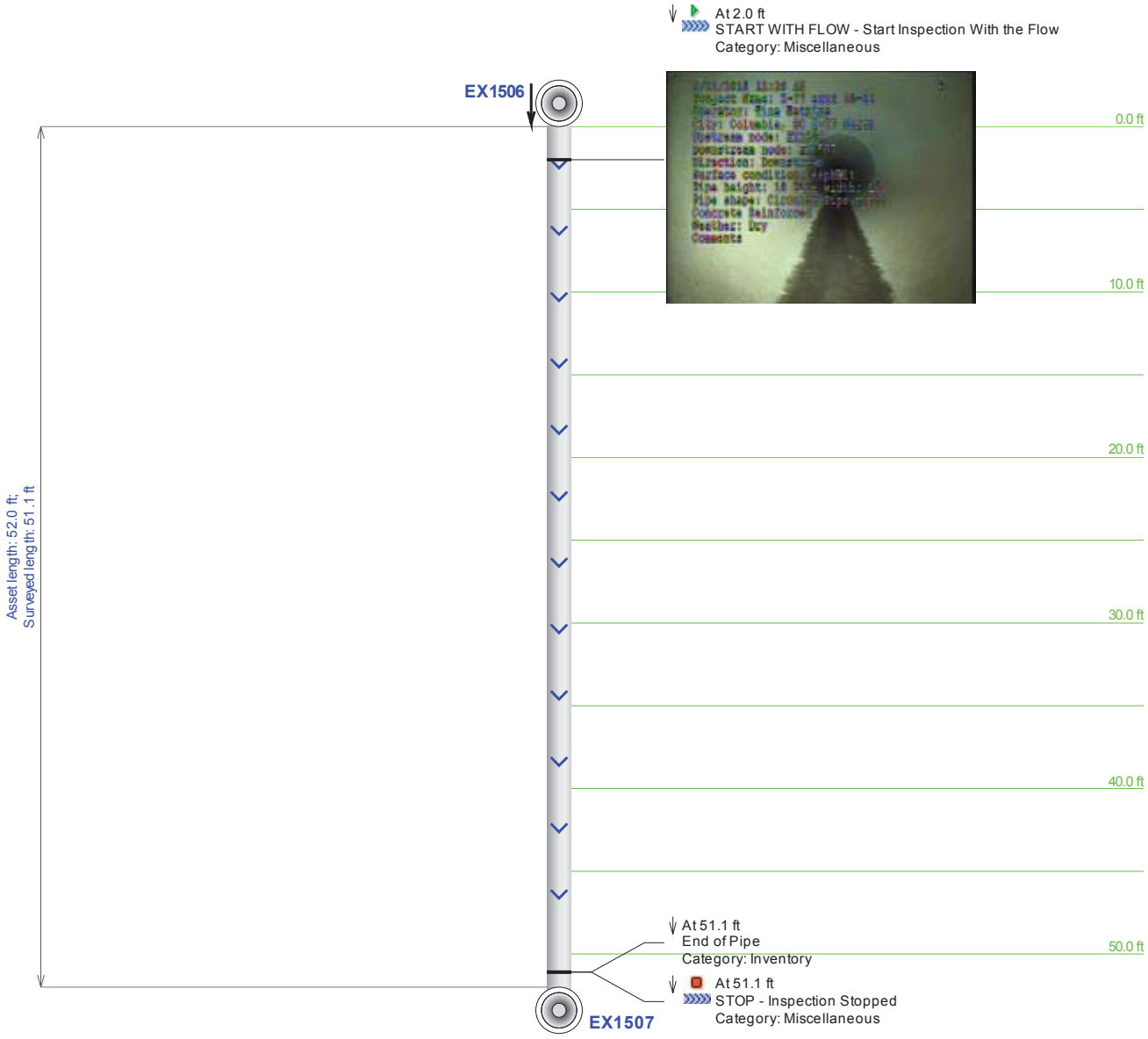
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1507 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 51.1 | Tina Watkins | |



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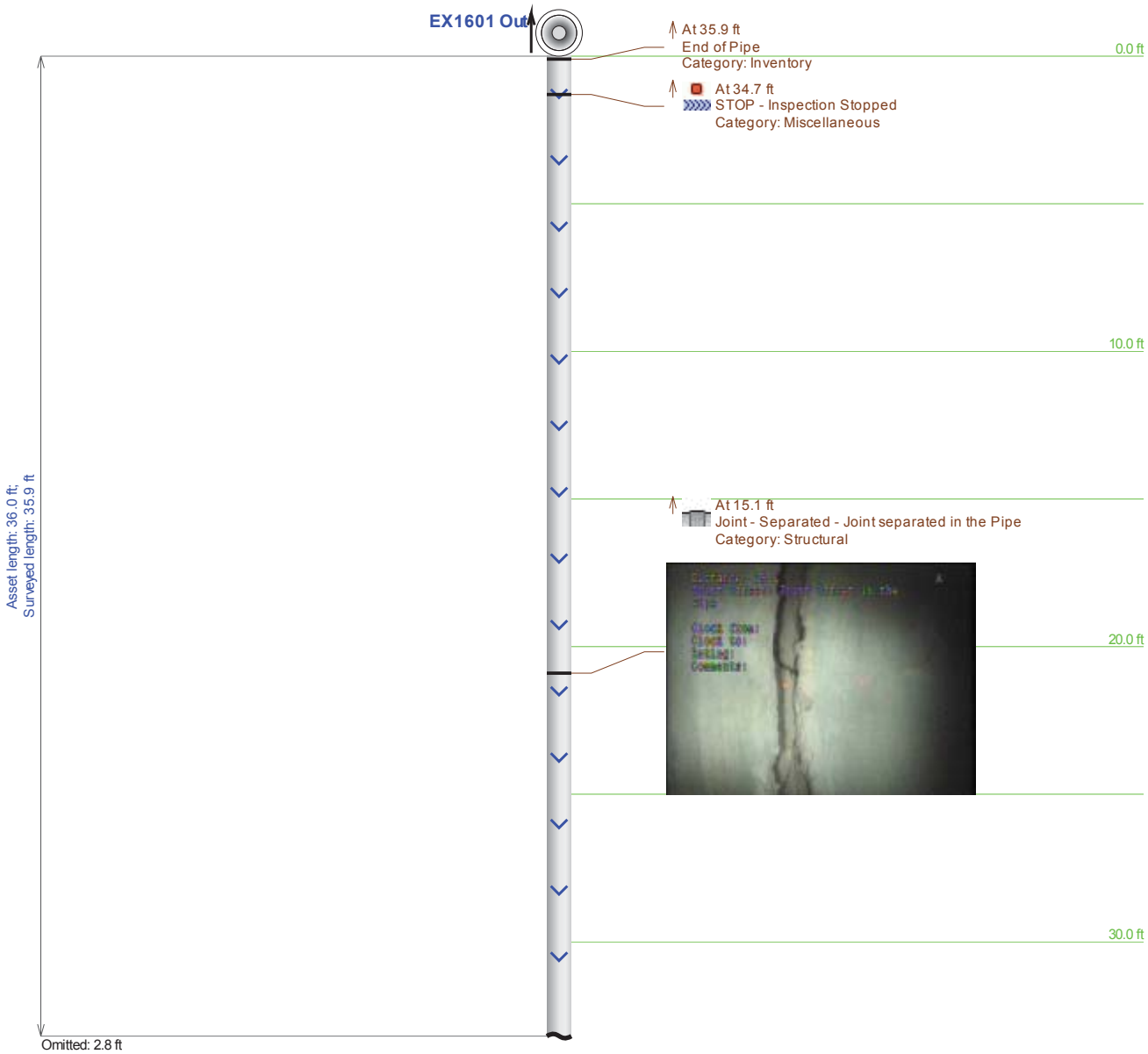
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1601 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 35.9 | Tina Watkins | |



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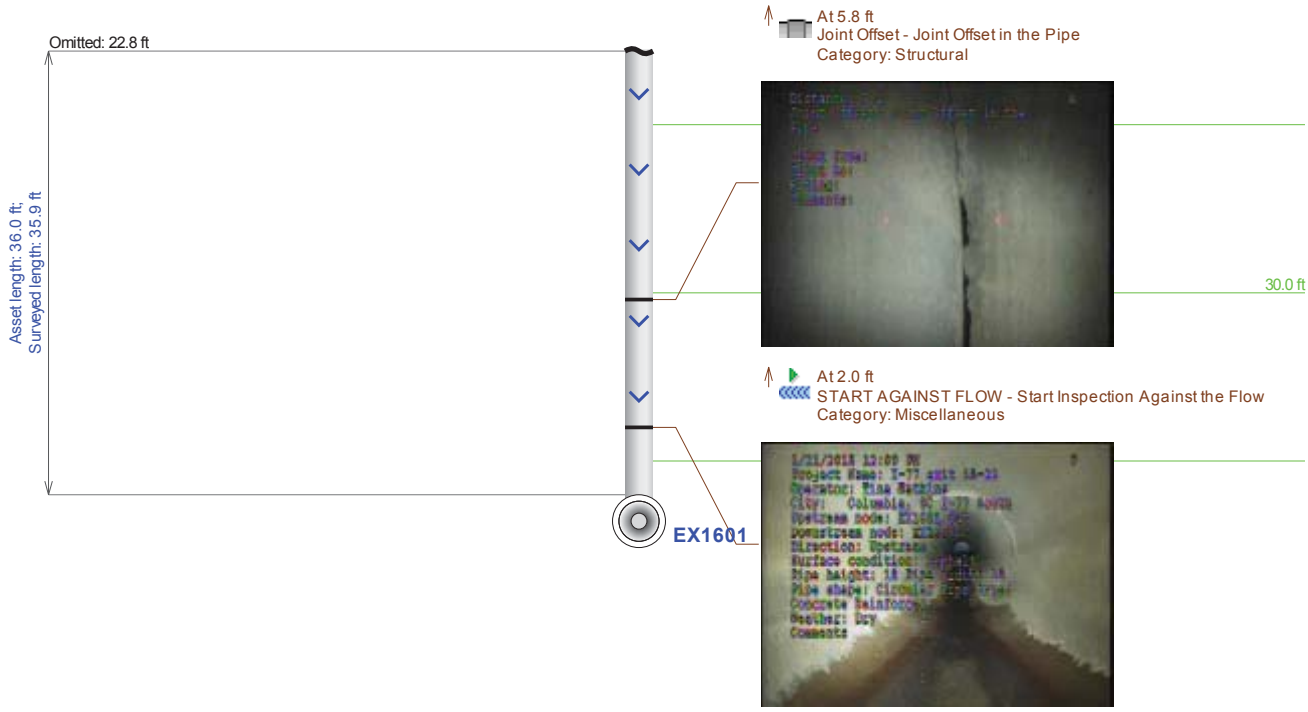
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1601 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 35.9 | Tina Watkins | |



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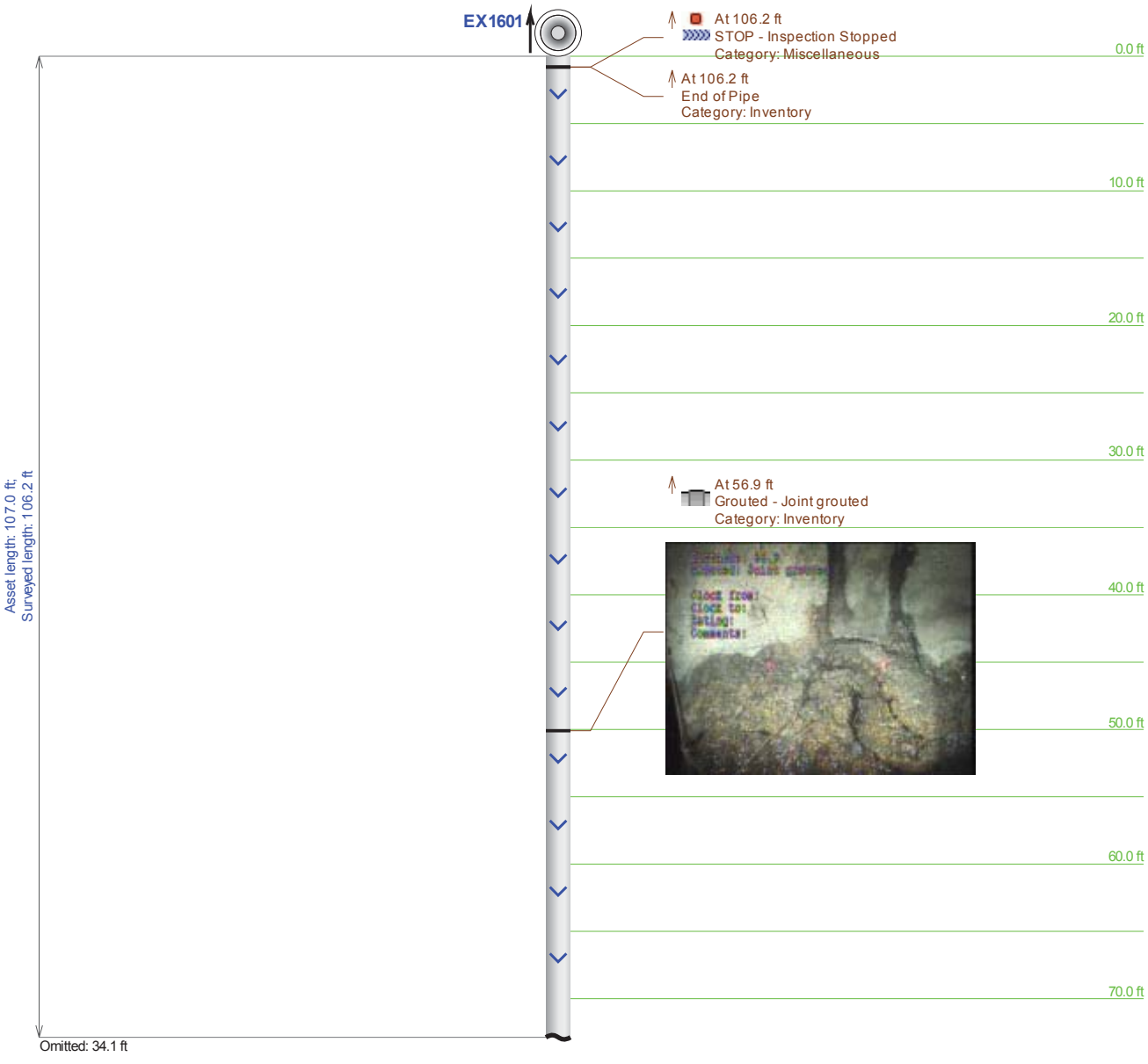
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1602 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 106.2 | Tina Watkins | |



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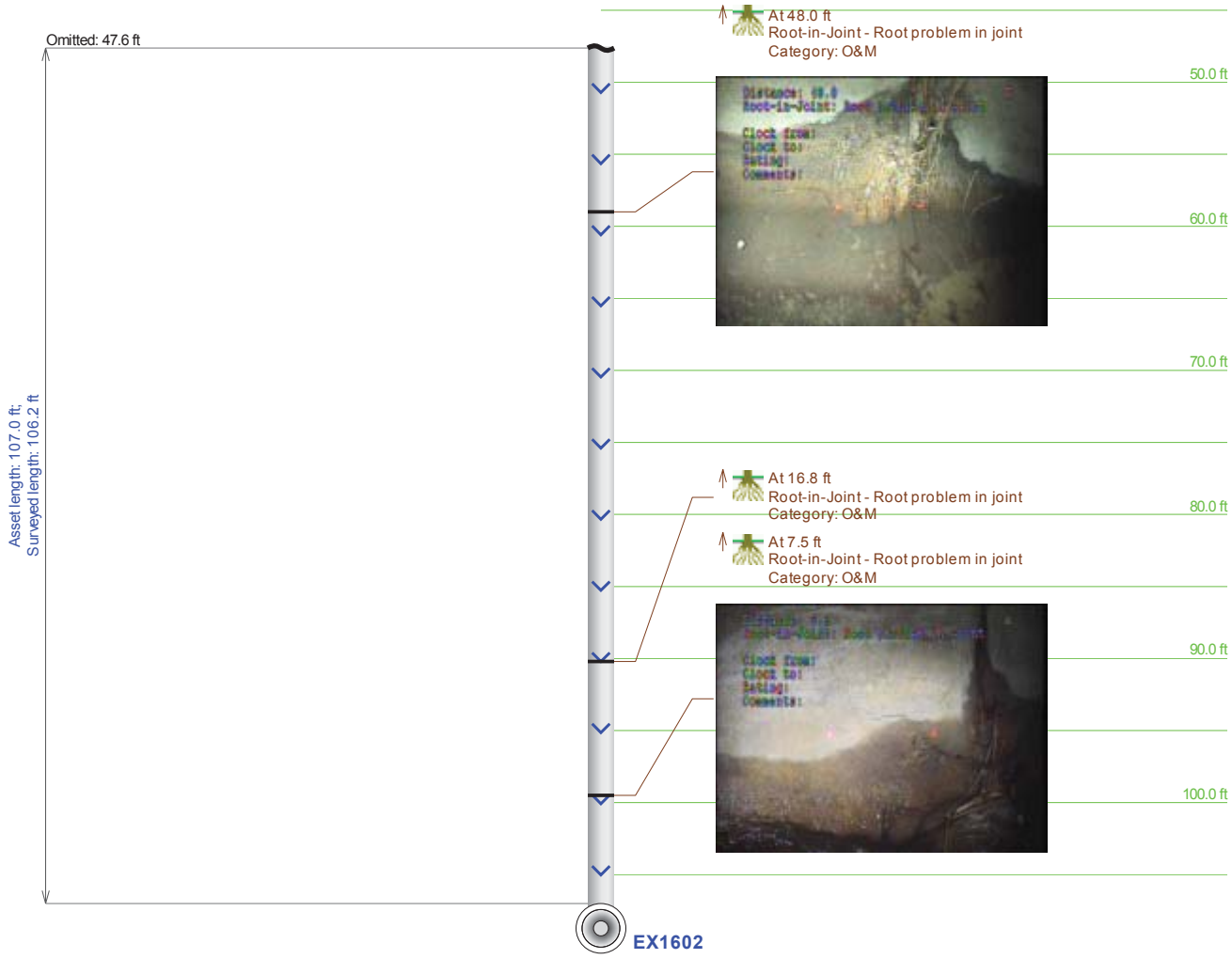
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1602 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 106.2 | Tina Watkins | |



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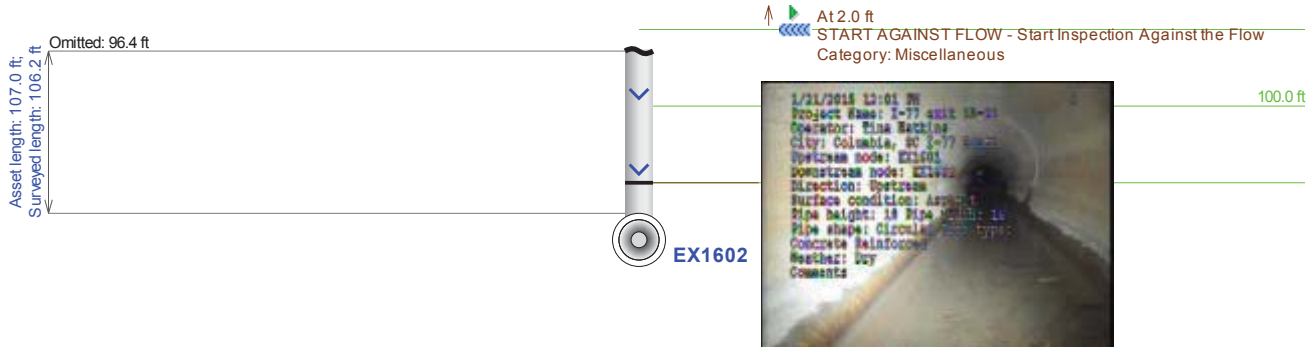
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1602 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 106.2 | Tina Watkins | |



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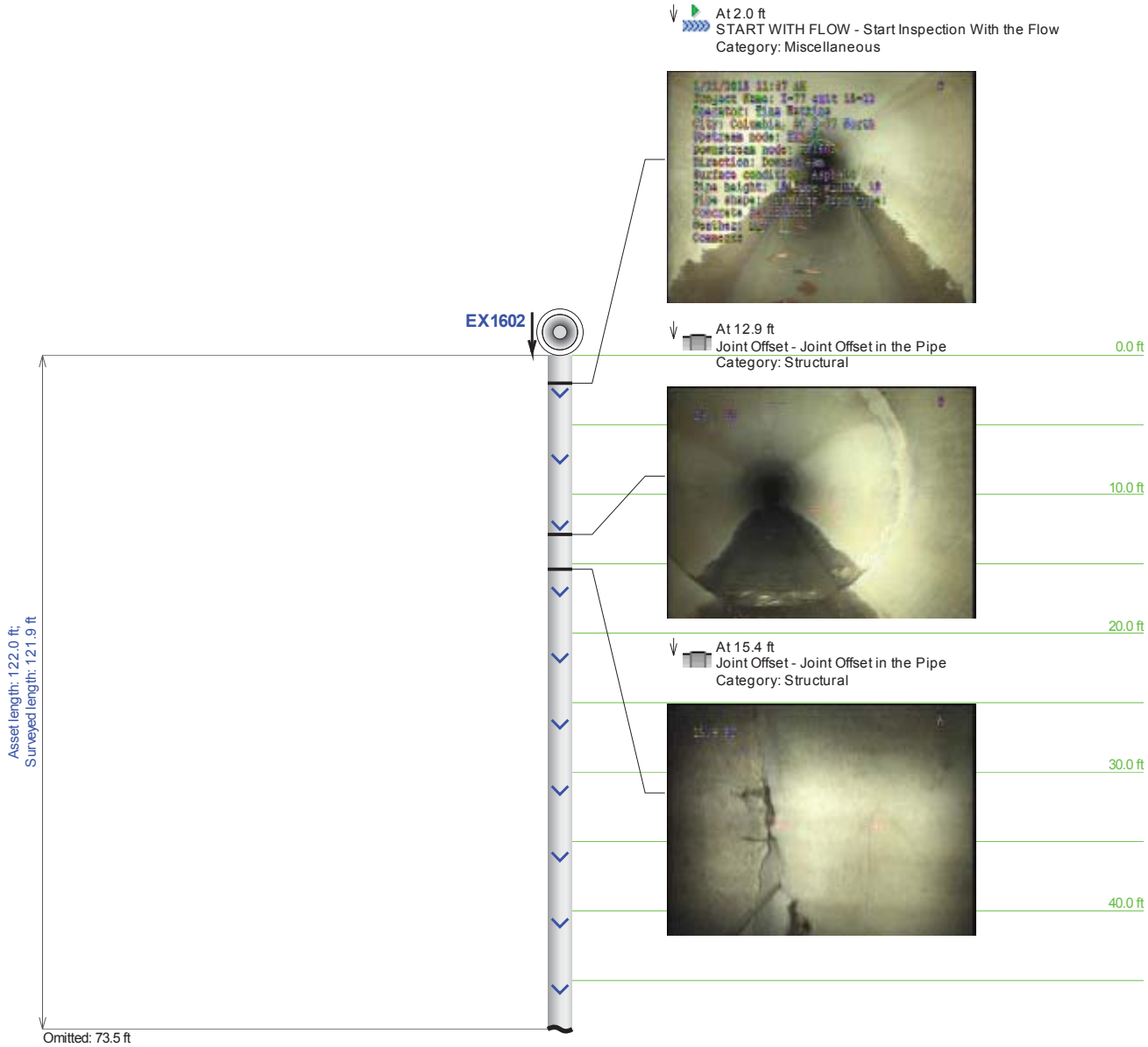
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1603 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 121.9 | Tina Watkins | |



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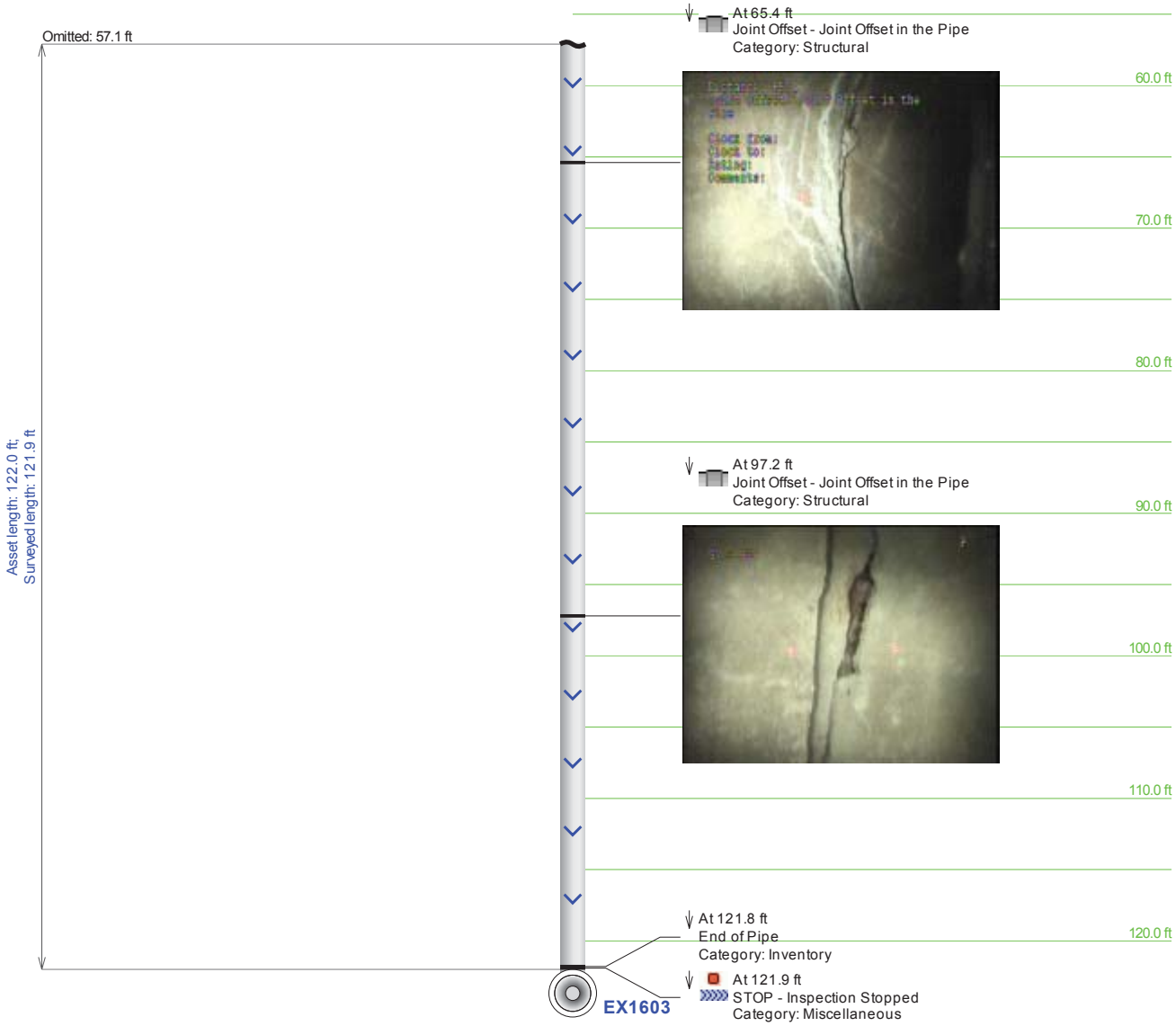
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1603 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 121.9 | Tina Watkins | |



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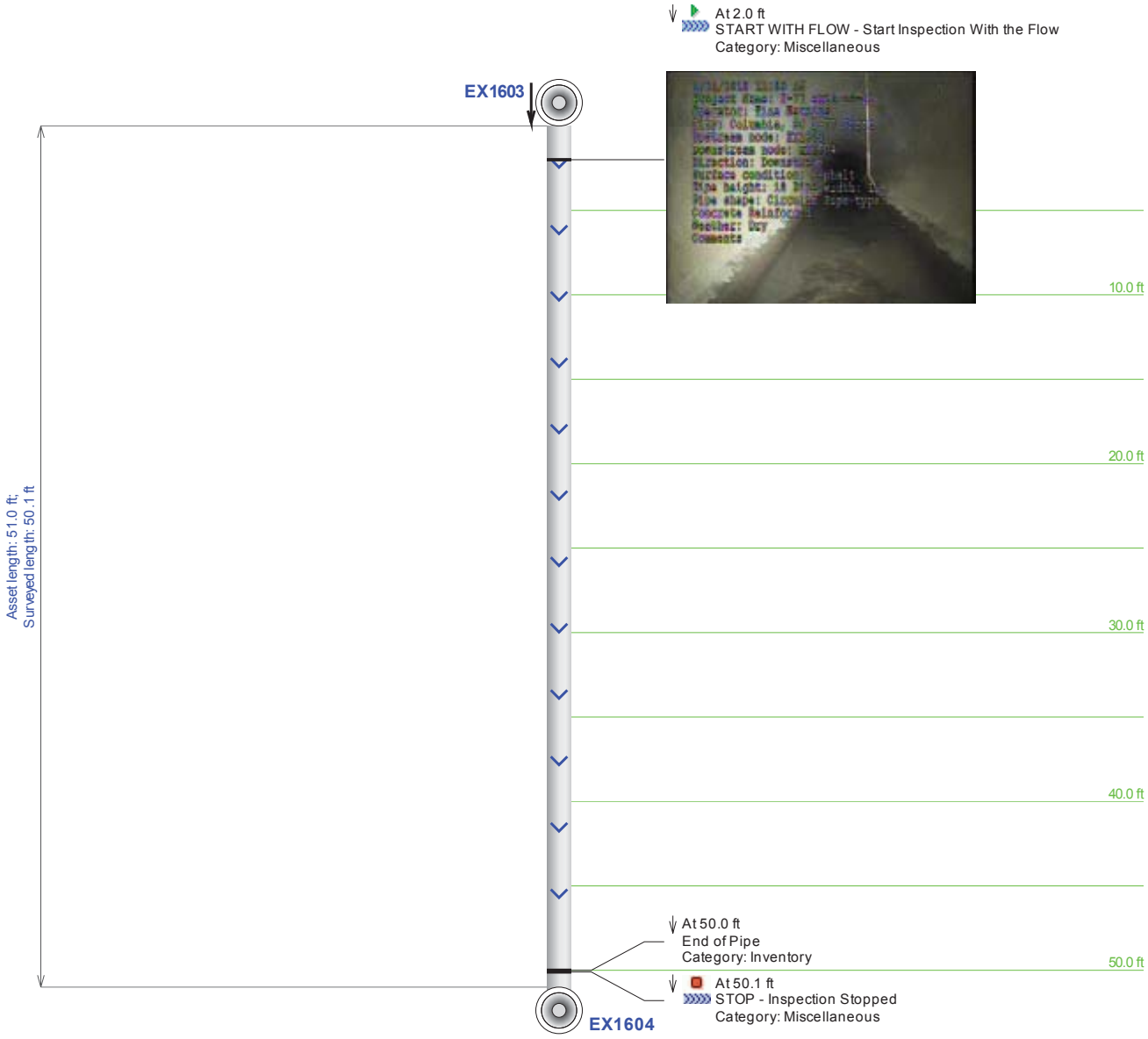
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1604 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 50.1 | Tina Watkins | |



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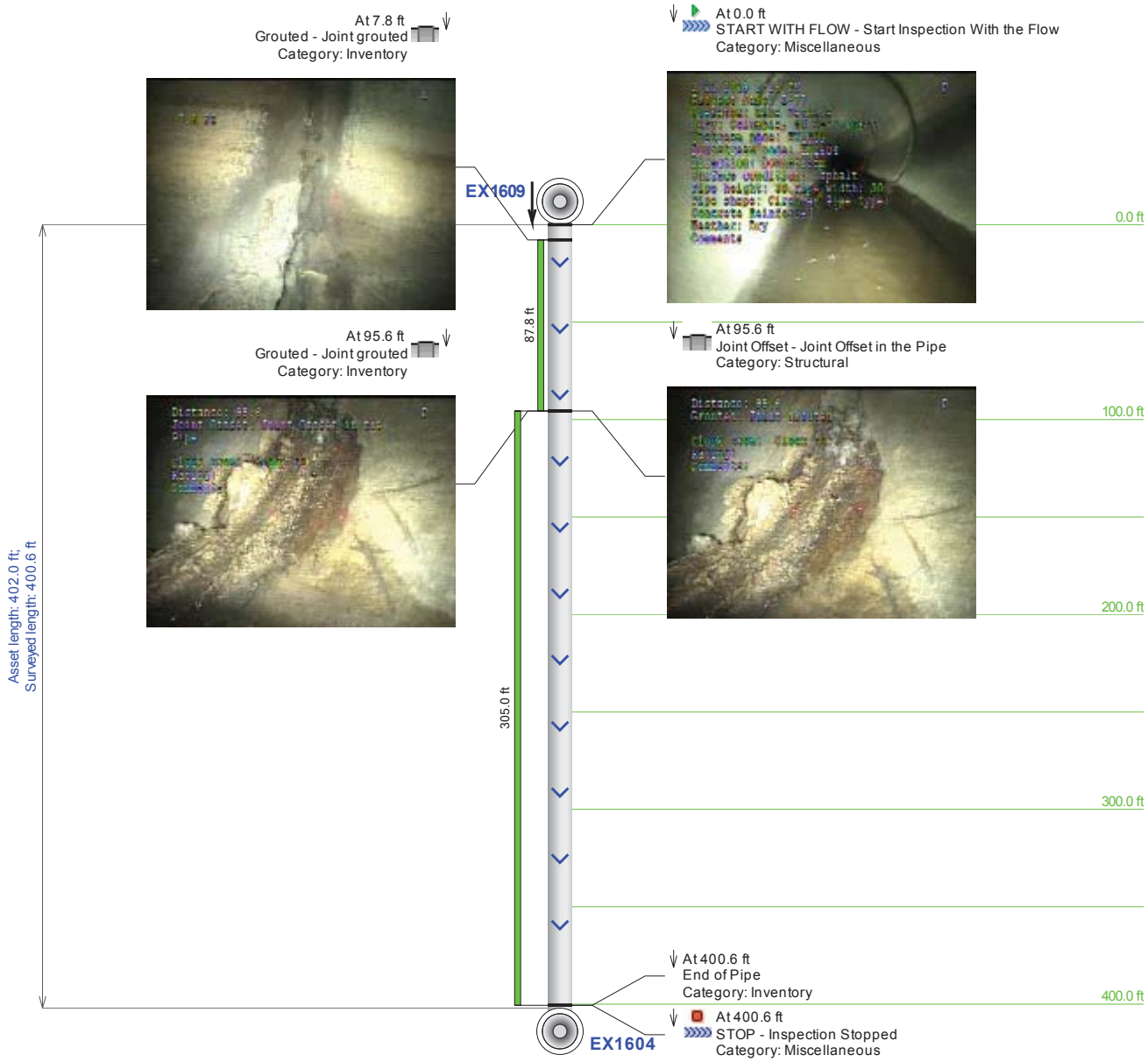
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP1606 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 30 | 30 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 400.6 | Tina Watkins | |



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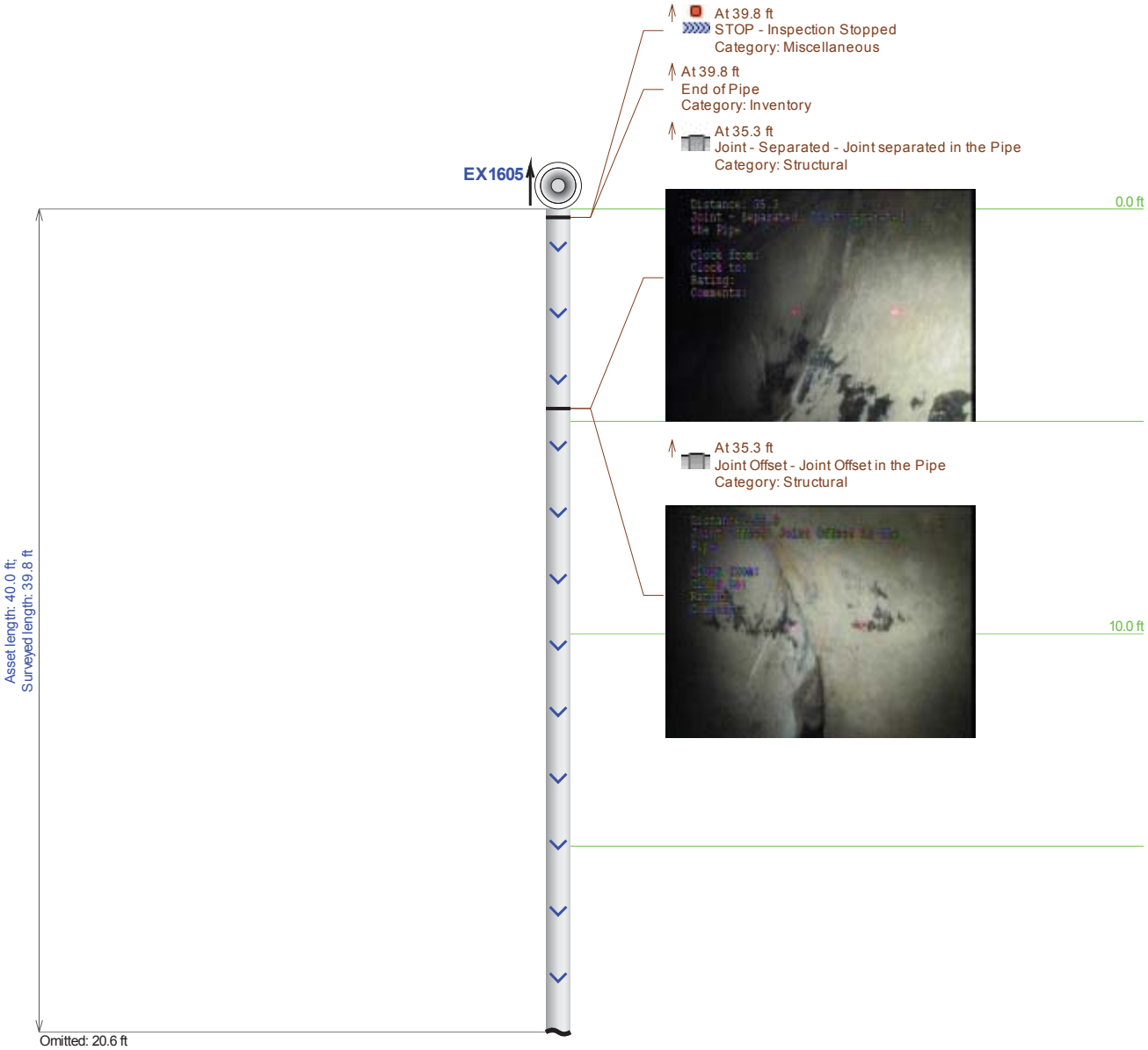
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1607 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 39.8 | Tina Watkins | |



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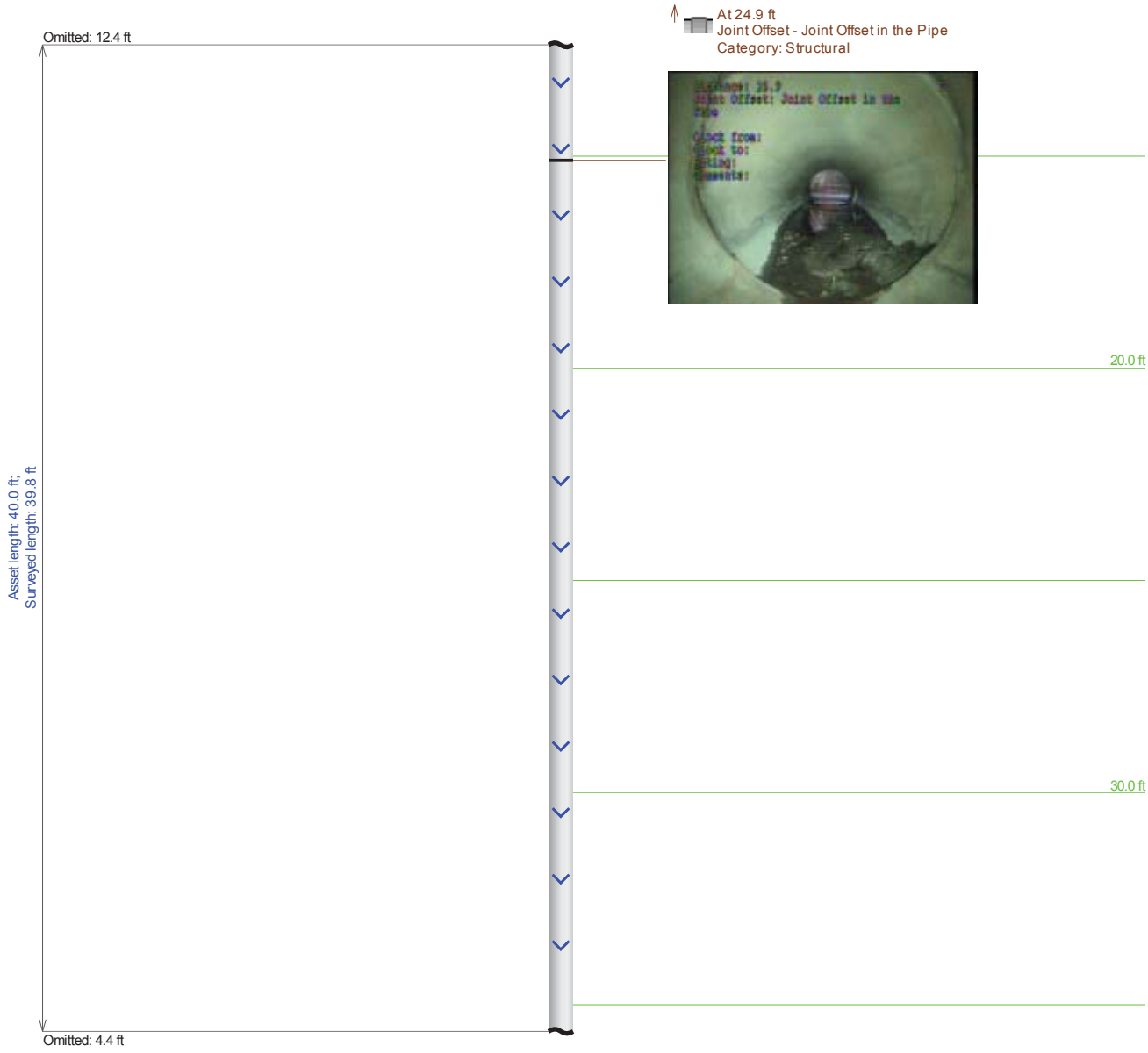
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1607 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 39.8 | Tina Watkins | |



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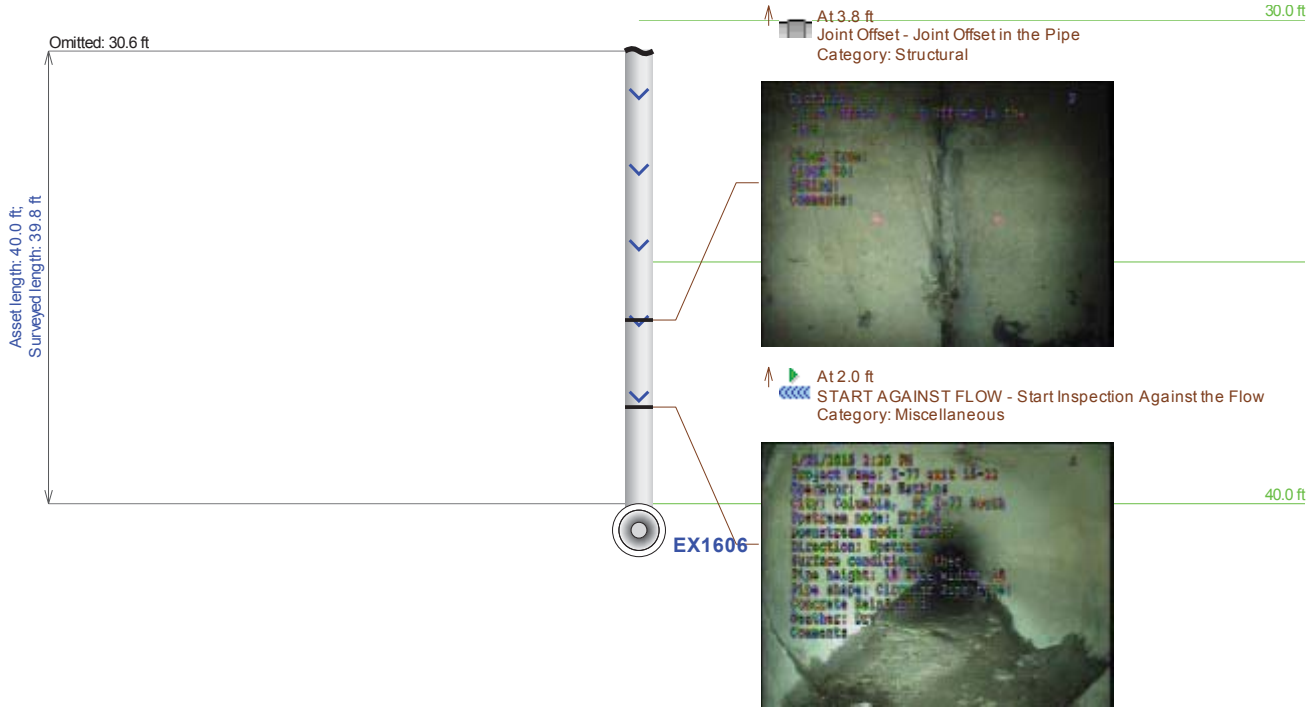
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1607 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 39.8 | Tina Watkins | |



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# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1608 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 105.4 | Tina Watkins | |

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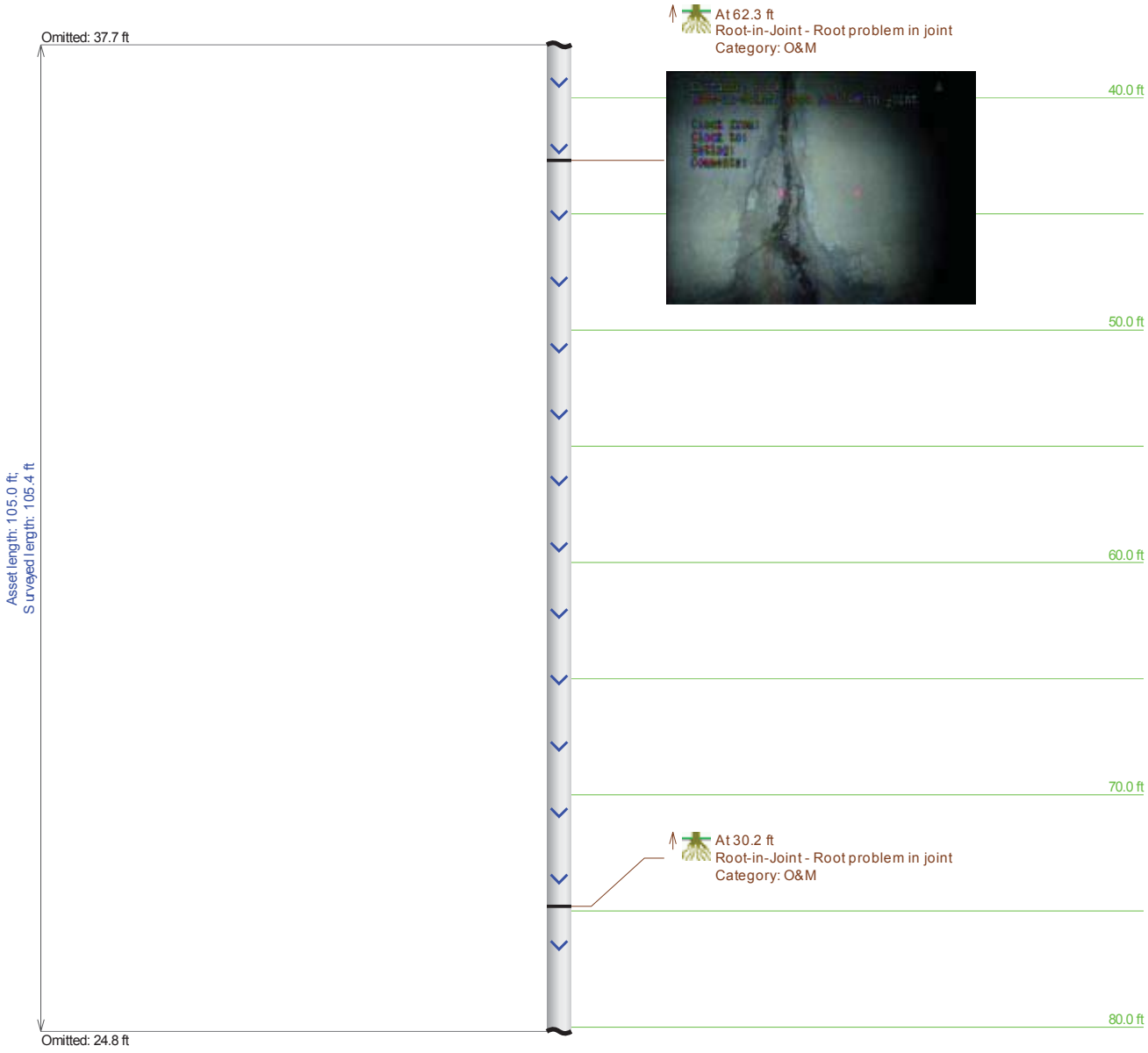
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1608 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 105.4 | Tina Watkins | |



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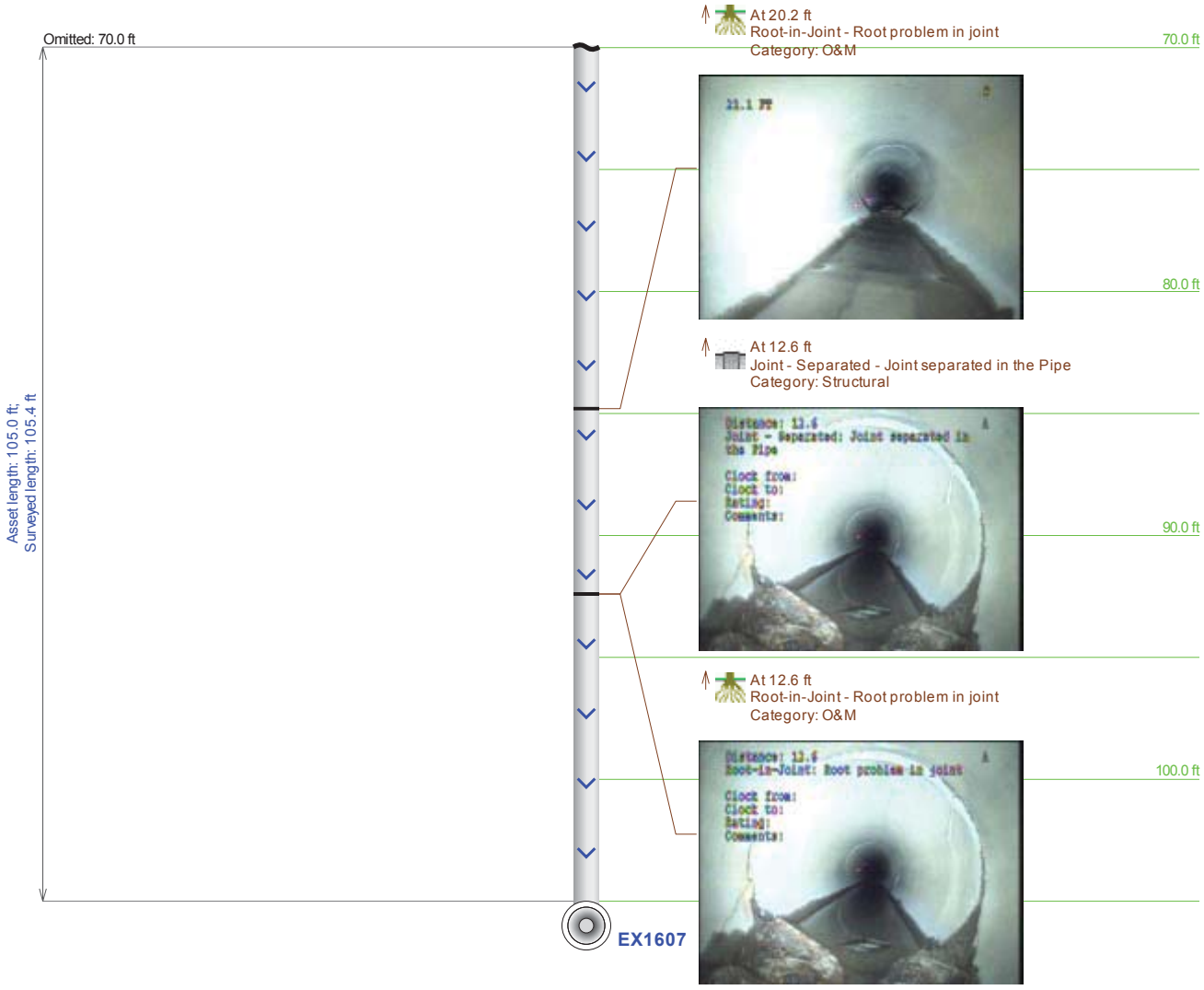
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1608 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 105.4 | Tina Watkins | |



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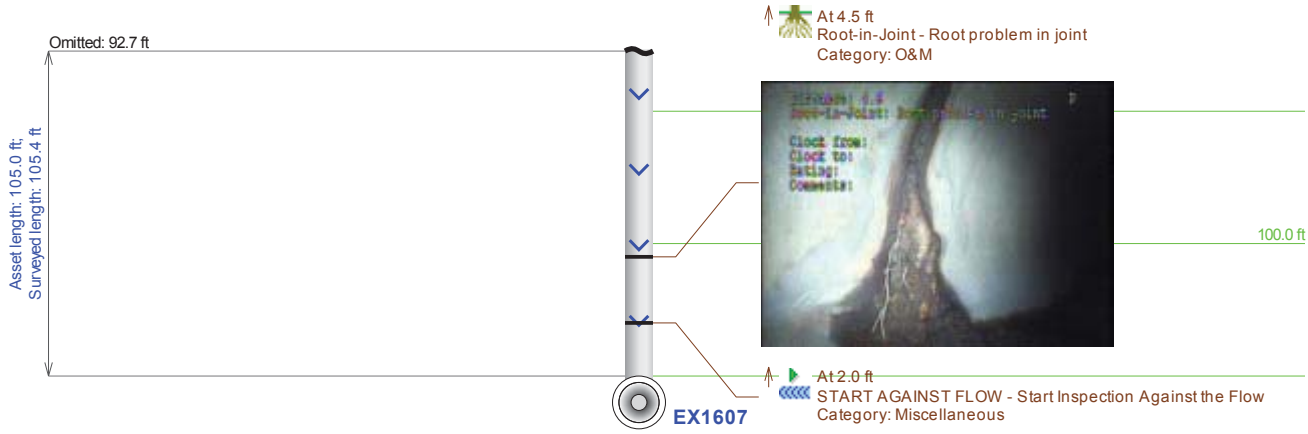
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1608 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 105.4 | Tina Watkins | |



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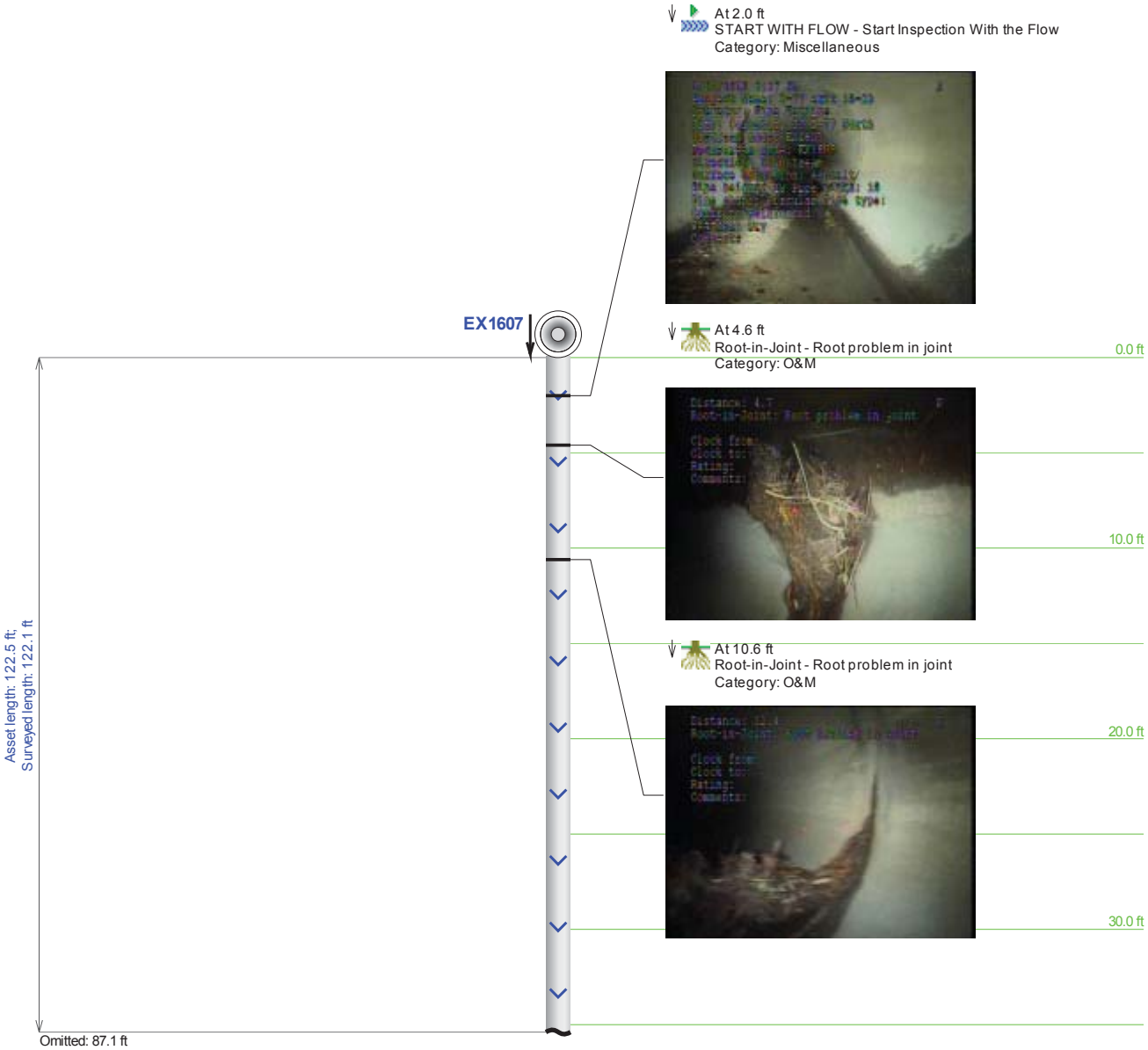
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1609 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 122.1 | Tina Watkins | |



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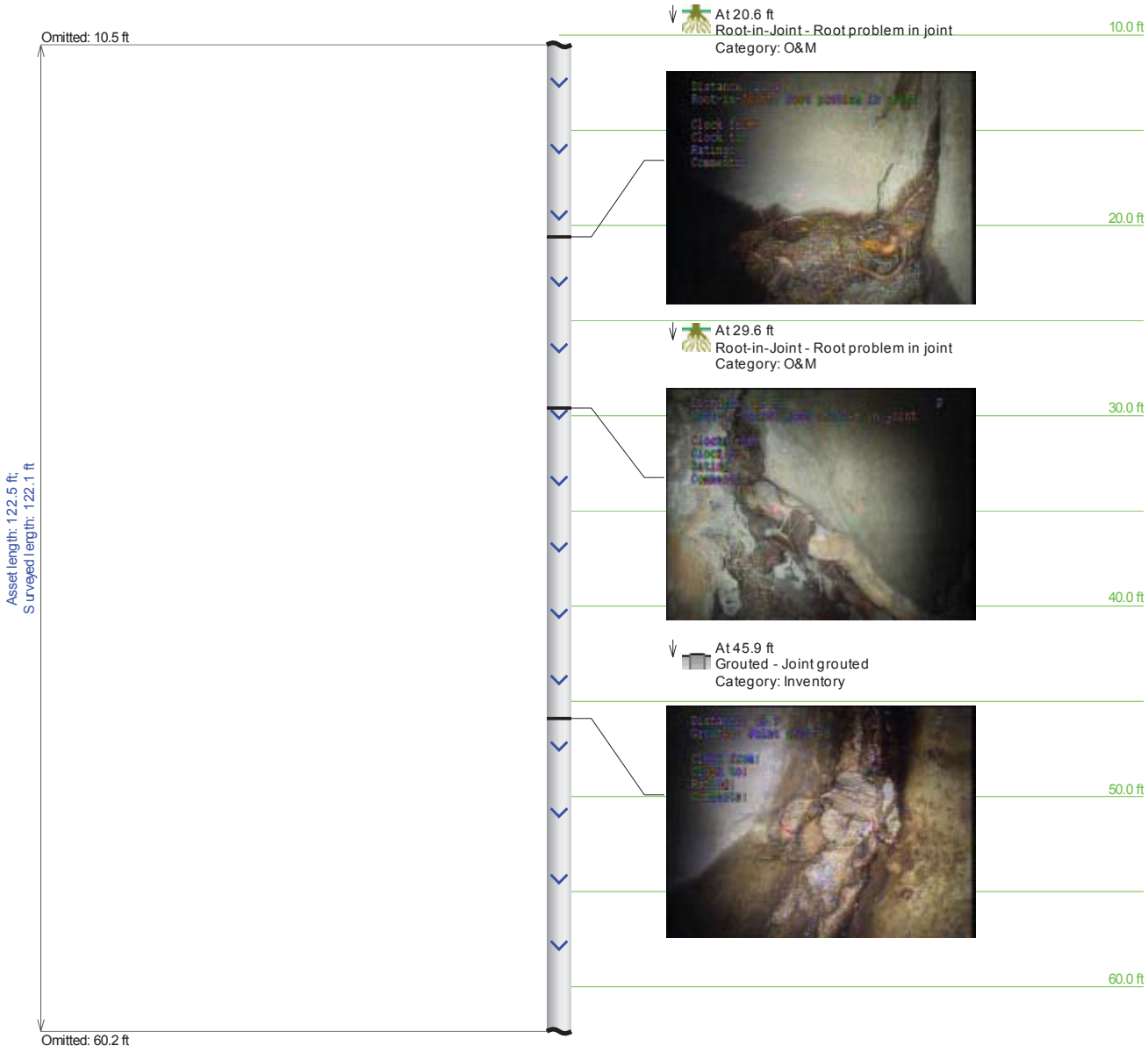
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1609 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 122.1 | Tina Watkins | |



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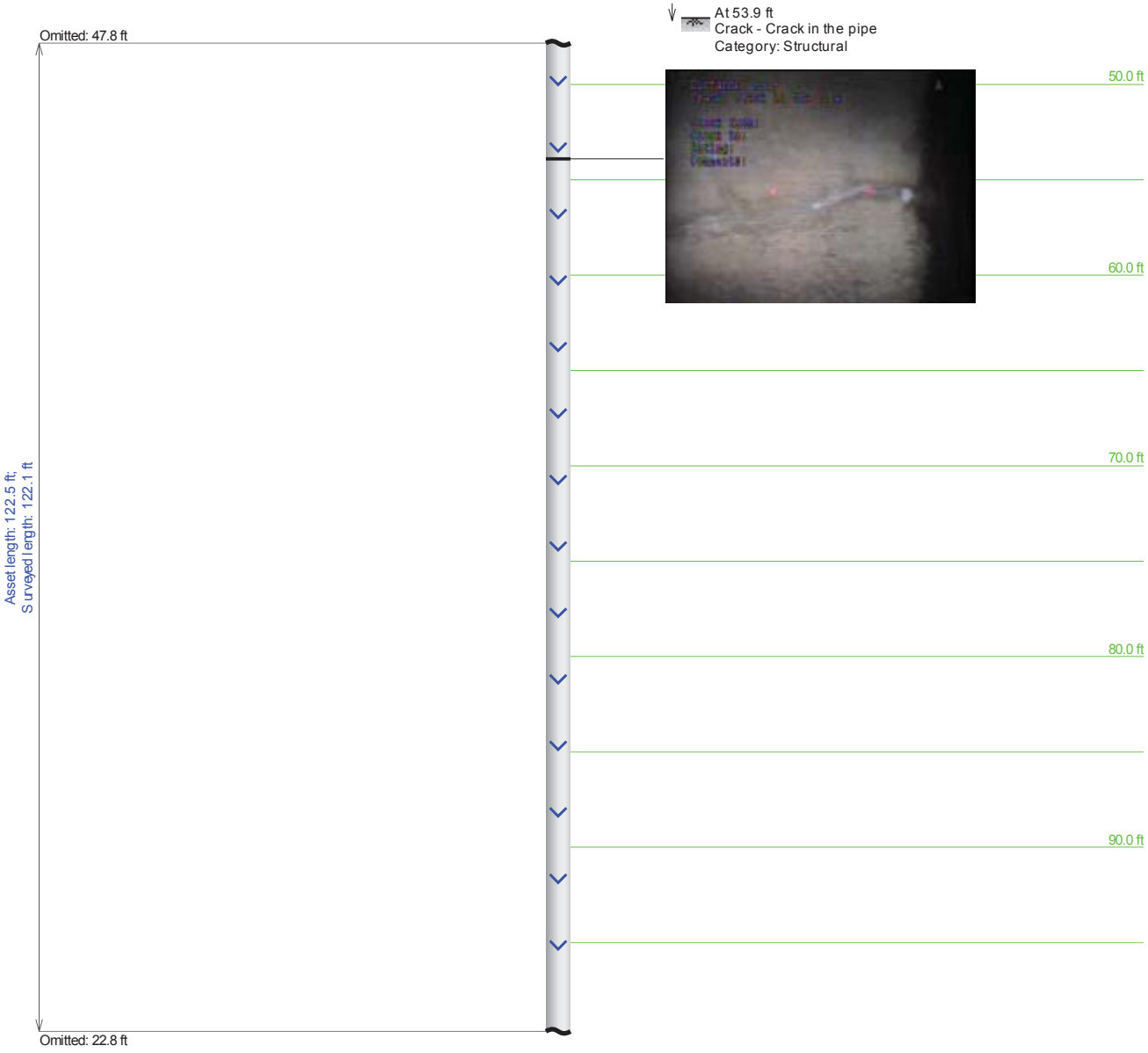
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1609 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 122.1 | Tina Watkins | |



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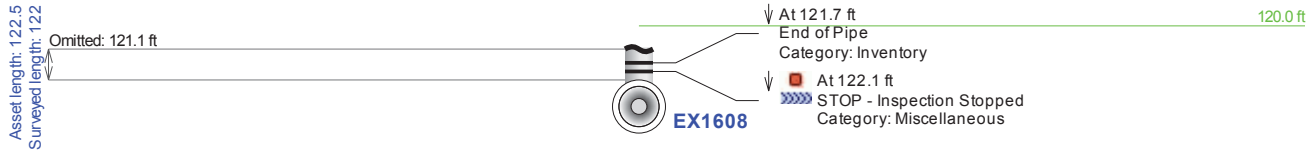
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1609 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 122.1 | Tina Watkins | |



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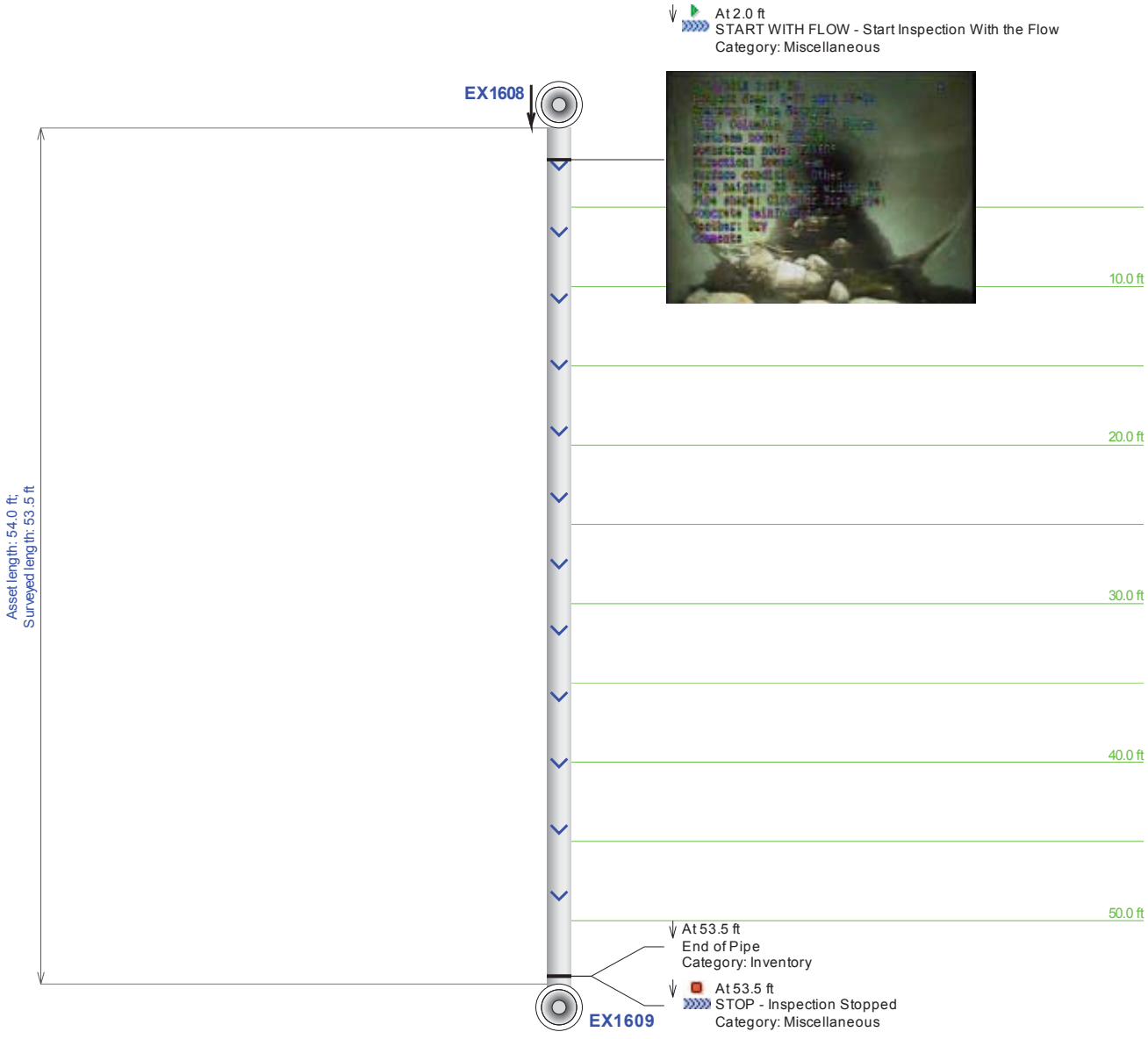
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1610 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Other | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 53.5 | Tina Watkins | |



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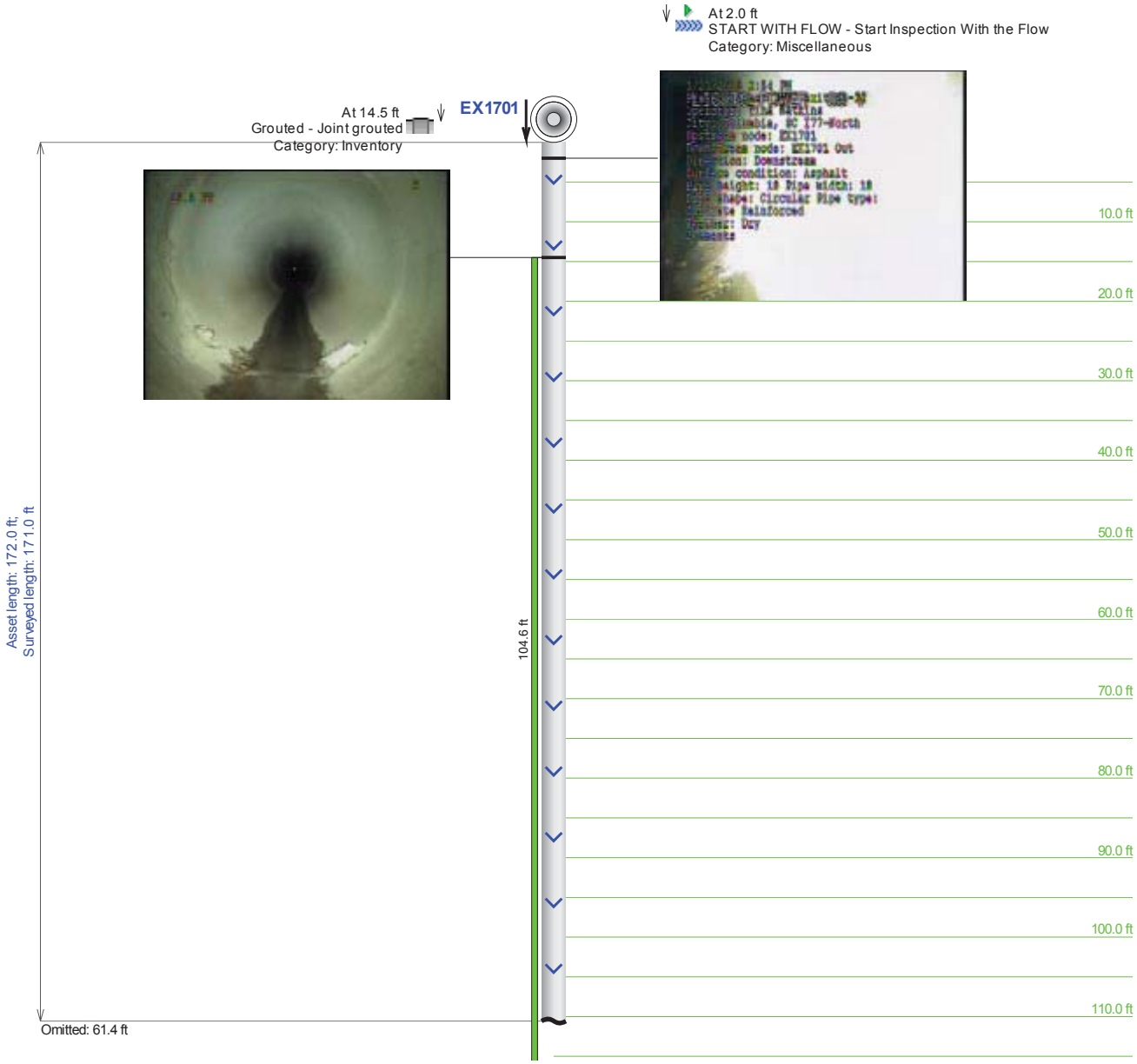
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1701 | Columbia, SC | I77-North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 171.0 | Tina Watkins | |



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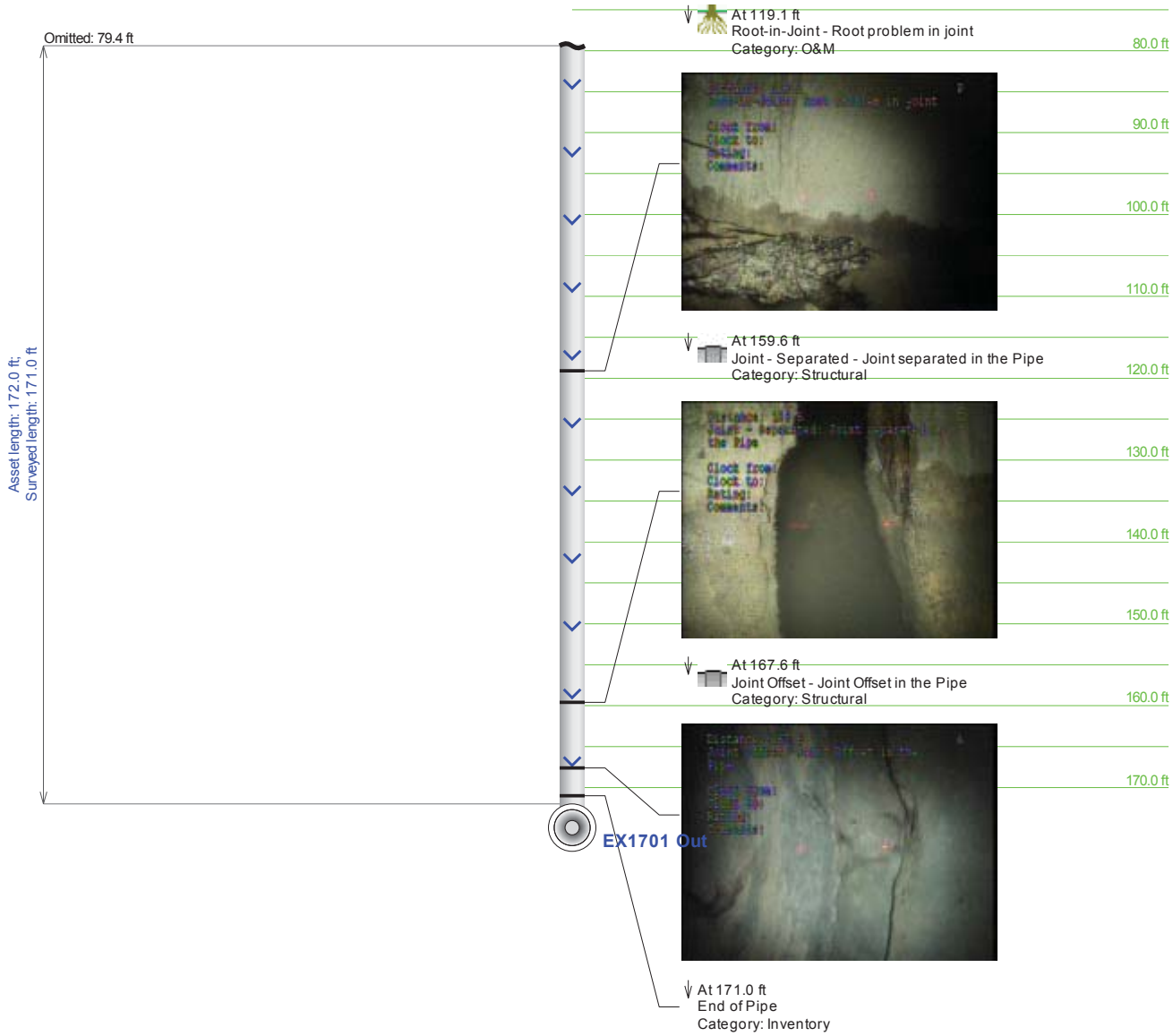
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1701 | Columbia, SC | I77-North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 171.0 | Tina Watkins | |



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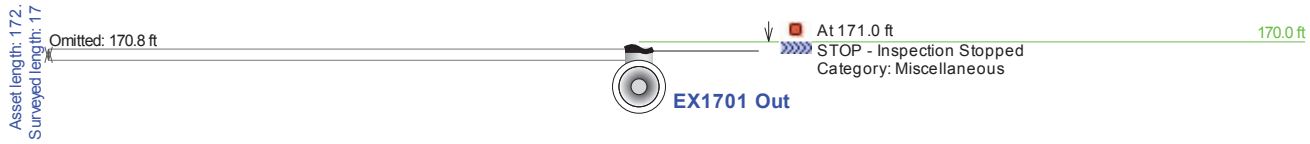
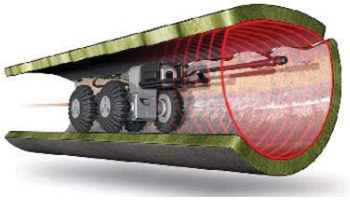
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1701 | Columbia, SC | I77-North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 171.0 | Tina Watkins | |





# AET Services

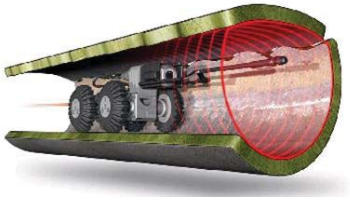
Robotic Inspections

# EC1702

**EC1702 Culvert 280’**

**Cracking Throughout**

**2 Pipes along right side from NB**



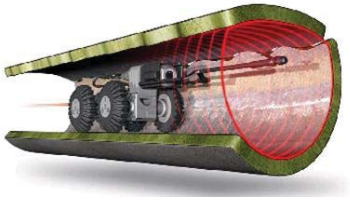
# AET Services

Robotic Inspections

# EC1703

**EC1703** **Culvert** **280’**

**Cracking Throughout**



# AET Services

Robotic Inspections

# EC1704

**EC1704** **Culvert** **280’**

**Cracking Throughout**

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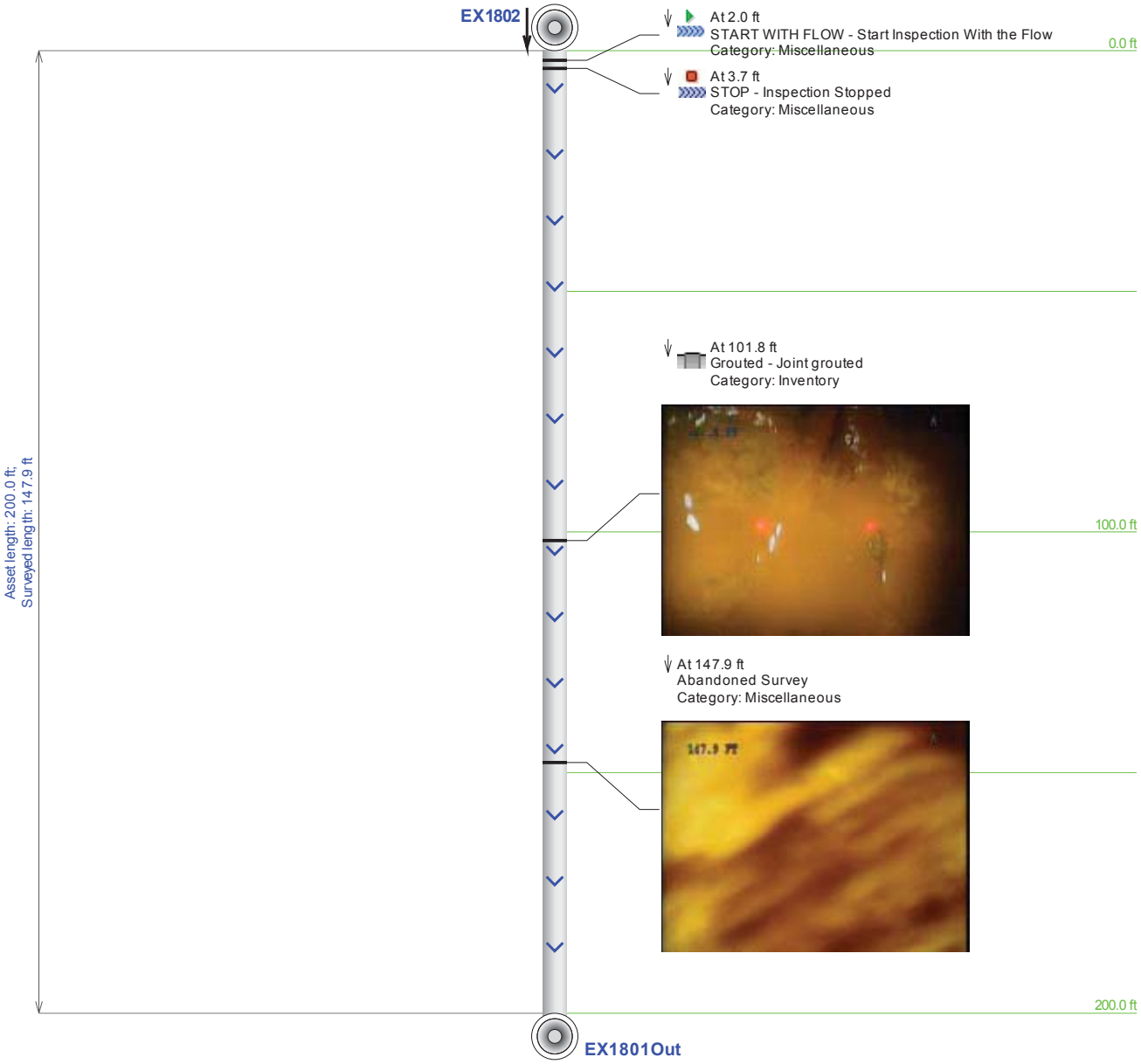
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1801 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 147.9 | Tina Watkins | |



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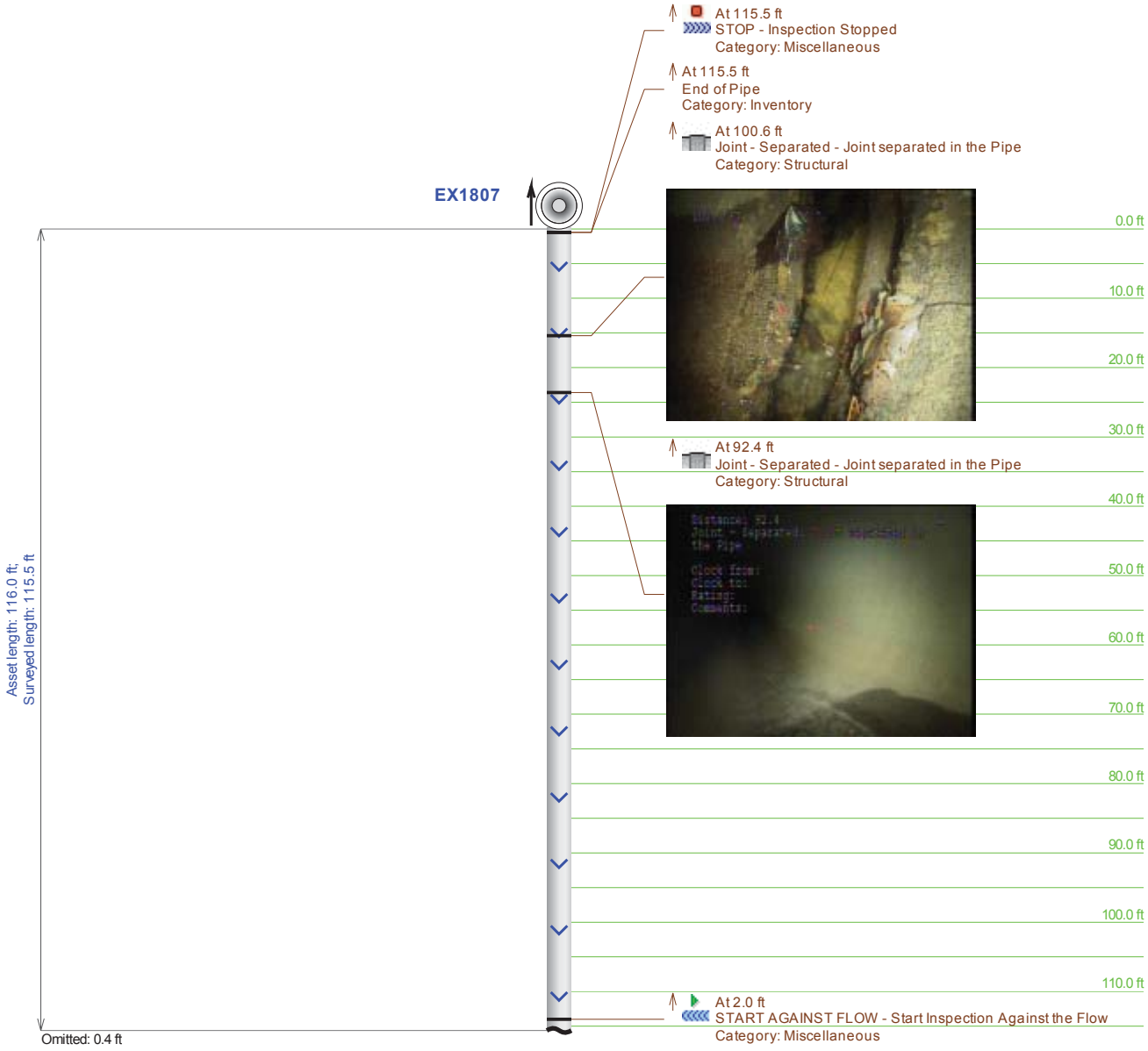
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1802 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 115.5 | Tina Watkins | |



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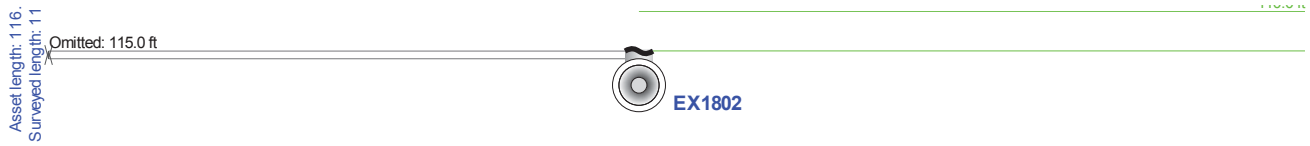
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1802 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 115.5 | Tina Watkins | |



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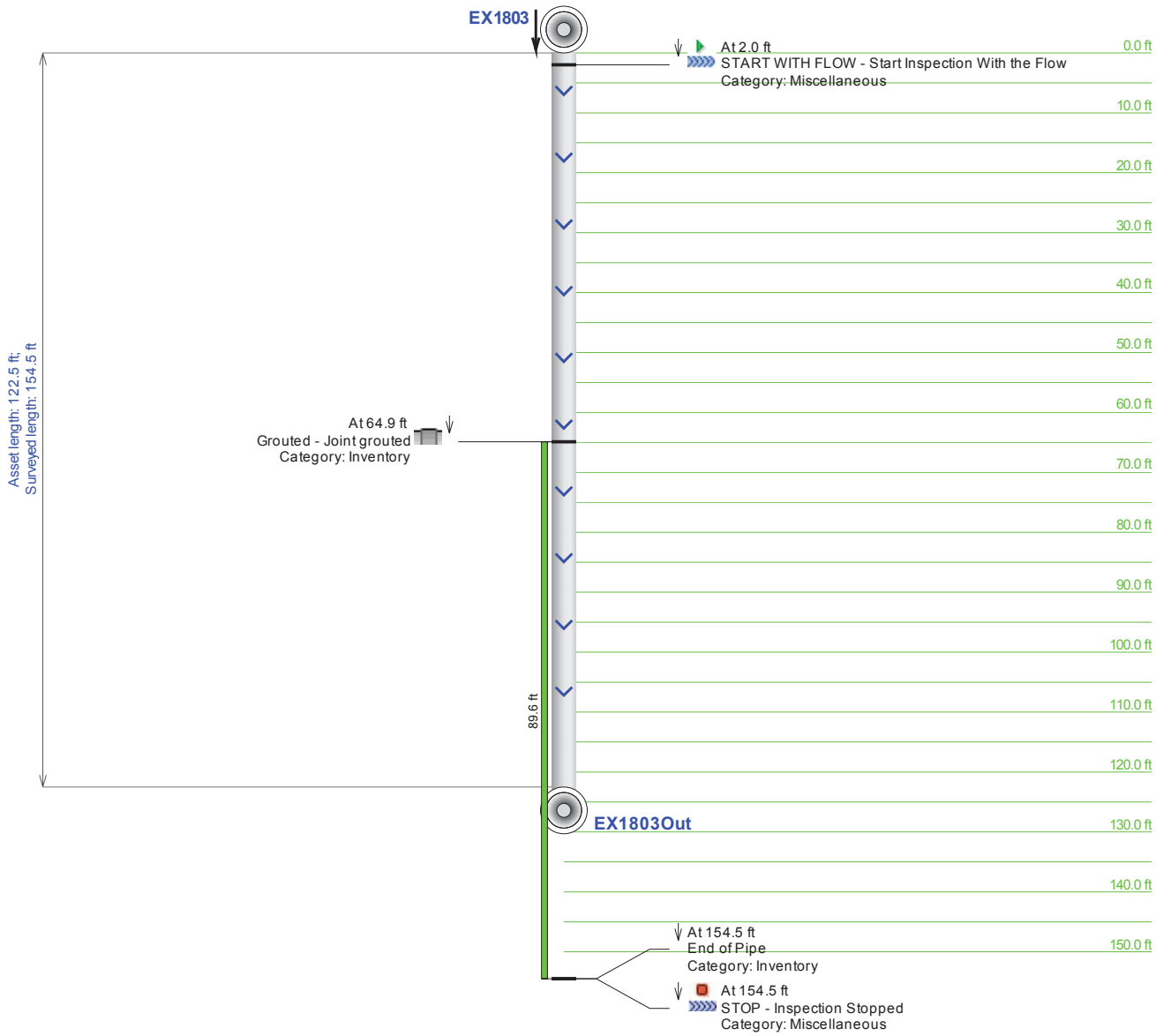
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP 1803 | Columia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 30 | 30 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 154.5 | Tina Watkins | |



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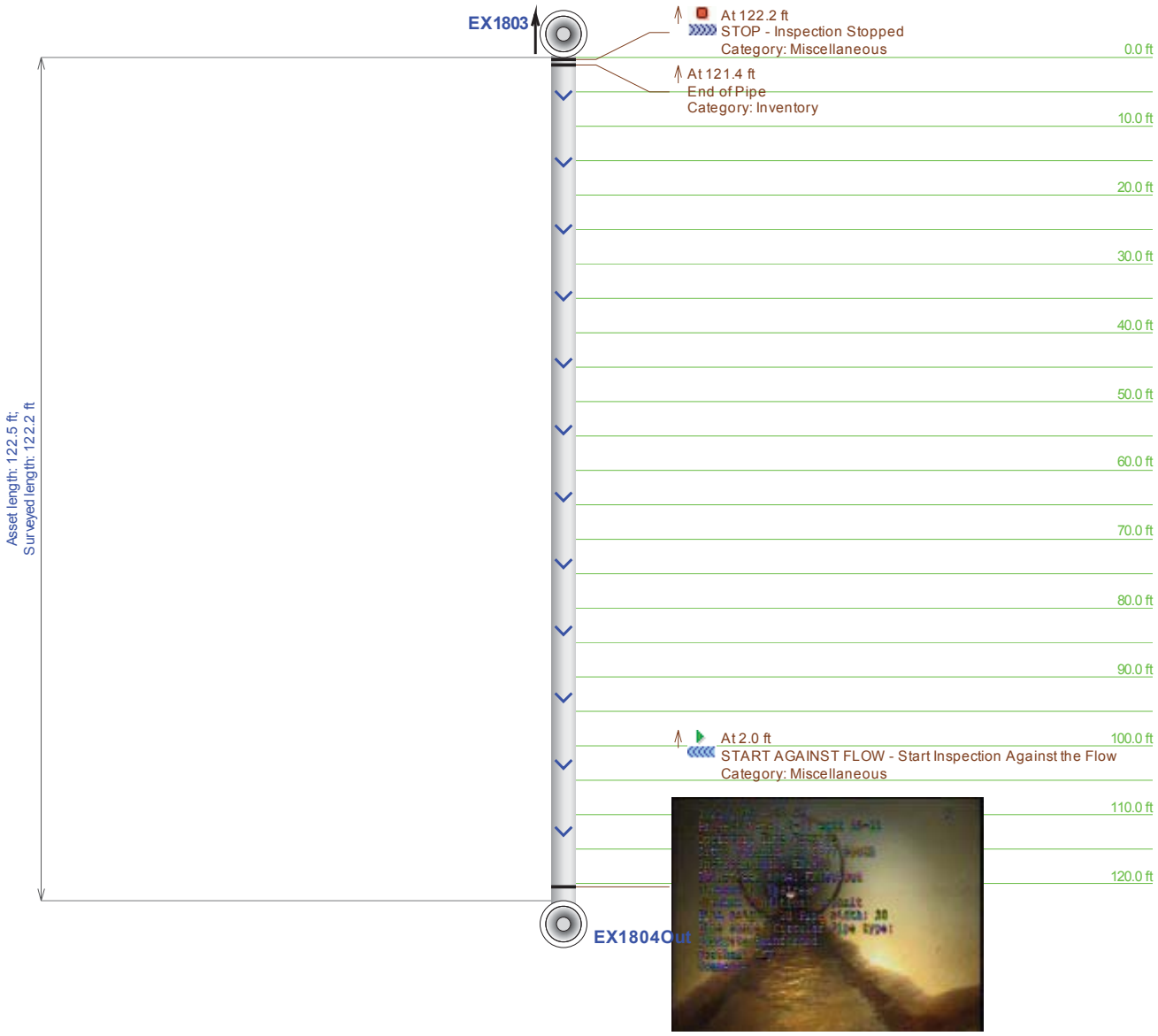
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP 1804 | Columia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 30 | 30 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 122.2 | Tina Watkins | |



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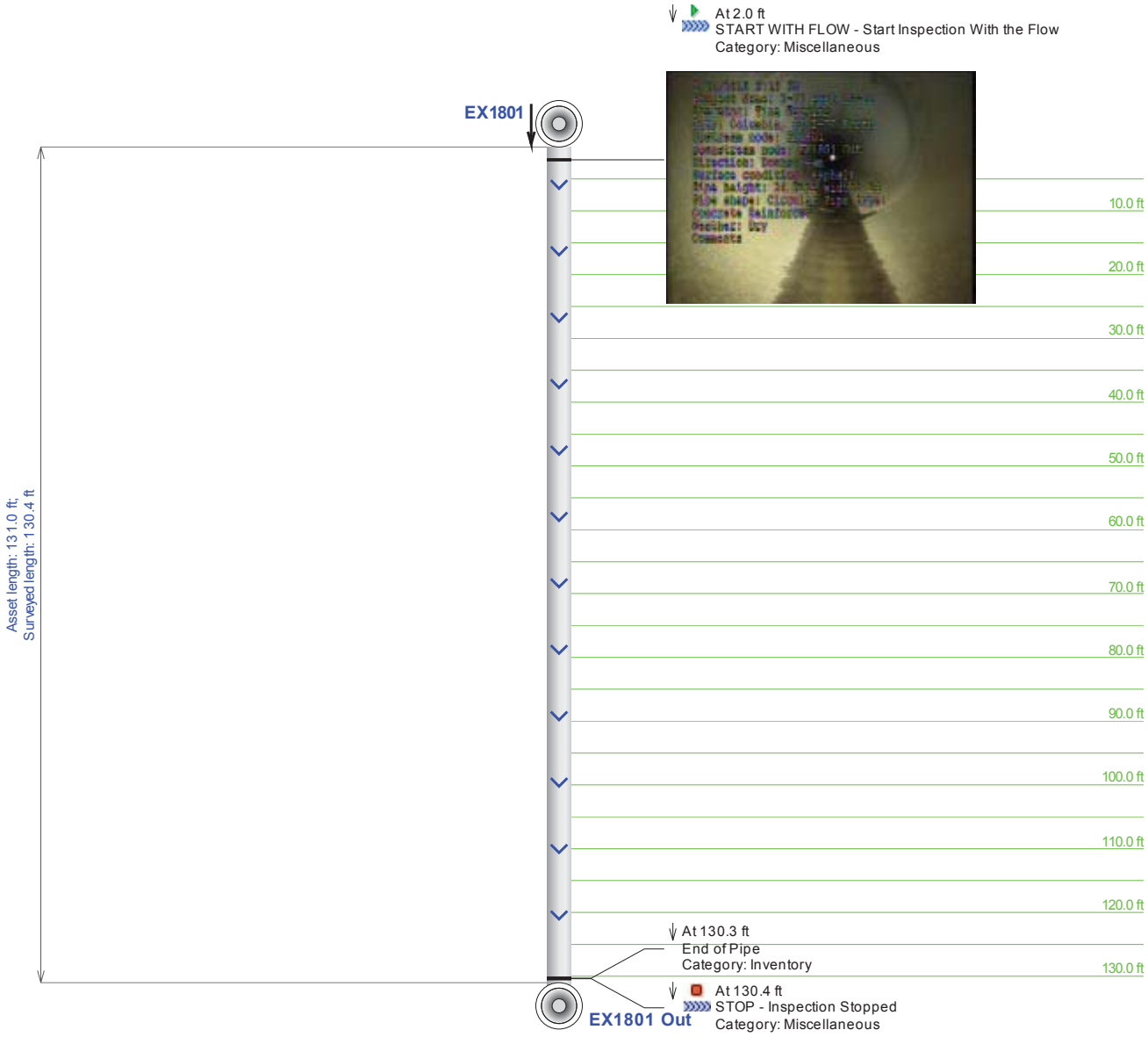
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP1806 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 130.4 | Tina Watkins | |



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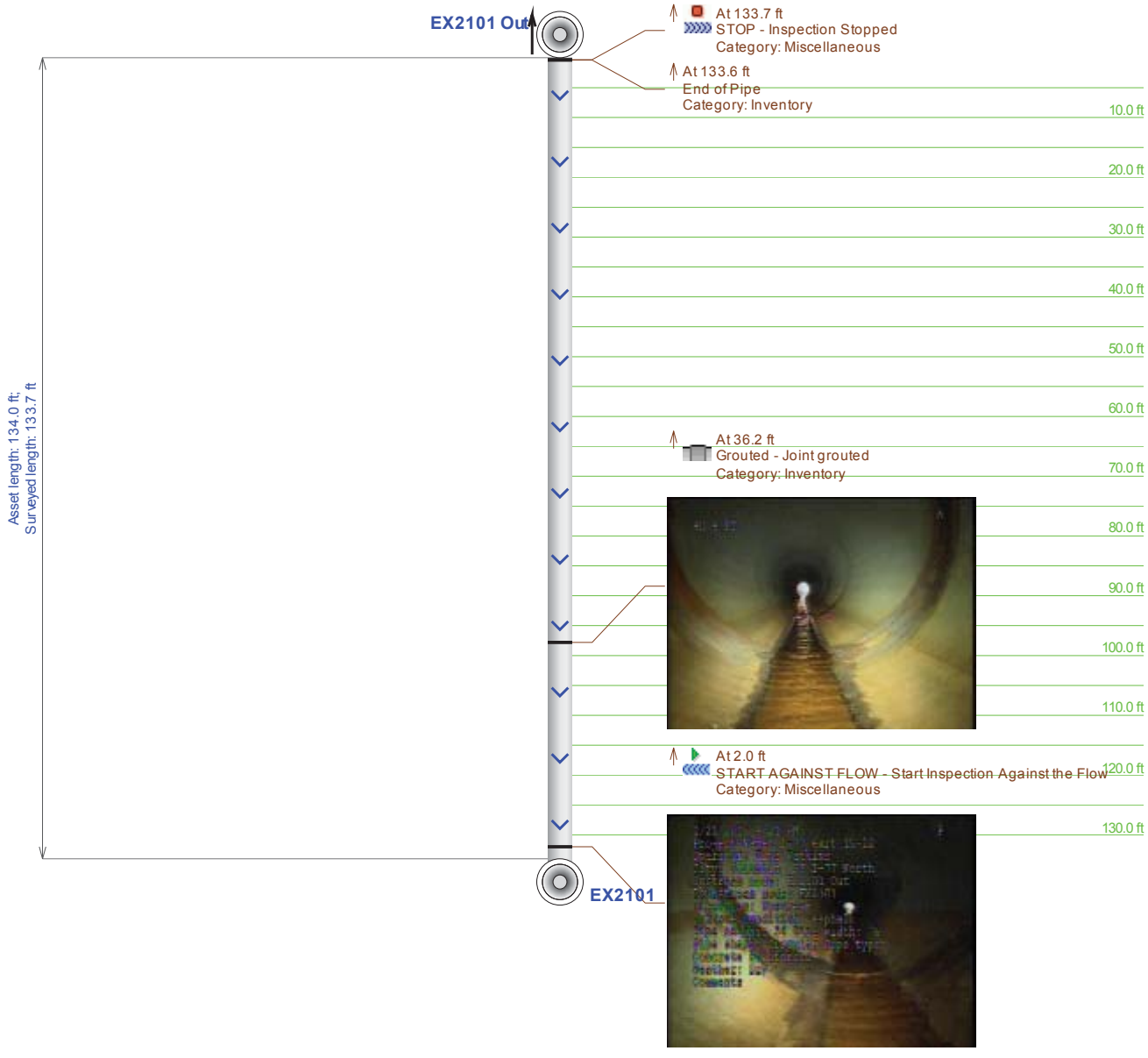
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2101 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 36 | 36 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 133.7 | Tina Watkins | |



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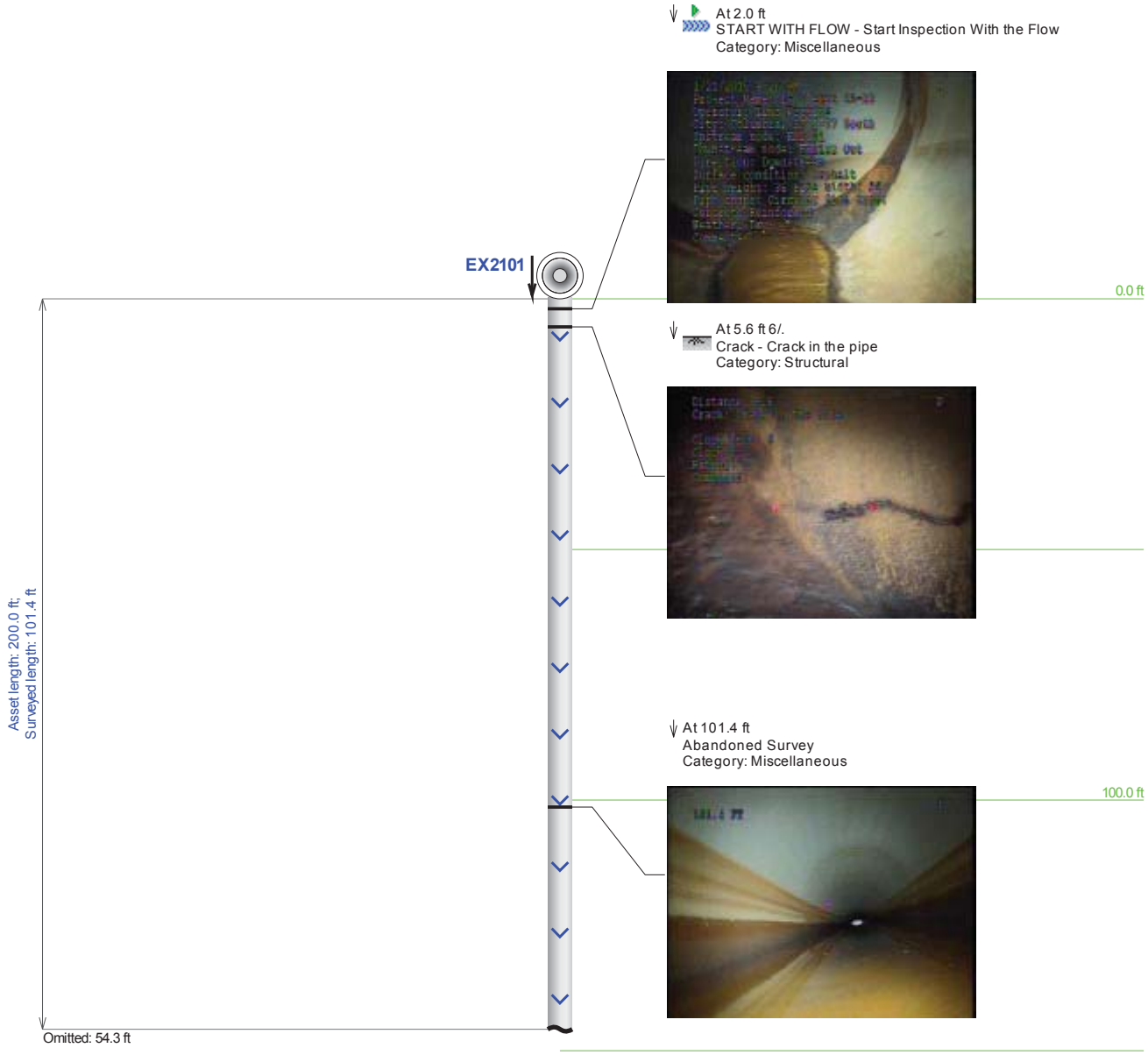
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2102 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 36 | 36 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 101.4 | Tina Watkins | |



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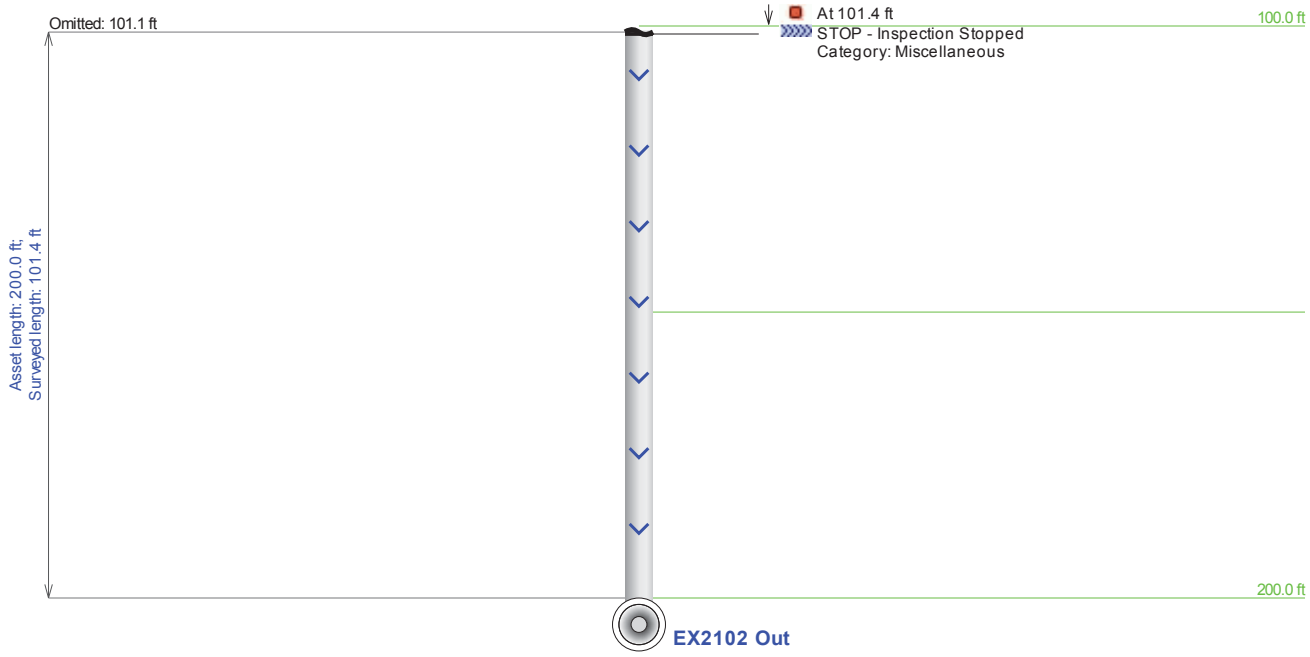
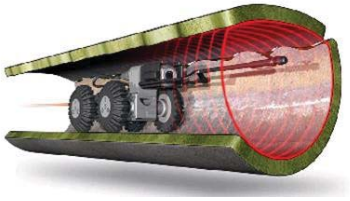
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2102 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 36 | 36 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 101.4 | Tina Watkins | |





# AET Services

Robotic Inspections

# EC2103

**EC2103** **Culvert** **288’**

**Cracking Throughout**

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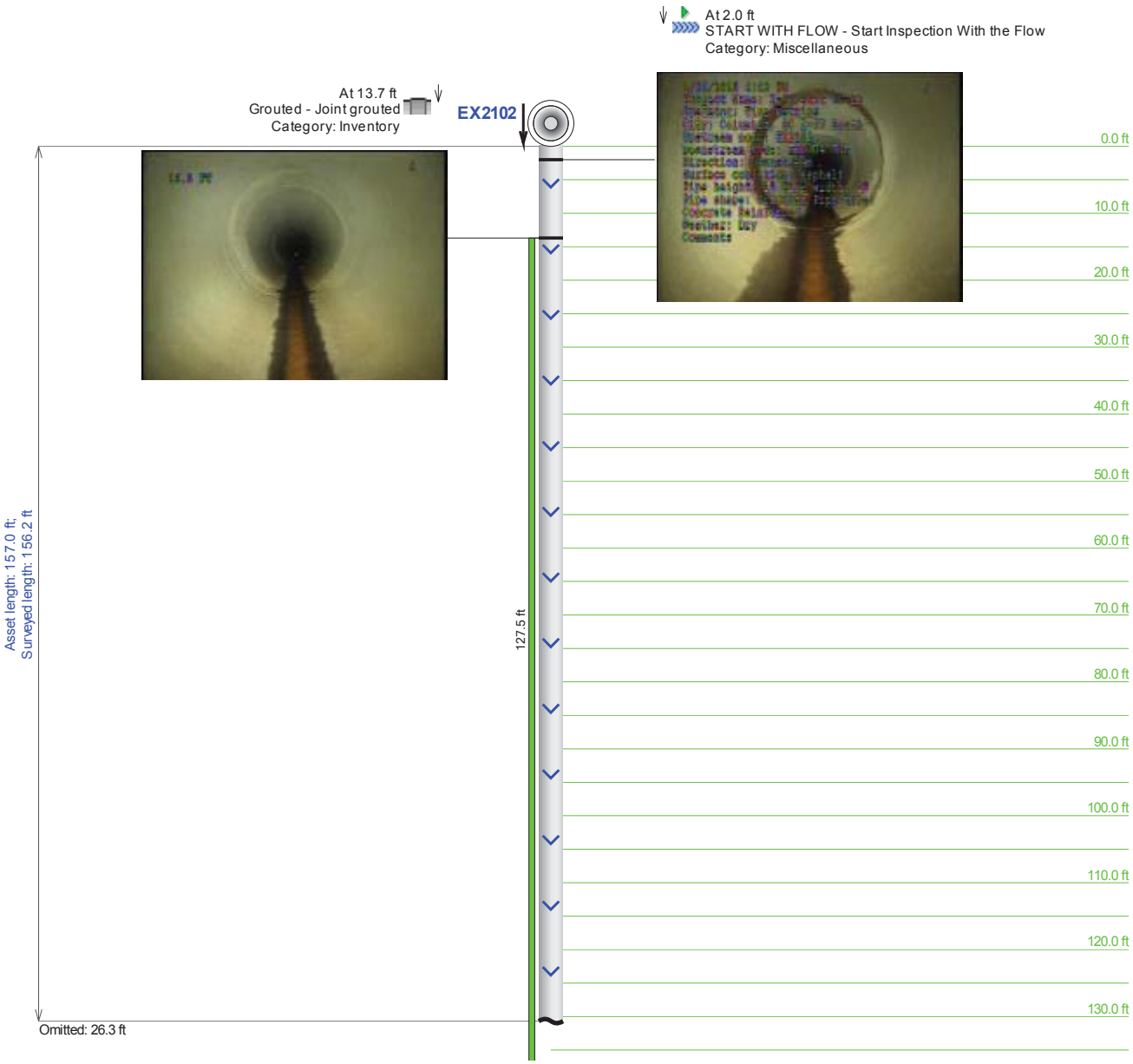
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2104 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 156.2 | Tina Watkins | |



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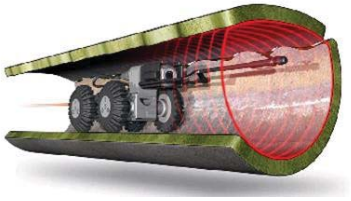
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2104 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 156.2 | Tina Watkins | |



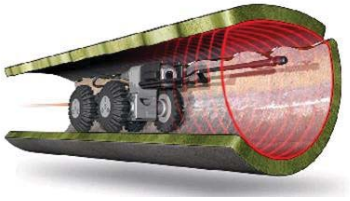
# AET Services

Robotic Inspections

# EC2105

**EC2105** **Culvert** **288’**

**Cracking Throughout**



# AET Services

Robotic Inspections

# EC2106

**EC2106** **Culvert** **288’**

**Cracking Throughout**

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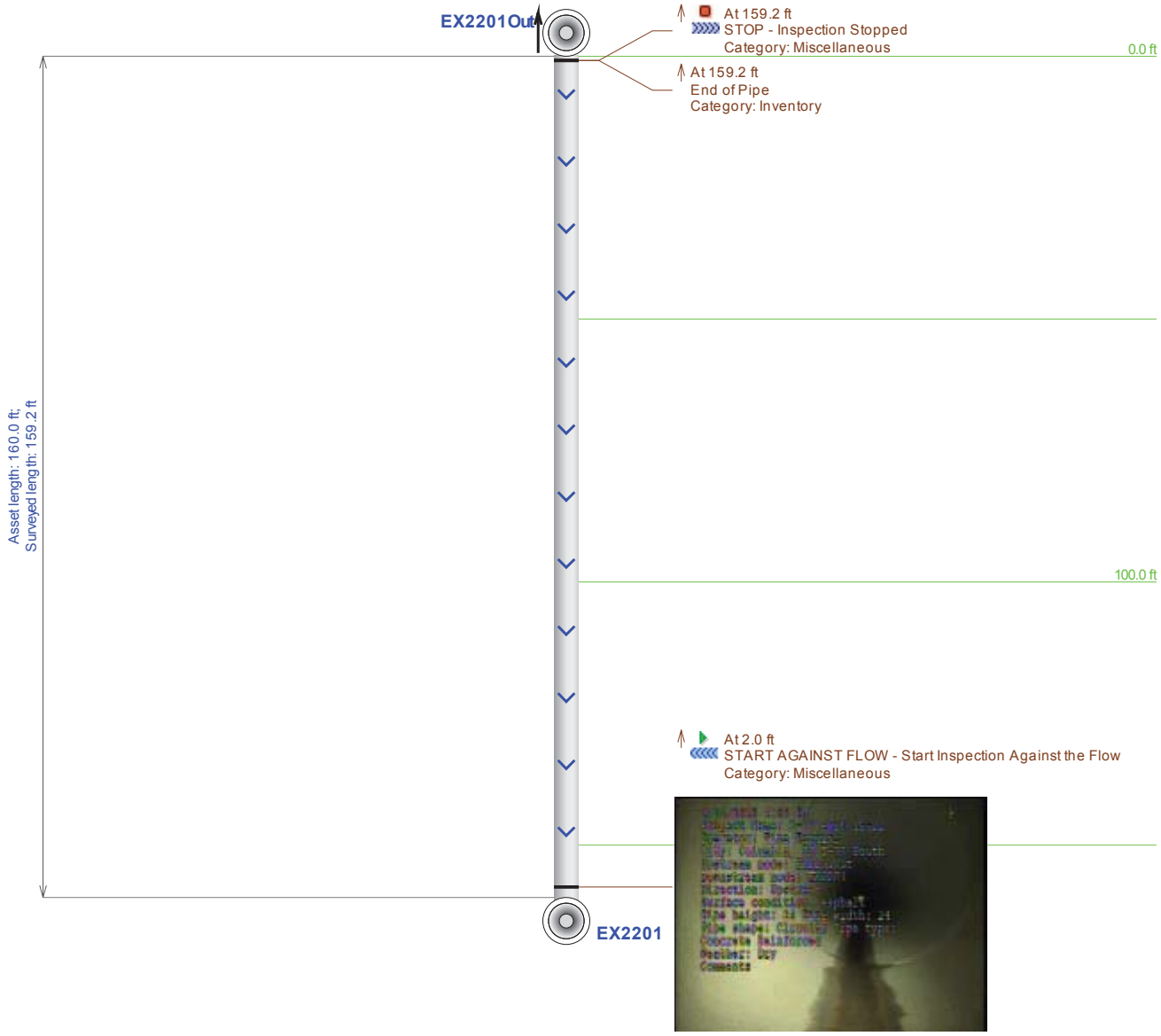
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2201 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| UPSTREAM | 159.2 | Tina Watkins | |



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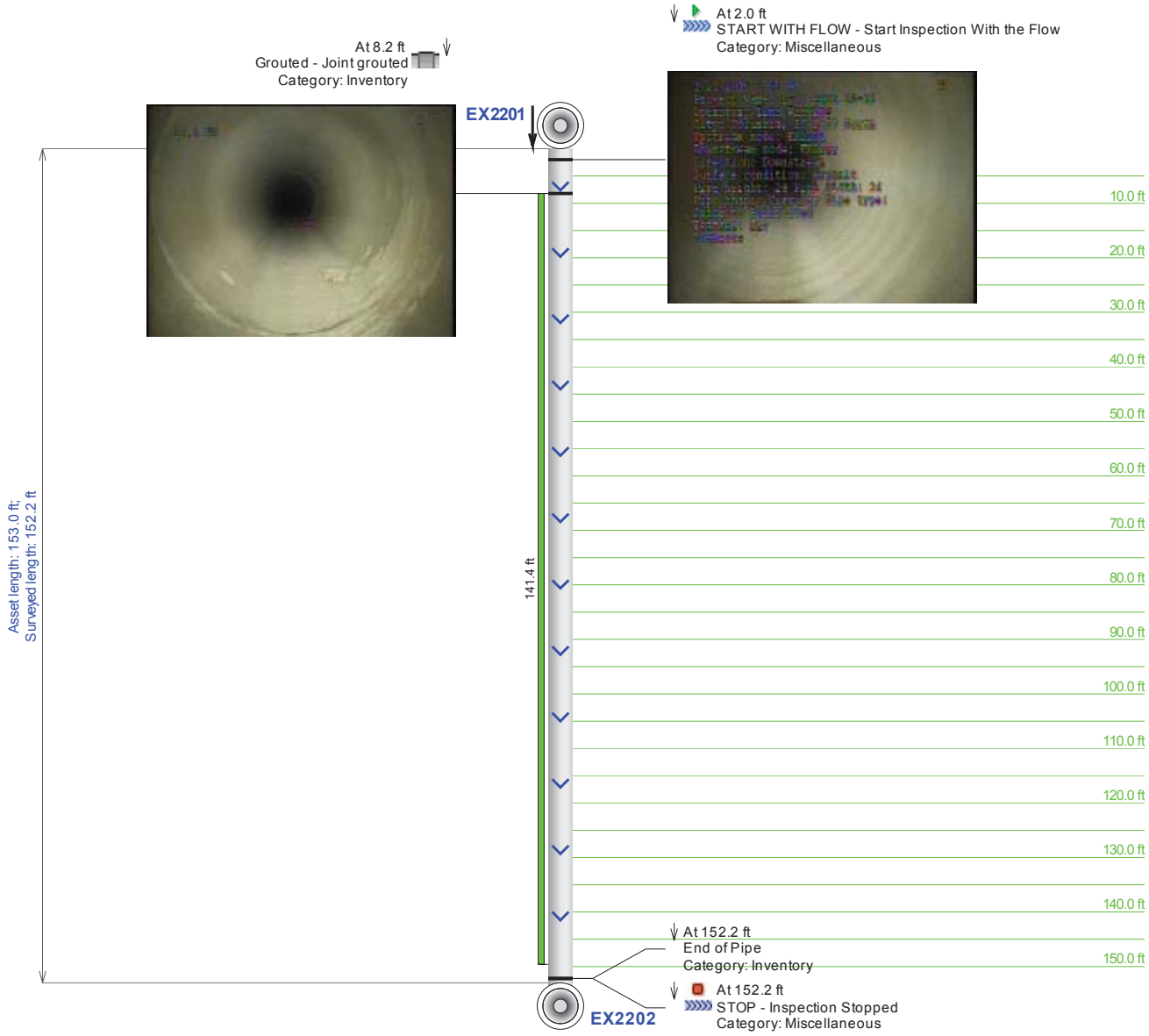
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2202 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 152.2 | Tina Watkins | |



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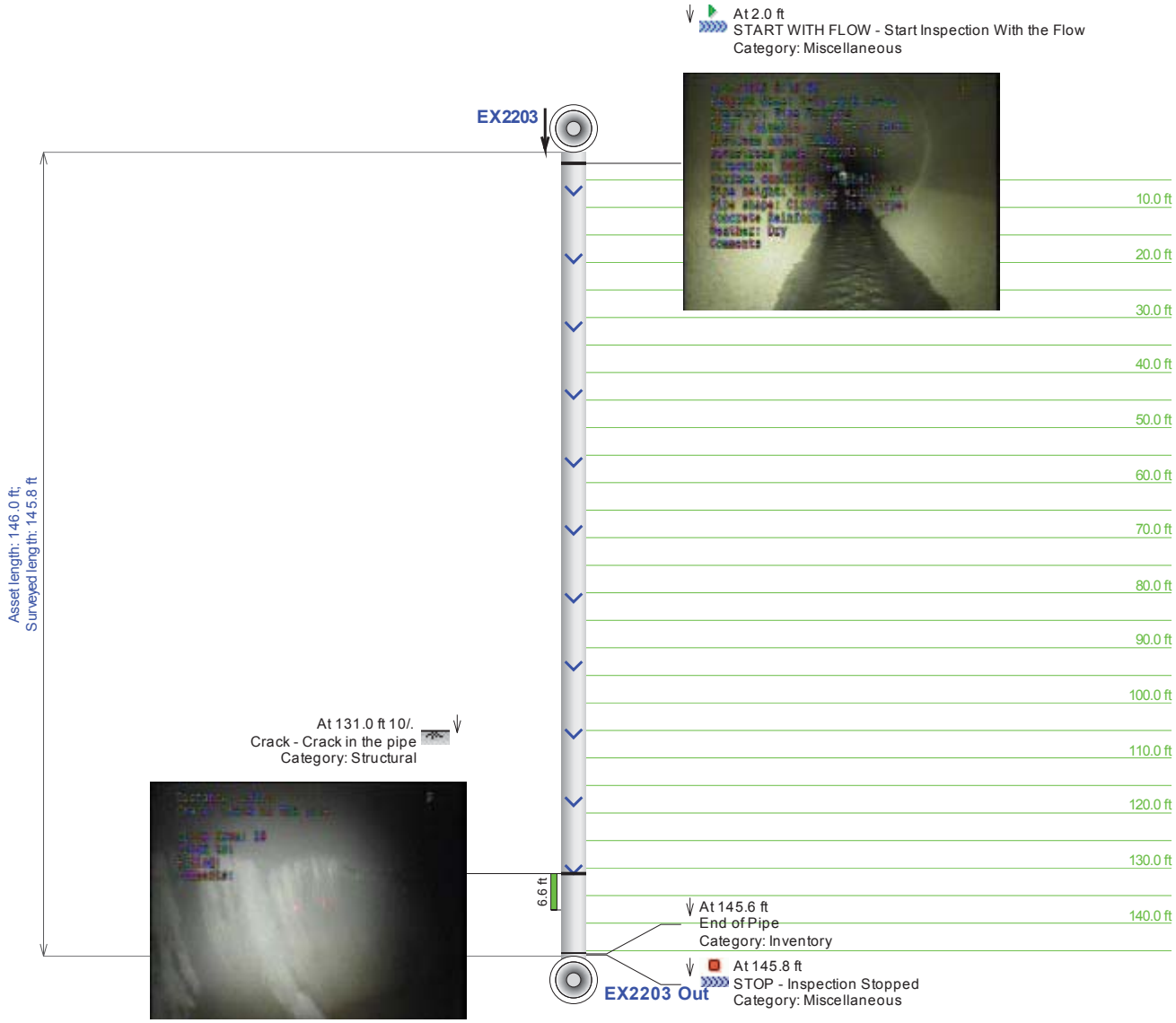
# Main Inspection with Pipe-Run Graph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2203 | Columbia, SC | I-77 South |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 36 | 36 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 145.8 | Tina Watkins | |



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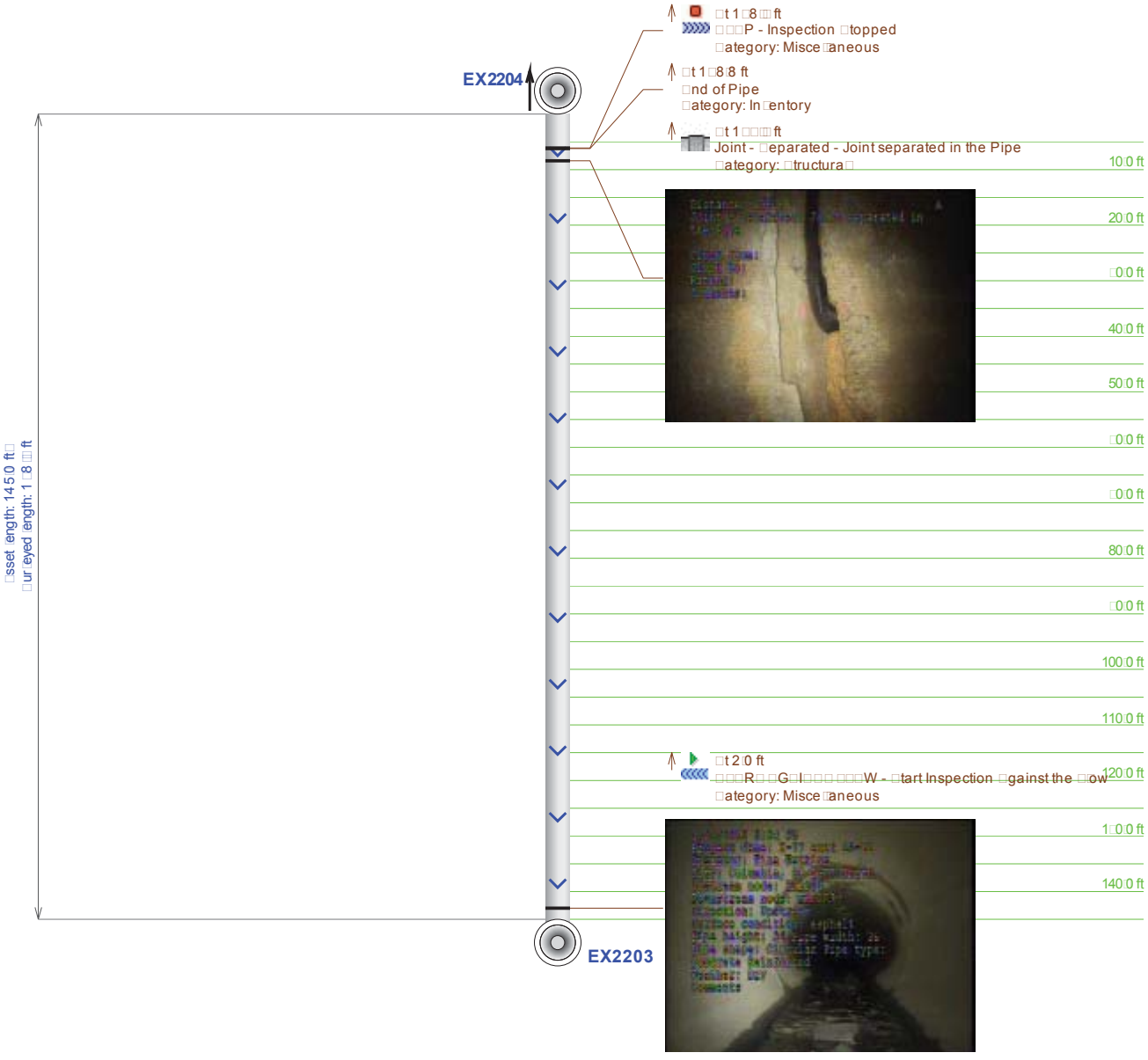
# Main Inspection with Pipe-Run □raph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2204 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/21/2015 | 36 | 36 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| □PSTREAM | 138.□ | Tina Watkins | |



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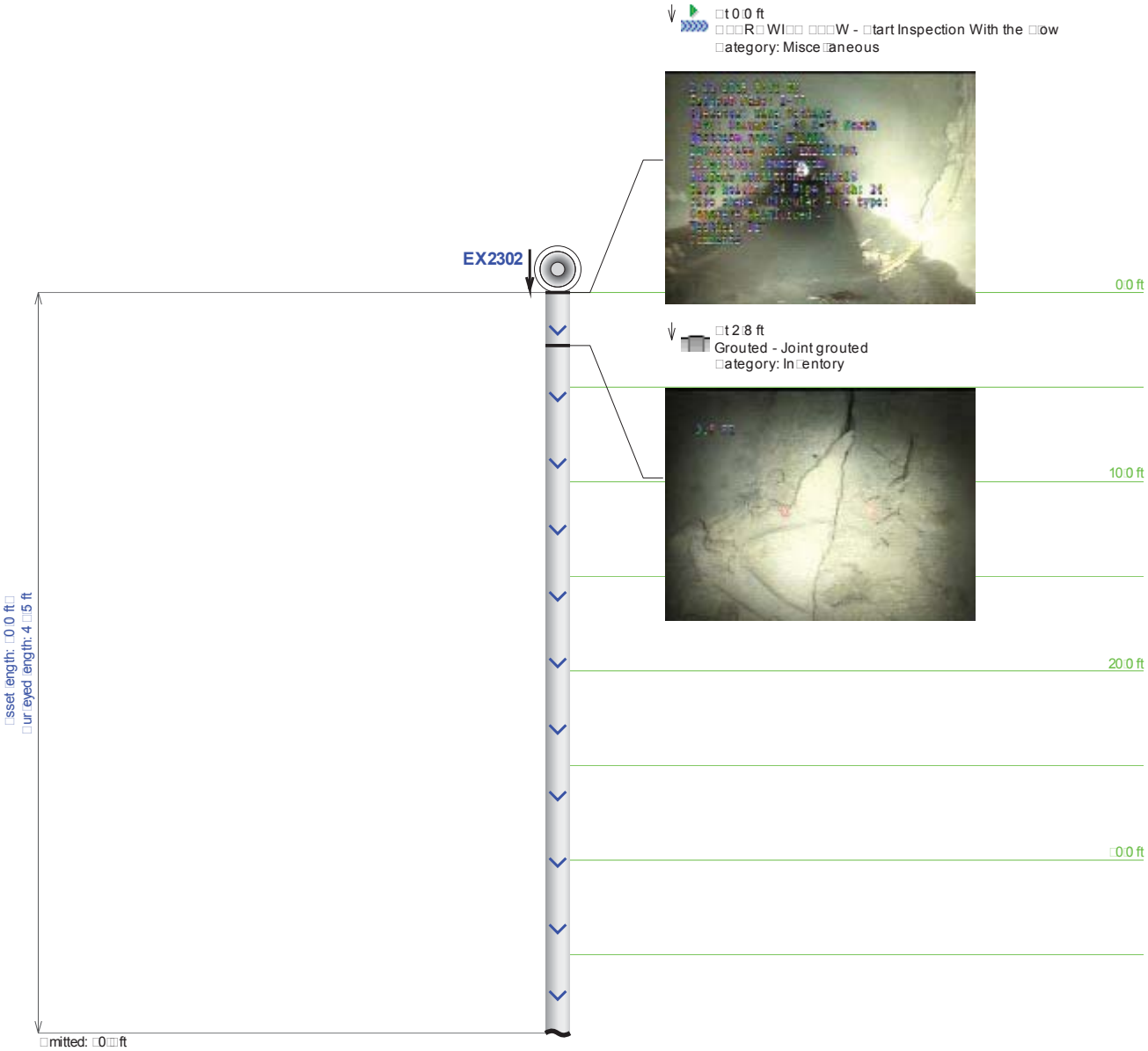
# Main Inspection with Pipe-Run □raph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP2301 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 43.5 | Tina Watkins | |



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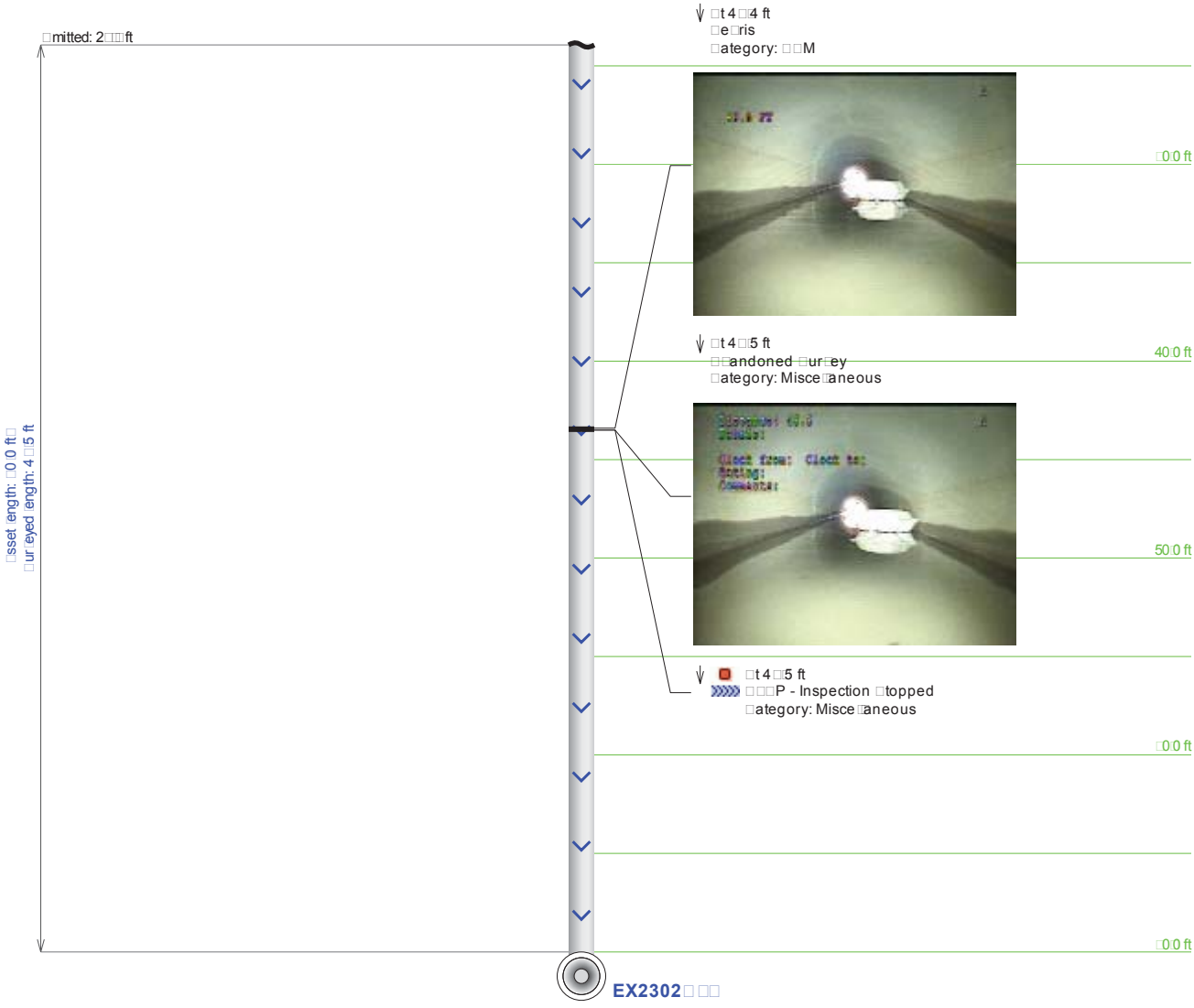
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP2301 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 43.5 | Tina Watkins | |



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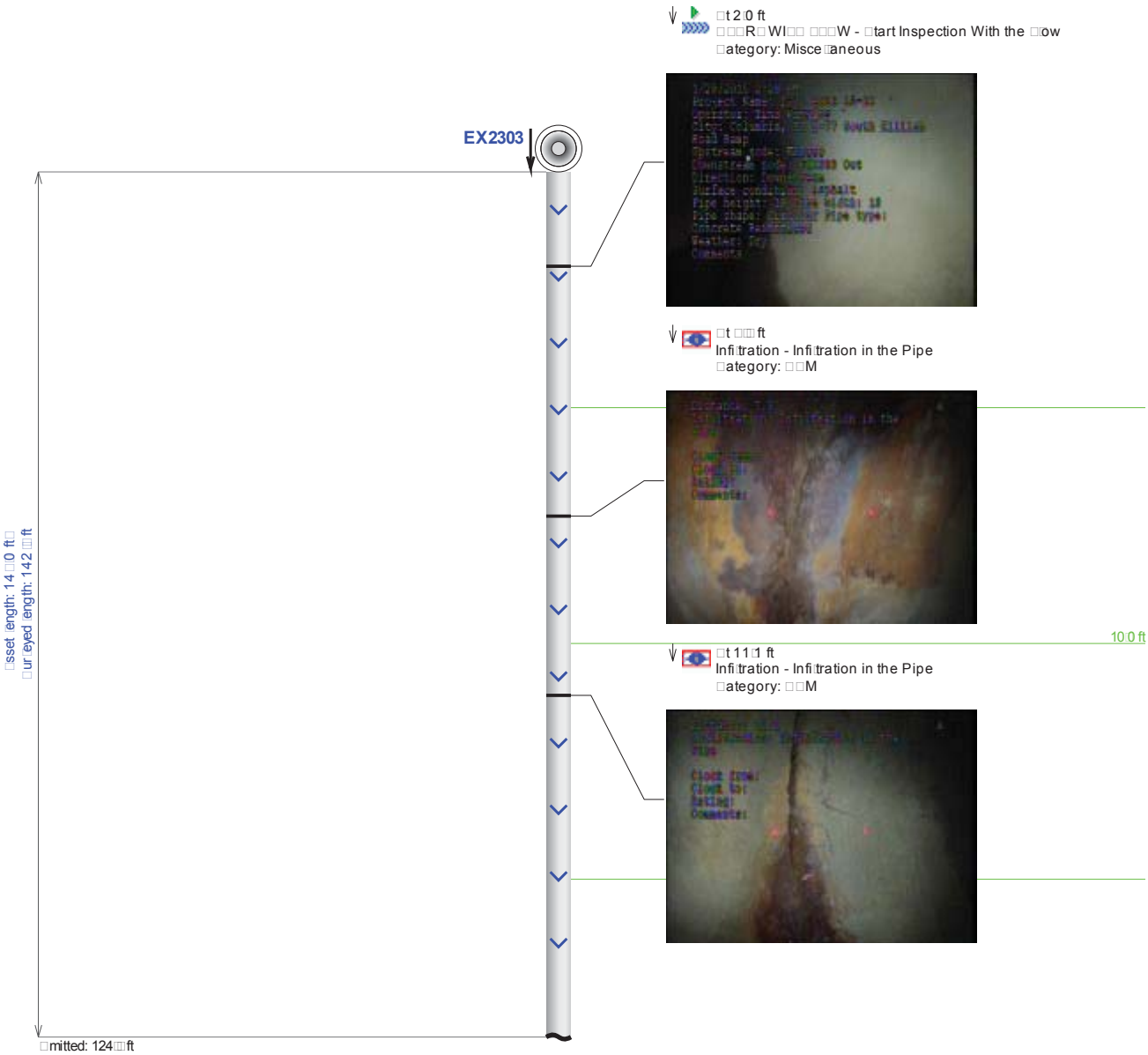
# Main Inspection with Pipe-Run □raph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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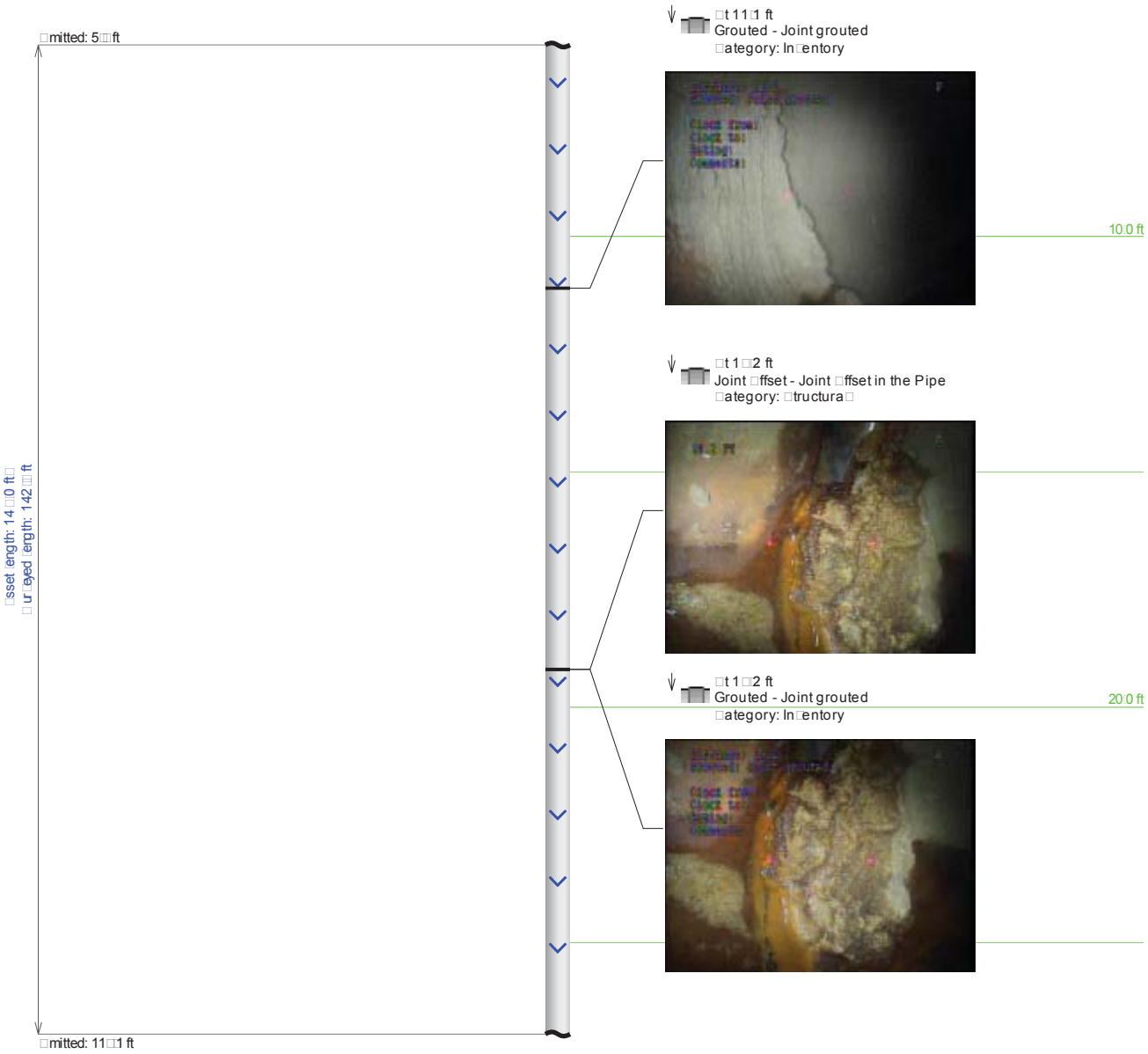
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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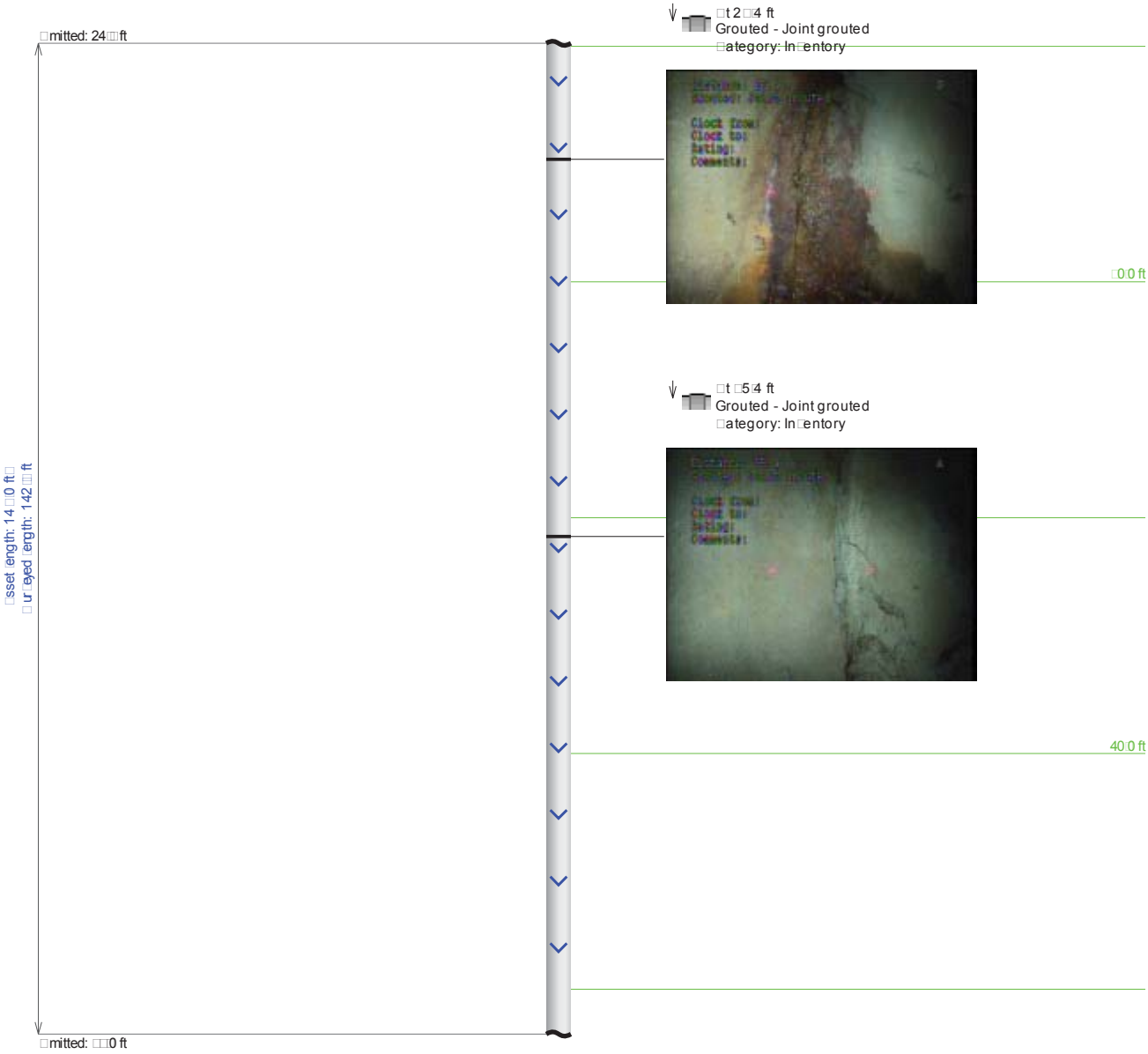
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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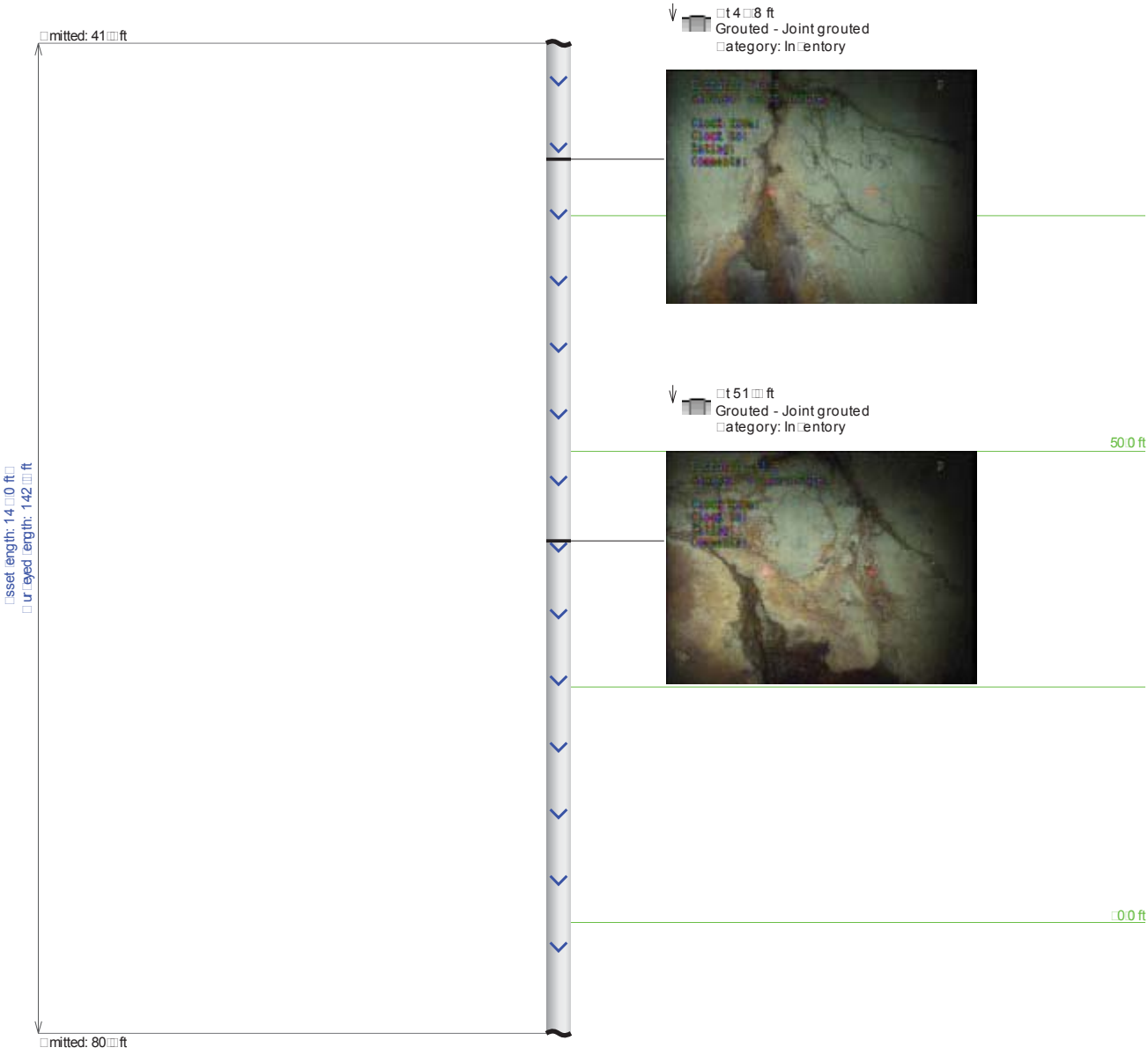
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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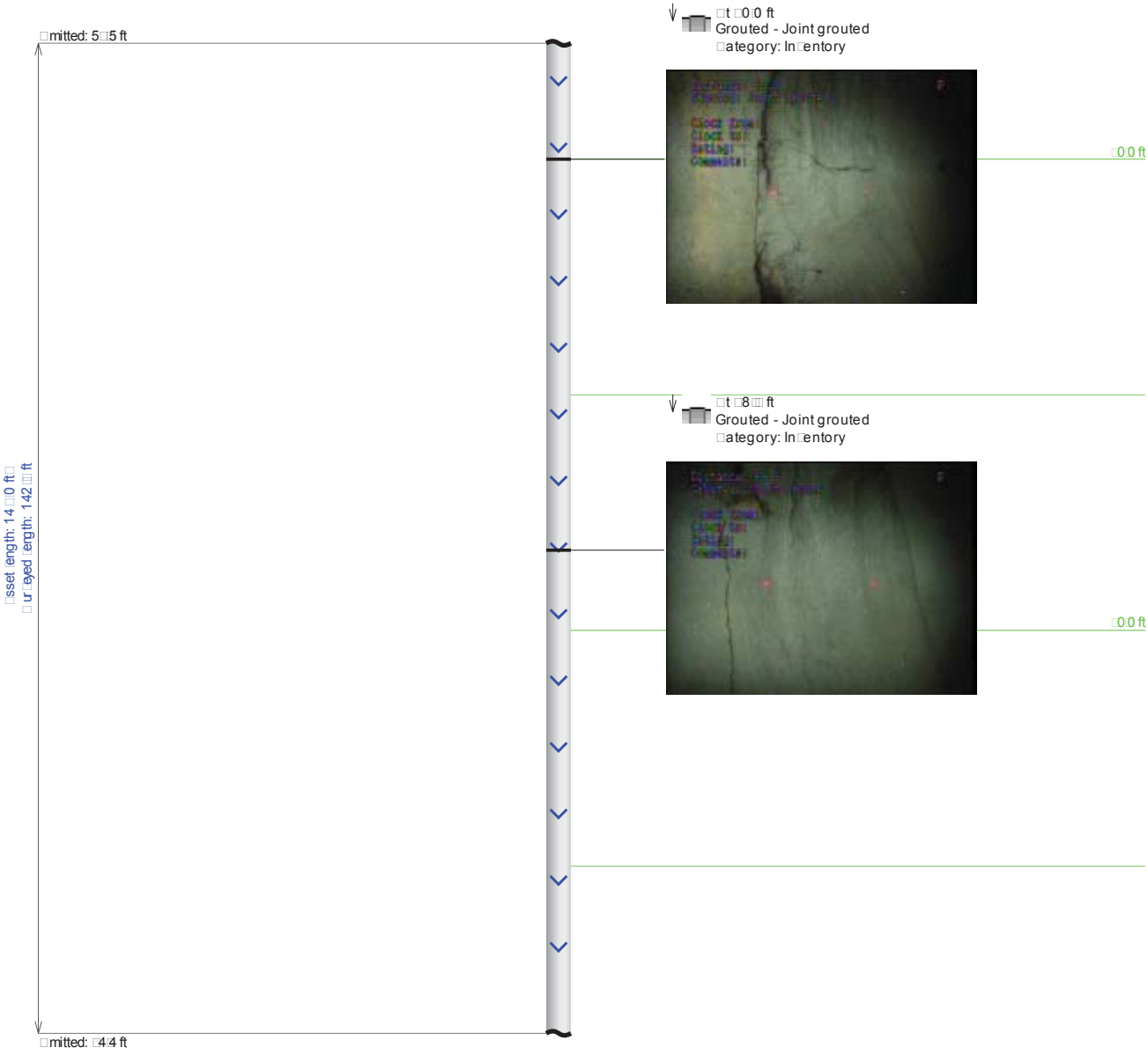
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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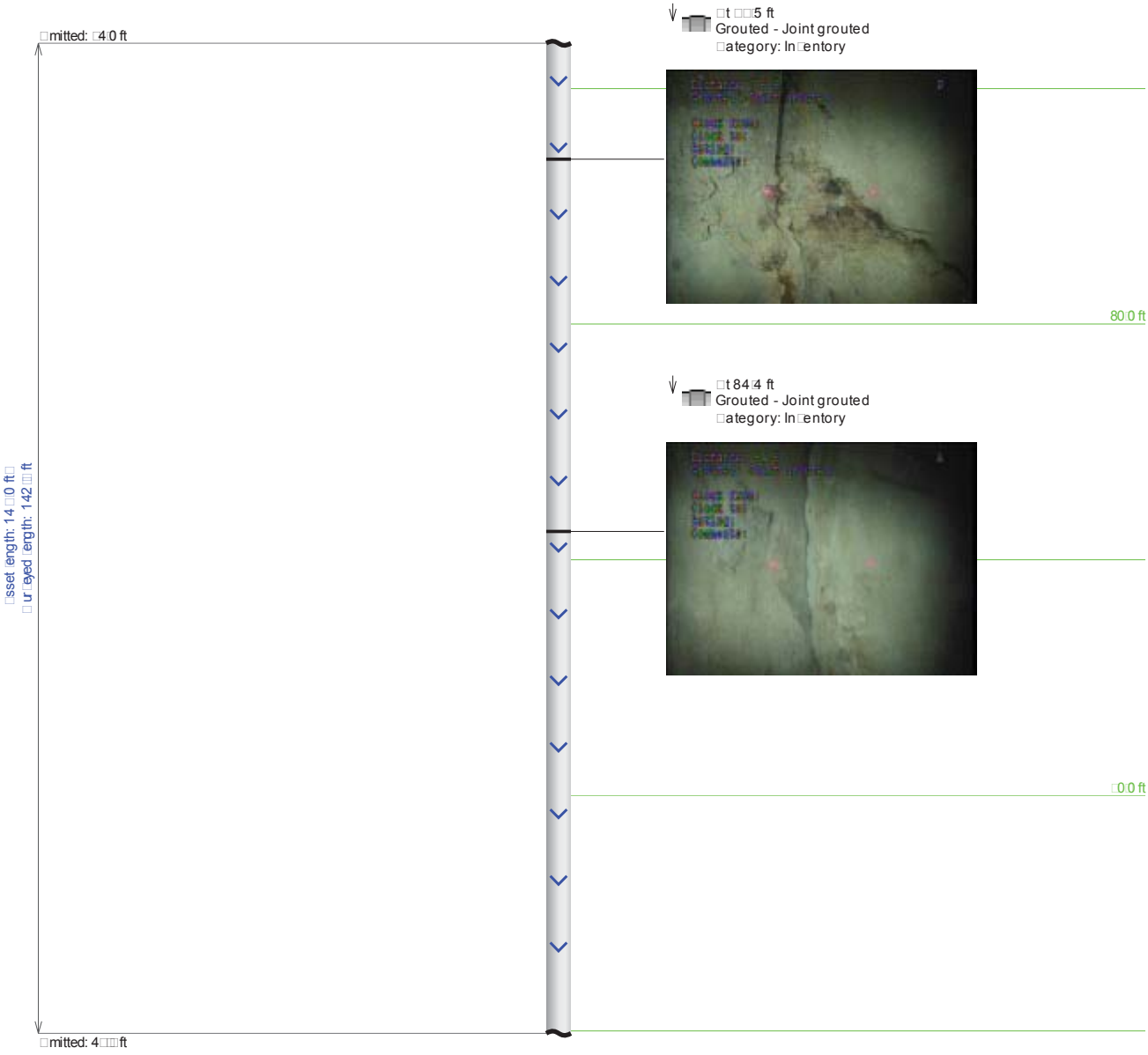
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |

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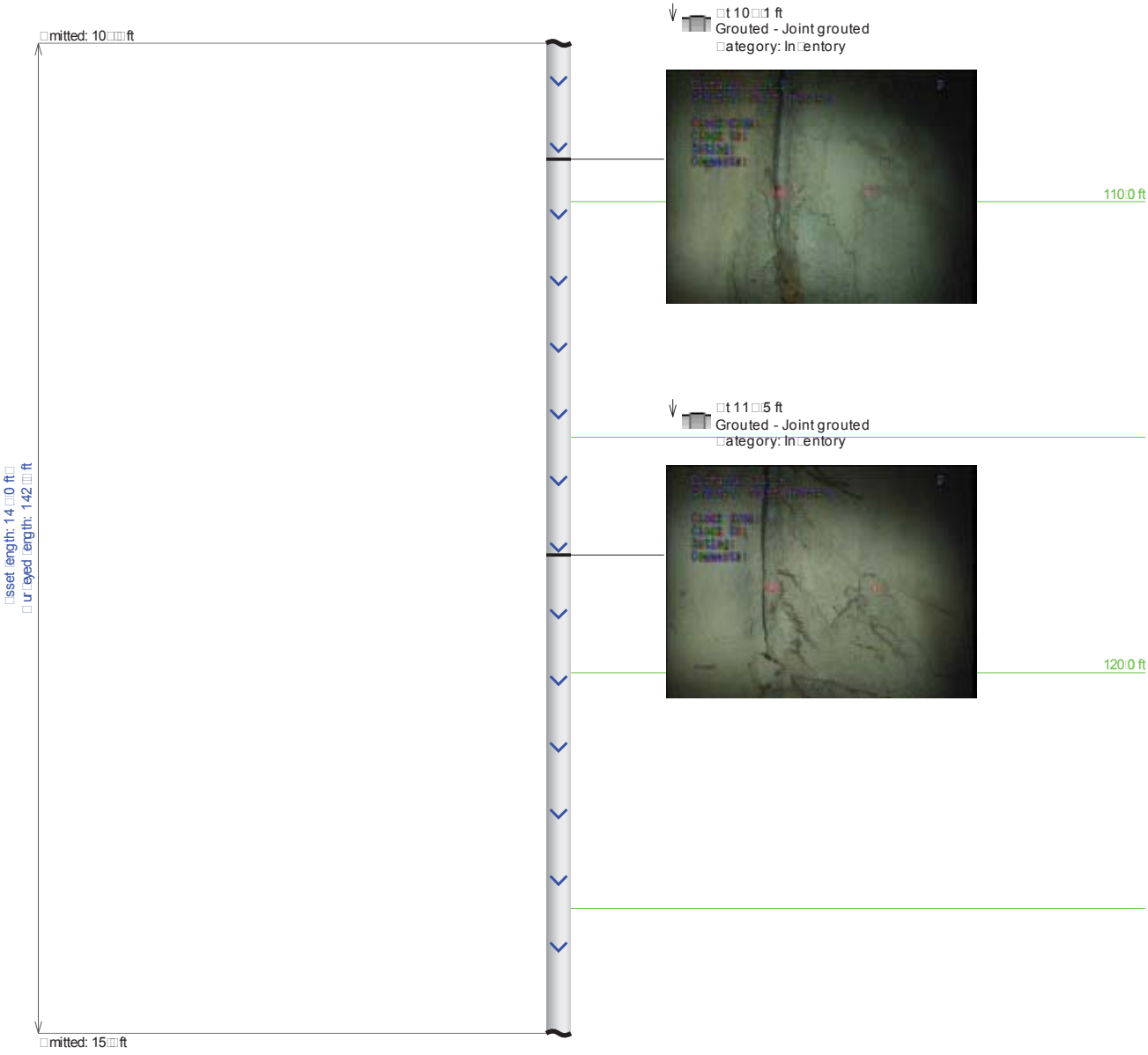
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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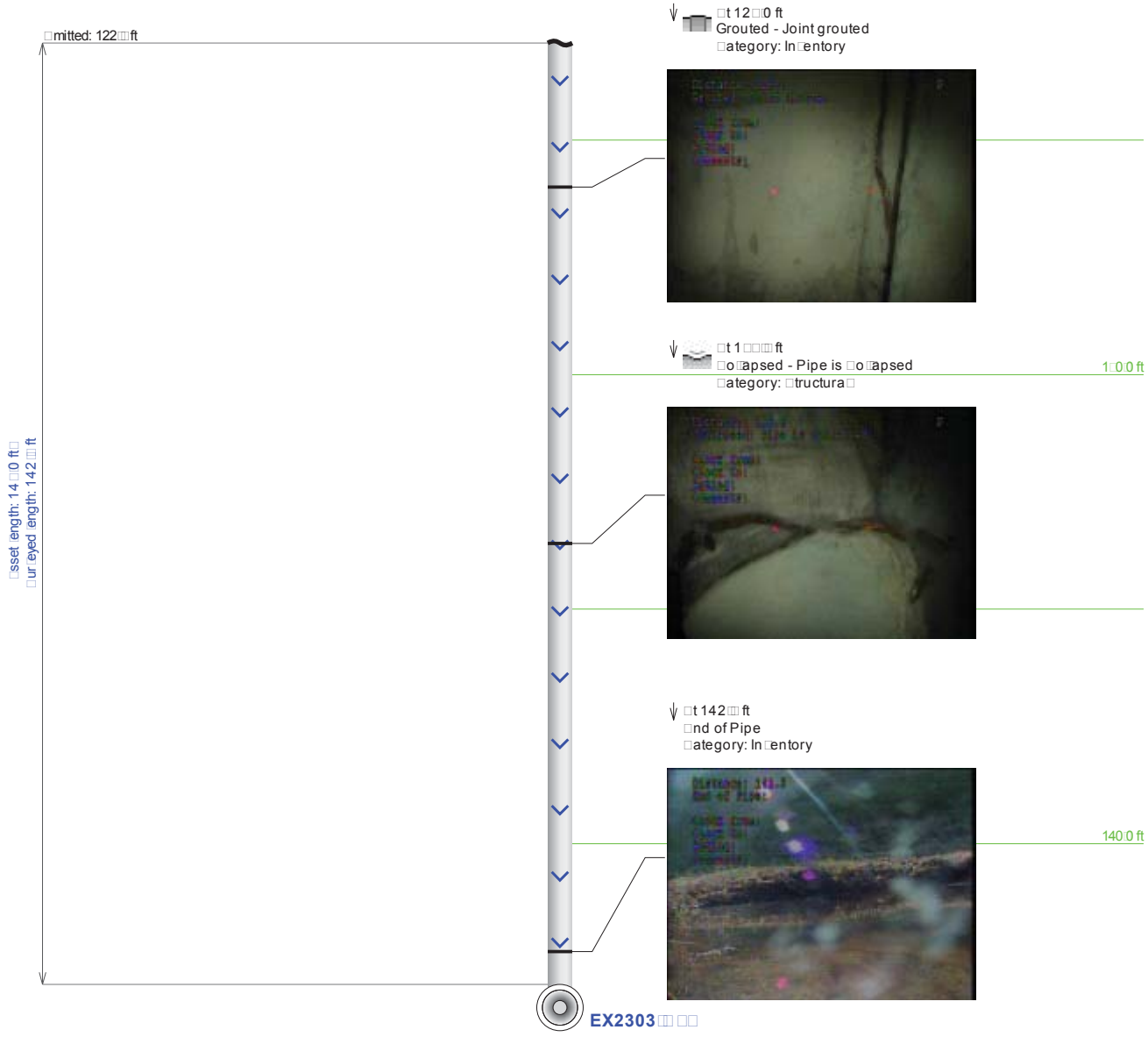
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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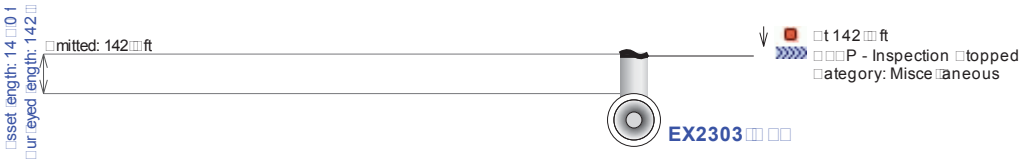
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 exit 15-22 | EP2303 | Columbia, SC | I-77 South □llian Road Ramp |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 1/28/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 142.3 | Tina Watkins | |



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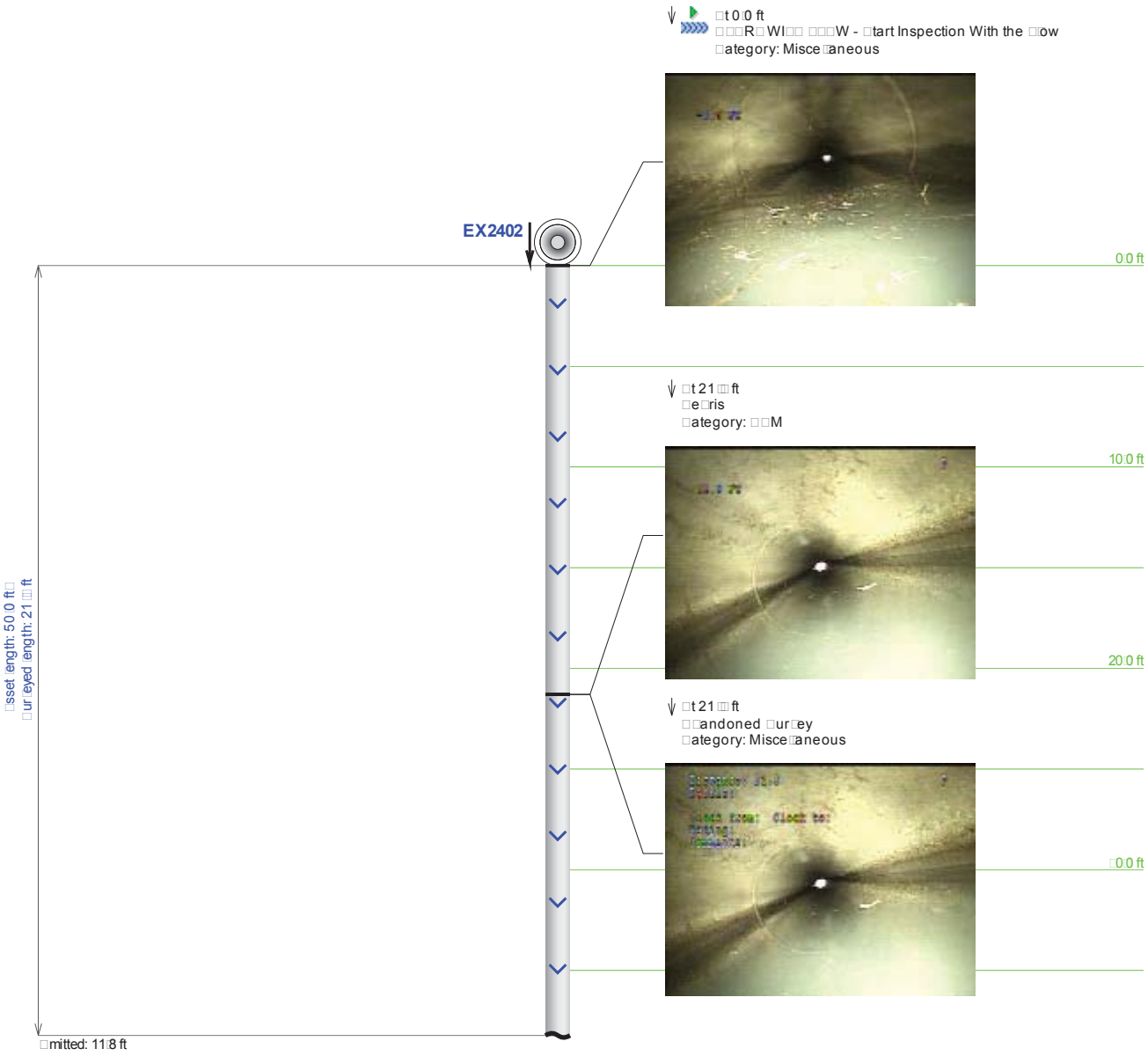
# Main Inspection with Pipe-Run □raph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP2403 | Columbia, SC | I77 South□□llian Rd |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 21.3 | Tina Watkins | |



AET Services
623 Rices Creek Road
□iberty,SC 2□657
1-800-□□0-8406
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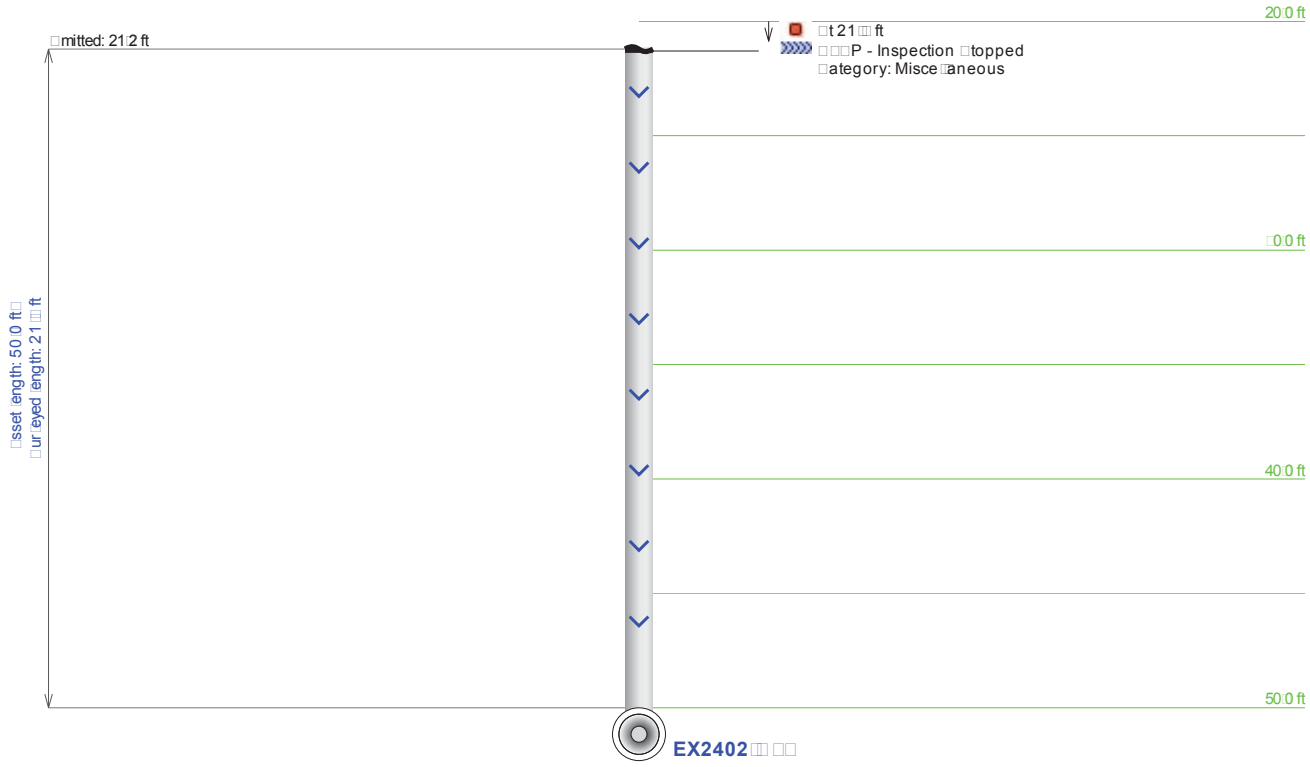
| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP2403 | Columbia, SC | I77 South□□llian Rd |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 24 | 24 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 21.3 | Tina Watkins | |



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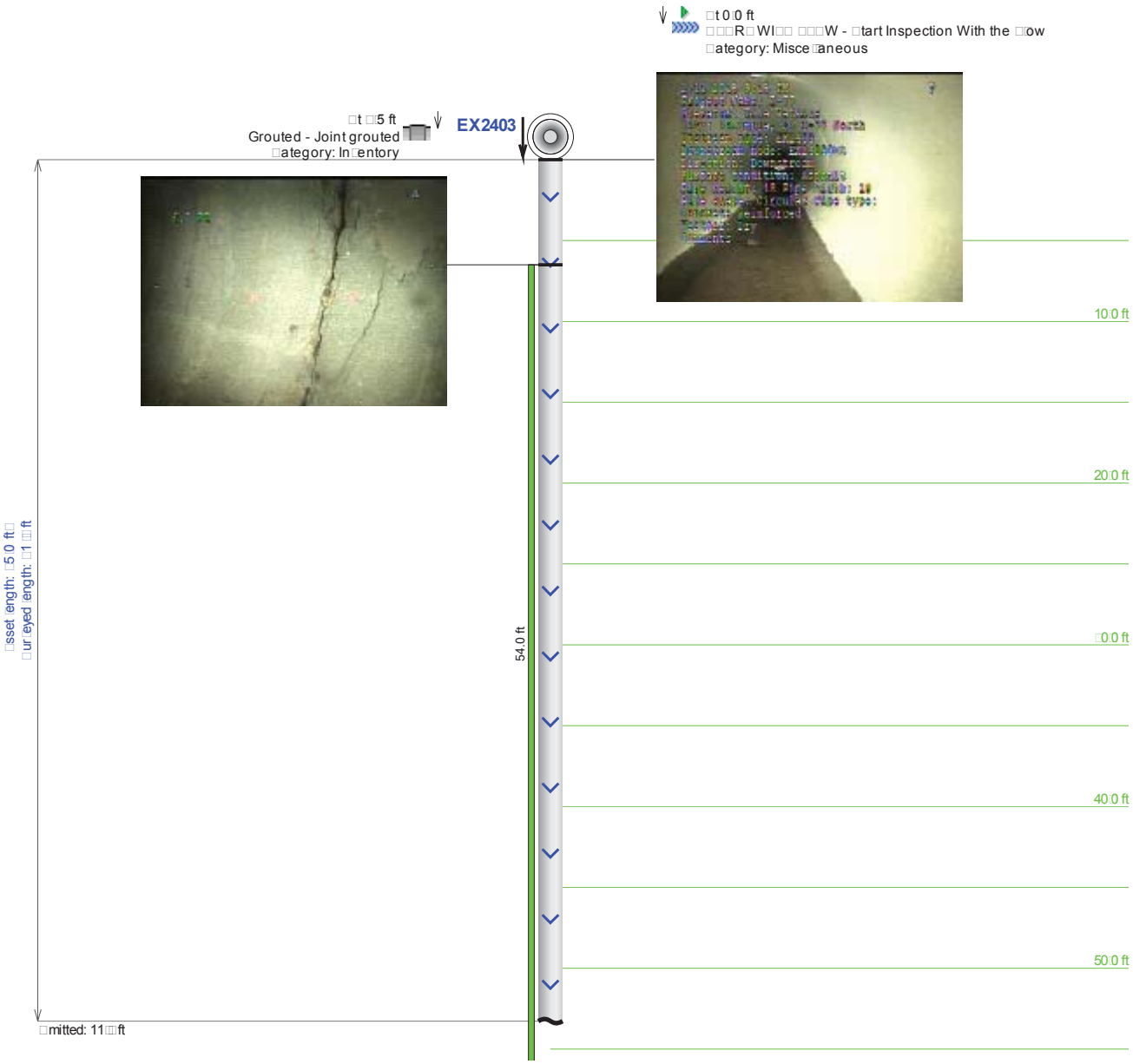
# Main Inspection with Pipe-Run □raph and Images

| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP2404 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 61.7 | Tina Watkins | |



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| Project Name: | Mainline ID: | City: | Address: |
|---|---|---|---|
| I-77 | EP2404 | Columbia, SC | I-77 North |

| Start date/time: | Pipe width: | Pipe height: | Pipe type: | Surface condition: | Weather: |
|---|---|---|---|---|---|
| 2/11/2015 | 18 | 18 | Concrete Reinforced | Asphalt | Dry |

| Direction: | Surveyed footage: | Operator: | Comments |
|---|---|---|---|
| Downstream | 61.7 | Tina Watkins | |