FINAL DRAINAGE REPORT
NEW BRITAIN – HARTFORD BUSWAY

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AUG 12 2010
INLAND WATER RESOURCES DIVISION

Connecticut Department of Transportation
Contract Project Hartford North (No. 63-H137)
Hartford

June 2010

H.W. LOCHNER INC.

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1 INTRODUCTION

1.1 Background

The Connecticut Department of Transportation (ConnDOT) retained H. W. Lochner, Inc. (LOCHNER) to prepare a final drainage report for a segment of a dedicated bus rapid transit facility from New Britain to Hartford.

The Preliminary Engineering led to decisions to break the 9.4 mile long Busway into five separate line contracts to be developed in the Final Design Phase. Lochner has been assigned the Final Design (FD) Phase for the northernmost section in Hartford – designated Project 63-H137 (Hartford-North Contract), see Figure 1 for the project location.

The Hartford North segment begins at station 450+00, approximately 725 feet south of the proposed Sigourney Station, and ends at 490+55, matching the existing grade at Asylum Street. The resulting project length, along the baseline, is 4,055 feet or 0.77 miles.

The project also includes the reconfiguration of the intersection of Sigourney and Hawthorn Streets, and the reconstruction the State of Connecticut Department of Public Works (DPW) parking lot.

The Hawthorn work starts at the intersection of Imlay Street and Hawthorn Street and runs east to its terminus with Sigourney Street. The Sigourney work starts approximately 100 feet north of the existing Aetna Service Road and ends at the Sigourney Street Bridge over I-84 to the south. The DPW parking lot is located on Capitol Avenue between Flower and Broad Street. The parking lot is also bounded by the Hartford Courant property.

The Sigourney Street Bus Station abuts the Hartford North project but is not included in this contract.

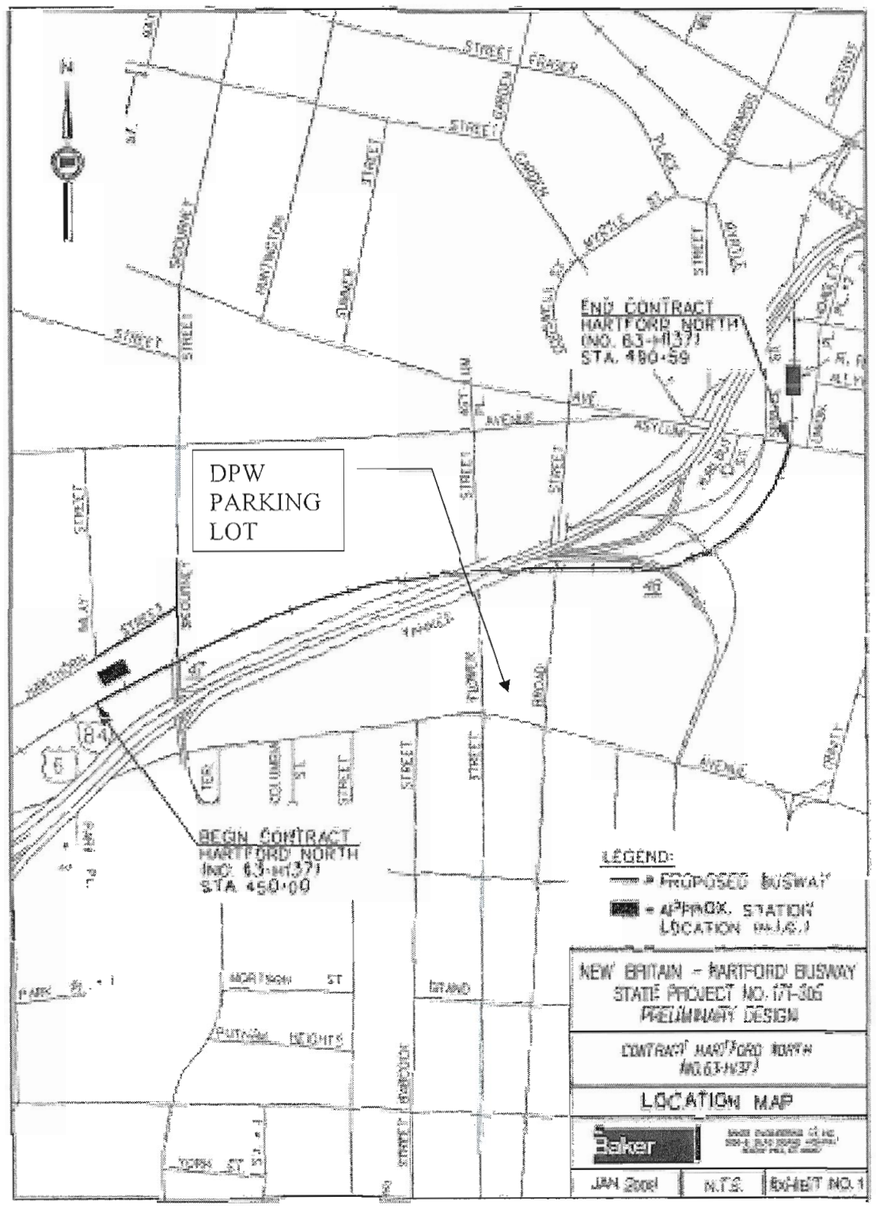

FIGURE 1

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1.2 Project Description

Below is a brief description of both the existing and proposed conditions.

1.2.1 Existing Conditions

1.2.1.1 Busway

The proposed location of the Busway from the Sigourney Station to Asylum Street currently is a stretch of the Amtrak's Springfield Line rail corridor, which consists of a single railroad track and an adjacent access road, both founded on an unpaved pervious surface.

1.2.1.2 Sigourney and Hawthorn Streets

Sigourney Street is classified as a Minor Arterial by the City of Hartford and ConnDOT and Hawthorn Street a Town Road. Sigourney Street connects the Asylum Hill area to the Frog Hollow area of Hartford. Sigourney Street can also be accessed by I-84. Hawthorn Street is an east west street that runs from Forrest Street to the west to Sigourney Street to the east.

1.2.1.3 DPW Parking Lot

The existing DPW Parking lot provides parking for the State of Connecticut and is located between Flower and Broad Street, with frontage on Capitol Avenue. The lot is covered with gravel and runoff from this lot travels to two catch basins along the southwest corner of the property. The two catch basins runoff to the Park River Conduit (PRC) via a 42 inch pipe.

1.2.2 Proposed conditions

1.2.2.1 Proposed Busway

Hartford North Contract includes the construction of a two-lane Busway from the contract interface with the Hartford South Contract (No. 155-H025) to just past the existing Sigourney Street Bridge; a one-lane Busway from that point to the intersection with Flower Street; a two-lane Busway from Flower Street to the Busway terminus at Asylum Street; and the reconstruction of a portion of Sigourney and Hawthorn Streets in the vicinity of Sigourney Street Station. Construction consists of the Busway itself, two bridges, fourteen retaining walls, travel/drop-off lanes for stations, and reconstruction of the I-84 westbound entrance ramps from both Asylum Street and Capitol Avenue, and reconstruction of the I-84 eastbound exit ramp to Asylum Street. This contract is the last (from south to north) of five Busway line contracts that will form the New Britain – Hartford Busway.

1.2.2.2 Sigourney and Hawthorn Streets

The project includes the reconfiguration of the intersection of Sigourney and Hawthorn Streets within the vicinity of the Aetna Campus to improve operations at this location.

1.2.2.3 DPW Parking Lot

The proposed parking will be paved and drainage patterns will not be significantly altered from the existing gravel lot.

1.3 Purpose

The purpose of this drainage report is to describe the final design of the storm sewer systems for the Hartford North Contract in accordance with the ConnDOT Hydraulics and Drainage Manual and the ConnDOT Design Submission Check List. Our report contains the following information:

- Data Collection/Investigation
- Design Criteria, Methodology and Assumptions
- Storm water Conveyance
- Environmental Issues, Permits, and storm water treatment measures
- Conclusions

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2 *DATA COLLECTION/INVESTIGATION*

In preparation of our Drainage Report, Lochner collected information from the following sources:

- City of Hartford Flood Commission (City of Hartford) Gate Chambers Information
    - 2007 Hartford Flood Control System PRC Valve Inspection Reports
    - October 1998 Collection System Gate Inspection Report
- Metropolitan District Commission (MDC) Storm and Combined Sewer Mapping
- ConnDOT Construction Drawings for I-84
- October 2008 Condition Survey

2.1 City of Hartford Flood Commission

2.1.1 PRC System

During the turn of the century, the Park River was formerly known as the Little River and Hog River, originally divided Hartford into northern and southern sections, and was a major part of Bushnell Park. From the confluence with the Connecticut River back to Bushnell Park, the river was partially enclosed by flood control projects in the 1940s in response to the floods of 1936 and 1938. After the 1936 flood, the mayor of Hartford established a Flood Control Commission, and the even bigger flood two years later added urgency to that commission's work. During this same time, the U.S. War Department was also interested in flood control, for increasing concern over the likelihood of war in Europe, meant America's rapidly expanding defense industry in the Hartford area had to be protected from any loss of time or materials. Plans for a system of dikes along the Connecticut River and for putting Hartford's river underground in what was known as the PRC were first created by the Hartford Department of Engineers, then taken over, and finalized by the Office of the District Engineer of the War Department. That office also supervised construction, which began in September 1940 and was completed in November 1943. The conduit was just over a mile long (5,800 feet) and ran from the Connecticut River to the space between the Capitol and Armory buildings; this section was identified as Section 1.

Since the 1940s, and partly in response to the 1955 flood, the flood control system has been refined and eight additional sections added to the original PRC. The conduit was extended west from Bushnell Park northwest to Farmington Avenue and Woodland Streets (Sections 2 through 9); with Sections 5 and 6 parts of the South Branch of the Conduit. Sections 2 through 9 were designed and constructed by the ConnDOT and later by the ACOE in 1960s. The construction of the conduit was finalized in the late 1980s. The conduit is made of reinforced concrete, confined in 2 tubes, each 30 feet wide and 19 feet high. A plan view showing all the sections and a typical elevation view of the conduit are included in Appendix A.

The City of Hartford Flood Commission provided as-built drawings and reports related to the original PRC design and construction to Lochner. The as-built drawings provide information related to high and low level interior drainage that discharge to several gate chambers, which eventually discharges to the PRC System. There are approximately thirty gate chambers; seven gate chambers are within the Busway project area, identified as Gate Chambers Numbers 6 through 12. In addition to the seven gates, there are two gates that are not identified with a Gate Number; these gates are identified as the Gully Brook Gate and the Armory Pump Station Flap Gate. (Appendix A). These chambers convey storm water from I-84 and local street drainage and include mechanically operated sluice gates within a Special Manhole. The pipes entering the chamber are also equipped with flap gates to prevent the back water from both the Park River and the Connecticut River from surging up the storm water system. According to discussions with the City of Hartford, they have indicated that the sluice gates have not been used since they were installed in the early 1960s. The inverts of the gates are approximately 10 feet below the top of the PRC. A drawing showing a typical gate structure is included in Appendix A.

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2.1.2 2007 Hartford Flood Control System PRC Valve Inspection Reports

In October of 2007, Fuss & O'Neill Inc. (F&O) performed an inspection of all the City of Hartford Gate Chambers. F&O provided Lochner with copies of the 2007 Hartford Flood Control System PRC Valve Inspection Reports for Gates 6 through 11. Their inspection reports identify that the gates are generally in fair condition and require minor repairs. Copies of the F&O draft reports are included in Appendix B of the Condition Survey Report, which was submitted to the ConnDOT in December 2008.

2.1.3 October 1998 Collection System Gate Inspection Report

In October of 1998, Camp Dresser & McKee (CDM) performed an inspection of all the MDC and City of Hartford Gates Chambers. F&O provided Lochner with a copy of the CDM Report. Portions of the CDM report related to Gates 6 through 11 and the Gully Brook are included in Appendix C of the Condition Survey Report, which was submitted to the ConnDOT in December 2008. Their inspection reports identify that the gates are generally in fair condition and require minor repairs.

2.2 MDC Data

In April of 2008, Lochner attended an informal meeting with Mr. Neil H. Amwake, P.E. Principal Engineer with the MDC. During this meeting, we discussed the project, drainage patterns within the city, any drainage concerns, and additional data needs. Mr. Amwake indicated that the MDC is responsible for the majority of the storm sewer piping. There are also private systems, City of Hartford, and State storm drainage that exist within the city. He also indicated that the majority of the storm sewers are currently combined with the sanitary and the MDC is in the process of separating them in accordance with a Connecticut Department of Environmental Protection (CTDEP) Consent Order. The MDC also indicated that connecting to the combined system is prohibited. However, if we connect to their separated system, the MDC would like to have no net increase in flow. The MDC requires our systems to be designed for a 10-year storm; with a 25-year check storm and that, the proposed hydraulic grade line (HGL) should not affect upstream properties. MDC provided Lochner a working a map showing all separated storm sewers and as-built drawings of separated systems.

During a more recent meeting with the Department and MDC, the MDC stated that the separated systems are not totally separated from combined. During storms events in excess of the 1 year storm, the combined sewer will overflow into the separated sewers.

2.3 ConnDOT Records Review

Lochner also conducted a review of I-84 construction drawings dating back to the late 1960's. The drawings show and confirm the location where drainage from I-84 connects to the PRC System.

2.4 CONDITION SURVEY

On October 28, 29, 30, November 10, and November 11, 2008, Lochner performed a condition survey inspection of all existing drainage facilities within the limits of the Hartford-North and Broad Street Breakout projects.

Based on preliminary drainage design by Lochner, Lochner identified eight gate chambers Appendix B, which stormwater from the Busway Project will potentially be directed to. These gates are identified as:

- Gate 6
- Gate 7
- Gate 8
- Gate 9
- Gate 10
- Gate 11
- Gully Brook Gate
- Armory Pump Station Gate

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Pipes associated with these gates were inspected and appear to be in fair to good condition with the exception of sediment buildup in the piping. However, existing drainage inlets (catch basins) located on Sigourney Street, Hawthorn Street, Asylum Avenue and Capital Avenue Ramps (within the project limits) appears to be in poor to fair condition. Primarily the grates and frames are in poor condition and require replacement. A significant number of catch basins are constructed of brick and are equipped with hoods. Inspection forms related to condition survey are included in Condition Survey Report, which was submitted to the ConnDOT in December 2008.

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3 DESIGN CRITERIA, METHODOLOGY, AND ASSUMPTIONS

3.1 Background

As discussed in Section 2, the storm water conveyance system within the area includes a complex arrangement of both storm sewer and combined sewer systems. These systems are owned by a combination of the City of Hartford, the MDC, or the State.

Record drawings reviewed by Lochner show that the majority of the stormwater associated with I-84 and some local roadways is conveyed to the PRC via gate structures. For the portion of the project in the vicinity of Asylum Street, storm water is conveyed to the Gully Brook Conduit. The Gully Brook Conduit then discharges to the PRC System. The record drawings also depict drainage structures within I-84 and the local roads, and piping connecting (trunk lines) to the gate structures. The size of the trunk lines range from 24 to 48 inches in diameter and are shown traversing beneath the railroad (Amtrak). Lochner identified nine gate structures and one outlet (DPW Parking Lot) within the project limits. However, two gate structures were not considered for busway flow, Gates 7 and 12 due to their location relative to the Busway. Gate 7 is located in the green island to the rear of the Armory and it discharges to the south side PRC. Gate 12 is located along the southwest side of Sigourney Street and along the eastbound side of I-84. Included in Appendix A, is a map showing the approximate locations of the gate structures within the project area. The stability of the gate structures to the PRC are not of concern because they are concrete structures. Therefore, no outlet protection is required.

3.2 Design Criteria

Hydraulic evaluation of the existing/proposed and temporary drainage system were performed using StormCAD® by Haestad Methods, which is consistent with procedures outlined in the U.S. Department of Transportation (USDOT), Hydraulic Engineering Circular (HEC) No. 22, ConnDOT Drainage Manual, and the ConnDOT Busway Design Manual.

3.2.1 Design Storm and Maximum Spread

3.2.1.1 Busway

Lochner considered the Busway classification as a State Collector Highway with a design speed of less than 45 mile per hour. The suggested minimum design storm frequency and design spread from the ConnDOT Drainage Manual is a 10-year rainfall frequency with an allowable design spread equal to the shoulder and half of a driving lane, which varies from approximately 8 to 10 feet. For design purposes Lochner used an allowable spread of 8 feet.

For sag conditions, the suggested minimum design storm frequency and design spread from the ConnDOT Drainage Manual is a 25-year rainfall frequency with an allowable design spread equal to the width of one lane. If excessive spread is anticipated flanker basin would be proposed. The locations of the flanker basins were determined in accordance with HEC-22.

3.2.1.2 Asylum Street Ramp

The suggested minimum design storm frequency and design spread from the ConnDOT Drainage Manual in a 10-year rainfall frequency with an allowable design spread of one foot encroaching into the driving lane.

3.2.1.3 Sigourney and Hawthorn Streets

The first design criterion assessed is the design storm frequency and maximum allowable spread of the gutter flow for Sigourney and Hawthorn Street.

Sigourney Street is classified as a Minor Arterial and Hawthorn Street a Town Road by the City of Hartford and ConnDOT. Sigourney and Hawthorn Streets are not state roadways, therefore for drainage purposes Sigourney and Hawthorn Streets should be classified as Town Roads with design speeds of less than 45 mile per hour. The suggested minimum design storm frequency and allowable design spread from the ConnDOT Drainage Manual is a 10-year rainfall frequency with an allowable design spread equal to the shoulder plus one half of a driving lane, approximately 8 feet.

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For sag conditions, the suggested minimum design storm frequency and design spread from the ConnDOT Drainage Manual is a 25-year rainfall frequency with an allowable design spread equal to the full roadway width except for one lane width for vehicle passage. If excessive spread is anticipated flanker basin would be proposed. The locations of the flanker basins were determined in accordance with HEC-22.

3.2.2 Storm Drain Design

An existing and proposed drainage analysis was conducted in accordance with the ConnDOT Drainage Manual, which included:

- Performed a Hydraulic Grade Line (HGL) Analysis,
- Determined that minimum velocities are achieved,
- Performed a capacity analysis of existing trunk lines that are connected to the Park River gates

3.2.2.1 Hydraulic Grade Line Analysis

In accordance with ConnDOT Drainage Manual storm drains shall be designed for "just-full" condition with the headwater in the structures (manholes and catch basins) limited to an elevation 1 foot below the top of the catch basin grate or manhole.

3.2.2.2 Minimum Cleaning Velocities

The minimum cleaning velocity from the design flow is 3 feet per second.

3.2.2.3 Capacity Analysis

In accordance with ConnDOT Drainage Manual, storm drains should also be sized on the assumption that they will flow full or practically full under the design discharge but will not flow under pressure head. The Manning's formula is recommended for capacity calculations.

3.2.3 Starting Water Surface Condition

Lochner conducted an evaluation to determine the starting water surface elevation (SWSEL) at each of the gate structures.

3.2.3.1 Background

Elevations for inverts, tops, and the gates are summarized on Table 1 and were obtained from as-built drawings for the PRC project. Included in Appendix B are excerpts of the as-built drawings. Also included in Appendix B is a profile of PRC from the inlets at the North Branch and South Branches to the outlet at the Connecticut River.

As part of our SWSEL evaluation, Lochner reviewed data from several sources related to the back water effect from the Connecticut River. Based on a review of the data, it appears that the Park River typically peaks several days before the Connecticut River does. We believe that the backwater effect from the Connecticut River based on a 2-year event is appropriate for storm drain design. The Connecticut River elevations associated with a 2-year event is representative of normal conditions for the river.

3.2.3.2 SWSEL Evaluation

Lochner conducted a joint probability analysis for main stream (Park River) to the tributary (Drainage to the Gate). This analysis assumes that the storm events are statistically independent. The analysis uses an area ratio and design frequencies for coincidental occurrence. The following data was used:

- Connecticut River is at a 2-year elevation (17.3 feet NGVD)
- Drainage area to the Park River is approximately 0.007 of that of the Connecticut River. Therefore a 100: 1 area ratio was used
- Drainage areas to the gate structures are approximately 0.0006 of that of the Park River. Therefore a 1000: 1 area ratio was used

- A 10 and 25-year design frequency at the gate is assumed

Using the above information and Table 8-3 of the ConnDOT Drainage Manual, it was determined that values in Table 8-3 are overly conservative for the 100:1 ratio. Therefore Lochner assumed a 2 year Main Stream to 5 year tributary for Connecticut River to Park River and a 5 year to 10 and 25 year for Park River to the Gate Structures (1000:1). Table 8-3 for 1000:1 uses a 2 year to 10 and 25 year. We believe that our assumption is conservative and appropriate for subsequent analyses.

In determining the 5 year discharge for the Park River, Lochner first created a discharge frequency curve of the PRC using FEMA discharges. A line of best fit was then applied to the data and the discharge for the 5 year event was estimated using the equation of the best fit. The discharge was estimated to be 4100 cfs.

Water surface elevations within the PRC were estimated using the Manning's equation, with the conduits geometric properties and 5 year discharge, entered into the equation. Calculations are included in Appendix B. The calculated water surface elevations are summarized on Table 1.

3.2.4 Other Assumptions

The Consulting Engineers General Memorandum 08-01 provides information to the consultant design engineers with regard to their responsibility for determining the appropriate type of pipe product for specific applications. The evaluation of the pipe material should be based on durability, hydraulic capacity, structural capacity, compatibility of pipe material to site conditions and life cycle cost. Memorandum 08-01 also states that the designers are reminded that pipe selection should also consider height of fill required for all loads during construction.

As part of the drainage design of the Busway, several pipe types, which are acceptable by CONNDOT, were considered and they include:

- Reinforced concrete Pipe (RCP)
- Corrugated aluminum Pipe (CAP)
- Aluminum coated corrugated steel Pipe (ACCMP)
- High density polyethylene Pipe (HDPE)
- Polyvinyl chloride plastic pipe (PVC)

Typically larger quantities of one item result in lower prices for that item. Therefore, if pipe types within a project are kept to a minimum, it should result in lower prices for whatever type of pipe is chosen. For this reason, it was considered appropriate to select one pipe material for all the project storm sewer systems.

As stated in Section 1, the project is located within the footprint of the existing Amtrak's Springfield Rail Road Line, which will be relocated south of the Busway corridor. The project currently consists of rail road tracks and ballast. The proposed project vertical and horizontal alignments will closely follow the existing geometry which results in relatively flat vertical grades to minimize cuts and fills. The drainage system closely follows the vertical grades and at some location needs to be relatively shallow for connections to convenient outlets. There are some locations where drainage also needs to be deep, in excess of 10 feet. To provide the necessary hydraulic capacity and maintain minimum cover requirements, relatively smooth pipe interiors are required. The use of corrugated metal pipes, although structurally adequate, would result in larger diameter pipes for the same grades, due to higher roughness coefficient. This would result in higher material cost. For these reasons CAP and ACCMP pipes were not considered.

This leaves three choices of pipe types; reinforced concrete, HDPE and PVC. HDPE and PVC plastics and therefore conduits made of these materials are "flexible" conduits. Structural loads on flexible conduits are carried by an interrelationship between the culvert structure and the surrounding soil. This is an important relationship; both the pipe material and the soil envelope play vital roles in the structural integrity of the plastic pipe. This requires careful installation, proper bedding, proper backfill and expert inspection and supervision. This results in a more labor intensive installation and inspection which in turn drives up the cost of the drainage system. These installations also can be compromised if future trenching

is performed in the surrounding soil that if part of the overall structural system. In an urban environment like the Hartford North site, it is likely that future utility installations will be necessary in these adjacent zones and it is considered prudent to avoid the use of HDPE and PVC for this reason. RCP are less influenced by the surrounding soil envelope, resulting in more economical installation costs and placing fewer restrictions on future excavation in the vicinity of the pipe runs.

Based on the above reasons, reinforced concrete pipe has been selected as the most suitable culvert type for this project.

3.3 Design Methodology

In accordance with the ConnDOT Drainage Manual, peak flows to storm drain inlets were estimated using the Rational Method.

3.3.1 Rational Method Parameters

3.3.1.1 Drainage Areas

Lochner delineated the existing and proposed drainage areas using topographical mapping provided by the City of Hartford and the MDC. Existing and Proposed Drainage Area Maps to the PRC gates are included in Appendix C. Also included in Appendix C are proposed inlet area maps for the Busway and the Local roads that are affected by the project. A summary of the existing and proposed drainage areas that include areas that are outside the project limits are summarized on Table 2. As summarized on Table 3 are the inlet areas. Stations on the table refer to stations on the drainage sheets.

3.3.1.2 Runoff Coefficient

The following runoff coefficients (C) were used:

Surface Cover	C value
Impervious Surfaces (paved, roof, gravel, etc)	0.90
Grass	0.23
Woods	0.13
Commercial	0.89

3.3.1.3 Rainfall Intensity

Lochner used the Intensity/Duration/Frequency (IDF) curve from the ConnDOT Drainage Manual to determine rainfall intensities.

3.3.1.4 Time of Concentration

Depending on the size of the drainage area, Tc's were either computed for large areas, assumed to be 5 minutes for small paved areas, with a minimum value of 10 minutes used for areas that are all or mostly unpaved, as well as roof areas where water can be stored.

3.3.1.5 Summary

Rational parameters are summarized in Tables included in Appendix D.

4 STORMWATER CONVEYANCE

4.1 Existing Conditions

4.1.1 Drainage Areas

As described above, there are five numbered gate structures, plus the Armory Pump Station, and the Gully Brook Conduit that conveys stormwater to the PRC. Below is a summary of the existing drainage areas:

Gate Structure Number	Area (Acres)
6	7.610
8	11.807
9	2.550
10	4.177
11	18.541
Armory Pump Station 36" RCP	15.051
Armory Pump Station 48 " RCP	13.045
Armory Pump Station Combined	28.096
Gully Brook	17.808
DPW Parking Lot	2.763

4.1.2 Gutter Flow Analysis

No existing drainage network exists on the Proposed Busway; therefore no existing Busway gutter analysis was performed.

The existing drainage network on Hawthorn and Sigourney Streets were evaluated for spread.

4.1.2.1 Gutter Flow Analysis Results

The gutter analysis was conducted using StormCAD. The results of the 10 and 25 year gutter analysis are included in Appendix D. The existing calculated 10 year gutter spread exceeds the allowable spread of 8 feet at several locations along Hawthorn and Sigourney Streets. The computation shows that during the 25 year event that the spread along both sides of Sigourney Street exceed the allowable spread of 12 feet or one lane. With regard to Hawthorn Street, the allowable spread is also exceeded.

4.1.3 HGL Analysis

In preparation of this report, Lochner conducted a HGL analysis for the 10 and 25 year event for the existing drainage systems.

The results of the HGL analysis for the 10 year event shows that water surface elevations exceed the tops of frames along Sigourney Street. HGL computations are included in Appendix D.

4.1.4 Capacity Analysis

In addition to the HGL Analysis, Lochner conducted a capacity analysis of existing drainage system. Included in Appendix D are pipe tables obtained from storm cad for the existing conditions, which shows the full flow capacities of all the existing pipes. Seven existing pipe segments within the project area were identified as flowing under pressure and are highlighted with yellow. The locations of these segments are:

- Pipe Segment 110 (P-110) runs from the existing Aetna Parking lot to Gate 11 Trunk Line

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- P-61, P-65, P-66, and P-69 segments run from a manhole at the intersection of the Aetna Access Road with Sigourney Street to a manhole on Hawthorne Street.
- P-7 runs northeast to southwest under Flower Street conveying flow from the eastern judicial parking lot to the western judicial parking lot, eventually flowing to Gate 9.
- P- 210 runs south to north and parallel to I-84 West Bound On Ramp from an existing manhole on the south side of Asylum Street, across Asylum Street and connecting to a pressure manhole in the middle of Asylum Street.

Of the seven segments reviewed five existing pipes segments will be upgraded or removed, P-7 and P-210 will remain. These two pipe segments are further discussed below.

- P-7 is an 18-inch RCP pipe that is on a 0.2 percent slope and has a full capacity of 4.93 cfs and a discharge of 12.14 cfs discharging through it.
- P- 210 is also an 18-inch RCP pipe that is on a 0.4 percent slope and has a full capacity of 6.51 cfs and a discharge of 14.17 cfs discharging through it.
- The difference between the HGL and the top of structures for P-7 is 2 and 6.40 feet respectively
- The difference between the HGL and the top of structures for P-210 is 5.7 and 7.75 feet respectively

4.2 Proposed Conditions

The proposed conditions were also evaluated using StormCAD. The proposed conditions were separated into three main areas:

- **Busway**
- **I-84 Westbound On-Ramp from Asylum Street**
- **Sigourney/Hawthorn Area**

These areas are discussed in general below and are detailed in the attached Drainage Plans :

Busway

The proposed Northbound Busway has 3 high points and 2 sag points in the vertical profile. One additional high point and low point are also created due to super elevation transitions in the roadway. The NB Busway High points are located at stations 451+35.62, 464+50.00, 478+80.00, and 485+41.26. The sag points are located at stations 460+71.43, 476+00.00, and 481+50.00. Stormwater flow from the NB Busway is connected to existing drainage facilities along the Busway corridor. Most of the stormwater at sag points drains to the nearest outfall gate to the City of Hartford's PRC. Several small areas drain against the roadway grade in order to balance the amount of drainage area flowing to each outfall gate.

West Tie-In To High Point STA 451+35

Water drains from the high point to the west where the project begins. One inlet is located near the western project tie-in and drains to the east against grade before connecting to the Gate 11 outfall at STA 458+50.

High Point STA 451+35 To High Point STA 464+50

Water drains to a sag point located near STA 460+75. All flow from STA 451+35 to 458+50 drains to the Gate 11 outfall. All flow east of this outfall including the sag point is piped east to the Gate 10 outfall near STA 463+46.

High Point STA 464+50 To High Point STA 478+80

The west end of this segment between STA 464+50 and STA 470+40 drains east and is piped to an outfall to Gate 9 near STA 468+62. This area also has a sag point at STA 476+00 where the Busway crosses

under Broad St. The area from STA 470+40 to STA 476+69 including the sag point drains to an existing road drain in Flower St. where it then flows to Outfall Gate 8. A small area between STA 476+69 and the High Point at STA 478+80 is piped against grade to the east eventually discharging to Gate 6.

High Point STA 478+80 To High Point 485+41

This area flows to a sag point located near STA 481+50. All flows in this area flow to the sag point and outfall to Gate 6 with the exception of a small area east of STA 484+43 which is piped east to the Gully Brook outfall.

High Point STA 485+41 To Eastern Tie-In (Asylum St.)

All drainage in this area flows east to the Gully Brook outfall. Several existing drainage pipes are used in this system near Asylum St.

Southbound Busway On-ramp

This ramp connects Asylum St. to the southbound Busway. This on-ramp has a bridge that crosses over the I-84 WB On-ramp from Capitol Ave. Drainage over the bridge flows from west to east where the drainage is collected via inlets along Retaining Wall 112. A sag point is located in the on-ramp at station 904+28 where a sag drain system combine into a single 18" outfall pipe which discharges into the infield area via riprap lined splash pad between the I-84 WB on-ramp from Asylum and the SB Busway on-ramp.

I-84 Westbound On-Ramp from Asylum Street

The existing on-ramp to I-84 WB from Asylum St. is being rebuilt to accommodate the roadway work for the Busway lanes. There is one high point located at station 203+79. Flow from the east of station 203+79 flows to the Gully Brook outfall. Water west of the high point flows to the 48" Armory outfall.

Sigourney/Hawthorn Area

Sigourney Street is being rebuilt to accommodate connections to the new bus station. A sag point is located at STA 43+97. All flow from the highpoint on the Sigourney Bridge over I-84 north towards the sag point. Flow from north of the project limits flows south to this point. New inlets will be installed and connected to the existing Sigourney drainage system using existing pipes where possible. Several offsite connections to the system also exist and will be maintained. This system connects to a manhole on Hawthorn Street which discharges to Gate 11.

As part of the Sigourney/ Hawthorn work, a portion of Hawthorn Street will also be realigned, starting at the intersection of Sigourney Street to approximately 100 feet west of the interception of Imlay Street. This realigned portion drains west toward a sag point on Hawthorn St. near STA 11+70. Flows from the western match point of Hawthorn Street also flow east toward this sag point. This system connects to same manhole as the Sigourney system near STA 13+88.

4.2.1 Drainage Areas

The proposed areas do not change appreciably when compared to existing.

GATE LOCATION	EXISTING AREA (ACRES)	PROPOSED AREA (ACRES)
6	7.610	9.177
8	11.684	14.187
9	2.550	3.434
10	4.177	4.865
11	18.541	21.388

Armory Pump Station 36" RCP	15.051	15.051
Armory Pump Station 48 " RCP	13.045	12.770
Armory Pump Station Combined	28.096	27.821
Gully Brook	17.808	18.045
DPW Parking Lot	2.763	2.763

When comparing the total areas as a whole there is an approximately 8.326 acres of increase in area from existing to the proposed with the maximum increase in area of 2.85 acres, occurring at Gate 11. This increase is primarily due to redirecting drainage from a residential area that currently enters the combined sewer and proposed Busway drainage from Hartford South's System 7 drainage system. The second highest increase is 2.3 acres is at Gate 8. This is due to the additional flow from the Railroad Relocation Project and from scuppers. The other increases at the other gates are due to the proposed Busway and scuppers above the Busway.

4.2.2 Gutter Flow Analysis

The gutter analyses for the proposed conditions were also conducted using StormCAD. The results of the 10 and 25 year gutter analysis are included in Appendix D. A gutter flow analysis was performed for the Busway, the Asylum Street Ramp, and Sigourney and Hawthorn Streets. Summarized below are the results.

With in the area of the Busway, we assumed the following:

A portion of the mainline Busway is located beneath I-84 and is not expected to receive a significant amount of rainfall. This area of Busway was delineated with the assumption that the Busway would be exposed to precipitation in order to be conservative in analysis. This is also reflected in calculations for areas flowing to the Park River and shows the addition of impervious area where drainage area from I-84 is also included.

4.2.2.1 Gutter Flow Analysis Results

4.2.2.2 Busway

Surface drainage analysis was completed for the entire project where new roadway work is being done. Flanking inlets are used at all sag points and an allowable spread of shoulder plus a half lane was used. The results show that the calculated spread in less than the allowable.

4.2.2.3 Asylum Street Ramp

The suggested minimum design storm frequency and design spread is a 10-year rainfall frequency with an allowable design spread of one foot encroaching into the driving lane or approximately 9 feet. The results show that our calculated spread is less than 9 feet.

4.2.2.4 Sigourney and Hawthorn Streets

The proposed work on Hawthorn and Sigourney Streets has improved the spread. Specifically, the calculated spread for the 10 and 25 year events are less than the allowable spread for Hawthorn Street. However, with regard to Sigourney Street, the calculated 10 year gutter spread exceeds the allowable spread of 8 feet, by approximately 4.25 feet at one location and 1 foot in other locations. The computation shows that during the 25 year event that the spread along west side of Sigourney Street exceed the allowable spread of 12 feet or one lane by approximately 1.41 feet. On this side of the street an adjacent travel lane exists in the south and north direction allowing passage of vehicles in the event that the right hand lanes are flooded and impassable.

4.2.3 Hydraulic Grade Line Analysis

A hydraulic grade line (HGL) analysis was conducted for the proposed conditions and shows a significant improvement when compared to existing, specifically in the Hawthorn Sigourney Street Area, where the calculated HGL elevation are below the tops of frames. The HGL elevations for the Proposed Busway are also below the top of frames.

4.2.4 Capacity Analysis

In addition to the HGL Analysis, Lochner conducted a capacity analysis of proposed drainage system. Included in Appendix D are pipe tables obtained from storm cad for the proposed conditions, which shows the full flow capacities of all the existing and proposed pipes. During the existing condition run, seven existing pipe segments within the project area were identified as flowing under pressure. The locations of these segments are:

- Pipe Segment 110 (P-110) runs from the existing Aetna Parking lot to Gate 11 Trunk Line
- P-61, P-65, P-66, and P-69 segments run from a manhole at the intersection of the Aetna Access Road with Sigourney Street to a manhole on Hawthorne Street.
- P-7 runs northeast to southwest under Flower Street conveying flow from the eastern judicial parking lot to the western judicial parking lot, eventually flowing to Gate 9.
- P- 210 runs south to north and parallel to I-84 West Bound On Ramp from an existing manhole on the south side of Asylum Street, across Asylum Street and connecting to a pressure manhole in the middle of Asylum Street.

As part of the proposed work, P-61, 65, 66, and 69 pipes segments will be upgraded or removed. Due to upgrading of these segments and rerouting some of the flows that were separated from the combined sewer combined, Pipe segment 54 is flowing under pressure. P-210 will remain, but will have less flow going to it. Therefore, in the proposed conditions this pipe is adequate. P-7 is still flowing under pressure due to the additional flow added from scuppers, etc. In addition to P-7, P-454 and P-455 are also flowing under pressure. P-54, P-7, P-454 and P-455 pipe segments are further discussed below.

- P-54 is a 30-inch RCP pipe that is on a 1.0 percent slope and has a full capacity of 23.98 cfs and a discharge of 27.20 cfs discharging through it.
- P-7 is an 18-inch RCP pipe that is on a 0.2 percent slope and has a full capacity of 4.93 cfs and a discharge of 12.04 cfs discharging through it.
- P- 454 and 455 are 24- inch RCP pipes that are on a 0.6 percent slope and has a full capacity 17.75 and 17.52 cfs respectively and a discharges of 18.85 and 19.60 cfs respectively discharging through them.
- The difference between the HGL and the top of structures for P-54 is 7.11 and 12.11 feet respectively
- The difference between the HGL and the top of structures for P-7 is 1.2 and 5.63 feet respectively
- The difference between the HGL and the top of structures for P-454 is 8.7 and 12.09 feet respectively
- The difference between the HGL and the top of structures for P-455 is 4.88 and 8.84 feet respectively

Lochner also checked pipe segment P-7 for the 25 year event. The HGL overtops the top of structure by is 1.40. During this condition overflow from this structure would flow to the roadway drain on Flower Street.

4.2.5 Other Information

Several inlets on I-84 are connected to scupper drains which currently run down the columns of the interstate bridge structure and outfall to the Amtrak railroad property. The scupper outlets will be modified and redirected to drain away from the Busway and into existing parking lot drains located beneath the interstate adjacent to the Amtrak/Busway property.

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5 *ENVIRONMENTAL ISSUES, STORMWATER TREATMENT, AND PERMITS*

5.1 Environmental Issues

5.1.1 Wetlands

The Hartford North contract (No. 63-H137) is located in a highly-developed urban area. All wetlands located within the Busway corridor were field delineated and none were identified within the limits of this contract.

5.1.2 Flood Plain

According to the Flood Insurance Rate Map (FIRM) for the City of Hartford dated September 2008, the Park River is contained within the PRC from Park Street to the south to Woodland Street and Farmington Avenue to the north and that detailed studies have been conducted for the Park river south of Park Street and North of Woodland Street and Farmington Avenue, which show floodplain limits. Therefore, no floodplains, regulatory floodways or stream channel encroachment lines are within the project limits. A copy of the FIRM is included in Appendix E.

5.1.3 National Diversity Database (NDDB)

Lochner conducted a preliminary review of the NDDB for presence of threatened or endangered species (see Appendix E). Our review identifies no threatened or endangered species within our project limits.

5.1.4 Sedimentation and Erosion Control

The goal of erosion and sedimentation controls is to remove 80 percent removal of sediment. Erosion and Sedimentation (E&S) controls such as inlet protection will be placed around catch basin structures and pipe outlets during construction phases as appropriate. In addition to inlet controls, temporary and permanent erosion and sedimentation control measures such as check dams, dewatering basins and sandbags to divert flow will be incorporated into the project.

All activities shall strictly conform to the following documents:

- Connecticut Guidelines for Soil Erosion and Sediment Control (Guidelines), Connecticut Department of Environmental Protection (CTDEP) Bulletin 34, 2002 and supplements thereto
- Connecticut Department of Transportation's CTDOT Standard Specifications for Roads, Bridges, and Incidental Construction, Form 816, 2004 and supplements thereto (Form 816). Section 1.10 Environmental Compliance and Section 2.10 Water Pollution Control are herein referenced for their significance to the purpose of this plan.
- CTDOT "On-Site Mitigation for Construction Activities," as revised.
- CTDOT Consultant Engineers Manual, March 1998 and supplements thereto
- CTDOT Drainage Manual, October 2000 and supplements thereto

5.1.5 Post Construction Stormwater Treatment Measures

Catch basins located on the upper portion of the Busway that discharge to Gate 11 will be connected to a main trunk-line (off line). The remaining catch basins will have standard two foot sumps unless the drainage contains more than four catch basins connected to the outlet, which is consistent to the June 16, 2003 ConnDOT Phase II Stormwater Memorandum (Appendix F), a deeper sump catch basin would be installed at the end of the run prior to discharge to the outlet. Catch basins on local streets (Sigourney and Hawthorne Streets) and within the DPW Parking Lot will be installed with hoods.

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5.2 Permits

It is our understandings that the following permit applications are anticipated to be required for the New Britain – Hartford Busway:

Permit Type	Statutory Authority	Issuing Agency
Clean Water Act of 1972: Section 404 (Impact on Waters [wetlands] of the U.S.)	33 USC 1251 et. seq.	U.S. Army Corp of Engineers
Clean Water Act of 1972: Section 401 (Water Quality Certification)	33 USC 401	Connecticut DEP
Connecticut Inland Wetland and Watercourses Act	CGS 22a-36 through 22a-45	Connecticut DEP
Flood Management Certification	CGS 25-68 (b – h)	Connecticut DEP
Stream Channel Encroachment	CGS 22a-342	Connecticut DEP
Storm water Discharge Permit	CGS 22a-430b	Connecticut DEP

It is also our understanding that based on site visits and review of the Construction Plans, all existing and proposed surface drainage are and will continue to be connected to various trunk lines which connect to the Park River drainage conduit. Therefore, the only permitting that is anticipated for this portion of the Busway would include a Stormwater Discharge Permit and a Flood Management Certification. We anticipate that additional local review submissions will be submitted to the various local agencies such as the MDC, and the City of Hartford for coordination.

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6 CONCLUSIONS

Based on our evaluation, Lochner has formulated the following conclusions:

6.1 Conclusions

6.1.1 Busway

6.1.1.1 Gutter Analysis

The results of the gutter analysis for the Busway show that the calculated spread in less than the allowable.

6.1.1.2 HGL Analysis

The calculated 10 year and 25 year HGL elevations are below the tops of frames.

6.1.1.3 Capacity Analysis

In addition to HGL analysis, a capacity analysis was conducted on the existing pipes. The results show that several pipes are flowing under pressure. The pipe that may be impacted is P-7, which is perpendicular to Flower Street and is in the judicial parking lot. During the 10-year event there is more than 1 foot of freeboard. However, during storms exceeding the 10 year the upstream manhole may be flooded. In the event that this manhole floods, runoff flows overland to the roadway drain on Flower Street.

6.1.2 Asylum Street Ramp

The results show that our calculated spread is less than the allowable 9 feet.

6.1.3 Sigourney and Hawthorn Streets

The results of the gutter analysis show that existing calculated spread exceeds the allowable spread for the 10 year event, however, the during the proposed conditions the allowable spread is achieved on Hawthorn Street but is not on Sigourney Street. The calculated spreads for the proposed 25 year event (sag condition) are below the allowable with the exception of Sigourney Street. In both conditions, an adjacent travel lane currently exist in both the south to north direction providing passage of vehicles in the event that the right hand lanes are flooded and impassable.

The hydraulic grade line (HGL) analysis was conducted for the proposed conditions and the results shows a significant improvement when compared to existing, where the calculated HGL elevation are below the tops of frames.

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REFERNCES

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References

1) Connecticut Department of Transportation (DOT). 2000. Connecticut Department of Transportation Drainage Manual.

2) Federal Highway Administration, *HEC-22, Urban Drainage Design Manual.*

3) Haestad (2002) Computer Applications in Hydraulic Engineering, Fifth Edition, Haestad Methods: Waterbury, p. 374.

4) McCuen, R.H., 1998. Hydrologic Design and Analysis; Prentice Hall, New Jersey, 814 pages.

5) Metropolitan District Commission GIS Topographical Mapping. 1inch = 200 foot. Hartford, Connecticut

6) Fuss and O'Neal, Inc. Hartford Flood Control System Park river Valve Inspection Reports, 2007

7) Camp Dresser & McKee Inc., Park River Gate Inspection Report, October 1998

8) H.W. Lochner, Inc. Condition Survey Report or the New Britain Hartford Busway, Hartford North, November 2008

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TABLES

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TABLE 1

SUMMARY OF STARTING WATER SURFACE ELEVATION AT THE PARK RIVER CONDUIT GATES (NGVD)

5-YEAR DISCHARGE - 4100 CFS

GATE	FLAP GATE / PIPE INVERT ELEVATION (FT NGVD)	FLAP GATE SIZE DIAMETER (FT)	SLUICE GATE INVERT ELEVATION (FT NGVD)	SLUICE GATE SIZE LxW (FT)	GATE CHAMBER TOP OF FRAME ELEVATION (FT NGVD)	CALCULATED PARK RIVER ELEVATION (FT NGVD)	RECOMMENDED PARK RIVER ELEVATION (FT NGVD)
6	31.50	36"	36.50	3 x 3	42.71	19.46	19.46
7	26.50	54"	25.00	4.5 x 4.5	48 20	20.38	20.38
8	33.40	48"	29.70	4 x 4	46.90	20.38	20.38
9	32.25	24"	32.75	2 x 2	42.00	20.48	20.48
10	29.75	36"	29.75	3 x 3	42.20	20.64	20.64
11	29.25	42"	29.25	3.5 x 3.5	42.70	20.99	20.99
ARMORY PUMP STATION (36" PIPE FROM ARMORY)	15.00/16.13	7 x 8 (GATE 5)	15.00	6 x 7 (GATE 3)	45.00	19.46	19.46
ARMORY PUMP STATION (48 " PIPE FROM RAMPS)	15.00/15.00	7 x 8 (GATE 5)	15.00	6 x 7 (GATE 4)	45.00	19.46	19.46
GULLY BROOK AT PARK RIVER	N/A	N/A	14.97	N/A	N/A	14.68	17.30
GULLY BROOK AT GATE	25.77	36"	20.85	3 x 3	36.90	24.19	24.19

Notes:
Pumps in Armory Pump Station do not activate until elevation 23.5 feet NGVD
2 Year water surface elevation in CT River was calculated to be 17.3 feet NGVD
Water surface elevation for the DPW parking Lot was assumed to be the crown of the 42 inch pipe

TABLE 2
SUMMARY OF EXISTING AND PROPOSED DRAINAGE AREAS

WATERSHED AREAS (ACRES)																	
LAND USE COVER	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED	EXISTING	PROPOSED
	GATE 6	GATE 6	GATE 8	GATE 8	GATE 9	GATE 9	GATE 10	GATE 10	GATE 11	GATE 11	ARMORY PUMP STATION 36"	ARMORY PUMP STATION 36"	ARMORY PUMP STATION 48"	ARMORY PUMP STATION 48"	GULLY BROOK	GULLY BROOK	TOTAL SUM OF SYSTEMS	TOTAL SUM OF SYSTEMS
PERVIOUS	2.932	3.830	4.563	4.651	0.000	0.000	1.404	1.404	5.933	5.957	1.324	1.324	7.447	7.397	1.157	1.232	24.761	25.796
IMPERVIOUS	4.678	5.347	7.244	9.536	2.550	3.434	2.773	3.461	12.608	15.432	13.727	13.727	5.598	5.373	16.651	16.813	65.830	73.123
SUM	7.610	9.177	11.807	14.187	2.550	3.434	4.177	4.865	18.541	21.388	15.051	15.051	13.045	12.770	17.808	18.045	90.591	98.918
% IMPERVIOUS	61%	58%	61%	67%	100%	100%	66%	71%	68%	72%	91%	91%	43%	42%	94%	93%	73%	74%

TABLE 3

SUMMARY OF EXISTING AND PROPOSED BUSWAY RELATED DRAINAGE AREAS

	WATERSHED AREAS (ACRES)																									
PARAMETER	EXISTING GATE 6	PROPOSED GATE 6	DELTA	EXISTING GATE 8	PROPOSED GATE 8	DELTA	EXISTING GATE 9	PROPOSED GATE 9	DELTA	EXISTING GATE 10	PROPOSED GATE 10	DELTA	EXISTING GATE 11	PROPOSED GATE 11[3]	DELTA	EXISTING ARMORY PUMP STATION 36"	PROPOSED ARMORY PUMP STATION 36"	DELTA	EXISTING ARMORY PUMP STATION 48"	PROPOSED ARMORY PUMP STATION 48"	DELTA	EXISTING GULLY BROOK[2]	PROPOSED GULLY BROOK[2]	DELTA	EXISTING CIDPW PARKING LOT TO 42" PIPE	PROPOSED CIDPW PARKING LOT TO 42" PIPE	DELTA
PERVIOUS	2.932	3.830	0.898	4.563	4.651	0.088	0.000	0.000	0.000	1.404	1.404	0.000	5.933	5.957	0.024	1.324	1.324	0.000	7.447	7.397	-0.050	1.157	1.252	0.095	0.690	0.690	0.000
IMPERVIOUS	4.678	5.347	0.669	7.244	9.536	2.292	2.550	3.434	0.884	2.773	3.461	0.688	12.648	15.472	2.825	13.727	13.727	0.000	5.598	5.375	-0.223	16.651	16.813	0.162	2.763	2.763	0.000
SUM	7.610	9.177	1.567	11.807	14.187	2.379	2.550	3.434	0.884	4.177	4.865	0.688	18.581	21.388	2.847	15.051	15.051	0.000	13.045	12.770	-0.275	17.808	18.065	0.257	2.763	2.763	0.000
% IMPERVIOUS	61%	58%	-0.032	61%	67%	0.059	100%	100%	0.000	66%	71%	0.048	68%	72%	0.041	91%	91%	0.000	43%	42%	-0.008	94%	93%	-0.001	100%	100%	0.000
RUNOFF COEFFICIENT	0.61	0.55	-0.063	0.64	0.61	-0.032	0.90	0.90	0.000	0.56	0.60	0.049	0.62	0.66	0.039	0.84	0.84	0.000	0.47	0.44	-0.016	0.88	0.87	-0.005	0.90	0.90	0.000
TIMES OF CONCENTRATION (min)	11.71	104.30	92.590	12.02	90.87	78.850	8.62	8.65	0.030	11.17	11.06	-0.110	31.06	28.41	-2.650	18.08	18.07	-0.010	164.96	164.21	-0.750	13.23	134.94	121.710	10.00	5.00	-5.000
DURATION (HRS)	0.39	3.48		0.40	3.03		0.29	0.29		0.37	0.37		1.04	0.95		0.60	0.60		5.50	5.47		0.44	4.50		0.33	0.17	
2-YEAR INTENSITY	3.50	0.80		3.30	0.90		3.80	3.80		3.40	3.40		1.90	2.00		2.70	2.70		0.60	0.60		3.10	0.70		3.60	4.90	
10-YEAR INTENSITY	4.50	1.30		4.50	1.40		5.10	5.10		4.70	4.70		2.80	3.00		3.80	3.80		0.90	0.90		4.30	1.10		4.80	6.00	
100-YEAR INTENSITY	6.10	1.90		6.10	2.10		6.70	6.70		6.30	6.50		4.00	4.30		5.30	5.30		1.30	1.30		5.90	1.60		6.50	7.80	
2- YEAR DISCHARGE (CFS)[3]	15.37	4.92	-11.55	25.96	8.94	-17.02	12.82	13.60	2.27	7.99	10.62	2.63	32.00	34.95	12.95	32.76	32.27	0.01	3.49	4.38	0.89	48.66	11.33	-36.73	8.95	11.44	2.49
10- YEAR DISCHARGE (CFS)[3]	21.36	6.98	-15.28	35.90	13.56	-22.34	18.00	21.74	3.74	16.96	14.52	3.56	32.00	50.01	18.01	47.08	47.04	0.04	5.31	5.17	0.86	66.16	16.99	-49.17	11.94	14.92	2.95
25- YEAR DISCHARGE (CFS)[3]	24.39	9.14	-15.25	41.06	15.97	-25.09	20.72	25.17	4.45	12.55	16.65	4.10	37.33	58.81	21.48	55.23	55.19	0.04	6.03	6.88	0.85	76.79	19.62	-57.17	13.68	16.66	2.98
100- YEAR DISCHARGE (CFS)[3]	28.43	9.57	-18.85	46.12	18.14	-27.98	15.38	20.71	5.33	14.64	18.54	3.90	46.26	60.92	14.66	66.63	66.63	0.00	7.26	7.36	0.10	92.12	25.23	-66.89	16.17	19.40	3.23

1. Includes area and flow from Hanford South an area that was entering a combined system that knows will go to this gate

2. Does not include combined sewer flow and area

3. Discharge calculated at outlet from StormCAD

PLANS

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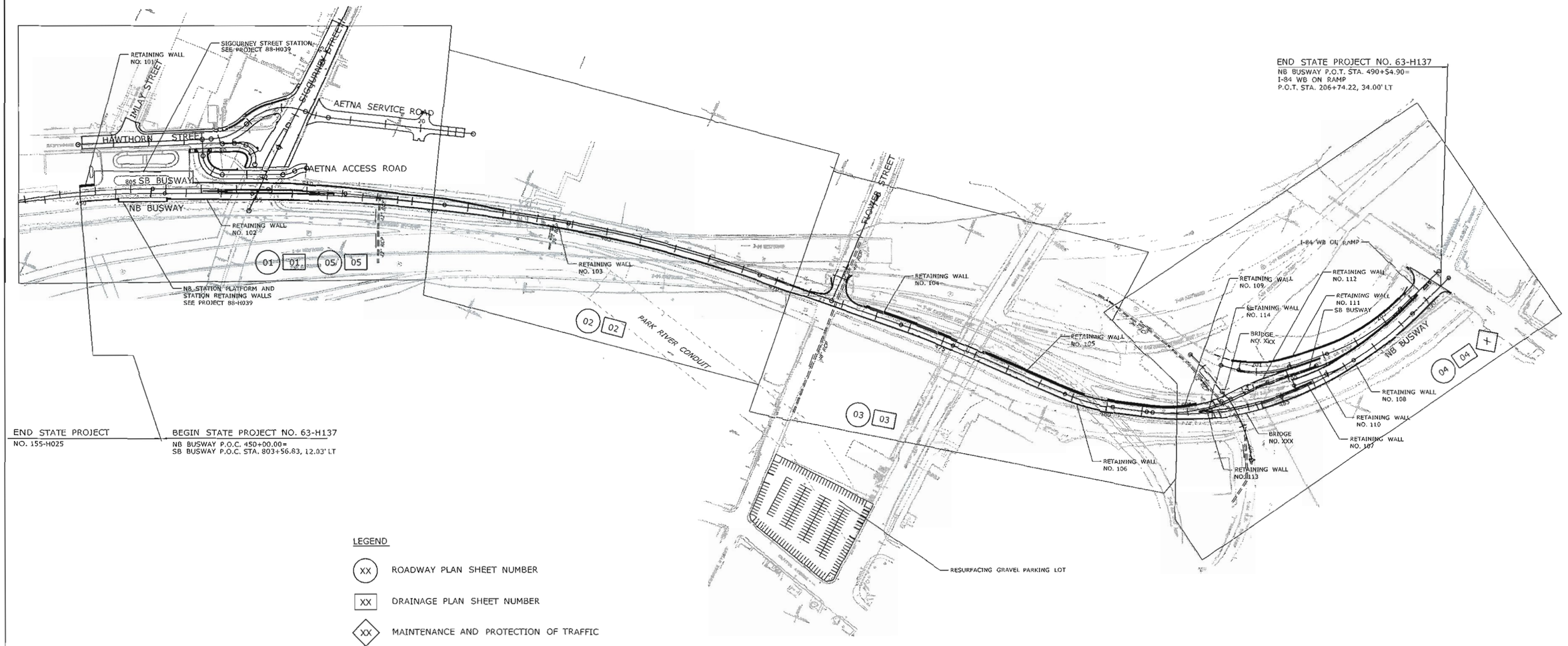
Rocky Hill, CT 06067
860/513-4003



REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted: 6/18/2009

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET 0 100 200
SCALE 1" = 100'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_063_H137_IND-001.dgn

SIGNATURE/ BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD

DRAWING TITLE: INDEX PLAN

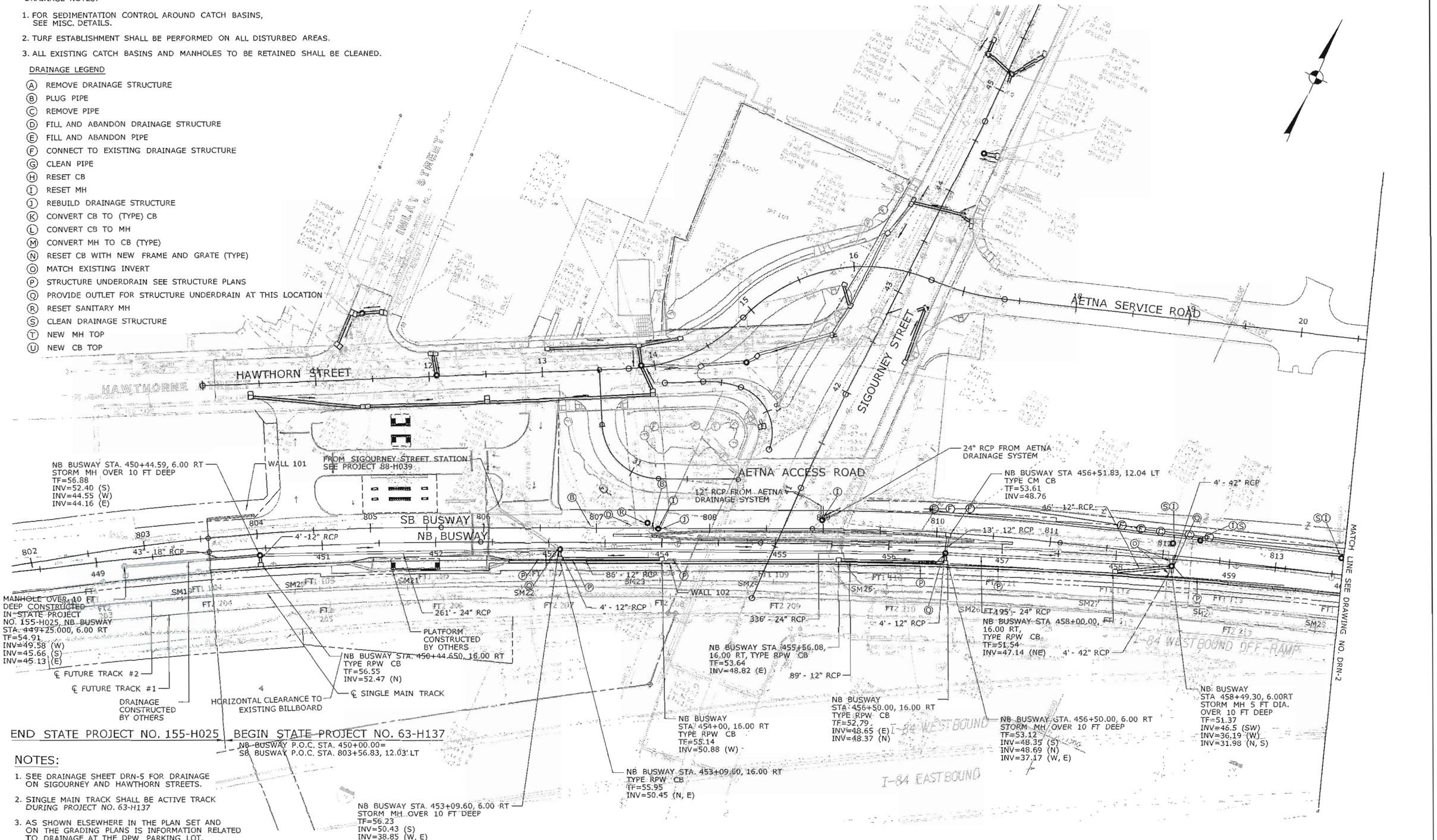
PROJECT NO. 63-H137
DRAWING NO. IND-1
SHEET NO.

DRAINAGE NOTES:

1. FOR SEDIMENTATION CONTROL AROUND CATCH BASINS, SEE MISC. DETAILS.
2. TURF ESTABLISHMENT SHALL BE PERFORMED ON ALL DISTURBED AREAS.
3. ALL EXISTING CATCH BASINS AND MANHOLES TO BE RETAINED SHALL BE CLEANED.

DRAINAGE LEGEND

- (A) REMOVE DRAINAGE STRUCTURE
- (B) PLUG PIPE
- (C) REMOVE PIPE
- (D) FILL AND ABANDON DRAINAGE STRUCTURE
- (E) FILL AND ABANDON PIPE
- (F) CONNECT TO EXISTING DRAINAGE STRUCTURE
- (G) CLEAN PIPE
- (H) RESET CB
- (I) RESET MH
- (J) REBUILD DRAINAGE STRUCTURE
- (K) CONVERT CB TO (TYPE) CB
- (L) CONVERT CB TO MH
- (M) CONVERT MH TO CB (TYPE)
- (N) RESET CB WITH NEW FRAME AND GRATE (TYPE)
- (O) MATCH EXISTING INVERT
- (P) STRUCTURE UNDERDRAIN SEE STRUCTURE PLANS
- (Q) PROVIDE OUTLET FOR STRUCTURE UNDERDRAIN AT THIS LOCATION
- (R) RESET SANITARY MH
- (S) CLEAN DRAINAGE STRUCTURE
- (T) NEW MH TOP
- (U) NEW CB TOP



NOTES:

1. SEE DRAINAGE SHEET DRN-5 FOR DRAINAGE ON SIGOURNEY AND HAWTHORN STREETS.
2. SINGLE MAIN TRACK SHALL BE ACTIVE TRACK *DURING PROJECT NO. 63-H137*
3. AS SHOWN ELSEWHERE IN THE PLAN SET AND ON THE GRADING PLANS IS INFORMATION RELATED TO DRAINAGE AT THE DPW PARKING LOT.

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
			Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET 0 40 80
SCALE 1"=40'

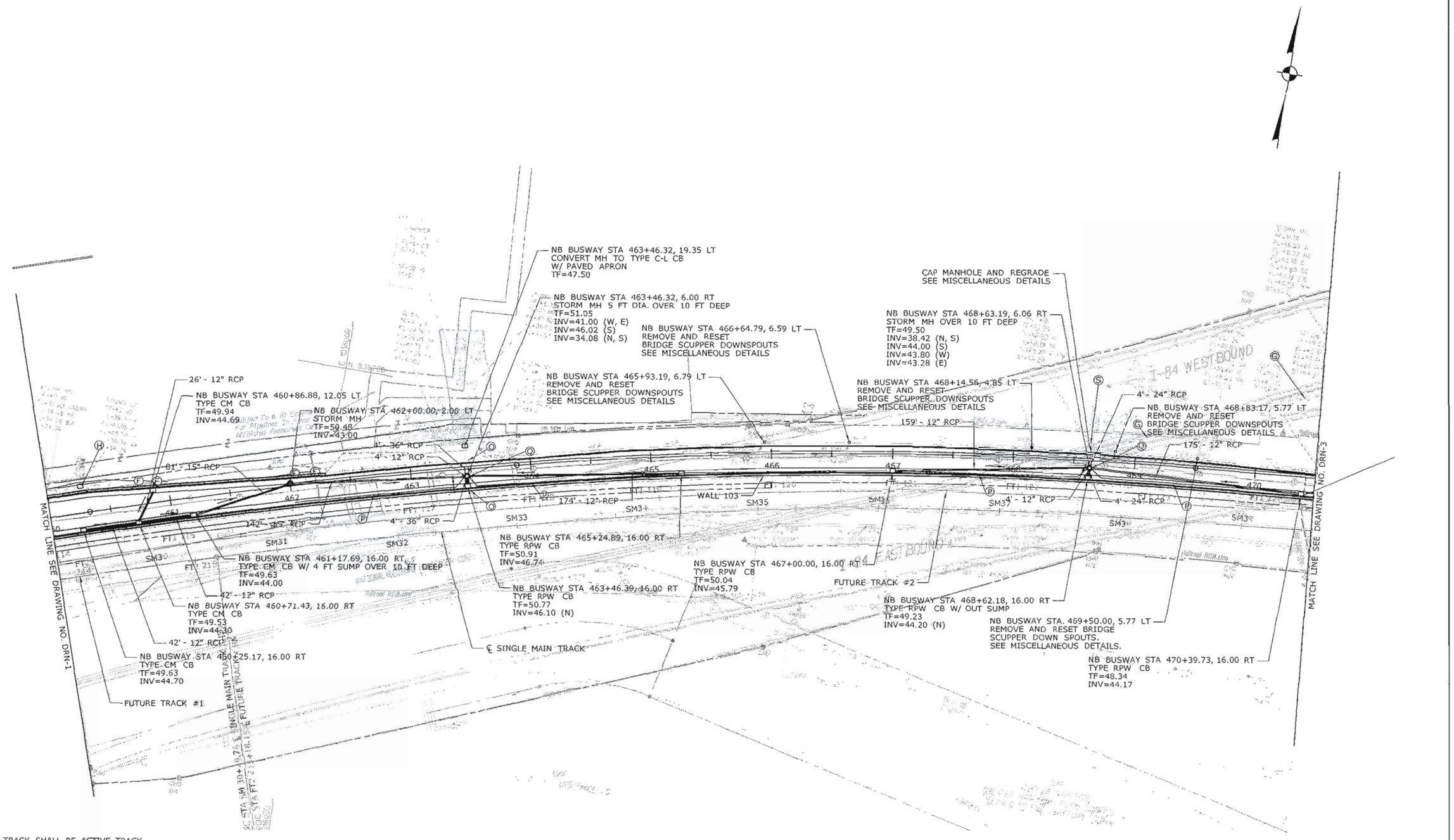
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
Filename: ...\HW_MSH_063_H137_DRN-001.dgn

SIGNATURE/BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD
DRAWING TITLE: DRAINAGE PLAN

PROJECT NO. 63-H137
DRAWING NO. DRN-1
SHEET NO.



NOTES:

1. SINGLE MAIN TRACK SHALL BE ACTIVE TRACK DURING PROJECT NO. 63-H137

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

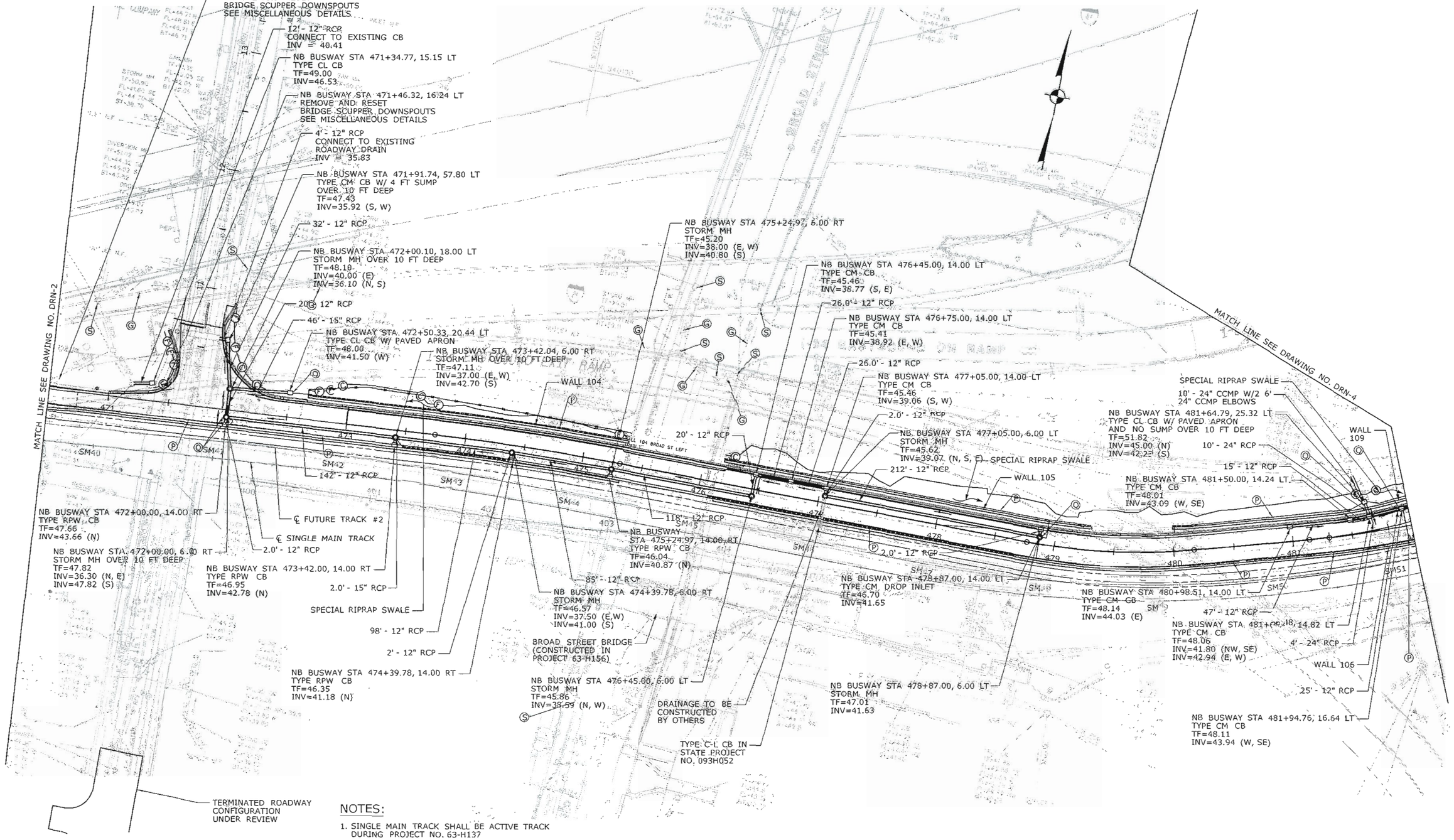
Filename: ...\HW_MSH_063_H137_DRN-002.dgn

SIGNATURE/ BLOCK: LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD
DRAWING TITLE: DRAINAGE PLAN

PROJECT NO. 63-H137
DRAWING NO. DRN-2
SHEET NO.



NOTES:

1. SINGLE MAIN TRACK SHALL BE ACTIVE TRACK DURING PROJECT NO. 63-H137

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

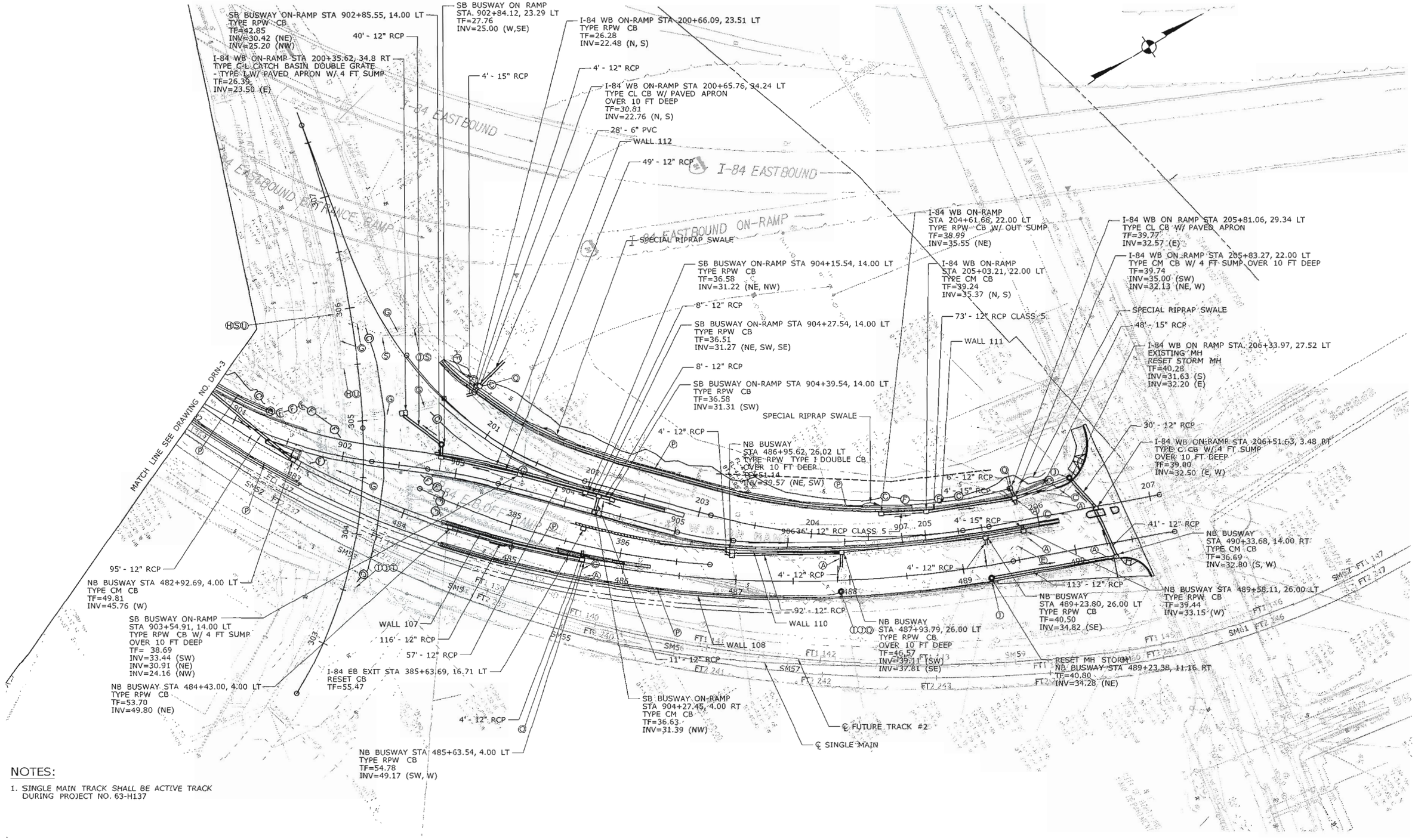
Filename: ...\HW_MSH_063_H137_DRN-003.dgn

SIGNATURE/BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD
BUSWAY
HARTFORD NORTH

TOWN: HARTFORD
DRAWING TITLE: DRAINAGE PLAN

PROJECT NO. 63-H137
DRAWING NO. DRN-3
SHEET NO.



NOTES:

1. SINGLE MAIN TRACK SHALL BE ACTIVE TRACK DURING PROJECT NO. 63-H137

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW.MSH_063.H137_DRN-004.dgn

SIGNATURE/BLOCK: LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

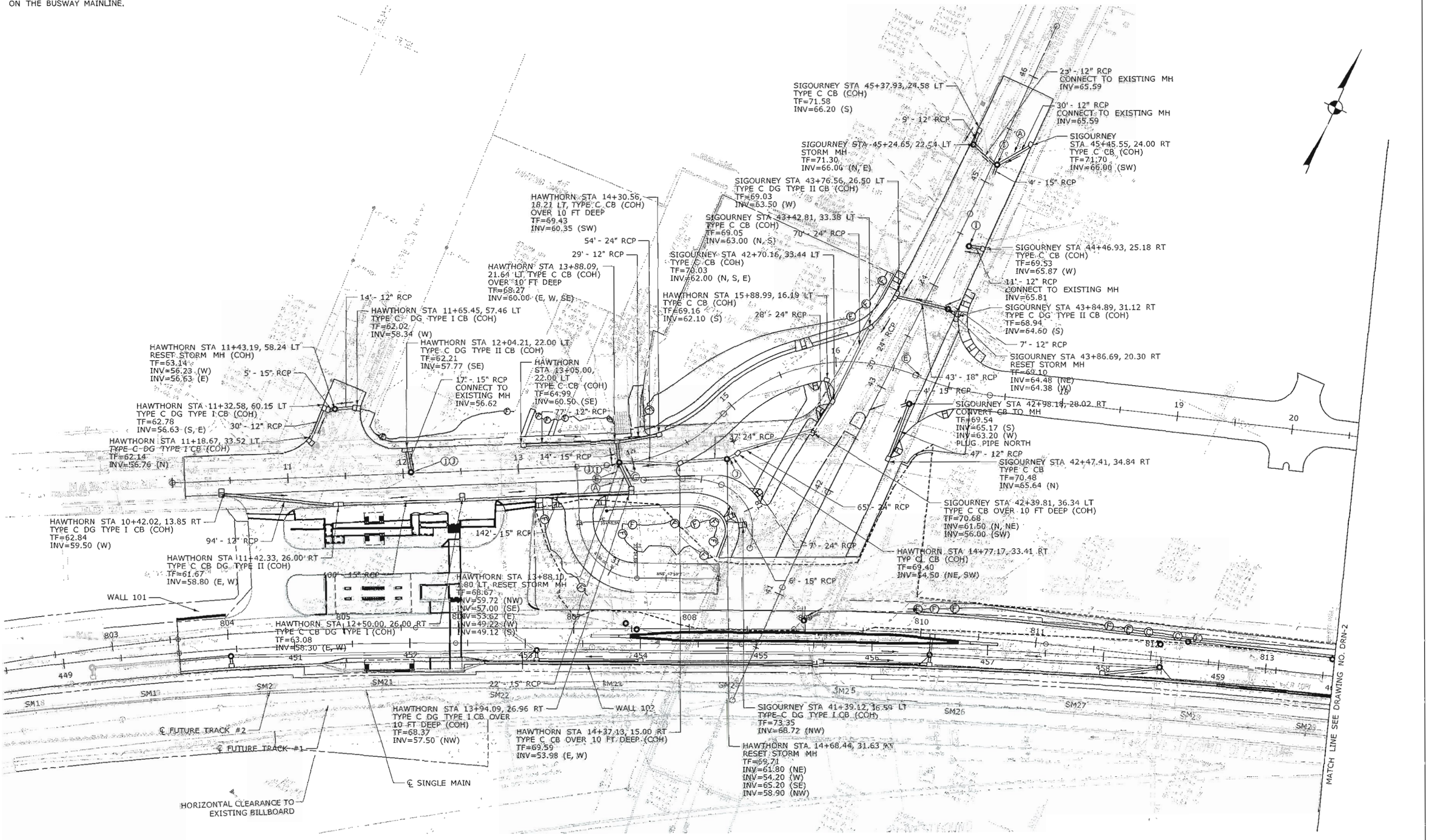
TOWN: HARTFORD

DRAWING TITLE: DRAINAGE PLAN

PROJECT NO. 63-H137
DRAWING NO. DRN-4
SHEET NO.

NOTE:

1. SEE DRAINAGE SHEETS 1-4 FOR DRAINAGE ON THE BUSWAY MAINLINE.



REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\MW_MSH_063-H137_DRN-005.dgn

SIGNATURE/ BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

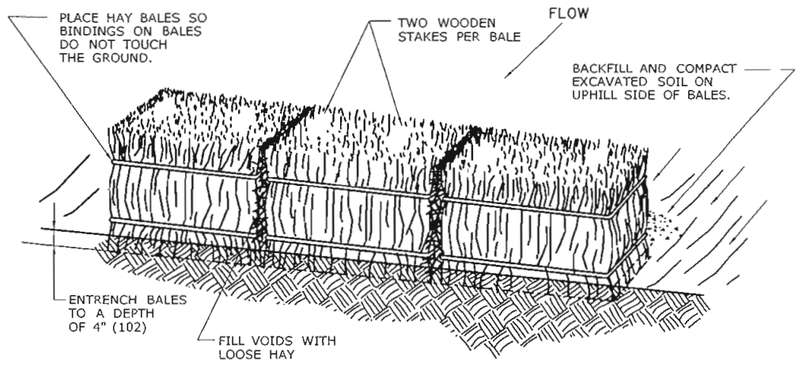
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD
BUSWAY
HARTFORD NORTH

TOWN: HARTFORD

DRAWING TITLE: DRAINAGE PLAN

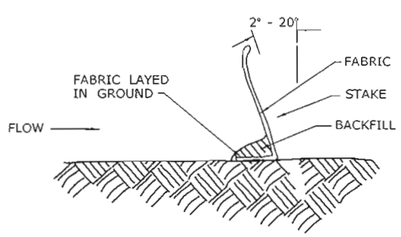
PROJECT NO. 63-H137
DRAWING NO. DRN-5
SHEET NO.



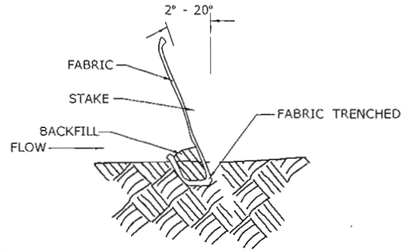
HAY BALE SYSTEM

GENERAL NOTES:

1. HAY BALES SHALL NOT BE USED IN A WATERCOURSE.
2. HAY BALES SHALL BE ENTRENCHED 4" (102) AND TIGHTLY BUTTED TOGETHER. REMOVE HEAVY BRUSH AND FILL ALL VOIDS WITH LOOSE HAY.
3. WOOD STAKES SHALL HAVE A MINIMUM CROSS-SECTION SIZE OF AT LEAST 1" (102) x 1" (102) AND MINIMUM LENGTH OF 4' (1219)
4. CLEAN OUT ACCUMULATED SEDIMENT WHEN ONE-HALF (1/2) OF THE ORIGINAL HEIGHT OF THE HAY BALE FENCE, AS INSTALLED, BECOMES FILLED WITH SEDIMENT OR AS DIRECTED BY THE ENGINEER.
5. NOT TO BE USED IN THE VICINITY OF URBAN AND RESIDENTIAL AREAS.



BACKFILLING GEOTEXTILE TOE



TRENCHING GEOTEXTILE TOE

END VIEW

GEOTEXTILE FENCE SYSTEM

GENERAL NOTES:

1. GEOTEXTILE FENCE SHOULD BE PLACED SO THE FENCE LEANS TOWARD THE SOURCE OF SEDIMENT.
2. MAXIMUM SPACING FOR WOODEN STAKES OR STEEL POSTS IS 10.0' (3048).
3. WOOD STAKES SHALL HAVE A MINIMUM CROSS-SECTION SIZE OF 1.5" (457) X 1.5" (457) AND MINIMUM LENGTH OF 4' (1219) STEEL POSTS SHALL BE AT LEAST 0.5 LB. PER FOOT (0.22KG PER CM) WITH A MINIMUM LENGTH OF 4' (1219).
4. WOODEN STAKES OR STEEL POSTS SHALL BE DRIVEN TO A MINIMUM OF 1' (305) INTO THE GROUND.
5. 6" (152) OF GEOTEXTILE SHALL BE BURIED BY BACKFILLING OR TRENCHING AND AT LEAST 2.5' (762) IN HEIGHT OF GEOTEXTILE SHALL BE EXPOSED.
6. FABRIC SHALL BE JOINED ONLY AT A SUPPORT POST WITH A MINIMUM OF 6" (152) OVERLAP AND SECURITY SEALED.
7. UPON RE-ESTABLISHMENT OF GROUND COVER IN DISTURBED AREAS AND WHEN DIRECTED BY THE ENGINEER, OR UPON FINAL INSPECTION FENCE AND ANY SEDIMENT SHALL BE REMOVED. AT NO TIME WILL THE FENCE REMAIN IN PLACE AFTER PROJECT COMPLETION.
8. GEOTEXTILE FENCE SHALL NOT BE USED IN A WATER COURSE.
9. ONLY GEOTEXTILE FROM THE DEPARTMENTS APPROVED PRODUCT LIST SHALL BE USED.
10. BACKFILLING OF GEOTEXTILE SHALL ONLY BE USED WHEN GROUND IS FROZEN OR WHERE OTHER OBSTRUCTIONS ARE ENCOUNTERED THAT PROHIBIT TRENCHING, IE, STUMPS OR ROCKS.
11. CLEAN OUT ACCUMULATED SEDIMENT WHEN ONE-HALF (1/2) OF THE ORIGINAL HEIGHT OF THE GEOTEXTILE FENCE, AS INSTALLED, BECOMES FILLED WITH SEDIMENT OR AS DIRECTED BY THE ENGINEER.

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted: 6/7/2010

DESIGNER/DRAFTER:

CHECKED BY:

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MST_063_H137_MDS-022.dgn

SIGNATURE/ BLOCK:

LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN:
HARTFORD

DRAWING TITLE:
SEDIMENTATION CONTROL SYSTEM DETAILS

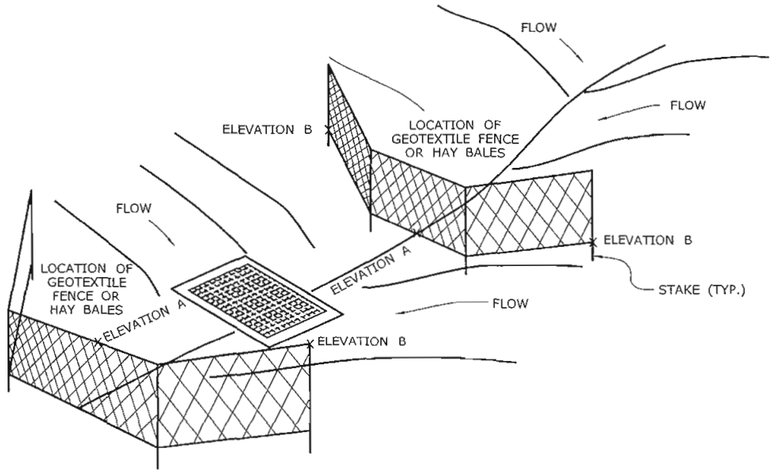
PROJECT NO.
63-H137

DRAWING NO.
MDS-22

SHEET NO.

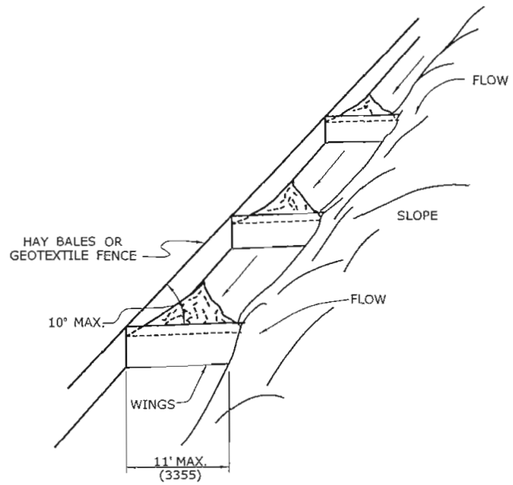
GENERAL NOTES:

1. THE CONTRACTOR SHALL MAINTAIN THE EARTHEN BERM AS DIRECTED BY THE ENGINEER.
2. WHEN USING A SEDIMENTATION CONTROL SYSTEM ALONG THE TOE OF SLOPE, ADD WINGS TO PREVENT SEDIMENT FROM MOVING *ALONG THE FENCE AND OFF THE SITE*. MINIMUM SPACING FOR WINGS IS 25' (7620).
3. CATCH BASIN ON SLOPE SHOULD NOT BE RINGED. THE SPACING OF SEDIMENTATION CONTROL SYSTEM SHALL VARY WITH SLOPE.
4. ELEVATION B = A + 12" (305) MIN.



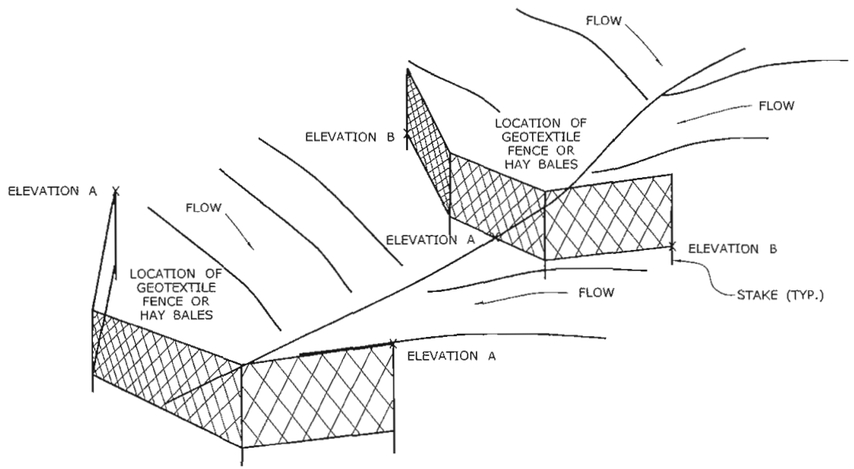
TREATMENT FOR A CATCH BASIN ON A SLOPE

(SEE NOTE 4)



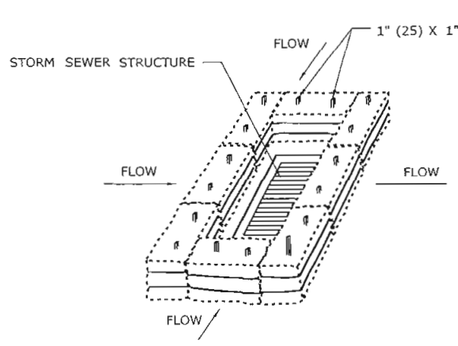
TREATMENT AT TOE OF SLOPE

(SEE NOTE 3)

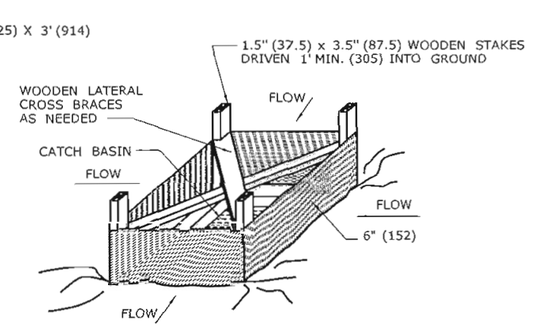


CHECK DAM

(SEE NOTE 4)



HAY BALE AT CATCH BASIN



GEOTEXTILE FENCE AT CATCH BASIN

TREATMENT FOR A CATCH BASIN IN A DEPRESSION

ALL METRIC DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
			Plotted: 6/7/2010

DESIGNER/DRAFTER:
CHECKED BY:
NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
Filename: ...\HW-MST-063-H137-MDS-021.dgn

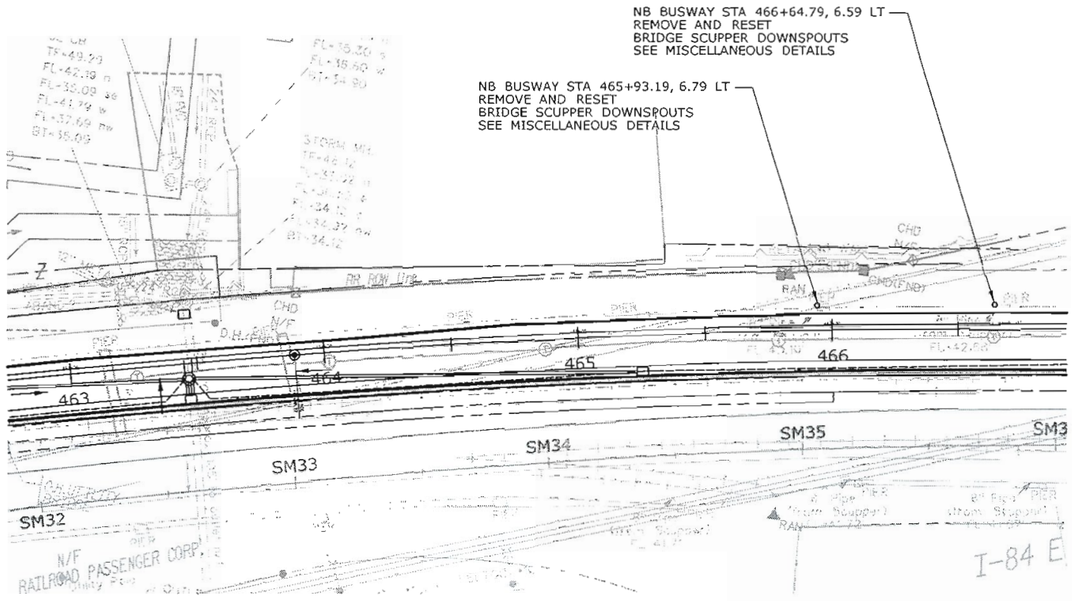
SIGNATURE/ BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN:
HARTFORD

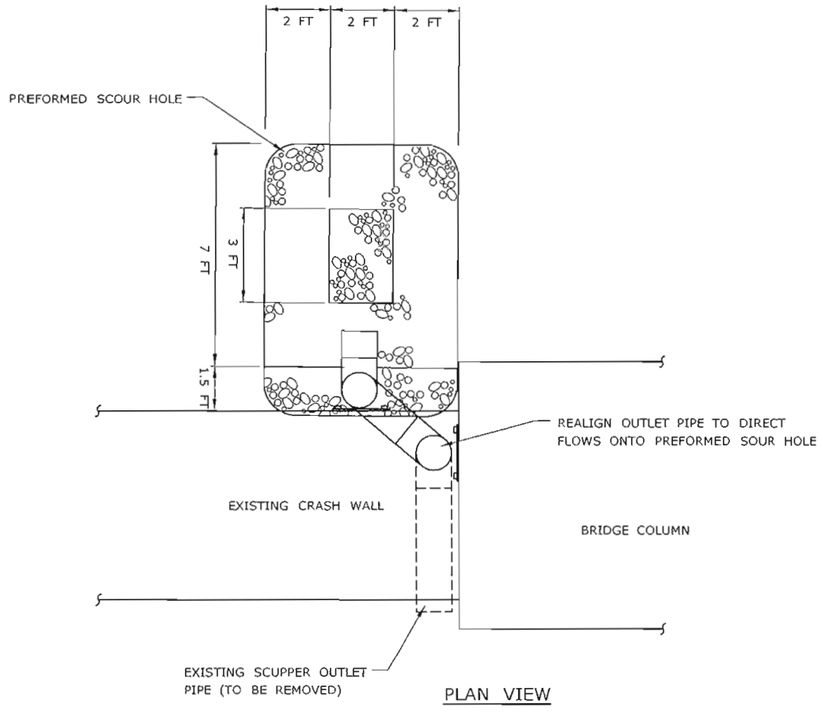
DRAWING TITLE:
SEDIMENTATION CONTROL TREATMENT DETAILS

PROJECT NO.
63-H137
DRAWING NO.
MDS-21
SHEET NO.

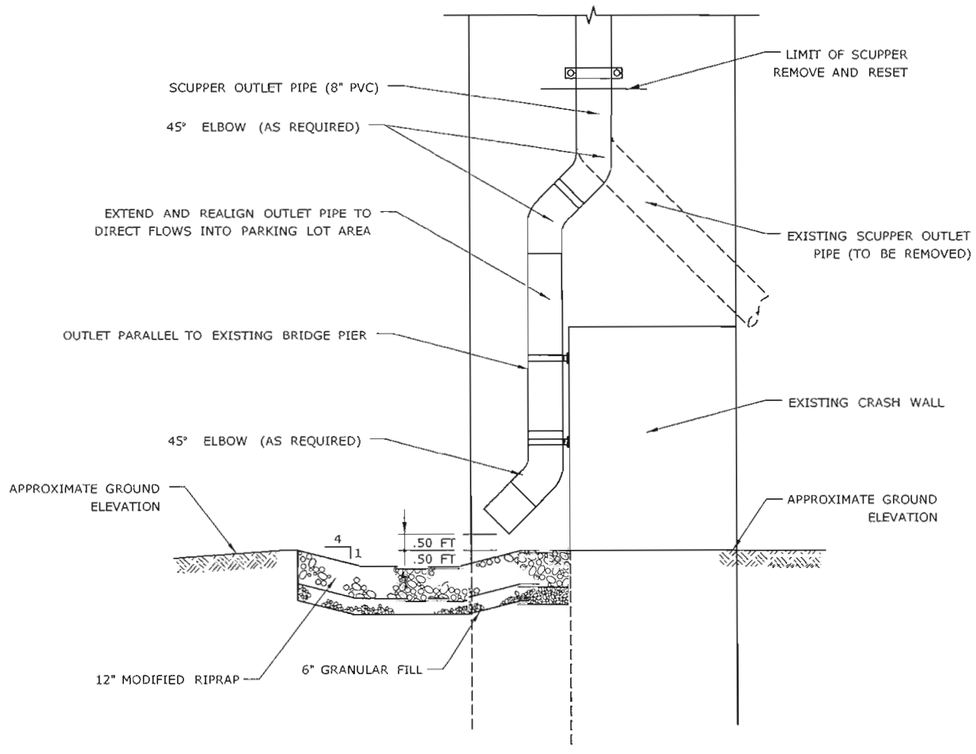


LOCATION A

CASE A LOCATIONS
NB BUSWAY STA 465+93.19, 6.79 LT
NB BUSWAY STA 466+64.79, 6.59 LT



PLAN VIEW



ELEVATION VIEW

NOTE: SCUPPER REALIGNMENT, INCLUDING ELBOWS, BRACKETS, ETC. TO BE PAID UNDER ITEM NO. 651745 - 8-INCH PVC.

SCUPPER OUTLET WITH PREFORMED SCOUR HOLE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. GRAY
NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW-MST-063_H137-MDS-025.dgn

SIGNATURE/BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

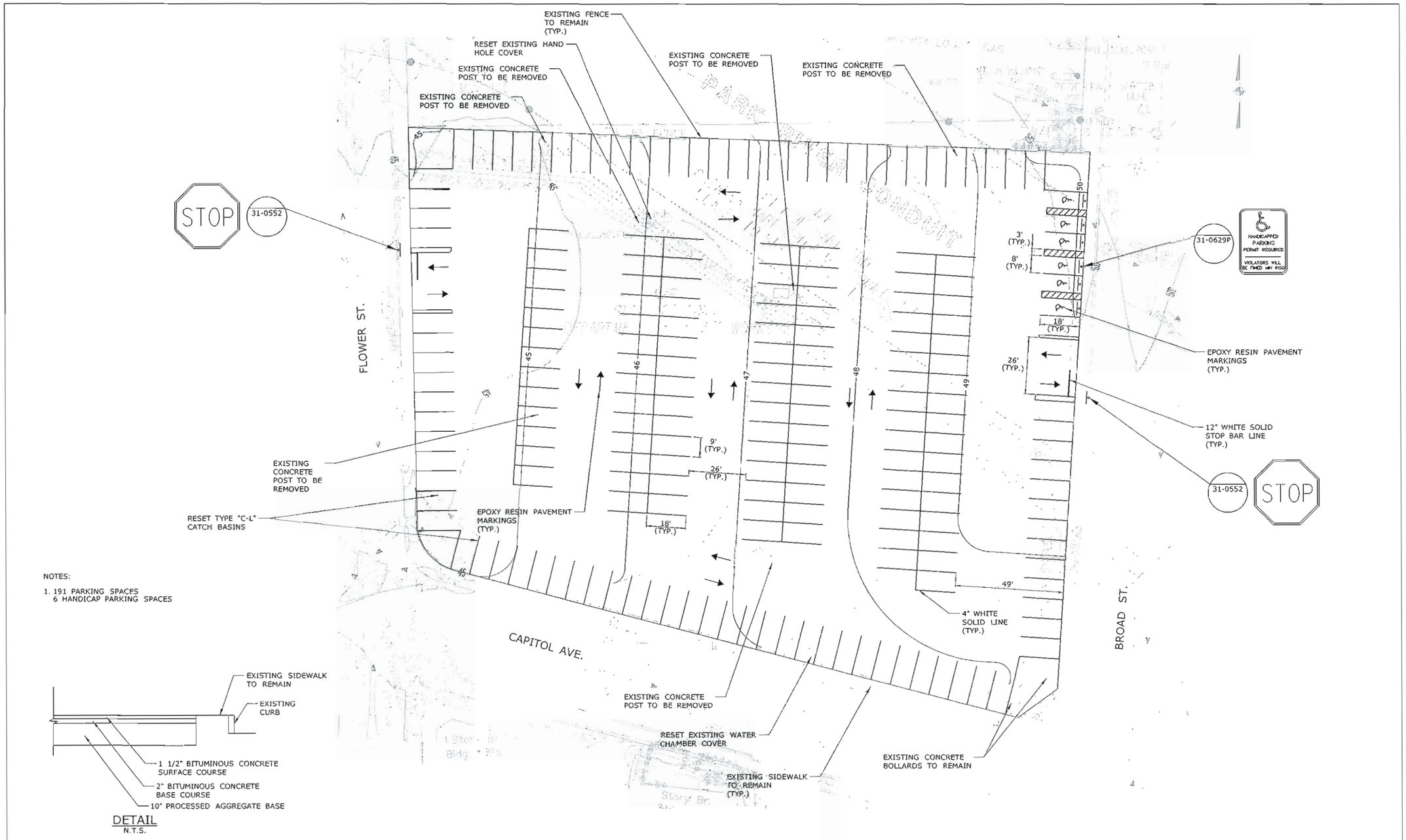
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD
BUSWAY
HARTFORD NORTH

TOWN: HARTFORD

DRAWING TITLE: MISCELLANEOUS DETAILS

PROJECT NO. 63-H137
DRAWING NO. MDS-25
SHEET NO.



NOTES:

1. 191 PARKING SPACES
   6 HANDICAP PARKING SPACES

DETAIL
N.T.S.

REV.	DATE	REVISION DESCRIPTION	SHEET NO.
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED

Plotted: 5/27/2009

DESIGNER/DRAFTER:

CHECKED BY:

SCALE IN FEET
0 20 40
SCALE 1"=20'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: HW_MST_053_H137_PAR_LOT.dgn

SIGNATURE/ BLOCK:

VN ENGINEERS, INC.
116 Washington Avenue
North Haven, CT 06473

APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

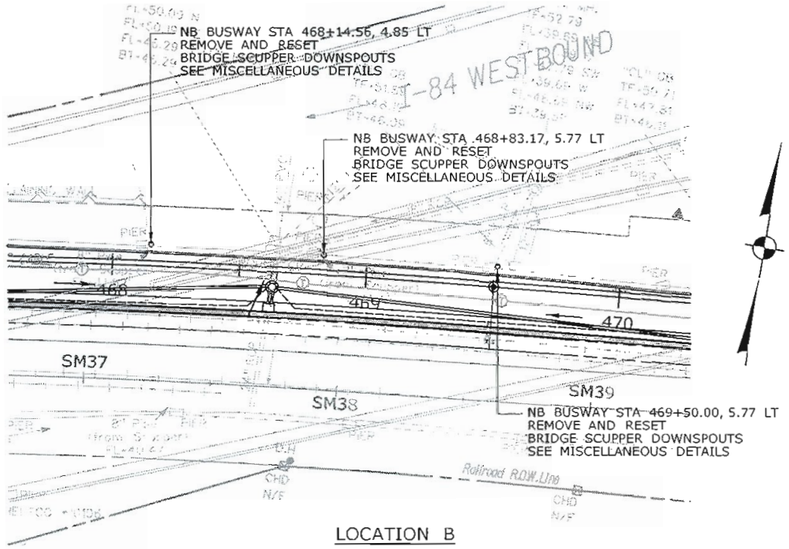
TOWN:
HARTFORD

DRAWING TITLE:
PARKING LOT

PROJECT NO.
63-H137

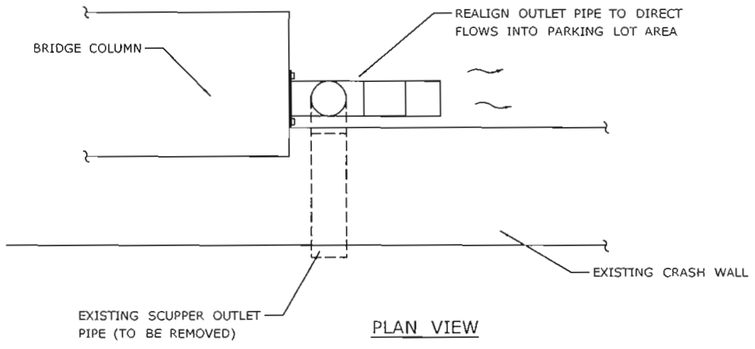
DRAWING NO.

SHEET NO.



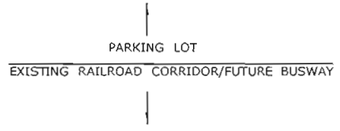
LOCATION B

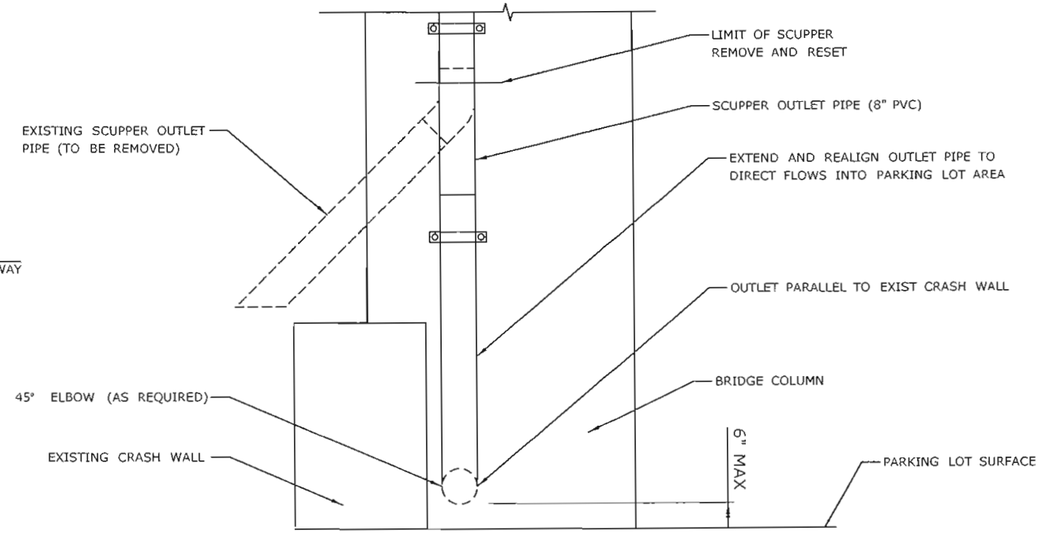
CASE B LOCATIONS
NB BUSWAY STA 468+14.56, 4.85 LT
NB BUSWAY STA 468+83.17, 5.77 LT
NB BUSWAY STA 469+50.00, 5.77 LT



PLAN VIEW

NOTE: SCUPPER REALIGNMENT, INCLUDING ELBOWS, BRACKETS, ETC. TO BE PAID UNDER ITEM NO. 651745 - 8-INCH PVC.





ELEVATION VIEW

SCUPPER OUTLET AT BRIDGE COLUMNS

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MST_063_H137_MDS-026.dgn

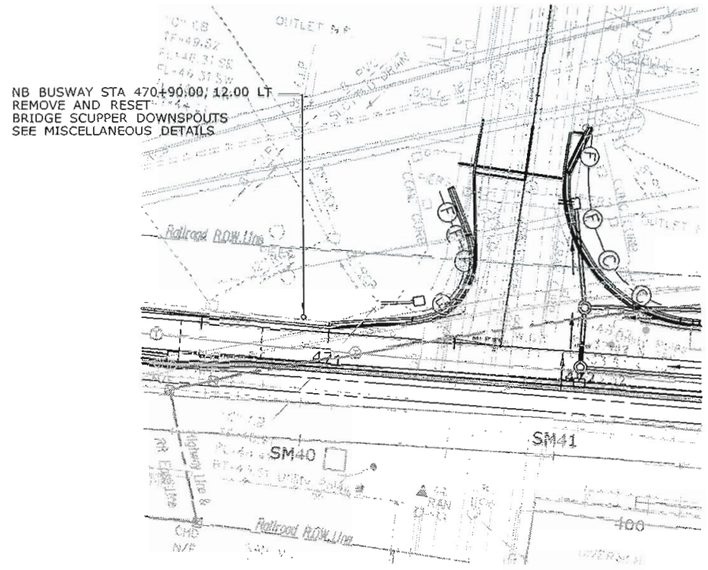
SIGNATURE/ BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

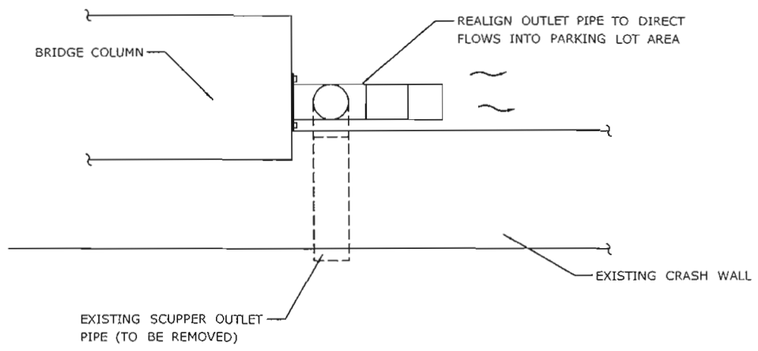
TOWN: HARTFORD
DRAWING TITLE: MISCELLANEOUS DETAILS

PROJECT NO. 63-H137
DRAWING NO. MDS-26
SHEET NO.

CASE C LOCATION
NB BUSWAY STA. 470+90.00, 12.00 LT

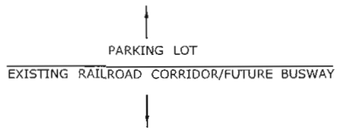


LOCATION C

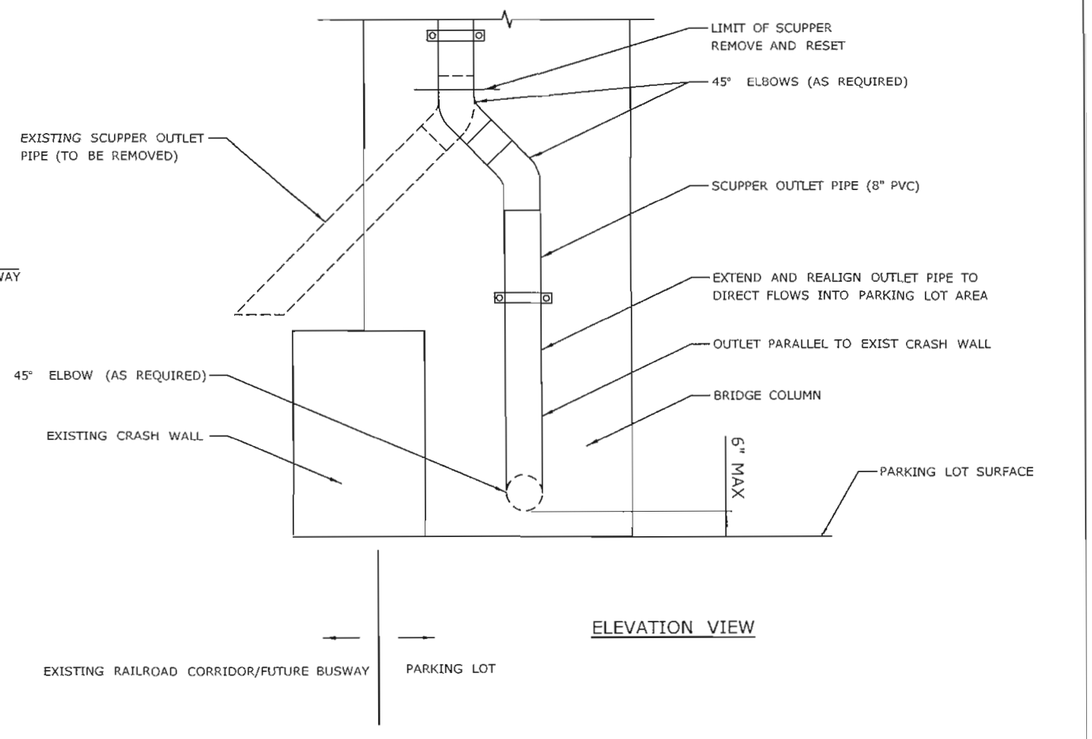


PLAN VIEW

NOTE: SCUPPER REALIGNMENT, INCLUDING ELBOWS, BRACKETS, ETC. TO BE PAID UNDER ITEM NO. 651745 - 8-INCH PVC.



SCUPPER OUTLET AT BRIDGE COLUMNS



ELEVATION VIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
NOT TO SCALE

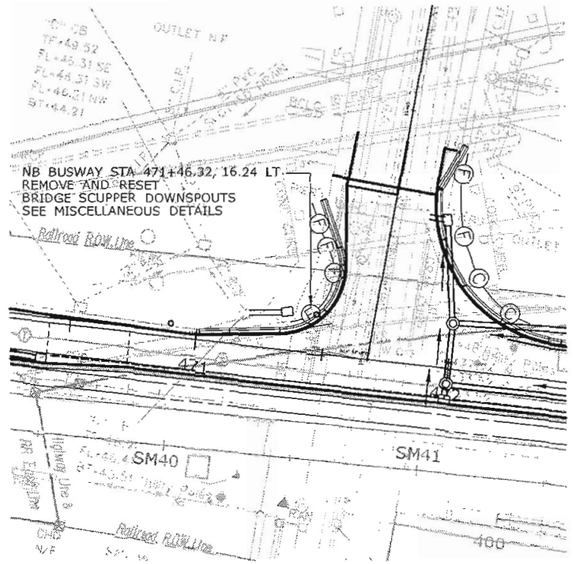
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
Filename: ...\NW_MST_063_H137_MDS-027.dgn

SIGNATURE/BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067
APPROVED BY: DATE:

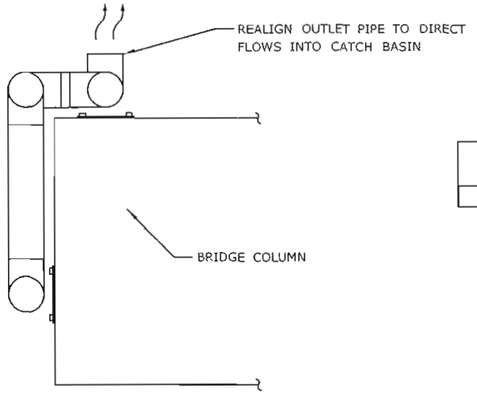
PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD
DRAWING TITLE: MISCELLANEOUS DETAILS

PROJECT NO. 63-H137
DRAWING NO. MDS-27
SHEET NO.



LOCATION D

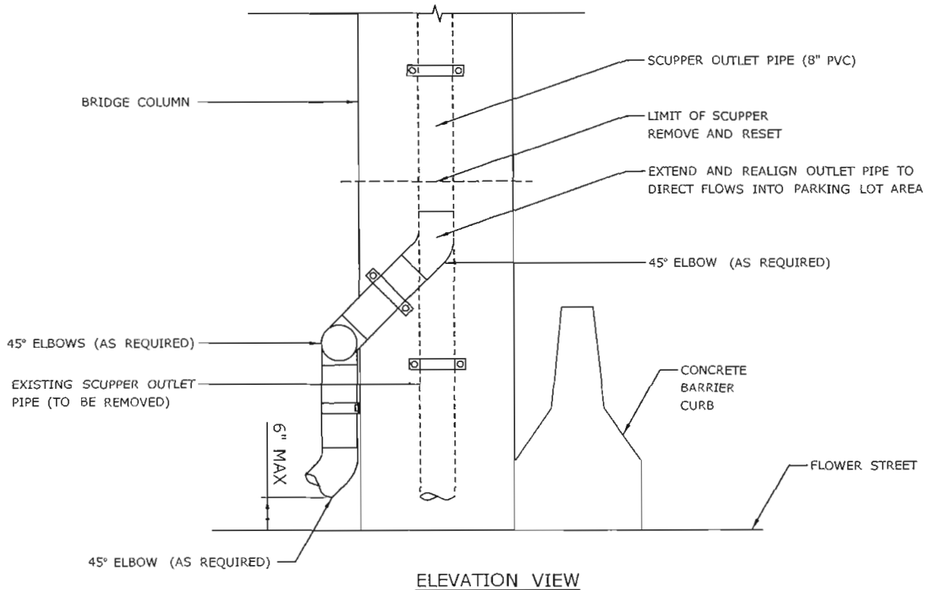


CASE D LOCATION
NB BUSWAY STA 471+46.32, 16.24 LT

PLAN VIEW

NOTE: SCUPPER REALIGNMENT, INCLUDING ELBOWS, BRACKETS, ETC. TO BE PAID UNDER ITEM NO. 651745 - 8-INCH PVC.

SCUPPER OUTLET AT BRIDGE COLUMN (FLOWER STREET)



ELEVATION VIEW

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
NOT TO SCALE

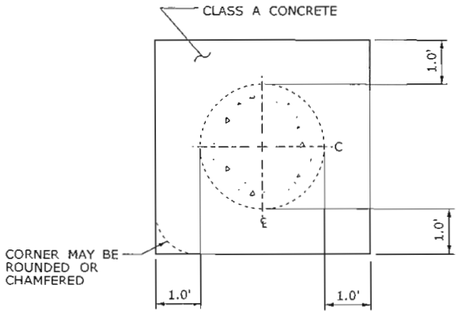
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
Filename: ...\HW_MST_063_H137_MDS-028.dgn

SIGNATURE/BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067
APPROVED BY: DATE:

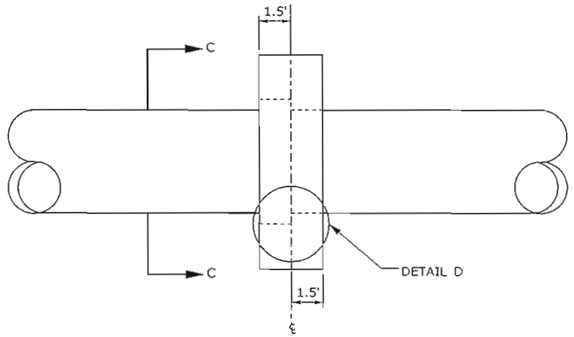
PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD
DRAWING TITLE: MISCELLANEOUS DETAILS

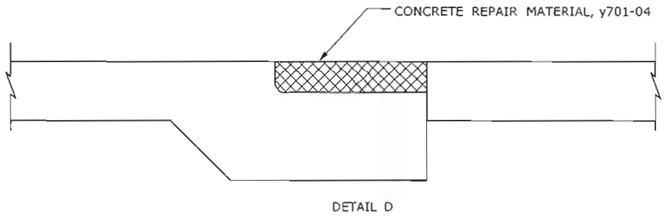
PROJECT NO. 63-H137
DRAWING NO. MDS-28
SHEET NO.



SECTION C-C



ELEVATION

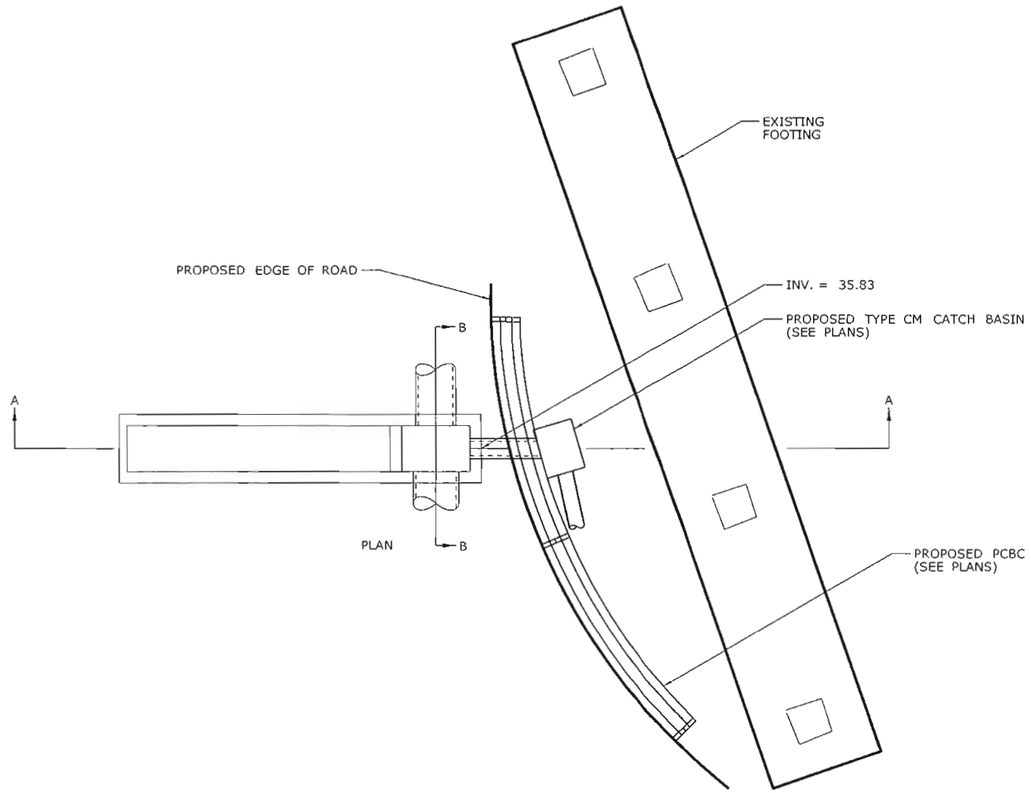


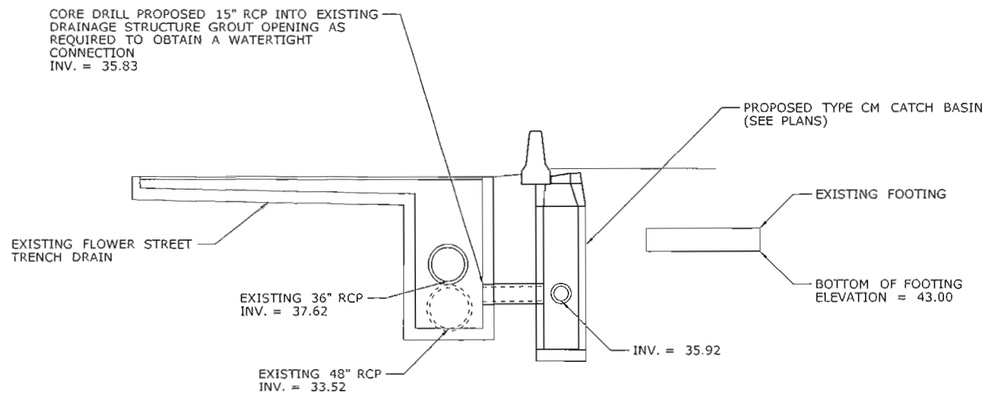
DETAIL D

CONCRETE PIPE CONNECTION

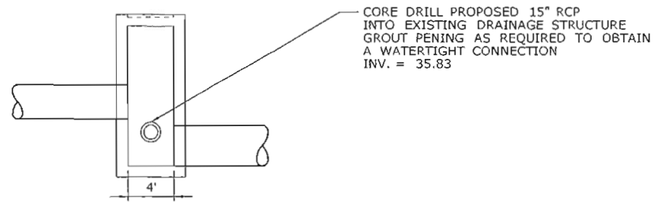
NOTES:

1. NOTE CONCRETE PIPE CONNECTION TO BE USED WITH PIPES WHERE PROPER CONNECTION CAN NOT BE ACHIEVER OR AS DIRECTED BY THE ENGINEER.





SECTION A-A



SECTION B-B

CATCH BASIN CONNECTION

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted: 6/7/2010

DESIGNER/DRAFTER:

CHECKED BY:

NOT TO SCALE

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MST_063_H137_MDS-029.dgn

SIGNATURE/ BLOCK:

LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN:
HARTFORD

DRAWING TITLE:
MISCELLANEOUS DETAILS

PROJECT NO.
63-H137

DRAWING NO.
MDS-29

SHEET NO.

APPENDIX A

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

APPENDIX A-1

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

CORPS OF ENGINEERS — U. S. ARMY

E160,000 — E161,000 — N153,000 — N152,000 — N151,000 — N150,000 — N149,000 — N148,000

WEST FLOODWALL — EAST FLOODWALL — INLET STRUCTURE — MORGAN STREET — FERGUSON AVENUE — SECTION 9 — SECTION 8 EXISTING — SECTION 7 — SECTION 6 EXISTING — SECTION 5 — SECTION 4 — SECTION 3 EXISTING — SECTION 2 — SECTION 1 EXISTING — JUNCTION STRUCTURE — AUXILIARY CONDUIT — POPE PARK PUMPING STATION — ARMORY PUMPING STATION — Laboratory & Field Office — PARK RIVER CONDUIT — CONNECTICUT RIVER

PLAN
SCALE: 1" = 200'

LEGEND

NEW	EXISTING	DESCRIPTION
x365.0	365.0	Elevations
x—F—x	x—EF—x	Fence
		Tree line
		Grade to drain
		Stone wall
		Limit of contractors work area
—E—	—O—E—O—	Electric line overhead
—T—	—O—T—O—	Telephone line overhead
		Earth cut and rock cut
		Earth fill
		Earth fill with rock slope protection
		Earth surface (Section)
		Assumed rock surface or rock cut (Section)
		Approximate limits of excavation
—NSD—	—SD—	Storm drain
R.I.		Drain inlet
—NSS—	—SS—	Sanitary sewer
DMH	DMH	Drain manhole
—NW—	—EW—	Water line
	—G—	Gas line
CB	CB	Catch basin
SMH	SMH	Sanitary manhole
		Gate valve
		Pole
		Manhole
5		Greater Hartford Flood Commission Boring (1960-PBG3)
FC3		Flood Commission Boring (1960)
BH6		Connecticut Highway Department (1953)
FD5		U.S. Army Corps of Engineers Boring
Line A5		Seismic Line
		Driving Test Pile Location
		Driving Test Pile and Load Test Location

LEGEND CONT'D.

NEW	EXISTING	DESCRIPTION
28A-2		Pressure Manhole Plant Identity Key and Quantity (See Specifications).
		Tree
		Deciduous tree
		Evergreen tree
		Shrub

VICINITY MAP
SCALE: 1" = 3.5 MILES
N. HARTFORD — HARTFORD — E. HARTFORD — MANCHESTER — NEW BRITAIN — CONNECTICUT RIVER

GENERAL NOTES:

1. Elevations refer to Mean Sea Level Datum.
2. All elevations are plus except as noted otherwise.
3. Plane coordinates refer to Connecticut Lambert Grid System.
4. Figures in hexagons indicate item numbers under which payment will be made.
5. Bid item references are shown on the drawings for convenience only. Under no circumstances should these items be used without reference to the specifications which describe the work and bid item. Should there be any discrepancies between the work covered by the bid item numbers as shown on the drawings and in the specification, the specifications shall govern.
6. For control see sheet 3.
7. For record of explorations see Division II of specifications.

GRAPHIC SCALE
1"=200' — 200' 0 200' 400'

As Built Drawing
Contract No. DACW 33-76-C-0098

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

REVISION	DATE	DESCRIPTION	BY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

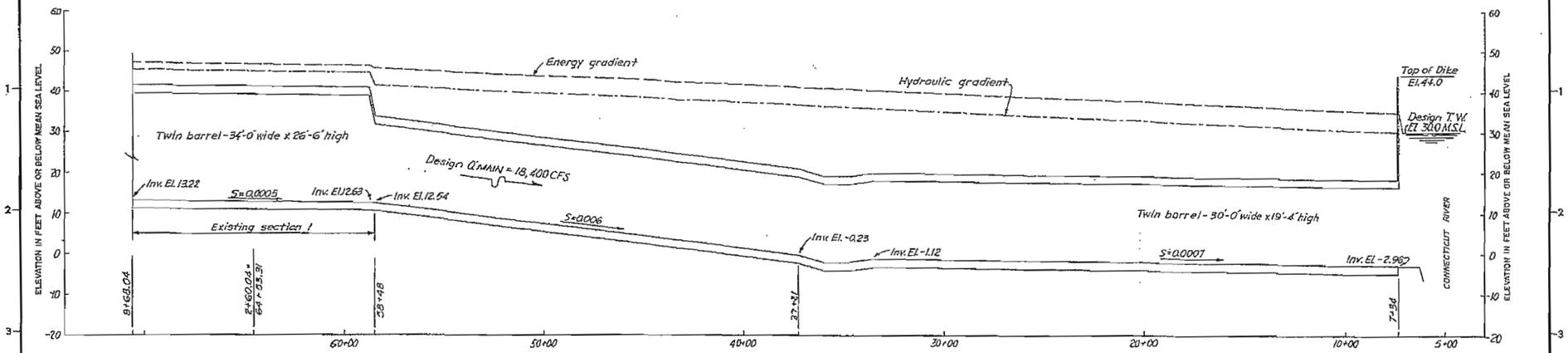
DES. BY R.C. — DR. BY L.R.L. — CK. BY M.B.

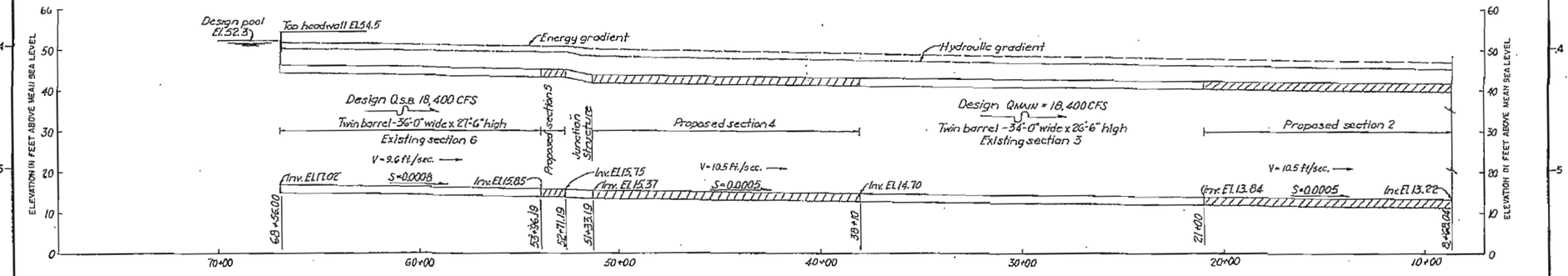
WATER RESOURCES DEVELOPMENT PROJECT
PARK RIVER LOCAL PROTECTION
GENERAL PLAN
HARTFORD — CONNECTICUT
DATE MARCH 1976
SCALE 1" = 200' — SPEC. DWG. NO. W-W-D-0000
DRAWING NUMBER 6115
SHEET

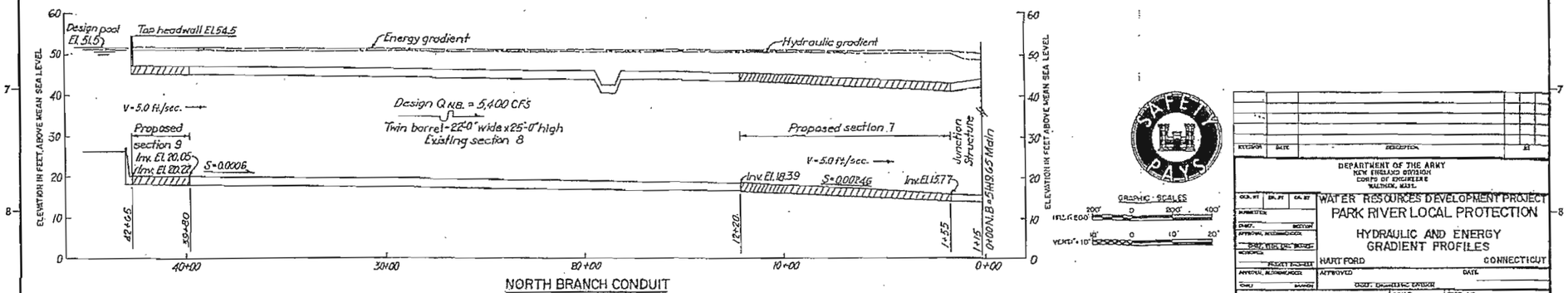
APPENDIX A-2

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

CORPS OF ENGINEERS — U. S. ARMY







SAFETY PAYS

GRAPHIC SCALES
HOR. 1"=200' 0 200' 400'
VERT. = 10' 0 10' 20'

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

WATER RESOURCES DEVELOPMENT PROJECT
PARK RIVER LOCAL PROTECTION
HYDRAULIC AND ENERGY GRADIENT PROFILES
HARTFORD CONNECTICUT
APPROVED DATE
DIVISION ENGINEER
SCALE SPEC. NO.
DRAWING NUMBER
SHEET

PLATE 3-14

APPENDIX A-3

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

FUR. ROAD SYS. NO.	STATE	TOWN	FED-AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	HARTFORD	I-16-84 (3)53160	63-138	1962	I-84	114	154

REVISION OF 1-9-63
SHOWN ON SHEET 114A
INCORPORATED ON THIS SHEET
Jan. 27, 1966

HARTFORD
INTERSTATE ROUTE 84

PLAN
SCALE: 1" = 40'

PROFILE A-A
(Along Taking Line)

GRADING DETAIL SOUTH SIDE
VICINITY OF STA. 23+05
Scale 1" = 10'
Rev 1

Revisions of 5-16-63 Shown on Sheet No. 114B
Incorporated on this Sheet Jan. 14, 1966

PROFILE
SCALE: HOR. 1" = 40'
VER. 1" = 10'

AT A BUTTRESS
Except E8R6B
E8R6C
ML18C

NORMAL
Sta. 21+00 to 23+78 and 29+30 to 33+04
South and East Side
Sta. 21+00 to 22+30 and 31+40 to 33+04
North and West Side

AWAY FROM CONDUIT
Sta. 28+30 to 30+06 West Side

NOTE: Where not specified, either the "Normal" or "Away from Conduit" Side Drain Detail may be used.

SIDE DRAIN DETAILS
SCALE 3/4" = 1'-0"

PROFILE SECTION

TYPICAL ROCK SECTION
STA. 21+20 TO STA. 29+0±
NO SCALE

COLUMNS
E8R4A
E8R5B
E8R6D

COLUMNS
ML20A THRU ML25A
ML20C THRU ML25C

COLUMNS
ML18A AND ML18C
ML18B AND ML19C
ML28B AND ML27A

PAYMENT LINES FOR EXCAVATION
AT COLUMN BUTTRESSES
SCALE: 3/16" = 1'-0"

DRY RUBBLE MASONRY WALL
SCALE: 1/8" = 1'-0"

REVISION OF 1-3-63
SHOWN ON SHEET 114B
INCORPORATED ON THIS SHEET
February 1, 1966

NOTES:
1. Steel sheet piling to be MZ-27 driven to rock. Steel sheet piling to be adequately supported and anchored for the indicated load conditions in a manner that will permit future construction of the conduit.
2. Word "SEWER" to be omitted from cover at Side Drain manholes.

CONNECTICUT
STATE HIGHWAY DEPARTMENT
CITY OF HARTFORD
PARK RIVER CONDUIT EXTENSION

PLAN AND PROFILE
STA. 21+00 TO STA. 27+00

REVISIONS		
NO.	DATE	DESCRIPTION
1	5-16-63	Walls Changed to Reflect Use of R.C.P. Conduit Instead of Box Conduit

DESIGNED BY M.ETCALF & EDDY
SCALE - AS SHOWN
MADE BY A.J.P. J.F.G. A.M.B. DATE 5-61
CHECKED BY R.H.L. W.C.K. DATE 1-62
APPROVED R.H.L. DATE 3-62
PROJECT NO. 63-138
SHEET NO. 3 OF 21

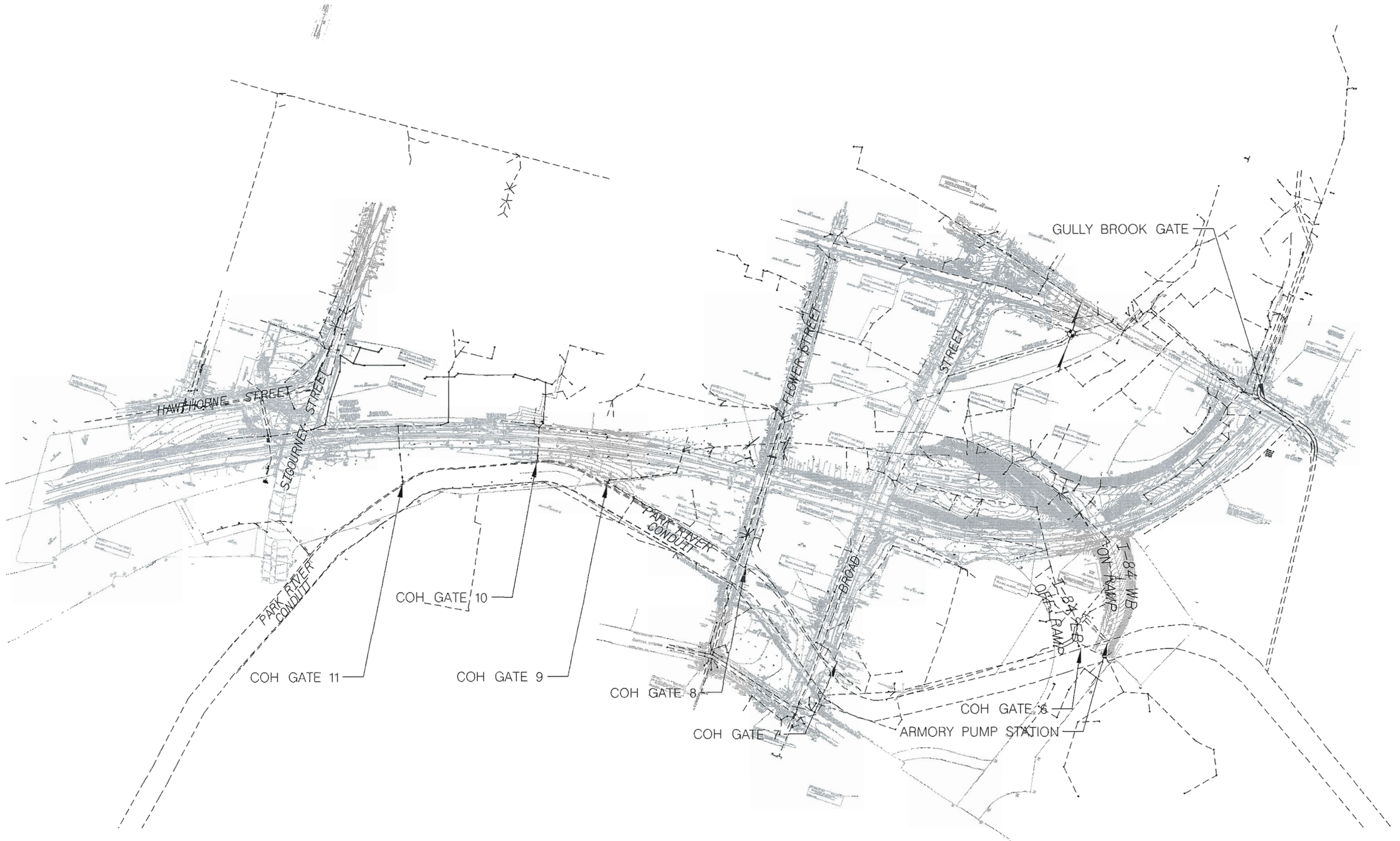
Robert H. Lubker 4-10-62
4-12-62

63-138

114, 114A, 114B

APPENDIX A-4

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

DESIGNER: H.W. LOCHNER, INC., ROCKY HILL, CT
CADD $FILE$$ | PLOTTED $DATE$

PROJECT TITLE:
NEW BRITAIN – HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD
DRAWING TITLE: GATE LOCATION MAP

PROJECT NO. 63-H137
FIGURE NO. APPENDIX B-4

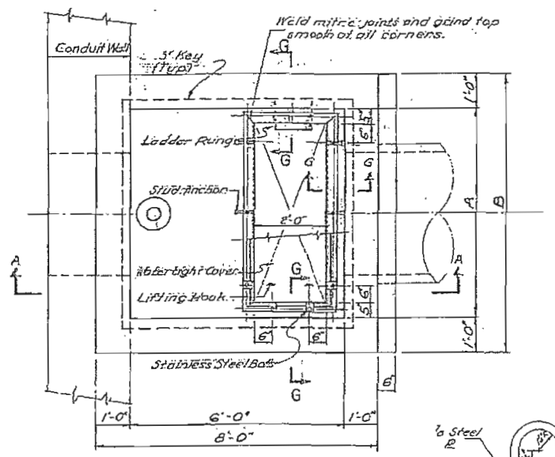
APPENDIX A-5

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

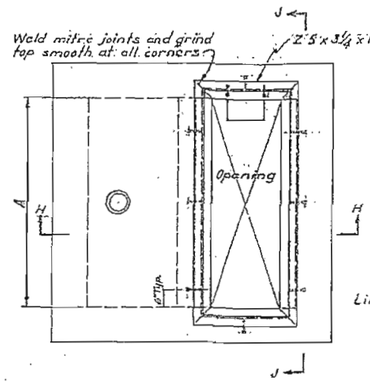
TYP. ROAD DIV. NO.	STATE	TOWN	FED. AID PROJ. NO.	PROJ. NO.	YEAR	ROUTE NO.	SHEET NO.	TOTAL SHEETS
1	CONN.	HARTFORD		63-138	1962	I-84	8	154

HARTFORD
INTERSTATE ROUTE 84

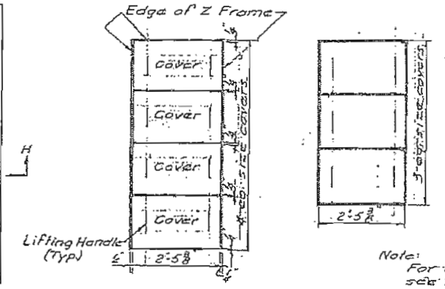
SPECIAL MANHOLES



PLAN AT PLATFORM
SCALE: 1/2" = 1'-0"



PLAN AT TOP
SCALE: 1 1/2" = 1'-0"

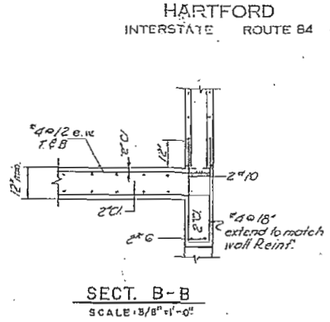


MH. NO. 2 & 3

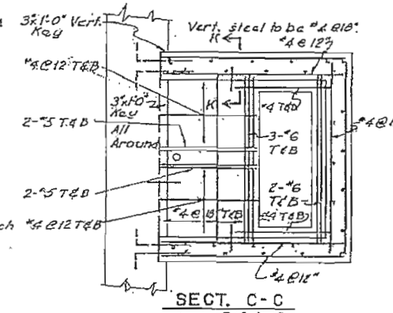
Note: For additional dimensions see M.H. No. 2 & 3.

MH. NO. 1

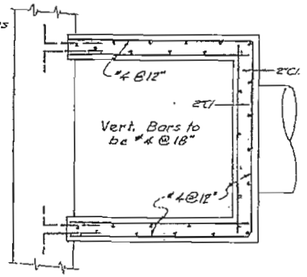
CONCRETE COVER DIAGRAMS
SCALE: 1/2" = 1'-0"



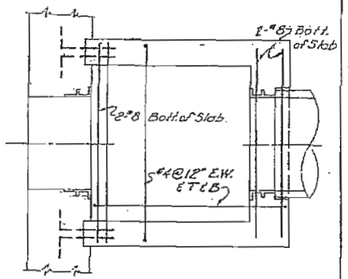
SECT. B-B
SCALE: 3/8" = 1'-0"



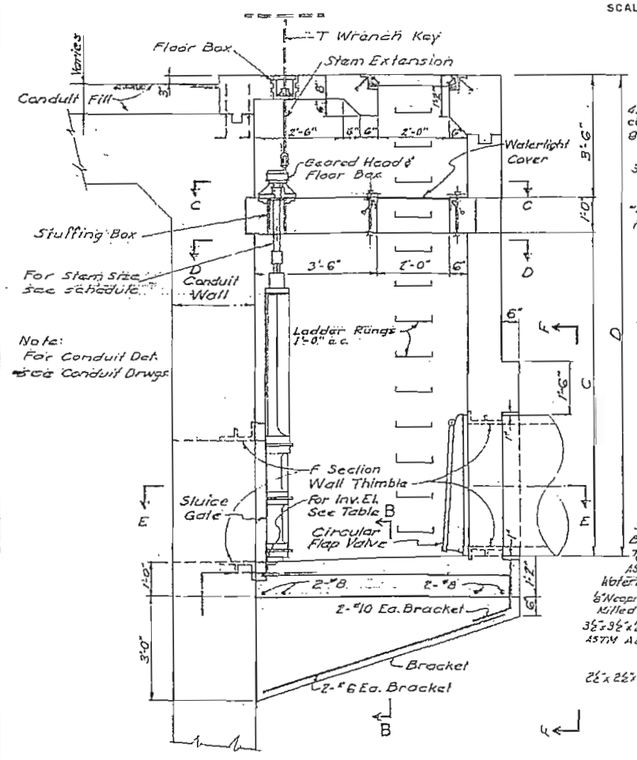
SECT. C-C
SCALE: 3/16" = 1'-0"



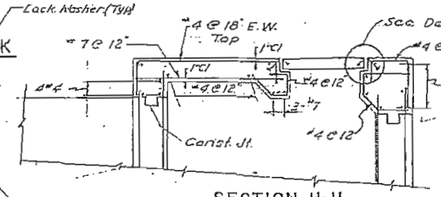
SECT. D-D
SCALE: 3/8" = 1'-0"



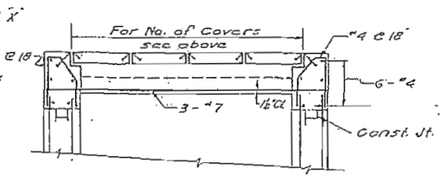
SECT. E-E
SCALE: 3/8" = 1'-0"



SECT. A-A
SCALE: 1½" = 1'-0"

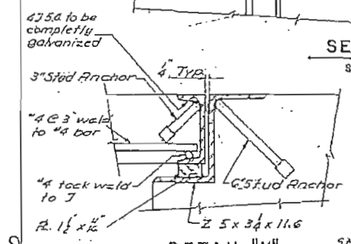


SECTION H-H
SCALE: 1 1/2" = 1'-0"

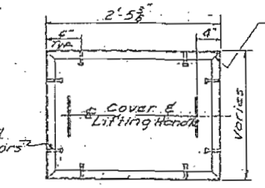


SECTION J-J
SCALE: 1 1/2" = 1'-0"

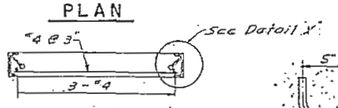
LIFTING HOOK
SCALE: 3" = 1'-0"



DETAIL "X"
SCALE: 3" = 1'-0"

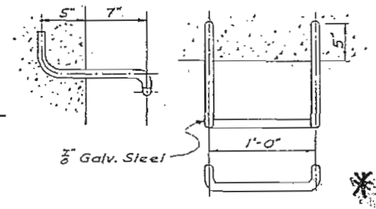


PLAN

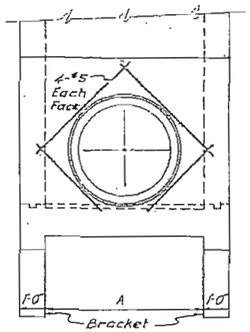


SECTION

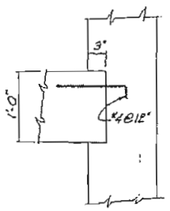
CONCRETE COVER DETAILS
SCALE: 1" = 1'-0"



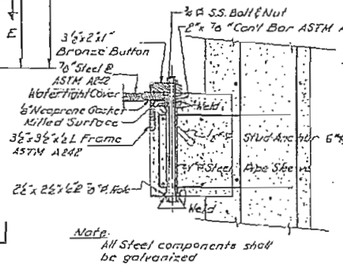
LADDER RUNG DETAIL
SCALE: 1½" = 1'-0"



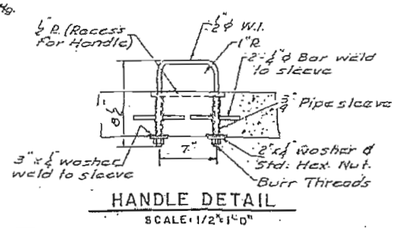
SECT. F-F
SCALE: 3/8" = 1'-0"



SECT. K-K
SCALE: 1" = 1'-0"



SECT. G-G
SCALE: 1" = 1'-0"



HANDLE DETAIL
SCALE: 1 1/2" = 1'-0"

SPECIAL MANHOLE SCHEDULE

Special M.H. No.	Conduit Station	Elevations Top of Conduit	Elevations Pipe Inv.	Pipe Size	Sluice Gate Size	Flap Valve Size	A	B	C	D	E	Stem Size
1	22+00 R	42.1 ±	32.25	24"	24"	24"	21.3"	6'-3"	6'-6"	11'-0"	11'-2"	1¾"
2	22+20 R	42.2 ±	29.75	36"	36"	36"	33.5"	7'-5"	9'-0"	13'-6"	13'-8"	2¼"
3	23+05 R	42.7 ±	29.25	42"	42"	42"	40.0"	8'-0"	10'-0"	14'-6"	14'-8"	2¼"

Note: All stems to have a 2" square operating nut for standard T wrench key.

PLAN
SUBMITTED PLOTTED TRACED DESIGNED
NOTE BOOK
NO. NEW CONST. NOTED TOP FIELD GIN. NOTED

APPENDIX B

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

H. W. LOCHNER, INC.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860-513-4003 F: 860-513-4006

Project 063H-137/063H156 Sheet 1 of
Subject WATER SURFACE ELEVATIONS Job No. 2398
Calc. By MM Date 1/10/09
Checked By Date

Reference

I. CALCULATION to determine the design STARTING WATER SURFACE ELEVATION in the PARK River Conduit using Joint probability Analysis.

A. ASSUMPTIONS

- BASED ON INFORMATION from the PARK RIVER GAGE and the CT RIVER GAGE, the TWO PEAKS DO NOT COINCIDE, therefore the gages are STATISTICAL INDEPENDENT.
- AREA of CT River GAGE is 10,546 mi.²
- AREA of PARK River is 74 mi.²
- AREA of City drainage to gates: 28.47 ACRES or 0.05 mi.²
- 10YR Design for Busway with a 25YR check STORM.
- USE TABLE 8-3 to determine TRIBUTARY design

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Project 06H137 / 063H156 Sheet 2 of
Subject WSEL Calculations
Job No. 2398
Calc. By MM Date 1/10/09
Checked By Date

Reference

Table 8-3 Joint Probability Analysis

AREA RATIO	FREQUENCIES FOR COINCIDENTAL OCCURRENCE							
	10-Year Design		25-Year Design		50-Year Design		100-Year Design	
	Main Stream	Tributary	Main Stream	Tributary	Main Stream	Tributary	Main Stream	Tributary
10,000 TO 1	2	10	2	25	2	50	2	100
	10	2	25	2	50	2	100	2
1,000 TO 1	2	10	2	25	5	50	10	100
	10	2	25	2	50	5	100	10
100 TO 1	5	10	5	25	10	50	25	100
	10	5	25	5	50	10	100	25
10 TO 1	10	10	10	25	25	50	50	100
	10	10	25	10	50	25	100	50
1 TO 1	10	10	25	25	50	50	100	100
	10	10	25	25	50	50	100	100

Notes: Shaded values denote design combination for coincidental frequency occurrence.
Non-shaded values denote check combination for coincidental frequency occurrence.

B. CALCULATE THE MAIN STREAM TO TRIBUTARY RATIO For the CT River to PARK RIVER.

$$\frac{10,546 \text{ mi.}^2}{74 \text{ mi.}^2} = 143:1$$

1.) For a 143:1 or 100:1 RATIO From TABLE 8-3 The MAIN STREAM to TRIBUTARY design.

a) The 10 YR Event is 5YR CT RIVER to 10YR PARK RIVER.

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Project 063H137 / 06H156
Subject WSEL CALCS.
Calc. By MM Date 1/10/08
Checked By _____ Date _____

Sheet 3 of _____
Job No. 2398

Reference

C. CALCULATE THE MAINSTREAM TO TRIBUTARY RATIO FOR PARK RIVER to GATE AREA

$$\frac{77\ mi^2}{0.05\ mi^2} = 1480 \Rightarrow 1000:1$$

b) For a 1000:1 ratio from TABLE B-3 The main stream to tributary design.

a) The 10yr Design event is a 2yr PARK RIVER To a 10YR GATE.

D. SUMMARY

		10 YR		25 YR	
100:1	CT RIVER	5		5	
	PARK RIVER		10		25
1000:1	PARK RIVER	2		2	
	GATE		10		25

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Project 06H137 / 06H156
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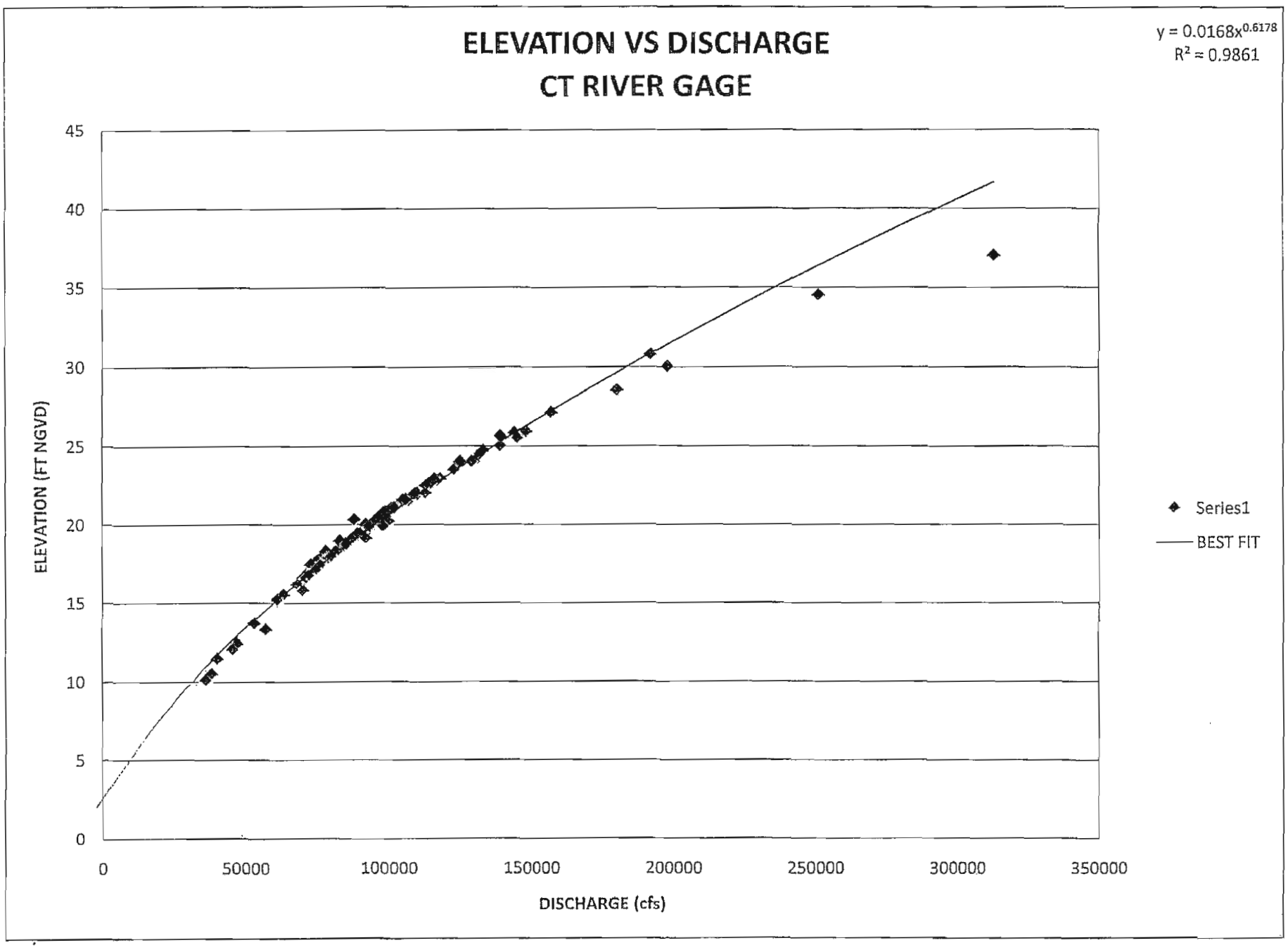
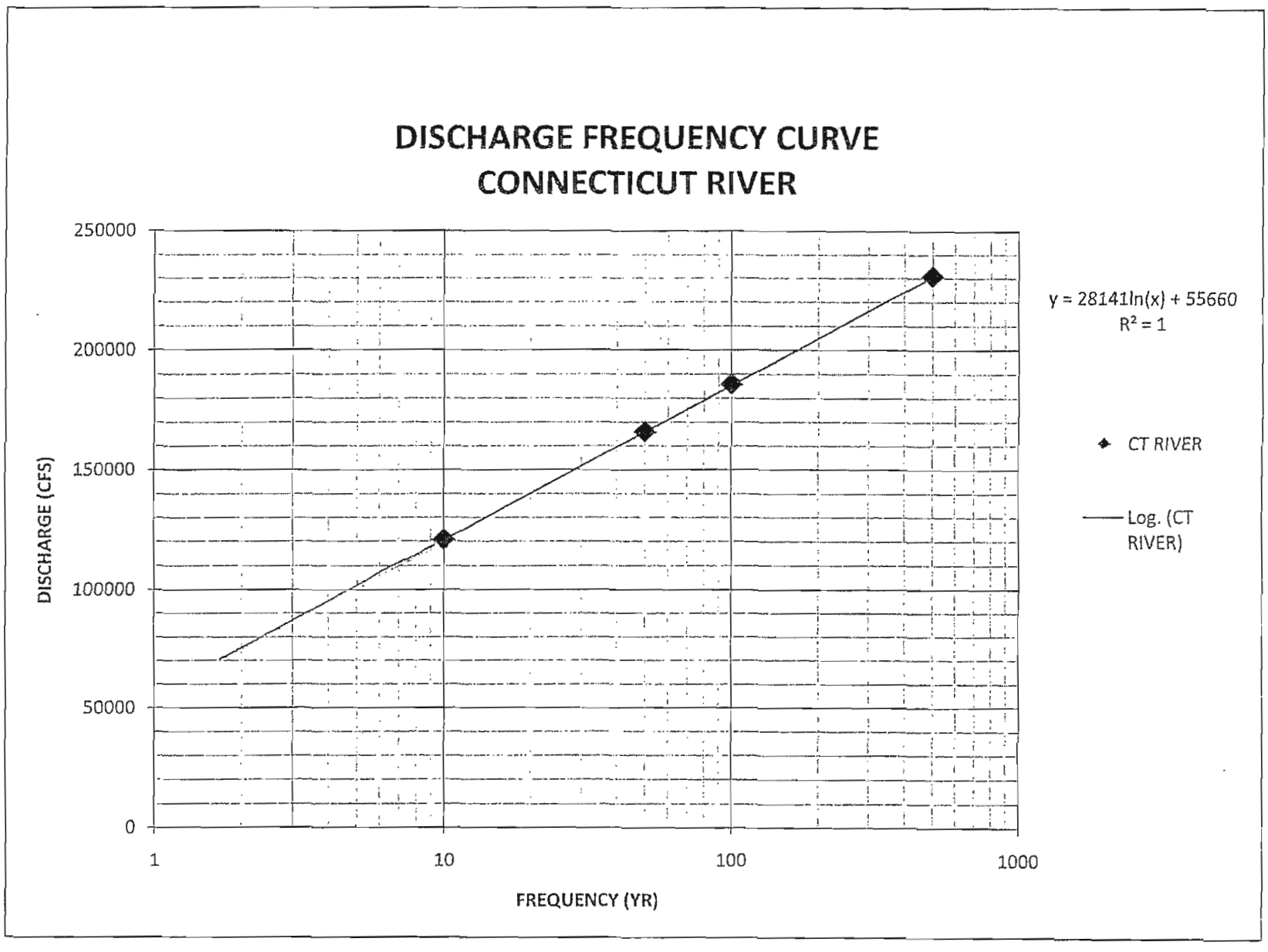
Sheet 4 of 4
Job No. 2398

Reference

These value seem conservative and do not seem appropriate because the 5YR CT RIVER WATER elevation would be 20.74' NGVD, which is also the average stage from 1900 to 2005, with the minimum being 10.10 FT NGVD, 10.10 FT equates to a 1.16 YR STORM. Therefore we believe that a 2YR CT RIVER STAGE of 17.30 FT NGVD is appropriate for the 100:1 RATIO with a 5YR PARK RIVER TRIBUTARY.

For the GATE AREA with the RATIO of 1000:1 we believe that a 5YR PARK River to a 10/25YR Tributary, because the river would PEAK Later than GATE AREA.


ELEVATION VS DISCHARGE
CT RIVER GAGE
y = 0.0168x^0.6178
R² = 0.9861
ELEVATION (FT NGVD)
45
40
35
30
25
20
15
10
5
0
0
50000
100000
150000
200000
250000
300000
350000
DISCHARGE (cfs)
Series1
BEST FIT

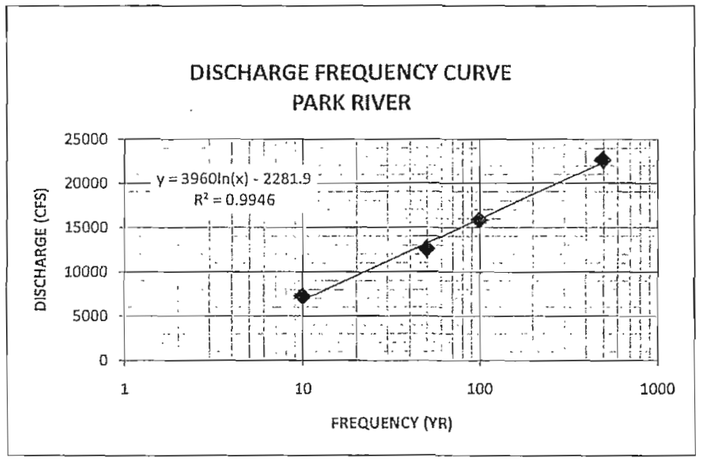

DISCHARGE FREQUENCY CURVE
CONNECTICUT RIVER
DISCHARGE (CFS)
250000
200000
150000
100000
50000
0
1
10
100
1000
FREQUENCY (YR)
y = 28141ln(x) + 55660
R² = 1
CT RIVER
Log. (CT RIVER)

II. Calculate the 5 year discharge and depth in the combined discharges to the Park River in the Junction Box.

A. The discharge was prorated from a rating curve generated using FEMA Flows.

FEMA FLOWS			
Year	Park River	North Branch	South Branch
	Dicharge (cfs)	Dicharge (cfs)	Dicharge (cfs)
10	7248	2890	4358
50	12590	4700	7890
100	15840	5640	10200
500	22650	8000	14650

Notes:
Discharges obtained from the City of Hartfrod FIS.
Discharges for the Park River are the sum of the North and South Branch Discharges



1. The 5 year discharge is : y=3960*ln(5) -2281.9

a. Q5 = 4091 cfs

B. Calculate the depth of flow in the junction box

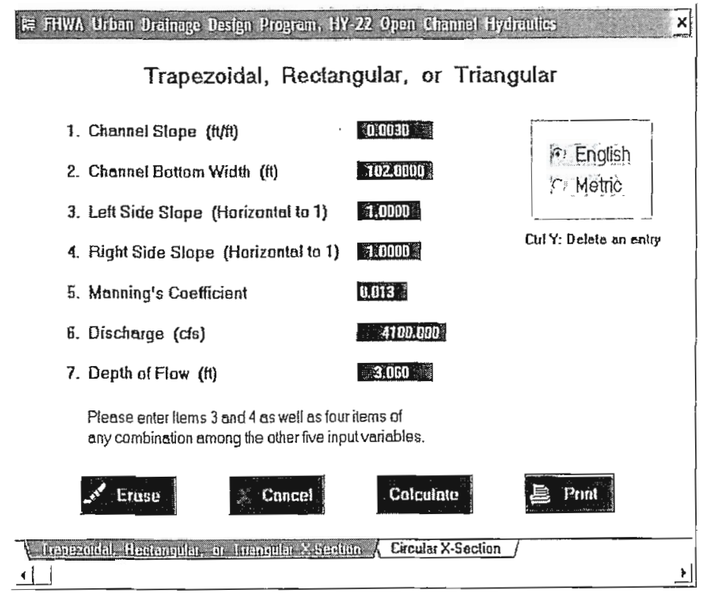
a. Geometry.

1. See sketch atached
2. length = 138 ft
3. Invert up: 15.77 ft
4. Invert down: 15.37 ft
5. Slope : 0.003 ft/ft
6. Width: 102 ft

b. Other assumptions

1. Open channel
2. Q = 4100 cfs
3. n = 0.013

c. Depth was calculated using FHWA VURBAN which uses the manning equation



d. Determine the water surface elevation in the Junction Box

1. d= 3.06 ft
2. Average Invert = 15.57 ft
3. Elevation = 18.63 feet

e. Determine flow over wier to auxillary outlet

1. Wier elevation= 18.77 feet
2. 18.77 > 18.63 Therefore no flow

III. Calculate the depth of flow in the conduit at the Gully Brook

a. Geometry for conduit at Gully Brook

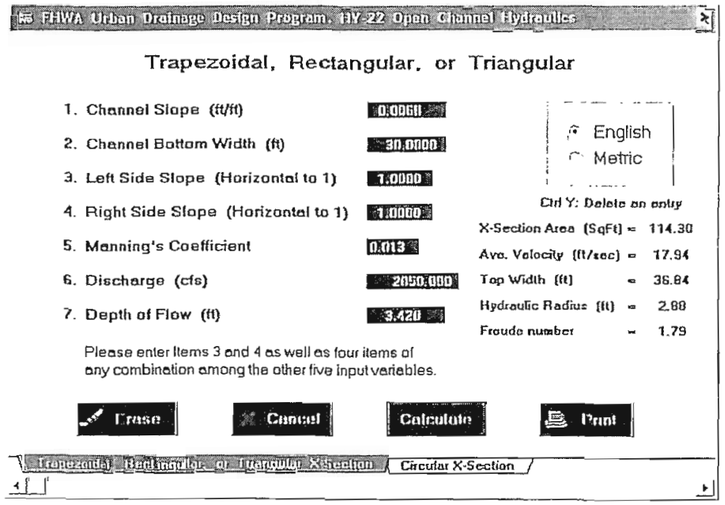
1. See profile
2. Twin Cell Box culvets
3. Cell Width 30 ft
4. Cell Helght 19.25 ft

b. Other assumptions

1. Open channel
2. Q cell = 2050 cfs
3. n = 0.013
4. Slopes = see below table

Gate	Slope
Gully	0.006

c. Depth was calculated using FHWA VURBAN which uses the manning equation



d. Determine the water surface elevations at gates

1. d= 3.42 ft

Gate	Invert (ft)	WSEL (ft)
Gully Brook	11.26	14.68

e. Determine back water

1. Inlet to Park River from Gully Brook elevation= 14.97 feet

2. 14.68 < 14.97 Therefore Gully Brook is flowing as open channel

IV. Calculate the depth of flow in the conduit at the Armory Gate, Gates 6 through 11

a. Geometry for gates 11 through the Armory Gate

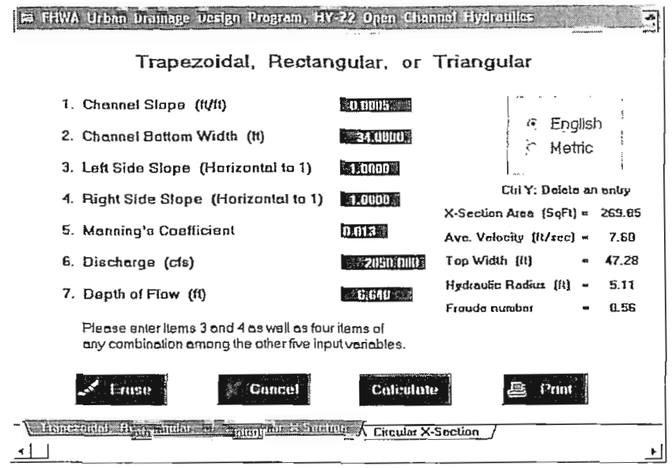
1. See profile
2. Twin Cell Box culvets
3. Cell Width 34 ft
4. Cell Helght 26.5 ft

b. Other assumptions

1. Open channel
2. Q cell = 2050 cfs
3. n = 0.013
4. Slopes = see below table

Gate	Slope
11	0.0005
10	0.0005
9	0.005
8	0.0005
6	0.0005
Armory	0.0005

c. Depth was calculated using FHWA VURBAN which uses the manning equation

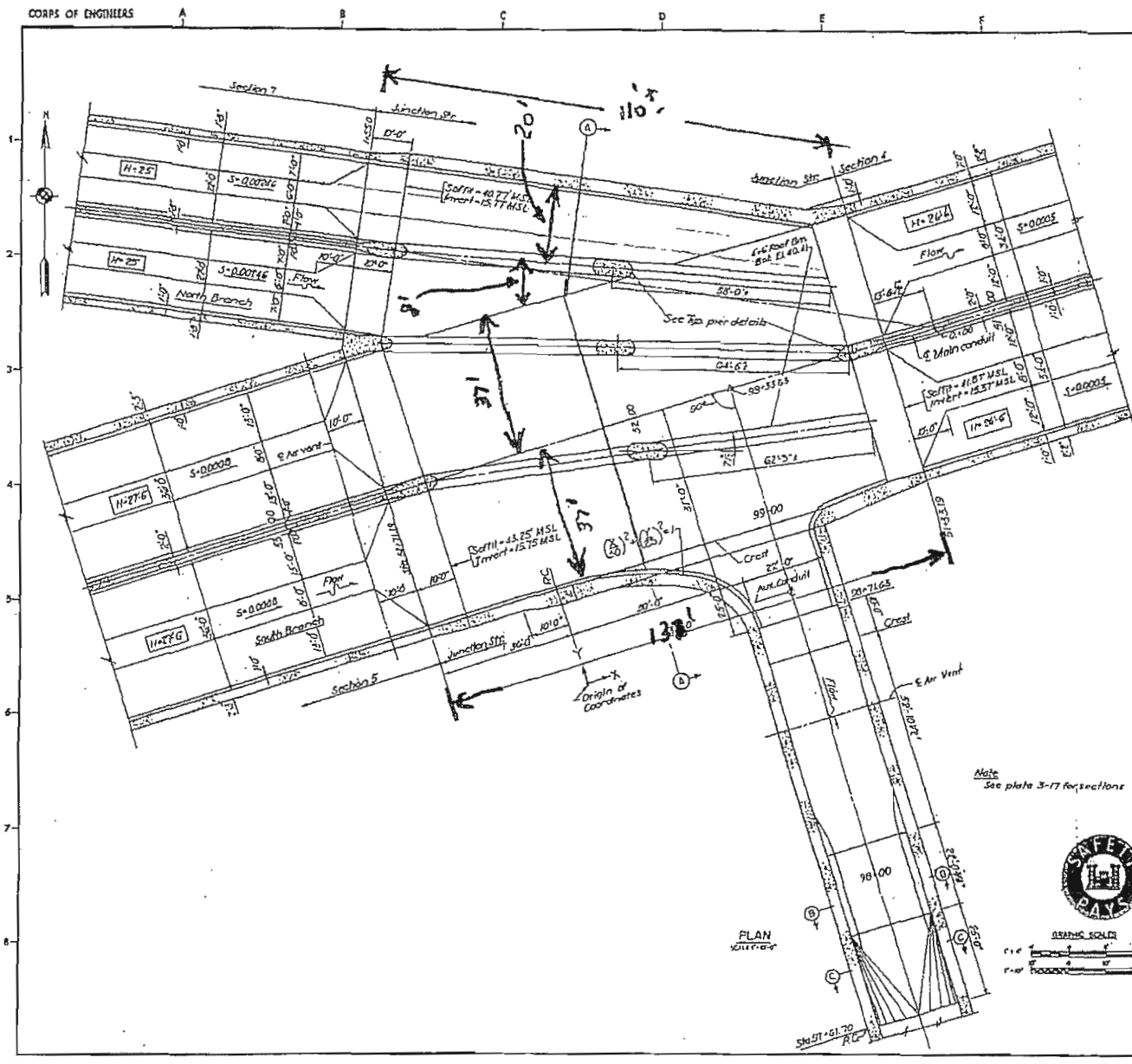


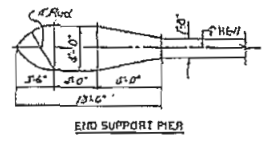
d. Determine the water surface elevations at gates

1. d= 6.64 ft

Gate	Invert (ft)	WSEL (ft)
11	14.35	20.99
10	14.00	20.64
9	13.84	20.48
8	13.74	20.38
6	12.823	19.463
Armory	12.823	19.463

CORPS OF ENGINEERS — U. S. ARMY





TYPICAL PIER DETAILS

SAFETY PAYS

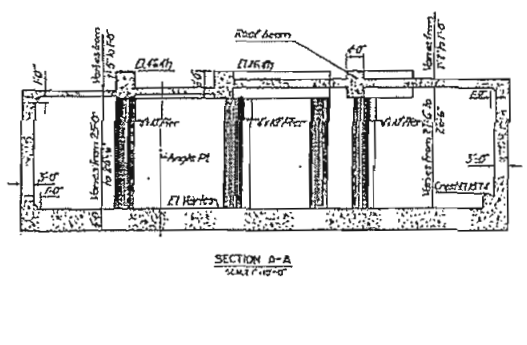
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WATERTOWN, MASS.

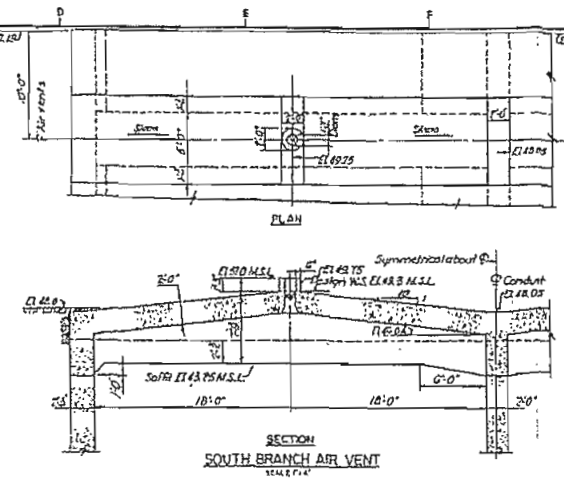
WATER RESOURCES DEVELOPMENT PROJECT
PARK RIVER LOCAL PROTECTION
PLAN OF JUNCTION STRUCTURE
HARTFORD — CONNECTICUT

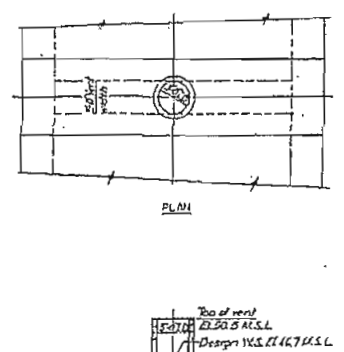
SHEET

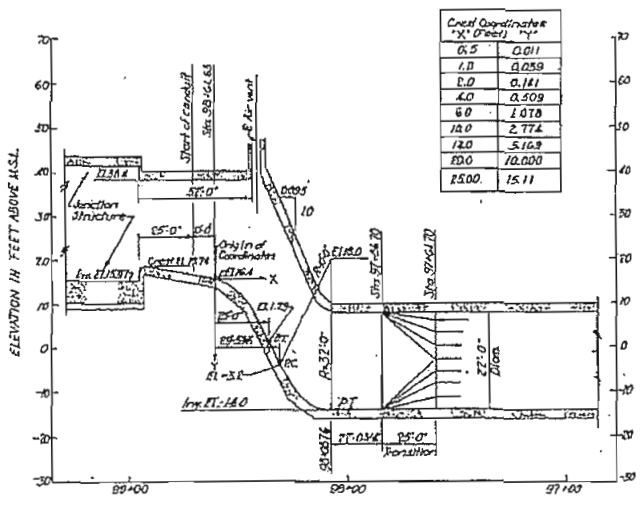
PLATE 3-16

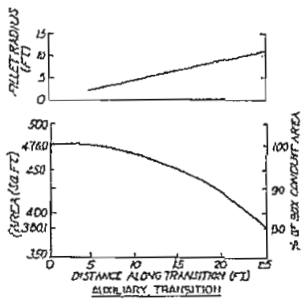
CORPS OF ENGINEERS — U. S. ARMY

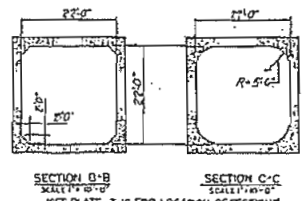












SAFETY PAYS

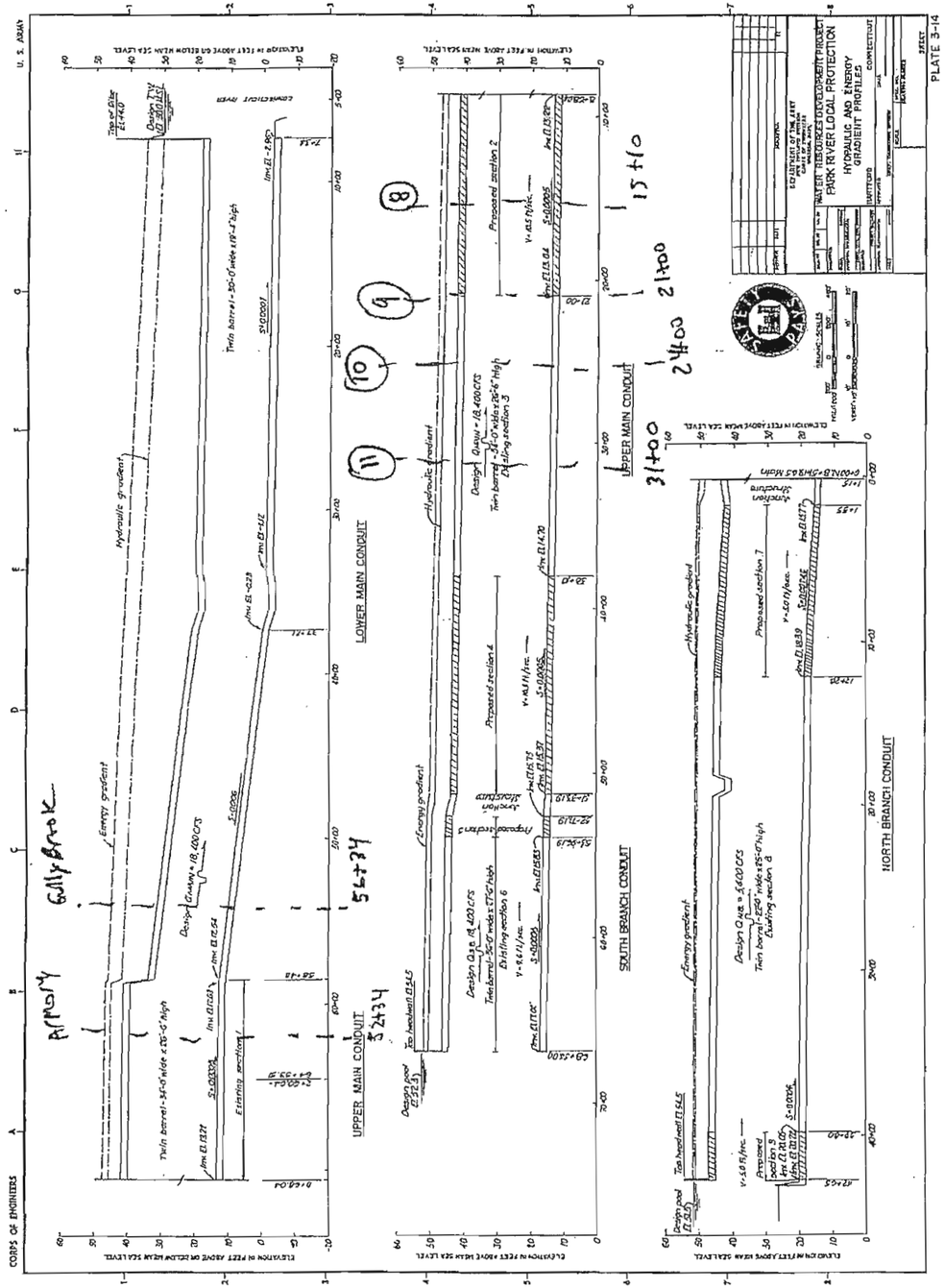
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS

WATER RESOURCES DEVELOPMENT PROJECT
PARK RIVER LOCAL PROTECTION
DETAILS - JUNCTION STRUCTURE
AND AUXILIARY CONDUIT ENTRANCE
HARTFORD — CONNECTICUT

SHEET

PLATE 3-17

0.45" = 1.0'



USGS Site Map for USGS 01190070 CONNECTICUT RIVER AT HARTFORD, CT. Page 1 of 2

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USGS Water Resources

Data Category: Site Information

Geographic Area: Connecticut GO

News: Recent changes

Site Map for Connecticut

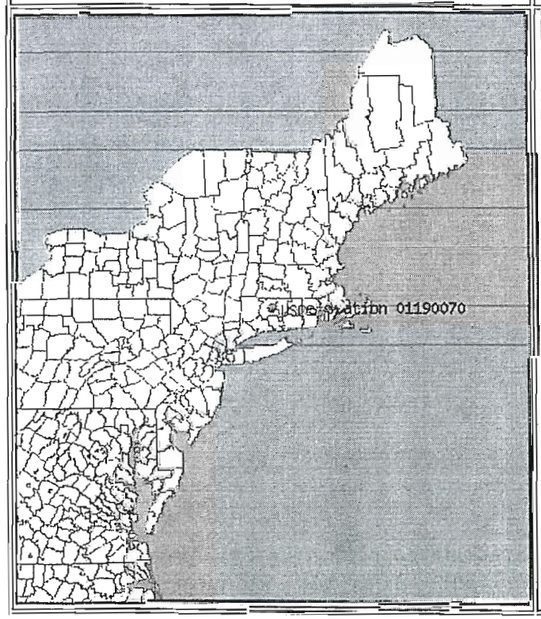
All times are reported in EST. We are having problems displaying data at some of our sites because of a major software upgrade. We are working on the problem and hope to have the data available soon.

USGS 01190070 CONNECTICUT RIVER AT HARTFORD, CT.

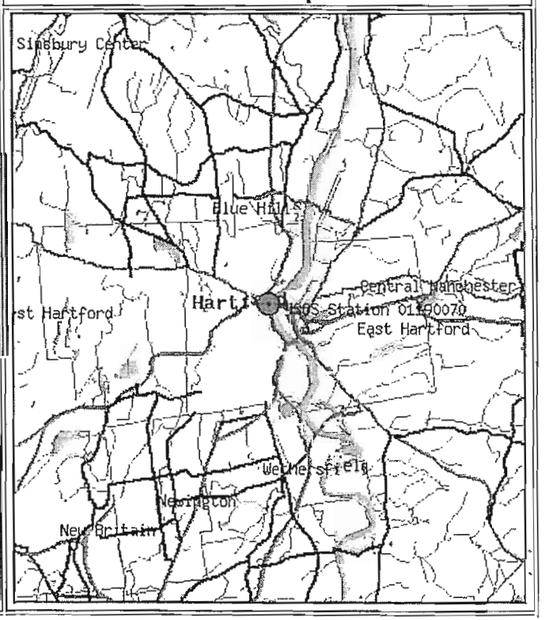
Available data for this site Site map GO

Hartford County, Connecticut
Hydrologic Unit Code 01080205
Latitude 41°46'10", Longitude 72°40'04" NAD27
Drainage area 10,487.00 square miles
Gage datum 00.00 feet above sea level NGVD29

Location of the site in Connecticut.



Site map.



[redacted]


```
#
# U.S. Geological Survey
# National Water Information System
# Retrieved: 2008-11-07 14:37:02 EST
#
# --------------------WARNING--------------------
# The data you have obtained from this automated
# U.S. Geological Survey database have not received
# Director's approval and as such are provisional
# and subject to revision.  The data are released
# on the condition that neither the USGS nor the
# United States Government may be held liable for
# any damages resulting from its use.
#
# More data may be available offline.
# For more information on these data,  contact  NWISWeb Data Inquiries.
# This file contains the annual peak streamflow data.
#
# This information includes the following fields:
#
#  agency_cd      Agency Code
#  site_no        USGS station number
#  peak_dt        format YYYY-MM-DD
#  peak_va        Annual peak streamflow value in cfs
#  peak_cd        Peak Discharge-Qualification codes (see explanation below)
#  gage_ht        Gage height for the associated peak streamflow in feet
#  gage_ht_cd     Gage height qualification codes
#  year_last_pk   Peak streamflow reported is the highest since this year
#  ag_dt          Date of maximum gage-height for water year (if not concurrent with peak)
#  ag_tm          Time of maximum gage-height for water year (if not concurrent with peak
#  ag_gage_ht     maximum Gage height for water year in feet (if not concurrent with peak
#  ag_gage_ht_cd maximum Gage height code
#
# Sites in this file include:
#  USGS 01190070 CONNECTICUT RIVER AT HARTFORD, CT.
#
# Peak Streamflow-Qualification Codes(peak_cd):
#   1 ... Discharge is a Maximum Daily Average
#   2 ... Discharge is an Estimate
#   3 ... Discharge affected by Dam Failure
#   4 ... Discharge less than indicated value,
#           which is Minimum Recordable Discharge at this site
#   5 ... Discharge affected to unknown degree by
#           Regulation or Diversion
#   6 ... Discharge affected by Regulation or Diversion
#   7 ... Discharge is an Historic Peak
#   8 ... Discharge actually greater than indicated value
#   9 ... Discharge due to Snowmelt, Hurricane,
#           Ice-Jam or Debris Dam breakup
#   A ... Year of occurrence is unknown or not exact
#   B ... Month or Day of occurrence is unknown or not exact
#   C ... All or part of the record affected by Urbanization,
#            Mining, Agricultural changes, Channelization, or other
#   D ... Base Discharge changed during this year
#   E ... Only Annual Maximum Peak available for this year
#
# Gage height qualification codes(gage_ht_cd,ag_gage_ht_cd):
#   1 ... Gage height affected by backwater
#   2 ... Gage height not the maximum for the year
#   3 ... Gage height at different site and(or) datum
#   4 ... Gage height below minimum recordable elevation
#   5 ... Gage height is an estimate
#   6 ... Gage datum changed during this year
#
#
agency_cd	site_no	peak_dt	peak_tm	peak_va	peak_cd	gage_ht	gage_ht_cd	year_last_pk	ag_dt	ag_tm	ag_gage_ht	ag_gage_ht_cd	modify_dt	peak_md
5s	15s	10d	6s	8s	27s	8s	13s	4s	10d	6s	8s	11s	19d	19n
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USGS	01190070	1866-02-26	96000	20.30	2008-07-20 22:18:38	2008-07-20 22:18:38
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USGS	01190070	1872-04-13	98000	20.50	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1873-04-13	99000	20.70	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1874-01-09	123000	23.40	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1875-04-06	81000	18.20	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1876-04-16	106000	21.50	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1877-03-29	113000	22.40	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1878-04-30	79000	18.00	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1879-05-01	102000	21.00	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1880-04-07	60000	14.90	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1881-04-26	66000	16.00	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1882-05-03	57000	14.30	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1883-04-15	95000	20.00	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1884-03-28	103000	21.10	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1885-04-24	76000	17.50	2008-07-20 22:18:38	2008-07-20 22:18:38
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USGS	01190070	1887-04-13	111000	22.00	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1888-04-08	85000	18.90	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1889-04-21	42000	11.30	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1889-11-30	62000	15.10	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1891-04-17	88000	19.30	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1892-01-16	78000	17.80	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1893-05-06	124000	23.50	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1894-04-25	51000	13.30	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1895-04-16	142000	25.20	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1896-03-03	144000	26.00	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1897-07-16	96000	20.30	2008-07-20 22:18:38	2008-07-20 22:18:38
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USGS	01190070	1899-04-27	106000	21.50	2008-07-20 22:18:38	2008-07-20 22:18:38
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USGS	01190070	1901-04-09	148000	25.90	2008-07-20 22:18:38	2008-07-20 22:18:38
USGS	01190070	1902-03-04	139000	25.00	2008-07-20 22:18:38	2008-07-20 22:18:38

USGS	01190070	1903-03-25	117000		22.80				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1904-04-30	101000		20.90				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1905-04-02	123000		23.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1906-04-18	91000		19.60				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1906-11-09	94000		19.80				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1908-02-18	78000		18.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1909-04-17	131000		24.20				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1910-01-23	93000		19.70				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1910-10-20	63000		15.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1912-04-10	100000		20.70				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1913-03-29	144000		25.80				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1914-04-23	105000		21.40				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1915-02-27	95000		20.10				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1916-04-03	88000		20.30				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1917-03-30	78000		17.80				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1918-04-04	82000		18.30				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1919-03-30	89000		19.30				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1920-03-30	110000		22.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1921-03-12	90000		19.40				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1922-04-14	129000		24.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1923-04-08	107000		21.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1924-04-08	95000		20.20				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1925-03-31	94000		20.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1926-04-27	96000		20.30				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1927-03-20	78000		18.30				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1927-11-07	180000		28.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1929-03-25	82000		18.40				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1930-04-10	53000		13.70				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1931-04-13	76000		17.40				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1932-04-14	94000		20.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1933-04-24	145000		25.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1934-04-14	115000		22.60				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1935-01-12	95000		20.20				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1936-03-21	313000		37.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1937-04-18	61000		15.20				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1938-09-22	251000				1938-09-23	34.50	2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1939-04-25	98000		20.70				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1940-05-07	116000		22.90				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1941-04-17	47000		12.40				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1942-04-10	70000	6	16.60				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1943-04-30	75000	6	17.30				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1944-04-26	76000	6	17.80				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1945-03-24	89000	6	19.40				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1946-03-11	72000	6	17.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1947-04-14	89000	6	19.40				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1948-03-24	125000	6	24.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1949-01-02	133000	6	24.70				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1950-04-07	83000	6	18.40				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1951-04-02	106000	6	21.60				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1952-06-04	105000	6	21.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1953-03-29	132000	6	24.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1954-04-20	82000	6	18.30				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1955-08-19	198000	6			1955-08-20	30.00	2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1955-10-16	110000	6			1955-10-17	21.90	2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1957-01-25	38000	6	10.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1958-04-25	105000	6	21.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1959-04-06	95000	6	20.10				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1960-04-07	157000	6	27.10				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1961-04-26	73000	6	17.10				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1962-04-03	94000	6	20.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1963-04-05	85000	6	18.80				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1964-04-17	80000	6	18.00				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1965-04-18	36000	6	10.10				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1966-03-28	57000	6	13.30				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1967-04-05	79000	6	17.90				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1968-03-25	97000	6	20.50				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	1969-04-24	114000	6	22.60				2008-07-20 22:18:38	2008-07-20 22:18:38	

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USGS	01190070	1998-04-02	102000	6	21.06	6			2008-07-20 22:18:38	2008-07-20 22:18:38	
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USGS	01190070	2002-04-17	69800	6	15.79				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	2003-04-01	92000	6	19.14				2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	2003-10-31	98100	5	19.9	5			2008-07-20 22:18:38	2008-07-20 22:18:38	
USGS	01190070	2005-04-05	113000	5	22.0	4			2008-07-20 22:18:38	2008-07-20 22:18:38	

Date vs. Stage
CT River Gage at Hartford

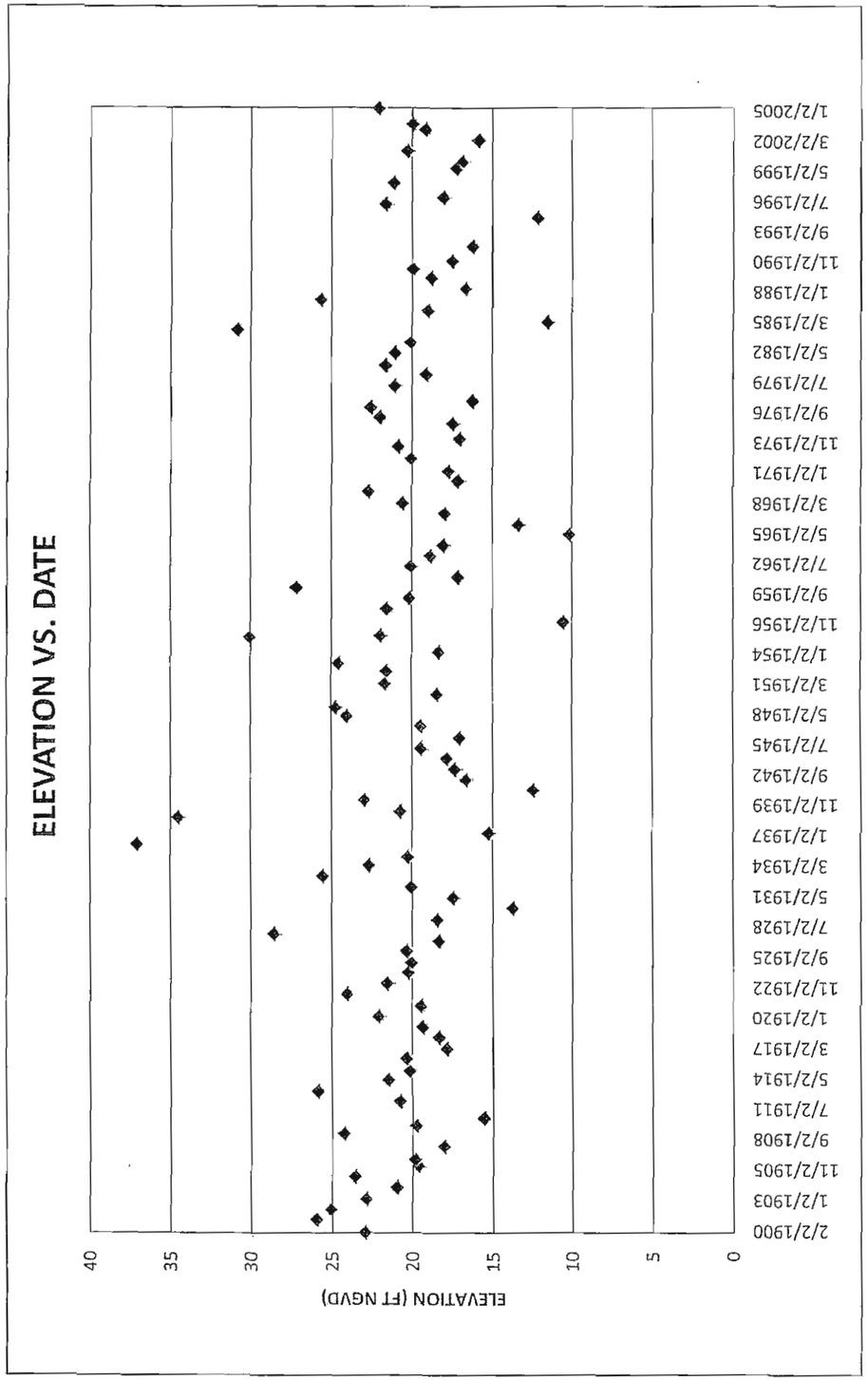
Year	Elevation (NGVD 29)
2/16/1900	22.9
4/9/1901	25.9
3/4/1902	25
3/25/1903	22.8
4/30/1904	20.9
4/2/1905	23.5
4/18/1906	19.6
11/9/1906	19.8
2/18/1908	18
4/17/1909	24.2
1/23/1910	19.7
10/20/1910	15.5
4/10/1912	20.7
3/29/1913	25.8
4/23/1914	21.4
2/27/1915	20.1
4/3/1916	20.3
3/30/1917	17.8
4/4/1918	18.3
3/30/1919	19.3
3/30/1920	22
3/12/1921	19.4
4/14/1922	24
4/8/1923	21.5
4/8/1924	20.2
3/31/1925	20
4/27/1926	20.3
3/20/1927	18.3
11/7/1927	28.5
3/25/1929	18.4
4/10/1930	13.7
4/13/1931	17.4
4/14/1932	20
4/24/1933	25.5
4/14/1934	22.6
1/12/1935	20.2
3/21/1936	37
4/18/1937	15.2
9/22/1938	34.5
4/25/1939	20.7
5/7/1940	22.9
4/17/1941	12.4
4/10/1942	16.6
4/30/1943	17.3
4/26/1944	17.8
3/24/1945	19.4

Date vs. Stage
CT River Gage at Hartford

3/11/1946	17
4/14/1947	19.4
3/24/1948	24
1/2/1949	24.7
4/7/1950	18.4
4/2/1951	21.6
6/4/1952	21.5
3/29/1953	24.5
4/20/1954	18.3
8/19/1955	30
10/16/1955	21.9
1/25/1957	10.5
4/25/1958	21.5
4/6/1959	20.1
4/7/1960	27.1
4/26/1961	17.1
4/3/1962	20
4/5/1963	18.8
4/17/1964	18
4/18/1965	10.1
3/28/1966	13.3
4/5/1967	17.9
3/25/1968	20.5
4/24/1969	22.6
4/20/1970	17.1
3/7/1971	17.7
5/7/1972	20
7/3/1973	20.8
4/7/1974	17
9/28/1975	17.44
4/4/1976	21.92
3/16/1977	22.49
10/20/1977	16.17
3/8/1979	21.02
4/12/1980	19.06
2/27/1981	21.56
4/22/1982	20.99
4/27/1983	20
6/1/1984	30.74
3/14/1985	11.45
4/2/1986	18.96
4/8/1987	25.6
5/1/1988	16.61
5/8/1989	18.76
3/22/1990	19.88
12/26/1990	17.45
4/27/1992	16.15

Date vs. Stage
CT River Gage at Hartford

1/19/1995	12.07
4/18/1996	21.56
12/4/1996	17.99
4/2/1998	21.06
9/18/1999	17.16
4/6/2000	16.79
4/29/2001	20.2
4/17/2002	15.79
4/1/2003	19.14
10/31/2003	19.9
4/5/2005	22
Average	20.18
Maximum	37.00
Minumum	10.10



USGS science for a changing world

National Water Information System: Web Interface

USGS Water Resources | Data Category: Surface Water | Geographic Area: Connecticut | GO

News: Recent changes

Peak Streamflow for Connecticut

All times are reported in EST. We are having problems displaying data at some of our sites because of a major software upgrade. We are working on the problem and hope to have the data available soon.

USGS 01190070 CONNECTICUT RIVER AT HARTFORD, CT.

Available data for this site | Surface-water: Peak streamflow | GO

Hartford County, Connecticut
Hydrologic Unit Code 01080205
Latitude 41°46'10", Longitude 72° 40'04" NAD27
Drainage area 10,487.00 square miles
Gage datum 00.00 feet above sea level NGVD29

Output formats

Table
Graph
Tab-separated file
peakfq (watstore) format
Reselect output format

Water Year	Date	Gage Height (feet)	Stream-flow (cfs)
1683	Jul. 1683	25.50	145,000
1692	Mar. 1692	25.70	146,000
1801	Mar. 20, 1801	27.00	160,000
1828	Feb. 11, 1828	22.30	112,000
1838	Jan. 28, 1838	22.50	115,000
1839	Jan. 29, 1839	23.70	126,000
1841	Jan. 09, 1841	25.80	147,000
1843	Mar. 29, 1843	26.70	157,000
1844	Dec. 25, 1843	19.00	86,000
1845	Feb. 25, 1845	18.50	83,000
1846	Mar. 16, 1846	18.30	82,000
1847	Apr. 25, 1847	20.70	100,000
1848	Jan. 17, 1848	15.50	63,000
1849	Nov. 11, 1848	17.00	73,000
1850	May 06, 1850	21.50	106,000
1851	Jan. 01, 1851	14.00	54,000
1852	Apr. 24, 1852	22.60	116,000
1853	May 29, 1853	15.50	63,000
1854	May 01, 1854	29.30	185,000
1855	Apr. 22, 1855	21.00	102,000
1856	Aug. 22, 1856	22.80	117,000
1857	Feb. 21, 1857	19.00	86,000
1858	Oct. 28, 1857	17.70	77,000
1859	Mar. 20, 1859	25.90	148,000
1860	Mar. 03, 1860	15.50	63,000
1861	Apr. 17, 1861	21.00	102,000
1862	Apr. 21, 1862	28.20	173,000
1863	Apr. 20, 1863	21.70	108,000
1864	Apr. 29, 1864	16.70	71,000
1865	Mar. 20, 1865	24.30	132,000
1866	Feb. 26, 1866	20.30	96,000
1867	Apr. 18, 1867	19.50	90,000
1868	Mar. 19, 1868	21.00	102,000
1869	Apr. 23, 1869	26.20	152,000
1870	Oct. 06, 1869	25.80	148,000
1871	May 07, 1871	18.20	81,000
1872	Apr. 13, 1872	20.50	98,000
1873	Apr. 13, 1873	20.70	99,000
1874	Jan. 09, 1874	23.40	123,000
1875	Apr. 06, 1875	18.20	81,000
1876	Apr. 16, 1876	21.50	106,000
1877	Mar. 29, 1877	22.40	113,000
1878	Apr. 30, 1878	18.00	79,000
1879	May 01, 1879	21.00	102,000
1880	Apr. 07, 1880	14.90	60,000
1881	Apr. 26, 1881	16.00	66,000
1882	May 03, 1882	14.30	57,000
1920	Mar. 30, 1920	22.00	110,000
1921	Mar. 12, 1921	19.40	90,000
1922	Apr. 14, 1922	24.00	129,000
1923	Apr. 08, 1923	21.50	107,000
1924	Apr. 08, 1924	20.20	95,000
1925	Mar. 31, 1925	20.00	94,000
1926	Apr. 27, 1926	20.30	96,000
1927	Mar. 20, 1927	18.30	78,000
1928	Nov. 07, 1927	28.50	180,000
1929	Mar. 25, 1929	18.40	82,000
1930	Apr. 10, 1930	13.70	53,000
1931	Apr. 13, 1931	17.40	76,000
1932	Apr. 14, 1932	20.00	94,000
1933	Apr. 24, 1933	25.50	145,000
1934	Apr. 14, 1934	22.60	115,000
1935	Jan. 12, 1935	20.20	95,000
1936	Mar. 21, 1936	37.00	313,000
1937	Apr. 18, 1937	15.20	61,000
1938	Sep. 22, 1938		251,000
1939	Apr. 25, 1939	20.70	98,000
1940	May 07, 1940	22.90	116,000
1941	Apr. 17, 1941	12.40	47,000
1942	Apr. 10, 1942	16.60	70,000[6]
1943	Apr. 30, 1943	17.30	75,000[6]
1944	Apr. 26, 1944	17.80	76,000[6]
1945	Mar. 24, 1945	19.40	89,000[6]
1946	Mar. 11, 1946	17.00	72,000[6]
1947	Apr. 14, 1947	19.40	89,000[6]
1948	Mar. 24, 1948	24.00	125,000[6]
1949	Jan. 02, 1949	24.70	133,000[6]
1950	Apr. 07, 1950	18.40	83,000[6]
1951	Apr. 02, 1951	21.60	106,000[6]
1952	Jun. 04, 1952	21.50	105,000[6]
1953	Mar. 29, 1953	24.50	132,000[6]
1954	Apr. 20, 1954	18.30	82,000[6]
1955	Aug. 19, 1955		198,000[6]
1956	Oct. 16, 1955		110,000[6]
1957	Jan. 25, 1957	10.50	38,000[6]
1958	Apr. 25, 1958	21.50	105,000[6]
1959	Apr. 06, 1959	20.10	95,000[6]
1960	Apr. 07, 1960	27.10	157,000[6]
1961	Apr. 26, 1961	17.10	73,000[6]
1962	Apr. 03, 1962	20.00	94,000[6]

1883	Apr. 15, 1883	20.00	95,000
1884	Mar. 28, 1884	21.10	103,000
1885	Apr. 24, 1885	17.50	76,000
1886	May 04, 1886	21.30	105,000
1887	Apr. 13, 1887	22.00	111,000
1888	Apr. 08, 1888	18.90	85,000
1889	Apr. 21, 1889	11.30	42,000
1890	Nov. 30, 1889	15.10	62,000
1891	Apr. 17, 1891	19.30	88,000
1892	Jan. 16, 1892	17.80	78,000
1893	May 06, 1893	23.50	124,000
1894	Apr. 25, 1894	13.30	51,000
1895	Apr. 16, 1895	25.20	142,000
1896	Mar. 03, 1896	26.00	144,000
1897	Jul. 16, 1897	20.30	96,000
1898	Mar. 22, 1898	20.70	100,000
1899	Apr. 27, 1899	21.50	106,000
1900	Feb. 16, 1900	22.90	118,000
1901	Apr. 09, 1901	25.90	148,000
1902	Mar. 04, 1902	25.00	139,000
1903	Mar. 25, 1903	22.80	117,000
1904	Apr. 30, 1904	20.90	101,000
1905	Apr. 02, 1905	23.50	123,000
1906	Apr. 18, 1906	19.60	91,000
1907	Nov. 09, 1906	19.80	94,000
1908	Feb. 18, 1908	18.00	78,000
1909	Apr. 17, 1909	24.20	131,000
1910	Jan. 23, 1910	19.70	93,000
1911	Oct. 20, 1910	15.50	63,000
1912	Apr. 10, 1912	20.70	100,000
1913	Mar. 29, 1913	25.80	144,000
1914	Apr. 23, 1914	21.40	105,000
1915	Feb. 27, 1915	20.10	95,000
1916	Apr. 03, 1916	20.30	88,000
1917	Mar. 30, 1917	17.80	78,000
1918	Apr. 04, 1918	18.30	82,000
1919	Mar. 30, 1919	19.30	89,000
1963	Apr. 05, 1963	18.80	85,000[6]
1964	Apr. 17, 1964	18.00	80,000[6]
1965	Apr. 18, 1965	10.10	36,000[6]
1966	Mar. 28, 1966	13.30	57,000[6]
1967	Apr. 05, 1967	17.90	79,000[6]
1968	Mar. 25, 1968	20.50	97,000[6]
1969	Apr. 24, 1969	22.60	114,000[6]
1970	Apr. 20, 1970	17.10	73,000[6]
1971	Mar. 07, 1971	17.70	75,000[6]
1972	May 07, 1972	20.00	92,000[6]
1973	Jul. 03, 1973	20.80	99,000[6]
1974	Apr. 07, 1974	17.00	73,000[6]
1975	Sep. 28, 1975	17.44	76,000[6]
1976	Apr. 04, 1976	21.92	109,000[6]
1977	Mar. 16, 1977	22.49	113,000[6]
1978	Oct. 20, 1977	16.17	68,000[6]
1979	Mar. 08, 1979	21.02	101,000[6]
1980	Apr. 12, 1980	19.06	87,000[6]
1981	Feb. 27, 1981	21.56	105,000[6]
1982	Apr. 22, 1982	20.99	101,000[6]
1983	Apr. 27, 1983	20.00[5]	94,000[2,6]
1984	Jun. 01, 1984		192,000[6]
1985	Mar. 14, 1985	11.45	40,000[6]
1986	Apr. 02, 1986	18.96	83,000[6]
1987	Apr. 08, 1987	25.60	139,000[6]
1988	May 01, 1988	16.61	71,000[6]
1989	May 08, 1989	18.76[6]	85,200[6]
1990	Mar. 22, 1990	19.88	93,200[6]
1991	Dec. 26, 1990	17.45	72,800[6]
1992	Apr. 27, 1992	16.15	68,200[6]
1995	Jan. 19, 1995	12.07	45,500[5]
1996	Apr. 18, 1996	21.56	106,000[5]

1997	Dec. 04, 1996	17.99	79,900[6]
1998	Apr. 02, 1998	21.06[6]	102,000[6]
1999	Sep. 18, 1999	17.16[6]	74,500[6]
2000	Apr. 06, 2000	16.79	72,100[6]
2001	Apr. 29, 2001	20.2	100,000[6]
2002	Apr. 17, 2002	15.79	69,800[6]
2003	Apr. 01, 2003	19.14	92,000[6]
2004	Oct. 31, 2003	19.9[5]	98,100[5]
2005	Apr. 05, 2005	22.0[4]	113,000[5]

Peak Gage-Height Qualification Codes.

- 4 -- Gage height below minimum recordable elevation
- 5 -- Gage height is an estimate
- 6 -- Gage datum changed during this year

Peak Streamflow Qualification Codes.

- 2 -- Discharge is an Estimate
- 5 -- Discharge affected to unknown degree by Regulation or Diversion
- 6 -- Discharge affected by Regulation or Diversion

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		(feet)	(cfs)
1936	Mar. 12, 1936	11.20	2,800
1937	Dec. 20, 1936	6.25	900
1938	Jan. 25, 1938	11.81	3,000
1939	Dec. 06, 1938	7.20[2]	1,100
1940	May 31, 1940	8.17[2]	1,460
1941	Feb. 08, 1941	8.98[1]	950
1942	Mar. 09, 1942	6.03[2]	850
1943	Dec. 30, 1942	8.14	1,380
1944	Apr. 25, 1944	4.74	560
1945	Apr. 26, 1945	8.16	1,500
1946	Dec. 07, 1945	5.82[2]	755
1947	Apr. 05, 1947	4.65	545
1948	Nov. 12, 1947	7.33	1,160
1949	Dec. 31, 1948	6.89	1,010
1950	Mar. 09, 1950	7.58[1]	900
1951	Mar. 31, 1951	8.80	1,760
1952	Mar. 11, 1952	7.55	1,260
1953	Jan. 24, 1953	8.50	1,640
1954	Sep. 11, 1954	6.14	872
1955	Aug. 19, 1955	18.80	10,000
1956	Oct. 16, 1955	12.40	3,680
1957	Apr. 06, 1957	5.10[2]	660
1958	Apr. 06, 1958	5.85	815
1959	Mar. 06, 1959	7.67	1,320
1960	Sep. 12, 1960	9.20	1,880
1961	Feb. 26, 1961	7.20	1,110
1962	Mar. 13, 1962	8.55	1,640
1963	Mar. 06, 1963	4.38[2]	520[2,6]
1964	Jan. 26, 1964	5.66[2]	766[2,6]
1965	Feb. 25, 1965	8.87[1]	890[6]
1966	Feb. 13, 1966	6.32	894[6]
1967	Apr. 18, 1967	4.85	610[6]
1968	Dec. 12, 1967	6.94	1,060[6]
1969	Mar. 25, 1969	7.60	1,220[6]
1970	Feb. 03, 1970	8.84	1,740[6]
1971	Feb. 27, 1971	4.99	484[6]
1972	Mar. 03, 1972	8.88	1,750[6]
1973	Feb. 03, 1973	7.95	1,380[6]
1974	Dec. 21, 1973	8.98	1,790[6]
1975	Sep. 27, 1975	10.37	2,460[6]
1976	Jan. 28, 1976	8.72	1,690[6]
1977	Feb. 25, 1977	7.16	1,010[6]
1978	Jan. 26, 1978	8.27	1,510[6]
1979	Jan. 25, 1979	8.64	1,660[6]
1980	Oct. 03, 1979	8.89	1,760[6]
1981	Feb. 24, 1981	8.64	1,660[6,C]
1982	Jun. 06, 1982	11.86	3,270[6,C]
1983	Apr. 11, 1983	8.40	1,600[6,C]
1984	May 31, 1984	8.35	1,530[6,C]
1985	Mar. 12, 1985	3.88	330[6,C]
1986	Jan. 26, 1986	7.15	1,080[6,C]
1995	Mar. 09, 1995	6.0	711[6]
1996	Apr. 16, 1996	9.0[4]	1,810[6]

Peak Gage-Height Qualification Codes.

- 1 -- Gage height affected by backwater
- 2 -- Gage height not the maximum for the year
- 4 -- Gage height below minimum recordable elevation

Peak Streamflow Qualification Codes.

- 2 -- Discharge is an Estimate
- 6 -- Discharge affected by Regulation or Diversion
- C -- All or part of the record affected by Urbanization, Mining, Agricultural changes, Channelization, or other

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1.31 1.3 nadww01

WATER RESOURCES DEVELOPMENT PROJECT

PARK RIVER
LOCAL PROTECTION

CONNECTICUT RIVER BASIN

HARTFORD, CONNECTICUT

DESIGN MEMORANDUM NO.1

HYDROLOGY

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JANUARY 1973

WATER RESOURCES DEVELOPMENT PROJECT
PARK RIVER LOCAL PROTECTION
CONNECTICUT RIVER BASIN
HARTFORD, CONNECTICUT

PERTINENT DATA

1.	PROJECT PURPOSE:	Flood Control
2.	PROJECT LOCATION:	
	State	Connecticut
	County	Hartford
	City	Hartford
	River	Park River
	Basin	Connecticut River Basin
3.	CLIMATE:	
	Mean Temperature	50.0° F.
	Mean Rainfall (inches)	42.38
	Mean Snowfall (inches)	43.8
4.	DRAINAGE AREAS:	
	Park River	78.3
	North Branch	27.7
	South Branch	47.0
5.	FLOOD OF RECORD:	
	Park River (cfs)	14,000 (Aug 1955)
	North Branch (cfs)	10,000 (Aug 1955)
	South Branch (cfs)	5,000 (Aug 1955)
6.	RECORD STORM RAINFALL:	
	August 1955 (inches)	9.47
7.	DESIGN STORM RAINFALL:	18.3 inches in 48 hours

8. DESIGN DISCHARGES:

Park River (cfs)	23,800
North Branch (cfs)	9,400
South Branch (cfs)	19,100

9. INTERIOR DRAINAGE:

High Level Area (acres)	1,209
Low Level Area (acres)	171
Pumping Stations:	
Number 1:	
Name	Riverside
Drainage Area (acres)	171
Capacity (cfs)	180

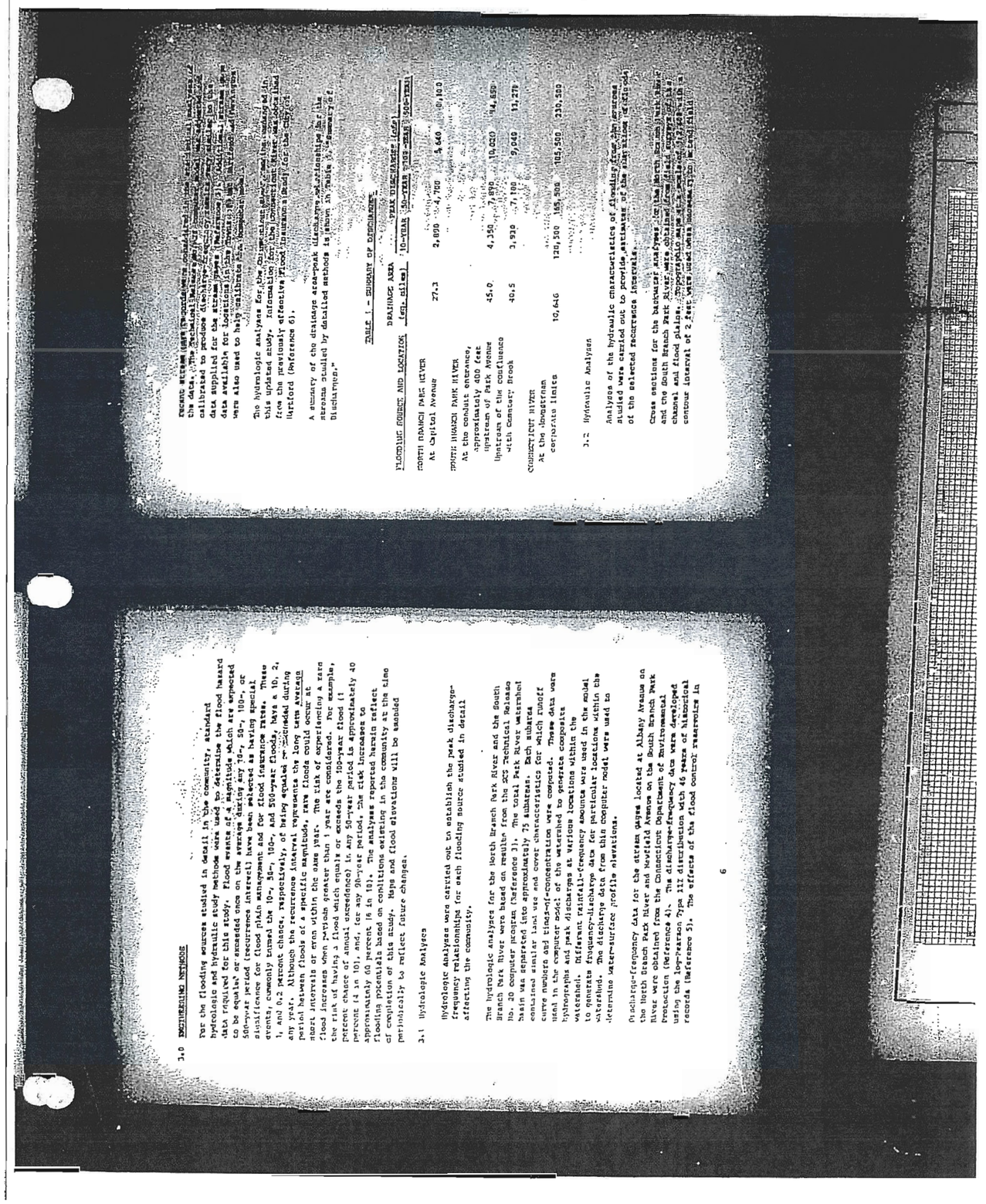


TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
NORTH BRANCH PARK RIVER					
At Capitol Avenue	27.3	2,800	4,700	4,640	9,400
SOUTH BRANCH PARK RIVER					
At the conduit entrance, approximately 400 feet upstream of Park Avenue	45.0	4,350	7,800	10,020	14,500
Upstream of the confluence with Cemetery Brook	40.5	3,930	7,100	9,040	11,270
CONNECTICUT RIVER					
At the downstream corporate limits	10,646	120,500	165,500	185,500	230,500

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of the selected recurrence intervals.

Cross sections for the backwater analyses of the North Branch Park River and the South Branch Park River were taken from field surveys and from the U.S. Geological Survey (USGS) 7.5 minute quadrangle maps (Reference 3). In addition, bridge openings and channel and flood plain geometry were surveyed in the field. The USGS quadrangle maps have a contour interval of 2 feet, with supplementary spot elevations in certain areas.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedance) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be updated periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

The hydrologic analyses for the North Branch Park River and the South Branch Park River were based on results from the 1973 Technical Release No. 20 computer program (Reference 3). The total Park River watershed basin was separated into approximately 75 subareas. Each subarea contained similar land use and cover characteristics for which runoff curve numbers and times-of-concentration were computed. These data were used in the computer model of the watershed to generate composite hydrographs and peak discharges at various locations within the watershed. Different rainfall-frequency amounts were used in the model to generate frequency-discharge data for particular locations within the watershed. The discharge data from this computer model were used to determine water-surface profile elevations.

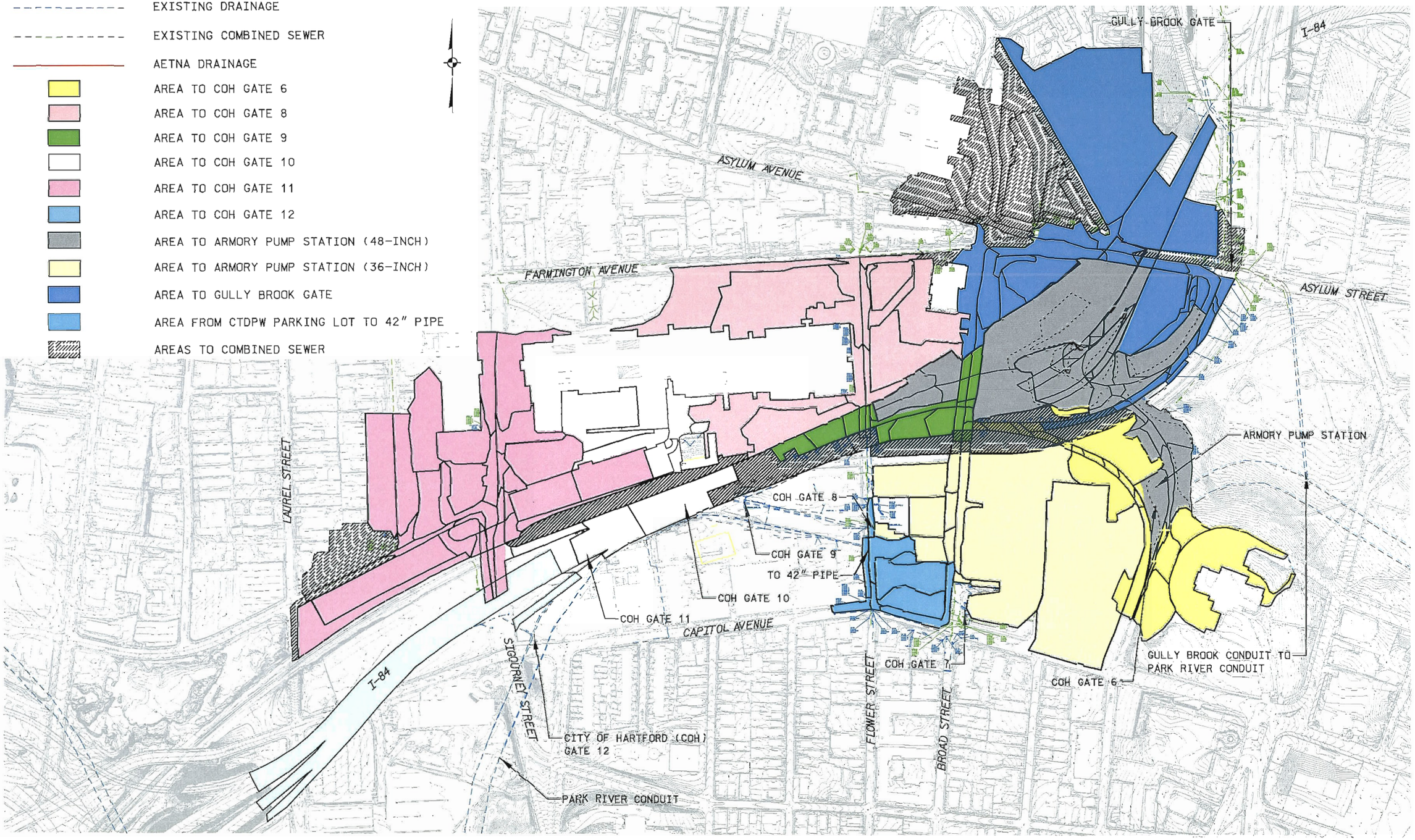
Discharge-frequency data for the stream gages located at Albany Avenue on the North Branch Park River and Mayfield Avenue on the South Branch Park River were obtained from the Connecticut Department of Environmental Protection (Reference 4). The discharge-frequency data were developed using the log-Pearson Type III distribution with 46 years of historical records (Reference 5). The effects of the flood control reservoirs in

APPENDIX C-1

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

LEGEND

- EXISTING DRAINAGE
- EXISTING COMBINED SEWER
- AETNA DRAINAGE
- AREA TO COH GATE 6
- AREA TO COH GATE 8
- AREA TO COH GATE 9
- AREA TO COH GATE 10
- AREA TO COH GATE 11
- AREA TO COH GATE 12
- AREA TO ARMORY PUMP STATION (48-INCH)
- AREA TO ARMORY PUMP STATION (36-INCH)
- AREA TO GULLY BROOK GATE
- AREA FROM CTDPW PARKING LOT TO 42" PIPE
- AREAS TO COMBINED SEWER



STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

DESIGNER: H. W. LOCHNER, INC., ROCKY HILL, CT

CADD K:\063H137_CTDOT\Hydro\Drainage_Area_Maps\HW_MST_MDL_063_H137_Drainage_areas.dgn | PLOTTED 6/7/2010

PROJECT TITLE
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD

PROJECT NO.: 63-H137

DRAWING TITLE:
EXISTING
DRAINAGE AREA MAP

FIGURE NO.

APPENDIX C-2

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

LEGEND

EXISTING DRAINAGE

EXISTING COMBINED SEWER

AREA TO COH GATE 6

AREA TO COH GATE 8

AREA TO COH GATE 9

AREA TO COH GATE 10

AREA TO COH GATE 11

AREA TO COH GATE 12

AREA TO ARMORY PUMP STATION (48-INCH)

AREA TO ARMORY PUMP STATION (36-INCH)

AREA TO GULLY BROOK GATE

GULLY BROOK GATE

I-84

ASYLUM AVENUE

FARMINGTON AVENUE

ASYLUM STREET

HIGH POINT

HIGH POINT

HIGH POINT

HIGH POINT

ARMORY PUMP STATION

COH GATE 8

COH GATE 9

COH GATE 10

COH GATE 11

COH GATE 7

COH GATE 6

GULLY BROOK CONDUIT TO PARK RIVER CONDUIT

CAPITOL AVENUE

LAUREL STREET

HIGH POINT

I-84

SIGOURNEY STREET

CITY OF HARTFORD (COH) GATE 12

PARK RIVER CONDUIT

FLOWER STREET

BROAD STREET

SCALE

0 100 200 300 400

SCALE 1" = 400'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

DESIGNER: H. W. LOCHNER, INC., ROCKY HILL, CT

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PROJECT TITLE

NEW BRITAIN – HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD

DRAWING TITLE

PROPOSED
DRAINAGE AREA MAP

PROJECT NO.: 63-H137

FIGURE NO. ---

APPENDIX C-3

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

SCALE
0 100 200 300 400
SCALE 1" = 400'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

DESIGNER H.W. LOCHNER INC., ROCKY HILL, CT

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HARTFORD NORTH

TOWN: HARTFORD

PROJECT NO.: 63-H137

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PROPOSED
INLET AREA KEY MAP

FIGURE NO.

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SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

APPROVED BY DATE:

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HARTFORD NORTH

TOWN: HARTFORD

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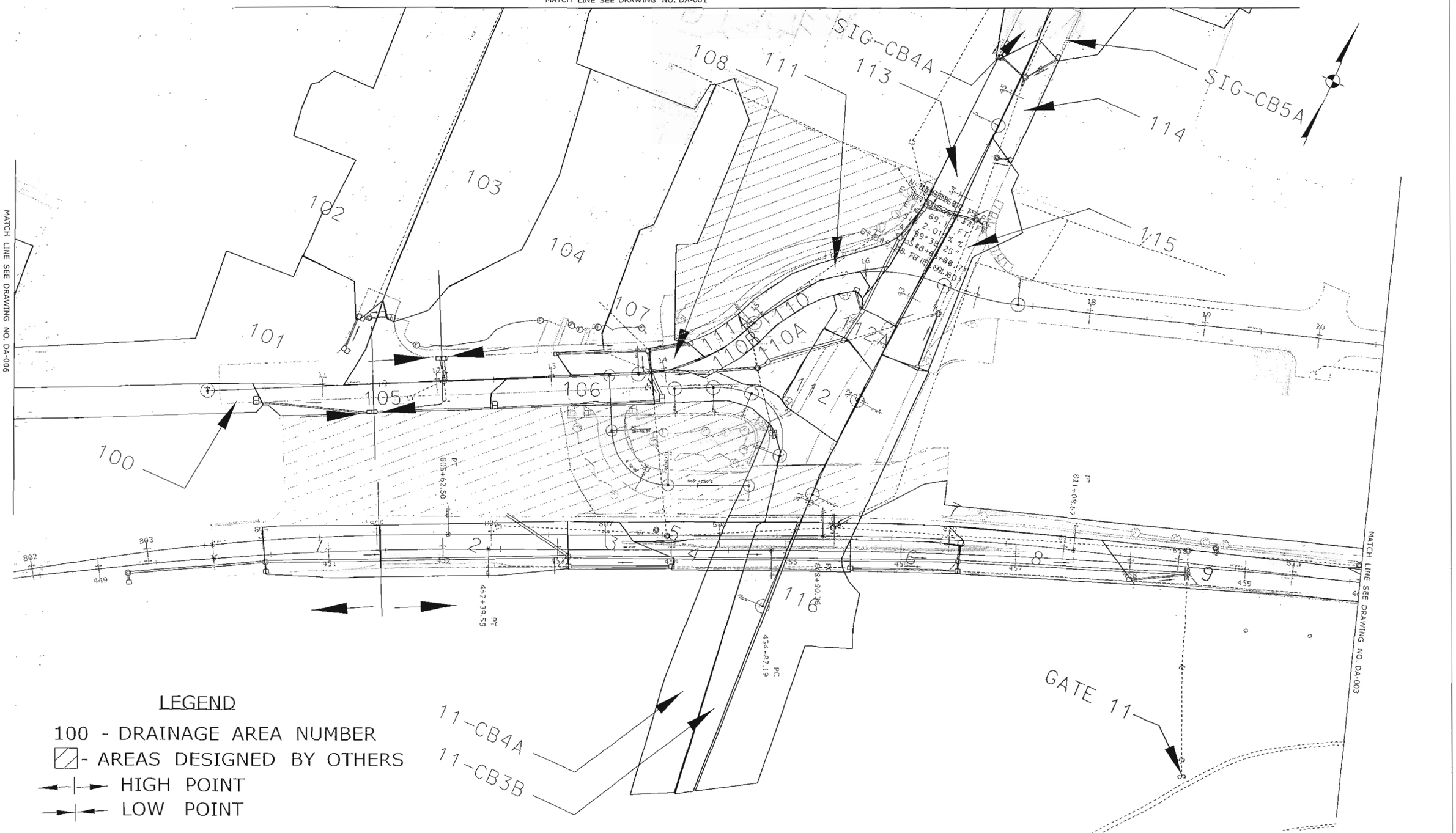
MATCH LINE SEE DRAWING NO. DA-006

MATCH LINE SEE DRAWING NO. DA-003



LEGEND

100 - DRAINAGE AREA NUMBER

- AREAS DESIGNED BY OTHERS

HIGH POINT

LOW POINT

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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CHECKED BY: R. GRAY

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SCALE 1"=40'

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DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_063_H137_DA-002.dgn

SIGNATURE/BLOCK:

LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

APPROVED BY: DATE:

PROJECT TITLE.
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN
HARTFORD

DRAWING TITLE
INLET AREA PLAN

PROJECT NO.
63-H137

DRAWING NO.

SHEET NO.
DA-002

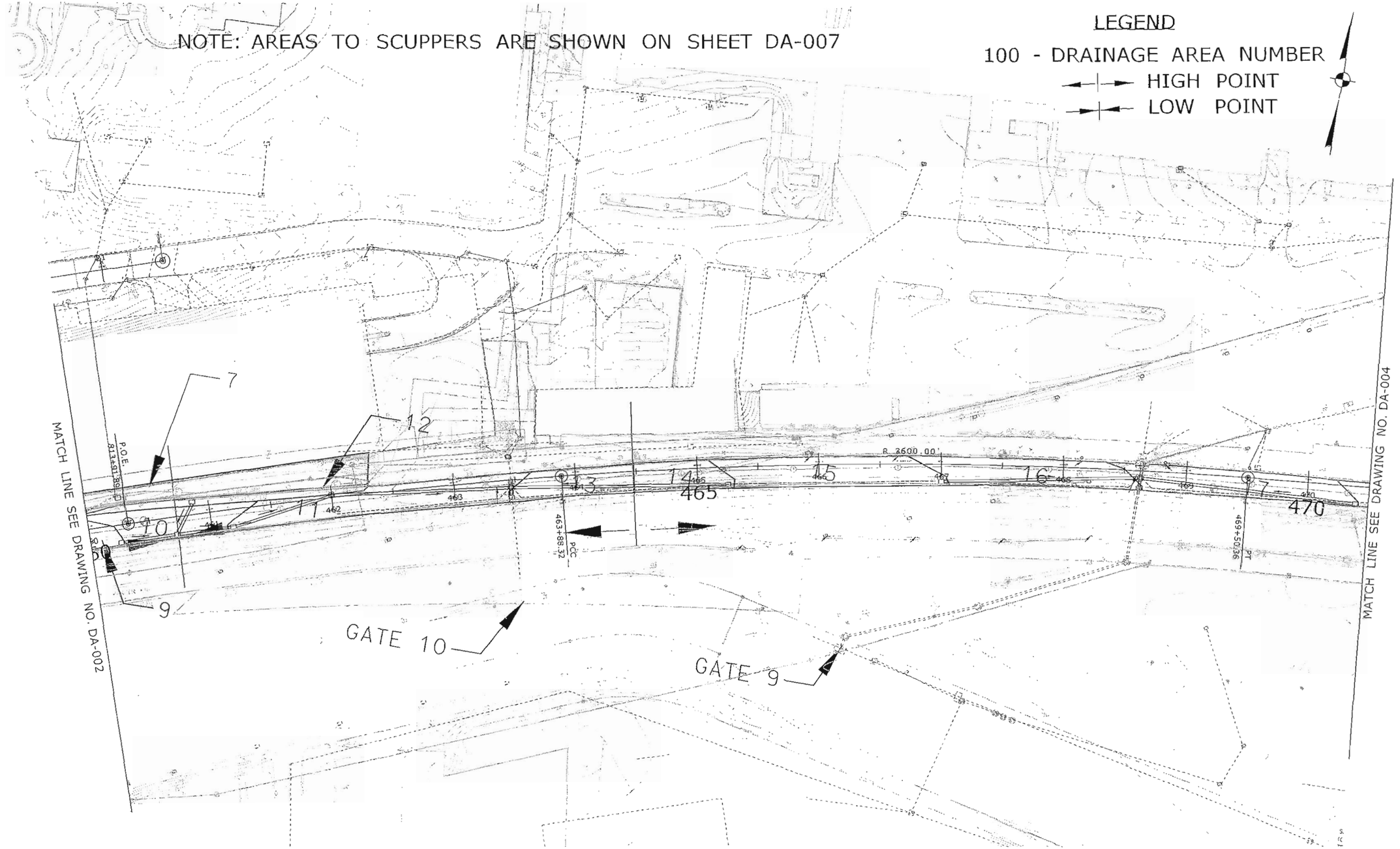
NOTE: AREAS TO SCUPPERS ARE SHOWN ON SHEET DA-007

LEGEND

100 - DRAINAGE AREA NUMBER

HIGH POINT

LOW POINT



REV.	DATE	REVISION DESCRIPTION	SHEET NO.
			Plotted 6/7/2010

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

DESIGNER/DRAFTER: D. MULLANEY

CHECKED BY: R. GRAY

SCALE IN FEET 0 40 80

SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\MW.MSH_063.H137.DA-003.dgn

SIGNATURE/BLOCK:

LOCHNER
H.W. LOCHNER, INC.
2110 Silas Deane Highway
Rocky Hill, CT 06067

APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

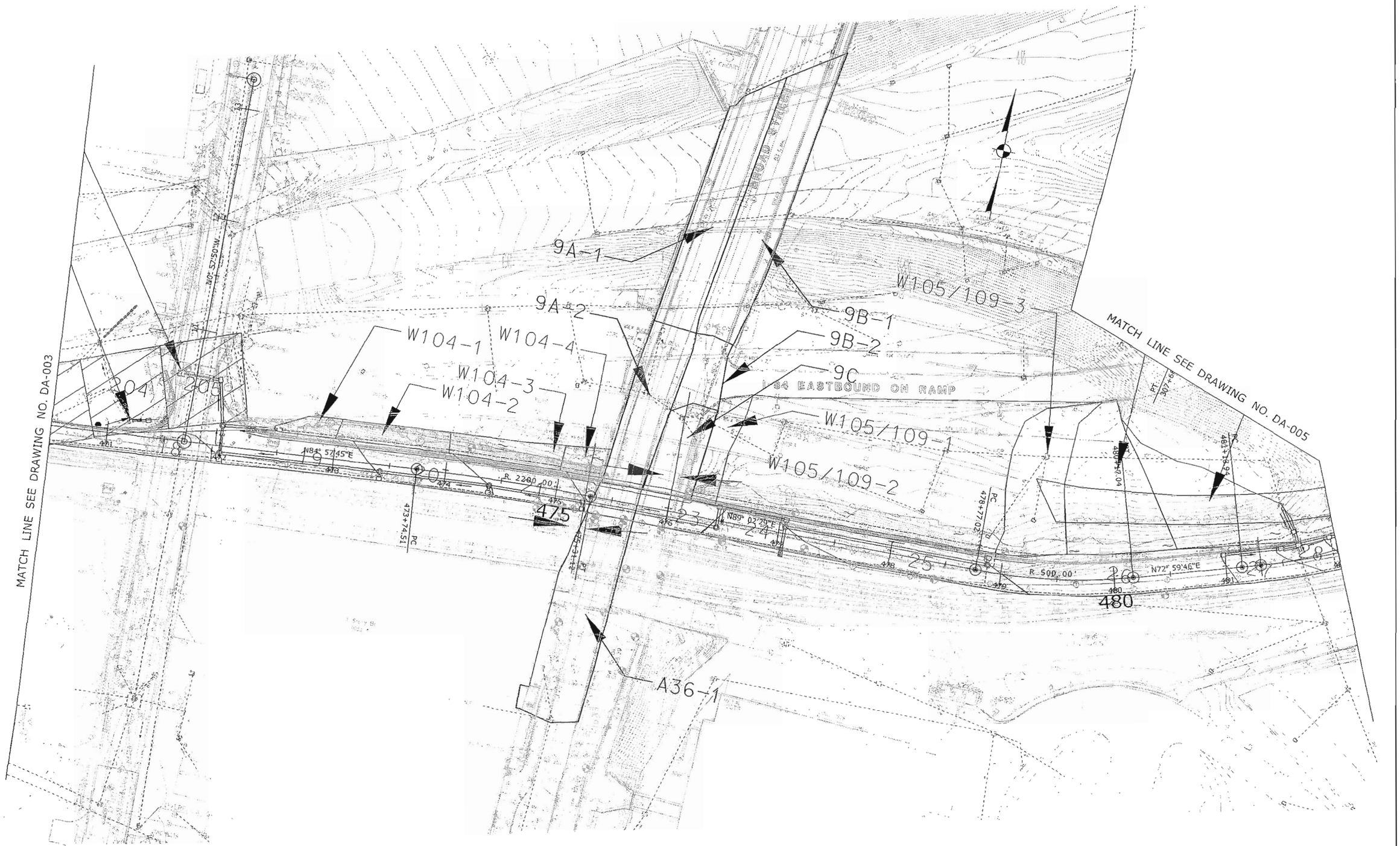
TOWN: HARTFORD

DRAWING TITLE: INLET AREA PLAN

PROJECT NO.: 63-H137

DRAWING NO.:

SHEET NO.: DA-003



REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSH_063_H137_DA-004.dgn

SIGNATURE/BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

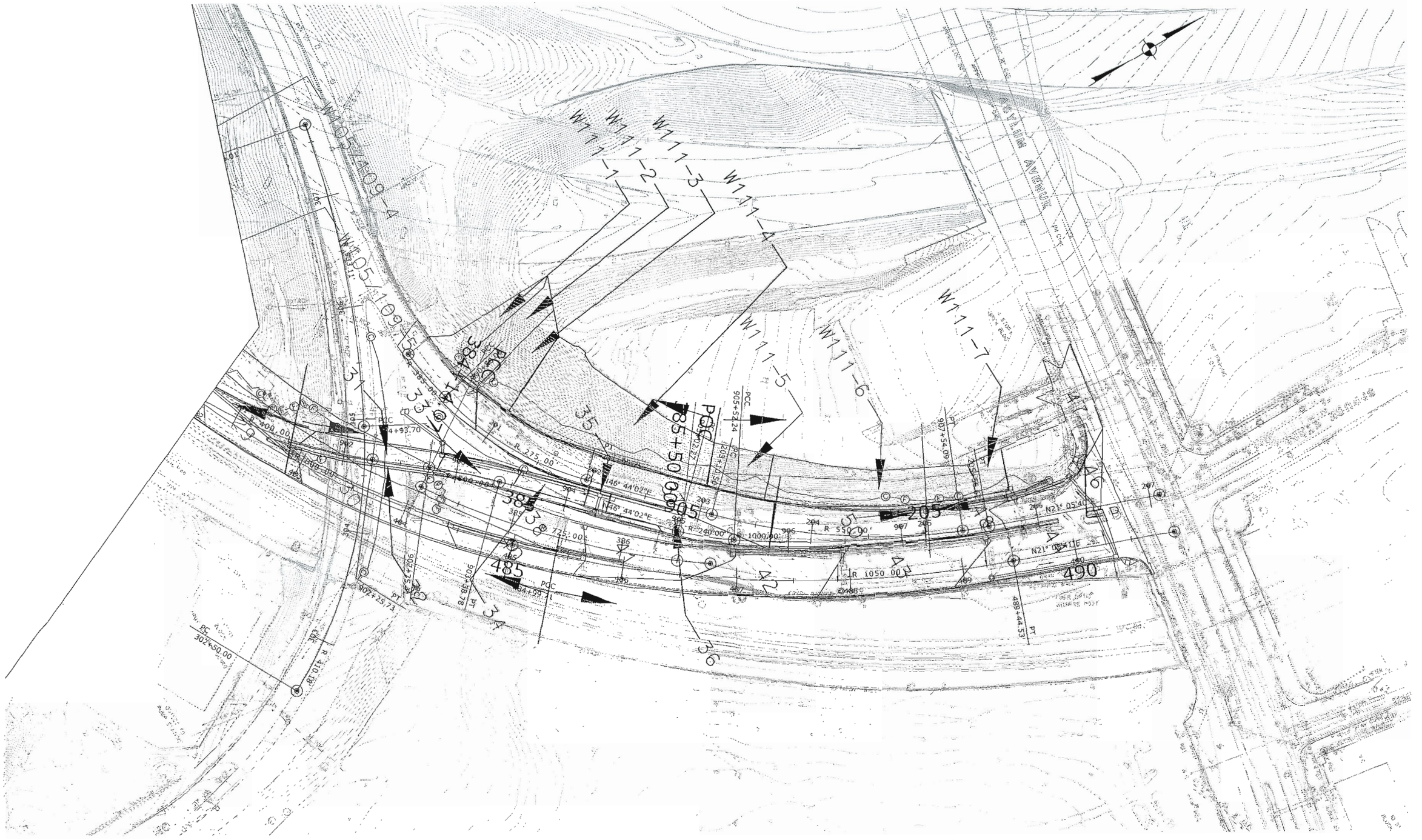
APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD

DRAWING TITLE: INLET AREA PLAN

PROJECT NO.: 63-H137
DRAWING NO.:
SHEET NO.: DA-004



REV.	DATE	REVISION DESCRIPTION	SHEET NO.

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Plotted 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET: 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\HW_MSN_063_H137_DA-005.dgn

SIGNATURE/BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

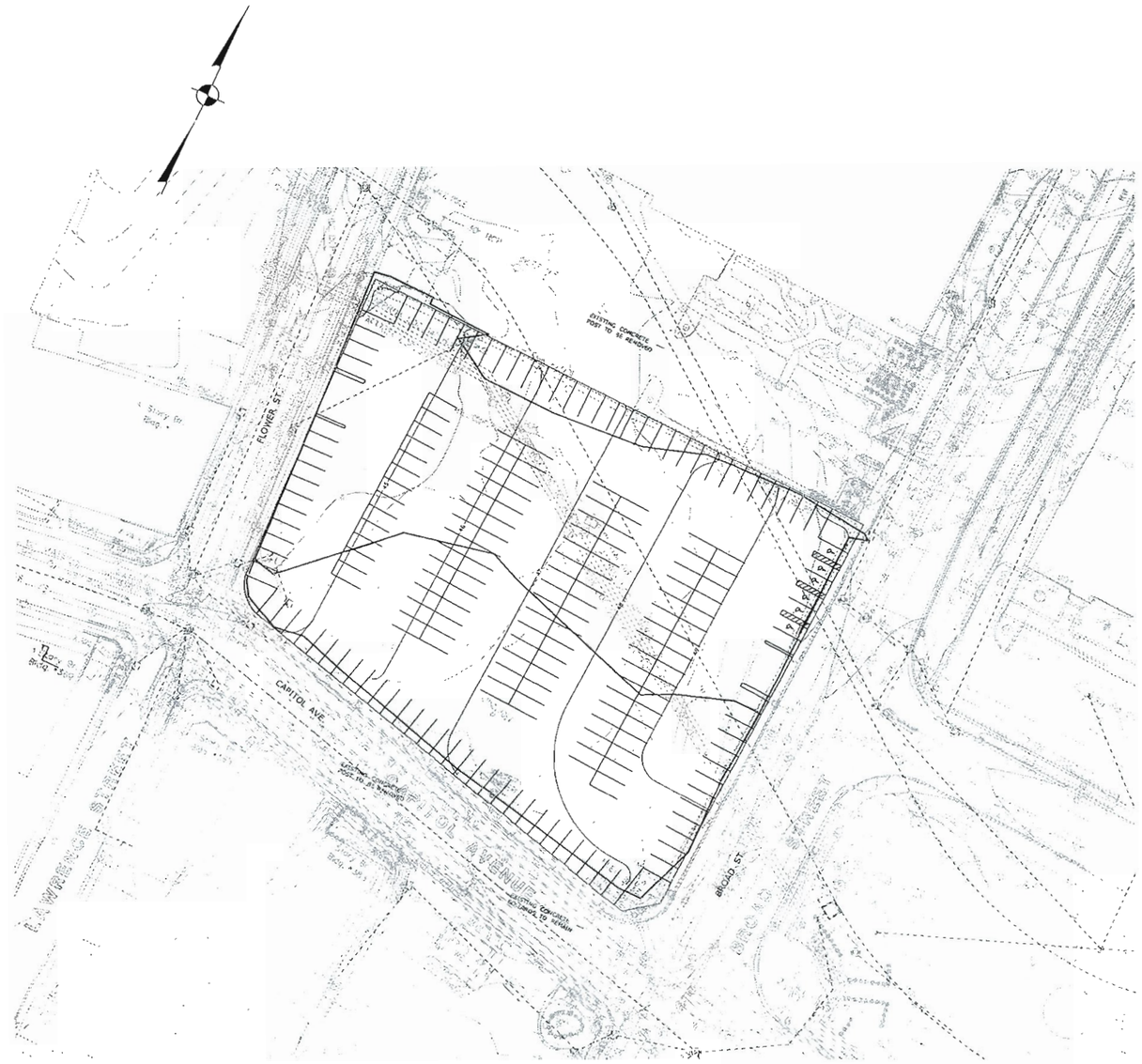
APPROVED BY: DATE:

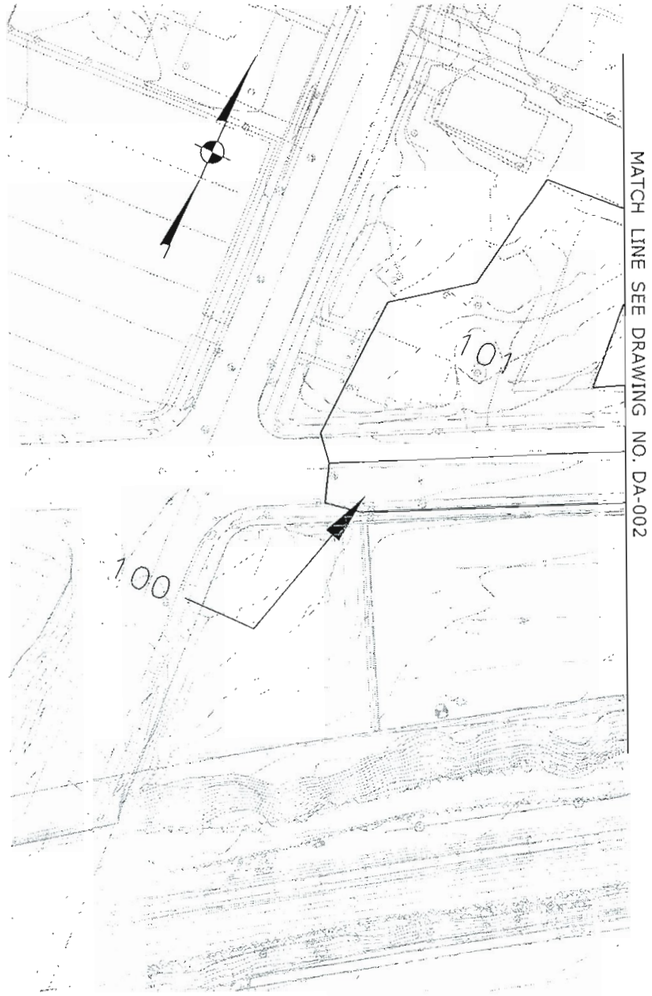
PROJECT TITLE:
NEW BRITAIN - HARTFORD
BUSWAY
HARTFORD NORTH

TOWN: HARTFORD

DRAWING TITLE: INLET AREA PLAN

PROJECT NO. 63-H137
DRAWING NO.
SHEET NO. DA-005





MATCH LINE SEE DRAWING NO. DA-002

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY

CHECKED BY: R. BRAY

SCALE IN FEET
0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: ...\NW_MSH_063_H137_DA-006.dgn

SIGNATURE/ BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

APPROVED BY DATE:

PROJECT TITLE
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

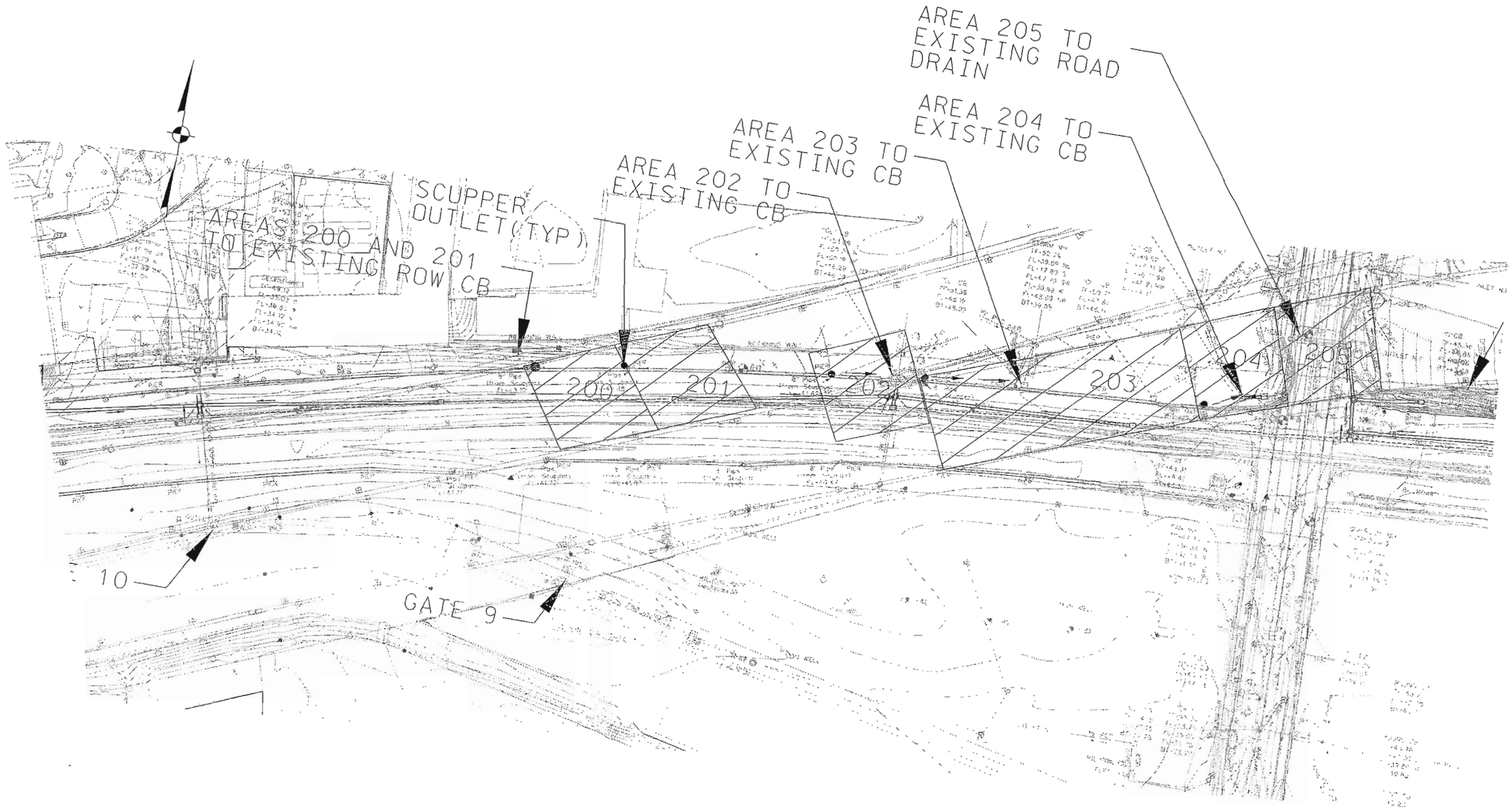
TOWN
HARTFORD

DRAWING TITLE:
INLET AREA PLAN

PROJECT NO.
63-H137

DRAWING NO.

SHEET NO.
DA-006



LEGEND

200 - DRAINAGE AREA NUMBER

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

THE INFORMATION, INCLUDING ESTIMATED QUANTITIES OF WORK, SHOWN ON THESE SHEETS IS BASED ON LIMITED INVESTIGATIONS BY THE STATE AND IS IN NO WAY WARRANTED TO INDICATE THE CONDITIONS OF ACTUAL QUANTITIES OF WORK WHICH WILL BE REQUIRED.

Plotted: 6/7/2010

DESIGNER/DRAFTER: D. MULLANEY
CHECKED BY: R. BRAY
SCALE IN FEET 0 40 80
SCALE 1"=40'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename ..\HW_MSH_063_H137_DA-007.dgn

SIGNATURE/ BLOCK:
LOCHNER
H.W. LOCHNER, INC
2110 Silas Deane Highway
Rocky Hill, CT 06067

APPROVED BY: DATE:

PROJECT TITLE:
NEW BRITAIN - HARTFORD BUSWAY
HARTFORD NORTH

TOWN: HARTFORD

DRAWING TITLE: INLET AREA PLAN

PROJECT NO.: 63-H137
DRAWING NO.:
SHEET NO.: DA-007

APPENDIX D-1

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

SUMMARY OF CALCULATED TIMES OF CONCENTRATION

AR48-1CA1	n	L	s	V	Tc (hr)	Tc (min)
PAVED	0.011	595	0.020168		0.23	13.9
GRASS	0.24	317	0.015773		1.82	108.9
GRASS	0.24	185	0.102703		0.56	33.5
						156.2

AR48-1	n	L	s	V	Tc (hr)	Tc (min)
WOODS	0.4	100	0.04		0.75	44.9
WOODS	0.4	100	0.33		0.32	19.3
						64.2

AR48-2	n	L	s	V	Tc (hr)	Tc (min)
GRASS	0.24	129	0.211628		0.31	18.8
		0	0	0.000	0.00	0.0
						18.8

AR48-3	n	L	s	V	Tc (hr)	Tc (min)
GRASS	0.24	118	0.364407		0.23	14.1
		0	0.011	0.000	0.00	0.0
						14.1

ARCB-18	n	L	s	V	Tc (hr)	Tc (min)
PAVED	0.011	142	0.049296		0.05	3.1
		0	0.025	0.000	0.00	0.0
						5.0

ARCB-10	n	L	s	V	Tc (hr)	Tc (min)
PAVED	0.011	142	0.049296		0.05	3.1
GRASS	0.24	207	0.130435		0.55	33.3
						36.3

ARCB-16	n	L	s	V	Tc (hr)	Tc (min)
WOODS	0.4	100	0.36		0.31	18.6
		0	0.025	0.000	0.00	0.0
						18.6

ARCB17	n	L	s	V	Tc (hr)	Tc (min)
PAVED	0.011	423	0.026005		0 16	9.5
GRASS	0.24	42	0 309524		0.11	6 6
						16.1

ARCB14	n	L	s	V	Tc (hr)	Tc (min)
PAVED	0.011	129	0.02845		0.06	3.6
GRASS	0.24	261	0.092		0.77	46.1
						49.6

ARCB-2	n	L	s	V	Tc (hr)	Tc (min)
PAVED	0.011	203	0.059113		0.06	3.8
GRASS	0.24	107	0 158879		0.30	18.1
						21.9

Slope to 476+00 rt	n	L	s	V	Tc (hr)	Tc (min)
WOODS	0 4	36	0.472222		0 12	7.4
GRASS	0.24	217	0.0553		0 81	48 7
						56.1

SLOPE TO 476+00 lt	n	L	s	V	Tc (hr)	Tc (min)
WOODS	0.4	36	0.777778		0.10	6.0
	0	0	0	0	0 00	0.0
						6.0

SLOPE TO 481+50	n	L	s	V	Tc (hr)	Tc (min)
WOODS	0 4	30	0.3		0.13	7.7
GRASS	0.24	117 5	0.13617		0.35	20.8
						28.4

AREAS 200 AND 201	n	L	s	V	Tc (hr)	Tc (min)
PAVED	0.011	423	0.023		0.17	10.0
GRASS	0.02	332	0.012048		0.29	17.2
						27.3

SUMMARY OF EXISTING DRAINAGE AREAS TO GATE 6

Area Number	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK AREA TO HIGH/ TO LOW/ OK
BYPASS TO ARCB 3	2141.00	0.05	0.05	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.04	0.05	OK
BYPASS TO ARCB 2	13436.00	0.31	0.13	0.90	0.00	0.13	0.18	0.23	0.00	0.39	0.50	10.00	0.15	0.31	OK
CAPITAL AREA DG -(90)	15234.00	0.35	0.00	0.90	0.00	0.13	0.35	0.23	0.00	0.39	0.23	10.00	0.08	0.35	OK
MH 79A CA	4810.00	0.11	0.00	0.90	0.11	0.13	0.00	0.23	0.00	0.39	0.13	5.00	0.01	0.11	OK
MH 79B CA	5757.00	0.13	0.13	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.12	0.13	OK
MH 79C CA	5245.00	0.12	0.12	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.11	0.12	OK
MH 79D CA	1697.60	0.04	0.04	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.04	0.04	OK
CAPITAL AREA DG -(90 CA)	113962.00	2.62	0.62	0.90	0.00	0.13	2.00	0.23	0.00	0.39	0.39	10.00	1.02	2.62	OK
MH 82 CA	6398.00	0.15	0.15	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.13	0.15	OK
MH 84 CA	2570.00	0.06	0.06	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.05	0.06	OK
MH 85 CA	2518.00	0.06	0.06	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.05	0.06	OK
MH 88 CA	2945.00	0.07	0.07	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.06	0.07	OK
MH 88A CA	91035.00	2.09	2.09	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	1.88	2.09	OK
CB TO BYPASS TO ARCB 3	2861.00	0.07	0.07	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.06	0.07	OK
BYPASS TO ARCB 2 CA	28593.00	0.66	0.66	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.59	0.66	OK
CB TO BYPASS TO ARCB 2	32287.00	0.74	0.13	0.90	0.00	0.13	0.61	0.23	0.00	0.39	0.35	10.00	0.26	0.74	OK
Total	331489.6000	7.6100	4.3591		0.1104		3.1404		0.0000						
Impervious		4.6782 61%	4.3591		0.0364		0.2826		0.0000		0.61		4.66 4.659862718	7.61	

SUMMARY OF EXISTING DRAINAGE AREAS TO GATE 8

Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
FARM BYPASS	FARM BYPASS	7029	0.161	0.117	0.90	0	0.13	0.045	0.23	0.000	0.39	0.71	5	0.115280303	0.16	OK
FARM I-1	FARM I-1	86646	1.989	0.590	0.90	0	0.13	1.399	0.23	0.000	0.39	0.43	10	0.852544995	1.99	OK
FSI-1	FSI-1	41047	0.942	0.226	0.90	0	0.13	0.716	0.23	0.000	0.39	0.39	10	0.368188705	0.94	OK
FSI-2	FSI-2	11112	0.255	0.255	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.229586777	0.26	OK
FSI-3	FSI-3	14359	0.330	0.330	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.296673554	0.33	OK
FSI-4	FSI-4	7708	0.177	0.177	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.159256198	0.18	OK
FSMH-2	FSMH-2	121763	2.795	0.973	0.90	0	0.13	0	0.23	1.822	0.39	0.57	10	1.586606749	2.80	OK
FSMH-10	FSMH-10	68926	1.582	0.791	0.90	0	0.13	0.791	0.23	0	0.39	0.57	10	0.894012626	1.58	OK
FSPG-1	FSPG-1	15784.75	0.362	0.362	0.90	0	0.13	0	0.23	0	0.39	0.90	10	0.326131198	0.36	OK
FSPG-2	FSPG-2	15784.75	0.362	0.362	0.90	0.000	0.13	0	0.23	0	0.39	0.90	10	0.326131198	0.36	OK
FSPG-3	FSPG-3	15784.75	0.362	0.362	0.90	0	0.13	0	0.23	0	0.39	0.90	10	0.326131198	0.36	OK
FSPG -4	FSPG -4	15784.75	0.362	0.362	0.90	0	0.13	0.000	0.23	0	0.39	0.90	10	0.326131198	0.36	OK
FSRD-1B	FSRD-1B	19426	0.446	0.446	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.401363636	0.45	OK
FSRD -1A	FSRD -1A	15872	0.364	0.364	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.327933884	0.36	OK
SCUPPER	TRNCH DRAIN	5367.95	0.123	0.123	0.90	0.000	0.13	0.000	0.23	0	0.39	0.90	5	0.110908058	0.12	OK
AETNA DI	AETNA DI	51935	1.192	0.954	0.90	0	0.13	0.238	0.23	0	0.39	0.77	10	0.913273875	1.19	OK
Total		514329.9500	11.8074	6.7955		0.0000		3.1901		1.8219						
Impervious			7.2444	5.7184		0.0000		0.2871		1.2389		0.64		7.56	11.81	
			61%											7.560154155		

SUMMARY OF EXISTING DRAINAGE AREAS TO GATE 9

Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Comercial (Acres)	C Comercial	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
9A1	9-BCB1	8473	0.195	0.195	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.175061983	0.19	OK
9A2	9-BCB1	5786	0.133	0.133	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.119545455	0.13	OK
9B1	9-BCB3	10791	0.248	0.248	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.222954545	0.25	OK
9B2	9-BCB3	2218	0.051	0.051	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.045826446	0.05	OK
9C	9-BCB2	3444	0.079	0.079	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.071157025	0.08	OK
9D	TRENCH DRAIN 1	13194	0.303	0.303	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.272603306	0.30	OK
9E	TRENCH DRAIN 2	15807	0.363	0.363	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.326590909	0.36	OK
9F1	INLET	1597	0.037	0.037	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.032995868	0.04	OK
9F2	INLET	10029.73	0.230	0.230	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.207225826	0.23	OK
9F3	INLET	4790.26	0.110	0.110	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.098972314	0.11	OK
9G	TRENCH DRAIN	11151.24	0.256	0.256	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.230397521	0.26	OK
9H	9-MH32	13320.07	0.306	0.306	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.275208058	0.31	OK
9I	9-MH34	10490.2	0.241	0.241	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.216739669	0.24	OK
Total		111091.5000	2.5503	2.5503		0.0000		0.0000		0.0000						
Impervious			2.5503	2.5503		0.0000		*0.0000*		0.0000		0.90		2.30	2.55	
			100%											2.295278926		

SUMMARY OF EXISTING DRAINAGE AREAS TO GATE 10

Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK AREA TO HIGH/ TO LOW/ OK
10-MH2		47997	1.102	1.102	0.90	0	0.13	0	0.23	0.00	0.39	0.90	5	0.992	1.10	OK
RR ROW CB1		63261	1.452	0.000	0.90	1.452	0.13	0	0.23	0.00	0.39	0.13	10	0.189	1.45	OK
AETNA YD 201		5975	0.137	0.000	0.90	0	0.13	0.137	0.23	0.00	0.39	0.23	10	0.032	0.14	OK
AETNA GC-1		13887	0.319	0.319	0.90	0	0.13	0	0.23	0.00	0.39	0.90	10	0.287	0.32	OK
AETNA CB 202		23859	0.548	0.211	0.90	0	0.13	0.337	0.23	0.00	0.39	0.49	10	0.267	0.55	OK
AETNA CB 203		23953	0.550	0.550	0.90	0	0.13	0	0.23	0.00	0.39	0.90	5	0.495	0.55	OK
EXISTING AETNA CB (10)		3020	0.069	0.069	0.90	0	0.13	0	0.23	0.00	0.39	0.90	5	0.062	0.07	OK
Total		181952.0000	4.1770	2.2510		1.4523		0.4738		0.00						
Impervious			2.7729	2.2510		0.4793		0.0426		0.00		0.56		2.32	4.18	
			66%											2.323669421		

SUMMARY OF EXISTING DRAINAGE AREAS TO GATE 11

Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
11-CB1	11-CB1	47391	1.088	0.544	0.90	0	0.13	0.544	0.23	0.000	0.39	0.57	15	0.614690427	1.09	OK
11-CB1A	11-CB1A	40144	0.922	0.283	0.90	0	0.13	0	0.23	0.638	0.39	0.55	5	0.503974518	0.92	OK
11-CB2	11-CB2	19926	0.457	0.457	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.411694215	0.46	OK
11-CB2A	11-CB2A	18927	0.435	0.110	0.90	0	0.13	0	0.23	0.324	0.39	0.52	5	0.225631543	0.43	OK
11-CB2B	11-CB2B	7135	0.164	0.164	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.147417355	0.16	OK
11-CB3A	11-CB3A	28682	0.658	0.658	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.592603306	0.66	OK
11-CB3B	11-CB3B	3646	0.084	0.084	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.075330579	0.08	OK
11-CB4A	11-CB4A	10351	0.238	0.238	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.213863636	0.24	OK
11-CB4B	11-CB4B	28642	0.658	0.658	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.59177686	0.66	OK
11-CB4C	11-CB4C	0	0.000	0.000	0.90	0	0.13	0	0.23	0	0.39	0.00	5	0	0.00	OK
11-CB86	11-CB86	45860	1.053	0.000	0.90	1.053	0.13	0	0.23	0	0.39	0.13	5	0.136864096	1.05	OK
AETNA PARKING LOT	AETNA PARKING LOT	68963	1.583	1.583	0.90	0	0.13	0	0.23	0	0.39	0.90	5	1.424855372	1.58	OK
11-CB89A	11-CB89A	18721	0.430	0.133	0.90	0	0.13	0.297	0.23	0	0.39	0.44	5	0.187827824	0.43	OK
11-CB89B	11-CB89B	9483	0.218	0.110	0.90	0	0.13	0.108	0.23	0	0.39	0.57	5	0.123638659	0.22	OK
11-CB89C	11-CB89C	8579	0.197	0.000	0.90	0	0.13	0.197	0.23	0	0.39	0.23	5	0.04529775	0.20	OK
11-MH92	11-MH92	13823	0.317	0.317	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.285599174	0.32	OK
AETNA -YD MH	AETNA -YD MH	68973	1.583	0.000	0.90	0	0.13	1.583	0.23	0	0.39	0.23	5	0.364182507	1.58	OK
AETNA BLD CB-1	AETNA BLD CB-1	9901	0.227	0.000	0.90	0	0.13	0.227	0.23	0	0.39	0.23	5	0.052278007	0.23	OK
AETNA CB-2	AETNA CB-2	3599	0.083	0.000	0.90	0	0.13	0.083	0.23	0	0.39	0.23	5	0.019002984	0.08	OK
AETNA CB-3	AETNA CB-3	6884	0.158	0.061	0.90	0	0.13	0.097	0.23	0	0.39	0.49	5	0.077461662	0.16	OK
AETNA PARKING ROOF-1	AETNA PARKING ROOF	38345	0.880	0.880	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.792252066	0.88	OK
AETNA PARKING ROOF-2	AETNA PARKING ROOF	45908	1.054	1.054	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.948512397	1.05	OK
GATE 11 MH	GATE 11 MH	44886	1.030	1.030	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.927396694	1.03	OK
SIG-CB1A	SIG-CB1A	5424	0.125	0.074	0.90	0	0.13	0.051	0.23	0	0.39	0.63	5	0.078212351	0.12	OK
SIG-CB2A	SIG-CB2A	51960	1.193	0.469	0.90	0	0.13	0	0.23	0.724	0.39	0.59	5	0.704143251	1.19	OK
SIG-CB2B	SIG-CB2B	30345	0.697	0.474	0.90	0	0.13	0.222	0.23	0	0.39	0.69	5	0.47805854	0.70	OK
SIG-CB2C	SIG-CB2C	13966	0.321	0.321	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.288553719	0.32	OK
SIG-CB3A	SIG-CB3A	24852	0.571	0.072	0.90	0	0.13	0.499	0.23	0	0.39	0.31	5	0.179209366	0.57	OK
SIG-CB4A	SIG-CB4A	26764	0.614	0.321	0.90	0	0.13	0.293	0.23	0	0.39	0.58	5	0.356651056	0.61	OK
SIG-CB5A	SIG-CB5A	65586	1.506	0.554	0.90	0	0.13	0.951	0.23	0	0.39	0.48	5	0.717767447	1.51	OK
Total		807666.0000	18.5415	10.6501		1.0528		5.1517		1.6868						
Impervious			12.6083 68%	10.6501		0.3474		0 4637		1.1470		0.62		11.56 11.56474736	18.54	

SUMMARY OF EXISTING DRAINAGE AREAS TO THE ARMORY PUMP STATION (36-INCH)

Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Comercial (Acres)	C Comercial	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)
A36-1	AB-CB1	10535	0.242	0.242	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.217665289	0.24
A36-2A	AB-CB-2	7720	0.177	0.177	0.90	0	0.13	0	0.00	0	0.89	0.90	5	0.159504132	0.18
A36-2B	AB-CB-2 (CA)	26272	0.603	0.603	0.90	0	0.13	0	0.00	0	0.89	0.90	10	0.542809917	0.60
A36-3	AB-CB-1(CA)	44565	1.023	1.023	0.90	0	0.13	0	0.00	0	0.89	0.90	10	0.920764463	1.02
A36-4	AB-CB-3	6116	0.140	0.140	0.90	0	0.13	0	0.00	0	0.89	0.90	5	0.126363636	0.14
A36-5	AB-CB-4	21484	0.493	0.493	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.443884298	0.49
A36-6A	--	2374	0.054	0.054	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.049049587	0.05
A36-6B	--	3376	0.078	0.078	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.069752066	0.08
A36-7A	AB-MH30	253592	5.822	4.366	0.90	0	0.13	1.455417815	0.23	0	0.89	0.73	10	4.264374197	5.82
A36-7B	AB-MH-3	9613	0.221	0.221	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.198615702	0.22
A36-8	--	269992	6.198	6.198	0.90	0	0.13	0	0.23	0	0.89	0.90	10	5.578347107	6.20
Total		655639.0000	15.0514	13.5960		0.0000		1.4554		0.0000					
Impervious			13.7270	13.5960		0.0000		0.1310		0.0000		0.84		12.57	15.05
			91%											12.57	

SUMMARY OF EXISTING DRAINAGE AREAS TO ARMORY PUMP STATION 48"

Area Number	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
AR-48-1	67861.00	1.56	0.58	0.90	0.98	0.13	0.00	0.23	0.00	0.39	0.42	64.17	0.65	1.56	OK
AR-48-1CA1	200756.00	4.61	1.53	0.90	0.53	0.13	2.55	0.23	0.00	0.39	0.44	156.23	2.03	4.61	OK
AR-48-1CA2	15359.00	0.35	0.25	0.90	0.00	0.13	0.11	0.23	0.00	0.39	0.70	10.00	0.25	0.35	OK
AR-48-1CA3	16093.00	0.37	0.23	0.90	0.14	0.13	0.00	0.23	0.00	0.39	0.61	10.00	0.22	0.37	OK
AR-48-1CA4	7616.00	0.17	0.17	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.16	0.17	OK
AR-48-2	8054.00	0.18	0.00	0.90	0.00	0.13	0.18	0.23	0.00	0.39	0.23	18.78	0.04	0.18	OK
AR48-2CA	6338.00	0.15	0.15	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.13	0.15	OK
AR-48-3	15018.00	0.34	0.00	0.90	0.00	0.13	0.34	0.23	0.00	0.39	0.23	14.07	0.08	0.34	OK
AR-MH12CA	3807.00	0.09	0.09	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.08	0.09	OK
AR-CB2	22550.00	0.52	0.09	0.90	0.00	0.13	0.43	0.23	0.00	0.39	0.34	21.95	0.18	0.52	OK
AR-CB3	9453.00	0.22	0.13	0.90	0.00	0.13	0.09	0.23	0.00	0.39	0.62	5.00	0.14	0.22	OK
AR-CB3 CA	7784.00	0.18	0.18	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.16	0.18	OK
AR-CB4	6143.00	0.14	0.04	0.90	0.00	0.13	0.10	0.23	0.00	0.39	0.43	10.00	0.06	0.14	OK
AR-CB6	4604.00	0.11	0.04	0.90	0.07	0.13	0.00	0.23	0.00	0.39	0.42	10.00	0.04	0.11	TOO LOW
AR-CB7	4464.00	0.10	0.02	0.90	0.09	0.13	0.00	0.23	0.00	0.39	0.26	10.00	0.03	0.10	OK
AR-CB8	7279.00	0.17	0.06	0.90	0.11	0.13	0.00	0.23	0.00	0.39	0.38	10.00	0.06	0.17	OK
AR-CB10	56645.00	1.30	0.24	0.90	0.68	0.13	0.39	0.23	0.00	0.39	0.30	36.35	0.39	1.30	OK
AR-CB13	2816.00	0.06	0.02	0.90	0.00	0.13	0.05	0.23	0.00	0.39	0.40	5.00	0.03	0.06	OK
AR-CB14	37449.00	0.86	0.08	0.90	0.00	0.13	0.78	0.23	0.00	0.39	0.30	49.61	0.25	0.86	OK
AR-CB16	25025.00	0.57	0.00	0.90	0.00	0.13	0.57	0.23	0.00	0.39	0.23	18.63	0.13	0.57	OK
AR-CB17	37890.00	0.87	0.24	0.90	0.00	0.13	0.62	0.23	0.00	0.39	0.42	16.11	0.36	0.87	OK
AR-CB18	2683.50	0.06	0.06	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.06	0.06	OK
AR-CB13A	2573.80	0.06	0.06	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.05	0.06	OK
Total	568261.3000	13.0455	4.2433		2.5903		6.2119		0.0000						
Impervious		5.5981	4.1842		0.8548		0.5591		0.0000		0.43		5.58	13.05	
		43%											5.584425849		

SUMMARY OF EXISTING DRAINAGE AREAS TO GULLY BROOK

Area Number	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Comercial (Acres)	C Comercial	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
GB-CB1	5560	0.128	0.128	0.90	0	0.13	0	0.23	0.000	0.89	0.90	5	0.114876033	0.13	OK
GB-CB2	10673	0.245	0.245	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.220516529	0.25	OK
GB-CB3	5882	0.135	0.000	0.90	0	0.13	0.135	0.23	0	0.89	0.23	10	0.031057392	0.14	OK
GB-CB4	24365	0.559	0.559	0.90	0	0.13	0.000	0.23	0	0.89	0.90	10	0.503409091	0.56	OK
GB-CB5	1360	0.031	0.031	0.90	0	0.13	0.000	0.23	0	0.89	0.90	10	0.028099174	0.03	OK
GB-CB6	5385	0.124	0.124	0.90	0	0.13	0.000	0.23	0	0.89	0.90	10	0.111260331	0.12	OK
GB-CB7	2530	0.058	0.058	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.052272727	0.06	OK
GB-CB8	3493	0.080	0.080	0.90	0	0.13	0	0.23	0	0.89	0.90	10	0.072169421	0.08	OK
GB-CB9	16342	0.375	0.375	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.337644628	0.38	OK
GB-CB10	2222	0.051	0.000	0.90	0	0.13	0.051	0.23	0	0.89	0.23	5	0.011732323	0.05	OK
GB-HB1	822	0.019	0.019	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.016983471	0.02	OK
GB-HB2	3211	0.074	0.074	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.066342975	0.07	OK
GB-HB3	1565	0.036	0.036	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.032334711	0.04	OK
GB-HB4	833	0.019	0.019	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.017210744	0.02	OK
GB-HB5	8231	0.189	0.189	0.90	0	0.13	0	0.23	0.000	0.89	0.90	10	0.170061983	0.19	OK
GB-HB7	61490	1.412	1.034	0.90	0.000	0.13	0	0.23	0.378076217	0.89	0.90	5	1.266673783	1.41	OK
GB-AS 1	6112	0.140	0.140	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.126280992	0.14	OK
GB-AS 2	14758	0.339	0.339	0.90	0	0.13	0	0.23	0	0.89	0.90	10	0.304917355	0.34	OK
GB-AS 3	26248	0.603	0.603	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.54231405	0.60	OK
GB-AS 4	18038	0.414	0.414	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.37268595	0.41	OK
GB-AS 5	11432	0.262	0.262	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.236198347	0.26	OK
GB-AS 6	9905	0.227	0.227	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.20464876	0.23	OK
GB-AS 1 CA	38899	0.893	0.893	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.803698347	0.89	OK
GB-AS 2 CA	77369	1.776	1.776	0.90	0	0.13	0	0.23	0	0.89	0.90	5	1.598533058	1.78	OK
GB-MH2 CA	44694	1.026	1.026	0.90	0	0.13	0	0.23	0	0.89	0.90	7	0.923429752	1.03	OK
GB-FAR 1	36906	0.847	0.000	0.90	0	0.13	0.847245179	0.23	0	0.89	0.23	10	0.194866391	0.85	OK
GB-FAR 2	6532	0.150	0.000	0.90	0	0.13	0.150	0.23	0	0.89	0.23	10	0.03448944	0.15	OK
GB-BB1	37344	0.857	0.857	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.771570248	0.86	OK
GB-BB2	3997	0.092	0.092	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.082582645	0.09	OK
GB-BB3	24446	0.561	0.281	0.90	0	0.13	0.281	0.23	0	0.89	0.57	10	0.31707966	0.56	OK
GB-BB4	10969	0.252	0.000	0.90	0	0.13	0.252	0.23	0	0.89	0.23	10	0.057917126	0.25	OK
GB-SP1	289909	6.655	6.655	0.90	0	0.13	0	0.23	0	0.89	0.90	10	5.989855372	6.66	OK
Total	775725.0000	17.8082	16.2393		0.0000		1.7157		0.3781						
Impervious		16.6508	16.2393		0.0000		0.1544		0.2571		0.88		15.61	18.63	
		94%											15.61371281		

SUMMARY OF PROPOSED DRAINAGE AREAS TO GATE 6

Existing Area Number	Proposed Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement	C Pavement	Area Wooded	C Wooded	Area Grass (C soils)	C Grass (C soils)	Area Residential	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA	CHECK=AREA TO HIGH/ TO LOW/ OK
BYPASS TO ARCB 3	EXSTING		2141.00	0.05	0.05	0.90	0.00	0 13	0.00	0.23	0.00	0.39	0.90	5.00	0.04	0.05	OK
BYPASS TO ARCB 2	EXSTING		13436.00	0.31	0.13	0.90	0.00	0.13	0 18	0.23	0.00	0.39	0.50	10.00	0.15	0.31	OK
CAPITAL AREA DG -(90)	EXSTING		15234.00	0.35	0.00	0.90	0.00	0.13	0.35	0.23	0.00	0.39	0.23	10.00	0.08	0.35	OK
MH 79A CA	EXSTING		4810.00	0.11	0.00	0.90	0.11	0.13	0.00	0.23	0.00	0.39	0.13	5.00	0.01	0.11	OK
MH 79B CA	EXSTING		5757.00	0.13	0 13	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.12	0.13	OK
MH 79C CA	EXSTING		5245.00	0.12	0.12	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.11	0.12	OK
MH 79D CA	EXSTING		1697.60	0.04	0.04	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.04	0.04	OK
CAPITAL AREA DG -(90 CA)	EXSTING		113962.00	2 62	0.62	0.90	0.00	0.13	2.00	0.23	0.00	0.39	0.39	10.00	1.02	2.62	OK
MH 82 CA	EXSTING		6398.00	0.15	0.15	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.13	0.15	OK
MH 84 CA	EXSTING		2570.00	0.06	0.06	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.05	0.06	OK
MH 85 CA	EXSTING		2518.00	0.06	0.06	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.05	0.06	OK
MH 86 CA	EXSTING		2945.00	0.07	0.07	0.90	0.00	0 13	0.00	0.23	0.00	0.39	0.90	5.00	0.06	0.07	OK
MH 88A CA	EXSTING		91035.00	2.09	2.09	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	1.88	2.09	OK
CB TO BYPASS TO ARCB 3	EXSTING		2861.00	0.07	0.07	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.06	0.07	OK
BYPASS TO ARCB 2 CA	EXSTING		28593.00	0.66	0.66	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.59	0.66	OK
CB TO BYPASS TO ARCB 2	EXSTING		32287.00	0.74	0.13	0.90	0.00	0.13	0.61	0.23	0.00	0.39	0.35	10.00	0.26	0.74	OK
	27	480+98.51	1761.69	0.04	0.04	0.90	0.00	0.13	0.00	0.23	0.00	0 39	0.90	5.00	0.04	0.04	OK
	28	481+50.00	1194.48	0.03	0.03	0.90	0.00	0.13	0.00	0 23	0.00	0.39	0.90	5.00	0.02	0.03	OK
	29	481+94.76	3738.88	0.09	0.09	0.90	0.00	0.13	0.00	0 23	0 00	0.39	0.90	5.00	0.08	0.09	OK
	30	482+98.54	3172.05	0.07	0.07	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.07	0.07	OK
	W105/109-6A	SLOPE	39771.550	0.91	0.00	0.90	0.91	0.13	0.00	0.23	0.00	0 39	0 13	82.81	0.12	0.91	OK
	W105/109-6B	SLOPE	4278.630	0.10	0.00	0.90	0.10	0.13	0.00	0.23	0.00	0.39	0.13	31.31	0.01	0.10	OK
	W105/109-6C	SLOPE	12403.860	0.28	0.00	0.90	0.28	0.13	0.00	0.23	0.00	0.39	0.13	35.7	0.04	0.28	OK
	W105/109-6D	SLOPE	1938.108	0.04	0.00	0.90	0.04	0.13	0.00	0.23	0.00	0.39	0.13	42.2	0.01	0.04	OK
Total			399748.8484	9.1770	4.5856		1.4509		3.1404		0.0000						
Impervious				5.3471	4.5856		0.4788		0.2826		0.0000		0.55		5.04	9.18	
				58%											5.037993326		
					0.19												

SUMMARY OF PROPOSED DRAINAGE AREAS TO GATE 8

Existing Area Number	Proposed Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
FARM BYPASS	EXISTING	FARM BYPASS	7029	0.161	0.117	0.90	0	0.13	0.045	0.23	0.000	0.39	0.71	5	0.115280303	0.16	OK
FARM I-1	EXISTING	FARM I-1	86646	1.989	0.590	0.90	0	0.13	1.399	0.23	0.000	0.39	0.43	10	0.852544995	1.99	OK
FSI-1	EXISTING	FSI-1	41047	0.942	0.226	0.90	0	0.13	0.716	0.23	0.000	0.39	0.39	10	0.368188705	0.94	OK
FSI-2	EXISTING	FSI-2	11112	0.255	0.255	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.229586777	0.26	OK
FSI-3	EXISTING	FSI-3	14359	0.330	0.330	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.296673554	0.33	OK
FSI-4	EXISTING	FSI-4	7708	0.177	0.177	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.159256198	0.18	OK
FSMH-2	EXISTING	FSMH-2	121763	2.795	0.973	0.90	0	0.13	0	0.23	1.822	0.39	0.57	10	1.586606749	2.80	OK
FSMH-10	EXISTING	FSMH-10	68926	1.582	0.791	0.90	0	0.13	0.791	0.23	0	0.39	0.57	10	0.894012626	1.58	OK
FSPG-1	EXISTING	FSPG-1	15784.75	0.362	0.362	0.90	0	0.13	0	0.23	0	0.39	0.90	10	0.326131198	0.36	OK
FSPG-2	EXISTING	FSPG-2	15784.75	0.362	0.362	0.90	0.000	0.13	0	0.23	0	0.39	0.90	10	0.326131198	0.36	OK
FSPG-3	EXISTING	FSPG-3	15784.75	0.362	0.362	0.90	0	0.13	0	0.23	0	0.39	0.90	10	0.326131198	0.36	OK
FSPG -4	EXISTING	FSPG -4	15784.75	0.362	0.362	0.90	0	0.13	0.000	0.23	0	0.39	0.90	10	0.326131198	0.36	OK
FSRD-1B	EXISTING	FSRD-1B	19426	0.446	0.446	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.401363636	0.45	OK
FSRD -1A	EXISTING	FSRD -1A	15872	0.364	0.364	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.327933884	0.36	OK
AETNA DI	EXISTING	AETNA DI	51935	1.192	0.954	0.90	0	0.13	0.238	0.23	0	0.39	0.77	10	0.913273875	1.19	OK
W104-8A	W104-8A	SLOPE	5730 15	0.132	0.000	0.90	0.132	0.13	0.000	0.23	0	0 39	0.13	17	0.017100999	0.13	OK
	18	472+00.00	3260.86	0.075	0.075	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.06737314	0.07	OK
	19	473+42.00 RT	4573.62	0 105	0.105	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.094496281	0.10	OK
	20	474+39.78	3162.88	0.073	0.073	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.06534876	0.07	OK
	21	475+24.97	2941.19	0.068	0.068	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.060768388	0.07	OK
	23	476+45.00	4077.14	0.094	0.094	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.08423843	0.09	OK
	24	476+75.00	2491.73	0.057	0.057	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.051482025	0.06	OK
	25	477+05.00	5659.39	0.130	0.130	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.116929545	0.13	OK
	26	478+87.00	7121.67	0.163	0.163	0.90	0	0.13	0.000	0 23	0	0.39	0.90	5	0.147141942	0.16	OK
	RR Relocation	477+05.00	70000	1.607	0.000	0.90	1.607	0.30	0.000	0.23	0	0.39	0.30	86	0.482093664	1.61	OK
Total			617980 6300	14.1869	7.4364		1 7365		3.1901		1.8219						
Impervious				9.5361	7.4364		0 5737		0.2871		1.2389		0.61		8.64	14.19	
				67%											8.636219272		

SUMMARY OF EXISTING AND PROPOSED DRAINAGE AREAS TO GATE 9

Existing Area Number	Proposed Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Comercial (Acres)	C Comercial	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
9A1	9A1	9-BCB1	8473	0.195	0.195	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.175061983	0.19	OK
9A2	9A2	9-BCB1	5786	0.133	0.133	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.119545455	0.13	OK
9B1	9B1	9-BCB3	10791	0.248	0.248	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.222954545	0.25	OK
9B2	9B2	9-BCB3	2218	0.051	0.051	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.045826446	0.05	OK
9C	EXISTING	9-BCB2	3444	0.079	0.079	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.071157025	0.08	OK
9D	EXISTING	TRENCH DRAIN 1	13194	0.303	0.303	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.272603306	0.30	OK
9E	EXISTING	TRENCH DRAIN 2	15807	0.363	0.363	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.326590909	0.36	OK
9F1	EXISTING	INLET	1597.02	0.037	0.037	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.032996281	0.04	OK
9F2	EXISTING	INLET	10029.73	0.230	0.230	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.207225826	0.23	OK
9F3	EXISTING	INLET	4790.26	0.110	0.110	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.098972314	0.11	OK
9G1	EXISTING	TRENCH DRAIN	11151.24	0.256	0.256	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.230397521	0.26	OK
9H	EXISTING	9-MH32	13320.07	0.306	0.306	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.275208058	0.31	OK
9I	EXISTING	9-MH34	10490.2	0.241	0.241	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.216739669	0.24	OK
	15	467+00	4170.52	0.096	0.096	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.086167769	0.10	OK
	16	468+62.18	3608.16	0.083	0.083	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.07454876	0.08	OK
SCUPPER	205	471+46.32	5367.95	0.123	0.123	0.90	0.000	0.13	0.000	0.23	0	0.39	0.90	5	0.110908058	0.12	OK
	17	470+39.73	3771.23	0.087	0.087	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.077917975	0.09	OK
SCUPPER	202		3041.1	0.070	0.070	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.062832645	0.07	OK
SCUPPER	203		13643.62	0.313	0.313	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.281892975	0.31	OK
SCUPPER	204		4900.09	0.112	0.112	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.101241529	0.11	OK
Total			149594.1900	3.4342	3.4342		0.0000		0.0000		0.0000						
Impervious				3.4342	3.4342		0.0000		0.0000		0.0000		0.90		3.09	3.43	
				100%											3.09078905		

SUMMARY OF EXISTING AND PROPOSED DRAINAGE AREAS FOR GATE 10

Existing Area Number	Proposed Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK AREA TO HIGH/ TO LOW OK
10-MH2		External CA	47997	1.102	1.102	0.90	0	0.13	0	0.23	0.000	0.39	0.90	5	0.991673564	1.10	OK
RR ROW CB1	DESIGNED BY OTHERS		63261	1.452	0.000	0.90	1.452	0.13	0	0.23	0.000	0.39	0.13	10	0.188795455	1.45	OK
AETNA YD 201	DESIGNED BY OTHERS		5975	0.137	0.000	0.90	0	0.13	0.137	0.23	0	0.39	0.23	10	0.031548439	0.14	OK
AETNA GC-1	DESIGNED BY OTHERS		13887	0.319	0.319	0.90	0	0.13	0	0.23	0.000	0.39	0.90	10	0.286921488	0.32	OK
AETNA CB 202	DESIGNED BY OTHERS		23859	0.548	0.211	0.90	0	0.13	0.337	0.23	0	0.39	0.49	10	0.267437098	0.55	OK
AETNA CB 203	DESIGNED BY OTHERS		23953	0.550	0.550	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.494896694	0.55	OK
EXISTING AETNA CB (10)	DESIGNED BY OTHERS		3020	0.069	0.069	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.062396694	0.07	OK
SCUPPER	200	RR ROW CB-1	4878.29	0.112	0.112	0.90	0	0.13	0	0.23	0	0.89	0.90	27	0.100791116	0.11	OK
SCUPPER	201	RR ROW CB-1	4988.88	0.115	0.115	0.90	0	0.13	0	0.23	0	0.89	0.90	27	0.103076033	0.11	OK
	12	460+86.88	1336.34	0.031	0.031	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.027610331	0.03	OK
	9	460+25.17	7092.42	0.163	0.163	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.146537603	0.16	OK
	10	460+71.43	2695.14	0.062	0.062	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.055684711	0.06	OK
	11	461+17.69	4951.41	0.114	0.114	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.10230186	0.11	OK
	13	463+46.39	2239.92	0.051	0.051	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.046279339	0.05	OK
	14	465+24.89	1792.56	0.041	0.041	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.037036364	0.04	OK
Total			211926.9600	4.8652	2.9391		1.4523		0.4738		0.0000		0.60		2.94	4.87	
Impervious				3.4610	2.9391		0.4793		0.0426		0.0000				2.942986777		
				71%													

0.462

SUMMARY OF EXISTING AND PROPOSED DRAINAGE AREAS TO GATE 11

Existing Area Number	Proposed Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
11-CB1	102	11+33.57	47391	1.088	0.544	0.90	0	0.13	0.544	0.23	0.000	0.39	0.57	15	0.614690427	1.09	OK
11-CB1A	103	11+65.87	40144	0.922	0.283	0.90	0	0.13	0	0.23	0.638	0.39	0.55	5	0.503974518	0.92	OK
11-CB2	104	12+04.21	33686	0.773	0.115	0.90	0	0.13	0	0.23	0.658	0.39	0.47	5	0.360451191	0.77	OK
11-CB3A	107	13+05.20	12248 11	0.281	0.038	0.90	0	0.13	0	0.23	0.244	0.39	0.46	5	0.128801949	0.28	OK
11-CB3B	11-CB3B	13+94.09	10678	0.245	0.245	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.220619835	0.25	OK
11-CB4A	11-CB4A	41+22.80	10351.36	0.238	0.238	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.213871074	0.24	OK
11-CB4B	DESIGNED BY OTHERS	11-CB4B	25451	0.584	0.584	0.90	0	0.13	0	0.23	0	0.39	0.90		0.525847107	0.58	OK
11-CB86	DESIGNED BY OTHERS	11-CB86	34950	0.802	0.000	0.90	0.802	0.13	0	0.23	0	0.39	0 13		0.104304408	0.80	
AETNA PARKING LOT	DESIGNED BY OTHERS	AETNA PARKING LOT	65115	1.495	1.495	0.90	0	0.13	0	0.23	0	0.39	0.90		1.34535124	1.49	OK
11-CB89A	DESIGNED BY OTHERS	11-CB89A	2868	0.066	0.000	0 90	0	0.13	0.066	0.23	0	0.39	0.23		0.015143251	0.07	OK
11-CB89B	DESIGNED BY OTHERS	11-CB89B	3324	0.076	0.000	0.90	0	0.13	0.076	0.23	0	0.39	0 23		0.017550964	0.08	OK
11-CB89C	DESIGNED BY OTHERS	11-CB89C	7467	0.171	0.000	0.90	0	0.13	0.171	0.23	0	0.39	0.23		0.039426309	0.17	OK
11-MH92	EXISTING	11-MH92	13823	0.317	0.317	0.90	0	0.13	0	0.23	0	0.39	0.90		0.285599174	0.32	OK
AETNA -YD MH	DESIGNED BY OTHERS	AETNA -YD MH	68973	1.583	0.000	0.90	0	0.13	1.583	0.23	0	0.39	0.23		0.364182507	1.58	OK
AETNA BLD CB-1	DESIGNED BY OTHERS	AETNA BLD CB-1	7988	0.183	0.000	0.90	0	0.13	0.183	0.23	0	0.39	0.23	10	0.042177227	0.18	OK
AETNA CB-2	DESIGNED BY OTHERS	AETNA CB-2	3599	0.083	0.000	0.90	0	0.13	0.083	0.23	0	0.39	0.23		0.019002984	0.08	OK
AETNA CB-3	DESIGNED BY OTHERS	AETNA CB-3	6884	0.158	0.061	0.90	0	0.13	0.097	0.23	0	0.39	0.49		0.077461662	0.16	OK
AETNA PARKING ROOF-1	DESIGNED BY OTHERS	AETNA PARKING ROOF	38345	0.880	0.880	0.90	0	0.13	0	0.23	0	0.39	0.90		0.792252056	0.88	OK
AETNA PARKING ROOF-2	DESIGNED BY OTHERS	AETNA PARKING ROOF	45908	1.054	1.054	0.90	0	0.13	0	0.23	0	0.39	0.90		0.948512397	1.05	OK
GATE 11 MH	EXISTING	GATE 11 MH	44886	1.030	1.030	0.90	0	0.13	0	0.23	0	0.39	0.90		0.927396694	1.03	OK
SIG-CB2A	116	42+47.33	20056.21	0.460	0.460	0.90	0	0.13	0	0.23	0.000	0.39	0.90	5	0.414384504	0.46	OK
SIG-CB2B	EXISTING	SIG-CB2B	30345	0.697	0.474	0.90	0	0.13	0.222	0.23	0	0.39	0.69		0.47805854	0.70	OK
SIG-CB3A	114	44+46.93	2283.17	0.052	0.052	0.90	0	0.13	0.000	0.23	0	0.39	0.90	5	0.047172934	0.05	OK
SIG-CB4A	SIG-CB4A	45+37.88	27005.33	0.620	0.321	0.90	0	0.13	0.299	0.23	0	0.39	0.58	5	0.357925296	0.62	OK
SIG-CB5A	SIG-CB5A	45+45.55	55796.665	1.281	0.554	0.90	0	0.13	0.726	0.23	0	0.39	0.52	5	0.666079039	1.28	OK
	1	450+44.65	4491.81	0.103	0.103	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.092805992	0.10	OK
	2	453+09.50	7321.89	0.168	0.168	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.151278719	0.17	OK
	3	454+00	2846.7	0.065	0.065	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.058816116	0.07	OK
	4	455+56.08	4463.4	0.102	0.102	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.092219008	0.10	OK
	5	456+51.83	4500 66	0.103	0.103	0.90	0	0 13	0	0.23	0	0 39	0.90	5	0.092988843	0.10	OK
	6	456+50.00	2535.32	0.058	0.058	0 90	0	0 13	0	0.23	0	0.39	0.90	5	0.052382645	0.06	OK
	8	458+00.00	5375.92	0.123	0.123	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.111072727	0.12	OK
	7	460+25 LT	12534.6	0.288	0.000	0.90	0	0.13	0 288	0.23	0	0.39	0.23	5	0.066183609	0.29	OK
	100	10+41.86	9962.43	0.229	0.229	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.205835331	0.23	OK
	101	11+18.60	36264.75	0.833	0.185	0.90	0	0.13	0 08110652	0.23	0.567	0.39	0.49	10	0.405839589	0.83	OK
	105	11+42.33	5296.72	0.122	0 122	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.109436364	0.12	OK
	106	12+50 00	3741.86	0.086	0.086	0 90	0	0 13	0	0.23	0	0.39	0.90	6	0.077311157	0.09	OK
	108	13+87.68	898.037	0.021	0.021	0 90	0	0.13	0	0.23	0	0.39	0 90	5	0.018554483	0.02	OK
	110	15+88.94	1747.65	0.040	0.040	0 90	0	0.13	0	0.23	0	0.39	0.90	5	0.036108471	0.04	OK
	110A	14+77.71	3758.85	0.086	0.086	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.07766219	0.09	OK
	110B	14+37.13	1008	0.023	0.023	0.90	0	0.13	0	0.23	0	0.39	0 90	5	0.020826446	0.02	OK
	111	43+42.81	2623.85	0.060	0.060	0.90	0	0.13	0	0 23	0	0.39	0.90	5	0 054211777	0.06	OK
	111A	14+28.00	774.113	0.018	0.018	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.01599407	0.02	OK
	112	42+39.9	4384.99	0.101	0.101	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.090598967	0.10	OK
	112 A	42+70.11	2077.67	0.048	0.048	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.042927066	0.05	OK
	113	43+76.56	7680.7	0.176	0 176	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.158692149	0.18	OK
	115	43+96 70	7558.54	0.174	0.174	0.90	0	0.13	0	0.23	0	0.39	0.90	5	0.156168182	0.17	OK
EXTERNAL CA TO TRUNK LINE	HARTFORD SOUTH		140263 2	3.220	0.960	0.90	0	0.13	0	0.23	2.26	0.71	0.77	5	2.4686	3.22	OK
Total			931677.5050	21 3884	11.7997		0.8023		4.4198		4.3665						
Impervious				15 4315	11 7997		0.2648		0.3978		2.9692		0.66		14.17	21.39	
				72%											14.1667512		
					3.0511												

SUMMARY OF PROPOSED DRAINAGE AREAS TO THE ARMORY PUMP STATION (36-INCH)

Existing Area Number	Proposed Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Comercial (Acres)	C Comercial	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)
A36-1	AR36-1	AB-CB1	10535	0.242	0.242	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.217665289	0.24
A36-2A	EXISTING	AB-CB-2	7720	0.177	0.177	0.90	0	0.13	0	0.00	0	0.89	0.90	5	0.159504132	0.18
A36-2B	EXISTING	AB-CB-2 (CA)	26272	0.603	0.603	0.90	0	0.13	0	0.00	0	0.89	0.90	10	0.542809917	0.60
A36-3	EXISTING	AB-CB-1(CA)	44565	1.023	1.023	0.90	0	0.13	0	0.00	0	0.89	0.90	10	0.920764463	1.02
A36-4	EXISTING	AB-CB-3	6116	0.140	0.140	0.90	0	0.13	0	0.00	0	0.89	0.90	5	0.126363636	0.14
A36-5	EXISTING	AB-CB-4	21484	0.493	0.493	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.443884298	0.49
A36-6A	EXISTING	--	2374	0.054	0.054	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.049049587	0.05
A36-6B	EXISTING	--	3376	0.078	0.078	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.069752066	0.08
A36-7A	EXISTING	AB-MH30	253592	5.822	4.366	0.90	0	0.13	1.455417815	0.23	0	0.89	0.73	10	4.264374197	5.82
A36-7B	EXISTING	AB-MH-3	9613	0.221	0.221	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.198615702	0.22
A36-8	EXISTING	--	269992	6.198	6.198	0.90	0	0.13	0	0.23	0	0.89	0.90	10	5.578347107	6.20
Total			655639.0000	15.0514	13.5960		0.0000		1.4554		0.0000					
Impervious				13.7270	13.5960		0.0000		0.1310		0.0000		0.84		12.57	15.05
				91%											12.57	

SUMMARY OF PROPOSED DRAINAGE AREAS TO ARMORY PUMP STATION 48"

Existing Area Number	Proposed Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Residential (Acres)	C Residential	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
AR-48-1	EXSITING		67861.00	1.56	0.58	0.90	0.98	0.13	0.00	0.23	0.00	0.39	0.42	64.17	0.65	1.56	OK
AR-48-1CA1	EXSITING		200756.00	4.61	1.53	0.90	0.53	0.13	2.55	0.23	0.00	0.39	0.44	156.23	2.03	4.61	OK
AR-48-1CA2	EXSITING		15359.00	0.35	0.25	0.90	0.00	0.13	0.11	0.23	0.00	0.39	0.70	10.00	0.25	0.35	OK
AR-48-1CA3	EXSITING		16093.00	0.37	0.23	0.90	0.14	0.13	0.00	0.23	0.00	0.39	0.61	10.00	0.22	0.37	OK
AR-48-1CA4	EXSITING		7616.00	0.17	0.17	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.16	0.17	OK
AR-48-2	EXSITING		8054.00	0.18	0.00	0.90	0.00	0.13	0.18	0.23	0.00	0.39	0.23	18.78	0.04	0.18	OK
AR48-2CA	EXSITING		6338.00	0.15	0.15	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.13	0.15	OK
AR-48-3	EXSITING		15018.00	0.34	0.00	0.90	0.00	0.13	0.34	0.23	0.00	0.39	0.23	14.07	0.08	0.34	OK
AR-MH12CA	EXSITING		3807.00	0.09	0.09	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.08	0.09	OK
AR-CB2	EXSITING		22550.00	0.52	0.09	0.90	0.00	0.13	0.43	0.23	0.00	0.39	0.34	21.95	0.18	0.52	OK
AR-CB3	EXSITING		9453.00	0.22	0.13	0.90	0.00	0.13	0.09	0.23	0.00	0.39	0.62	5.00	0.14	0.22	OK
AR-CB3 CA	EXSITING		7784.00	0.18	0.18	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.16	0.18	OK
AR-CB4	EXSITING		6143.00	0.14	0.04	0.90	0.00	0.13	0.10	0.23	0.00	0.39	0.43	10.00	0.06	0.14	OK
AR-CB6	EXSITING		3096.00	0.07	0.04	0.90	0.03	0.13	0.00	0.23	0.00	0.39	0.55	10.00	0.04	0.07	OK
AR-CB7	EXSITING		4444.00	0.10	0.02	0.90	0.09	0.13	0.00	0.23	0.00	0.39	0.26	10.00	0.03	0.10	OK
AR-CB8	EXSITING		7279.00	0.17	0.06	0.90	0.11	0.13	0.00	0.23	0.00	0.39	0.38	10.00	0.06	0.17	OK
AR-CB10	EXSITING		56645.00	1.30	0.24	0.90	0.68	0.13	0.39	0.23	0.00	0.39	0.30	36.35	0.39	1.30	OK
AR-CB13	EXSITING		2816.00	0.06	0.02	0.90	0.00	0.13	0.05	0.23	0.00	0.39	0.40	5.00	0.03	0.06	OK
AR-CB14	EXSITING		31372.00	0.72	0.16	0.90	0.00	0.13	0.56	0.23	0.00	0.39	0.38	49.61	0.27	0.72	OK
AR-CB16	EXSITING		25025.00	0.57	0.00	0.90	0.00	0.13	0.57	0.23	0.00	0.39	0.23	18.63	0.13	0.57	OK
AR-CB17	EXSITING																
AR-CB18	EXSITING		2683.50	0.06	0.06	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.06	0.06	OK
AR-CB13A	EXSITING		2573.80	0.06	0.06	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.05	0.06	OK
	31	902+85.55	2014.13	0.05	0.05	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.04	0.05	OK
	33	903+54.91	1046.5	0.02	0.02	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.02	0.02	OK
	34	904+15.54	988.375	0.02	0.02	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.02	0.02	OK
	35	904+27.54	348.76	0.01	0.01	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.01	0.01	OK
	36	904+39.54	2097.23	0.05	0.05	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.04	0.05	OK
	32	904+27.45 rt	1448.83	0.03	0.03	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.03	0.03	OK
	37	200+66.99	8697.22	0.20	0.20	0.90	0.00	0.13	0.00	0.23	0.00	0.39	0.90	5.00	0.18	0.20	OK
	W111-1	SLOPE	9134.290	0.21	0.00	0.90	0.00	0.13	0.21	0.23	0.00	0.39	0.23	18.6	0.05	0.21	OK
	W111-2	SLOPE	3048.180	0.07	0.00	0.90	0.00	0.13	0.07	0.23	0.00	0.39	0.23	15	0.02	0.07	OK
	W111-3	SLOPE	2501.150	0.06	0.00	0.90	0.00	0.13	0.06	0.23	0.00	0.39	0.23	10	0.01	0.06	OK
	W111-4	SLOPE	2190.370	0.05	0.00	0.90	0.00	0.13	0.05	0.23	0.00	0.39	0.23	10	0.01	0.05	OK
Total			556281.3350	12.7705	4.4526		2.5553		5.7626		0.0000						
Impervious				5.3734 42%	4.0115		0.8432		0.5186		0.0000		0.44		5.66 5.664923972	12.77	

SUMMARY OF PROPOSED DRAINAGE AREAS TO GULLY BROOK

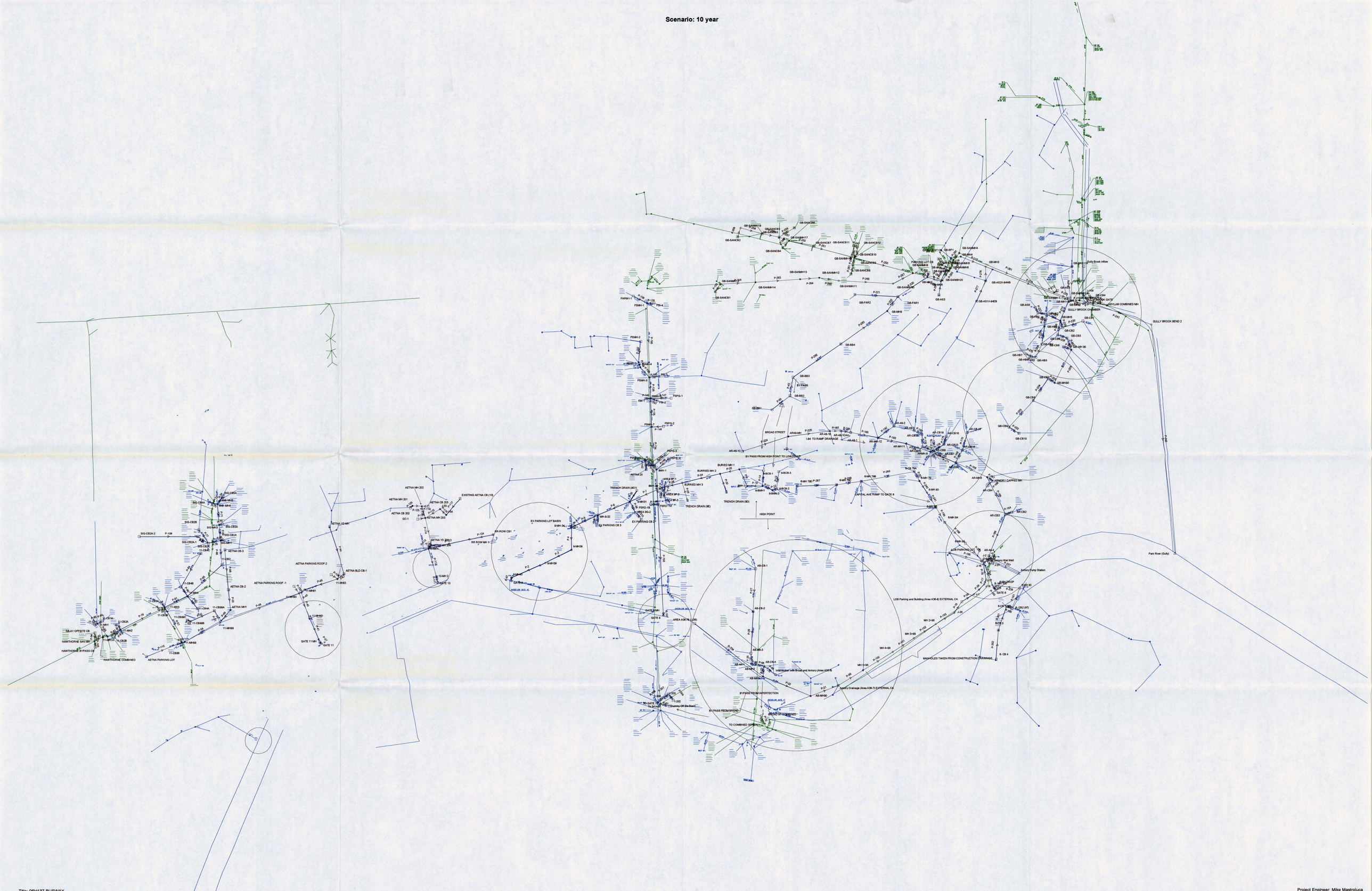
Existing Area Number	Proposed Area Number	Catch Basin ID	Area square ft	Area (Acres)	Area Pavement (Acres)	C Pavement	Area Wooded (Acres)	C Wooded	Area Grass (C soils) (Acres)	C Grass (C soils)	Area Comercial (Acres)	C Comercial	Weighted C	tc (Minutes)	CA CALCULATION	Check AREA (ACRES)	CHECK=AREA TO HIGH/ TO LOW/ OK
GB-CB2	EXISTING		0	0.000	0.000	0.90	0	0.13	0	0.23	0	0.89	0.00	5	0	0.00	OK
GB-CB3	EXISTING		0	0.000	0.000	0.90	0	0.13	0.000	0.23	0	0.89	0.00	10	0	0.00	OK
GB-CB4	EXISTING		24365	0.559	0.559	0.90	0	0.13	0.000	0.23	0	0.89	0.90	10	0.503409091	0.56	OK
GB-CB9	EXISTING		0	0.000	0.000	0.90	0	0.13	0	0.23	0	0.89	0.00	5	0	0.00	OK
GB-HB1	EXISTING		822	0.019	0.019	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.016983471	0.02	OK
GB-HB2	EXISTING		3211	0.074	0.074	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.066342975	0.07	OK
GB-HB3	EXISTING		1565	0.036	0.036	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.032334711	0.04	OK
GB-HB4	EXISTING		833	0.019	0.019	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.017210744	0.02	OK
GB-HB5	EXISTING		8231	0.189	0.189	0.90	0	0.13	0	0.23	0.000	0.89	0.90	10	0.170061983	0.19	OK
GB-HB7	EXISTING		61490	1.412	1.034	0.90	0.000	0.13	0	0.23	0.378076217	0.89	0.90	5	1.266673783	1.41	OK
GB-AS 1	EXISTING		6112	0.140	0.140	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.126280992	0.14	OK
GB-AS 2	EXISTING		14758	0.339	0.339	0.90	0	0.13	0	0.23	0	0.89	0.90	10	0.304917355	0.34	OK
GB-AS 3	EXISTING		26248	0.603	0.603	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.54231405	0.60	OK
GB-AS 4	EXISTING		18038	0.414	0.414	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.37268595	0.41	OK
GB-AS 5	EXISTING		11432	0.262	0.262	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.236198347	0.26	OK
GB-AS 6	EXISTING		9905	0.227	0.227	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.20464876	0.23	OK
GB-AS 1 CA	EXISTING		38899	0.893	0.893	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.803698347	0.89	OK
GB-AS 2 CA	EXISTING		77369	1.776	1.776	0.90	0	0.13	0	0.23	0	0.89	0.90	5	1.598533058	1.78	OK
GB-MH2 CA	EXISTING		44694	1.026	1.026	0.90	0	0.13	0	0.23	0	0.89	0.90	7	0.923429752	1.03	OK
GB-FAR 1	EXISTING		36906	0.847	0.000	0.90	0	0.13	0.847245179	0.23	0	0.89	0.23	10	0.194866391	0.85	OK
GB-FAR 2	EXISTING		6532	0.150	0.000	0.90	0	0.13	0.150	0.23	0	0.89	0.23	10	0.03448944	0.15	OK
GB-BB1	EXISTING		37344	0.857	0.857	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.771570248	0.86	OK
GB-BB2	EXISTING		3997	0.092	0.092	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.082582645	0.09	OK
GB-BB3	EXISTING		24446	0.561	0.281	0.90	0	0.13	0.281	0.23	0	0.89	0.57	10	0.31707966	0.56	OK
GB-BB4	EXISTING		10969	0.252	0.000	0.90	0	0.13	0.252	0.23	0	0.89	0.23	10	0.057917126	0.25	OK
GB-SP1	EXISTING		289909	6.655	6.655	0.90	0	0.13	0	0.23	0	0.89	0.90	10	5.989855372	6.66	OK
	40	484+42.75	1915.74	0.044	0.044	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.039581405	0.04	OK
	39	485+63.54	464.85	0.011	0.011	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.009604339	0.01	OK
	38	100+13.11	16315.91	0.375	0.375	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.337105579	0.37	OK
	41	486+95.62	4159.22	0.095	0.095	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.085934298	0.10	OK
	42	487+93.79	5201 62	0.119	0.119	0 90	0	0.13	0	0.23	0	0.89	0.90	5	0.107471488	0.12	OK
	43	489+23.80	5461.7	0.125	0.125	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.112845041	0.13	OK
	44	490+33.68	7574.107	0.174	0.174	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.156489814	0.17	OK
	46	206+51.63	801.03	0.018	0.018	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.016550207	0.02	OK
	47	205+83.27	3046.2	0.070	0.070	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.062938017	0.07	OK
	48	205+03 21	2233.38	0.051	0.051	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.046144215	0.05	OK
	50	204+61.66	4890.61	0.112	0.112	0.90	0	0.13	0	0.23	0	0.89	0.90	5	0.101045661	0.11	OK
	W111-5		2051.590	0.047	0.000	0.90	0	0.13	0.047	0.23	0	0.89	0.23	25.8	0.010832546	0.05	OK
	W111-6		1469.680	0.034	0.000	0.90	0	0.13	0.034	0.23	0	0.89	0.23	31.9	0.007760018	0.03	OK
	W111-7		1942.150	0.045	0.000	0.90	0	0.13	0.045	0.23	0	0.89	0.23	26.4	0.010254695	0.04	OK
	W111-8		3636.620	0.083	0.000	0.90	0	0.13	0.083	0.23	0	0.89	0.23	64.3	0.019201621	0.08	OK
	W111-9		2593.380	0.060	0.000	0.90	0	0.13	0.060	0.23	0	0.89	0.23	47.5	0.013693237	0.06	OK
Total			786035.7870	18.0449	16.3936		0.0000		1.7981		0.3781						
Impervious				16.8126	16.3936		0.0000		0.1618		0.2571		0.87		15.77	18.87	
				93%											15.77153643		

1.195

APPENDIX D-2

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

Scenario: 10 year


GULLY BROOK BEND 2
Gully Brook Inflow
GULLY BROOK COMBINED MH
GULLY BROOK CHAMBER
GULLY BROOK GATE
Park River (Outfall)
Armory Wet Well
Armory Pump Station
ARMORY CAPPED MH
ARMORY DP
LOB Parking and Building (Area A36-8) EXTERNAL CA
MANHOLES TAKEN FROM CONSTRUCTION DRAWINGS
Armory Drainage (Area A36-7) EXTERNAL CA
Intersection with Broad and Armory (Area A36-6)
BY PASS FROM INTERTECTION
BY PASS FROM BROAD
TO COMBINED SEWER
TO GATE 10
TO GATE 11
TO GATE 9
TO GATE 8
TO GATE 6
TO GATE 5
TO GATE 4
TO GATE 3
TO GATE 2
TO GATE 1
TO Dummy Of Site Basin
BY PASS FROM HIGH POINT TO LOW POINT
I-84 TO RAMP DRAINAGE
CAPITAL AVE RAMP TO GATE 6
HIGH POINT
TRENCH DRAIN (SE)
TRENCH DRAIN (SW)
TRENCH DRAIN (NW)
TRENCH DRAIN (NE)
EX PARKING LOT BASIN
EX PARKING CB 2
EX PARKING CB 3
AREA SP-1
AREA SP-2
AREA SP-3
AREA WQ-1
AREA WQ-2
AREA A36-7B (LOB)
AREA A36-7A (LOB)
AETNA DI
AETNA CB-1
AETNA CB-2
AETNA CB-3
AETNA MH
AETNA MH 201
AETNA MH 202
AETNA MH 203
AETNA CB 201
AETNA CB 202
AETNA CB 203
AETNA YD 201
AETNA YD 202
AETNA YD 203
AETNA LID MH
AETNA BLD CB-1
AETNA PARKING ROOF-1
AETNA PARKING ROOF-2
AETNA PARKING LOT
HAWTHORNE COMBINED
HAWTHORNE BYPASS CB
HAWTHORNE SAN MH
RELAY OFFSITE CB
EXISTING AETNA CB (10)
RR ROW CB1
RR ROW MH 1
BROAD STREET
AR48-MH
AR-48-1
AR-48-2
AR-48-1C
AR-48-1C1
AR-48-1C2
AR-MH-12
AR-MH-111
AR-CB-MF
AR-CB16
AR-CB15
AR-CB17
AR-CB18
AR-CB19
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AR-MH36
AR-MH37
AR-MH38
AR-MH39
AR-MH40

Scenario: 10 year

System Data (Busway)

Label	Inlet	Inlet Location	Bypass Target	Area (acres)	Composite Rational C	Time of Concentration (min)	System CA (acres)	System Flow Time (min)	External CA (acres)	External Time of Concentration (min)
Dummy Off Site Basin	Combination Type C Grate Type A - Park Curb	In Sag		0.372	0.90	0.00	0.396	0.00	0.000	0.00
BROAD ST COMBINED	Combination Type C Grate Type A - Plain Curb	In Sag		0.000	0.00	0.00	0.191	0.00	0.000	0.00
HAWTHORNE BYPASS CB	Combination Type C Grate Type A - Plain Curb	On Grade	11-CB2B	0.237	0.90	5.00	0.141	5.00	0.000	0.00
IMLAY OFFSITE CB	Combination Type C Grate Type A - Plain Curb	In Sag		0.838	0.49	10.00	0.711	10.00	0.000	0.00
AETNA PARKING LOT	Generic Manhole w/ External Flow	In Sag		1.583	0.90	5.00	0.764	5.00	0.000	0.00
SIG-CB2A-2	Grate Type C-L - Grate Type A	In Sag		1.190	0.59	10.00	0.702	10.00	0.000	0.00
AETNA PARKING ROOF -1	Generic Manhole w/ External Flow	In Sag		0.880	0.90	10.00	0.792	10.00	0.000	0.00
SIG-CB2A-1	Grate Type C-L - Grate Type A	In Sag		0.000	0.00	0.00	0.702	10.82	0.000	0.00
AETNA -YD MH	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.364	10.00	0.364	10.00
AETNA CB-3	Grate Type C-L - Grate Type A	On Grade	AETNA CB-2	0.158	0.49	5.00	0.646	10.00	0.583	10.00
SIG-CB1A	Grate Type C-L - Grate Type A	In Sag		0.125	0.63	5.00	0.079	5.00	0.000	0.00
11-CB1	Combination Type C Grate Type A - Plain Curb	On Grade	IMLAY OFFSITE CB	1.408	0.45	10.00	0.334	10.00	0.000	0.00
11-CB1A	Combination Type C Grate Type A - Plain Curb	On Grade	11-CB2A	1.223	0.51	10.00	0.330	10.00	0.000	0.00
11-CB2B	Combination Type C Grate Type A - Plain Curb	In Sag		0.164	0.90	5.00	0.261	5.00	0.000	0.00
11-CB2A	Combination Type C Grate Type A - Plain Curb	In Sag		0.761	0.46	10.00	0.938	10.00	0.000	0.00
SIG-CB2B	Grate Type C-L - Grate Type A	In Sag		0.697	0.69	10.00	0.481	10.00	0.000	0.00
SIG-CB2C	Combination Type C Grate Type A - Plain Curb	In Sag		0.321	0.90	5.00	1.614	11.10	0.000	0.00
SIG-CB4A	Grate Type C-L - Grate Type A	On Grade	SIG-CB2C	0.614	0.58	10.00	0.214	10.00	0.000	0.00
SIG-CB5A	Combination Type C Grate Type A - Plain Curb	On Grade	SIG-CB3A	1.506	0.48	10.00	0.367	10.00	0.000	0.00
SIG-CB3A	Combination Type C Grate Type A - Plain Curb	In Sag		0.571	0.31	10.00	0.720	10.00	0.000	0.00
11-CB2	Grate Type C-L - Grate Type A	On Grade	SIG-CB3A	0.457	0.90	5.00	3.218	11.35	0.000	0.00
11-CB4A	Combination Type C Grate Type A - Plain Curb	On Grade	11-CB3B	0.238	0.90	5.00	0.142	5.00	0.000	0.00
11-CB3A	Combination Type C Grate Type A - Plain Curb	On Grade	11-CB2A	0.658	0.90	5.00	0.298	5.00	0.000	0.00
11-CB3B	Combination Type C Grate Type A - Plain Curb	On Grade	11-CB2B	0.084	0.90	5.00	0.107	5.00	0.000	0.00
11-CB86	Grate Type C-L - Grate Type A	In Sag		1.050	0.13	30.00	0.900	30.00	0.000	0.00
11-CB89C	Grate Type C-L - Grate Type A	In Sag		0.197	0.23	5.00	0.045	5.00	0.000	0.00
11-CB89B	Combination Type C Grate Type A - Plain Curb	On Grade	11-CB89A	0.218	0.57	5.00	0.138	5.06	0.000	0.00
11-CB89A	Combination Type C Grate Type A - Plain Curb	In Sag		0.430	0.44	5.00	0.359	5.48	0.000	0.00
AETNA CB-2	Grate Type C-L - Grate Type A	In Sag		0.083	0.23	5.00	0.680	10.44	0.000	0.00
AETNA BLD CB-1	Grate Type C-L - Grate Type A	In Sag		0.227	0.23	5.00	0.416	10.47	0.000	0.00
GATE 11 MH	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	11.529	31.03	0.928	5.00
11-MH92	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	10.601	30.88	0.286	5.00
11-CB4C	Combination Type C Grate Type A - Plain Curb	In Sag		0.000	0.00	0.00	0.000	0.00	0.000	0.00
11-CB4B	Grate Type C-L - Grate Type A	In Sag		0.658	0.90	5.00	0.592	5.00	0.000	0.00
AETNA PARKING ROOF-2	Generic Manhole w/ External Flow	In Sag		1.054	0.90	10.00	0.949	10.00	0.000	0.00
GC-1	Generic Default 100%	In Sag		0.319	0.90	10.00	0.287	10.00	0.000	0.00
AETNA YD 201	Grate Type C-L - Grate Type B	In Sag		0.137	0.23	10.00	0.032	10.00	0.000	0.00
AETNA CB 202	Combination Type C Grate Type A - Plain Curb	On Grade	AETNA CB 203	0.050	0.90	5.00	0.310	10.00	0.270	10.00
RR-ROW CB1	Generic Default 100%	In Sag		1.452	0.13	10.00	0.189	10.00	0.000	0.00
AETNA CB 203	Grate Type C-L - Grate Type A	In Sag		0.550	0.90	5.00	0.500	5.00	0.000	0.00
10-MH 2	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	2.369	11.32	0.990	5.00
EXISTING AETNA CB (10)	Generic Default 100%	On Grade	AETNA CB 203	0.069	0.90	5.00	0.062	5.00	0.000	0.00
FSRD-1B	Generic Default 100%	In Sag		0.573	0.90	5.00	1.885	5.00	0.174	5.00
FSPG-2	Generic Manhole w/ External Flow	In Sag		0.360	0.90	10.00	0.324	10.00	0.000	0.00
FSPG-1	Generic Manhole w/ External Flow	In Sag		0.360	0.90	10.00	0.324	10.00	0.000	0.00
FSPG -4	Generic Manhole w/ External Flow	In Sag		0.360	0.90	10.00	0.324	10.00	0.000	0.00
FSPG-3	Generic Manhole w/ External Flow	In Sag		0.360	0.90	10.00	0.324	10.00	0.000	0.00
FSI-1	Combination Type C Grate Type A - Plain Curb	On Grade	FSRD-1B	0.940	0.90	10.00	0.534	10.00	0.000	0.00
FSI-2	Generic Default 100%	On Grade	FSRD -1A	0.260	0.90	5.00	0.420	5.00	0.000	0.00
AETNA DI	Grate Type C-L - Grate Type A	On Grade	FSRD-1B	1.190	0.77	10.00	0.423	10.00	0.000	0.00
FSI-3	Grate Type C-L - Grate Type A	On Grade	FSI-2	0.330	0.90	5.00	0.177	5.00	0.000	0.00
FSMH-10	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	1.313	10.12	0.890	10.00
FSRD -1A	Generic Default 100%	In Sag		0.540	0.90	5.00	8.215	11.31	0.000	0.00

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System Data (Busway)

Label	Inlet	Inlet Location	Bypass Target	Area (acres)	Composite Rational C	Time of Concentration (min)	System CA (acres)	System Flow Time (min)	External CA (acres)	External Time of Concentration (min)
FSMH-2	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	1.580	10.00	1.580	10.00
FSI-4	Combination Type C Grate Type A - Plain Curb	On Grade	FSI-2	0.180	0.90	5.00	0.135	5.00	0.000	0.00
FARM I-1	Combination Type C Grate Type A - Plain Curb	On Grade	FSI-1	1.990	0.39	10.00	0.386	10.00	0.000	0.00
AR-CB7	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB8	0.100	0.26	10.00	0.030	10.00	0.000	0.00
AR-48-4	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	5.404	164.96	0.000	0.00
AREA A36-7B (LOB)	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.200	10.00	0.200	10.00
LOB Parking and Buliding (Area A36-8) EX	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	12.304	16.87	5.570	10.00
AB-CB-4	Combination Type C Grate Type B - Park Curb	On Grade	BROAD ST COMBINED	0.493	0.90	5.00	2.274	10.69	0.000	0.00
Armory Drainage (Area A36-7) EXTERNA	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	6.734	15.40	4.260	10.00
Intersection with Broad and Armory (Area	Combination Type C Grate Type A - Park Curb	In Sag		0.132	0.90	5.00	0.119	5.00	0.000	0.00
AB-CB-1	Combination Type C Grate Type A - Park Curb	On Grade	AB-CB-2	0.242	0.90	5.00	1.076	10.00	0.920	10.00
AB-CB-2	Grate Type C-L - Grate Type A	On Grade	AB-CB-3	0.177	0.90	5.00	1.763	10.27	0.540	10.00
AB-CB-3	Combination Type C Grate Type A - Park Curb	On Grade	Dummy Off Site Basin	0.140	0.90	5.00	1.902	10.50	0.000	0.00
AR-48-1B	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	2.415	156.20	2.010	156.20
AR-48-1CA4	Generic Manhole w/ External Flow	On Grade	AR-48-1	1.560	0.42	60.00	2.575	156.32	0.160	5.00
AR-48-1	Grate Type C-L - Grate Type A	On Grade	AR-CB10	1.560	0.00	0.00	3.020	156.39	0.000	0.00
AR-48-3	Grate Type C-L - Grate Type A	On Grade	AR-CB15	0.340	0.23	14.00	0.078	14.00	0.000	0.00
AR-CB15	Grate Type C-L - Grate Type A	On Grade	AR-CB18	0.000	0.00	0.00	0.078	14.12	0.000	0.00
AR-CB10	Grate Type C-L - Grate Type A	On Grade	AR-CB8	1.300	0.30	36.00	0.646	36.00	0.000	0.00
AR-CB18	Grate Type C-L - Grate Type A	In Sag		0.240	0.33	19.00	0.080	19.00	0.000	0.00
AR-CB16	Grate Type C-L - Grate Type A	On Grade	AR-CB18	0.000	0.00	0.00	0.039	0.00	0.000	0.00
AR-CB13	Grate Type C-L - Grate Type A	In Sag		0.060	0.40	5.00	0.119	5.00	0.000	0.00
AR-CB8	Grate Type C-L - Grate Type A	In Sag		0.170	0.38	10.00	1.042	36.15	0.000	0.00
AR-CB-17	Grate Type C-L - Grate Type A	On Grade	AR-CB16	0.720	0.46	16.11	0.292	16.11	0.000	0.00
AR-CB14	Grate Type C-L - Grate Type A	On Grade	AR-CB13	0.860	0.30	50.00	0.495	50.00	0.000	0.00
AR-CB6	Grate Type C-L - Grate Type A	On Grade	AR-CB7	0.110	0.42	10.00	4.850	157.44	0.000	0.00
AR-CB2	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB14	0.520	0.34	22.00	0.197	22.00	0.000	0.00
AR-CB3	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB4	0.220	0.62	5.00	5.404	164.32	0.160	5.00
AR-CB4	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB6	0.140	0.43	10.00	0.061	10.00	0.000	0.00
AR-MH-12	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	3.272	156.61	0.080	5.00
AR-48-2	Grate Type C-L - Grate Type A	On Grade	AR-48-3	0.180	0.23	19.00	0.171	19.00	0.130	5.00
AR-48-1C	Combination Type C Grate Type A - Plain Curb	On Grade	AR-48-1	0.370	0.61	10.00	0.405	10.00	0.250	10.00
GB-CB4	Combination Type C Grate Type A - Plain Curb	In Sag		0.559	0.90	10.00	1.865	10.00	0.000	0.00
GB-AS5	Combination Type C Grate Type A - Plain Curb	On Grade	GB-CB4	0.262	0.90	5.00	0.708	5.00	0.000	0.00
GARNER ST CB	Generic Manhole w/ External Flow	On Grade	PARKING LOT CB	1.062	0.90	5.00	0.000	5.00	0.000	0.00
PARKING LOT CB	Generic Manhole w/ External Flow	On Grade	GB-AS2/I-84WB	0.000	0.00	0.00	0.000	0.00	0.000	0.00
GB-SANCB10	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS4	1.088	0.90	5.00	0.839	5.00	0.000	0.00
GB-SANCB7	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB10	0.614	0.90	5.00	0.536	5.00	0.000	0.00
GB-SANCB11	Grate Type C-L - Grate Type A	On Grade	GB-SANCB10	0.898	0.90	5.00	0.705	5.03	0.000	0.00
GB-SANCB12	Grate Type C-L - Grate Type A	On Grade	GB-SANCB10	0.830	0.90	5.00	0.343	5.00	0.000	0.00
GB-SANCB9	Combination Type C Grate Type B - Park Curb	On Grade	GB-AS4	0.167	0.90	5.00	0.294	5.06	0.000	0.00
GB-SANCB8	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS3	0.344	0.90	5.00	0.187	5.00	0.000	0.00
GB-SANCB1	Combination Type C Grate Type A - Plain Curb	On Grade	FSI-4	0.160	0.90	5.00	0.104	5.00	0.000	0.00
GB-SANCB6	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB5	1.244	0.90	5.00	0.466	5.00	0.000	0.00
GB-SANCB5	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB7	0.461	0.90	5.00	1.406	5.72	0.000	0.00
GB-SANCB4	Combination Type C Grate Type A - Plain Curb	On Grade	GB-BB1	0.125	0.90	5.00	0.115	5.00	0.000	0.00
GB-SANCB2	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB4	0.186	0.90	5.00	0.117	5.00	0.000	0.00
GB-SANCB3	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB5	0.640	0.90	5.00	0.410	5.61	0.000	0.00
Gully Brook inflow	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.000	0.00	0.000	0.00
GB-HB7	Combination Type C Grate Type A - Plain Curb	In Sag		1.412	0.90	10.00	1.271	10.00	0.000	0.00
GB-MH2 CA	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.923	10.00	0.923	10.00
GB-CB6	Grate Type PRW w/o Throat	On Grade	GB-CB5	0.124	0.90	5.00	0.104	5.00	0.000	0.00
GB-HB2	Combination Type C Grate Type A - Plain Curb	In Sag		0.074	0.90	5.00	1.807	10.38	0.000	0.00

System Data (Busway)

Label	Inlet	Inlet Location	Bypass Target	Area (acres)	Composite Rational C	Time of Concentration (min)	System CA (acres)	System Flow Time (min)	External CA (acres)	External Time of Concentration (min)
GB-SP1	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	7.952	12.20	5.990	10.00
GB-CB3	Grate Type C-L - Grate Type A	In Sag		0.135	0.23	10.00	0.634	10.09	0.000	0.00
GB-CB5	Grate Type CM-CS w/o Throat	On Grade	GB-CB1	0.031	0.90	10.00	0.603	10.00	0.000	0.00
GB-CB7	Grate Type PRW w/o Throat	On Grade	GB-CB6	0.058	0.90	5.00	0.438	5.78	0.000	0.00
GB-CB8	Grate Type PRW w/o Throat	On Grade	GB-CB7	0.080	0.90	5.00	0.344	5.53	0.000	0.00
GB-CB9	Grate Type PRW w/o Throat	On Grade	GB-CB8	0.375	0.90	5.00	0.205	5.17	0.000	0.00
GB-CB10	Grate Type C-L - Grate Type A	In Sag		0.051	0.23	5.00	0.012	5.00	0.000	0.00
GB-CB2	Combination Type C Grate Type A - Plain Curb	In Sag		0.245	0.90	5.00	0.533	6.33	0.000	0.00
GB-CB1	Combination Type C Grate Type A - Plain Curb	In Sag		0.128	0.90	5.00	0.125	5.00	0.000	0.00
GB-HB1	Combination Type C Grate Type A - Plain Curb	In Sag		0.019	0.90	5.00	0.250	5.10	0.000	0.00
GB-AS6	Combination Type C Grate Type A - Plain Curb	On Grade	GB-CB2	0.227	0.90	5.00	0.233	5.00	0.000	0.00
GB-HB3	Combination Type C Grate Type A - Plain Curb	On Grade	GB-HB2	0.036	0.90	5.00	1.486	10.31	0.000	0.00
GB-HB4	Combination Type C Grate Type A - Plain Curb	On Grade	GB-HB3	0.019	0.90	5.00	1.447	10.19	0.000	0.00
GB-HB5	Combination Type C Grate Type A - Plain Curb	On Grade	GB-HB4	0.189	0.90	5.00	1.390	10.09	0.000	0.00
GB-HB6	Combination Type C Grate Type A - Plain Curb	On Grade	GB-HB2	0.000	0.00	0.00	1.271	10.04	0.000	0.00
GB-AS2/I-84WB	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS5	0.339	0.90	10.00	3.575	10.00	1.600	5.00
GB-AS1/I-84EB	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS6	0.140	0.90	5.00	1.052	5.00	0.800	5.00
GB-AS3	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS1/I-84EB	0.603	0.90	5.00	0.324	5.00	0.000	0.00
GB-FAR2	Grate Type C-L - Grate Type A	On Grade	GB-FAR1	0.150	0.23	10.00	0.032	10.00	0.000	0.00
GB-FAR1	Grate Type C-L - Grate Type A	In Sag		0.847	0.23	10.00	0.891	11.57	0.000	0.00
GB-AS4	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS2/I-84WB	0.414	0.90	5.00	0.747	5.00	0.000	0.00
GB-BB4	Grate Type C-L - Grate Type A	On Grade	GB-FAR1	0.252	0.23	10.00	0.654	10.62	0.000	0.00
GB-BB3	Generic Manhole w/ External Flow	On Grade	GB-BB2	0.561	0.58	10.00	0.603	10.00	0.000	0.00
GB-BB1	Combination Type C Grate Type A - Park Curb	On Grade	9-BCB-1	0.857	0.90	5.00	0.375	5.00	0.000	0.00
GB-BB2	Combination Type C Grate Type A - Park Curb	On Grade	9-BCB-3	0.092	0.90	5.00	0.603	5.45	0.000	0.00
6- CB 4	Combination Type C Grate Type A - Plain Curb	On Grade	6- CB2 (97)	0.740	0.35	10.00	0.763	10.00	0.590	5.00
6-CB 3	Combination Type C Grate Type A - Plain Curb	On Grade	6-CB 1 (98)	0.070	0.90	5.00	0.816	10.34	0.000	0.00
LOB PARKING LOT	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	1.940	10.00	1.940	10.00
6-MH 90	Grate Type C-L - Grate Type A	On Grade	AR-CB2	0.350	0.23	10.00	2.191	10.71	1.020	10.00
6- CB2 (97)	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB2	0.310	0.50	10.00	1.104	10.58	0.000	0.00
6-CB 1 (98)	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB3	0.050	0.90	5.00	0.871	10.52	0.000	0.00
6-MH 82	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.410	10.45	0.130	5.00
6-MH 85	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.510	10.89	0.050	5.00
6-CB 79A	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.280	10.00	0.010	10.00
6-MH 79B	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.270	6.49	0.120	5.00
6-MH 79C	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.150	6.02	0.110	5.00
6-MH 79D	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.040	5.00	0.040	5.00
6-MH 84	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.460	10.59	0.050	5.00
I-204	Generic Default 100%	In Sag		0.100	0.90	5.00	1.415	10.13	0.000	0.00
I-203	Grate Type C-L - Grate Type A	In Sag		0.860	0.90	10.00	1.325	10.09	0.000	0.00
I-202	Grate Type C-L - Grate Type A	On Grade	I-203	0.612	0.90	10.00	0.295	10.00	0.000	0.00
EX PARKING CB 3	Generic Default 100%	In Sag		0.000	0.00	0.00	0.000	0.00	0.000	0.00
EX PARKING CB 2	Generic Default 100%	In Sag		0.000	0.00	0.00	0.000	0.00	0.000	0.00
AREA 9G-2	Grate Type C-L DG - Type I - Grate Type A	In Sag		0.000	0.00	0.00	0.000	0.00	0.000	0.00
TRENCH DRAIN (9G1)	Grate Type C-L - Grate Type A	In Sag		0.256	0.90	5.00	0.230	5.00	0.000	0.00
AREA 9F-3	Combination Type C Grate Type A - Plain Curb	In Sag		0.110	0.90	5.00	0.099	5.00	0.000	0.00
AREA 9F-2	Combination Type C Grate Type A - Plain Curb	In Sag		0.230	0.90	5.00	0.336	7.09	0.000	0.00
TRENCH DRAIN (9D)	Generic Default 100%	In Sag		0.303	0.90	5.00	0.273	5.00	0.000	0.00
TRENCH DRAIN (9E)	Grate Type C-L - Grate Type A	In Sag		0.363	0.90	5.00	0.327	5.00	0.000	0.00
MH-9-32	Generic Manhole w/ External Flow	In Sag		0.306	0.90	5.00	2.700	7.75	0.000	0.00
9-BCB-3	Combination Type C Grate Type A - Park Curb	In Sag		0.299	0.90	5.00	0.462	5.00	0.000	0.00
9-BCB-2	Combination Type C Grate Type A - Park Curb	On Grade	9-BCB-3	0.079	0.90	5.00	0.520	5.21	0.000	0.00
9-BCB-1	Combination Type C Grate Type B - Park Curb	In Sag		0.328	0.90	5.00	0.739	5.00	0.000	0.00

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Scenario: 10 year

System Data (Busway)

Label	Inlet	Inlet Location	Bypass Target	Area (acres)	Composite Rational C	Time of Concentration (min)	System CA (acres)	System Flow Time (min)	External CA (acres)	External Time of Concentration (min)
AREA 9F-1	Combination Type C Grate Type A - Plain Curb	On Grade	FSRD -1A	0.036	0.90	5.00	0.030	5.00	0.000	0.00
EX PARKING LOT BASIN	Generic Default 100%	In Sag		0.241	0.90	5.00	0.217	5.00	0.000	0.00

Scenario: 10 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
6- CB 4	Combination Type C Grate Type A - Plain Curb	0.740	0.35	10.00	4.80	0.259	0.000	0.259	1.25	On Grade	0.020000	0.020	0.12	6.19	0.00	0.42	0.086	6- CB2 (97)	0.173	0.0	0.590	5.00
6- CB2 (97)	Combination Type C Grate Type A - Plain Curb	0.310	0.50	10.00	4.80	0.155	0.086	0.241	1.17	On Grade	0.060000	0.060	0.15	2.47	0.00	0.04	0.008	AR-CB2	0.233	0.0	0.000	0.00
6-CB 1 (98)	Combination Type C Grate Type A - Plain Curb	0.050	0.90	5.00	6.00	0.045	0.009	0.054	0.33	On Grade	0.060000	0.060	0.09	1.53	0.00	0.00	0.000	AR-CB3	0.054	0.0	0.000	0.00
6-CB 3	Combination Type C Grate Type A - Plain Curb	0.070	0.90	5.00	6.00	0.063	0.000	0.063	0.38	On Grade	0.020000	0.020	0.08	3.96	0.00	0.06	0.009	6-CB 1 (98)	0.054	0.0	0.000	0.00
6-CB 79A	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.010	10.00
6-MH 79B	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.120	5.00
6-MH 79C	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.110	5.00
6-MH 79D	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.040	5.00
6-MH 82	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.130	5.00
6-MH 84	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.050	5.00
6-MH 85	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.050	5.00
6-MH 90	Grate Type C-L - Grate Type A	0.350	0.23	10.00	4.80	0.081	0.000	0.081	0.39	On Grade	0.020000	0.020	0.08	3.99	0.00	0.06	0.013	AR-CB2	0.067	0.0	1.020	10.00
9-BCB-1	Combination Type C Grate Type B - Park Curb	0.328	0.90	5.00	6.00	0.295	0.444	0.739	4.47	In Sag		0.020	0.31	15.48	0.00	0.00	0.000		0.739	0.0	0.000	0.00
9-BCB-2	Combination Type C Grate Type A - Park Curb	0.079	0.90	5.00	6.00	0.071	0.000	0.071	0.43	On Grade	0.007000	0.020	0.10	5.04	0.00	0.08	0.013	9-BCB-3	0.058	0.0	0.000	0.00
9-BCB-3	Combination Type C Grate Type A - Park Curb	0.299	0.90	5.00	6.00	0.269	0.193	0.462	2.79	In Sag		0.020	0.22	11.21	0.00	0.00	0.000		0.462	0.0	0.000	0.00
10-MH 2	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.990	5.00
11-CB1	Combination Type C Grate Type A - Plain Curb	1.408	0.45	10.00	4.80	0.634	0.000	0.634	3.07	On Grade	0.020000	0.020	0.17	8.65	0.00	1.45	0.300	IMLAY OFFSIT	0.334	0.0	0.000	0.00
11-CB1A	Combination Type C Grate Type A - Plain Curb	1.223	0.51	10.00	4.80	0.624	0.000	0.624	3.02	On Grade	0.020000	0.020	0.17	8.60	0.00	1.42	0.294	11-CB2A	0.330	0.0	0.000	0.00
11-CB2	Grate Type C-L - Grate Type A	0.457	0.90	5.00	6.00	0.411	0.000	0.411	2.49	On Grade	0.020000	0.020	0.16	8.00	0.00	1.13	0.187	SIG-CB3A	0.224	0.0	0.000	0.00
11-CB2A	Combination Type C Grate Type A - Plain Curb	0.761	0.46	10.00	4.80	0.350	0.588	0.938	4.54	In Sag		0.020	0.34	17.04	0.00	0.00	0.000		0.938	0.0	0.000	0.00
11-CB2B	Combination Type C Grate Type A - Plain Curb	0.164	0.90	5.00	6.00	0.148	0.114	0.261	1.58	In Sag		0.020	0.18	8.77	0.00	0.00	0.000		0.261	0.0	0.000	0.00
11-CB3A	Combination Type C Grate Type A - Plain Curb	0.658	0.90	5.00	6.00	0.592	0.000	0.592	3.58	On Grade	0.020000	0.020	0.18	9.17	0.00	1.78	0.294	11-CB2A	0.298	0.0	0.000	0.00
11-CB3B	Combination Type C Grate Type A - Plain Curb	0.084	0.90	5.00	6.00	0.076	0.073	0.148	0.90	On Grade	0.020000	0.020	0.11	5.45	0.00	0.25	0.041	11-CB2B	0.107	0.0	0.000	0.00
11-CB4A	Combination Type C Grate Type A - Plain Curb	0.238	0.90	5.00	6.00	0.214	0.000	0.214	1.30	On Grade	0.020000	0.020	0.13	6.26	0.00	0.44	0.073	11-CB3B	0.142	0.0	0.000	0.00
11-CB4B	Grate Type C-L - Grate Type A	0.658	0.90	5.00	6.00	0.592	0.000	0.592	3.58	In Sag		0.020	0.35	17.33	0.00	0.00	0.000		0.592	0.0	0.000	0.00
11-CB4C	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
11-CB86	Grate Type C-L - Grate Type A	1.050	0.13	30.00	2.80	0.137	0.000	0.137	0.38	In Sag		0.020	0.10	4.88	0.00	0.00	0.000		0.137	0.0	0.000	0.00
11-CB89A	Combination Type C Grate Type A - Plain Curb	0.430	0.44	5.00	6.00	0.189	0.031	0.220	1.33	In Sag		0.020	0.16	7.88	0.00	0.00	0.000		0.220	0.0	0.000	0.00
11-CB89B	Combination Type C Grate Type A - Plain Curb	0.218	0.57	5.00	6.00	0.124	0.000	0.124	0.75	On Grade	0.020000	0.020	0.10	5.11	0.00	0.19	0.031	11-CB89A	0.093	0.0	0.000	0.00
11-CB89C	Grate Type C-L - Grate Type A	0.197	0.23	5.00	6.00	0.045	0.000	0.045	0.27	In Sag		0.020	0.08	4.14	0.00	0.00	0.000		0.045	0.0	0.000	0.00
11-MH92	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.286	5.00
AB-CB-1	Combination Type C Grate Type A - Park Curb	0.242	0.90	5.00	6.00	0.218	0.000	0.218	1.32	On Grade	0.067700	0.020	0.10	5.01	0.00	0.38	0.062	AB-CB-2	0.156	0.0	0.920	10.00
AB-CB-2	Grate Type C-L - Grate Type A	0.177	0.90	5.00	6.00	0.159	0.062	0.222	1.34	On Grade	0.037700	0.020	0.11	5.63	0.00	0.45	0.075	AB-CB-3	0.147	0.0	0.540	10.00
AB-CB-3	Combination Type C Grate Type A - Park Curb	0.140	0.90	5.00	6.00	0.126	0.075	0.201	1.21	On Grade	0.037700	0.020	0.11	5.42	0.00	0.37	0.061	Dummy Off Site	0.139	0.0	0.000	0.00
AB-CB-4	Combination Type C Grate Type B - Park Curb	0.493	0.90	5.00	6.00	0.444	0.000	0.444	2.68	On Grade	0.040000	0.020	0.14	7.23	0.00	1.16	0.191	BROAD ST CO	0.253	0.0	0.000	0.00
AETNA -YD MH	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.364	10.00
AETNA BLD CB-1	Grate Type C-L - Grate Type A	0.227	0.23	5.00	6.00	0.052	0.000	0.052	0.32	In Sag		0.020	0.09	4.43	0.00	0.00	0.000		0.052	0.0	0.000	0.00
AETNA CB-2	Grate Type C-L - Grate Type A	0.083	0.23	5.00	6.00	0.019	0.015	0.034	0.21	In Sag		0.020	0.07	3.63	0.00	0.00	0.000		0.034	0.0	0.000	0.00
AETNA CB-3	Grate Type C-L - Grate Type A	0.158	0.49	5.00	6.00	0.077	0.000	0.077	0.47	On Grade	0.020000	0.020	0.09	4.28	0.00	0.09	0.015	AETNA CB-2	0.063	0.0	0.583	10.00
AETNA CB 202	Combination Type C Grate Type A - Plain Curb	0.050	0.90	5.00	6.00	0.045	0.000	0.045	0.27	On Grade	0.020000	0.020	0.07	3.49	0.00	0.03	0.005	AETNA CB 203	0.040	0.0	0.270	10.00
AETNA CB 203	Grate Type C-L - Grate Type A	0.550	0.90	5.00	6.00	0.495	0.005	0.500	3.02	In Sag		0.020	0.31	15.61	0.00	0.00	0.000		0.500	0.0	0.000	0.00
AETNA DI	Grate Type C-L - Grate Type A	1.190	0.77	10.00	4.80	0.916	0.000	0.916	4.44	On Grade	0.020000	0.020	0.20	9.94	0.00	2.39	0.494	FSRD-1B	0.423	0.0	0.000	0.00
AETNA PARKING LOT	Generic Manhole w/ External Flow	1.583	0.90	5.00	6.00	1.425	0.000	1.425	8.62	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		1.425		0.000	0.00
AETNA PARKING ROOF-2	Generic Manhole w/ External Flow	1.054	0.90	10.00	4.80	0.949	0.000	0.949	4.59	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.949		0.000	0.00
AETNA PARKING ROOF -1	Generic Manhole w/ External Flow	0.880	0.90	10.00	4.80	0.792	0.000	0.792	3.83	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.792		0.000	0.00
AETNA YD 201	Grate Type C-L - Grate Type B	0.137	0.23	10.00	4.80	0.032	0.000	0.032	0.15	In Sag		0.020	0.06	3.20	0.00	0.00	0.000		0.032	0.0	0.000	0.00
AR-48-1	Grate Type C-L - Grate Type A	1.560	0.00	0.00	0.00	0.000	0.725	0.725	4.39	On Grade	0.060000	0.060	0.24	4.05	0.00	1.70	0.281	AR-CB10	0.445	0.0	0.000	0.00
AR-48-1B	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		2.010	156.20
AR-48-1C	Combination Type C Grate Type A - Plain Curb	0.370	0.61	10.00	4.80	0.226	0.000	0.226	1.09	On Grade	0.020000	0.020	0.12	5.87	0.00	0.34	0.070	AR-48-1	0.155	0.0	0.250	10.00
AR-48-1CA4	Generic Manhole w/ External Flow	1.560	0.42	60.00	1.81	0.655	0.000	0.655	1.20	On Grade	0.020000	0.020	0.12	6.08	0.00	1.20	0.655	AR-48-1	0.000		0.160	5.00
AR-48-2	Grate Type C-L - Grate Type A	0.180	0.23	19.00	3.66	0.041	0.000	0.041	0.15	On Grade	0.040000	0.060	0.07	1.24	0.00	0.00	0.000	AR-48-3	0.041	0.0	0.130	5.00
AR-48-3	Grate Type C-L - Grate Type A	0.340	0.23	14.00	4.13	0.078	0.000	0.078	0.33	On Grade	0.040000	0.060	0.10	1.65	0.00	0.00	0.000	AR-CB15	0.078	0.0	0.000	0.00
AR-48-4	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00

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Scenario: 10 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudinal Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
AR-CB-17	Grate Type C-L - Grate Type A	0.720	0.46	16.11	3.89	0.331	0.000	0.331	1.30	On Grade	0.015000	0.055	0.19	3.51	0.00	0.15	0.039	AR-CB16	0.292	0.0	0.000	0.00
AR-CB2	Combination Type C Grate Type A - Plain Curb	0.520	0.34	22.00	3.43	0.177	0.021	0.198	0.68	On Grade	0.060000	0.060	0.12	2.02	0.00	0.00	0.001	AR-CB14	0.197	0.0	0.000	0.00
AR-CB3	Combination Type C Grate Type A - Plain Curb	0.220	0.62	5.00	6.00	0.136	0.000	0.136	0.82	On Grade	0.060000	0.060	0.13	2.17	0.00	0.01	0.001	AR-CB4	0.135	0.0	0.160	5.00
AR-CB4	Combination Type C Grate Type A - Plain Curb	0.140	0.43	10.00	4.80	0.060	0.001	0.061	0.30	On Grade	0.060000	0.060	0.09	1.48	0.00	0.00	0.000	AR-CB6	0.061	0.0	0.000	0.00
AR-CB6	Grate Type C-L - Grate Type A	0.110	0.42	10.00	4.80	0.046	0.000	0.046	0.22	On Grade	0.020000	0.020	0.06	3.24	0.00	0.02	0.004	AR-CB7	0.042	0.0	0.000	0.00
AR-CB7	Combination Type C Grate Type A - Plain Curb	0.100	0.26	10.00	4.80	0.026	0.004	0.030	0.15	On Grade	0.020000	0.060	0.08	1.39	0.00	0.00	0.000	AR-CB8	0.030	0.0	0.000	0.00
AR-CB8	Grate Type C-L - Grate Type A	0.170	0.38	10.00	4.80	0.065	0.103	0.168	0.81	In Sag		0.035	0.16	4.66	0.00	0.00	0.000		0.168	0.0	0.000	0.00
AR-CB10	Grate Type C-L - Grate Type A	1.300	0.30	36.00	2.60	0.390	0.281	0.671	1.76	On Grade	0.030000	0.050	0.18	3.67	0.00	0.27	0.103	AR-CB8	0.568	0.0	0.000	0.00
AR-CB13	Grate Type C-L - Grate Type A	0.060	0.40	5.00	6.00	0.024	0.056	0.080	0.49	In Sag		0.020	0.11	5.49	0.00	0.00	0.000		0.080	0.0	0.000	0.00
AR-CB14	Grate Type C-L - Grate Type A	0.860	0.30	50.00	2.13	0.258	0.001	0.259	0.55	On Grade	0.020000	0.020	0.09	4.55	0.00	0.12	0.056	AR-CB13	0.202	0.0	0.000	0.00
AR-CB15	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	On Grade	0.010000	0.040	0.00	0.00	0.00	0.00	0.000	AR-CB18	0.000	0.0	0.000	0.00
AR-CB16	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.039	0.039	0.24	On Grade	0.060000	0.030	0.06	2.09	0.00	0.00	0.000	AR-CB18	0.039	0.0	0.000	0.00
AR-CB18	Grate Type C-L - Grate Type A	0.240	0.33	19.00	3.66	0.079	0.000	0.080	0.29	In Sag		0.035	0.10	2.97	0.00	0.00	0.000		0.080	0.0	0.000	0.00
AR-MH-12	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.080	5.00
AREA 9F-1	Combination Type C Grate Type A - Plain Curb	0.036	0.90	5.00	6.00	0.032	0.000	0.032	0.19	On Grade	0.020000	0.020	0.06	3.08	0.00	0.01	0.002	FSRD -1A	0.030	0.0	0.000	0.00
AREA 9F-2	Combination Type C Grate Type A - Plain Curb	0.230	0.90	5.00	6.00	0.207	0.000	0.207	1.25	In Sag		0.020	0.15	7.57	0.00	0.00	0.000		0.207	0.0	0.000	0.00
AREA 9F-3	Combination Type C Grate Type A - Plain Curb	0.110	0.90	5.00	6.00	0.099	0.000	0.099	0.60	In Sag		0.020	0.09	4.68	0.00	0.00	0.000		0.099	0.0	0.000	0.00
AREA 9G-2	Grate Type C-L DG - Type I - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
AREA A36-7B (LOB)	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.200	10.00
Armory Drainage (Area A36-7) EXTEF	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		4.260	10.00
BROAD ST COMBINED	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.191	0.191	1.16	In Sag		0.020	0.14	7.17	0.00	0.00	0.000		0.191	0.0	0.000	0.00
Dummy Off Site Basin	Combination Type C Grate Type A - Park Curb	0.372	0.90	0.00	6.00	0.335	0.061	0.396	2.39	In Sag		0.020	0.20	10.05	0.00	0.00	0.000		0.396	0.0	0.000	0.00
EX PARKING CB 2	Generic Default 100%	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00
EX PARKING CB 3	Generic Default 100%	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00
EX PARKING LOT BASIN	Generic Default 100%	0.241	0.90	5.00	6.00	0.217	0.000	0.217	1.31	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.217		0.000	0.00
EXISTING AETNA CB (10)	Generic Default 100%	0.069	0.90	5.00	6.00	0.062	0.000	0.062	0.38	On Grade	0.020000	0.020	0.08	3.94	0.00	0.00	0.000	AETNA CB 203	0.062		0.000	0.00
FARM I-1	Combination Type C Grate Type A - Plain Curb	1.990	0.39	10.00	4.80	0.776	0.000	0.776	3.76	On Grade	0.020000	0.020	0.19	9.34	0.00	1.89	0.390	FSI-1	0.386	0.0	0.000	0.00
FSI-1	Combination Type C Grate Type A - Plain Curb	0.940	0.90	10.00	4.80	0.846	0.390	1.236	5.99	On Grade	0.020000	0.020	0.22	11.12	0.00	3.40	0.702	FSRD-1B	0.534	0.0	0.000	0.00
FSI-2	Generic Default 100%	0.260	0.90	5.00	6.00	0.234	0.186	0.420	2.54	On Grade	0.020000	0.020	0.16	8.06	0.00	0.00	0.000	FSRD -1A	0.420		0.000	0.00
FSI-3	Grate Type C-L - Grate Type A	0.330	0.90	5.00	6.00	0.297	0.000	0.297	1.80	On Grade	0.020000	0.020	0.14	7.08	0.00	0.73	0.120	FSI-2	0.177	0.0	0.000	0.00
FSI-4	Combination Type C Grate Type A - Plain Curb	0.180	0.90	5.00	6.00	0.162	0.040	0.202	1.22	On Grade	0.020000	0.020	0.12	6.12	0.00	0.40	0.066	FSI-2	0.135	0.0	0.000	0.00
FSMH-2	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		1.580	10.00
FSMH-10	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.890	10.00
FSPG-1	Generic Manhole w/ External Flow	0.360	0.90	10.00	4.80	0.324	0.000	0.324	1.57	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG-2	Generic Manhole w/ External Flow	0.360	0.90	10.00	4.80	0.324	0.000	0.324	1.57	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG-3	Generic Manhole w/ External Flow	0.360	0.90	10.00	4.80	0.324	0.000	0.324	1.57	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG -4	Generic Manhole w/ External Flow	0.360	0.90	10.00	4.80	0.324	0.000	0.324	1.57	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSRD-1B	Generic Default 100%	0.573	0.90	5.00	6.00	0.516	1.196	1.711	10.35	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		1.711		0.174	5.00
FSRD -1A	Generic Default 100%	0.540	0.90	5.00	6.00	0.486	0.002	0.488	2.95	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.488		0.000	0.00
GARNER ST CB	Generic Manhole w/ External Flow	1.062	0.90	5.00	6.00	0.956	0.000	0.956	5.78	On Grade	0.020000	0.020	0.22	10.97	0.00	5.78	0.956	PARKING LOT	0.000		0.000	0.00
GATE 11 MH	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.928	5.00
GB-AS1/I-84EB	Combination Type C Grate Type A - Plain Curb	0.140	0.90	5.00	6.00	0.126	0.342	0.468	2.83	On Grade	0.020000	0.020	0.17	8.39	0.00	1.30	0.216	GB-AS6	0.252	0.0	0.800	5.00
GB-AS2/I-84WB	Combination Type C Grate Type A - Plain Curb	0.339	0.90	10.00	4.80	0.305	2.452	2.757	13.35	On Grade	0.020000	0.020	0.30	15.02	0.00	8.88	1.834	GB-AS5	0.923	0.0	1.600	5.00
GB-AS3	Combination Type C Grate Type A - Plain Curb	0.603	0.90	5.00	6.00	0.543	0.123	0.666	4.03	On Grade	0.020000	0.020	0.19	9.58	0.00	2.07	0.342	GB-AS1/I-84EB	0.324	0.0	0.000	0.00
GB-AS4	Combination Type C Grate Type A - Plain Curb	0.414	0.90	5.00	6.00	0.373	1.871	2.244	13.57	On Grade	0.020000	0.020	0.30	15.11	0.00	9.05	1.496	GB-AS2/I-84WE	0.747	0.0	0.000	0.00
GB-AS5	Combination Type C Grate Type A - Plain Curb	0.262	0.90	5.00	6.00	0.236	1.834	2.070	12.52	On Grade	0.020000	0.020	0.29	14.66	0.00	8.24	1.362	GB-CB4	0.708	0.0	0.000	0.00
GB-AS6	Combination Type C Grate Type A - Plain Curb	0.227	0.90	5.00	6.00	0.204	0.216	0.420	2.54	On Grade	0.020000	0.020	0.16	8.06	0.00	1.13	0.187	GB-CB2	0.233	0.0	0.000	0.00
GB-BB1	Combination Type C Grate Type A - Park Curb	0.857	0.90	5.00	6.00	0.771	0.048	0.819	4.95	On Grade	0.020000	0.020	0.21	10.36	0.00	2.69	0.444	9-BCB-1	0.375	0.0	0.000	0.00
GB-BB2	Combination Type C Grate Type A - Park Curb	0.092	0.90	5.00	6.00	0.083	0.325	0.408	2.47	On Grade	0.020000	0.020	0.16	7.97	0.00	1.09	0.180	9-BCB-3	0.228	0.0	0.000	0.00
GB-BB3	Generic Manhole w/ External Flow	0.561	0.58	10.00	4.80	0.325	0.000	0.325	1.58	On Grade	0.020000	0.020	0.13	6.74	0.00	1.58	0.325	GB-BB2	0.000		0.000	0.00
GB-BB4	Grate Type C-L - Grate Type A	0.252	0.23	10.00	4.80	0.058	0.000	0.058	0.28	On Grade	0.020000	0.020	0.07	3.53	0.00	0.03	0.007	GB-FAR1	0.051	0.0	0.000	0.00
GB-CB1	Combination Type C Grate Type A - Plain Curb	0.128	0.90	5.00	6.00	0.115	0.010	0.125	0.76	In Sag		0.020	0.11	5.47	0.00	0.00	0.000		0.125	0.0	0.000	0.00
GB-CB2	Combination Type C Grate Type A - Plain Curb	0.245	0.90	5.00	6.00	0.221	0.187	0.407	2.46	In Sag		0.020	0.23	11.62	0.00	0.00	0.000		0.407	0.0	0.000	0.00

Scenario: 10 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
GB-CB3	Grate Type C-L - Grate Type A	0.135	0.23	10.00	4.80	0.031	0.000	0.031	0.15	In Sag		0.020	0.06	3.18	0.00	0.00	0.000		0.031	0.0	0.000	0.00
GB-CB4	Combination Type C Grate Type A - Plain Curb	0.559	0.90	10.00	4.80	0.503	1.362	1.865	9.03	In Sag		0.020	0.52	25.97	0.00	0.00	0.000		1.865	0.0	0.000	0.00
GB-CB5	Grate Type CM-CS w/o Throat	0.031	0.90	10.00	4.80	0.028	0.043	0.071	0.34	On Grade	0.020000	0.020	0.08	3.81	0.00	0.05	0.010	GB-CB1	0.061	0.0	0.000	0.00
GB-CB6	Grate Type PRW w/o Throat	0.124	0.90	5.00	6.00	0.112	0.035	0.147	0.89	On Grade	0.020000	0.020	0.11	5.44	0.00	0.26	0.043	GB-CB5	0.104	0.0	0.000	0.00
GB-CB7	Grate Type PRW w/o Throat	0.058	0.90	5.00	6.00	0.052	0.077	0.129	0.78	On Grade	0.020000	0.020	0.10	5.18	0.00	0.21	0.035	GB-CB6	0.094	0.0	0.000	0.00
GB-CB8	Grate Type PRW w/o Throat	0.080	0.90	5.00	6.00	0.072	0.144	0.216	1.31	On Grade	0.020000	0.020	0.13	6.28	0.00	0.47	0.077	GB-CB7	0.139	0.0	0.000	0.00
GB-CB9	Grate Type PRW w/o Throat	0.375	0.90	5.00	6.00	0.338	0.000	0.338	2.04	On Grade	0.020000	0.020	0.15	7.43	0.00	0.87	0.144	GB-CB8	0.194	0.0	0.000	0.00
GB-CB10	Grate Type C-L - Grate Type A	0.051	0.23	5.00	6.00	0.012	0.000	0.012	0.07	In Sag		0.020	0.05	2.40	0.00	0.00	0.000		0.012	0.0	0.000	0.00
GB-FAR1	Grate Type C-L - Grate Type A	0.847	0.23	10.00	4.80	0.195	0.009	0.204	0.99	In Sag		0.020	0.16	8.06	0.00	0.00	0.000		0.204	0.0	0.000	0.00
GB-FAR2	Grate Type C-L - Grate Type A	0.150	0.23	10.00	4.80	0.035	0.000	0.035	0.17	On Grade	0.020000	0.020	0.06	2.90	0.00	0.01	0.002	GB-FAR1	0.032	0.0	0.000	0.00
GB-HB1	Combination Type C Grate Type A - Plain Curb	0.019	0.90	5.00	6.00	0.017	0.000	0.017	0.10	In Sag		0.020	0.01	1.33	0.00	0.00	0.000		0.017	0.0	0.000	0.00
GB-HB2	Combination Type C Grate Type A - Plain Curb	0.074	0.90	5.00	6.00	0.067	0.004	0.071	0.43	In Sag		0.020	0.08	3.75	0.00	0.00	0.000		0.071	0.0	0.000	0.00
GB-HB3	Combination Type C Grate Type A - Plain Curb	0.036	0.90	5.00	6.00	0.032	0.011	0.043	0.26	On Grade	0.020000	0.020	0.07	3.44	0.00	0.03	0.004	GB-HB2	0.039	0.0	0.000	0.00
GB-HB4	Combination Type C Grate Type A - Plain Curb	0.019	0.90	5.00	6.00	0.017	0.051	0.068	0.41	On Grade	0.020000	0.020	0.08	4.08	0.00	0.07	0.011	GB-HB3	0.057	0.0	0.000	0.00
GB-HB5	Combination Type C Grate Type A - Plain Curb	0.189	0.90	5.00	6.00	0.170	0.000	0.170	1.03	On Grade	0.020000	0.020	0.11	5.74	0.00	0.31	0.051	GB-HB4	0.119	0.0	0.000	0.00
GB-HB6	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	On Grade	0.020000	0.020	0.00	0.00	0.00	0.00	0.000	GB-HB2	0.000	0.0	0.000	0.00
GB-HB7	Combination Type C Grate Type A - Plain Curb	1.412	0.90	10.00	4.80	1.271	0.000	1.271	6.15	In Sag		0.020	0.41	20.55	0.00	0.00	0.000		1.271	0.0	0.000	0.00
GB-MH2 CA	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.923	10.00
GB-SANCB1	Combination Type C Grate Type A - Plain Curb	0.160	0.90	5.00	6.00	0.144	0.000	0.144	0.87	On Grade	0.020000	0.020	0.11	5.40	0.00	0.24	0.040	FSI-4	0.104	0.0	0.000	0.00
GB-SANCB2	Combination Type C Grate Type A - Plain Curb	0.186	0.90	5.00	6.00	0.167	0.000	0.167	1.01	On Grade	0.020000	0.020	0.11	5.71	0.00	0.30	0.050	GB-SANCB4	0.117	0.0	0.000	0.00
GB-SANCB3	Combination Type C Grate Type A - Plain Curb	0.640	0.90	5.00	6.00	0.576	0.000	0.576	3.48	On Grade	0.020000	0.020	0.18	9.07	0.00	1.71	0.283	GB-SANCB5	0.293	0.0	0.000	0.00
GB-SANCB4	Combination Type C Grate Type A - Plain Curb	0.125	0.90	5.00	6.00	0.113	0.050	0.163	0.98	On Grade	0.020000	0.020	0.11	5.65	0.00	0.29	0.048	GB-BB1	0.115	0.0	0.000	0.00
GB-SANCB5	Combination Type C Grate Type A - Plain Curb	0.461	0.90	5.00	6.00	0.415	0.937	1.352	8.18	On Grade	0.020000	0.020	0.25	12.50	0.00	4.97	0.822	GB-SANCB7	0.530	0.0	0.000	0.00
GB-SANCB6	Combination Type C Grate Type A - Plain Curb	1.244	0.90	5.00	6.00	1.120	0.000	1.120	6.77	On Grade	0.020000	0.020	0.23	11.64	0.00	3.95	0.654	GB-SANCB5	0.466	0.0	0.000	0.00
GB-SANCB7	Combination Type C Grate Type A - Plain Curb	0.614	0.90	5.00	6.00	0.553	0.822	1.374	8.31	On Grade	0.020000	0.020	0.25	12.57	0.00	5.07	0.838	GB-SANCB10	0.536	0.0	0.000	0.00
GB-SANCB8	Combination Type C Grate Type A - Plain Curb	0.344	0.90	5.00	6.00	0.310	0.000	0.310	1.87	On Grade	0.020000	0.020	0.14	7.19	0.00	0.74	0.123	GB-AS3	0.187	0.0	0.000	0.00
GB-SANCB9	Combination Type C Grate Type B - Park Curb	0.167	0.90	5.00	6.00	0.150	0.000	0.150	0.91	On Grade	0.020000	0.020	0.11	5.48	0.00	0.26	0.042	GB-AS4	0.108	0.0	0.000	0.00
GB-SANCB10	Combination Type C Grate Type A - Plain Curb	1.088	0.90	5.00	6.00	0.979	1.689	2.668	16.13	On Grade	0.020000	0.020	0.32	16.12	0.00	11.06	1.829	GB-AS4	0.839	0.0	0.000	0.00
GB-SANCB11	Grate Type C-L - Grate Type A	0.898	0.90	5.00	6.00	0.808	0.000	0.808	4.89	On Grade	0.020000	0.020	0.21	10.30	0.00	2.70	0.446	GB-SANCB10	0.362	0.0	0.000	0.00
GB-SANCB12	Grate Type C-L - Grate Type A	0.830	0.90	5.00	6.00	0.747	0.000	0.747	4.52	On Grade	0.020000	0.020	0.20	10.00	0.00	2.45	0.404	GB-SANCB10	0.343	0.0	0.000	0.00
GB-SP1	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		5.990	10.00
GC-1	Generic Default 100%	0.319	0.90	10.00	4.80	0.287	0.000	0.287	1.39	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.287		0.000	0.00
Gully Brook inflow	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00
HAWTHORNE BYPASS CB	Combination Type C Grate Type A - Plain Curb	0.237	0.90	5.00	6.00	0.213	0.000	0.213	1.29	On Grade	0.020000	0.020	0.13	6.25	0.00	0.44	0.072	11-CB2B	0.141	0.0	0.000	0.00
I-202	Grate Type C-L - Grate Type A	0.612	0.90	10.00	4.80	0.551	0.000	0.551	2.67	On Grade	0.020000	0.020	0.16	8.21	0.00	1.24	0.256	I-203	0.295	0.0	0.000	0.00
I-203	Grate Type C-L - Grate Type A	0.860	0.90	10.00	4.80	0.774	0.256	1.030	4.99	In Sag		0.020	0.43	21.30	0.00	0.00	0.000		1.030	0.0	0.000	0.00
I-204	Generic Default 100%	0.100	0.90	5.00	6.00	0.090	0.000	0.090	0.54	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.090		0.000	0.00
IMLAY OFFSITE CB	Combination Type C Grate Type A - Plain Curb	0.838	0.49	10.00	4.80	0.411	0.300	0.711	3.44	In Sag		0.020	0.29	14.34	0.00	0.00	0.000		0.711	0.0	0.000	0.00
Intersection with Broad and Armory (A	Combination Type C Grate Type A - Park Curb	0.132	0.90	5.00	6.00	0.119	0.000	0.119	0.72	In Sag		0.020	0.08	3.87	0.00	0.00	0.000		0.119	0.0	0.000	0.00
LOB Parking and Buliding (Area A36-8	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		5.570	10.00
LOB PARKING LOT	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		1.940	10.00
MH-9-32	Generic Manhole w/ External Flow	0.306	0.90	5.00	6.00	0.275	0.000	0.275	1.67	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.275		0.000	0.00
PARKING LOT CB	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.956	0.956	5.78	On Grade	0.020000	0.020	0.22	10.97	0.00	5.78	0.956	GB-AS2/I-84WE	0.000		0.000	0.00
RR-ROW CB1	Generic Default 100%	1.452	0.13	10.00	4.80	0.189	0.000	0.189	0.91	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.189		0.000	0.00
SIG-CB1A	Grate Type C-L - Grate Type A	0.125	0.63	5.00	6.00	0.079	0.000	0.079	0.48	In Sag		0.020	0.11	5.44	0.00	0.00	0.000		0.079	0.0	0.000	0.00
SIG-CB2A-1	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
SIG-CB2A-2	Grate Type C-L - Grate Type A	1.190	0.59	10.00	4.80	0.702	0.000	0.702	3.40	In Sag		0.020	0.34	16.78	0.00	0.00	0.000		0.702	0.0	0.000	0.00
SIG-CB2B	Grate Type C-L - Grate Type A	0.697	0.69	10.00	4.80	0.481	0.000	0.481	2.33	In Sag		0.020	0.27	13.32	0.00	0.00	0.000		0.481	0.0	0.000	0.00
SIG-CB2C	Combination Type C Grate Type A - Plain Curb	0.321	0.90	5.00	6.00	0.289	0.142	0.431	2.60	In Sag		0.020	0.24	12.04	0.00	0.00	0.000		0.431	0.0	0.000	0.00
SIG-CB3A	Combination Type C Grate Type A - Plain Curb	0.571	0.31	10.00	4.80	0.177	0.543	0.720	3.49	In Sag		0.020	0.29	14.46	0.00	0.00	0.000		0.720	0.0	0.000	0.00
SIG-CB4A	Grate Type C-L - Grate Type A	0.614	0.58	10.00	4.80	0.356	0.000	0.356	1.72	On Grade	0.020000	0.020	0.14	6.97	0.00	0.69	0.142	SIG-CB2C	0.214	0.0	0.000	0.00
SIG-CB5A	Combination Type C Grate Type A - Plain Curb	1.506	0.48	10.00	4.80	0.723	0.000	0.723	3.50	On Grade	0.020000	0.020	0.18	9.09	0.00	1.72	0.356	SIG-CB3A	0.367	0.0	0.000	0.00
TRENCH DRAIN (9D)	Generic Default 100%	0.303	0.90	5.00	6.00	0.273	0.000	0.273	1.65	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.273		0.000	0.00

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Scenario: 10 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
TRENCH DRAIN (9E)	Grate Type C-L - Grate Type A	0.363	0.90	5.00	6.00	0.327	0.000	0.327	1.98	In Sag		0.020	0.24	12.07	0.00	0.00	0.000		0.327	0.0	0.000	0.00
TRENCH DRAIN (9G1)	Grate Type C-L - Grate Type A	0.256	0.90	5.00	6.00	0.230	0.000	0.230	1.39	In Sag		0.020	0.20	9.82	0.00	0.00	0.000		0.230	0.0	0.000	0.00

Scenario: 25 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
6- CB 4	Combination Type C Grate Type A - Plain Curb	0.740	0.35	10.00	5.47	0.259	0.000	0.259	1.43	On Grade	0.020000	0.020	0.13	6.50	0.00	0.51	0.092	6- CB2 (97)	0.167	0.0	0.590	5.00
6- CB2 (97)	Combination Type C Grate Type A - Plain Curb	0.310	0.50	10.00	5.47	0.155	0.092	0.247	1.36	On Grade	0.060000	0.060	0.16	2.61	0.00	0.09	0.016	AR-CB2	0.230	0.0	0.000	0.00
6-CB 1 (98)	Combination Type C Grate Type A - Plain Curb	0.050	0.90	5.00	6.70	0.045	0.010	0.055	0.37	On Grade	0.060000	0.060	0.10	1.61	0.00	0.00	0.000	AR-CB3	0.055	0.0	0.000	0.00
6-CB 3	Combination Type C Grate Type A - Plain Curb	0.070	0.90	5.00	6.70	0.063	0.000	0.063	0.43	On Grade	0.020000	0.020	0.08	4.12	0.00	0.07	0.010	6-CB 1 (98)	0.053	0.0	0.000	0.00
6-CB 79A	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.010	10.00
6-MH 79B	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.120	5.00
6-MH 79C	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.110	5.00
6-MH 79D	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.040	5.00
6-MH 82	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.130	5.00
6-MH 84	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.050	5.00
6-MH 85	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.050	5.00
6-MH 90	Grate Type C-L - Grate Type A	0.350	0.23	10.00	5.47	0.081	0.000	0.081	0.44	On Grade	0.020000	0.020	0.08	4.19	0.00	0.08	0.015	AR-CB2	0.066	0.0	1.020	10.00
9-BCB-1	Combination Type C Grate Type B - Park Curb	0.328	0.90	5.00	6.70	0.295	0.459	0.755	5.10	In Sag		0.020	0.34	16.89	0.00	0.00	0.000		0.755	0.0	0.000	0.00
9-BCB-2	Combination Type C Grate Type A - Park Curb	0.079	0.90	5.00	6.70	0.071	0.000	0.071	0.48	On Grade	0.007000	0.020	0.11	5.25	0.00	0.10	0.014	9-BCB-3	0.057	0.0	0.000	0.00
9-BCB-3	Combination Type C Grate Type A - Park Curb	0.299	0.90	5.00	6.70	0.269	0.201	0.470	3.17	In Sag		0.020	0.24	12.24	0.00	0.00	0.000		0.470	0.0	0.000	0.00
10-MH 2	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.990	5.00
11-CB1	Combination Type C Grate Type A - Plain Curb	1.408	0.45	10.00	5.47	0.634	0.000	0.634	3.50	On Grade	0.020000	0.020	0.18	9.09	0.00	1.72	0.312	IMLAY OFFSIT	0.321	0.0	0.000	0.00
11-CB1A	Combination Type C Grate Type A - Plain Curb	1.223	0.51	10.00	5.47	0.624	0.000	0.624	3.44	On Grade	0.020000	0.020	0.18	9.03	0.00	1.69	0.306	11-CB2A	0.318	0.0	0.000	0.00
11-CB2	Grate Type C-L - Grate Type A	0.457	0.90	5.00	6.70	0.411	0.000	0.411	2.78	On Grade	0.020000	0.020	0.17	8.34	0.00	1.31	0.194	SIG-CB3A	0.217	0.0	0.000	0.00
11-CB2A	Combination Type C Grate Type A - Plain Curb	0.761	0.46	10.00	5.47	0.350	0.609	0.959	5.29	In Sag		0.020	0.37	18.74	0.00	0.00	0.000		0.959	0.0	0.000	0.00
11-CB2B	Combination Type C Grate Type A - Plain Curb	0.164	0.90	5.00	6.70	0.148	0.122	0.269	1.82	In Sag		0.020	0.19	9.60	0.00	0.00	0.000		0.269	0.0	0.000	0.00
11-CB3A	Combination Type C Grate Type A - Plain Curb	0.658	0.90	5.00	6.70	0.592	0.000	0.592	4.00	On Grade	0.020000	0.020	0.19	9.56	0.00	2.05	0.303	11-CB2A	0.289	0.0	0.000	0.00
11-CB3B	Combination Type C Grate Type A - Plain Curb	0.084	0.90	5.00	6.70	0.076	0.076	0.152	1.03	On Grade	0.020000	0.020	0.11	5.74	0.00	0.31	0.046	11-CB2B	0.106	0.0	0.000	0.00
11-CB4A	Combination Type C Grate Type A - Plain Curb	0.238	0.90	5.00	6.70	0.214	0.000	0.214	1.45	On Grade	0.020000	0.020	0.13	6.53	0.00	0.52	0.076	11-CB3B	0.138	0.0	0.000	0.00
11-CB4B	Grate Type C-L - Grate Type A	0.658	0.90	5.00	6.70	0.592	0.000	0.592	4.00	In Sag		0.020	0.37	18.56	0.00	0.00	0.000		0.592	0.0	0.000	0.00
11-CB4C	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
11-CB86	Grate Type C-L - Grate Type A	1.050	0.13	30.00	3.31	0.137	0.000	0.137	0.46	In Sag		0.020	0.11	5.31	0.00	0.00	0.000		0.137	0.0	0.000	0.00
11-CB89A	Combination Type C Grate Type A - Plain Curb	0.430	0.44	5.00	6.70	0.189	0.033	0.223	1.50	In Sag		0.020	0.17	8.50	0.00	0.00	0.000		0.223	0.0	0.000	0.00
11-CB89B	Combination Type C Grate Type A - Plain Curb	0.218	0.57	5.00	6.70	0.124	0.000	0.124	0.84	On Grade	0.020000	0.020	0.11	5.32	0.00	0.23	0.033	11-CB89A	0.091	0.0	0.000	0.00
11-CB89C	Grate Type C-L - Grate Type A	0.197	0.23	5.00	6.70	0.045	0.000	0.045	0.31	In Sag		0.020	0.09	4.36	0.00	0.00	0.000		0.045	0.0	0.000	0.00
11-MH92	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.286	5.00
AB-CB-1	Combination Type C Grate Type A - Park Curb	0.242	0.90	5.00	6.70	0.218	0.000	0.218	1.47	On Grade	0.067700	0.020	0.10	5.23	0.00	0.45	0.066	AB-CB-2	0.151	0.0	0.920	10.00
AB-CB-2	Grate Type C-L - Grate Type A	0.177	0.90	5.00	6.70	0.159	0.066	0.226	1.52	On Grade	0.037700	0.020	0.12	5.91	0.00	0.54	0.081	AB-CB-3	0.145	0.0	0.540	10.00
AB-CB-3	Combination Type C Grate Type A - Park Curb	0.140	0.90	5.00	6.70	0.126	0.081	0.207	1.40	On Grade	0.037700	0.020	0.11	5.72	0.00	0.46	0.068	Dummy Off Site	0.139	0.0	0.000	0.00
AB-CB-4	Combination Type C Grate Type B - Park Curb	0.493	0.90	5.00	6.70	0.444	0.000	0.444	3.00	On Grade	0.040000	0.020	0.15	7.53	0.00	1.34	0.199	BROAD ST CO	0.245	0.0	0.000	0.00
AETNA -YD MH	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.364	10.00
AETNA BLD CB-1	Grate Type C-L - Grate Type A	0.227	0.23	5.00	6.70	0.052	0.000	0.052	0.35	In Sag		0.020	0.09	4.67	0.00	0.00	0.000		0.052	0.0	0.000	0.00
AETNA CB-2	Grate Type C-L - Grate Type A	0.083	0.23	5.00	6.70	0.019	0.016	0.035	0.24	In Sag		0.020	0.08	3.88	0.00	0.00	0.000		0.035	0.0	0.000	0.00
AETNA CB-3	Grate Type C-L - Grate Type A	0.158	0.49	5.00	6.70	0.077	0.000	0.077	0.52	On Grade	0.020000	0.020	0.09	4.46	0.00	0.11	0.016	AETNA CB-2	0.061	0.0	0.583	10.00
AETNA CB 202	Combination Type C Grate Type A - Plain Curb	0.050	0.90	5.00	6.70	0.045	0.000	0.045	0.30	On Grade	0.020000	0.020	0.07	3.64	0.00	0.04	0.005	AETNA CB 203	0.040	0.0	0.270	10.00
AETNA CB 203	Grate Type C-L - Grate Type A	0.550	0.90	5.00	6.70	0.495	0.005	0.500	3.38	In Sag		0.020	0.33	16.72	0.00	0.00	0.000		0.500	0.0	0.000	0.00
AETNA DI	Grate Type C-L - Grate Type A	1.190	0.77	10.00	5.47	0.916	0.000	0.916	5.05	On Grade	0.020000	0.020	0.21	10.43	0.00	2.81	0.510	FSRD-1B	0.406	0.0	0.000	0.00
AETNA PARKING LOT	Generic Manhole w/ External Flow	1.583	0.90	5.00	6.70	1.425	0.000	1.425	9.62	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		1.425		0.000	0.00
AETNA PARKING ROOF-2	Generic Manhole w/ External Flow	1.054	0.90	10.00	5.47	0.949	0.000	0.949	5.23	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.949		0.000	0.00
AETNA PARKING ROOF -1	Generic Manhole w/ External Flow	0.880	0.90	10.00	5.47	0.792	0.000	0.792	4.37	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.792		0.000	0.00
AETNA YD 201	Grate Type C-L - Grate Type B	0.137	0.23	10.00	5.47	0.032	0.000	0.032	0.17	In Sag		0.020	0.07	3.38	0.00	0.00	0.000		0.032	0.0	0.000	0.00
AR-48-1	Grate Type C-L - Grate Type A	1.560	0.00	0.00	0.00	0.000	0.730	0.730	4.93	On Grade	0.060000	0.060	0.25	4.23	0.00	2.07	0.306	AR-CB10	0.424	0.0	0.000	0.00
AR-48-1B	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		2.010	156.20
AR-48-1C	Combination Type C Grate Type A - Plain Curb	0.370	0.61	10.00	5.47	0.226	0.000	0.226	1.25	On Grade	0.020000	0.020	0.12	6.17	0.00	0.41	0.075	AR-48-1	0.151	0.0	0.250	10.00
AR-48-1CA4	Generic Manhole w/ External Flow	1.560	0.42	60.00	2.17	0.655	0.000	0.655	1.43	On Grade	0.020000	0.020	0.13	6.50	0.00	1.43	0.655	AR-48-1	0.000		0.160	5.00
AR-48-2	Grate Type C-L - Grate Type A	0.180	0.23	19.00	4.25	0.041	0.000	0.041	0.18	On Grade	0.040000	0.060	0.08	1.31	0.00	0.00	0.000	AR-48-3	0.041	0.0	0.130	5.00
AR-48-3	Grate Type C-L - Grate Type A	0.340	0.23	14.00	4.76	0.078	0.000	0.078	0.38	On Grade	0.040000	0.060	0.10	1.74	0.00	0.00	0.000	AR-CB15	0.078	0.0	0.000	0.00
AR-48-4	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00

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Scenario: 25 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
AR-CB-17	Grate Type C-L - Grate Type A	0.720	0.46	16.11	4.52	0.331	0.000	0.331	1.51	On Grade	0.015000	0.055	0.20	3.72	0.00	0.21	0.045	AR-CB16	0.286	0.0	0.000	0.00
AR-CB2	Combination Type C Grate Type A - Plain Curb	0.520	0.34	22.00	4.02	0.177	0.031	0.208	0.84	On Grade	0.060000	0.060	0.13	2.18	0.00	0.01	0.002	AR-CB14	0.206	0.0	0.000	0.00
AR-CB3	Combination Type C Grate Type A - Plain Curb	0.220	0.62	5.00	6.70	0.136	0.000	0.136	0.92	On Grade	0.060000	0.060	0.14	2.26	0.00	0.01	0.002	AR-CB4	0.135	0.0	0.160	5.00
AR-CB4	Combination Type C Grate Type A - Plain Curb	0.140	0.43	10.00	5.47	0.060	0.002	0.062	0.34	On Grade	0.060000	0.060	0.09	1.56	0.00	0.00	0.000	AR-CB6	0.062	0.0	0.000	0.00
AR-CB6	Grate Type C-L - Grate Type A	0.110	0.42	10.00	5.47	0.046	0.000	0.046	0.25	On Grade	0.020000	0.020	0.07	3.40	0.00	0.03	0.005	AR-CB7	0.041	0.0	0.000	0.00
AR-CB7	Combination Type C Grate Type A - Plain Curb	0.100	0.26	10.00	5.47	0.026	0.005	0.031	0.17	On Grade	0.020000	0.060	0.09	1.48	0.00	0.00	0.000	AR-CB8	0.031	0.0	0.000	0.00
AR-CB8	Grate Type C-L - Grate Type A	0.170	0.38	10.00	5.47	0.065	0.128	0.193	1.06	In Sag		0.035	0.19	5.33	0.00	0.00	0.000		0.193	0.0	0.000	0.00
AR-CB10	Grate Type C-L - Grate Type A	1.300	0.30	36.00	3.07	0.390	0.306	0.696	2.15	On Grade	0.030000	0.050	0.20	3.96	0.00	0.40	0.128	AR-CB8	0.568	0.0	0.000	0.00
AR-CB13	Grate Type C-L - Grate Type A	0.060	0.40	5.00	6.70	0.024	0.064	0.088	0.60	In Sag		0.020	0.12	6.12	0.00	0.00	0.000		0.088	0.0	0.000	0.00
AR-CB14	Grate Type C-L - Grate Type A	0.860	0.30	50.00	2.56	0.258	0.002	0.260	0.67	On Grade	0.020000	0.020	0.10	4.89	0.00	0.17	0.064	AR-CB13	0.196	0.0	0.000	0.00
AR-CB15	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	On Grade	0.010000	0.040	0.00	0.07	0.00	0.00	0.000	AR-CB18	0.000	0.0	0.000	0.00
AR-CB16	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.045	0.045	0.31	On Grade	0.060000	0.030	0.07	2.30	0.00	0.01	0.001	AR-CB18	0.044	0.0	0.000	0.00
AR-CB18	Grate Type C-L - Grate Type A	0.240	0.33	19.00	4.25	0.079	0.001	0.080	0.34	In Sag		0.035	0.11	3.16	0.00	0.00	0.000		0.080	0.0	0.000	0.00
AR-MH-12	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.080	5.00
AREA 9F-1	Combination Type C Grate Type A - Plain Curb	0.036	0.90	5.00	6.70	0.032	0.000	0.032	0.22	On Grade	0.020000	0.020	0.06	3.21	0.00	0.02	0.003	FSRD -1A	0.030	0.0	0.000	0.00
AREA 9F-2	Combination Type C Grate Type A - Plain Curb	0.230	0.90	5.00	6.70	0.207	0.000	0.207	1.40	In Sag		0.020	0.16	8.12	0.00	0.00	0.000		0.207	0.0	0.000	0.00
AREA 9F-3	Combination Type C Grate Type A - Plain Curb	0.110	0.90	5.00	6.70	0.099	0.000	0.099	0.67	In Sag		0.020	0.10	5.02	0.00	0.00	0.000		0.099	0.0	0.000	0.00
AREA 9G-2	Grate Type C-L DG - Type I - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
AREA A36-7B (LOB)	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.200	10.00
Armory Drainage (Area A36-7) EXTEF	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		4.260	10.00
BROAD ST COMBINED	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.199	0.199	1.34	In Sag		0.020	0.16	7.91	0.00	0.00	0.000		0.199	0.0	0.000	0.00
Dummy Off Site Basin	Combination Type C Grate Type A - Park Curb	0.372	0.90	0.00	6.70	0.335	0.068	0.402	2.72	In Sag		0.020	0.22	10.99	0.00	0.00	0.000		0.402	0.0	0.000	0.00
EX PARKING CB 2	Generic Default 100%	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00
EX PARKING CB 3	Generic Default 100%	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00
EX PARKING LOT BASIN	Generic Default 100%	0.241	0.90	5.00	6.70	0.217	0.000	0.217	1.46	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.217		0.000	0.00
EXISTING AETNA CB (10)	Generic Default 100%	0.069	0.90	5.00	6.70	0.062	0.000	0.062	0.42	On Grade	0.020000	0.020	0.08	4.10	0.00	0.00	0.000	AETNA CB 203	0.062		0.000	0.00
FARM I-1	Combination Type C Grate Type A - Plain Curb	1.990	0.39	10.00	5.47	0.776	0.000	0.776	4.28	On Grade	0.020000	0.020	0.20	9.80	0.00	2.23	0.405	FSI-1	0.371	0.0	0.000	0.00
FSI-1	Combination Type C Grate Type A - Plain Curb	0.940	0.90	10.00	5.47	0.846	0.405	1.251	6.90	On Grade	0.020000	0.020	0.23	11.73	0.00	4.05	0.733	FSRD-1B	0.517	0.0	0.000	0.00
FSI-2	Generic Default 100%	0.260	0.90	5.00	6.70	0.234	0.196	0.430	2.91	On Grade	0.020000	0.020	0.17	8.48	0.00	0.00	0.000	FSRD -1A	0.430		0.000	0.00
FSI-3	Grate Type C-L - Grate Type A	0.330	0.90	5.00	6.70	0.297	0.000	0.297	2.01	On Grade	0.020000	0.020	0.15	7.38	0.00	0.85	0.125	FSI-2	0.172	0.0	0.000	0.00
FSI-4	Combination Type C Grate Type A - Plain Curb	0.180	0.90	5.00	6.70	0.162	0.042	0.204	1.38	On Grade	0.020000	0.020	0.13	6.41	0.00	0.48	0.071	FSI-2	0.133	0.0	0.000	0.00
FSMH-2	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		1.580	10.00
FSMH-10	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.890	10.00
FSPG-1	Generic Manhole w/ External Flow	0.360	0.90	10.00	5.47	0.324	0.000	0.324	1.79	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG-2	Generic Manhole w/ External Flow	0.360	0.90	10.00	5.47	0.324	0.000	0.324	1.79	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG-3	Generic Manhole w/ External Flow	0.360	0.90	10.00	5.47	0.324	0.000	0.324	1.79	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG -4	Generic Manhole w/ External Flow	0.360	0.90	10.00	5.47	0.324	0.000	0.324	1.79	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSRD-1B	Generic Default 100%	0.573	0.90	5.00	6.70	0.516	1.243	1.759	11.88	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		1.759		0.174	5.00
FSRD -1A	Generic Default 100%	0.540	0.90	5.00	6.70	0.486	0.003	0.489	3.30	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.489		0.000	0.00
GARNER ST CB	Generic Manhole w/ External Flow	1.062	0.90	5.00	6.70	0.956	0.000	0.956	6.46	On Grade	0.020000	0.020	0.23	11.44	0.00	6.46	0.956	PARKING LOT	0.000		0.000	0.00
GATE 11 MH	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.928	5.00
GB-AS1/I-84EB	Combination Type C Grate Type A - Plain Curb	0.140	0.90	5.00	6.70	0.126	0.356	0.482	3.25	On Grade	0.020000	0.020	0.18	8.84	0.00	1.57	0.232	GB-AS6	0.249	0.0	0.800	5.00
GB-AS2/I-84WB	Combination Type C Grate Type A - Plain Curb	0.339	0.90	10.00	5.47	0.305	2.552	2.857	15.76	On Grade	0.020000	0.020	0.32	15.98	0.00	10.76	1.951	GB-AS5	0.906	0.0	1.600	5.00
GB-AS3	Combination Type C Grate Type A - Plain Curb	0.603	0.90	5.00	6.70	0.543	0.128	0.671	4.53	On Grade	0.020000	0.020	0.20	10.02	0.00	2.40	0.356	GB-AS1/I-84EB	0.316	0.0	0.000	0.00
GB-AS4	Combination Type C Grate Type A - Plain Curb	0.414	0.90	5.00	6.70	0.373	1.964	2.336	15.78	On Grade	0.020000	0.020	0.32	15.99	0.00	10.78	1.596	GB-AS2/I-84WB	0.740	0.0	0.000	0.00
GB-AS5	Combination Type C Grate Type A - Plain Curb	0.262	0.90	5.00	6.70	0.236	1.951	2.187	14.77	On Grade	0.020000	0.020	0.31	15.60	0.00	9.99	1.479	GB-CB4	0.708	0.0	0.000	0.00
GB-AS6	Combination Type C Grate Type A - Plain Curb	0.227	0.90	5.00	6.70	0.204	0.232	0.436	2.95	On Grade	0.020000	0.020	0.17	8.52	0.00	1.38	0.204	GB-CB2	0.232	0.0	0.000	0.00
GB-BB1	Combination Type C Grate Type A - Park Curb	0.857	0.90	5.00	6.70	0.771	0.052	0.823	5.56	On Grade	0.020000	0.020	0.22	10.81	0.00	3.10	0.459	9-BCB-1	0.364	0.0	0.000	0.00
GB-BB2	Combination Type C Grate Type A - Park Curb	0.092	0.90	5.00	6.70	0.083	0.325	0.408	2.75	On Grade	0.020000	0.020	0.17	8.31	0.00	1.26	0.186	9-BCB-3	0.221	0.0	0.000	0.00
GB-BB3	Generic Manhole w/ External Flow	0.561	0.58	10.00	5.47	0.325	0.000	0.325	1.79	On Grade	0.020000	0.020	0.14	7.08	0.00	1.79	0.325	GB-BB2	0.000		0.000	0.00
GB-BB4	Grate Type C-L - Grate Type A	0.252	0.23	10.00	5.47	0.058	0.000	0.058	0.32	On Grade	0.020000	0.020	0.07	3.71	0.00	0.04	0.008	GB-FAR1	0.050	0.0	0.000	0.00
GB-CB1	Combination Type C Grate Type A - Plain Curb	0.128	0.90	5.00	6.70	0.115	0.013	0.128	0.87	In Sag		0.020	0.12	5.96	0.00	0.00	0.000		0.128	0.0	0.000	0.00
GB-CB2	Combination Type C Grate Type A - Plain Curb	0.245	0.90	5.00	6.70	0.221	0.204	0.424	2.87	In Sag		0.020	0.26	12.78	0.00	0.00	0.000		0.424	0.0	0.000	0.00

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
GB-CB3	Grate Type C-L - Grate Type A	0.135	0.23	10.00	5.47	0.031	0.000	0.031	0.17	In Sag		0.020	0.07	3.35	0.00	0.00	0.000		0.031	0.0	0.000	0.00
GB-CB4	Combination Type C Grate Type A - Plain Curb	0.559	0.90	10.00	5.47	0.503	1.479	1.982	10.93	In Sag		0.020	0.58	29.13	0.00	0.00	0.000		1.982	0.0	0.000	0.00
GB-CB5	Grate Type CM-CS w/o Throat	0.031	0.90	10.00	5.47	0.028	0.048	0.076	0.42	On Grade	0.020000	0.020	0.08	4.11	0.00	0.07	0.013	GB-CB1	0.063	0.0	0.000	0.00
GB-CB6	Grate Type PRW w/o Throat	0.124	0.90	5.00	6.70	0.112	0.041	0.152	1.03	On Grade	0.020000	0.020	0.11	5.74	0.00	0.33	0.048	GB-CB5	0.104	0.0	0.000	0.00
GB-CB7	Grate Type PRW w/o Throat	0.058	0.90	5.00	6.70	0.052	0.084	0.136	0.92	On Grade	0.020000	0.020	0.11	5.50	0.00	0.28	0.041	GB-CB6	0.095	0.0	0.000	0.00
GB-CB8	Grate Type PRW w/o Throat	0.080	0.90	5.00	6.70	0.072	0.150	0.222	1.50	On Grade	0.020000	0.020	0.13	6.61	0.00	0.57	0.084	GB-CB7	0.138	0.0	0.000	0.00
GB-CB9	Grate Type PRW w/o Throat	0.375	0.90	5.00	6.70	0.338	0.000	0.338	2.28	On Grade	0.020000	0.020	0.15	7.74	0.00	1.01	0.150	GB-CB8	0.188	0.0	0.000	0.00
GB-CB10	Grate Type C-L - Grate Type A	0.051	0.23	5.00	6.70	0.012	0.000	0.012	0.08	In Sag		0.020	0.05	2.49	0.00	0.00	0.000		0.012	0.0	0.000	0.00
GB-FAR1	Grate Type C-L - Grate Type A	0.847	0.23	10.00	5.47	0.195	0.011	0.205	1.13	In Sag		0.020	0.17	8.72	0.00	0.00	0.000		0.205	0.0	0.000	0.00
GB-FAR2	Grate Type C-L - Grate Type A	0.150	0.23	10.00	5.47	0.035	0.000	0.035	0.19	On Grade	0.020000	0.020	0.06	3.05	0.00	0.01	0.003	GB-FAR1	0.032	0.0	0.000	0.00
GB-HB1	Combination Type C Grate Type A - Plain Curb	0.019	0.90	5.00	6.70	0.017	0.000	0.017	0.12	In Sag		0.020	0.01	1.43	0.00	0.00	0.000		0.017	0.0	0.000	0.00
GB-HB2	Combination Type C Grate Type A - Plain Curb	0.074	0.90	5.00	6.70	0.067	0.005	0.072	0.49	In Sag		0.020	0.08	4.08	0.00	0.00	0.000		0.072	0.0	0.000	0.00
GB-HB3	Combination Type C Grate Type A - Plain Curb	0.036	0.90	5.00	6.70	0.032	0.013	0.046	0.31	On Grade	0.020000	0.020	0.07	3.65	0.00	0.04	0.005	GB-HB2	0.040	0.0	0.000	0.00
GB-HB4	Combination Type C Grate Type A - Plain Curb	0.019	0.90	5.00	6.70	0.017	0.054	0.071	0.48	On Grade	0.020000	0.020	0.09	4.32	0.00	0.09	0.013	GB-HB3	0.058	0.0	0.000	0.00
GB-HB5	Combination Type C Grate Type A - Plain Curb	0.189	0.90	5.00	6.70	0.170	0.000	0.170	1.15	On Grade	0.020000	0.020	0.12	5.99	0.00	0.37	0.054	GB-HB4	0.116	0.0	0.000	0.00
GB-HB6	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	On Grade	0.020000	0.020	0.00	0.00	0.00	0.00	0.000	GB-HB2	0.000	0.0	0.000	0.00
GB-HB7	Combination Type C Grate Type A - Plain Curb	1.412	0.90	10.00	5.47	1.271	0.000	1.271	7.01	In Sag		0.020	0.45	22.26	0.00	0.00	0.000		1.271	0.0	0.000	0.00
GB-MH2 CA	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.923	10.00
GB-SANCB1	Combination Type C Grate Type A - Plain Curb	0.160	0.90	5.00	6.70	0.144	0.000	0.144	0.97	On Grade	0.020000	0.020	0.11	5.62	0.00	0.28	0.042	FSI-4	0.102	0.0	0.000	0.00
GB-SANCB2	Combination Type C Grate Type A - Plain Curb	0.186	0.90	5.00	6.70	0.167	0.000	0.167	1.13	On Grade	0.020000	0.020	0.12	5.95	0.00	0.36	0.053	GB-SANCB4	0.114	0.0	0.000	0.00
GB-SANCB3	Combination Type C Grate Type A - Plain Curb	0.640	0.90	5.00	6.70	0.576	0.000	0.576	3.89	On Grade	0.020000	0.020	0.19	9.46	0.00	1.98	0.293	GB-SANCB5	0.283	0.0	0.000	0.00
GB-SANCB4	Combination Type C Grate Type A - Plain Curb	0.125	0.90	5.00	6.70	0.113	0.053	0.166	1.12	On Grade	0.020000	0.020	0.12	5.93	0.00	0.35	0.052	GB-BB1	0.113	0.0	0.000	0.00
GB-SANCB5	Combination Type C Grate Type A - Plain Curb	0.461	0.90	5.00	6.70	0.415	0.962	1.377	9.30	On Grade	0.020000	0.020	0.26	13.11	0.00	5.80	0.859	GB-SANCB7	0.518	0.0	0.000	0.00
GB-SANCB6	Combination Type C Grate Type A - Plain Curb	1.244	0.90	5.00	6.70	1.120	0.000	1.120	7.56	On Grade	0.020000	0.020	0.24	12.13	0.00	4.52	0.670	GB-SANCB5	0.450	0.0	0.000	0.00
GB-SANCB7	Combination Type C Grate Type A - Plain Curb	0.614	0.90	5.00	6.70	0.553	0.859	1.411	9.53	On Grade	0.020000	0.020	0.26	13.23	0.00	5.97	0.884	GB-SANCB10	0.527	0.0	0.000	0.00
GB-SANCB8	Combination Type C Grate Type A - Plain Curb	0.344	0.90	5.00	6.70	0.310	0.000	0.310	2.09	On Grade	0.020000	0.020	0.15	7.49	0.00	0.87	0.128	GB-AS3	0.181	0.0	0.000	0.00
GB-SANCB9	Combination Type C Grate Type B - Park Curb	0.167	0.90	5.00	6.70	0.150	0.000	0.150	1.02	On Grade	0.020000	0.020	0.11	5.71	0.00	0.30	0.045	GB-AS4	0.105	0.0	0.000	0.00
GB-SANCB10	Combination Type C Grate Type A - Plain Curb	1.088	0.90	5.00	6.70	0.979	1.758	2.737	18.48	On Grade	0.020000	0.020	0.34	16.97	0.00	12.96	1.919	GB-AS4	0.818	0.0	0.000	0.00
GB-SANCB11	Grate Type C-L - Grate Type A	0.898	0.90	5.00	6.70	0.808	0.000	0.808	5.46	On Grade	0.020000	0.020	0.21	10.74	0.00	3.09	0.458	GB-SANCB10	0.350	0.0	0.000	0.00
GB-SANCB12	Grate Type C-L - Grate Type A	0.830	0.90	5.00	6.70	0.747	0.000	0.747	5.04	On Grade	0.020000	0.020	0.21	10.43	0.00	2.81	0.416	GB-SANCB10	0.331	0.0	0.000	0.00
GB-SP1	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		5.990	10.00
GC-1	Generic Default 100%	0.319	0.90	10.00	5.47	0.287	0.000	0.287	1.58	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.287		0.000	0.00
Gully Brook inflow	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00
HAWTHORNE BYPASS CB	Combination Type C Grate Type A - Plain Curb	0.237	0.90	5.00	6.70	0.213	0.000	0.213	1.44	On Grade	0.020000	0.020	0.13	6.52	0.00	0.51	0.076	11-CB2B	0.137	0.0	0.000	0.00
I-202	Grate Type C-L - Grate Type A	0.612	0.90	10.00	5.47	0.551	0.000	0.551	3.04	On Grade	0.020000	0.020	0.17	8.62	0.00	1.47	0.267	I-203	0.284	0.0	0.000	0.00
I-203	Grate Type C-L - Grate Type A	0.860	0.90	10.00	5.47	0.774	0.267	1.041	5.74	In Sag		0.020	0.47	23.28	0.00	0.00	0.000		1.041	0.0	0.000	0.00
I-204	Generic Default 100%	0.100	0.90	5.00	6.70	0.090	0.000	0.090	0.61	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.090		0.000	0.00
IMLAY OFFSITE CB	Combination Type C Grate Type A - Plain Curb	0.838	0.49	10.00	5.47	0.411	0.312	0.723	3.99	In Sag		0.020	0.31	15.72	0.00	0.00	0.000		0.723	0.0	0.000	0.00
Intersection with Broad and Armory (A	Combination Type C Grate Type A - Park Curb	0.132	0.90	5.00	6.70	0.119	0.000	0.119	0.80	In Sag		0.020	0.09	4.27	0.00	0.00	0.000		0.119	0.0	0.000	0.00
LOB Parking and Buliding (Area A36-8	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		5.570	10.00
LOB PARKING LOT	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		1.940	10.00
MH-9-32	Generic Manhole w/ External Flow	0.306	0.90	5.00	6.70	0.275	0.000	0.275	1.86	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.275		0.000	0.00
PARKING LOT CB	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.956	0.956	6.46	On Grade	0.020000	0.020	0.23	11.44	0.00	6.46	0.956	GB-AS2/I-84WE	0.000		0.000	0.00
RR-ROW CB1	Generic Default 100%	1.452	0.13	10.00	5.47	0.189	0.000	0.189	1.04	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.189		0.000	0.00
SIG-CB1A	Grate Type C-L - Grate Type A	0.125	0.63	5.00	6.70	0.079	0.000	0.079	0.53	In Sag		0.020	0.12	5.76	0.00	0.00	0.000		0.079	0.0	0.000	0.00
SIG-CB2A-1	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
SIG-CB2A-2	Grate Type C-L - Grate Type A	1.190	0.59	10.00	5.47	0.702	0.000	0.702	3.87	In Sag		0.020	0.36	18.19	0.00	0.00	0.000		0.702	0.0	0.000	0.00
SIG-CB2B	Grate Type C-L - Grate Type A	0.697	0.69	10.00	5.47	0.481	0.000	0.481	2.65	In Sag		0.020	0.29	14.42	0.00	0.00	0.000		0.481	0.0	0.000	0.00
SIG-CB2C	Combination Type C Grate Type A - Plain Curb	0.321	0.90	5.00	6.70	0.289	0.149	0.438	2.96	In Sag		0.020	0.26	13.05	0.00	0.00	0.000		0.438	0.0	0.000	0.00
SIG-CB3A	Combination Type C Grate Type A - Plain Curb	0.571	0.31	10.00	5.47	0.177	0.564	0.741	4.09	In Sag		0.020	0.32	15.97	0.00	0.00	0.000		0.741	0.0	0.000	0.00
SIG-CB4A	Grate Type C-L - Grate Type A	0.614	0.58	10.00	5.47	0.356	0.000	0.356	1.96	On Grade	0.020000	0.020	0.15	7.32	0.00	0.82	0.149	SIG-CB2C	0.207	0.0	0.000	0.00
SIG-CB5A	Combination Type C Grate Type A - Plain Curb	1.506	0.48	10.00	5.47	0.723	0.000	0.723	3.99	On Grade	0.020000	0.020	0.19	9.55	0.00	2.04	0.370	SIG-CB3A	0.353	0.0	0.000	0.00
TRENCH DRAIN (9D)	Generic Default 100%	0.303	0.90	5.00	6.70	0.273	0.000	0.273	1.84	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.273		0.000	0.00

Scenario: 25 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudinal Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
TRENCH DRAIN (9E)	Grate Type C-L - Grate Type A	0.363	0.90	5.00	6.70	0.327	0.000	0.327	2.21	In Sag		0.020	0.26	12.89	0.00	0.00	0.000		0.327	0.0	0.000	0.00
TRENCH DRAIN (9G1)	Grate Type C-L - Grate Type A	0.256	0.90	5.00	6.70	0.230	0.000	0.230	1.56	In Sag		0.020	0.21	10.48	0.00	0.00	0.000		0.230	0.0	0.000	0.00

Scenario: 10 year

Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
6- MH 100	0+16	42.00	42.00	30.90	4.00		Flat	HEC-22 Ener	0.11
6-MH 79	4+88	63.21	63.21	56.31	4.00		Flat	HEC-22 Ener	0.01
6-MH 80	4+37	48.00	48.00	40.60	4.00		Flat	HEC-22 Ener	0.01
6-MH 88	1+14	41.00	41.00	32.00	4.00		Flat	HEC-22 Ener	0.11
6-MH DROP	0+35	45.00	45.00	34.00	4.00		Flat	HEC-22 Ener	0.11
8MH-1	5+30	49.66	49.66	38.26	4.00		Flat	HEC-22 Ener	0.23
9-BMH-2	11+42	70.01	70.01	59.11	4.00		Flat	HEC-22 Ener	0.06
9-BMH1	11+03	69.85	69.85	58.55	4.00		Flat	HEC-22 Ener	0.26
9-MH-34	3+30	52.98	52.98	38.50	4.00		Flat	HEC-22 Ener	0.12
9-MH31	5+61	51.12	51.12	43.07	4.00		Flat	HEC-22 Ener	0.30
9-MH38	2+48	45.00	45.00	38.00	4.00		Flat	HEC-22 Ener	0.37
9-MH39	1+42	45.00	45.00	37.00	4.00		Flat	HEC-22 Ener	0.07
9-MH40	0+10	44.68	44.68	32.85	4.00		Flat	HEC-22 Ener	0.35
9MH-3	10+47	60.00	60.00	56.10	4.00		Flat	HEC-22 Ener	0.48
9MH-30	6+88	48.35	48.35	43.25	4.00		Flat	HEC-22 Ener	0.29
10-MH1	1+26	48.51	48.51	34.31	4.00		Flat	HEC-22 Ener	0.08
11-MH1	10+88	63.13	63.13	56.23	4.00		Flat	HEC-22 Ener	0.02
11-MH1A	10+30	62.23	62.23	51.63	4.00		Flat	HEC-22 Ener	0.08
11-MH2	9+77	62.32	62.32	50.12	4.00		Flat	HEC-22 Ener	0.06
11-MH3	7+96	66.72	66.72	49.12	4.00		Flat	HEC-22 Ener	0.18
11-MH4	8+88	69.80	69.80	54.20	4.00		Flat	HEC-22 Ener	0.74
11-MH88	6+52	53.44	53.44	46.04	4.00		Flat	HEC-22 Ener	0.17
11-MH89	5+06	58.71	58.71	44.51	4.00		Flat	HEC-22 Ener	0.20
11-MH90	2+00	54.10	54.10	34.10	4.00		Flat	HEC-22 Ener	0.07
11-MH91	2+25	52.83	52.83	35.90	4.00		Flat	HEC-22 Ener	0.05
11-MH93	3+51	49.99	49.99	36.50	4.00		Flat	HEC-22 Ener	0.08
AB-MH1	12+51	49.81	49.81	42.90	4.00		Flat	HEC-22 Ener	0.40
AB-MH2	12+34	50.47	50.47	41.07	4.00		Flat	HEC-22 Ener	0.06
AB-MH3	11+66	49.48	49.48	34.38	4.00		Flat	HEC-22 Ener	0.07
AB-MH90	9+77	49.87	49.87	34.67	4.00		Flat	HEC-22 Ener	0.19
AETNA MH 201	3+21	62.00	62.00	38.35	4.00		Flat	HEC-22 Ener	0.14
AETNA MH 202	2+87	61.90	61.90	37.90	4.00		Flat	HEC-22 Ener	0.21
AETNA MH 203	2+43	62.00	62.00	37.40	4.00		Flat	HEC-22 Ener	0.07
AETNA MH 204	1+42	54.80	54.80	36.30	4.00		Flat	HEC-22 Ener	0.15
AETNA MH1	5+66	60.80	60.80	54.05	4.00		Flat	HEC-22 Ener	0.13
AR-MH5	4+40	30.18	30.18	15.78	4.00		Flat	HEC-22 Ener	0.00
AR-MH11	7+58	29.02	29.02	17.92	4.00		Flat	HEC-22 Ener	0.00
AR48-MH	11+91	44.50	44.50	35.15	4.00		Flat	HEC-22 Ener	0.04
ARMH-9	6+66	27.43	27.43	17.03	4.00		Flat	HEC-22 Ener	0.00
ARMORY CAPPED	4+65	30.18	30.18	22.75	4.00		Flat	HEC-22 Ener	0.03
Armory Wet Well	1+05	61.50	61.50	15.00	4.00		Flat	HEC-22 Ener	0.00
BURIED MH 1	9+78	60.00	60.00	54.00	4.00		Flat	HEC-22 Ener	0.31
BURRIED MH 2	9+06	55.00	55.00	53.00	4.00		Flat	HEC-22 Ener	0.06
BURRIED MH 3	7+63	50.00	50.00	47.00	4.00		Flat	HEC-22 Ener	0.07
FSMH-1	11+37	79.56	79.56	69.19	4.00		Flat	HEC-22 Ener	0.01
FSMH-3	9+39	67.34	67.34	60.14	4.00		Flat	HEC-22 Ener	0.09
FSMH-4	9+20	66.60	66.60	56.90	4.00		Flat	HEC-22 Ener	0.10
FSMH-5	8+70	63.77	63.77	55.07	4.00		Flat	HEC-22 Ener	0.07
FSMH-6	7+96	59.94	59.94	51.44	4.00		Flat	HEC-22 Ener	0.06
FSMH-7	6+89	55.21	55.21	46.71	4.00		Flat	HEC-22 Ener	0.07
FSMH-9	5+49	51.00	51.00	40.99	4.00		Flat	HEC-22 Ener	0.01
GATE 8 MH	0+09	47.00	47.00	29.80	4.00		Flat	HEC-22 Ener	0.04
GB- MH 90	13+62	39.58	39.58	33.98	4.00		Flat	HEC-22 Ener	0.13

Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
GB-MH1	11+57	40.15	40.15	27.65	4.00		Flat	HEC-22 Ener	0.67
GB-MH2	11+46	39.61	39.61	28.01	4.00		Flat	HEC-22 Ener	0.14
GB-MH3	14+83	52.00	52.00	29.70	4.00		Flat	HEC-22 Ener	0.77
GB-MH4	15+81	67.00	67.00	30.21	4.00		Flat	HEC-22 Ener	0.35
GB-MH5	12+30	39.43	39.43	29.13	4.00		Flat	HEC-22 Ener	0.45
GB-MH6	17+08	68.00	68.00	46.50	4.00		Flat	HEC-22 Ener	0.05
GB-MH7	17+60	69.44	69.44	47.96	4.00		Flat	HEC-22 Ener	0.32
GB-MH8	19+54	74.34	74.34	50.74	4.00		Flat	HEC-22 Ener	0.04
GB-MH90	14+95	44.64	44.64	36.54	4.00		Flat	HEC-22 Ener	0.21
GB-SANMH 1	1+99	42.64	42.64	28.74	4.00		Flat	HEC-22 Ener	1.49
GB-SANMH 2	1+25	39.17	39.17	25.47	4.00		Flat	HEC-22 Ener	3.10
GB-SANMH 3	1+01	38.30	38.30	25.37	4.00		Flat	HEC-22 Ener	2.08
GB-SANMH4	5+74	41.00	41.00	32.65	4.00		Flat	HEC-22 Ener	4.38
GB-SANMH5	6+06	67.00	67.00	54.71	4.00		Flat	HEC-22 Ener	1.94
GB-SANMH6	6+40	67.20	67.20	54.80	4.00		Flat	HEC-22 Ener	0.03
GB-SANMH7	7+25	68.31	68.31	55.47	4.00		Flat	HEC-22 Ener	0.33
GB-SANMH8	8+02	70.65	70.65	57.13	4.00		Flat	HEC-22 Ener	0.14
GB-SANMH9	6+72	68.00	68.00	55.50	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH10	8+83	75.00	75.00	59.90	4.00		Flat	HEC-22 Ener	0.01
GB-SANMH11	10+80	79.00	79.00	67.00	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH12	11+52	80.76	80.76	60.42	4.00		Flat	HEC-22 Ener	0.02
GB-SANMH13	12+21	81.00	81.00	69.80	4.00		Flat	HEC-22 Ener	0.01
GB-SANMH14	13+84	82.17	82.17	70.67	4.00		Flat	HEC-22 Ener	0.01
GB-SANMH15	15+12	81.50	81.50	71.25	4.00		Flat	HEC-22 Ener	0.03
GB-SANMH16	10+20	81.89	81.89	69.49	4.00		Flat	HEC-22 Ener	0.18
GB-SANMH17	12+66	88.58	88.58	76.58	4.00		Flat	HEC-22 Ener	0.13
GB-SANMH19	14+49	91.00	91.00	89.00	4.00		Flat	HEC-22 Ener	0.04
GB-SANMH20	6+91	68.00	68.00	55.19	4.00		Flat	HEC-22 Ener	2.15
GULLY BROOK BEI	8+38	34.80	34.80	14.22	4.00		Flat	HEC-22 Ener	0.36
GULLY BROOK CH/	11+00	38.30	38.30	20.85	4.00		Flat	HEC-22 Ener	0.77
GULLY BROOK GA	10+82	36.90	36.90	15.97	4.00		Flat	HEC-22 Ener	0.41
HAWTHORNE SAN	0+35	62.68	62.68	52.38	4.00		Flat	HEC-22 Ener	0.12
J-1	2+71	42.00	42.00	21.59	4.00		Flat	HEC-22 Ener	0.15
J-2	1+27	42.00	42.00	16.09	4.00		Flat	HEC-22 Ener	0.48
J-16	1+46	42.00	42.00	20.96	4.00		Flat	HEC-22 Ener	0.49
J-17	2+01	42.00	42.00	21.24	4.00		Flat	HEC-22 Ener	0.27
J-18	2+19	42.00	42.00	21.33	4.00		Flat	HEC-22 Ener	0.27
J-20	3+73	42.00	42.00	22.09	4.00		Flat	HEC-22 Ener	0.08
J-27	1+13	42.00	42.00	15.01	8.00		Flat	HEC-22 Ener	0.23
J-53	3+05	59.64	59.64	44.00	4.00		Flat	HEC-22 Ener	0.03
J-54	3+35	59.64	59.64	53.00	4.00		Flat	HEC-22 Ener	0.03
J-108	11+10	38.25	38.25	16.15	4.00		Flat	HEC-22 Ener	0.29
MH 2+95	4+52	42.00	42.00	27.26	4.00		Flat	HEC-22 Ener	0.04
MH 3+95	5+46	42.00	42.00	28.60	4.00		Flat	HEC-22 Ener	0.05
MH 4+95	6+36	42.00	42.00	30.10	4.00		Flat	HEC-22 Ener	0.05
MH 5+95	7+63	42.00	42.00	31.58	4.00		Flat	HEC-22 Ener	0.04
RR ROW MH 1	2+77	49.00	49.00	39.43	4.00		Flat	HEC-22 Ener	0.01
SIG-MH1	11+42	68.98	68.98	64.28	4.00		Flat	HEC-22 Ener	0.19
SIG-MH3	12+00	69.71	69.71	63.81	4.00		Depresse	HEC-22 Ener	0.13
SIG-MH5	12+91	71.71	71.71	65.90	4.00		Flat	HEC-22 Ener	0.01
SIG -MH4	12+74	71.39	71.39	65.49	4.00		Flat	HEC-22 Ener	0.08

Scenario: 25 year

Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
6- MH 100	0+16	42.00	42.00	30.90	4.00		Flat	HEC-22 Ener	0.12
6-MH 79	4+88	63.21	63.21	56.31	4.00		Flat	HEC-22 Ener	0.01
6-MH 80	4+37	48.00	48.00	40.60	4.00		Flat	HEC-22 Ener	0.01
6-MH 88	1+14	41.00	41.00	32.00	4.00		Flat	HEC-22 Ener	0.12
6-MH DROP	0+35	45.00	45.00	34.00	4.00		Flat	HEC-22 Ener	0.13
8MH-1	5+30	49.66	49.66	38.26	4.00		Flat	HEC-22 Ener	0.26
9-BMH-2	11+42	70.01	70.01	59.11	4.00		Flat	HEC-22 Ener	0.10
9-BMH1	11+03	69.85	69.85	58.55	4.00		Flat	HEC-22 Ener	0.37
9-MH-34	3+30	52.98	52.98	38.50	4.00		Flat	HEC-22 Ener	0.13
9-MH31	5+61	51.12	51.12	43.07	4.00		Flat	HEC-22 Ener	0.39
9-MH38	2+48	45.00	45.00	38.00	4.00		Flat	HEC-22 Ener	0.45
9-MH39	1+42	45.00	45.00	37.00	4.00		Flat	HEC-22 Ener	0.09
9-MH40	0+10	44.68	44.68	32.85	4.00		Flat	HEC-22 Ener	0.41
9MH-3	10+47	60.00	60.00	56.10	4.00		Flat	HEC-22 Ener	0.60
9MH-30	6+88	48.35	48.35	43.25	4.00		Flat	HEC-22 Ener	0.42
10-MH1	1+26	48.51	48.51	34.31	4.00		Flat	HEC-22 Ener	0.09
11-MH1	10+88	63.13	63.13	56.23	4.00		Flat	HEC-22 Ener	0.04
11-MH1A	10+30	62.23	62.23	51.63	4.00		Flat	HEC-22 Ener	0.10
11-MH2	9+77	62.32	62.32	50.12	4.00		Flat	HEC-22 Ener	0.08
11-MH3	7+96	66.72	66.72	49.12	4.00		Flat	HEC-22 Ener	0.25
11-MH4	8+88	69.80	69.80	54.20	4.00		Flat	HEC-22 Ener	1.10
11-MH88	6+52	53.44	53.44	46.04	4.00		Flat	HEC-22 Ener	0.21
11-MH89	5+06	58.71	58.71	44.51	4.00		Flat	HEC-22 Ener	0.24
11-MH90	2+00	54.10	54.10	34.10	4.00		Flat	HEC-22 Ener	0.09
11-MH91	2+25	52.83	52.83	35.90	4.00		Flat	HEC-22 Ener	0.05
11-MH93	3+51	49.99	49.99	36.50	4.00		Flat	HEC-22 Ener	0.10
AB-MH1	12+51	49.81	49.81	42.90	4.00		Flat	HEC-22 Ener	0.48
AB-MH2	12+34	50.47	50.47	41.07	4.00		Flat	HEC-22 Ener	0.08
AB-MH3	11+66	49.48	49.48	34.38	4.00		Flat	HEC-22 Ener	0.09
AB-MH90	9+77	49.87	49.87	34.67	4.00		Flat	HEC-22 Ener	0.22
AETNA MH 201	3+21	62.00	62.00	38.35	4.00		Flat	HEC-22 Ener	0.20
AETNA MH 202	2+87	61.90	61.90	37.90	4.00		Flat	HEC-22 Ener	0.24
AETNA MH 203	2+43	62.00	62.00	37.40	4.00		Flat	HEC-22 Ener	0.08
AETNA MH 204	1+42	54.80	54.80	36.30	4.00		Flat	HEC-22 Ener	0.17
AETNA MH1	5+66	60.80	60.80	54.05	4.00		Flat	HEC-22 Ener	0.15
AR-MH5	4+40	30.18	30.18	15.78	4.00		Flat	HEC-22 Ener	0.00
AR-MH11	7+58	29.02	29.02	17.92	4.00		Flat	HEC-22 Ener	0.00
AR48-MH	11+91	44.50	44.50	35.15	4.00		Flat	HEC-22 Ener	0.04
ARMH-9	6+66	27.43	27.43	17.03	4.00		Flat	HEC-22 Ener	0.00
ARMORY CAPPED	4+65	30.18	30.18	22.75	4.00		Flat	HEC-22 Ener	0.03
Armory Wet Well	1+05	61.50	61.50	15.00	4.00		Flat	HEC-22 Ener	0.00
BURIED MH 1	9+78	60.00	60.00	54.00	4.00		Flat	HEC-22 Ener	0.37
BURRIED MH 2	9+06	55.00	55.00	53.00	4.00		Flat	HEC-22 Ener	0.07
BURRIED MH 3	7+63	50.00	50.00	47.00	4.00		Flat	HEC-22 Ener	0.08
FSMH-1	11+37	79.56	79.56	69.19	4.00		Flat	HEC-22 Ener	0.02
FSMH-3	9+39	67.34	67.34	60.14	4.00		Flat	HEC-22 Ener	0.11
FSMH-4	9+20	66.60	66.60	56.90	4.00		Flat	HEC-22 Ener	0.11
FSMH-5	8+70	63.77	63.77	55.07	4.00		Flat	HEC-22 Ener	0.08
FSMH-6	7+96	59.94	59.94	51.44	4.00		Flat	HEC-22 Ener	0.07
FSMH-7	6+89	55.21	55.21	46.71	4.00		Flat	HEC-22 Ener	0.08
FSMH-9	5+49	51.00	51.00	40.99	4.00		Flat	HEC-22 Ener	0.02
GATE 8 MH	0+09	47.00	47.00	29.80	4.00		Flat	HEC-22 Ener	0.04
GB- MH 90	13+62	39.58	39.58	33.98	4.00		Flat	HEC-22 Ener	0.17

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Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
GB-MH1	11+57	40.15	40.15	27.65	4.00		Flat	HEC-22 Ener	0.90
GB-MH2	11+46	39.61	39.61	28.01	4.00		Flat	HEC-22 Ener	0.18
GB-MH3	14+83	52.00	52.00	29.70	4.00		Flat	HEC-22 Ener	1.07
GB-MH4	15+81	67.00	67.00	30.21	4.00		Flat	HEC-22 Ener	0.53
GB-MH5	12+30	39.43	39.43	29.13	4.00		Flat	HEC-22 Ener	0.69
GB-MH6	17+08	68.00	68.00	46.50	4.00		Flat	HEC-22 Ener	0.05
GB-MH7	17+60	69.44	69.44	47.96	4.00		Flat	HEC-22 Ener	0.37
GB-MH8	19+54	74.34	74.34	50.74	4.00		Flat	HEC-22 Ener	0.04
GB-MH90	14+95	44.64	44.64	36.54	4.00		Flat	HEC-22 Ener	0.24
GB-SANMH 1	1+99	42.64	42.64	28.74	4.00		Flat	HEC-22 Ener	1.86
GB-SANMH 2	1+25	39.17	39.17	25.47	4.00		Flat	HEC-22 Ener	3.87
GB-SANMH 3	1+01	38.30	38.30	25.37	4.00		Flat	HEC-22 Ener	2.60
GB-SANMH4	5+74	41.00	41.00	32.65	4.00		Flat	HEC-22 Ener	5.32
GB-SANMH5	6+06	67.00	67.00	54.71	4.00		Flat	HEC-22 Ener	2.54
GB-SANMH6	6+40	67.20	67.20	54.80	4.00		Flat	HEC-22 Ener	0.03
GB-SANMH7	7+25	68.31	68.31	55.47	4.00		Flat	HEC-22 Ener	0.40
GB-SANMH8	8+02	70.65	70.65	57.13	4.00		Flat	HEC-22 Ener	0.17
GB-SANMH9	6+72	68.00	68.00	55.50	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH10	8+83	75.00	75.00	59.90	4.00		Flat	HEC-22 Ener	0.01
GB-SANMH11	10+80	79.00	79.00	67.00	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH12	11+52	80.76	80.76	60.42	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH13	12+21	81.00	81.00	69.80	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH14	13+84	82.17	82.17	70.67	4.00		Flat	HEC-22 Ener	0.01
GB-SANMH15	15+12	81.50	81.50	71.25	4.00		Flat	HEC-22 Ener	0.03
GB-SANMH16	10+20	81.89	81.89	69.49	4.00		Flat	HEC-22 Ener	0.20
GB-SANMH17	12+66	88.58	88.58	76.58	4.00		Flat	HEC-22 Ener	0.15
GB-SANMH19	14+49	91.00	91.00	89.00	4.00		Flat	HEC-22 Ener	0.05
GB-SANMH20	6+91	68.00	68.00	55.19	4.00		Flat	HEC-22 Ener	2.59
GULLY BROOK BEI	8+38	34.80	34.80	14.22	4.00		Flat	HEC-22 Ener	0.37
GULLY BROOK CH	11+00	38.30	38.30	20.85	4.00		Flat	HEC-22 Ener	0.99
GULLY BROOK GA	10+82	36.90	36.90	15.97	4.00		Flat	HEC-22 Ener	0.42
HAWTHORNE SAN	0+35	62.68	62.68	52.38	4.00		Flat	HEC-22 Ener	0.13
J-1	2+71	42.00	42.00	21.59	4.00		Flat	HEC-22 Ener	0.23
J-2	1+27	42.00	42.00	16.09	4.00		Flat	HEC-22 Ener	0.67
J-16	1+46	42.00	42.00	20.96	4.00		Flat	HEC-22 Ener	0.61
J-17	2+01	42.00	42.00	21.24	4.00		Flat	HEC-22 Ener	0.40
J-18	2+19	42.00	42.00	21.33	4.00		Flat	HEC-22 Ener	0.41
J-20	3+73	42.00	42.00	22.09	4.00		Flat	HEC-22 Ener	0.14
J-27	1+13	42.00	42.00	15.01	8.00		Flat	HEC-22 Ener	0.31
J-53	3+05	59.64	59.64	44.00	4.00		Flat	HEC-22 Ener	0.04
J-54	3+35	59.64	59.64	53.00	4.00		Flat	HEC-22 Ener	0.04
J-108	11+10	38.25	38.25	16.15	4.00		Flat	HEC-22 Ener	0.28
MH 2+95	4+52	42.00	42.00	27.26	4.00		Flat	HEC-22 Ener	0.04
MH 3+95	5+46	42.00	42.00	28.60	4.00		Flat	HEC-22 Ener	0.06
MH 4+95	6+36	42.00	42.00	30.10	4.00		Flat	HEC-22 Ener	0.06
MH 5+95	7+63	42.00	42.00	31.58	4.00		Flat	HEC-22 Ener	0.05
RR ROW MH 1	2+77	49.00	49.00	39.43	4.00		Flat	HEC-22 Ener	0.01
SIG-MH1	11+42	68.98	68.98	64.28	4.00		Flat	HEC-22 Ener	0.25
SIG-MH3	12+00	69.71	69.71	63.81	4.00		Depresse	HEC-22 Ener	0.17
SIG-MH5	12+91	71.71	71.71	65.90	4.00		Flat	HEC-22 Ener	0.01
SIG -MH4	12+74	71.39	71.39	65.49	4.00		Flat	HEC-22 Ener	0.10

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-302	6- CB 4	6-CB 3	12 inch	3.69	104.00	5.03	0.39	0.43	1.04	0.009708	54.00	54.88	60.00	53.00	53.84	60.00
P-191	6- CB2 (97)	6-MH 90	18 inch	5.24	81.00	10.22	0.37	0.20	3.29	0.042643	49.56	50.44	55.46	46.00	47.15	51.80
P-193	6- MH 100	GATE 6	36 inch	21.37	16.00	45.56	0.58	0.14	13.83	0.891638	31.80	33.29	42.00	13.00	19.46	43.00
P-190	6-CB 1 (98)	6- CB2 (97)	18 inch	4.14	21.00	5.87	0.31	0.23	0.14	0.010426	49.80	50.58	55.36	49.56	50.44	55.46
P-301	6-CB 3	6-CB 1 (98)	12 inch	3.91	93.00	8.76	0.48	1.19	3.49	0.029799	53.00	53.84	60.00	49.80	50.35	55.36
P-201	6-CB 79A	6-MH 79	18 inch	1.36	40.00	3.56	0.16	0.20	0.30	0.006601	56.88	57.32	61.98	56.61	57.01	63.21
P-240	6-MH 79	6-MH 80	24 inch	1.35	51.00	8.17	0.14	1.04	14.01	0.257103	56.41	56.81	63.21	42.60	42.80	48.00
P-289	6-MH 79B	6-CB 79A	12 inch	1.54	196.00	4.05	0.21	0.25	1.63	0.008082	58.57	59.10	68.17	56.98	57.47	61.98
P-288	6-MH 79C	6-MH 79B	12 inch	0.87	91.00	3.23	0.15	0.12	0.56	0.006534	59.27	59.66	67.07	58.67	59.10	68.17
P-287	6-MH 79D	6-MH 79C	12 inch	0.24	142.00	2.31	0.07	0.08	1.04	0.007244	60.50	60.70	67.00	59.47	59.66	67.07
P-241	6-MH 80	6-MH 82	24 inch	1.34	61.00	6.38	0.14	0.08	2.32	0.038919	41.40	41.80	48.00	39.00	39.49	50.60
P-199	6-MH 82	6-MH 84	24 inch	1.96	62.00	7.68	0.17	0.15	2.97	0.048340	39.00	39.49	50.60	36.00	36.51	42.40
P-198	6-MH 84	6-MH 85	24 inch	2.18	108.00	5.86	0.18	0.53	2.36	0.018612	36.00	36.51	42.40	33.80	34.15	41.60
P-303	6-MH 85	6-MH 88	30 inch	2.40	92.00	4.98	0.18	0.02	-0.03	0.001398	33.20	33.71	41.60	32.50	33.74	41.00
P-194	6-MH 88	6- MH 100	30 inch	11.40	98.00	5.59	0.43	0.26	0.24	0.004245	32.50	33.63	41.00	32.00	33.39	42.00
P-238	6-MH 90	6-MH DROP	24 inch	10.36	79.00	12.71	0.47	2.44	4.53	0.032524	46.00	47.15	51.80	42.00	42.62	45.00
P-239	6-MH DROP	6- MH 100	24 inch	10.33	19.00	12.88	0.47	1.56	1.42	0.017596	34.00	35.15	45.00	33.00	33.73	42.00
P-130	8MH-1	FSRD -1A	36 inch	27.35	127.00	6.94	0.69	0.75	0.69	0.005011	38.26	39.95	49.66	37.62	39.26	46.62
P-14	9-BCB-1	9-BMH1	15 inch	4.47	58.00	3.64	0.23	0.39	0.36	0.003430	65.03	66.17	69.33	64.95	65.81	69.85
P-12	9-BCB-2	9-BMH-2	15 inch	3.12	16.00	9.95	0.29	1.12	1.23	0.024985	64.75	65.46	69.55	63.81	64.24	70.01
P-13	9-BCB-3	9-BCB-2	15 inch	2.79	64.00	5.16	0.27	0.19	0.57	0.010112	65.52	66.19	69.22	64.85	65.62	69.55
P-11	9-BMH-2	9-BMH1	15 inch	3.12	39.00	2.54	0.10	0.10	0.31	0.007941	59.81	61.21	70.01	59.55	60.90	69.85
P-10	9-BMH1	9MH-3	15 inch	7.48	56.00	7.96	0.68	0.58	2.97	0.054808	59.55	60.64	69.85	56.10	57.67	60.00
P-4	9-MH-34	9-MH38	24 inch	15.53	82.00	6.34	0.56	0.43	0.25	0.004659	38.50	40.04	52.98	38.00	39.79	45.00
P-6	9-MH31	MH-9-32	18 inch	13.20	125.00	9.89	0.96	1.52	3.05	0.019878	43.07	44.43	51.12	40.32	41.38	52.79
P-3	9-MH38	9-MH39	24 inch	15.38	106.00	7.57	0.65	0.59	0.93	0.009381	38.00	39.41	45.00	37.00	38.48	45.00
P-2	9-MH39	9-MH40	24 inch	15.22	132.00	11.89	0.65	0.42	3.81	0.030535	37.00	38.41	45.00	32.85	34.60	44.68
P-97	9-MH40	GATE 9	24 inch	15.09	10.00	15.01	0.64	1.53	1.02	0.013943	32.85	34.25	44.68	32.25	33.23	44.68
P-9	9MH-3	BURIED MH 1	15 inch	7.45	69.00	9.81	0.67	0.57	1.82	0.027783	56.10	57.19	60.00	54.00	55.37	60.00
P-7	9MH-30	9-MH31	18 inch	12.14	127.00	6.87	0.73	0.73	1.70	0.013350	43.35	46.43	48.35	43.07	44.73	51.12
P-111	10-MH 2	GATE 10	36 inch	10.97	21.00	7.72	0.39	0.72	0.49	0.007465	30.78	31.83	45.00	30.50	31.34	45.00
P-112	10-MH1	10-MH 2	36 inch	6.46	105.00	5.45	0.28	0.46	0.94	0.007223	34.31	35.11	48.51	33.50	34.17	45.00
P-85	11-CB1	11-MH1	12 inch	1.62	12.00	12.76	0.22	0.07	0.78	0.077350	58.05	58.59	62.75	56.43	57.81	63.13
P-84	11-CB1A	11-MH1	12 inch	1.60	20.00	10.81	0.22	0.06	1.07	0.060851	58.34	58.88	62.54	56.63	57.81	63.13
P-65	11-CB2	11-MH4	15 inch	14.89	166.00	12.13	2.29	2.30	8.83	0.053139	63.20	71.87	68.60	61.80	63.04	69.80
P-80	11-CB2A	11-MH2	12 inch	4.54	19.00	13.68	0.59	0.52	0.89	0.050341	57.77	58.66	61.57	56.62	57.77	62.32
P-81	11-CB2B	11-MH2	12 inch	1.58	35.00	15.48	0.21	0.06	-0.09	0.001818	57.70	58.23	61.50	50.82	58.32	62.32
P-59	11-CB3A	11-MH3	15 inch	1.80	20.00	8.46	0.20	0.87	1.05	0.019177	60.55	61.08	65.65	59.72	60.03	66.72
P-58	11-CB3B	11-MH3	15 inch	0.65	13.00	10.41	0.11	1.51	2.51	0.085547	63.64	63.95	66.14	61.32	61.45	66.72
P-62	11-CB4A	11-MH4	15 inch	0.86	59.00	5.91	0.13	0.54	2.44	0.034417	67.50	67.86	73.75	65.20	65.42	69.80
P-90	11-CB4B	11-MH4	15 inch	3.58	40.00	7.56	0.32	0.84	1.23	0.017795	59.89	60.65	64.09	58.90	59.42	69.80
P-64	11-CB4C	11-CB4B	10 inch	0.00	138.00	0.00	0.00	0.00	2.86	0.020695	63.51	63.51	67.21	59.89	60.65	64.09
P-56	11-CB86	11-MH88	15 inch	2.54	24.00	6.17	0.25	0.21	0.22	0.010625	47.50	48.14	51.59	47.24	47.92	53.44
P-51	11-CB89A	11-MH89	12 inch	2.13	49.00	7.19	0.27	0.80	1.72	0.024154	54.40	55.02	58.90	52.90	53.30	58.71
P-52	11-CB89B	11-CB89A	12 inch	0.83	95.00	3.77	0.14	0.04	0.76	0.009049	55.40	55.78	60.00	54.40	55.02	58.90
P-53	11-CB89C	11-CB89B	12 inch	0.27	12.00	3.22	0.08	0.02	0.03	0.007776	55.60	55.82	60.00	55.40	55.78	60.00
P-83	11-MH1	11-MH1A	18 inch	3.21	58.00	1.82	0.05	0.05	0.04	0.000669	56.23	57.79	63.13	52.02	57.75	62.23
P-82	11-MH1A	11-MH2	18 inch	3.15	53.00	1.81	0.05	0.05	0.05	0.000929	51.73	57.67	62.23	50.82	57.62	62.32
P-79	11-MH2	11-MH3	24 inch	8.71	181.00	2.81	0.12	0.12	0.28	0.001526	50.12	57.56	62.32	49.22	57.29	66.72
P-57	11-MH3	11-MH88	24 inch	27.99	144.00	11.33	1.38	1.27	2.63	0.018964	49.12	50.96	66.72	46.34	48.33	53.44
P-61	11-MH4	11-MH3	18 inch	18.14	92.00	10.27	1.64	1.67	1.99	0.021343	54.20	57.07	69.80	53.62	55.07	66.72
P-54	11-MH88	11-MH89	24 inch	20.04	146.00	8.52	0.85	0.69	1.41	0.010772	46.14	47.75	53.44	44.51	46.34	58.71
P-48	11-MH89	11-MH90	30 inch	22.87	306.00	12.60	0.71	2.47	9.25	0.024472	44.51	46.14	58.71	35.90	36.89	54.10

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-42	11-MH90	11-MH92	42 inch	28.75	96.00	12.65	0.64	2.22	3.07	0.015535	34.10	35.76	54.10	31.64	32.68	50.24
P-45	11-MH91	11-MH90	30 inch	6.38	25.00	5.61	0.31	0.46	0.32	0.006430	35.90	36.74	52.83	35.70	36.42	54.10
P-41	11-MH92	GATE 11 MH	42 inch	29.50	96.00	10.78	0.65	0.58	1.47	0.015982	31.54	33.22	50.24	30.00	31.75	39.25
P-46	11-MH93	11-MH91	24 inch	6.48	126.00	4.74	0.35	0.35	0.60	0.004762	36.50	37.40	49.99	35.90	36.80	52.83
P-27	AB-CB-1	AB-CB-2	15 inch	5.21	154.00	9.43	0.44	0.34	5.18	0.034272	56.36	57.29	62.66	51.05	52.11	55.85
P-26	AB-CB-2	AB-CB-3	15 inch	8.46	150.00	10.75	0.81	0.80	5.36	0.035796	50.85	51.99	55.85	45.48	46.63	50.18
P-25	AB-CB-3	AB-MH1	18 inch	9.06	39.00	11.74	0.59	0.45	1.47	0.041309	45.38	46.54	50.18	43.71	45.07	49.81
P-23	AB-CB-4	AB-MH3	18 inch	10.76	37.00	9.81	0.72	1.30	1.19	0.016492	40.88	42.14	49.58	40.00	40.95	49.48
P-96	AB-MH1	AB-MH2	18 inch	9.04	17.00	10.50	0.59	1.18	0.85	0.015138	43.51	44.67	49.81	42.97	43.82	50.47
P-98	AB-MH2	AB-CB-4	18 inch	9.03	31.00	5.11	0.41	0.41	0.23	0.007394	41.07	42.76	50.47	40.98	42.53	49.58
P-22	AB-MH3	AB-MH90	24 inch	10.23	189.00	3.26	0.20	0.34	0.59	0.002332	34.84	36.57	49.48	34.67	35.98	49.87
P-21	AB-MH90	Armory Drainage (Area A36-7) EXTERNAL CA	24 inch	9.88	107.00	7.37	0.46	0.41	1.20	0.011648	34.67	35.79	49.87	33.42	34.59	48.90
P-89	AETNA -YD MH	AETNA BLD CB-1	24 inch	1.76	179.00	6.30	0.16	0.04	5.10	0.029128	42.11	42.57	74.50	36.74	37.47	50.47
P-47	AETNA BLD CB-1	11-MH93	24 inch	1.98	32.00	4.00	0.06	0.03	-0.01	0.000560	36.74	37.47	50.47	36.50	37.49	49.99
P-50	AETNA CB-2	AETNA MH1	15 inch	3.24	76.00	5.37	0.30	0.45	0.91	0.009994	54.85	55.58	60.50	54.05	54.67	60.80
P-88	AETNA CB-3	AETNA CB-2	15 inch	3.13	142.00	5.33	0.29	0.44	1.61	0.010272	56.45	57.16	70.90	54.95	55.55	60.50
P-126	AETNA CB 202	AETNA MH 201	12 inch	1.50	11.00	4.19	0.21	0.27	0.15	0.008137	49.40	49.92	61.60	49.30	49.77	62.00
P-119	AETNA CB 203	AETNA MH 202	12 inch	3.02	23.00	5.18	0.36	0.42	0.29	0.010111	57.64	58.39	61.44	57.40	58.10	61.90
P-142	AETNA DI	FSMH-10	12 inch	2.05	34.00	4.85	0.26	0.36	0.45	0.010115	45.07	45.68	49.87	44.70	45.23	50.90
P-125	AETNA MH 201	AETNA MH 202	12 inch	1.50	34.00	1.91	0.06	0.06	0.06	0.001773	38.35	48.03	62.00	38.00	47.97	61.90
P-118	AETNA MH 202	AETNA MH 203	15 inch	3.88	44.00	5.30	0.34	0.34	0.39	0.009088	37.90	38.70	61.90	37.50	38.30	62.00
P-114	AETNA MH 203	AETNA MH 204	24 inch	5.52	101.00	5.93	0.31	0.05	0.06	0.003118	37.40	38.23	62.00	36.40	38.17	54.80
P-113	AETNA MH 204	10-MH1	24 inch	5.62	16.00	12.22	0.32	1.48	1.55	0.024258	36.30	37.14	54.80	35.11	35.59	48.51
P-49	AETNA MH1	11-MH89	15 inch	3.22	60.00	5.26	0.30	0.43	0.70	0.009450	52.95	53.67	60.80	52.35	52.97	58.71
P-110	AETNA PARKING LOT	11-CB86	12 inch	4.62	125.00	5.88	0.54	0.60	2.14	0.016624	49.00	50.54	55.50	47.50	48.39	51.59
P-108	AETNA PARKING ROOF-2	11-MH93	6 inch	4.59	27.00	23.39	8.50	8.50	33.99	1.259070	71.00	71.50	72.00	36.50	37.51	49.99
P-107	AETNA PARKING ROOF -1	11-MH90	6 inch	3.83	32.00	19.53	5.93	5.93	35.67	1.114734	71.00	71.50	72.00	34.10	35.83	54.10
P-127	AETNA YD 201	AETNA MH 204	12 inch	0.15	11.00	4.88	0.06	0.37	1.08	0.069182	51.00	51.16	54.80	50.00	50.08	54.80
P-185	AR-48-1	AR-MH-12	36 inch	3.10	101.00	7.61	0.19	0.17	3.72	0.037013	25.40	25.95	34.50	21.66	22.23	30.50
P-187	AR-48-1B	AR-48-1CA4	36 inch	2.48	43.00	6.05	0.17	0.15	0.98	0.023233	28.50	28.99	37.50	27.50	28.01	36.50
P-224	AR-48-1C	AR48-MH	15 inch	1.96	177.00	5.23	0.21	0.19	8.47	0.048006	43.65	44.21	53.00	35.15	35.74	44.50
P-186	AR-48-1CA4	AR-48-1	36 inch	2.64	36.00	8.06	0.18	1.01	2.03	0.033190	27.50	28.01	36.50	25.70	25.98	34.50
P-182	AR-48-2	AR-MH-12	15 inch	0.63	70.00	3.09	0.11	0.02	1.65	0.024839	23.57	23.88	32.07	21.66	22.23	30.50
P-180	AR-48-3	AR-CB15	18 inch	0.33	31.00	4.19	0.07	0.27	1.19	0.031804	22.73	22.94	27.63	21.62	21.75	25.62
P-161	AR-48-4	Armory Wet Well	48 inch	5.31	22.00	0.42	0.00	0.00	0.00	0.000014	15.10	19.46	42.00	15.00	19.46	61.50
P-170	AR-CB-17	AR-CB14	15 inch	1.15	65.00	1.55	0.06	0.15	0.23	0.002122	22.48	23.08	26.28	22.43	22.85	26.33
P-164	AR-CB2	AR-CB3	15 inch	0.68	25.00	3.47	0.11	0.19	0.31	0.009558	32.63	32.95	37.93	32.37	32.64	37.07
P-189	AR-CB3	AR-48-4	48 inch	5.33	162.00	4.20	0.00	0.00	0.00	0.000013	15.87	19.46	37.07	15.10	19.46	42.00
P-166	AR-CB4	ARMORY CAPPED MH	15 inch	0.30	28.00	2.80	0.07	0.04	0.28	0.011032	23.07	23.28	30.17	22.75	23.00	30.18
P-168	AR-CB6	AR-MH5	42 inch	4.95	125.00	0.51	0.00	0.00	0.00	0.000024	15.96	19.47	25.76	15.88	19.47	30.18
P-226	AR-CB7	AR-CB8	12 inch	0.15	45.00	1.27	0.02	0.05	0.14	0.002428	21.36	21.57	25.16	21.27	21.43	25.27
P-173	AR-CB8	ARMH-9	24 inch	2.72	12.00	0.87	0.01	0.01	0.00	0.000145	17.37	19.48	25.27	17.03	19.47	27.43
P-177	AR-CB10	AR-CB8	18 inch	1.69	43.00	4.85	0.18	0.37	0.69	0.011705	21.21	21.70	25.31	20.63	21.01	25.27
P-174	AR-CB13	AR-CB8	12 inch	0.72	45.00	2.79	0.12	0.13	0.24	0.005122	21.10	21.46	25.70	20.87	21.22	25.27
P-169	AR-CB14	AR-CB6	18 inch	1.06	52.00	4.68	0.14	0.01	2.05	0.041852	21.13	21.51	26.33	17.96	19.47	25.76
P-179	AR-CB15	AR-CB10	18 inch	0.32	45.00	2.05	0.07	0.01	0.04	0.002030	21.52	21.74	25.62	21.31	21.70	25.31
P-175	AR-CB16	AR-CB13	12 inch	0.23	29.00	3.08	0.07	0.03	0.42	0.015969	21.69	21.89	24.79	21.20	21.46	25.70
P-176	AR-CB18	AR-CB8	12 inch	0.29	55.00	1.67	0.04	0.08	0.13	0.001757	20.85	21.12	24.65	20.77	20.99	25.27
P-183	AR-MH-12	AR-MH11	36 inch	3.35	103.00	9.12	0.20	0.02	2.76	0.028568	21.66	22.23	30.50	18.12	19.47	29.02
P-165	AR-MH5	AR-CB3	48 inch	4.91	151.00	0.89	0.00	0.00	0.00	0.000009	15.88	19.46	30.18	15.87	19.46	37.07
P-184	AR-MH11	ARMH-9	36 inch	3.35	92.00	4.67	0.02	0.01	-0.00	0.000060	18.02	19.47	29.02	17.23	19.47	27.43
P-225	AR48-MH	AR-48-1B	15 inch	1.93	150.00	5.05	0.21	0.40	6.77	0.043868	35.15	35.70	44.50	28.50	28.94	37.50
P-34	AREA 9F-1	AREA 9F-2	12 inch	0.18	29.00	0.23	0.00	0.00	0.00	0.000026	44.92	47.40	48.92	44.48	47.40	48.98

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-32	AREA 9F-2	9MH-30	12 inch	1.87	21.00	2.38	0.09	0.09	0.06	0.002761	44.38	47.40	48.98	44.25	47.34	48.35
P-33	AREA 9F-3	AREA 9F-2	12 inch	0.60	15.00	0.76	0.01	0.01	0.00	0.000282	44.88	47.40	48.58	44.58	47.40	48.98
P-36	AREA 9G-2	9-MH31	15 inch	0.00	44.00	0.00	0.00	0.00	1.05	0.023924	46.21	46.21	49.52	44.95	45.16	51.12
P-104	AREA A36-7B (LOB)	AB-MH3	24 inch	0.97	314.00	1.25	0.00	0.00	0.01	0.000017	35.00	36.65	46.80	34.84	36.64	49.48
P-171	ARMH-9	AR-CB6	36 inch	4.41	101.00	5.45	0.01	0.01	0.00	0.000043	17.13	19.47	27.43	16.06	19.47	25.76
P-167	ARMORY CAPPED MH	AR-MH5	12 inch	0.30	25.00	10.48	0.08	0.00	3.51	0.143389	22.75	22.97	30.18	15.98	19.47	30.18
P-99	Armory Drainage (Area A36-7) EXTERNAL CA	MH 5+95	30 inch	26.78	107.00	7.43	0.81	0.86	0.72	0.006335	32.70	34.46	48.90	32.02	33.74	42.00
P-237	Armory Wet Well	Armory Pump Station	8 x 7 ft	17.33	105.00	3.37	0.00	0.00	0.00	0.000006	15.00	19.46	61.50	14.80	19.46	45.00
P-72	BROAD ST COMBINED	TO COMBINED SIPHON	12 inch	1.16	26.00	6.94	0.17	0.73	1.35	0.030303	44.47	44.92	47.97	43.31	43.58	47.21
P-20	BURIED MH 1	BURRIED MH 2	18 inch	7.42	72.00	7.32	0.48	0.35	0.81	0.013141	54.00	55.06	60.00	53.00	54.25	55.00
P-24	BURRIED MH 2	BURRIED MH 3	18 inch	8.97	143.00	11.62	0.58	0.44	5.79	0.041489	53.00	54.16	55.00	47.00	48.37	50.00
P-28	BURRIED MH 3	9MH-30	18 inch	10.80	75.00	12.88	0.72	0.58	1.55	0.022503	47.00	48.26	50.00	43.35	46.71	48.35
P-87	Dummy Off Site Basin	TO GATE 7	18 inch	2.39	33.00	16.44	0.22	4.20	10.96	0.211433	42.83	43.42	44.83	32.25	32.46	45.05
P-310	EX PARKING CB 2	AREA 9G-2	12 inch	0.00	32.00	0.00	0.00	0.00	0.10	0.003125	46.41	46.41	48.91	46.31	46.31	49.52
P-311	EX PARKING CB 3	MH-9-32	12 inch	0.00	33.00	0.00	0.00	0.00	0.30	0.009091	48.19	48.19	51.59	47.89	47.89	52.79
P-309	EX PARKING LOT BASIN	9-MH-34	12 inch	1.31	11.00	10.15	0.19	1.20	1.53	0.047343	46.29	46.77	53.09	45.00	45.25	52.98
P-117	EXISTING AETNA CB (10)	J-54	12 inch	0.38	77.00	5.42	0.09	0.46	2.68	0.030039	55.57	55.82	59.78	53.00	53.14	59.64
P-138	FARM I-1	FSMH-1	12 inch	1.87	56.00	11.29	0.24	0.23	4.74	0.084986	73.95	74.53	81.05	69.19	69.79	79.56
P-144	FSI-1	FSMH-6	12 inch	2.59	18.00	10.18	0.31	1.26	1.54	0.032672	53.98	54.67	59.38	52.74	53.13	59.94
P-143	FSI-2	FSMH-6	12 inch	2.54	26.00	10.52	0.31	0.29	1.97	0.076483	54.63	55.31	59.03	52.64	53.35	59.94
P-140	FSI-3	FSMH-5	12 inch	1.07	34.00	9.43	0.17	1.38	4.07	0.084006	60.01	60.45	64.31	56.17	56.37	63.77
P-139	FSI-4	FSMH-1	15 inch	0.82	25.00	7.39	0.13	0.04	1.70	0.071570	71.10	71.45	78.70	69.19	69.76	79.56
P-160	FSMH-1	FSMH-5	24 inch	2.52	267.00	8.54	0.20	0.02	13.43	0.050936	69.19	69.74	79.56	55.07	56.32	63.77
P-152	FSMH-2	FSMH-3	10 inch	7.65	77.00	15.63	3.06	3.56	5.42	0.063957	67.46	68.29	71.66	62.14	62.87	67.34
P-158	FSMH-3	FSMH-4	24 inch	7.63	19.00	17.72	0.38	3.10	3.67	0.049753	60.14	61.12	67.34	57.00	57.46	66.60
P-159	FSMH-4	FSMH-5	24 inch	7.62	50.00	10.38	0.38	0.18	1.47	0.033406	56.90	57.88	66.60	55.07	56.42	63.77
P-136	FSMH-5	FSMH-6	24 inch	10.81	74.00	15.35	0.49	0.27	3.27	0.047124	55.07	56.25	63.77	51.44	52.98	59.94
P-135	FSMH-6	FSMH-7	24 inch	16.83	107.00	13.84	0.71	0.60	4.60	0.044016	51.44	52.92	59.94	46.71	48.32	55.21
P-134	FSMH-7	FSMH-9	24 inch	18.29	140.00	13.42	0.77	2.80	6.00	0.028411	46.71	48.25	55.21	41.35	42.25	51.00
P-131	FSMH-9	8MH-1	36 inch	25.85	19.00	22.09	0.66	3.38	3.18	0.024363	40.99	42.63	51.00	38.56	39.45	49.66
P-132	FSMH-10	FSMH-9	18 inch	6.33	33.00	7.84	0.25	0.20	0.06	0.003515	41.60	42.85	50.90	40.99	42.78	51.00
P-147	FSPG-1	FSMH-6	24 inch	1.57	75.00	4.34	0.15	0.03	0.55	0.008963	53.50	53.93	70.00	52.64	53.38	59.94
P-148	FSPG-2	FSMH-7	24 inch	1.57	42.00	3.63	0.15	0.20	0.33	0.006672	49.00	49.43	70.00	48.71	49.10	55.21
P-145	FSPG-3	FSMH-9	18 inch	1.57	62.00	5.32	0.17	0.01	0.32	0.007734	42.50	42.97	70.00	41.35	42.65	51.00
P-146	FSPG -4	8MH-1	18 inch	1.57	60.00	4.37	0.17	0.30	0.72	0.009975	42.50	42.97	70.00	41.86	42.25	49.66
P-149	FSRD-1B	FSRD -1A	24 inch	11.40	26.00	10.07	0.46	0.22	-0.20	0.001690	33.90	35.16	46.62	33.52	35.36	46.62
P-156	FSRD -1A	GATE 8 MH	48 inch	38.07	394.00	9.46	0.71	0.69	3.71	0.009441	33.52	35.36	46.62	29.80	31.65	47.00
P-246	GARNER ST CB	GB-SANMH9	12 inch	0.00	26.00	0.00	0.00	0.00	0.00	0.000000	56.00	60.76	69.50	55.50	60.76	68.00
P-157	GATE 8 MH	GATE 8	48 inch	37.16	9.00	9.97	0.70	0.96	0.31	0.005017	29.80	31.62	47.00	29.70	31.31	47.00
P-37	GATE 11 MH	GATE 11	42 inch	32.01	8.00	20.70	0.69	1.91	1.31	0.010987	30.00	31.75	39.25	29.25	30.44	39.25
P-207	GB- MH 90	GB-CB5	12 inch	3.13	46.00	7.06	0.37	0.25	0.67	0.017264	34.28	35.04	39.58	33.25	34.37	38.25
P-277	GB-AS1/I-84EB	GB-AS2/I-84WB	18 inch	6.36	81.00	12.19	0.43	0.21	4.53	0.058648	57.00	57.98	60.00	52.00	53.44	57.95
P-278	GB-AS2/I-84WB	GB-MH3	18 inch	17.31	51.00	17.32	1.53	3.80	4.54	0.044487	52.00	53.44	57.95	48.00	48.90	52.00
P-294	GB-AS3	GB-MH6	15 inch	1.96	51.00	5.20	0.21	0.42	0.84	0.012302	58.00	58.56	68.00	57.29	57.72	68.00
P-219	GB-AS4	GB-MH7	15 inch	4.52	16.00	8.22	0.39	0.81	0.65	0.014339	51.50	52.36	69.00	51.08	51.72	69.44
P-272	GB-AS5	GB-SANMH 1	15 inch	4.28	14.00	3.49	0.19	0.19	0.06	0.004393	28.80	42.70	41.70	28.74	42.64	42.64
P-231	GB-AS6	GB-HB1	10 inch	1.41	22.00	3.51	0.19	0.21	0.10	0.003813	42.58	43.15	46.58	42.50	43.05	46.10
P-55	GB-BB1	GB-BB2	15 inch	2.27	84.00	3.14	0.07	0.06	0.08	0.001172	64.67	65.65	72.97	64.40	65.57	73.80
P-43	GB-BB2	GB-BB3	15 inch	3.59	68.00	2.93	0.16	0.28	0.36	0.003486	64.40	65.48	73.80	64.31	65.12	74.91
P-282	GB-BB3	GB-BB4	15 inch	2.92	211.00	5.69	0.28	0.26	2.77	0.013217	64.31	65.00	74.91	61.52	62.23	70.82
P-283	GB-BB4	GB-MH8	15 inch	3.10	204.00	5.52	0.29	0.47	2.51	0.011381	61.52	62.23	70.82	59.14	59.72	74.34
P-230	GB-CB1	GB-CB2	12 inch	0.76	77.00	0.96	0.01	0.01	0.03	0.000452	32.86	34.89	36.46	32.29	34.85	37.89
P-229	GB-CB2	GB-MH5	12 inch	3.06	26.00	3.90	0.24	0.24	0.19	0.007400	32.19	34.85	37.89	31.63	34.66	39.43

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-209	GB-CB3	GB-MH5	15 inch	3.06	51.00	2.49	0.10	0.10	0.11	0.002244	32.45	34.30	37.45	31.63	34.19	39.43
P-271	GB-CB4	ASYLUM COMBINED MH	12 inch	9.03	54.00	24.08	2.06	7.23	9.75	0.084865	34.35	35.34	0.00	25.06	25.59	35.86
P-208	GB-CB5	GB-CB3	15 inch	2.92	35.00	6.26	0.09	0.09	0.07	0.002034	33.15	34.37	38.25	32.55	34.30	37.45
P-228	GB-CB6	GB- MH 90	12 inch	0.63	31.00	4.16	0.12	0.01	-0.02	0.002919	34.82	35.15	38.92	34.28	35.17	39.58
P-205	GB-CB7	GB-MH90	12 inch	2.58	27.00	7.36	0.31	0.77	0.98	0.019512	37.81	38.50	42.91	37.04	37.51	44.64
P-204	GB-CB8	GB-CB7	12 inch	2.04	95.00	6.35	0.26	0.63	2.32	0.020547	41.25	41.86	47.55	39.11	39.54	42.91
P-203	GB-CB9	GB-CB8	12 inch	1.23	134.00	6.20	0.18	0.60	4.31	0.029042	46.29	46.76	55.49	42.15	42.45	47.55
P-202	GB-CB10	GB-CB9	12 inch	0.07	42.00	4.03	0.04	0.00	4.03	0.096796	50.68	50.79	53.88	46.39	46.76	55.49
P-220	GB-FAR1	GB-MH7	18 inch	4.09	129.00	6.91	0.31	0.11	1.89	0.016137	50.46	51.23	73.06	48.14	49.35	69.44
P-221	GB-FAR2	GB-FAR1	15 inch	0.16	155.00	3.54	0.05	0.19	6.03	0.038017	72.44	72.59	76.54	66.46	66.56	73.06
P-232	GB-HB1	GB-HB2	10 inch	1.51	29.00	13.51	0.24	2.51	4.14	0.064242	42.50	43.05	46.10	38.69	38.91	44.79
P-227	GB-HB2	GB-MH5	15 inch	8.64	56.00	10.01	0.84	1.47	1.95	0.023573	37.29	38.43	44.79	35.63	36.48	39.43
P-236	GB-HB3	GB-HB2	15 inch	7.12	42.00	9.63	0.63	1.30	1.56	0.021159	39.24	40.31	47.14	37.99	38.75	44.79
P-235	GB-HB4	GB-HB3	15 inch	6.96	65.00	9.63	0.61	1.40	2.30	0.023256	41.30	42.36	50.00	39.34	40.06	47.14
P-234	GB-HB5	GB-HB4	12 inch	6.71	53.00	8.54	1.13	1.13	1.88	0.035453	43.00	44.24	54.00	41.30	42.36	50.00
P-233	GB-HB6	GB-HB5	12 inch	6.14	22.00	7.82	0.95	0.95	0.65	0.029743	43.50	44.89	54.00	43.00	44.24	54.00
P-276	GB-HB7	GB-HB6	12 inch	6.15	20.00	7.83	0.95	0.95	0.60	0.029826	44.00	45.49	54.00	43.50	44.89	54.00
P-211	GB-MH1	GB-MH2	18 inch	14.10	11.00	13.80	1.06	0.99	0.37	0.040761	30.35	31.73	40.15	29.81	31.36	39.61
P-212	GB-MH2	GULLY BROOK CHAMBER	33 inch	66.25	46.00	20.20	2.06	4.07	2.99	0.021240	28.01	30.57	39.61	25.79	27.58	38.30
P-270	GB-MH2 CA	GB-MH2	15 inch	4.47	127.00	8.72	0.39	0.21	0.50	0.005368	30.35	31.21	40.15	28.01	30.71	39.61
P-214	GB-MH3	GB-MH2	33 inch	50.92	337.00	8.57	1.14	1.14	3.12	0.009273	29.70	34.10	52.00	28.01	30.97	39.61
P-215	GB-MH4	GB-MH3	33 inch	35.56	98.00	5.99	0.56	0.56	0.44	0.004521	30.21	35.31	67.00	29.70	34.87	52.00
P-210	GB-MH5	GB-MH1	18 inch	14.17	73.00	8.02	1.00	1.00	1.33	0.018212	30.63	33.73	39.43	30.35	32.40	40.15
P-295	GB-MH6	GB-SP1	24 inch	8.88	91.00	6.77	0.21	0.12	0.06	0.001548	46.50	47.95	68.00	45.59	47.89	68.00
P-296	GB-MH7	GB-MH6	18 inch	7.44	52.00	9.54	0.49	0.28	0.40	0.011745	47.96	49.02	69.44	46.50	48.62	68.00
P-222	GB-MH8	GB-FAR1	18 inch	3.04	65.00	3.20	0.16	0.24	0.29	0.003257	50.74	51.52	74.34	50.56	51.23	73.06
P-206	GB-MH90	GB- MH 90	12 inch	2.57	133.00	6.06	0.31	0.20	2.10	0.016592	36.64	37.33	44.64	34.38	35.23	39.58
P-155	GB-SANCB1	GB-SANMH15	12 inch	0.63	33.00	12.38	0.12	0.09	7.37	0.224061	78.65	78.98	80.95	71.25	71.62	81.50
P-259	GB-SANCB2	GB-SANMH19	12 inch	0.71	34.00	4.89	0.13	0.11	0.48	0.014641	89.50	89.85	91.00	89.00	89.37	91.00
P-299	GB-SANCB3	GB-SANCB5	12 inch	2.43	63.00	10.06	0.30	0.15	2.29	0.038664	86.37	87.04	90.67	83.76	84.75	89.36
P-298	GB-SANCB4	GB-SANMH17	12 inch	0.69	34.00	8.60	0.13	1.15	2.70	0.049318	87.79	88.14	88.79	85.28	85.44	88.58
P-297	GB-SANCB5	GB-SANMH17	12 inch	8.29	38.00	24.39	1.74	6.52	7.66	0.075590	83.76	84.75	89.36	76.58	77.09	88.58
P-256	GB-SANCB6	GB-SANCB5	12 inch	2.82	65.00	5.50	0.34	0.47	0.58	0.006863	86.04	86.76	89.34	85.56	86.18	89.36
P-252	GB-SANCB7	GB-SANMH17	12 inch	3.24	94.00	32.56	0.39	0.27	7.18	0.077717	83.44	84.21	86.14	0.00	77.03	88.58
P-261	GB-SANCB8	GB-SANCB9	10 inch	1.13	33.00	8.81	0.19	0.07	1.05	0.035522	76.17	76.64	78.97	74.17	75.60	81.17
P-262	GB-SANCB9	GB-SANMH16	10 inch	1.78	26.00	5.48	0.28	0.44	0.42	0.009812	75.00	75.60	81.17	74.69	75.18	81.89
P-260	GB-SANCB10	GB-SANMH16	12 inch	5.07	7.00	24.28	0.70	2.80	2.33	0.032398	77.58	78.50	81.78	75.69	76.18	81.89
P-248	GB-SANCB11	GB-SANMH16	12 inch	4.26	43.00	15.15	0.54	2.89	4.05	0.039420	78.89	79.76	83.49	75.29	75.71	81.89
P-247	GB-SANCB12	GB-SANCB11	12 inch	2.07	14.00	8.26	0.26	0.13	0.13	0.018513	79.27	79.88	82.97	78.89	79.76	83.49
P-273	GB-SANMH 1	GB-SANMH 2	15 inch	18.84	74.00	15.36	3.66	3.66	6.30	0.085107	28.74	45.47	42.64	25.47	39.17	39.17
P-274	GB-SANMH 2	GB-SANMH 3	15 inch	18.81	24.00	15.33	3.65	3.65	2.04	0.084835	25.47	38.98	39.17	25.37	36.95	38.30
P-275	GB-SANMH 3	ASYLUM COMBINED MH	15 inch	18.80	101.00	15.32	3.65	3.65	8.56	0.084747	25.37	34.87	38.30	25.06	26.30	35.86
P-281	GB-SANMH4	GB-SANMH 1	15 inch	16.29	375.00	13.27	2.74	2.74	23.85	0.063591	32.65	66.49	41.00	28.74	42.64	42.64
P-291	GB-SANMH5	GB-SANMH4	15 inch	16.31	32.00	13.29	2.75	2.75	2.05	0.063786	54.71	57.96	67.00	54.67	55.91	41.00
P-290	GB-SANMH6	GB-SANMH5	18 inch	16.35	34.00	9.25	1.33	1.33	0.82	0.024240	54.80	60.73	67.20	54.71	59.90	67.00
P-292	GB-SANMH7	GB-SANMH20	18 inch	16.45	34.00	9.31	1.35	1.35	0.83	0.024528	55.47	65.72	68.31	55.19	64.88	68.00
P-300	GB-SANMH8	GB-SANMH7	24 inch	16.60	77.00	5.29	0.43	0.43	0.25	0.003188	57.13	66.29	70.65	55.47	66.05	68.31
P-245	GB-SANMH9	GB-SANMH6	12 inch	0.00	32.00	0.00	0.00	0.00	0.00	0.000000	55.50	60.76	68.00	54.80	60.76	67.20
P-267	GB-SANMH10	GB-SANMH8	12 inch	0.47	81.00	0.60	0.01	0.01	0.01	0.000105	59.90	69.04	75.00	57.13	69.03	70.65
P-266	GB-SANMH11	GB-SANMH10	12 inch	0.57	197.00	0.73	0.01	0.01	0.03	0.000153	67.00	69.07	79.00	59.90	69.04	75.00
P-265	GB-SANMH12	GB-SANMH11	12 inch	0.58	72.00	6.21	0.11	0.01	0.70	0.011180	69.46	69.78	80.76	67.00	69.08	79.00
P-264	GB-SANMH13	GB-SANMH12	15 inch	0.59	69.00	3.07	0.11	0.08	0.30	0.004820	69.80	70.10	81.00	69.46	69.80	80.76
P-263	GB-SANMH14	GB-SANMH13	15 inch	0.61	163.00	3.19	0.11	0.11	0.87	0.005337	70.67	70.97	82.17	69.80	70.11	81.00

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-154	GB-SANMH15	GB-SANMH14	15 inch	0.63	128.00	2.36	0.09	0.11	0.51	0.003782	71.25	71.59	81.50	70.77	71.08	82.17
P-250	GB-SANMH16	GB-SANMH8	24 inch	22.66	218.00	16.41	0.99	0.81	4.75	0.022630	69.49	71.19	81.89	57.13	66.43	70.65
P-251	GB-SANMH17	GB-SANMH16	18 inch	12.11	246.00	12.52	0.84	0.73	5.54	0.022963	75.58	76.90	88.58	69.49	71.36	81.89
P-258	GB-SANMH19	GB-SANCB3	15 inch	0.71	82.00	2.75	0.12	0.12	0.43	0.005244	89.00	89.33	91.00	88.57	88.90	90.67
P-293	GB-SANMH20	GB-SANMH6	18 inch	16.41	51.00	9.29	1.34	1.34	1.25	0.024412	55.19	62.73	68.00	54.93	61.49	67.20
P-216	GB-SP1	GB-MH4	33 inch	35.66	36.00	9.24	0.93	1.22	0.55	0.007521	45.90	47.89	68.00	45.57	47.34	67.00
P-128	GC-1	AETNA MH 203	15 inch	1.39	29.00	4.50	0.17	0.31	0.39	0.008689	44.50	44.97	50.00	44.20	44.58	62.00
P-242	GULLY BROOK BEND 2	Park River (Gully)	7 x 7 ft	465.46	838.00	7.03	0.81	0.92	1.53	0.001696	14.22	18.83	34.80	12.97	17.30	36.00
P-213	GULLY BROOK CHAMBER	GULLY BROOK GATE	36 inch	66.16	18.00	28.99	1.60	4.54	3.32	0.021081	20.85	23.45	38.30	18.52	20.13	36.90
P-243	GULLY BROOK GATE	GULLY BROOK BEND 2	11 x 9 ft	466.13	244.00	14.77	1.91	1.13	0.60	0.005668	15.97	19.79	36.90	14.22	19.19	34.80
P-285	Gully Brook inflow	J-108	11 x 9 ft	400.00	107.00	13.45	1.73	1.16	-0.08	0.004500	16.82	20.27	37.64	16.15	20.35	38.25
P-105	HAWTHORNE BYPASS CB	HAWTHORNE SAN MH	12 inch	0.85	21.00	10.85	0.14	1.64	2.74	0.059329	58.60	58.99	62.10	56.08	56.24	62.68
P-93	HAWTHORNE SAN MH	HAWTHORNE COMBINED	18 inch	4.12	35.00	3.44	0.22	0.31	0.19	0.002809	52.48	53.38	62.68	52.41	53.19	62.51
P-304	I-202	I-203	12 inch	1.43	29.00	5.50	0.06	0.05	0.02	0.000927	41.25	42.14	45.25	40.91	42.12	44.91
P-307	I-203	I-204	12 inch	6.40	21.00	8.14	1.03	1.05	0.42	0.019015	40.81	42.12	44.91	40.73	41.69	44.63
P-308	I-204	To 54 inch	12 inch	6.82	27.00	13.49	1.19	1.17	1.18	0.044471	40.23	41.20	44.63	39.02	40.02	45.02
P-94	IMLAY OFFSITE CB	HAWTHORNE SAN MH	12 inch	3.44	29.00	13.56	0.41	2.06	2.49	0.029005	58.48	59.27	61.88	56.38	56.79	62.68
P-95	Intersection with Broad and Armory (Area A36-	AB-CB-4	15 inch	0.72	51.00	7.79	0.12	0.01	4.11	0.082795	46.05	46.38	49.05	40.98	42.27	49.58
P-39	J-1	J-18	36 inch	47.37	52.00	6.70	0.70	0.70	0.26	0.005044	21.59	25.00	42.00	21.33	24.74	42.00
P-15	J-2	J-27	36 inch	47.03	14.00	6.65	0.69	0.69	0.07	0.004973	16.09	19.80	42.00	16.00	19.73	42.00
P-40	J-16	J-2	36 inch	47.08	19.00	6.66	0.92	1.08	0.26	0.005491	20.96	23.39	42.00	20.89	23.12	42.00
P-16	J-17	J-16	36 inch	47.20	55.00	7.62	0.72	0.70	0.23	0.004380	21.24	24.11	42.00	20.96	23.88	42.00
P-17	J-18	J-17	36 inch	47.24	18.00	6.68	0.69	0.69	0.09	0.005017	21.33	24.47	42.00	21.24	24.38	42.00
P-19	J-20	LOB Parking and Buliding (Area A36-8) EXTERNA	36 inch	26.11	50.00	3.69	0.21	0.21	0.08	0.001533	22.09	25.75	42.00	21.85	25.68	42.00
P-18	J-27	Armory Wet Well	36 inch	47.00	8.00	6.65	0.69	0.69	0.04	0.004966	15.10	19.50	42.00	15.00	19.46	61.50
P-115	J-53	AETNA MH 203	12 inch	0.37	62.00	2.48	0.09	0.10	1.32	0.021125	45.00	45.25	59.64	43.69	43.94	62.00
P-116	J-54	J-53	12 inch	0.37	30.00	5.40	0.09	0.06	0.97	0.033113	46.00	46.25	59.64	45.00	45.28	59.64
P-284	J-108	GULLY BROOK GATE	11 x 9 ft	400.00	28.00	13.57	1.34	1.15	-0.14	0.001964	16.15	20.06	38.25	15.97	20.20	36.90
P-38	LOB Parking and Buliding (Area A36-8) EXTEI	J-1	36 inch	47.49	52.00	6.72	0.70	0.70	0.26	0.005071	21.85	25.41	42.00	21.59	25.15	42.00
P-195	LOB PARKING LOT	6-MH 88	15 inch	9.39	124.00	7.65	0.91	0.91	2.62	0.021144	35.00	36.39	42.94	32.00	33.77	41.00
P-5	MH-9-32	9-MH-34	24 inch	14.54	106.00	8.00	0.62	0.33	0.31	0.005659	39.69	41.06	52.79	38.50	40.75	52.98
P-103	MH 2+95	J-20	36 inch	26.21	79.00	6.88	0.67	0.74	0.46	0.005004	27.26	28.91	42.00	26.86	28.45	42.00
P-102	MH 3+95	MH 2+95	30 inch	26.34	94.00	6.76	0.71	0.80	0.58	0.005221	28.60	30.45	42.00	28.12	29.87	42.00
P-101	MH 4+95	MH 3+95	30 inch	26.45	90.00	6.89	0.74	0.80	0.55	0.005394	30.10	31.93	42.00	29.62	31.37	42.00
P-100	MH 5+95	MH 4+95	30 inch	26.65	127.00	5.80	0.58	0.81	0.80	0.004486	31.58	33.66	42.00	31.10	32.86	42.00
P-244	PARKING LOT CB	GB-SANMH9	12 inch	0.00	13.00	0.00	0.00	0.00	0.00	0.000000	56.00	60.76	68.50	55.50	60.76	68.00
P-124	RR-ROW CB1	RR ROW MH 1	15 inch	0.91	88.00	3.60	0.14	0.20	0.85	0.008906	44.99	45.37	48.50	44.19	44.52	49.00
P-123	RR ROW MH 1	10-MH1	18 inch	0.90	151.00	4.23	0.12	0.28	2.41	0.014923	39.43	39.78	49.00	37.11	37.38	48.51
P-86	SIG-CB1A	SIG-MH1	15 inch	0.48	8.00	0.39	0.00	0.00	0.00	0.000054	64.57	68.98	68.87	64.38	68.98	68.98
P-91	SIG-CB2A-1	SIG-CB2C	15 inch	3.31	45.00	2.70	0.11	0.11	0.12	0.002622	66.98	68.68	68.28	64.86	68.56	68.56
P-109	SIG-CB2A-2	SIG-CB2A-1	12 inch	3.40	213.00	4.33	0.29	0.29	1.15	0.005387	66.00	69.43	68.00	63.98	68.28	68.28
P-77	SIG-CB2B	SIG-CB2C	15 inch	2.33	60.00	1.90	0.06	0.06	0.08	0.001299	65.24	68.64	68.84	65.16	68.56	68.56
P-76	SIG-CB2C	SIG-MH1	15 inch	7.53	45.00	6.14	0.59	0.59	0.61	0.013595	64.66	69.59	68.56	64.48	68.98	68.98
P-70	SIG-CB3A	SIG-MH3	12 inch	3.49	11.00	4.44	0.31	0.31	0.06	0.005670	65.87	69.77	69.17	65.81	69.71	69.71
P-75	SIG-CB4A	SIG -MH4	10 inch	1.04	30.00	1.90	0.06	0.06	0.05	0.001606	67.81	69.97	71.21	65.81	69.92	71.39
P-74	SIG-CB5A	SIG-MH5	15 inch	1.78	17.00	1.45	0.03	0.03	0.01	0.000755	66.00	69.88	71.41	65.90	69.87	71.71
P-66	SIG-MH1	11-CB2	15 inch	13.91	88.00	11.34	2.00	2.00	4.08	0.046402	64.38	72.68	68.98	63.20	68.60	68.60
P-69	SIG-MH3	SIG-MH1	15 inch	6.11	58.00	4.98	0.38	0.38	0.52	0.008937	64.91	69.50	69.71	64.48	68.98	68.98
P-73	SIG-MH5	SIG -MH4	15 inch	1.76	17.00	1.44	0.03	0.03	0.01	0.000746	65.90	69.86	71.71	65.49	69.84	71.39
P-71	SIG -MH4	SIG-MH3	15 inch	2.78	74.00	2.26	0.08	0.08	0.14	0.001848	65.49	69.76	71.39	65.01	69.62	69.71
P-30	TRENCH DRAIN (9D)	BURRIED MH 2	12 inch	1.65	72.00	3.88	0.08	0.07	0.14	0.002083	53.50	54.35	55.00	53.00	54.22	55.00
P-29	TRENCH DRAIN (9E)	BURRIED MH 3	12 inch	1.98	67.00	5.41	0.25	0.10	0.27	0.006244	48.00	48.60	50.00	47.00	48.33	50.00
P-35	TRENCH DRAIN (9G1)	9-MH31	12 inch	1.39	48.00	4.84	0.20	0.36	0.78	0.012863	49.00	49.50	51.00	48.32	48.71	51.12

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-302	6- CB 4	6-CB 3	12 inch	4.18	104.00	5.32	0.44	0.50	1.47	0.013462	54.00	55.35	60.00	53.00	53.88	60.00
P-191	6- CB2 (97)	6-MH 90	18 inch	5.95	81.00	10.58	0.40	0.23	3.27	0.042513	49.56	50.50	55.46	46.00	47.23	51.80
P-193	6- MH 100	GATE 6	36 inch	24.41	16.00	47.41	0.64	0.19	13.93	0.899052	31.80	33.39	42.00	13.00	19.46	43.00
P-190	6-CB 1 (98)	6- CB2 (97)	18 inch	4.70	21.00	6.07	0.34	0.25	0.13	0.010372	49.80	50.63	55.36	49.56	50.50	55.46
P-301	6-CB 3	6-CB 1 (98)	12 inch	4.43	93.00	9.02	0.57	1.26	3.48	0.029953	53.00	53.88	60.00	49.80	50.40	55.36
P-201	6-CB 79A	6-MH 79	18 inch	1.54	40.00	3.69	0.17	0.21	0.31	0.006588	56.88	57.35	61.98	56.61	57.04	63.21
P-240	6-MH 79	6-MH 80	24 inch	1.54	51.00	8.50	0.15	1.12	14.02	0.255919	56.41	56.84	63.21	42.60	42.81	48.00
P-289	6-MH 79B	6-CB 79A	12 inch	1.73	196.00	4.17	0.23	0.27	1.63	0.008086	58.57	59.13	68.17	56.98	57.50	61.98
P-288	6-MH 79C	6-MH 79B	12 inch	0.98	91.00	3.33	0.16	0.12	0.56	0.006510	59.27	59.69	67.07	58.67	59.13	68.17
P-287	6-MH 79D	6-MH 79C	12 inch	0.27	142.00	2.39	0.07	0.07	1.03	0.007253	60.50	60.71	67.00	59.47	59.69	67.07
P-241	6-MH 80	6-MH 82	24 inch	1.53	61.00	6.64	0.15	0.09	2.31	0.038887	41.40	41.83	48.00	39.00	39.52	50.60
P-199	6-MH 82	6-MH 84	24 inch	2.23	62.00	7.99	0.18	0.16	2.97	0.048336	39.00	39.52	50.60	36.00	36.55	42.40
P-198	6-MH 84	6-MH 85	24 inch	2.50	108.00	6.09	0.20	0.58	2.37	0.018455	36.00	36.55	42.40	33.80	34.18	41.60
P-303	6-MH 85	6-MH 88	30 inch	2.74	92.00	5.19	0.19	0.02	-0.09	0.000859	33.20	33.74	41.60	32.50	33.84	41.00
P-194	6-MH 88	6- MH 100	30 inch	13.05	98.00	5.80	0.47	0.27	0.20	0.004070	32.50	33.71	41.00	32.00	33.52	42.00
P-238	6-MH 90	6-MH DROP	24 inch	11.80	79.00	13.19	0.52	2.58	4.57	0.031818	46.00	47.23	51.80	42.00	42.67	45.00
P-239	6-MH DROP	6- MH 100	24 inch	11.76	19.00	13.36	0.52	1.64	1.45	0.017183	34.00	35.23	45.00	33.00	33.79	42.00
P-130	8MH-1	FSRD -1A	36 inch	31.08	127.00	7.15	0.76	0.79	0.67	0.005029	38.26	40.07	49.66	37.62	39.39	46.62
P-14	9-BCB-1	9-BMH1	15 inch	5.10	58.00	4.15	0.27	0.43	0.40	0.004114	65.03	66.27	69.33	64.95	65.87	69.85
P-12	9-BCB-2	9-BMH-2	15 inch	3.54	16.00	10.31	0.32	1.17	1.24	0.024374	64.75	65.51	69.55	63.81	64.27	70.01
P-13	9-BCB-3	9-BCB-2	15 inch	3.17	64.00	5.33	0.29	0.20	0.55	0.009969	65.52	66.24	69.22	64.85	65.69	69.55
P-11	9-BMH-2	9-BMH1	15 inch	3.53	39.00	2.88	0.13	0.13	0.40	0.010194	59.81	61.94	70.01	59.55	61.54	69.85
P-10	9-BMH1	9MH-3	15 inch	8.53	56.00	6.95	0.75	0.75	3.33	0.059497	59.55	61.17	69.85	56.10	57.84	60.00
P-4	9-MH-34	9-MH38	24 inch	17.85	82.00	6.41	0.52	0.51	0.43	0.005478	38.50	40.39	52.98	38.00	39.96	45.00
P-6	9-MH31	MH-9-32	18 inch	15.17	125.00	10.05	1.20	1.19	2.73	0.021992	43.07	44.48	51.12	40.32	41.75	52.79
P-3	9-MH38	9-MH39	24 inch	17.69	106.00	7.78	0.75	0.67	0.92	0.009359	38.00	39.52	45.00	37.00	38.59	45.00
P-2	9-MH39	9-MH40	24 inch	17.51	132.00	12.33	0.74	0.50	3.74	0.030182	37.00	38.51	45.00	32.85	34.76	44.68
P-97	9-MH40	GATE 9	24 inch	17.36	10.00	15.60	0.73	1.63	1.04	0.014082	32.85	34.35	44.68	32.25	33.31	44.68
P-9	9MH-3	BURIED MH 1	15 inch	8.50	69.00	10.09	0.82	0.75	1.74	0.026252	56.10	57.24	60.00	54.00	55.50	60.00
P-7	9MH-30	9-MH31	18 inch	13.88	127.00	7.86	0.96	0.96	2.22	0.017472	43.35	47.08	48.35	43.07	44.86	51.12
P-111	10-MH 2	GATE 10	36 inch	12.57	21.00	8.03	0.42	0.77	0.50	0.007343	30.78	31.91	45.00	30.50	31.40	45.00
P-112	10-MH1	10-MH 2	36 inch	7.40	105.00	5.67	0.31	0.50	0.95	0.007177	34.31	35.17	48.51	33.50	34.22	45.00
P-85	11-CB1	11-MH1	12 inch	1.77	12.00	2.26	0.08	0.08	0.02	0.001774	58.05	60.65	62.75	56.43	60.63	63.13
P-84	11-CB1A	11-MH1	12 inch	1.75	20.00	2.23	0.08	0.08	0.03	0.001735	58.34	60.66	62.54	56.63	60.62	63.13
P-65	11-CB2	11-MH4	15 inch	17.12	166.00	13.95	3.03	3.03	11.67	0.070285	63.20	74.71	68.60	61.80	63.04	69.80
P-80	11-CB2A	11-MH2	12 inch	5.29	19.00	6.74	0.71	0.71	0.25	0.013051	57.77	62.50	61.57	56.62	62.25	62.32
P-81	11-CB2B	11-MH2	12 inch	1.82	35.00	2.32	0.08	0.08	0.05	0.001542	57.70	61.33	61.50	50.82	61.27	62.32
P-59	11-CB3A	11-MH3	15 inch	1.95	20.00	8.66	0.21	0.89	1.06	0.018833	60.55	61.11	65.65	59.72	60.05	66.72
P-58	11-CB3B	11-MH3	15 inch	0.72	13.00	10.74	0.12	1.56	2.52	0.082558	63.64	63.97	66.14	61.32	61.46	66.72
P-62	11-CB4A	11-MH4	15 inch	0.93	59.00	6.06	0.14	0.57	2.45	0.034176	67.50	67.88	73.75	65.20	65.43	69.80
P-90	11-CB4B	11-MH4	15 inch	4.00	40.00	7.79	0.35	0.17	0.09	0.006986	59.89	60.70	64.09	58.90	60.61	69.80
P-64	11-CB4C	11-CB4B	10 inch	0.00	138.00	0.00	0.00	0.00	2.81	0.020369	63.51	63.51	67.21	59.89	60.70	64.09
P-56	11-CB86	11-MH88	15 inch	3.00	24.00	6.46	0.28	0.13	-0.02	0.005384	47.50	48.20	51.59	47.24	48.22	53.44
P-51	11-CB89A	11-MH89	12 inch	2.39	49.00	7.41	0.29	0.85	1.73	0.023888	54.40	55.06	58.90	52.90	53.33	58.71
P-52	11-CB89B	11-CB89A	12 inch	0.92	95.00	3.87	0.15	0.04	0.74	0.008920	55.40	55.80	60.00	54.40	55.06	58.90
P-53	11-CB89C	11-CB89B	12 inch	0.31	12.00	3.32	0.08	0.02	0.03	0.007484	55.60	55.83	60.00	55.40	55.80	60.00
P-83	11-MH1	11-MH1A	18 inch	3.51	58.00	1.99	0.06	0.06	0.05	0.000800	56.23	60.58	63.13	52.02	60.54	62.23
P-82	11-MH1A	11-MH2	18 inch	3.46	53.00	1.96	0.06	0.06	0.06	0.001087	51.73	60.44	62.23	50.82	60.39	62.32
P-79	11-MH2	11-MH3	24 inch	9.97	181.00	3.18	0.16	0.16	0.35	0.001944	50.12	60.31	62.32	49.22	59.96	66.72
P-57	11-MH3	11-MH88	24 inch	32.01	144.00	10.19	1.61	1.61	2.88	0.020020	49.12	51.59	66.72	46.34	48.71	53.44
P-61	11-MH4	11-MH3	18 inch	20.85	92.00	11.80	2.16	2.18	2.61	0.028217	54.20	57.71	69.80	53.62	55.09	66.72
P-54	11-MH88	11-MH89	24 inch	23.69	146.00	8.67	0.93	0.88	1.49	0.010525	46.14	48.01	53.44	44.51	46.52	58.71
P-48	11-MH89	11-MH90	30 inch	27.06	306.00	13.18	0.82	2.70	9.29	0.024238	44.51	46.28	58.71	35.90	36.99	54.10

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Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-42	11-MH90	11-MH92	42 inch	34.06	96.00	13.28	0.72	2.39	3.12	0.015095	34.10	35.91	54.10	31.64	32.79	50.24
P-45	11-MH91	11-MH90	30 inch	7.31	25.00	5.83	0.33	0.49	0.32	0.006370	35.90	36.80	52.83	35.70	36.48	54.10
P-41	11-MH92	GATE 11 MH	42 inch	34.95	96.00	11.30	0.73	0.66	1.46	0.015976	31.54	33.37	50.24	30.00	31.91	39.25
P-46	11-MH93	11-MH91	24 inch	7.40	126.00	4.90	0.37	0.38	0.60	0.004762	36.50	37.47	49.99	35.90	36.87	52.83
P-27	AB-CB-1	AB-CB-2	15 inch	5.91	154.00	9.74	0.51	0.40	5.16	0.034228	56.36	57.34	62.66	51.05	52.18	55.85
P-26	AB-CB-2	AB-CB-3	15 inch	9.62	150.00	11.03	1.00	0.96	5.31	0.035680	50.85	52.02	55.85	45.48	46.72	50.18
P-25	AB-CB-3	AB-MH1	18 inch	10.31	39.00	12.14	0.68	0.53	1.39	0.039543	45.38	46.62	50.18	43.71	45.23	49.81
P-23	AB-CB-4	AB-MH3	18 inch	12.23	37.00	10.07	0.85	1.38	1.17	0.017351	40.88	42.20	49.58	40.00	41.03	49.48
P-96	AB-MH1	AB-MH2	18 inch	10.29	17.00	10.84	0.68	1.26	0.85	0.015768	43.51	44.74	49.81	42.97	43.89	50.47
P-98	AB-MH2	AB-CB-4	18 inch	10.28	31.00	5.82	0.53	0.53	0.30	0.009586	41.07	42.98	50.47	40.98	42.68	49.58
P-22	AB-MH3	AB-MH90	24 inch	11.80	189.00	3.75	0.23	0.37	0.65	0.002643	34.84	36.75	49.48	34.67	36.10	49.87
P-21	AB-MH90	Armory Drainage (Area A36-7) EXTERNAL CA	24 inch	11.47	107.00	7.66	0.51	0.38	1.09	0.011356	34.67	35.89	49.87	33.42	34.80	48.90
P-89	AETNA -YD MH	AETNA BLD CB-1	24 inch	2.01	179.00	6.55	0.17	0.04	5.05	0.028928	42.11	42.60	74.50	36.74	37.55	50.47
P-47	AETNA BLD CB-1	11-MH93	24 inch	2.27	32.00	4.16	0.06	0.03	-0.01	0.000528	36.74	37.55	50.47	36.50	37.57	49.99
P-50	AETNA CB-2	AETNA MH1	15 inch	3.70	76.00	5.55	0.33	0.48	0.91	0.010026	54.85	55.63	60.50	54.05	54.72	60.80
P-88	AETNA CB-3	AETNA CB-2	15 inch	3.56	142.00	5.50	0.32	0.47	1.61	0.010285	56.45	57.21	70.90	54.95	55.60	60.50
P-126	AETNA CB 202	AETNA MH 201	12 inch	1.71	11.00	4.33	0.23	0.28	0.15	0.008206	49.40	49.96	61.60	49.30	49.81	62.00
P-119	AETNA CB 203	AETNA MH 202	12 inch	3.38	23.00	5.26	0.40	0.43	0.26	0.010361	57.64	58.43	61.44	57.40	58.16	61.90
P-142	AETNA DI	FSMH-10	12 inch	2.24	34.00	4.95	0.28	0.38	0.45	0.010173	45.07	45.71	49.87	44.70	45.26	50.90
P-125	AETNA MH 201	AETNA MH 202	12 inch	1.71	34.00	2.17	0.07	0.07	0.08	0.002293	38.35	49.58	62.00	38.00	49.50	61.90
P-118	AETNA MH 202	AETNA MH 203	15 inch	4.43	44.00	5.46	0.38	0.36	0.38	0.009070	37.90	38.75	61.90	37.50	38.37	62.00
P-114	AETNA MH 203	AETNA MH 204	24 inch	6.31	101.00	6.15	0.34	0.06	-0.08	0.001961	37.40	38.29	62.00	36.40	38.37	54.80
P-113	AETNA MH 204	10-MH1	24 inch	6.43	16.00	12.71	0.34	1.54	1.57	0.023314	36.30	37.20	54.80	35.11	35.63	48.51
P-49	AETNA MH1	11-MH89	15 inch	3.68	60.00	5.43	0.33	0.46	0.70	0.009492	52.95	53.72	60.80	52.35	53.03	58.71
P-110	AETNA PARKING LOT	11-CB86	12 inch	5.16	125.00	6.57	0.67	0.72	2.66	0.020893	49.00	51.08	55.50	47.50	48.42	51.59
P-108	AETNA PARKING ROOF-2	11-MH93	6 inch	5.23	27.00	26.65	11.04	11.04	33.91	1.256058	71.00	71.50	72.00	36.50	37.59	49.99
P-107	AETNA PARKING ROOF -1	11-MH90	6 inch	4.37	32.00	22.25	7.69	7.69	35.51	1.109532	71.00	71.50	72.00	34.10	35.99	54.10
P-127	AETNA YD 201	AETNA MH 204	12 inch	0.17	11.00	5.08	0.06	0.40	1.08	0.067304	51.00	51.17	54.80	50.00	50.09	54.80
P-185	AR-48-1	AR-MH-12	36 inch	3.49	101.00	7.89	0.20	0.18	3.72	0.037011	25.40	25.98	34.50	21.66	22.27	30.50
P-187	AR-48-1B	AR-48-1CA4	36 inch	2.82	43.00	6.28	0.18	0.16	0.98	0.023231	28.50	29.02	37.50	27.50	28.04	36.50
P-224	AR-48-1C	AR48-MH	15 inch	2.21	177.00	5.40	0.23	0.20	8.46	0.048002	43.65	44.24	53.00	35.15	35.78	44.50
P-186	AR-48-1CA4	AR-48-1	36 inch	3.00	36.00	8.37	0.19	1.07	2.04	0.032205	27.50	28.04	36.50	25.70	26.00	34.50
P-182	AR-48-2	AR-MH-12	15 inch	0.73	70.00	3.23	0.12	0.02	1.64	0.024765	23.57	23.91	32.07	21.66	22.27	30.50
P-180	AR-48-3	AR-CB15	18 inch	0.38	31.00	4.38	0.08	0.30	1.19	0.031401	22.73	22.96	27.63	21.62	21.76	25.62
P-161	AR-48-4	Armory Wet Well	48 inch	6.03	22.00	0.48	0.00	0.00	0.00	0.000018	15.10	19.46	42.00	15.00	19.46	61.50
P-170	AR-CB-17	AR-CB14	15 inch	1.30	65.00	1.59	0.07	0.17	0.24	0.002179	22.48	23.12	26.28	22.43	22.88	26.33
P-164	AR-CB2	AR-CB3	15 inch	0.83	25.00	3.68	0.13	0.21	0.32	0.009435	32.63	32.99	37.93	32.37	32.67	37.07
P-189	AR-CB3	AR-48-4	48 inch	6.05	162.00	4.36	0.00	0.00	0.00	0.000017	15.87	19.46	37.07	15.10	19.46	42.00
P-166	AR-CB4	ARMORY CAPPED MH	15 inch	0.34	28.00	2.93	0.08	0.05	0.28	0.010970	23.07	23.30	30.17	22.75	23.02	30.18
P-168	AR-CB6	AR-MH5	42 inch	5.63	125.00	0.58	0.01	0.01	0.00	0.000031	15.96	19.47	25.76	15.88	19.47	30.18
P-226	AR-CB7	AR-CB8	12 inch	0.17	45.00	1.32	0.03	0.06	0.14	0.002456	21.36	21.58	25.16	21.27	21.44	25.27
P-173	AR-CB8	ARMH-9	24 inch	3.35	12.00	1.07	0.02	0.02	0.00	0.000219	17.37	19.48	25.27	17.03	19.48	27.43
P-177	AR-CB10	AR-CB8	18 inch	2.00	43.00	5.09	0.20	0.40	0.70	0.011521	21.21	21.74	25.31	20.63	21.04	25.27
P-174	AR-CB13	AR-CB8	12 inch	0.90	45.00	2.96	0.14	0.15	0.24	0.005128	21.10	21.51	25.70	20.87	21.27	25.27
P-169	AR-CB14	AR-CB6	18 inch	1.24	52.00	4.90	0.15	0.01	2.08	0.042628	21.13	21.55	26.33	17.96	19.47	25.76
P-179	AR-CB15	AR-CB10	18 inch	0.37	45.00	2.14	0.07	0.01	0.02	0.001546	21.52	21.76	25.62	21.31	21.74	25.31
P-175	AR-CB16	AR-CB13	12 inch	0.30	29.00	3.32	0.08	0.03	0.41	0.015603	21.69	21.92	24.79	21.20	21.51	25.70
P-176	AR-CB18	AR-CB8	12 inch	0.34	55.00	1.74	0.05	0.09	0.13	0.001773	20.85	21.15	24.65	20.77	21.01	25.27
P-183	AR-MH-12	AR-MH11	36 inch	3.78	103.00	9.46	0.21	0.02	2.80	0.028973	21.66	22.27	30.50	18.12	19.47	29.02
P-165	AR-MH5	AR-CB3	48 inch	5.58	151.00	0.92	0.00	0.00	0.00	0.000014	15.88	19.47	30.18	15.87	19.46	37.07
P-184	AR-MH11	ARMH-9	36 inch	3.78	92.00	4.84	0.02	0.01	-0.01	0.000076	18.02	19.47	29.02	17.23	19.48	27.43
P-225	AR48-MH	AR-48-1B	15 inch	2.18	150.00	5.23	0.23	0.42	6.77	0.043845	35.15	35.74	44.50	28.50	28.97	37.50
P-34	AREA 9F-1	AREA 9F-2	12 inch	0.20	29.00	0.26	0.00	0.00	0.00	0.000032	44.92	48.42	48.92	44.48	48.42	48.98

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-32	AREA 9F-2	9MH-30	12 inch	2.11	21.00	2.69	0.11	0.11	0.07	0.003523	44.38	48.42	48.98	44.25	48.35	48.35
P-33	AREA 9F-3	AREA 9F-2	12 inch	0.67	15.00	0.85	0.01	0.01	0.01	0.000352	44.88	48.43	48.58	44.58	48.42	48.98
P-36	AREA 9G-2	9-MH31	15 inch	0.00	44.00	0.00	0.00	0.00	0.79	0.018007	46.21	46.21	49.52	44.95	45.42	51.12
P-104	AREA A36-7B (LOB)	AB-MH3	24 inch	1.10	314.00	1.30	0.00	0.00	0.01	0.000021	35.00	36.84	46.80	34.84	36.84	49.48
P-171	ARMH-9	AR-CB6	36 inch	5.03	101.00	5.67	0.01	0.01	0.00	0.000056	17.13	19.47	27.43	16.06	19.47	25.76
P-167	ARMORY CAPPED MH	AR-MH5	12 inch	0.34	25.00	10.94	0.09	0.00	3.52	0.144218	22.75	22.99	30.18	15.98	19.47	30.18
P-99	Armory Drainage (Area A36-7) EXTERNAL CA	MH 5+95	30 inch	31.14	107.00	7.58	0.89	0.87	0.65	0.006319	32.70	34.65	48.90	32.02	34.00	42.00
P-237	Armory Wet Well	Armory Pump Station	8 x 7 ft	19.62	105.00	3.52	0.00	0.00	0.00	0.000008	15.00	19.46	61.50	14.80	19.46	45.00
P-72	BROAD ST COMBINED	TO COMBINED SIPHON	12 inch	1.34	26.00	7.24	0.19	0.78	1.36	0.029496	44.47	44.96	47.97	43.31	43.60	47.21
P-20	BURIED MH 1	BURRIED MH 2	18 inch	8.47	72.00	7.54	0.55	0.40	0.79	0.013018	54.00	55.13	60.00	53.00	54.34	55.00
P-24	BURRIED MH 2	BURRIED MH 3	18 inch	10.22	143.00	12.02	0.67	0.52	5.57	0.039998	53.00	54.23	55.00	47.00	48.67	50.00
P-28	BURRIED MH 3	9MH-30	18 inch	12.28	75.00	6.95	0.75	0.75	1.03	0.013679	47.00	48.53	50.00	43.35	47.51	48.35
P-87	Dummy Off Site Basin	TO GATE 7	18 inch	2.72	33.00	17.08	0.24	4.53	10.99	0.202765	42.83	43.46	44.83	32.25	32.47	45.05
P-310	EX PARKING CB 2	AREA 9G-2	12 inch	0.00	32.00	0.00	0.00	0.00	0.10	0.003125	46.41	46.41	48.91	46.31	46.31	49.52
P-311	EX PARKING CB 3	MH-9-32	12 inch	0.00	33.00	0.00	0.00	0.00	0.30	0.009091	48.19	48.19	51.59	47.89	47.89	52.79
P-309	EX PARKING LOT BASIN	9-MH-34	12 inch	1.46	11.00	10.48	0.20	1.24	1.54	0.045666	46.29	46.80	53.09	45.00	45.26	52.98
P-117	EXISTING AETNA CB (10)	J-54	12 inch	0.42	77.00	5.60	0.10	0.49	2.69	0.029800	55.57	55.84	59.78	53.00	53.15	59.64
P-138	FARM I-1	FSMH-1	12 inch	2.05	56.00	11.59	0.26	0.24	4.74	0.084980	73.95	74.56	81.05	69.19	69.82	79.56
P-144	FSI-1	FSMH-6	12 inch	2.85	18.00	10.46	0.34	0.27	1.15	0.067843	53.98	54.70	59.38	52.74	53.55	59.94
P-143	FSI-2	FSMH-6	12 inch	2.91	26.00	10.92	0.35	0.25	1.85	0.074818	54.63	55.36	59.03	52.64	53.52	59.94
P-140	FSI-3	FSMH-5	12 inch	1.16	34.00	9.66	0.17	0.16	3.82	0.112899	60.01	60.46	64.31	56.17	56.64	63.77
P-139	FSI-4	FSMH-1	15 inch	0.90	25.00	7.60	0.13	0.04	1.69	0.071258	71.10	71.47	78.70	69.19	69.79	79.56
P-160	FSMH-1	FSMH-5	24 inch	2.77	267.00	8.80	0.21	0.02	13.37	0.050749	69.19	69.77	79.56	55.07	56.41	63.77
P-152	FSMH-2	FSMH-3	10 inch	8.72	77.00	15.98	3.97	3.97	7.21	0.093642	67.46	70.18	71.66	62.14	62.97	67.34
P-158	FSMH-3	FSMH-4	24 inch	8.70	19.00	18.41	0.42	0.41	3.13	0.165256	60.14	61.19	67.34	57.00	58.06	66.60
P-159	FSMH-4	FSMH-5	24 inch	8.69	50.00	10.77	0.42	0.20	1.43	0.033065	56.90	57.95	66.60	55.07	56.52	63.77
P-136	FSMH-5	FSMH-6	24 inch	12.23	74.00	15.90	0.54	0.30	3.24	0.046959	55.07	56.33	63.77	51.44	53.09	59.94
P-135	FSMH-6	FSMH-7	24 inch	19.09	107.00	14.31	0.81	0.69	4.59	0.043974	51.44	53.01	59.94	46.71	48.43	55.21
P-134	FSMH-7	FSMH-9	24 inch	20.76	140.00	13.86	0.89	2.99	6.03	0.028077	46.71	48.34	55.21	41.35	42.31	51.00
P-131	FSMH-9	8MH-1	36 inch	29.35	19.00	22.92	0.73	0.71	2.41	0.127880	40.99	42.74	51.00	38.56	40.33	49.66
P-132	FSMH-10	FSMH-9	18 inch	7.13	33.00	8.08	0.26	0.25	0.15	0.004584	41.60	43.07	50.90	40.99	42.92	51.00
P-147	FSPG-1	FSMH-6	24 inch	1.79	75.00	4.51	0.16	0.03	0.41	0.007295	53.50	53.96	70.00	52.64	53.55	59.94
P-148	FSPG-2	FSMH-7	24 inch	1.79	42.00	3.77	0.16	0.22	0.34	0.006645	49.00	49.46	70.00	48.71	49.13	55.21
P-145	FSPG-3	FSMH-9	18 inch	1.79	62.00	5.52	0.18	0.02	0.24	0.006580	42.50	43.00	70.00	41.35	42.76	51.00
P-146	FSPG -4	8MH-1	18 inch	1.79	60.00	4.54	0.18	0.32	0.73	0.009919	42.50	43.00	70.00	41.86	42.27	49.66
P-149	FSRD-1B	FSRD -1A	24 inch	13.06	26.00	10.45	0.42	0.27	-0.10	0.001878	33.90	35.40	46.62	33.52	35.49	46.62
P-156	FSRD -1A	GATE 8 MH	48 inch	43.59	394.00	9.82	0.77	0.76	3.70	0.009441	33.52	35.49	46.62	29.80	31.79	47.00
P-246	GARNER ST CB	GB-SANMH9	12 inch	0.00	26.00	0.00	0.00	0.00	0.00	0.000000	56.00	61.96	69.50	55.50	61.96	68.00
P-157	GATE 8 MH	GATE 8	48 inch	42.50	9.00	10.34	0.76	1.03	0.31	0.005042	29.80	31.75	47.00	29.70	31.43	47.00
P-37	GATE 11 MH	GATE 11	42 inch	37.95	8.00	21.76	0.77	2.03	1.34	0.010680	30.00	31.91	39.25	29.25	30.57	39.25
P-207	GB- MH 90	GB-CB5	12 inch	3.49	46.00	4.44	0.31	0.31	0.44	0.009580	34.28	35.97	39.58	33.25	35.53	38.25
P-277	GB-AS1/I-84EB	GB-AS2/I-84WB	18 inch	7.09	81.00	12.56	0.47	0.25	4.57	0.058992	57.00	58.03	60.00	52.00	53.47	57.95
P-278	GB-AS2/I-84WB	GB-MH3	18 inch	19.61	51.00	17.82	1.94	4.03	4.49	0.046959	52.00	53.47	57.95	48.00	48.98	52.00
P-294	GB-AS3	GB-MH6	15 inch	2.13	51.00	5.33	0.22	0.44	0.84	0.012244	58.00	58.58	68.00	57.29	57.74	68.00
P-219	GB-AS4	GB-MH7	15 inch	5.00	16.00	8.43	0.43	0.85	0.65	0.014525	51.50	52.41	69.00	51.08	51.76	69.44
P-272	GB-AS5	GB-SANMH 1	15 inch	4.78	14.00	3.90	0.24	0.24	0.08	0.005485	28.80	42.72	41.70	28.74	42.64	42.64
P-231	GB-AS6	GB-HB1	10 inch	1.57	22.00	3.57	0.21	0.23	0.11	0.003969	42.58	43.20	46.58	42.50	43.08	46.10
P-55	GB-BB1	GB-BB2	15 inch	2.46	84.00	3.20	0.08	0.06	0.10	0.001310	64.67	65.74	72.97	64.40	65.64	73.80
P-43	GB-BB2	GB-BB3	15 inch	3.90	68.00	3.18	0.17	0.29	0.37	0.003715	64.40	65.54	73.80	64.31	65.17	74.91
P-282	GB-BB3	GB-BB4	15 inch	3.23	211.00	5.84	0.30	0.28	2.77	0.013216	64.31	65.03	74.91	61.52	62.27	70.82
P-283	GB-BB4	GB-MH8	15 inch	3.44	204.00	5.67	0.31	0.50	2.51	0.011385	61.52	62.27	70.82	59.14	59.76	74.34
P-230	GB-CB1	GB-CB2	12 inch	0.87	77.00	1.10	0.02	0.02	0.05	0.000590	32.86	36.32	36.46	32.29	36.28	37.89
P-229	GB-CB2	GB-MH5	12 inch	3.59	26.00	4.57	0.33	0.33	0.26	0.010171	32.19	36.28	37.89	31.63	36.01	39.43

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-209	GB-CB3	GB-MH5	15 inch	3.46	51.00	2.82	0.12	0.12	0.15	0.002868	32.45	35.44	37.45	31.63	35.29	39.43
P-271	GB-CB4	ASYLUM COMBINED MH	12 inch	10.93	54.00	25.25	3.01	7.84	9.69	0.090059	34.35	35.35	0.00	25.06	25.65	35.86
P-208	GB-CB5	GB-CB3	15 inch	3.31	35.00	2.70	0.11	0.11	0.09	0.002626	33.15	35.53	38.25	32.55	35.44	37.45
P-228	GB-CB6	GB- MH 90	12 inch	0.70	31.00	0.89	0.01	0.01	0.01	0.000388	34.82	36.16	38.92	34.28	36.14	39.58
P-205	GB-CB7	GB-MH90	12 inch	2.85	27.00	7.56	0.34	0.80	0.99	0.019530	37.81	38.53	42.91	37.04	37.54	44.64
P-204	GB-CB8	GB-CB7	12 inch	2.24	95.00	6.51	0.28	0.66	2.33	0.020497	41.25	41.89	47.55	39.11	39.56	42.91
P-203	GB-CB9	GB-CB8	12 inch	1.34	134.00	6.35	0.19	0.63	4.32	0.028960	46.29	46.78	55.49	42.15	42.46	47.55
P-202	GB-CB10	GB-CB9	12 inch	0.08	42.00	4.17	0.04	0.00	4.01	0.096494	50.68	50.79	53.88	46.39	46.78	55.49
P-220	GB-FAR1	GB-MH7	18 inch	4.58	129.00	7.12	0.33	0.12	1.82	0.015762	50.46	51.28	73.06	48.14	49.46	69.44
P-221	GB-FAR2	GB-FAR1	15 inch	0.18	155.00	3.67	0.06	0.21	6.04	0.037971	72.44	72.60	76.54	66.46	66.56	73.06
P-232	GB-HB1	GB-HB2	10 inch	1.68	29.00	13.94	0.27	2.61	4.15	0.062438	42.50	43.08	46.10	38.69	38.93	44.79
P-227	GB-HB2	GB-MH5	15 inch	9.87	56.00	10.24	1.05	1.55	1.90	0.025068	37.29	38.47	44.79	35.63	36.57	39.43
P-236	GB-HB3	GB-HB2	15 inch	8.13	42.00	9.91	0.76	1.38	1.54	0.021986	39.24	40.36	47.14	37.99	38.82	44.79
P-235	GB-HB4	GB-HB3	15 inch	7.93	65.00	9.91	0.74	1.47	2.28	0.023801	41.30	42.41	50.00	39.34	40.13	47.14
P-234	GB-HB5	GB-HB4	12 inch	7.63	53.00	9.72	1.47	1.47	2.43	0.045884	43.00	44.84	54.00	41.30	42.41	50.00
P-233	GB-HB6	GB-HB5	12 inch	7.00	22.00	8.92	1.24	1.24	0.85	0.038634	43.50	45.69	54.00	43.00	44.84	54.00
P-276	GB-HB7	GB-HB6	12 inch	7.01	20.00	8.93	1.24	1.24	0.77	0.038717	44.00	46.47	54.00	43.50	45.69	54.00
P-211	GB-MH1	GB-MH2	18 inch	16.19	11.00	9.16	1.30	1.30	0.26	0.023746	30.35	31.96	40.15	29.81	31.70	39.61
P-212	GB-MH2	GULLY BROOK CHAMBER	33 inch	76.90	46.00	20.91	2.68	4.48	2.90	0.023790	28.01	30.65	39.61	25.79	27.75	38.30
P-270	GB-MH2 CA	GB-MH2	15 inch	5.09	127.00	9.03	0.43	0.27	0.44	0.004757	30.35	31.27	40.15	28.01	30.83	39.61
P-214	GB-MH3	GB-MH2	33 inch	58.39	337.00	9.83	1.50	1.50	4.11	0.012190	29.70	35.29	52.00	28.01	31.19	39.61
P-215	GB-MH4	GB-MH3	33 inch	40.60	98.00	6.84	0.73	0.73	0.58	0.005893	30.21	36.94	67.00	29.70	36.36	52.00
P-210	GB-MH5	GB-MH1	18 inch	16.25	73.00	9.19	1.31	1.31	1.75	0.023931	30.63	34.60	39.43	30.35	32.86	40.15
P-295	GB-MH6	GB-SP1	24 inch	9.98	91.00	6.98	0.20	0.16	0.13	0.001893	46.50	48.15	68.00	45.59	48.02	68.00
P-296	GB-MH7	GB-MH6	18 inch	8.37	52.00	9.84	0.54	0.35	0.24	0.008366	47.96	49.08	69.44	46.50	48.84	68.00
P-222	GB-MH8	GB-FAR1	18 inch	3.38	65.00	3.28	0.17	0.25	0.29	0.003307	50.74	51.57	74.34	50.56	51.28	73.06
P-206	GB-MH90	GB- MH 90	12 inch	2.85	133.00	6.21	0.34	0.20	1.14	0.009623	36.64	37.36	44.64	34.38	36.22	39.58
P-155	GB-SANCB1	GB-SANMH15	12 inch	0.69	33.00	12.66	0.13	0.10	7.36	0.224045	78.65	79.00	80.95	71.25	71.63	81.50
P-259	GB-SANCB2	GB-SANMH19	12 inch	0.77	34.00	5.02	0.14	0.11	0.48	0.014630	89.50	89.87	91.00	89.00	89.39	91.00
P-299	GB-SANCB3	GB-SANCB5	12 inch	2.64	63.00	10.29	0.32	0.18	2.32	0.038999	86.37	87.07	90.67	83.76	84.75	89.36
P-298	GB-SANCB4	GB-SANMH17	12 inch	0.77	34.00	8.85	0.13	1.22	2.71	0.047810	87.79	88.16	88.79	85.28	85.45	88.58
P-297	GB-SANCB5	GB-SANMH17	12 inch	9.03	38.00	24.94	2.06	6.77	7.63	0.076975	83.76	84.75	89.36	76.58	77.12	88.58
P-256	GB-SANCB6	GB-SANCB5	12 inch	3.04	65.00	5.58	0.36	0.48	0.57	0.006941	86.04	86.79	89.34	85.56	86.21	89.36
P-252	GB-SANCB7	GB-SANMH17	12 inch	3.56	94.00	33.47	0.43	0.32	7.16	0.077292	83.44	84.25	86.14	0.00	77.09	88.58
P-261	GB-SANCB8	GB-SANCB9	10 inch	1.22	33.00	9.02	0.21	0.08	1.04	0.035375	76.17	76.66	78.97	74.17	75.62	81.17
P-262	GB-SANCB9	GB-SANMH16	10 inch	1.93	26.00	5.58	0.30	0.46	0.42	0.009966	75.00	75.62	81.17	74.69	75.21	81.89
P-260	GB-SANCB10	GB-SANMH16	12 inch	5.53	7.00	24.87	0.81	2.90	2.32	0.032289	77.58	78.52	81.78	75.69	76.20	81.89
P-248	GB-SANCB11	GB-SANMH16	12 inch	4.60	43.00	15.47	0.60	2.97	4.05	0.039185	78.89	79.78	83.49	75.29	75.73	81.89
P-247	GB-SANCB12	GB-SANCB11	12 inch	2.24	14.00	8.44	0.28	0.14	0.13	0.018657	79.27	79.91	82.97	78.89	79.78	83.49
P-273	GB-SANMH 1	GB-SANMH 2	15 inch	21.05	74.00	17.16	4.57	4.57	7.86	0.106250	28.74	47.03	42.64	25.47	39.17	39.17
P-274	GB-SANMH 2	GB-SANMH 3	15 inch	21.03	24.00	17.14	4.56	4.56	2.54	0.105985	25.47	40.84	39.17	25.37	38.30	38.30
P-275	GB-SANMH 3	ASYLUM COMBINED MH	15 inch	21.02	101.00	17.13	4.56	4.56	10.70	0.105899	25.37	37.00	38.30	25.06	26.31	35.86
P-281	GB-SANMH4	GB-SANMH 1	15 inch	17.95	375.00	14.62	3.32	3.32	28.95	0.077198	32.65	71.59	41.00	28.74	42.64	42.64
P-291	GB-SANMH5	GB-SANMH4	15 inch	17.96	32.00	14.63	3.33	3.33	2.48	0.077292	54.71	58.39	67.00	54.67	55.91	41.00
P-290	GB-SANMH6	GB-SANMH5	18 inch	17.97	34.00	10.17	1.61	1.61	1.00	0.029287	54.80	61.93	67.20	54.71	60.93	67.00
P-292	GB-SANMH7	GB-SANMH20	18 inch	18.02	34.00	10.20	1.62	1.62	1.00	0.029427	55.47	67.93	68.31	55.19	66.93	68.00
P-300	GB-SANMH8	GB-SANMH7	24 inch	18.09	77.00	5.76	0.52	0.52	0.29	0.003784	57.13	68.60	70.65	55.47	68.31	68.31
P-245	GB-SANMH9	GB-SANMH6	12 inch	0.00	32.00	0.00	0.00	0.00	0.00	0.000000	55.50	61.96	68.00	54.80	61.96	67.20
P-267	GB-SANMH10	GB-SANMH8	12 inch	0.51	81.00	0.65	0.01	0.01	0.01	0.000122	59.90	70.66	75.00	57.13	70.65	70.65
P-266	GB-SANMH11	GB-SANMH10	12 inch	0.60	197.00	0.76	0.01	0.01	0.03	0.000166	67.00	70.70	79.00	59.90	70.67	75.00
P-265	GB-SANMH12	GB-SANMH11	12 inch	0.64	72.00	0.81	0.01	0.01	0.01	0.000188	69.46	70.72	80.76	67.00	70.70	79.00
P-264	GB-SANMH13	GB-SANMH12	15 inch	0.65	69.00	3.15	0.01	0.00	0.00	0.000060	69.80	70.72	81.00	69.46	70.72	80.76
P-263	GB-SANMH14	GB-SANMH13	15 inch	0.67	163.00	3.28	0.11	0.01	0.26	0.002274	70.67	70.99	82.17	69.80	70.72	81.00

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-154	GB-SANMH15	GB-SANMH14	15 inch	0.69	128.00	2.42	0.09	0.12	0.51	0.003784	71.25	71.60	81.50	70.77	71.09	82.17
P-250	GB-SANMH16	GB-SANMH8	24 inch	24.79	218.00	16.79	1.12	0.97	2.48	0.012055	69.49	71.25	81.89	57.13	68.77	70.65
P-251	GB-SANMH17	GB-SANMH16	18 inch	13.25	246.00	12.79	0.96	0.87	5.49	0.022688	75.58	76.94	88.58	69.49	71.45	81.89
P-258	GB-SANMH19	GB-SANCB3	15 inch	0.77	82.00	2.82	0.12	0.12	0.43	0.005244	89.00	89.34	91.00	88.57	88.91	90.67
P-293	GB-SANMH20	GB-SANMH6	18 inch	18.00	51.00	10.19	1.61	1.61	1.50	0.029371	55.19	64.34	68.00	54.93	62.85	67.20
P-216	GB-SP1	GB-MH4	33 inch	40.68	36.00	9.48	1.06	1.31	0.53	0.007922	45.90	48.02	68.00	45.57	47.49	67.00
P-128	GC-1	AETNA MH 203	15 inch	1.58	29.00	4.67	0.19	0.33	0.40	0.008623	44.50	45.00	50.00	44.20	44.60	62.00
P-242	GULLY BROOK BEND 2	Park River (Gully)	7 x 7 ft	475.92	838.00	7.07	0.82	0.96	1.59	0.001736	14.22	18.89	34.80	12.97	17.30	36.00
P-213	GULLY BROOK CHAMBER	GULLY BROOK GATE	36 inch	76.79	18.00	30.20	2.00	4.91	3.30	0.022168	20.85	23.59	38.30	18.52	20.28	36.90
P-243	GULLY BROOK GATE	GULLY BROOK BEND 2	11 x 9 ft	476.76	244.00	14.87	1.94	1.15	0.59	0.005657	15.97	19.85	36.90	14.22	19.26	34.80
P-285	Gully Brook inflow	J-108	11 x 9 ft	400.00	107.00	13.45	1.73	1.12	-0.16	0.004164	16.82	20.27	37.64	16.15	20.43	38.25
P-105	HAWTHORNE BYPASS CB	HAWTHORNE SAN MH	12 inch	0.93	21.00	11.12	0.15	1.69	2.75	0.057674	58.60	59.00	62.10	56.08	56.25	62.68
P-93	HAWTHORNE SAN MH	HAWTHORNE COMBINED	18 inch	4.74	35.00	3.53	0.24	0.34	0.21	0.002950	52.48	53.45	62.68	52.41	53.25	62.51
P-304	I-202	I-203	12 inch	1.57	29.00	1.99	0.06	0.06	0.03	0.001143	41.25	42.27	45.25	40.91	42.24	44.91
P-307	I-203	I-204	12 inch	7.26	21.00	9.24	1.33	1.34	0.53	0.024527	40.81	42.24	44.91	40.73	41.71	44.63
P-308	I-204	To 54 inch	12 inch	7.74	27.00	13.84	1.52	1.51	1.19	0.044606	40.23	41.21	44.63	39.02	40.02	45.02
P-94	IMLAY OFFSITE CB	HAWTHORNE SAN MH	12 inch	3.99	29.00	14.11	0.49	2.17	2.50	0.028488	58.48	59.33	61.88	56.38	56.82	62.68
P-95	Intersection with Broad and Armory (Area A36-	AB-CB-4	15 inch	0.80	51.00	8.06	0.13	0.01	4.03	0.081436	46.05	46.40	49.05	40.98	42.37	49.58
P-39	J-1	J-18	36 inch	55.49	52.00	7.85	0.96	0.96	0.36	0.006921	21.59	25.90	42.00	21.33	25.54	42.00
P-15	J-2	J-27	36 inch	55.19	14.00	7.81	0.95	0.95	0.10	0.006846	16.09	19.92	42.00	16.00	19.83	42.00
P-40	J-16	J-2	36 inch	55.23	19.00	7.81	1.08	1.28	0.32	0.006444	20.96	23.62	42.00	20.89	23.30	42.00
P-16	J-17	J-16	36 inch	55.34	55.00	7.83	0.95	0.95	0.38	0.006885	21.24	24.60	42.00	20.96	24.22	42.00
P-17	J-18	J-17	36 inch	55.38	18.00	7.83	0.95	0.95	0.12	0.006894	21.33	25.13	42.00	21.24	25.01	42.00
P-19	J-20	LOB Parking and Buliding (Area A36-8) EXTERNA	36 inch	30.50	50.00	4.31	0.29	0.29	0.10	0.002091	22.09	27.02	42.00	21.85	26.92	42.00
P-18	J-27	Armory Wet Well	36 inch	55.16	8.00	7.80	0.95	0.95	0.05	0.006839	15.10	19.52	42.00	15.00	19.46	61.50
P-115	J-53	AETNA MH 203	12 inch	0.42	62.00	2.56	0.10	0.10	1.32	0.021124	45.00	45.27	59.64	43.69	43.95	62.00
P-116	J-54	J-53	12 inch	0.42	30.00	5.59	0.10	0.07	0.96	0.033081	46.00	46.27	59.64	45.00	45.30	59.64
P-284	J-108	GULLY BROOK GATE	11 x 9 ft	400.00	28.00	13.57	1.28	1.11	-0.12	0.001866	16.15	20.15	38.25	15.97	20.27	36.90
P-38	LOB Parking and Buliding (Area A36-8) EXTEI	J-1	36 inch	55.60	52.00	7.86	0.96	0.96	0.36	0.006948	21.85	26.49	42.00	21.59	26.13	42.00
P-195	LOB PARKING LOT	6-MH 88	15 inch	10.70	124.00	8.72	1.18	1.18	3.40	0.027447	35.00	37.27	42.94	32.00	33.87	41.00
P-5	MH-9-32	9-MH-34	24 inch	16.74	106.00	5.33	0.44	0.44	0.58	0.005479	39.69	41.70	52.79	38.50	41.12	52.98
P-103	MH 2+95	J-20	36 inch	30.60	79.00	7.13	0.75	0.79	0.44	0.005041	27.26	29.05	42.00	26.86	28.61	42.00
P-102	MH 3+95	MH 2+95	30 inch	30.72	94.00	6.77	0.75	0.93	0.70	0.005603	28.60	30.71	42.00	28.12	30.01	42.00
P-101	MH 4+95	MH 3+95	30 inch	30.84	90.00	6.94	0.77	0.93	0.67	0.005724	30.10	32.19	42.00	29.62	31.51	42.00
P-100	MH 5+95	MH 4+95	30 inch	31.02	127.00	6.32	0.65	0.94	0.95	0.005212	31.58	33.95	42.00	31.10	33.00	42.00
P-244	PARKING LOT CB	GB-SANMH9	12 inch	0.00	13.00	0.00	0.00	0.00	0.00	0.000000	56.00	61.96	68.50	55.50	61.96	68.00
P-124	RR-ROW CB1	RR ROW MH 1	15 inch	1.04	88.00	3.74	0.15	0.22	0.85	0.008891	44.99	45.39	48.50	44.19	44.54	49.00
P-123	RR ROW MH 1	10-MH1	18 inch	1.03	151.00	4.40	0.13	0.30	2.41	0.014882	39.43	39.81	49.00	37.11	37.40	48.51
P-86	SIG-CB1A	SIG-MH1	15 inch	0.53	8.00	0.43	0.00	0.00	0.00	0.000068	64.57	68.98	68.87	64.38	68.98	68.98
P-91	SIG-CB2A-1	SIG-CB2C	15 inch	3.79	45.00	3.09	0.15	0.15	0.16	0.003448	66.98	68.72	68.28	64.86	68.56	68.56
P-109	SIG-CB2A-2	SIG-CB2A-1	12 inch	3.87	213.00	4.93	0.38	0.38	1.49	0.006993	66.00	69.77	68.00	63.98	68.28	68.28
P-77	SIG-CB2B	SIG-CB2C	15 inch	2.65	60.00	2.16	0.07	0.07	0.10	0.001687	65.24	68.66	68.84	65.16	68.56	68.56
P-76	SIG-CB2C	SIG-MH1	15 inch	8.69	45.00	7.08	0.78	0.78	0.82	0.018116	64.66	69.80	68.56	64.48	68.98	68.98
P-70	SIG-CB3A	SIG-MH3	12 inch	4.09	11.00	5.20	0.42	0.42	0.09	0.007785	65.87	69.80	69.17	65.81	69.71	69.71
P-75	SIG-CB4A	SIG -MH4	10 inch	1.14	30.00	2.09	0.07	0.07	0.06	0.001946	67.81	70.13	71.21	65.81	70.07	71.39
P-74	SIG-CB5A	SIG-MH5	15 inch	1.95	17.00	1.59	0.04	0.04	0.02	0.000909	66.00	70.02	71.41	65.90	70.00	71.71
P-66	SIG-MH1	11-CB2	15 inch	16.03	88.00	13.07	2.65	2.65	5.42	0.061622	64.38	74.02	68.98	63.20	68.60	68.60
P-69	SIG-MH3	SIG-MH1	15 inch	7.00	58.00	5.70	0.51	0.51	0.68	0.011742	64.91	69.66	69.71	64.48	68.98	68.98
P-73	SIG-MH5	SIG -MH4	15 inch	1.94	17.00	1.58	0.04	0.04	0.02	0.000899	65.90	69.99	71.71	65.49	69.97	71.39
P-71	SIG -MH4	SIG-MH3	15 inch	3.06	74.00	2.49	0.10	0.10	0.17	0.002241	65.49	69.88	71.39	65.01	69.71	69.71
P-30	TRENCH DRAIN (9D)	BURRIED MH 2	12 inch	1.84	72.00	3.98	0.09	0.09	0.19	0.002669	53.50	54.49	55.00	53.00	54.30	55.00
P-29	TRENCH DRAIN (9E)	BURRIED MH 3	12 inch	2.21	67.00	5.56	0.15	0.12	0.22	0.003784	48.00	48.84	50.00	47.00	48.62	50.00
P-35	TRENCH DRAIN (9G1)	9-MH31	12 inch	1.56	48.00	4.98	0.21	0.39	0.79	0.012823	49.00	49.53	51.00	48.32	48.74	51.12

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APPENDIX D-3

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

Existing

Scenario: 10 year

Pipe Report LOCHNER

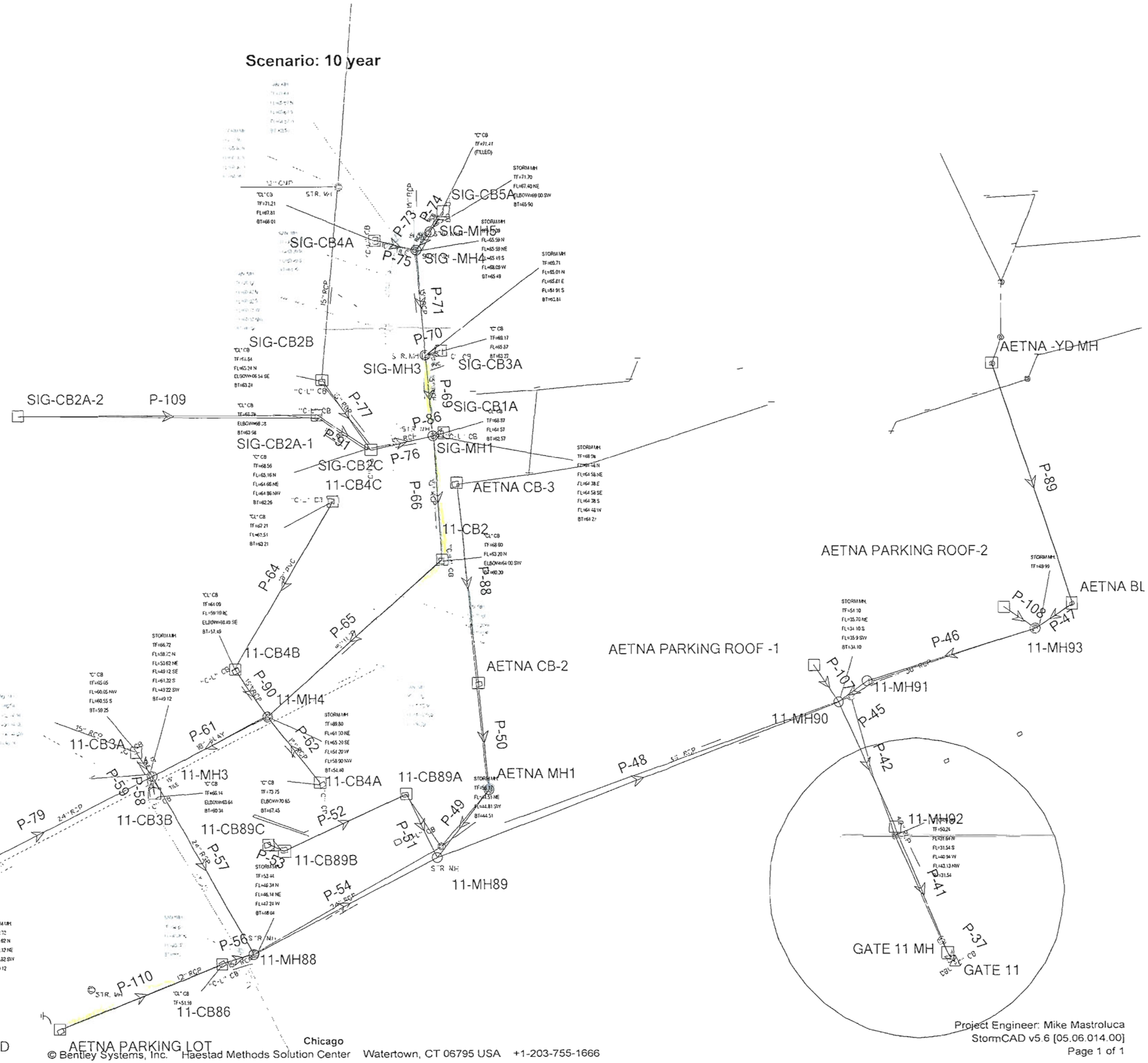
Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-96	AB-MH1	AB-MH2	N/A	N/A	N/A	1.902	4.71	9.04	18.72	17.00	0.031765	18 inch	0.013	43.51	42.97	49.81	50.47	4.80	6.00	44.67	43.82	Concrete
P-98	AB-MH2	AB-CB-4	N/A	N/A	N/A	1.902	4.71	9.03	5.66	31.00	0.002903	18 inch	0.013	41.07	40.98	50.47	49.58	7.90	7.10	42.76	42.53	Concrete
P-99	Armory Drainage (Area A36-7) EX	MH 5+95	0.000	0.00	0.000	6.734	3.95	26.78	32.70	107.00	0.006355	30 inch	0.013	32.70	32.02	48.90	42.00	13.70	7.48	34.46	33.74	Concrete
P-100	MH 5+95	MH 4+95	N/A	N/A	N/A	6.734	3.93	26.65	25.22	127.00	0.003780	30 inch	0.013	31.58	31.10	42.00	42.00	7.92	8.40	33.66	32.86	Concrete
P-101	MH 4+95	MH 3+95	N/A	N/A	N/A	6.734	3.90	26.45	29.95	90.00	0.005333	30 inch	0.013	30.10	29.62	42.00	42.00	9.40	9.88	31.93	31.37	Concrete
P-102	MH 3+95	MH 2+95	N/A	N/A	N/A	6.734	3.88	26.34	29.31	94.00	0.005106	30 inch	0.013	28.60	28.12	42.00	42.00	10.90	11.38	30.45	29.87	Concrete
P-103	MH 2+95	J-20	N/A	N/A	N/A	6.734	3.86	26.21	47.46	79.00	0.005063	36 inch	0.013	27.26	26.86	42.00	42.00	11.74	12.14	28.91	28.45	Concrete
P-104	AREA A36-7B (LOB)	AB-MH3	0.000	0.00	0.000	0.200	4.80	0.97	5.11	314.00	0.000510	24 inch	0.013	35.00	34.84	46.80	49.48	9.80	12.64	36.65	36.64	Concrete
P-15	J-2	J-27	N/A	N/A	N/A	12.304	3.79	47.03	53.47	14.00	0.006429	36 inch	0.013	16.09	16.00	42.00	42.00	22.91	23.00	19.80	19.73	Concrete
P-18	J-27	Armory Wet Well	N/A	N/A	N/A	12.304	3.79	47.00	74.57	8.00	0.012500	36 inch	0.013	15.10	15.00	42.00	61.50	23.90	43.50	19.50	19.46	Concrete
P-161	AR-48-4	Armory Wet Well	0.000	0.00	0.000	5.404	0.98	5.31	96.84	22.00	0.004545	48 inch	0.013	15.10	15.00	42.00	61.50	22.90	42.50	19.46	19.46	Concrete
P-164	AR-CB2	AR-CB3	0.520	0.34	0.177	0.197	3.43	0.68	6.59	25.00	0.010400	15 inch	0.013	32.63	32.37	37.93	37.07	4.05	3.45	32.95	32.64	Concrete
P-165	AR-MH5	AR-CB3	N/A	N/A	N/A	4.912	0.99	4.91	11.69	151.00	0.000066	48 inch	0.013	15.88	15.87	30.18	37.07	10.30	17.20	19.46	19.46	Concrete
P-166	AR-CB4	ARMORY CAPPED MH	0.140	0.43	0.060	0.061	4.80	0.30	6.91	28.00	0.011429	15 inch	0.013	23.07	22.75	30.17	30.18	5.85	6.18	23.28	23.00	Concrete
P-167	ARMORY CAPPED MH	AR-MH5	N/A	N/A	N/A	0.061	4.78	0.30	24.10	25.00	0.270800	12 inch	0.010	22.75	15.98	30.18	30.18	6.43	13.20	22.97	19.47	PVC
P-168	AR-CB6	AR-MH5	0.110	0.42	0.046	4.850	1.01	4.95	25.45	125.00	0.000640	42 inch	0.013	15.96	15.88	25.76	30.18	6.30	10.80	19.47	19.47	Concrete
P-169	AR-CB14	AR-CB6	0.860	0.30	0.258	0.495	2.13	1.06	14.05	52.00	0.060962	18 inch	0.024	21.13	17.96	26.33	25.76	3.70	6.30	21.51	19.47	CMP
P-170	AR-CB-17	AR-CB14	0.720	0.46	0.331	0.292	3.89	1.15	1.79	65.00	0.000769	15 inch	0.013	22.48	22.43	26.28	26.33	2.55	2.65	23.08	22.85	Concrete
P-171	ARMH-9	AR-CB6	N/A	N/A	N/A	4.314	1.01	4.41	68.65	101.00	0.010594	36 inch	0.013	17.13	16.06	27.43	25.76	7.30	6.70	19.47	19.47	Concrete
P-173	AR-CB8	ARMH-9	0.170	0.38	0.065	1.042	2.59	2.72	38.08	12.00	0.028333	24 inch	0.013	17.37	17.03	25.27	27.43	5.90	8.40	19.48	19.47	Concrete
P-174	AR-CB13	AR-CB8	0.060	0.40	0.024	0.119	6.00	0.72	2.55	45.00	0.005111	12 inch	0.013	21.10	20.87	25.70	25.27	3.60	3.40	21.46	21.22	Concrete
P-175	AR-CB16	AR-CB13	0.000	0.00	0.000	0.039	6.00	0.23	4.63	29.00	0.016897	12 inch	0.013	21.69	21.20	24.79	25.70	2.10	3.50	21.89	21.46	Concrete
P-176	AR-CB18	AR-CB8	0.240	0.33	0.079	0.080	3.66	0.29	1.77	55.00	0.001455	12 inch	0.010	20.85	20.77	24.65	25.27	2.80	3.50	21.12	20.99	PVC
P-177	AR-CB10	AR-CB8	1.300	0.30	0.390	0.646	2.60	1.69	12.20	43.00	0.013488	18 inch	0.013	21.21	20.63	25.31	25.27	2.60	3.14	21.70	21.01	Concrete
P-179	AR-CB15	AR-CB10	0.000	0.00	0.000	0.078	4.11	0.32	7.18	45.00	0.004667	18 inch	0.013	21.52	21.31	25.62	25.31	2.60	2.50	21.74	21.70	Concrete
P-180	AR-48-3	AR-CB15	0.340	0.23	0.078	0.078	4.13	0.33	19.88	31.00	0.035806	18 inch	0.013	22.73	21.62	27.63	25.62	3.40	2.50	22.94	21.75	Concrete
P-182	AR-48-2	AR-MH-12	0.180	0.23	0.041	0.171	3.66	0.63	5.78	70.00	0.027286	15 inch	0.024	23.57	21.66	32.07	30.50	7.25	7.59	23.88	22.23	CMP
P-183	AR-MH-12	AR-MH11	0.000	0.00	0.000	3.272	1.02	3.35	160.74	103.00	0.034369	36 inch	0.010	21.66	18.12	30.50	29.02	5.84	7.90	22.23	19.47	PVC
P-184	AR-MH11	ARMH-9	N/A	N/A	N/A	3.272	1.02	3.35	61.80	92.00	0.008587	36 inch	0.013	18.02	17.23	29.02	27.43	8.00	7.20	19.47	19.47	Concrete
P-185	AR-48-1	AR-MH-12	1.560	0.00	0.000	3.020	1.02	3.10	128.34	101.00	0.037030	36 inch	0.013	25.40	21.66	34.50	30.50	6.10	5.84	25.95	22.23	Concrete
P-186	AR-48-1CA4	AR-48-1	1.560	0.42	0.655	2.575	1.02	2.64	149.13	36.00	0.050000	36 inch	0.013	27.50	25.70	36.50	34.50	6.00	5.80	28.01	25.98	Concrete
P-187	AR-48-1B	AR-48-1CA4	0.000	0.00	0.000	2.415	1.02	2.48	101.71	43.00	0.023256	36 inch	0.013	28.50	27.50	37.50	36.50	6.00	6.00	28.99	28.01	Concrete
P-189	AR-CB3	AR-48-4	0.220	0.62	0.136	5.404	0.98	5.33	99.03	162.00	0.004753	48 inch	0.013	15.87	15.10	37.07	42.00	17.20	22.90	19.46	19.46	Concrete
P-224	AR-48-1C	AR48-MH	0.370	0.61	0.226	0.405	4.80	1.96	7.67	177.00	0.048023	15 inch	0.024	43.65	35.15	53.00	44.50	8.10	8.10	44.21	35.74	CMP
P-225	AR48-MH	AR-48-1B	N/A	N/A	N/A	0.405	4.71	1.93	7.37	150.00	0.044333	15 inch	0.024	35.15	28.50	44.50	37.50	8.10	7.75	35.70	28.94	CMP
P-226	AR-CB7	AR-CB8	0.100	0.26	0.026	0.030	4.80	0.15	1.59	45.00	0.002000	12 inch	0.013	21.36	21.27	25.16	25.27	2.80	3.00	21.57	21.43	Concrete
P-237	Armory Wet Well	Armory Pump Station	N/A	N/A	N/A	17.708	0.97	17.33	423.52	105.00	0.001905	8 x 7 ft	0.013	15.00	14.80	61.50	45.00	39.50	23.20	19.46	19.46	Concrete
P-271	GB-CB4	ASYLUM COMBINED MH	0.559	0.90	0.503	1.865	4.80	9.03	19.21	54.00	0.172037	12 inch	0.010	34.35	25.06	0.00	35.86	-35.35	9.80	35.34	25.59	PVC
P-272	GB-AS5	GB-SANMH 1	0.262	0.90	0.236	0.708	6.00	4.28	4.23	14.00	0.004286	15 inch	0.013	28.80	28.74	41.70	42.64	11.65	12.65	42.70	42.64	Concrete
P-273	GB-SANMH 1	GB-SANMH 2	N/A	N/A	N/A	4.708	3.97	18.84	13.58	74.00	0.044189	15 inch	0.013	28.74	25.47	42.64	39.17	12.65	12.45	45.47	39.17	Concrete
P-274	GB-SANMH 2	GB-SANMH 3	N/A	N/A	N/A	4.708	3.96	18.81	4.17	24.00	0.004167	15 inch	0.013	25.47	25.37	39.17	38.30	12.45	11.68	38.98	36.95	Concrete
P-275	GB-SANMH 3	ASYLUM COMBINED MH	N/A	N/A	N/A	4.708	3.96	18.80	3.58	101.00	0.003069	15 inch	0.013	25.37	25.06	38.30	35.86	11.68	9.55	34.87	26.30	Concrete
P-281	GB-SANMH4	GB-SANMH 1	N/A	N/A	N/A	4.000	4.04	16.29	6.60	375.00	0.010427	15 inch	0.013	32.65	28.74	41.00	42.64	7.10	12.65	66.49	42.64	Concrete
P-244	PARKING LOT CB	GB-SANMH9	0.000	0.00	0.000	0.000	0.00	0.00	9.08	13.00	0.038462	12 inch	0.010	56.00	55.50	68.50	68.00	11.50	11.50	60.76	60.76	PVC
P-245	GB-SANMH9	GB-SANMH6	N/A	N/A	N/A	0.000	0.00	0.00	6.85	32.00	0.021875	12 inch	0.010	55.50	54.80	68.00	67.20	11.50	11.40	60.76	60.76	PVC
P-246	GARNER ST CB	GB-SANMH9	1.062	0.90	0.956	0.000	0.00	0.00	6.42	26.00	0.019231	12 inch	0.010	56.00	55.50	69.50	68.00	12.50	11.50	60.76	60.76	PVC
P-290	GB-SANMH6	GB-SANMH5	N/A	N/A	N/A	4.000	4.06	16.35	5.40	34.00	0.002647	18 inch	0.013	54.80	54.71	67.20	67.00	10.90	10.79	60.73	59.90	Concrete
P-291	GB-SANMH5	GB-SANMH4	N/A	N/A	N/A	4.000	4.05	16.31	2.28	32.00	0.001250	15 inch	0.013	54.71	54.67	67.00	41.00	11.04	-14.92	57.96	55.91	Concrete
P-292	GB-SANMH7	GB-SANMH20	N/A	N/A	N/A	4.000	4.08	16.45	9.53	34.00	0.008235	18 inch	0.013	55.47	55.19	68.31	68.00	11.34	11.31	65.72	64.88	Concrete
P-293	GB-SANMH20	GB-SANMH6	N/A	N/A	N/A	4.000	4.07	16.41	7.50	51.00	0.005098	18 inch	0.013	55.19	54.93	68.00	67.20	11.31	10.77	62.73	61.49	Concrete
P-247	GB-SANCB12	GB-SANCB11	0.830	0.90	0.747	0.343	6.00	2.07	7.63	14.00	0.027143	12 inch	0.010	79.27	78.89	82.97	83.49	2.70	3.60	79.88	79.76	PVC

Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-87	Dummy Off Site Basin	TO GATE 7	0.372	0.90	0.335	0.396	6.00	2.39	59.47	33.00	0.320606	18 inch	0.013	42.83	32.25	44.83	45.05	0.50	11.30	43.42	32.46	Concrete
P-72	BROAD ST COMBINED	TO COMBINED SIPHON	0.000	0.00	0.000	0.191	6.00	1.16	7.53	26.00	0.044615	12 inch	0.013	44.47	43.31	47.97	47.21	2.50	2.90	44.92	43.58	Concrete
P-93	HAWTHORNE SAN MH	HAWTHORNE COMBINED	N/A	N/A	N/A	0.852	4.80	4.12	5.55	35.00	0.002000	18 inch	0.011	52.48	52.41	62.68	62.51	8.70	8.60	53.38	53.19	Vitrified Clay Pip
P-94	IMLAY OFFSITE CB	HAWTHORNE SAN MH	0.838	0.49	0.411	0.711	4.80	3.44	12.46	29.00	0.072414	12 inch	0.010	58.48	56.38	61.88	62.68	2.40	5.30	59.27	56.79	PVC
P-105	HAWTHORNE BYPASS CB	HAWTHORNE SAN MH	0.237	0.90	0.213	0.141	6.00	0.85	16.04	21.00	0.120000	12 inch	0.010	58.60	56.08	62.10	62.68	2.50	5.60	58.99	56.24	PVC
P-37	GATE 11 MH	GATE 11	0.000	0.00	0.000	11.529	2.75	32.01	308.04	8.00	0.093750	42 inch	0.013	30.00	29.25	39.25	39.25	5.75	6.50	31.75	30.44	Concrete
P-41	11-MH92	GATE 11 MH	0.000	0.00	0.000	10.601	2.76	29.50	127.42	96.00	0.016042	42 inch	0.013	31.54	30.00	50.24	39.25	15.20	5.75	33.22	31.75	Concrete
P-42	11-MH90	11-MH92	N/A	N/A	N/A	10.315	2.77	28.75	161.05	96.00	0.025625	42 inch	0.013	34.10	31.64	54.10	50.24	16.50	15.10	35.76	32.68	Concrete
P-45	11-MH91	11-MH90	N/A	N/A	N/A	1.365	4.64	6.38	36.68	25.00	0.008000	30 inch	0.013	35.90	35.70	52.83	54.10	14.43	15.90	36.74	36.42	Concrete
P-46	11-MH93	11-MH91	N/A	N/A	N/A	1.365	4.71	6.48	15.61	126.00	0.004762	24 inch	0.013	36.50	35.90	49.99	52.83	11.49	14.93	37.40	36.80	Concrete
P-47	AETNA BLD CB-1	11-MH93	0.227	0.23	0.052	0.416	4.73	1.98	19.59	32.00	0.007500	24 inch	0.013	36.74	36.50	50.47	49.99	11.73	11.49	37.47	37.49	Concrete
P-48	11-MH89	11-MH90	N/A	N/A	N/A	8.158	2.78	22.87	68.80	306.00	0.028137	30 inch	0.013	44.51	35.90	58.71	54.10	11.70	15.70	46.14	36.89	Concrete
P-49	AETNA MH1	11-MH89	N/A	N/A	N/A	0.680	4.70	3.22	6.46	60.00	0.010000	15 inch	0.013	52.95	52.35	60.80	58.71	6.60	5.11	53.67	52.97	Concrete
P-50	AETNA CB-2	AETNA MH1	0.083	0.23	0.019	0.680	4.73	3.24	6.63	76.00	0.010526	15 inch	0.013	54.85	54.05	60.50	60.80	4.40	5.50	55.58	54.67	Concrete
P-51	11-CB89A	11-MH89	0.430	0.44	0.189	0.359	5.90	2.13	6.23	49.00	0.030612	12 inch	0.013	54.40	52.90	58.90	58.71	3.50	4.81	55.02	53.30	Concrete
P-52	11-CB89B	11-CB89A	0.218	0.57	0.124	0.138	5.99	0.83	3.66	95.00	0.010526	12 inch	0.013	55.40	54.40	60.00	58.90	3.60	3.50	55.78	55.02	Concrete
P-53	11-CB89C	11-CB89B	0.197	0.23	0.045	0.045	6.00	0.27	4.60	12.00	0.016667	12 inch	0.013	55.60	55.40	60.00	60.00	3.40	3.60	55.82	55.78	Concrete
P-54	11-MH88	11-MH89	N/A	N/A	N/A	7.119	2.79	20.04	23.90	146.00	0.011164	24 inch	0.013	46.14	44.51	53.44	58.71	5.30	12.20	47.75	46.34	Concrete
P-56	11-CB86	11-MH88	1.050	0.13	0.137	0.900	2.80	2.54	8.74	24.00	0.010833	15 inch	0.010	47.50	47.24	51.59	53.44	2.84	4.95	48.14	47.92	PVC
P-57	11-MH3	11-MH88	N/A	N/A	N/A	6.219	4.46	27.99	31.43	144.00	0.019306	24 inch	0.013	49.12	46.34	66.72	53.44	15.60	5.10	50.96	48.33	Concrete
P-58	11-CB3B	11-MH3	0.084	0.90	0.076	0.107	6.00	0.65	32.25	13.00	0.178462	15 inch	0.011	63.64	61.32	66.14	66.72	1.25	4.15	63.95	61.45	Vitrified Clay Pip
P-59	11-CB3A	11-MH3	0.658	0.90	0.592	0.298	6.00	1.80	15.55	20.00	0.041500	15 inch	0.011	60.55	59.72	65.65	66.72	3.85	5.75	61.08	60.03	Vitrified Clay Pip
P-61	11-MH4	11-MH3	N/A	N/A	N/A	3.952	4.55	18.14	9.86	92.00	0.006304	18 inch	0.011	54.20	53.62	69.80	66.72	14.10	11.60	57.07	55.07	Vitrified Clay Pip
P-62	11-CB4A	11-MH4	0.238	0.90	0.214	0.142	6.00	0.86	12.75	59.00	0.038983	15 inch	0.013	67.50	65.20	73.75	69.80	5.00	3.35	67.86	65.42	Concrete
P-65	11-CB2	11-MH4	0.457	0.90	0.411	3.218	4.59	14.89	5.93	166.00	0.008434	15 inch	0.013	63.20	61.80	68.60	69.80	4.15	6.75	71.87	63.04	Concrete
P-66	SIG-MH1	11-CB2	N/A	N/A	N/A	2.994	4.61	13.91	7.48	88.00	0.013409	15 inch	0.013	64.38	63.20	68.98	68.60	3.35	4.15	72.68	68.60	Concrete
P-69	SIG-MH3	SIG-MH1	N/A	N/A	N/A	1.301	4.66	6.11	5.56	58.00	0.007414	15 inch	0.013	64.91	64.48	69.71	68.98	3.55	3.25	69.50	68.98	Concrete
P-70	SIG-CB3A	SIG-MH3	0.571	0.31	0.177	0.720	4.80	3.49	3.42	11.00	0.005455	12 inch	0.010	65.87	65.81	69.17	69.71	2.30	2.90	69.77	69.71	PVC
P-71	SIG -MH4	SIG-MH3	N/A	N/A	N/A	0.581	4.74	2.78	5.20	74.00	0.006486	15 inch	0.013	65.49	65.01	71.39	69.71	4.65	3.45	69.76	69.62	Concrete
P-73	SIG-MH5	SIG -MH4	N/A	N/A	N/A	0.367	4.77	1.76	10.03	17.00	0.024118	15 inch	0.013	65.90	65.49	71.71	71.39	4.56	4.65	69.86	69.84	Concrete
P-74	SIG-CB5A	SIG-MH5	1.506	0.48	0.723	0.367	4.80	1.78	4.95	17.00	0.005882	15 inch	0.013	66.00	65.90	71.41	71.71	4.16	4.56	69.88	69.87	Concrete
P-75	SIG-CB4A	SIG -MH4	0.614	0.58	0.356	0.214	4.80	1.04	6.69	30.00	0.066667	10 inch	0.011	67.81	65.81	71.21	71.39	2.57	4.75	69.97	69.92	Vitrified Clay Pip
P-76	SIG-CB2C	SIG-MH1	0.321	0.90	0.289	1.614	4.63	7.53	4.09	45.00	0.004000	15 inch	0.013	64.66	64.48	68.56	68.98	2.65	3.25	69.59	68.98	Concrete
P-77	SIG-CB2B	SIG-CB2C	0.697	0.69	0.481	0.481	4.80	2.33	2.36	60.00	0.001333	15 inch	0.013	65.24	65.16	68.84	68.56	2.35	2.15	68.64	68.56	Concrete
P-79	11-MH2	11-MH3	N/A	N/A	N/A	1.862	4.64	8.71	15.95	181.00	0.004972	24 inch	0.013	50.12	49.22	62.32	66.72	10.20	15.50	57.56	57.29	Concrete
P-80	11-CB2A	11-MH2	0.761	0.46	0.350	0.938	4.80	4.54	11.39	19.00	0.060526	12 inch	0.010	57.77	56.62	61.57	62.32	2.80	4.70	58.66	57.77	PVC
P-81	11-CB2B	11-MH2	0.164	0.90	0.148	0.261	6.00	1.58	20.53	35.00	0.196571	12 inch	0.010	57.70	50.82	61.50	62.32	2.80	10.50	58.23	58.32	PVC
P-82	11-MH1A	11-MH2	N/A	N/A	N/A	0.664	4.71	3.15	13.76	53.00	0.017170	18 inch	0.013	51.73	50.82	62.23	62.32	9.00	10.00	57.67	57.62	Concrete
P-83	11-MH1	11-MH1A	N/A	N/A	N/A	0.664	4.80	3.21	33.44	58.00	0.072586	18 inch	0.011	56.23	52.02	63.13	62.23	5.40	8.71	57.79	57.75	Vitrified Clay Pip
P-84	11-CB1A	11-MH1	1.223	0.51	0.624	0.330	4.80	1.60	12.31	20.00	0.085500	12 inch	0.011	58.34	56.63	62.54	63.13	3.20	5.50	58.88	57.81	Vitrified Clay Pip
P-85	11-CB1	11-MH1	1.408	0.45	0.634	0.334	4.80	1.62	15.47	12.00	0.135000	12 inch	0.011	58.05	56.43	62.75	63.13	3.70	5.70	58.59	57.81	Vitrified Clay Pip
P-86	SIG-CB1A	SIG-MH1	0.125	0.63	0.079	0.079	6.00	0.48	9.95	8.00	0.023750	15 inch	0.013	64.57	64.38	68.87	68.98	3.05	3.35	68.98	68.98	Concrete
P-88	AETNA CB-3	AETNA CB-2	0.158	0.49	0.077	0.646	4.80	3.13	6.64	142.00	0.010563	15 inch	0.013	56.45	54.95	70.90	60.50	13.20	4.30	57.16	55.55	Concrete
P-89	AETNA -YD MH	AETNA BLD CB-1	0.000	0.00	0.000	0.364	4.80	1.76	39.18	179.00	0.030000	24 inch	0.013	42.11	36.74	74.50	50.47	30.39	11.73	42.57	37.47	Steel
P-64	11-CB4C	11-CB4B	0.000	0.00	0.000	0.000	0.00	0.00	4.61	138.00	0.026232	10 inch	0.010	63.51	59.89	67.21	64.09	2.87	3.37	63.51	60.65	PVC
P-90	11-CB4B	11-MH4	0.658	0.90	0.592	0.592	6.00	3.58	10.16	40.00	0.024750	15 inch	0.013	59.89	58.90	64.09	69.80	2.95	9.65	60.65	59.42	Concrete
P-91	SIG-CB2A-1	SIG-CB2C	0.000	0.00	0.000	0.702	4.67	3.31	14.02	45.00	0.047111	15 inch	0.013	66.98	64.86	68.28	68.56	0.05	2.45	68.68	68.56	Concrete
P-108	AETNA PARKING ROOF-2	11-MH93	1.054	0.90	0.949	0.949	4.80	4.59	8.25	27.00	1.277778	6 inch	0.010	71.00	36.50	72.00	49.99	0.50	12.99	71.50	37.51	PVC
P-107	AETNA PARKING ROOF -1	11-MH90	0.880	0.90	0.792	0.792	4.80	3.83	7.83	32.00	1.153125	6 inch	0.010	71.00	34.10	72.00	54.10	0.50	19.50	71.50	35.83	PVC
P-109	SIG-CB2A-2	SIG-CB2A-1	1.190	0.59	0.702	0.702	4.80	3.40	4.51	213.00	0.009484	12 inch	0.010	66.00	63.98	68.00	68.28	1.00	3.30	69.43	68.28	PVC
P-110	AETNA PARKING LOT	11-CB86	1.583	0.90	1.425	0.764	6.00	4.62	3.90	125.00	0.012000	12 inch	0.013	49.00	47.50	55.50	51.59	5.50	3.09	50.54	48.39	Concrete

Scenario: 10 year



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Project Engineer: Mike Mastroluca
StormCAD v5.6 [05.06.014.00]

Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-111	10-MH 2	GATE 10	0.000	0.00	0.000	2.369	4.59	10.97	77.01	21.00	0.013333	36 inch	0.013	30.78	30.50	45.00	45.00	11.22	11.50	31.83	31.34	Concrete
P-112	10-MH1	10-MH 2	N/A	N/A	N/A	1.379	4.65	6.46	58.58	105.00	0.007714	36 inch	0.013	34.31	33.50	48.51	45.00	11.20	8.50	35.11	34.17	Concrete
P-113	AETNA MH 204	10-MH1	N/A	N/A	N/A	1.191	4.68	5.62	61.69	16.00	0.074375	24 inch	0.013	36.30	35.11	54.80	48.51	16.50	11.40	37.14	35.59	Concrete
P-114	AETNA MH 203	AETNA MH 204	N/A	N/A	N/A	1.159	4.73	5.52	22.51	101.00	0.009901	24 inch	0.013	37.40	36.40	62.00	54.80	22.60	16.40	38.23	38.17	Concrete
P-115	J-53	AETNA MH 203	N/A	N/A	N/A	0.062	5.93	0.37	2.81	62.00	0.021129	12 inch	0.024	45.00	43.69	59.64	62.00	13.64	17.31	45.25	43.94	CMP
P-116	J-54	J-53	N/A	N/A	N/A	0.062	5.95	0.37	8.46	30.00	0.033333	12 inch	0.010	46.00	45.00	59.64	59.64	12.64	13.64	46.25	45.28	PVC
P-117	EXISTING AETNA CB (10)	J-54	0.069	0.90	0.062	0.062	6.00	0.38	8.46	77.00	0.033377	12 inch	0.010	55.57	53.00	59.78	59.64	3.21	5.64	55.82	53.14	PVC
P-118	AETNA MH 202	AETNA MH 203	N/A	N/A	N/A	0.810	4.75	3.88	6.16	44.00	0.009091	15 inch	0.013	37.90	37.50	61.90	62.00	22.75	23.25	38.70	38.30	Concrete
P-119	AETNA CB 203	AETNA MH 202	0.550	0.90	0.495	0.500	6.00	3.02	3.64	23.00	0.010435	12 inch	0.013	57.64	57.40	61.44	61.90	2.80	3.50	58.39	58.10	Concrete
P-123	RR ROW MH 1	10-MH1	N/A	N/A	N/A	0.189	4.74	0.90	13.02	151.00	0.015364	18 inch	0.013	39.43	37.11	49.00	48.51	8.07	9.90	39.78	37.38	Concrete
P-124	RR-ROW CB1	RR ROW MH 1	1.452	0.13	0.189	0.189	4.80	0.91	6.16	88.00	0.009091	15 inch	0.013	44.99	44.19	48.50	49.00	2.26	3.56	45.37	44.52	Concrete
P-125	AETNA MH 201	AETNA MH 202	N/A	N/A	N/A	0.310	4.80	1.50	3.61	34.00	0.010294	12 inch	0.013	38.35	38.00	62.00	61.90	22.65	22.90	48.03	47.97	Concrete
P-126	AETNA CB 202	AETNA MH 201	0.050	0.90	0.045	0.310	4.80	1.50	3.40	11.00	0.009091	12 inch	0.013	49.40	49.30	61.60	62.00	11.20	11.70	49.92	49.77	Concrete
P-127	AETNA YD 201	AETNA MH 204	0.137	0.23	0.032	0.032	4.80	0.15	10.74	11.00	0.090909	12 inch	0.013	51.00	50.00	54.80	54.80	2.80	3.80	51.16	50.08	Concrete
P-128	GC-1	AETNA MH 203	0.319	0.90	0.287	0.287	4.80	1.39	7.12	29.00	0.010345	15 inch	0.012	44.50	44.20	50.00	62.00	4.25	16.55	44.97	44.58	Corrugated HDP
P-130	8MH-1	FSRD -1A	N/A	N/A	N/A	5.841	4.65	27.35	47.35	127.00	0.005039	36 inch	0.013	38.26	37.62	49.66	46.62	8.40	6.00	39.95	39.26	Concrete
P-131	FSMH-9	8MH-1	N/A	N/A	N/A	5.517	4.65	25.85	238.52	19.00	0.127895	36 inch	0.013	40.99	38.56	51.00	49.66	7.01	8.10	42.63	39.45	Concrete
P-132	FSMH-10	FSMH-9	0.000	0.00	0.000	1.313	4.78	6.33	14.28	33.00	0.018485	18 inch	0.013	41.60	40.99	50.90	51.00	7.80	8.51	42.85	42.78	Concrete
P-134	FSMH-7	FSMH-9	N/A	N/A	N/A	3.881	4.68	18.29	44.26	140.00	0.038286	24 inch	0.013	46.71	41.35	55.21	51.00	6.50	7.65	48.25	42.25	Concrete
P-135	FSMH-6	FSMH-7	N/A	N/A	N/A	3.557	4.70	16.83	47.56	107.00	0.044206	24 inch	0.013	51.44	46.71	59.94	55.21	6.50	6.50	52.92	48.32	Concrete
P-136	FSMH-5	FSMH-6	N/A	N/A	N/A	2.278	4.71	10.81	65.13	74.00	0.049054	24 inch	0.010	55.07	51.44	63.77	59.94	6.70	6.50	56.25	52.98	PVC
P-140	FSI-3	FSMH-5	0.330	0.90	0.297	0.177	6.00	1.07	11.97	34.00	0.112941	12 inch	0.013	60.01	56.17	64.31	63.77	3.30	6.60	60.45	56.37	Concrete
P-142	AETNA DI	FSMH-10	1.190	0.77	0.916	0.423	4.80	2.05	3.72	34.00	0.010882	12 inch	0.013	45.07	44.70	49.87	50.90	3.80	5.20	45.68	45.23	Concrete
P-143	FSI-2	FSMH-6	0.260	0.90	0.234	0.420	6.00	2.54	9.86	26.00	0.076538	12 inch	0.013	54.63	52.64	59.03	59.94	3.40	6.30	55.31	53.35	Concrete
P-144	FSI-1	FSMH-6	0.940	0.90	0.846	0.534	4.80	2.59	9.35	18.00	0.068889	12 inch	0.013	53.98	52.74	59.38	59.94	4.40	6.20	54.67	53.13	Concrete
P-145	FSPG-3	FSMH-9	0.360	0.90	0.324	0.324	4.80	1.57	14.31	62.00	0.018548	18 inch	0.013	42.50	41.35	70.00	51.00	26.00	8.15	42.97	42.65	Concrete
P-146	FSPG -4	8MH-1	0.360	0.90	0.324	0.324	4.80	1.57	10.85	60.00	0.010667	18 inch	0.013	42.50	41.86	70.00	49.66	26.00	6.30	42.97	42.25	Concrete
P-147	FSPG-1	FSMH-6	0.360	0.90	0.324	0.324	4.80	1.57	24.22	75.00	0.011467	24 inch	0.013	53.50	52.64	70.00	59.94	14.50	5.30	53.93	53.38	Concrete
P-148	FSPG-2	FSMH-7	0.360	0.90	0.324	0.324	4.80	1.57	18.80	42.00	0.006905	24 inch	0.013	49.00	48.71	70.00	55.21	19.00	4.50	49.43	49.10	Concrete
P-149	FSRD-1B	FSRD -1A	0.573	0.90	0.516	1.885	6.00	11.40	35.55	26.00	0.014615	24 inch	0.010	33.90	33.52	46.62	46.62	10.72	11.10	35.16	35.36	PVC
P-156	FSRD -1A	GATE 8 MH	0.540	0.90	0.486	8.215	4.60	38.07	139.57	394.00	0.009442	48 inch	0.013	33.52	29.80	46.62	47.00	9.10	13.20	35.36	31.65	Concrete
P-157	GATE 8 MH	GATE 8	N/A	N/A	N/A	8.215	4.49	37.16	151.41	9.00	0.011111	48 inch	0.013	29.80	29.70	47.00	47.00	13.20	13.30	31.62	31.31	Concrete
P-152	FSMH-2	FSMH-3	0.000	0.00	0.000	1.580	4.80	7.65	7.49	77.00	0.069091	10 inch	0.010	67.46	62.14	71.66	67.34	3.37	4.37	68.29	62.87	PVC
P-158	FSMH-3	FSMH-4	N/A	N/A	N/A	1.580	4.79	7.63	91.96	19.00	0.165263	24 inch	0.013	60.14	57.00	67.34	66.60	5.20	7.60	61.12	57.46	Concrete
P-159	FSMH-4	FSMH-5	N/A	N/A	N/A	1.580	4.79	7.62	43.28	50.00	0.036600	24 inch	0.013	56.90	55.07	66.60	63.77	7.70	6.70	57.88	56.42	Concrete
P-138	FARM I-1	FSMH-1	1.990	0.39	0.776	0.386	4.80	1.87	12.28	56.00	0.085000	12 inch	0.011	73.95	69.19	81.05	79.56	6.10	9.37	74.53	69.79	Vitrified Clay Pip
P-139	FSI-4	FSMH-1	0.180	0.90	0.162	0.135	6.00	0.82	17.85	25.00	0.076400	15 inch	0.013	71.10	69.19	78.70	79.56	6.35	9.12	71.45	69.76	Concrete
P-160	FSMH-1	FSMH-5	N/A	N/A	N/A	0.521	4.79	2.52	52.02	267.00	0.052884	24 inch	0.013	69.19	55.07	79.56	63.77	8.37	6.70	69.74	56.32	Concrete
P-16	J-17	J-16	N/A	N/A	N/A	12.304	3.81	47.20	47.25	55.00	0.005018	36 inch	0.013	21.24	20.96	42.00	42.00	17.76	18.04	24.11	23.88	Concrete
P-17	J-18	J-17	N/A	N/A	N/A	12.304	3.81	47.24	47.16	18.00	0.005000	36 inch	0.013	21.33	21.24	42.00	42.00	17.67	17.76	24.47	24.38	Concrete
P-19	J-20	LOB Parking and Buliding (Area /	N/A	N/A	N/A	6.734	3.85	26.11	46.69	50.00	0.004900	36 inch	0.013	22.09	21.85	42.00	42.00	16.91	17.15	25.75	25.68	Concrete
P-38	LOB Parking and Buliding (Area A	J-1	0.000	0.00	0.000	12.304	3.83	47.49	47.16	52.00	0.005000	36 inch	0.013	21.85	21.59	42.00	42.00	17.15	17.41	25.41	25.15	Concrete
P-39	J-1	J-18	N/A	N/A	N/A	12.304	3.82	47.37	47.16	52.00	0.005000	36 inch	0.013	21.59	21.33	42.00	42.00	17.41	17.67	25.00	24.74	Concrete
P-40	J-16	J-2	N/A	N/A	N/A	12.304	3.80	47.08	42.18	19.00	0.004000	36 inch	0.013	20.96	20.89	42.00	42.00	18.04	18.11	23.39	23.12	Concrete
P-21	AB-MH90	Armory Drainage (Area A36-7) E:	N/A	N/A	N/A	2.474	3.96	9.88	24.45	107.00	0.011682	24 inch	0.013	34.67	33.42	49.87	48.90	13.20	13.48	35.79	34.59	Concrete
P-22	AB-MH3	AB-MH90	N/A	N/A	N/A	2.474	4.10	10.23	6.78	189.00	0.000899	24 inch	0.013	34.84	34.67	49.48	49.87	12.64	13.20	36.57	35.98	Concrete
P-23	AB-CB-4	AB-MH3	0.493	0.90	0.444	2.274	4.69	10.76	16.20	37.00	0.023784	18 inch	0.013	40.88	40.00	49.58	49.48	7.20	7.98	42.14	40.95	Concrete
P-95	Intersection with Broad and Armo	AB-CB-4	0.132	0.90	0.119	0.119	6.00	0.72	20.37	51.00	0.099412	15 inch	0.013	46.05	40.98	49.05	49.58	1.75	7.35	46.38	42.27	Concrete
P-25	AB-CB-3	AB-MH1	0.140	0.90	0.126	1.902	4.72	9.06	21.74	39.00	0.042821	18 inch	0.013	45.38	43.71	50.18	49.81	3.30	4.60	46.54	45.07	Concrete
P-26	AB-CB-2	AB-CB-3	0.177	0.90	0.159	1.763	4.76	8.46	12.22	150.00	0.035800	15 inch	0.013	50.85	45.48	55.85	50.18	3.75	3.45	51.99	46.63	Concrete
P-27	AB-CB-1	AB-CB-2	0.242	0.90	0.218	1.076	4.80	5.21	11.99	154.00	0.034481	15 inch	0.013	56.36	51.05	62.66	55.85	5.05	3.55	57.29	52.11	Concrete

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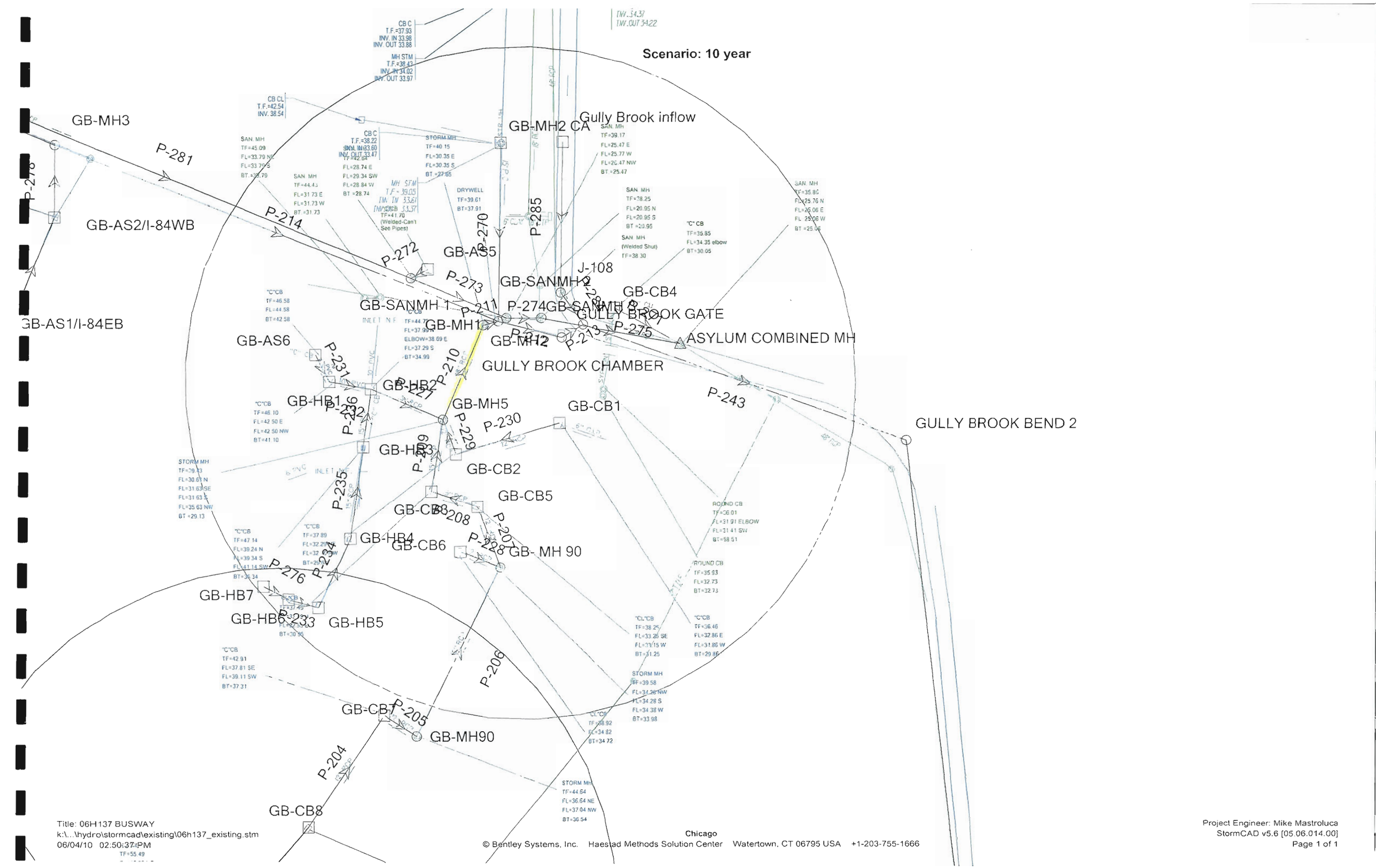
Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-248	GB-SANCB11	GB-SANMH16	0.898	0.90	0.808	0.705	5.99	4.26	13.40	43.00	0.083721	12 inch	0.010	78.89	75.29	83.49	81.89	3.60	5.60	79.76	75.71	PVC
P-250	GB-SANMH16	GB-SANMH8	N/A	N/A	N/A	3.895	5.77	22.66	53.86	218.00	0.056697	24 inch	0.013	69.49	57.13	81.89	70.65	10.40	11.52	71.19	66.43	Concrete
P-251	GB-SANMH17	GB-SANMH16	N/A	N/A	N/A	2.057	5.84	12.11	21.48	246.00	0.024756	18 inch	0.010	75.58	69.49	88.58	81.89	11.50	10.90	76.90	71.36	PVC
P-252	GB-SANCB7	GB-SANMH17	0.614	0.90	0.553	0.536	6.00	3.24	43.63	94.00	0.887660	12 inch	0.010	83.44	0.00	86.14	88.58	1.70	87.58	84.21	77.03	PVC
P-260	GB-SANCB10	GB-SANMH16	1.088	0.90	0.979	0.839	6.00	5.07	24.07	7.00	0.270000	12 inch	0.010	77.58	75.69	81.78	81.89	3.20	5.20	78.50	76.18	PVC
P-261	GB-SANCB8	GB-SANCB9	0.344	0.90	0.310	0.187	6.00	1.13	6.37	33.00	0.060606	10 inch	0.011	76.17	74.17	78.97	81.17	1.97	6.17	76.64	75.60	Vitrified Clay Pip
P-262	GB-SANCB9	GB-SANMH16	0.167	0.90	0.150	0.294	5.99	1.78	2.83	26.00	0.011923	10 inch	0.011	75.00	74.69	81.17	81.89	5.34	6.37	75.60	75.18	Vitrified Clay Pip
P-154	GB-SANMH15	GB-SANMH14	N/A	N/A	N/A	0.104	5.99	0.63	3.96	128.00	0.003750	15 inch	0.013	71.25	70.77	81.50	82.17	9.00	10.15	71.59	71.08	Concrete
P-155	GB-SANCB1	GB-SANMH15	0.160	0.90	0.144	0.104	6.00	0.63	21.93	33.00	0.224242	12 inch	0.010	78.65	71.25	80.95	81.50	1.30	9.25	78.98	71.62	PVC
P-263	GB-SANMH14	GB-SANMH13	N/A	N/A	N/A	0.104	5.80	0.61	6.13	163.00	0.005337	15 inch	0.010	70.67	69.80	82.17	81.00	10.25	9.95	70.97	70.11	PVC
P-264	GB-SANMH13	GB-SANMH12	N/A	N/A	N/A	0.104	5.60	0.59	5.89	69.00	0.004928	15 inch	0.010	69.80	69.46	81.00	80.76	9.95	10.05	70.10	69.80	PVC
P-265	GB-SANMH12	GB-SANMH11	N/A	N/A	N/A	0.104	5.50	0.58	8.56	72.00	0.034167	12 inch	0.010	69.46	67.00	80.76	79.00	10.30	11.00	69.78	69.08	PVC
P-266	GB-SANMH11	GB-SANMH10	N/A	N/A	N/A	0.104	5.45	0.57	8.79	197.00	0.036041	12 inch	0.010	67.00	59.90	79.00	75.00	11.00	14.10	69.07	69.04	PVC
P-267	GB-SANMH10	GB-SANMH8	N/A	N/A	N/A	0.104	4.51	0.47	8.56	81.00	0.034198	12 inch	0.010	59.90	57.13	75.00	70.65	14.10	12.52	69.04	69.03	PVC
P-256	GB-SANCB6	GB-SANCB5	1.244	0.90	1.120	0.466	6.00	2.82	3.98	65.00	0.007385	12 inch	0.010	86.04	85.56	89.34	89.36	2.30	2.80	86.76	86.18	PVC
P-297	GB-SANCB5	GB-SANMH17	0.461	0.90	0.415	1.406	5.85	8.29	20.13	38.00	0.188947	12 inch	0.010	83.76	76.58	89.36	88.58	4.60	11.00	84.75	77.09	PVC
P-298	GB-SANCB4	GB-SANMH17	0.125	0.90	0.113	0.115	6.00	0.69	12.58	34.00	0.073824	12 inch	0.010	87.79	85.28	88.79	88.58	0.00	2.30	88.14	85.44	PVC
P-258	GB-SANMH19	GB-SANCB3	N/A	N/A	N/A	0.117	5.98	0.71	4.68	82.00	0.005244	15 inch	0.013	89.00	88.57	91.00	90.67	0.75	0.85	89.33	88.90	Concrete
P-259	GB-SANCB2	GB-SANMH19	0.186	0.90	0.167	0.117	6.00	0.71	5.62	34.00	0.014706	12 inch	0.010	89.50	89.00	91.00	91.00	0.50	1.00	89.85	89.37	PVC
P-299	GB-SANCB3	GB-SANCB5	0.640	0.90	0.576	0.410	5.87	2.43	9.43	63.00	0.041429	12 inch	0.010	86.37	83.76	90.67	89.36	3.30	4.60	87.04	84.75	PVC
P-300	GB-SANMH8	GB-SANMH7	N/A	N/A	N/A	4.000	4.12	16.60	43.18	77.00	0.021558	24 inch	0.010	57.13	55.47	70.65	68.31	11.52	10.84	66.29	66.05	PVC
P-202	GB-CB10	GB-CB9	0.051	0.23	0.012	0.012	6.00	0.07	11.39	42.00	0.102143	12 inch	0.013	50.68	46.39	53.88	55.49	2.20	8.10	50.79	46.76	Concrete
P-203	GB-CB9	GB-CB8	0.375	0.90	0.338	0.205	5.96	1.23	6.26	134.00	0.030896	12 inch	0.013	46.29	42.15	55.49	47.55	8.20	4.40	46.76	42.45	Concrete
P-204	GB-CB8	GB-CB7	0.080	0.90	0.072	0.344	5.89	2.04	5.35	95.00	0.022526	12 inch	0.013	41.25	39.11	47.55	42.91	5.30	2.80	41.86	39.54	Concrete
P-205	GB-CB7	GB-MH90	0.058	0.90	0.052	0.438	5.83	2.58	6.02	27.00	0.028519	12 inch	0.013	37.81	37.04	42.91	44.64	4.10	6.60	38.50	37.51	Concrete
P-206	GB-MH90	GB- MH 90	N/A	N/A	N/A	0.438	5.82	2.57	4.64	133.00	0.016992	12 inch	0.013	36.64	34.38	44.64	39.58	7.00	4.20	37.33	35.23	Concrete
P-207	GB- MH 90	GB-CB5	N/A	N/A	N/A	0.542	5.74	3.13	5.33	46.00	0.022391	12 inch	0.013	34.28	33.25	39.58	38.25	4.30	4.00	35.04	34.37	Concrete
P-208	GB-CB5	GB-CB3	0.031	0.90	0.028	0.603	4.80	2.92	8.46	35.00	0.017143	15 inch	0.013	33.15	32.55	38.25	37.45	3.85	3.65	34.37	34.30	Concrete
P-209	GB-CB3	GB-MH5	0.135	0.23	0.031	0.634	4.79	3.06	8.19	51.00	0.016078	15 inch	0.013	32.45	31.63	37.45	39.43	3.75	6.55	34.30	34.19	Concrete
P-210	GB-MH5	GB-MH1	N/A	N/A	N/A	2.974	4.73	14.17	6.51	73.00	0.003836	18 inch	0.013	30.63	30.35	39.43	40.15	7.30	8.30	33.73	32.40	Concrete
P-211	GB-MH1	GB-MH2	N/A	N/A	N/A	2.974	4.71	14.10	23.27	11.00	0.049091	18 inch	0.013	30.35	29.81	40.15	39.61	8.30	8.30	31.73	31.36	Concrete
P-212	GB-MH2	GULLY BROOK CHAMBER	N/A	N/A	N/A	15.424	4.26	66.25	116.18	46.00	0.048261	33 inch	0.013	28.01	25.79	39.61	38.30	8.85	9.76	30.57	27.58	Concrete
P-213	GULLY BROOK CHAMBER	GULLY BROOK GATE	N/A	N/A	N/A	15.424	4.26	66.16	239.96	18.00	0.129444	36 inch	0.013	20.85	18.52	38.30	36.90	14.45	15.38	23.45	20.13	Concrete
P-214	GB-MH3	GB-MH2	N/A	N/A	N/A	11.527	4.38	50.92	37.45	337.00	0.005015	33 inch	0.013	29.70	28.01	52.00	39.61	19.55	8.85	34.10	30.97	Concrete
P-215	GB-MH4	GB-MH3	N/A	N/A	N/A	7.952	4.44	35.56	38.15	98.00	0.005204	33 inch	0.013	30.21	29.70	67.00	52.00	34.04	19.55	35.31	34.87	Concrete
P-216	GB-SP1	GB-MH4	0.000	0.00	0.000	7.952	4.45	35.66	50.63	36.00	0.009167	33 inch	0.013	45.90	45.57	68.00	67.00	19.35	18.68	47.89	47.34	Concrete
P-227	GB-HB2	GB-MH5	0.074	0.90	0.067	1.807	4.74	8.64	11.12	56.00	0.029643	15 inch	0.013	37.29	35.63	44.79	39.43	6.25	2.55	38.43	36.48	Concrete
P-228	GB-CB6	GB- MH 90	0.124	0.90	0.112	0.104	6.00	0.63	4.70	31.00	0.017419	12 inch	0.013	34.82	34.28	38.92	39.58	3.10	4.30	35.15	35.17	Concrete
P-229	GB-CB2	GB-MH5	0.245	0.90	0.221	0.533	5.71	3.06	5.23	26.00	0.021538	12 inch	0.013	32.19	31.63	37.89	39.43	4.70	6.80	34.85	34.66	Concrete
P-230	GB-CB1	GB-CB2	0.128	0.90	0.115	0.125	6.00	0.76	3.07	77.00	0.007403	12 inch	0.013	32.86	32.29	36.46	37.89	2.60	4.60	34.89	34.85	Concrete
P-231	GB-AS6	GB-HB1	0.227	0.90	0.204	0.233	6.00	1.41	1.72	22.00	0.003636	10 inch	0.010	42.58	42.50	46.58	46.10	3.17	2.77	43.15	43.05	PVC
P-232	GB-HB1	GB-HB2	0.019	0.90	0.017	0.250	5.98	1.51	10.32	29.00	0.131379	10 inch	0.010	42.50	38.69	46.10	44.79	2.77	5.27	43.05	38.91	PVC
P-233	GB-HB6	GB-HB5	0.000	0.00	0.000	1.271	4.80	6.14	5.37	22.00	0.022727	12 inch	0.013	43.50	43.00	54.00	54.00	9.50	10.00	44.89	44.24	Concrete
P-234	GB-HB5	GB-HB4	0.189	0.90	0.170	1.390	4.79	6.71	6.38	53.00	0.032075	12 inch	0.013	43.00	41.30	54.00	50.00	10.00	7.70	44.24	42.36	Concrete
P-235	GB-HB4	GB-HB3	0.019	0.90	0.017	1.447	4.77	6.96	11.22	65.00	0.030154	15 inch	0.013	41.30	39.34	50.00	47.14	7.45	6.55	42.36	40.06	Concrete
P-236	GB-HB3	GB-HB2	0.036	0.90	0.032	1.486	4.76	7.12	11.14	42.00	0.029762	15 inch	0.013	39.24	37.99	47.14	44.79	6.65	5.55	40.31	38.75	Concrete
P-242	GULLY BROOK BEND 2	Park River (Gully)	N/A	N/A	N/A	15.424	4.21	465.46	628.26	838.00	0.001492	7 x 7 ft	0.013	14.22	12.97	34.80	36.00	13.58	16.03	18.83	17.30	Concrete
P-243	GULLY BROOK GATE	GULLY BROOK BEND 2	N/A	N/A	N/A	15.424	4.25	466.13	1,753.45	244.00	0.007172	11 x 9 I	0.013	15.97	14.22	36.90	34.80	11.93	11.58	19.79	19.19	Concrete
P-270	GB-MH2 CA	GB-MH2	0.000	0.00	0.000	0.923	4.80	4.47	11.40	127.00	0.018425	15 inch	0.010	30.35	28.01	40.15	39.61	8.55	10.35	31.21	30.71	PVC
P-276	GB-HB7	GB-HB6	1.412	0.90	1.271	1.271	4.80	6.15	5.63	20.00	0.025000	12 inch	0.013	44.00	43.50	54.00	54.00	9.00	9.50	45.49	44.89	Concrete
P-277	GB-AS1/I-84EB	GB-AS2/I-84WB	0.140	0.90	0.126	1.052	6.00	6.36	26.10	81.00	0.061728	18 inch	0.013	57.00	52.00	60.00	57.95	1.50	4.45	57.98	53.44	Concrete



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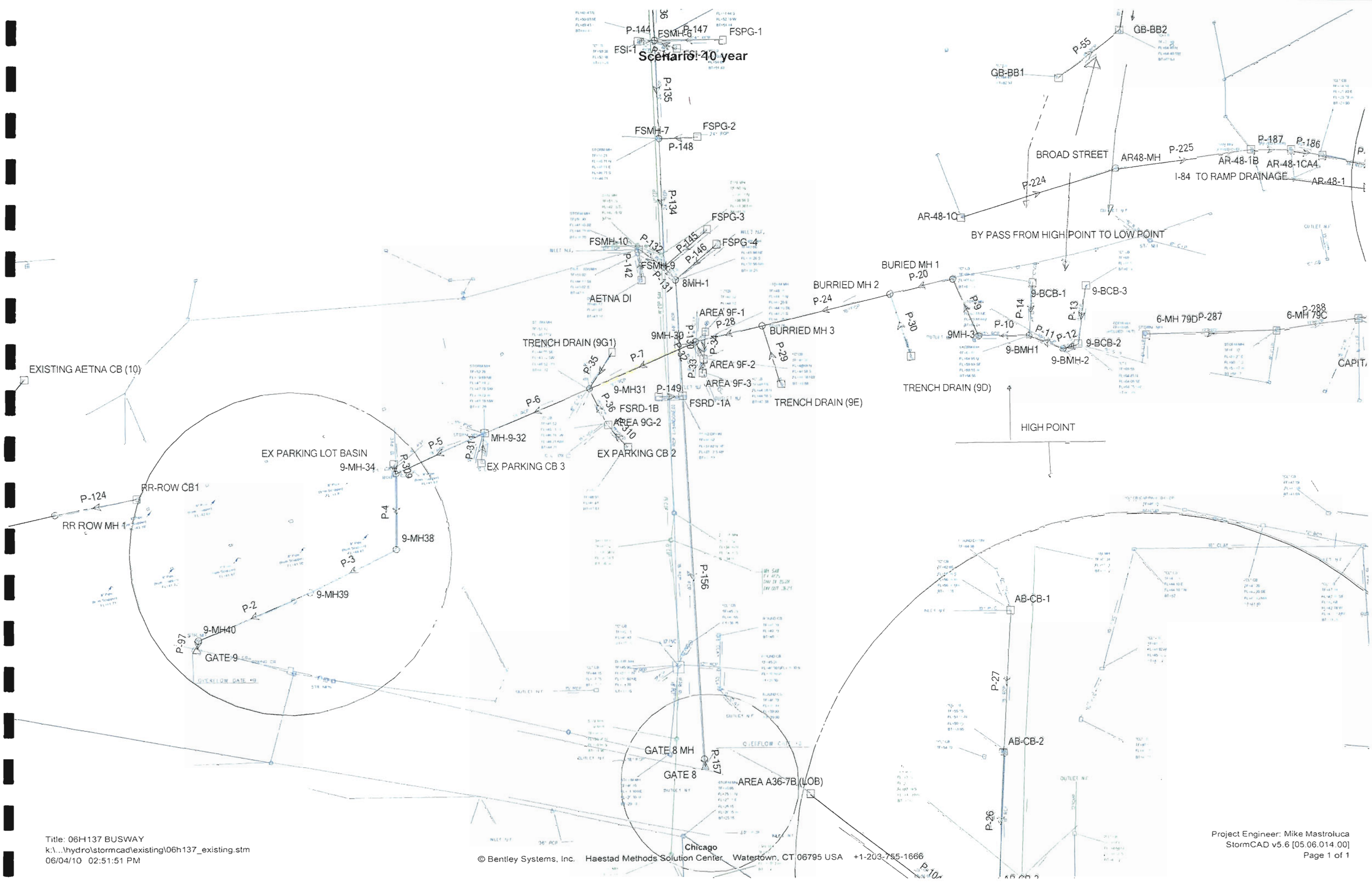
Project Engineer: Mike Mastroluca
StormCAD v5.6 [05.06.014.00]

Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-278	GB-AS2/I-84WB	GB-MH3	0.339	0.90	0.305	3.575	4.80	17.31	29.42	51.00	0.078431	18 inch	0.013	52.00	48.00	57.95	52.00	4.45	2.50	53.44	48.90	Concrete
P-284	J-108	GULLY BROOK GATE	N/A	N/A	N/A	0.000	0.00	400.00	I,660.07	28.00	0.006429	11 x 9 I	0.013	16.15	15.97	38.25	36.90	13.10	11.93	20.06	20.20	Concrete
P-285	Gully Brook inflow	J-108	0.000	0.00	0.000	0.000	0.00	400.00	I,638.38	107.00	0.006262	11 x 9 I	0.013	16.82	16.15	37.64	38.25	11.82	13.10	20.27	20.35	Concrete
P-294	GB-AS3	GB-MH6	0.603	0.90	0.543	0.324	6.00	1.96	7.62	51.00	0.013922	15 inch	0.013	58.00	57.29	68.00	68.00	8.75	9.46	58.56	57.72	Concrete
P-295	GB-MH6	GB-SP1	N/A	N/A	N/A	1.962	4.49	8.88	22.62	91.00	0.010000	24 inch	0.013	46.50	45.59	68.00	68.00	19.50	20.41	47.95	47.89	Concrete
P-219	GB-AS4	GB-MH7	0.414	0.90	0.373	0.747	6.00	4.52	10.47	16.00	0.026250	15 inch	0.013	51.50	51.08	69.00	69.44	16.25	17.11	52.36	51.72	Concrete
P-220	GB-FAR1	GB-MH7	0.847	0.23	0.195	0.891	4.56	4.09	14.09	129.00	0.017984	18 inch	0.013	50.46	48.14	73.06	69.44	21.10	19.80	51.23	49.35	Concrete
P-221	GB-FAR2	GB-FAR1	0.150	0.23	0.035	0.032	4.80	0.16	12.69	155.00	0.038581	15 inch	0.013	72.44	66.46	76.54	73.06	2.85	5.35	72.59	66.56	Concrete
P-222	GB-MH8	GB-FAR1	N/A	N/A	N/A	0.654	4.61	3.04	5.53	65.00	0.002769	18 inch	0.013	50.74	50.56	74.34	73.06	22.10	21.00	51.52	51.23	Concrete
P-55	GB-BB1	GB-BB2	0.857	0.90	0.771	0.375	6.00	2.27	3.66	84.00	0.003214	15 inch	0.013	64.67	64.40	72.97	73.80	7.05	8.15	65.65	65.57	Concrete
P-43	GB-BB2	GB-BB3	0.092	0.90	0.083	0.603	5.91	3.59	2.35	68.00	0.001324	15 inch	0.013	64.40	64.31	73.80	74.91	8.15	9.35	65.48	65.12	Concrete
P-282	GB-BB3	GB-BB4	0.561	0.58	0.325	0.603	4.80	2.92	7.43	211.00	0.013223	15 inch	0.013	64.31	61.52	74.91	70.82	9.35	8.05	65.00	62.23	Concrete
P-283	GB-BB4	GB-MH8	0.252	0.23	0.058	0.654	4.71	3.10	6.98	204.00	0.011667	15 inch	0.013	61.52	59.14	70.82	74.34	8.05	13.95	62.23	59.72	Concrete
P-296	GB-MH7	GB-MH6	N/A	N/A	N/A	1.638	4.51	7.44	17.60	52.00	0.028077	18 inch	0.013	47.96	46.50	69.44	68.00	19.98	20.00	49.02	48.62	Concrete
P-193	6- MH 100	GATE 6	N/A	N/A	N/A	4.641	4.57	21.37	722.95	16.00	1.175000	36 inch	0.013	31.80	13.00	42.00	43.00	7.20	27.00	33.29	19.46	Concrete
P-194	6-MH 88	6- MH 100	N/A	N/A	N/A	2.450	4.61	11.40	29.30	98.00	0.005102	30 inch	0.013	32.50	32.00	41.00	42.00	6.00	7.50	33.63	33.39	Concrete
P-195	LOB PARKING LOT	6-MH 88	0.000	0.00	0.000	1.940	4.80	9.39	10.05	124.00	0.024194	15 inch	0.013	35.00	32.00	42.94	41.00	6.69	7.75	36.39	33.77	Concrete
P-190	6-CB 1 (98)	6- CB2 (97)	0.050	0.90	0.045	0.871	4.72	4.14	11.23	21.00	0.011429	18 inch	0.013	49.80	49.56	55.36	55.46	4.06	4.40	50.58	50.44	Concrete
P-191	6- CB2 (97)	6-MH 90	0.310	0.50	0.155	1.104	4.71	5.24	22.02	81.00	0.043951	18 inch	0.013	49.56	46.00	55.46	51.80	4.40	4.30	50.44	47.15	Concrete
P-238	6-MH 90	6-MH DROP	0.350	0.23	0.081	2.191	4.69	10.36	50.90	79.00	0.050633	24 inch	0.013	46.00	42.00	51.80	45.00	3.80	1.00	47.15	42.62	Steel
P-239	6-MH DROP	6- MH 100	N/A	N/A	N/A	2.191	4.67	10.33	51.90	19.00	0.052632	24 inch	0.013	34.00	33.00	45.00	42.00	9.00	7.00	35.15	33.73	Steel
P-301	6-CB 3	6-CB 1 (98)	0.070	0.90	0.063	0.816	4.75	3.91	6.61	93.00	0.034409	12 inch	0.013	53.00	49.80	60.00	55.36	6.00	4.56	53.84	50.35	Concrete
P-302	6- CB 4	6-CB 3	0.740	0.35	0.259	0.763	4.80	3.69	3.49	104.00	0.009615	12 inch	0.013	54.00	53.00	60.00	60.00	5.00	6.00	54.88	53.84	Concrete
P-198	6-MH 84	6-MH 85	0.000	0.00	0.000	0.460	4.71	2.18	32.29	108.00	0.020370	24 inch	0.013	36.00	33.80	42.40	41.60	4.40	5.80	36.51	34.15	Concrete
P-199	6-MH 82	6-MH 84	0.000	0.00	0.000	0.410	4.73	1.96	49.76	62.00	0.048387	24 inch	0.013	39.00	36.00	50.60	42.40	9.60	4.40	39.49	36.51	Concrete
P-201	6-CB 79A	6-MH 79	0.000	0.00	0.000	0.280	4.80	1.36	8.63	40.00	0.006750	18 inch	0.013	56.88	56.61	61.98	63.21	3.60	5.10	57.32	57.01	Concrete
P-240	6-MH 79	6-MH 80	N/A	N/A	N/A	0.280	4.77	1.35	63.76	51.00	0.270784	24 inch	0.024	56.41	42.60	63.21	48.00	4.80	3.40	56.81	42.80	CMP
P-241	6-MH 80	6-MH 82	N/A	N/A	N/A	0.280	4.76	1.34	44.87	61.00	0.039344	24 inch	0.013	41.40	39.00	48.00	50.60	4.60	9.60	41.80	39.49	Concrete
P-287	6-MH 79D	6-MH 79C	0.000	0.00	0.000	0.040	6.00	0.24	3.03	142.00	0.007254	12 inch	0.013	60.50	59.47	67.00	67.07	5.50	6.60	60.70	59.66	Concrete
P-288	6-MH 79C	6-MH 79B	0.000	0.00	0.000	0.150	5.78	0.87	2.89	91.00	0.006593	12 inch	0.013	59.27	58.67	67.07	68.17	6.80	8.50	59.66	59.10	Concrete
P-289	6-MH 79B	6-CB 79A	0.000	0.00	0.000	0.270	5.67	1.54	3.21	196.00	0.008112	12 inch	0.013	58.57	56.98	68.17	61.98	8.60	4.00	59.10	57.47	Concrete
P-303	6-MH 85	6-MH 88	0.000	0.00	0.000	0.510	4.66	2.40	46.51	92.00	0.007609	30 inch	0.010	33.20	32.50	41.60	41.00	5.90	6.00	33.71	33.74	PVC
P-304	I-202	I-203	0.612	0.90	0.551	0.295	4.80	1.43	5.01	29.00	0.011724	12 inch	0.010	41.25	40.91	45.25	44.91	3.00	3.00	42.14	42.12	PVC
P-307	I-203	I-204	0.860	0.90	0.774	1.325	4.79	6.40	2.86	21.00	0.003810	12 inch	0.010	40.81	40.73	44.91	44.63	3.10	2.90	42.12	41.69	PVC
P-308	I-204	To 54 inch	0.100	0.90	0.090	1.415	4.78	6.82	9.80	27.00	0.044815	12 inch	0.010	40.23	39.02	44.63	45.02	3.40	5.00	41.20	40.02	PVC
P-2	9-MH39	9-MH40	N/A	N/A	N/A	2.917	5.18	15.22	40.11	132.00	0.031439	24 inch	0.013	37.00	32.85	45.00	44.68	6.00	9.83	38.41	34.60	Concrete
P-3	9-MH38	9-MH39	N/A	N/A	N/A	2.917	5.23	15.38	21.97	106.00	0.009434	24 inch	0.013	38.00	37.00	45.00	45.00	5.00	6.00	39.41	38.48	Concrete
P-4	9-MH-34	9-MH38	N/A	N/A	N/A	2.917	5.28	15.53	17.66	82.00	0.006098	24 inch	0.013	38.50	38.00	52.98	45.00	12.48	5.00	40.04	39.79	Concrete
P-5	MH-9-32	9-MH-34	0.306	0.90	0.275	2.700	5.34	14.54	23.97	106.00	0.011226	24 inch	0.013	39.69	38.50	52.79	52.98	11.10	12.48	41.06	40.75	Concrete
P-6	9-MH31	MH-9-32	N/A	N/A	N/A	2.425	5.40	13.20	15.58	125.00	0.022000	18 inch	0.013	43.07	40.32	51.12	52.79	6.55	10.97	44.43	41.38	Concrete
P-7	9MH-30	9-MH31	N/A	N/A	N/A	2.195	5.49	12.14	4.93	127.00	0.002205	18 inch	0.013	43.35	43.07	48.35	51.12	3.50	6.55	46.43	44.73	Concrete
P-97	9-MH40	GATE 9	N/A	N/A	N/A	2.917	5.13	15.09	55.41	10.00	0.060000	24 inch	0.013	32.85	32.25	44.68	44.68	9.83	10.43	34.25	33.23	Concrete
P-9	9MH-3	BURIED MH 1	N/A	N/A	N/A	1.259	5.87	7.45	11.27	69.00	0.030435	15 inch	0.013	56.10	54.00	60.00	60.00	2.65	4.75	57.19	55.37	Concrete
P-10	9-BMH1	9MH-3	N/A	N/A	N/A	1.259	5.90	7.48	8.68	56.00	0.061607	15 inch	0.024	59.55	56.10	69.85	60.00	9.05	2.65	60.64	57.67	CMP
P-11	9-BMH-2	9-BMH1	N/A	N/A	N/A	0.520	5.95	3.12	2.86	39.00	0.006667	15 inch	0.024	59.81	59.55	70.01	69.85	8.95	9.05	61.21	60.90	CMP
P-12	9-BCB-2	9-BMH-2	0.079	0.90	0.071	0.520	5.96	3.12	15.66	16.00	0.058750	15 inch	0.013	64.75	63.81	69.55	70.01	3.55	4.95	65.46	64.24	Concrete
P-13	9-BCB-3	9-BCB-2	0.299	0.90	0.269	0.462	6.00	2.79	6.61	64.00	0.010469	15 inch	0.013	65.52	64.85	69.22	69.55	2.45	3.45	66.19	65.62	Concrete
P-14	9-BCB-1	9-BMH1	0.328	0.90	0.295	0.739	6.00	4.47	2.84	58.00	0.001379	15 inch	0.011	65.03	64.95	69.33	69.85	3.05	3.65	66.17	65.81	Vitrified Clay Pip
P-20	BURIED MH 1	BURRIED MH 2	N/A	N/A	N/A	1.259	5.85	7.42	12.38	72.00	0.013889	18 inch	0.013	54.00	53.00	60.00	55.00	4.50	0.50	55.06	54.25	Concrete
P-24	BURRIED MH 2	BURRIED MH 3	N/A	N/A	N/A	1.532	5.81	8.97	21.52	143.00	0.041958	18 inch	0.013	53.00	47.00	55.00	50.00	0.50	1.50	54.16	48.37	Concrete
P-28	BURRIED MH 3	9MH-30	N/A	N/A	N/A	1.859	5.77	10.80	23.17	75.00	0.048667	18 inch	0.013	47.00	43.35	50.00	48.35	1.50	3.50	48.26	46.71	Concrete



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Project Engineer: Mike Mastroluca
StormCAD v5.6 [05.06.014.00]

Scenario: 10 year

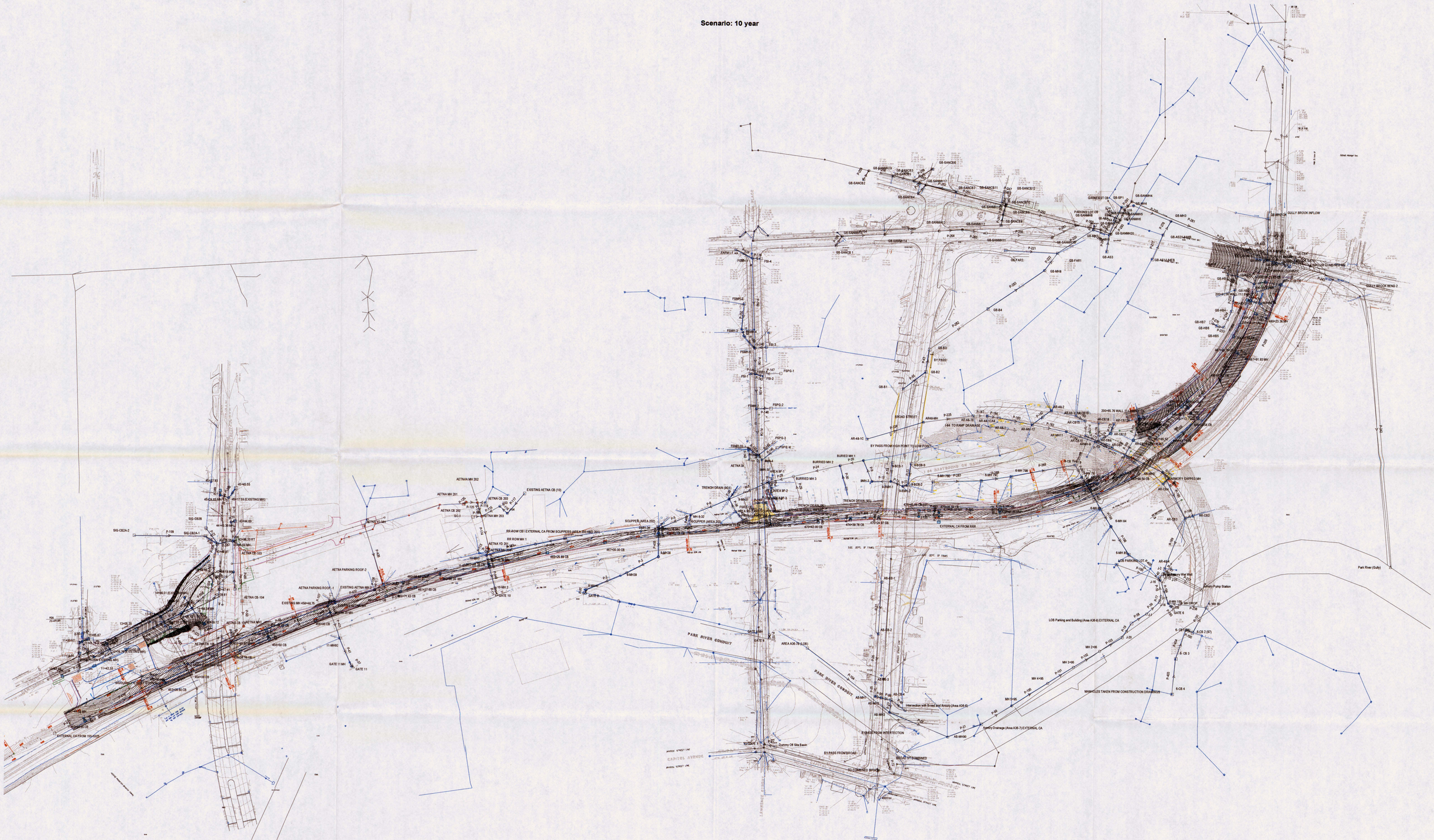
Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-29	TRENCH DRAIN (9E)	BURRIED MH 3	0.363	0.90	0.327	0.327	6.00	1.98	4.35	67.00	0.014925	12 inch	0.013	48.00	47.00	50.00	50.00	1.00	2.00	48.60	48.33	Concrete
P-30	TRENCH DRAIN (9D)	BURRIED MH 2	0.303	0.90	0.273	0.273	6.00	1.65	2.97	72.00	0.006944	12 inch	0.013	53.50	53.00	55.00	55.00	0.50	1.00	54.35	54.22	Concrete
P-32	AREA 9F-2	9MH-30	0.230	0.90	0.207	0.336	5.53	1.87	2.80	21.00	0.006190	12 inch	0.013	44.38	44.25	48.98	48.35	3.60	3.10	47.40	47.34	Concrete
P-33	AREA 9F-3	AREA 9F-2	0.110	0.90	0.099	0.099	6.00	0.60	5.04	15.00	0.020000	12 inch	0.013	44.88	44.58	48.58	48.98	2.70	3.40	47.40	47.40	Concrete
P-34	AREA 9F-1	AREA 9F-2	0.036	0.90	0.032	0.030	6.00	0.18	4.39	29.00	0.015172	12 inch	0.013	44.92	44.48	48.92	48.98	3.00	3.50	47.40	47.40	Concrete
P-35	TRENCH DRAIN (9G1)	9-MH31	0.256	0.90	0.230	0.230	6.00	1.39	4.24	48.00	0.014167	12 inch	0.013	49.00	48.32	51.00	51.12	1.00	1.80	49.50	48.71	Concrete
P-36	AREA 9G-2	9-MH31	0.000	0.00	0.000	0.000	0.00	0.00	10.93	44.00	0.028636	15 inch	0.013	46.21	44.95	49.52	51.12	2.06	4.92	46.21	45.16	Concrete
P-309	EX PARKING LOT BASIN	9-MH-34	0.241	0.90	0.217	0.217	6.00	1.31	12.20	11.00	0.117273	12 inch	0.013	46.29	45.00	53.09	52.98	5.80	6.98	46.77	45.25	Concrete
P-310	EX PARKING CB 2	AREA 9G-2	0.000	0.00	0.000	0.000	0.00	0.00	1.99	32.00	0.003125	12 inch	0.013	46.41	46.31	48.91	49.52	1.50	2.21	46.41	46.31	Concrete
P-311	EX PARKING CB 3	MH-9-32	0.000	0.00	0.000	0.000	0.00	0.00	3.40	33.00	0.009091	12 inch	0.013	48.19	47.89	51.59	52.79	2.40	3.90	48.19	47.89	Concrete

APPENDIX D-4

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

Scenario: 10 year



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Chicago
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Project Engineer: Mike Mastroluca
StormCAD v5.6 [05.06.014.00]
Page 1 of 1

10 YEAR DISCHARGE
INLET TABLE
PROPOSED CONDITIONS

Station	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudinal Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
10+41.86	Combination DG Type C (Type I) - Grt Type A - Plain	0.229	0.9	5	6.02	0.206	0	0.206	1.25	On Grade	0.01	0.02	0.14	7.04	0	0.15	0.025	11+42.33	0.181	0	0	0
11+18.60	Combination DG Type C (Type I) - Grt Type A - Plain	0.838	0.49	10	4.8	0.411	0.102	0.512	2.48	On Grade	0.01	0.02	0.18	9.1	3.49	0.54	0.112	12+04.21	0.4	0	0	0
11+33.57	Combination DG Type C (Type I) - Grt Type A - Plain	1.088	0.57	15	3.98	0.62	0	0.62	2.49	On Grade	0.03	0.02	0.15	7.41	3.49	0.41	0.102	11+18.60	0.518	0	0	0
11+42.33	Combination DG Type C (Type II) - Grt Type A - Plain	0.122	0.9	5	6.02	0.11	0.062	0.172	1.04	In Sag		0.02	0.12	5.81	2.5	0	0		0.172	0	0	0
11+65.87	Combination DG Type C (Type I) - Grt Type A - Plain	0.922	0.55	10	4.8	0.507	0	0.507	2.46	On Grade	0.02	0.02	0.16	7.96	3.49	0.46	0.094	12+04.21	0.413	0	0	0
12+04.21	Combination Type C Grate Type A - Plain Curb	0.773	0.47	10	4.8	0.363	0.239	0.602	2.92	In Sag		0.02	0.22	10.77	0	0	0		0.602	0	0	0
12+50.00	Combination DG Type C (Type I) - Grt Type B - Plain	0.086	0.9	5	6.02	0.077	0	0.077	0.47	On Grade	0.02	0.02	0.09	4.28	0	0	0.001	11+42.33	0.077	0	0	0
13+05.20	Combination Type C Grate Type A - Plain Curb	0.281	0.46	10	4.8	0.129	0	0.129	0.63	On Grade	0.01	0.02	0.11	5.43	0	0.15	0.03	12+04.21	0.099	0	0	0
13+87.94	Combination Type C Grate Type A - Plain Curb	0.02	0.9	5	6.02	0.018	0.014	0.032	0.19	On Grade	0.017	0.02	0.06	3.16	0	0.01	0.002	12+04.21	0.03	0	0.225	10
13+94.09	Combination DG Type C (Type I) - Grt Type A - Plain	0.245	0.9	5	6.02	0.221	0.052	0.273	1.66	On Grade	0.017	0.02	0.14	7.08	0	0.22	0.037	11+42.33	0.236	0	0	0
14+28.60	Combination Type C Grate Type A - Plain Curb	0.077	0.9	5	6.02	0.069	0	0.069	0.42	On Grade	0.017	0.02	0.08	4.23	2.5	0.08	0.014	13+87.94	0.055	0	0.496	5
14+37.13	Combination Type C Grate Type A - Plain Curb	0.138	0.9	5	6.02	0.124	0	0.124	0.75	On Grade	0.017	0.02	0.11	5.27	2.5	0.22	0.036	13+94.09	0.088	25	0	0
14+77.17	Grate Type C-L - Grate Type A	0.086	0.9	5	6.02	0.077	0	0.077	0.47	In Sag		0.02	0.11	5.4	0	0	0		0.077	0	0	0
15+88.99	Combination City Type C Grate Type A - Granite Curb	0.04	0.9	5	6.02	0.036	0	0.036	0.22	In Sag		0.02	0.05	2.32	0	0	0		0.036	0	0	0
41+39.12	Combination DG Type C (Type I) - Grt Type A - Plain	0.238	0.9	5	6.02	0.214	0	0.214	1.3	On Grade	0.03	0.02	0.12	5.81	0	0.1	0.016	13+94.09	0.198	0	0	0
42+39.81	Combination Type C Grate Type A - Plain Curb	0.112	0.9	5	6.02	0.101	0	0.101	0.61	On Grade	0.03	0.02	0.09	4.38	0	0.13	0.021	42+70.16	0.08	0	0	0
42+47.41	Combination DG Type C (Type II) - Grt Type A - Plain	0.46	0.9	5	6.02	0.414	0	0.414	2.51	On Grade	0.03	0.02	0.15	7.44	2.5	1.12	0.185	43+96.70 RT	0.229	0	0	0
42+70.16	Combination City Type C Grate Type A - Granite Curb	0.048	0.9	5	6.02	0.043	0.021	0.064	0.39	In Sag		0.02	0.07	3.5	0	0	0		0.064	0	0	0
43+42.81	Combination City Type C Grate Type A - Granite Curb	0.06	0.9	5	6.02	0.054	0	0.054	0.33	In Sag		0.02	0.06	3.15	0	0	0		0.054	0	0	0
43+76.56	mbination City Type C DG - Type II - Grate Type A - Granite Cu	0.176	0.9	5	6.02	0.158	0.146	0.304	1.85	In Sag		0.02	0.16	8.03	0	0	0		0.304	0	0	0
43+84.89	mbination City Type C DG - Type II - Grate Type A - Granite Cu	0.052	0.9	5	6.02	0.047	0.33	0.376	2.29	On Grade	0.0134	0.02	0.17	8.35	2.5	1.05	0.173	43+96.70 RT	0.204	0	0	0
43+96.70 RT	Combination DG Type C (Type II) - Grt Type A - Plain	0.174	0.9	5	6.02	0.157	0.358	0.514	3.12	In Sag		0.02	0.22	11.25	2.5	0	0		0.514	0	0	0
45+37.93	Combination Type C Grate Type A - Plain Curb	0.62	0.58	10	4.8	0.36	0	0.36	1.74	On Grade	0.014	0.02	0.15	7.48	2.5	0.71	0.146	43+76.56	0.214	0	0	0
45+45.55	Combination Type C Grate Type A - Plain Curb	1.281	0.52	10	4.8	0.666	0	0.666	3.23	On Grade	0.014	0.02	0.19	9.43	2.5	1.6	0.33	43+84.89	0.336	0	0	0
200+65.76 WALL 111 SWALE CB	Ditch Type C-L Single Grate B	0.387	0.23	30	2.8	0.089	0	0.089	0.25	In Sag			0.04	2.17		0	0		0.089	0	0	0
204+61.66 CB	Grate Type RPW w/o Throat	0.112	0.9	5	6.02	0.101	0.007	0.108	0.66	In Sag		0.046	0.19	4.12	8	0	0		0.108	50	0	0
205+03.21 CB	Grate Type RPW w/o Throat	0.051	0.9	5	6.02	0.046	0	0.046	0.28	On Grade	0.005	0.03	0.11	3.52	8	0.04	0.007	204+61.66 CB	0.039	25	0	0
205+81.06 WALL 111 SWALE CB	Ditch Type C-L Single Grate B	0.269	0.23	133.05	1.13	0.062	0	0.062	0.07	In Sag			0.02	2.07		0	0		0.062	0	0	0
205+83.27 CB	Grate Type CM w/o Throat	0.07	0.9	5	6.02	0.063	0	0.063	0.38	In Sag		0.02	0.1	4.86	8	0	0		0.063	0	0	0
206+51.63 CB	Combination Type C Grate Type A - Plain Curb	0.018	0.9	5	6.02	0.016	0.187	0.204	1.24	On Grade	0.005	0.044	0.21	4.87	0	0.2	0.033	GB-CB4	0.171	0	0	0
450+44.65 CB	Grate Type RPW w/o Throat	0.103	0.9	5	6.02	0.093	0	0.093	0.56	On Grade	0.019	0.04	0.12	3.01	4	0.09	0.015	EXTERNAL CA FROM 155-H025	0.078	25	0	0
453+09.60 CB	Grate Type RPW w/o Throat	0.168	0.9	5	6.02	0.151	0	0.151	0.92	On Grade	0.009	0.04	0.17	4.31	4	0.28	0.046	454+00 CB	0.106	25	0	0
454+00 CB	Grate Type RPW w/o Throat	0.071	0.9	5	6.02	0.064	0.046	0.109	0.66	On Grade	0.009	0.04	0.15	3.68	4	0.16	0.027	455+56.08 CB	0.083	25	0	0
455+56.08 CB	Grate Type RPW w/o Throat	0.097	0.9	5	6.02	0.087	0.027	0.114	0.69	On Grade	0.009	0.04	0.15	3.74	4	0.17	0.028	456+50 CB	0.087	25	0	0
456+50 CB	Grate Type RPW w/o Throat	0.058	0.9	5	6.02	0.052	0.028	0.08	0.48	On Grade	0.009	0.04	0.13	3.27	4	0.09	0.014	458+00 CB	0.066	25	0	0
456+51.83 CB	Grate Type CM w/o Throat	0.105	0.9	5	6.02	0.095	0	0.095	0.57	On Grade	0.009	0.028	0.12	4.34	3.25	0.14	0.024	458+00 CB	0.071	25	0	0
458+00 CB	Grate Type RPW w/o Throat	0.123	0.9	5	6.02	0.111	0.038	0.149	0.9	On Grade	0.009	0.04	0.17	4.25	4	0.27	0.044	460+25.17 CB	0.104	25	0	0
460+25 RT	Grate Type C-L - Grate Type A	0.288	0.23	10	4.8	0.066	0	0.066	0.32	In Sag		0.02	0.09	4.46	0	0	0		0.066	0	0	0
460+25.17 CB	Grate Type CM w/o Throat	0.163	0.9	5	6.02	0.147	0.044	0.191	1.16	On Grade	0.0055	0.04	0.2	5.9	4	0.39	0.065	460+71.43 CB	0.126	25	0	0
460+71.43 CB	Grate Type CM w/o Throat	0.062	0.9	5	6.02	0.056	0.093	0.149	0.9	In Sag		0.04	0.21	6.63	4	0	0		0.149	50	0	0
460+86.88 CB	Grate Type CM w/o Throat	0.031	0.9	5	6.02	0.028	0	0.028	0.17	In Sag		0.04	0.11	2.67	4	0	0		0.028	50	0	0
461+17.69 CB	Grate Type CM w/o Throat	0.114	0.9	5	6.02	0.103	0.006	0.109	0.66	On Grade	0.005	0.04	0.16	4.19	4	0.17	0.028	460+71.43 CB	0.081	25	0	0
463+46.39 CB	Grate Type RPW w/o Throat	0.051	0.9	5	6.02	0.046	0	0.046	0.28	On Grade	0.005	0.04	0.12	2.97	4	0.04	0.006	461+17.69 CB	0.04	25	0	0
465+25.89 CB	Grate Type CM w/o Throat	0.041	0.9	5	6.02	0.037	0	0.037	0.22	On Grade	0.005	0.04	0.11	2.73	4	0.02	0.003	467+00.00 CB	0.034	25	0	0
467+00.00 CB	Grate RPW WITH OUT THROAT	0.096	0.9	5	6.02	0.086	0.003	0.09	0.54	On Grade	0.005	0.04	0.15	3.81	4	0.13	0.021	468+62.18 CB	0.069	25	0	0
468+62.18 CB	Grate RPW WITH OUT THROAT	0.083	0.9	5	6.02	0.075	0.021	0.096	0.58	On Grade	0.005	0.04	0.16	3.91	4	0.14	0.024	470+39.73 CB	0.072	25	0	0
470+39.73 CB	Grate RPW WITH OUT THROAT	0.087	0.9	5	6.02	0.078	0.024	0.102	0.62	On Grade	0.005	0.04	0.16	4.01	4	0.16	0.026	472+00.00 CB	0.076	25	0	0
471+91.74	Grate Type CM Single Barrier	0	0	0	0	0	0	0	0	In Sag		0.02	0	0	0	0	0		0	0	0	0
472+00.00 CB	Grate RPW WITH OUT THROAT	0.075	0.9	5	6.02	0.068	0.026	0.094	0.57	On Grade	0.005	0.04	0.15	5.42	2	0.13	0.021	473+42.00 CB	0.073	25	0	0
472+50.33 (WALL 104-8A)	Grate Type C-L - Grate Type A	0.132	0.13	17	3.82	0.017	0	0.017	0.07	In Sag		0.02	0.05	2.74	0	0	0		0.017	50	0	0
473+42.00 CB	Grate RPW WITH OUT THROAT	0.105	0.9	5	6.02	0.095	0.021	0.116	0.7	On Grade	0.005	0.04	0.16	5.95	2	0.18	0.03	474+39.78 CB	0.085	25	0	0
474+39.78 CB	Grate Type CM w/o Throat	0.073	0.9	5	6.02	0.066	0.03	0.096	0.58	On Grade	0.005	0.04	0.15	4.61	2	0.1	0.017	475+24.97 CB	0.079	25	0	0
475+24.97 CB	Grate Type CM w/o Throat	0.068	0.9	5	6.02	0.061	0.017	0.078	0.48	On Grade	0.005	0.028	0.13	4.52	0	0.08	0.014	476+45.00 CB	0.064	25	0	0
476+45.00 CB	Grate Type CM w/o Throat	0.094	0.9	5	6.02	0.085	0.014	0.098	0.6	On Grade	0.02	0.04	0.12	4.07	2	0.1	0.016	476+75.00 CB	0.083	50	0	0
476+75.00 CB	Grate Type CM w/o Throat	0.057	0.9	5	6.02	0.051	0.045	0.096	0.59	In Sag		0.04	0.16	5.89	2	0	0		0.096	25	0	0
477+05.00 CB	Grate Type CM w/o Throat	0.13	0.9	5	6.02	0.117	0.03	0.147	0.89	On Grade	0.02	0.04	0.14	4.84	2	0.18	0.029	476+75.00 CB	0.117	0	0	0
478+87.00 CB	Grate Type CM w/o Throat	0.163	0.9	5	6.02	0.147	0.001	0.148	0.9	On Grade	0.02	0.04	0.14	4.85	2	0.18	0.03	477+05.00 CB	0.118	0	0	0
480+98.51 CB	Grate Type CM w/o Throat	0.04	0.9	5	6.02	0.036	0	0.036	0.22	On Grade	0.005	0.048	0.12	2.42	2	0.01	0.001	478+87.00 CB	0.035	25	0	0
481+94.76 CB	Grate Type CM w/o Throat	0.09	0.9	5	6.02	0.081	0.003	0.084	0.51	On Grade	0.005	0.048	0.16	3.31	2	0.05	0.008	I-261	0.076	25	0	0
481+13.11 CB	Grate Type RPW w/o Throat	0.375	0.9	5	6.02	0.338	0	0.338	2.05	On Grade	0.0496	0.02	0.13	6.27	8	1.05	0.173	486+95.62 CB	0.164	25	0	0
481+50.00 CB	Grate Type CM w/o Throat	0.03	0.9	5	6.02	0.027	0	0.027	0.17	On Grade	0.005	0.048	0.1	2.17	0	0	0	480+98.51 CB	0.027	50	0.121	28.4
481+64.79 CB	Ditch Type C-L Single Grate B	1.34	0.13	102.58	1.38	0.174	0	0.174	0.24	In Sag			0.05	2.19		0	0		0.174	50	0	0
482+98.54 CB	Grate Type CM w/o Throat	0.07	0.9	5	6.02	0.063	0	0.063	0.38	On Grade	0.0165	0.048	0.11	2.38	2	0.02	0.003	481+ 94.76 CB	0.06	25	0	0
484+42.75 CB	Grate Type CM w/o Throat	0.044	0.9	5	6.02	0.04	0	0.04	0.24	On Grade	0.0228	0.048	0.09	1.88	0	0	0	482+98.54 CB	0.04	25	0	0
485+63.54 CB	Grate Type RPW w/o Throat	0.011	0.9	5	6.02	0.01	0	0.01	0.06	On Grade	0.0051	0.043	0.07	1.59	0	0	0	486+95.62 CB	0.01	25	0	0
486+95.62 CB	Grate Type RPW DG Type I w/o Throat	0.095	0.9	5	6.02	0.086	0.173	0.259	1.57	On Grade	0.02	0.043	0.18	4.17	0	0.01	0.002	487+93.79 CB	0.256	0	0	0
487+93.79 CB	Grate Type RPW w/o Throat	0.119	0.9	5	6.02	0.107	0.002	0.109	0.66	On Grade	0.054	0.043	0.11	2.51	4	0.06	0.01	489+23.80	0.099	25	0	0
489+23.80	Grate Type RPW w/o Throat	0.125	0.9	5	6.02	0.113	0.01	0.123	0.75	On Grade	0.043	0.02	0.09	4.41	0	0.19	0.031	489+58.08	0.092	25	0	0
489+58.08	Grate Type RPW w/o Throat	0	0	0	0	0	0.031	0.031	0.19	On Grade	0.0377	0.021	0.06	2.62	0	0.01	0.002	490+33.68 CB	0.029	25	0	0
490+33.68 CB	Grate Type CM w/o Throat	0.174	0.9	5	6.02	0.157	0.002	0.158	0.96	On Grade	0.0093	0.05	0.18	3.64	0	0.13	0.021	ASYLUM COMBINED MH	0.138	25	0	0
902+85.52	Grate Type CM w/o Throat	0.05	0.9	5	6.02	0.045	0	0.045	0.27	On Grade	0.06	0.02	0.06	2.84	0	0.02	0.003	903+54.91	0.042	25	0	0
903+54.91	Grate Type RPW w/o Throat	0.02	0.9	5	6.02	0.018	0.003	0.021	0.13	On Grade	0.06	0.02	0.04	2.15	0	0	0	904+15.54	0.021	25	0	0
904+15.54	Grate Type RPW w/o Throat	0.02	0.9	5	6.02	0.018	0	0.018	0.11	On Grade	0.0081	0.02	0.06	2.95	0	0.01	0.001	904+27.54	0.017	25	0	0
904+27.45	Grate Type CM w/o Throat	0.01	0.9	5	6.02	0.009	0	0.009	0.05	In Sag		0.02	0.05	2.59	0	0	0		0.009	50	0	0

10 YEAR DISCHARGE
INLET TABLE
PROPOSED CONDITIONS

Station	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudinal Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
904+27.54	Grate Type RPW w/o Throat	0.01	0.9	5	6.02	0.009	0.009	0.018	0.11	In Sag		0.02	0.07	3.29	0	0	0		0.018	50	0	0
904+39.54	Grate Type RPW w/o Throat	0.05	0.9	5	6.02	0.045	0	0.045	0.27	On Grade	0.0081	0.02	0.08	4.14	0	0.05	0.008	904+27.54	0.037	25	0	0
AB-CB-1	Combination Type C Grate Type A - Park Curb	0.242	0.9	5	6.02	0.218	0	0.218	1.32	On Grade	0.0677	0.02	0.1	5.02	0	0.38	0.062	AB-CB-2	0.155	0	0.92	10
AB-CB-2	Grate Type C-L - Grate Type A	0.177	0.9	5	6.02	0.159	0.062	0.222	1.35	On Grade	0.0377	0.02	0.11	5.64	0	0.45	0.075	AB-CB-3	0.147	0	0.54	10
AB-CB-3	Combination Type C Grate Type A - Park Curb	0.14	0.9	5	6.02	0.126	0.075	0.201	1.22	On Grade	0.0377	0.02	0.11	5.43	0	0.37	0.061	Dummy Off Site Basin	0.139	0	0	0
AB-CB-4	Combination Type C Grate Type B - Park Curb	0.493	0.9	5	6.02	0.444	0	0.444	2.69	On Grade	0.04	0.02	0.14	7.24	0	1.16	0.191	BROAD ST COMBINED	0.252	0	0	0
AR-CB-17 (200+66.99)	Grate Type RPW w/o Throat	0.213	0.9	5	6.02	0.192	0	0.192	1.16	On Grade	0.015	0.055	0.19	3.37	10	0.2	0.032	AR-CB13A	0.159	0	0	0
AR-CB14 (200+35.62)	Grate Type C-L DG - Type I - Grate Type A	0.86	0.3	50	2.13	0.258	0	0.258	0.55	On Grade	0.02	0.02	0.09	4.55	0	0.01	0.005	AR-CB13	0.253	0	0	0

Scenario: 10 year

System Data (Busway)

Label	Inlet	Inlet Location	Bypass Target	Area (acres)	Composite Rational C	Time of Concentration (min)	System CA (acres)	System Flow Time (min)	External CA (acres)	External Time of Concentration (min)
Dummy Off Site Basin	Combination Type C Grate Type A - Park Curb	In Sag		0.372	0.90	0.00	0.396	0.00	0.000	0.00
BROAD ST COMBINED	Combination Type C Grate Type A - Plain Curb	In Sag		0.000	0.00	0.00	0.191	0.00	0.000	0.00
AR-CB7	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB8	0.100	0.26	10.00	0.030	10.00	0.000	0.00
AR-48-4	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	5.644	164.05	0.000	0.00
AREA A36-7B (LOB)	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.200	10.00	0.200	10.00
LOB Parking and Buliding (Area A36-8) EX	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	12.303	16.87	5.570	10.00
AB-CB-4	Combination Type C Grate Type B - Park Curb	On Grade	BROAD ST COMBINED	0.493	0.90	5.00	2.273	10.69	0.000	0.00
Armory Drainage (Area A36-7) EXTERNA	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	6.733	15.40	4.260	10.00
Intersection with Broad and Armory (Area	Combination Type C Grate Type A - Park Curb	In Sag		0.132	0.90	5.00	0.119	5.00	0.000	0.00
AB-CB-1	Combination Type C Grate Type A - Park Curb	On Grade	AB-CB-2	0.242	0.90	5.00	1.075	10.00	0.920	10.00
AB-CB-2	Grate Type C-L - Grate Type A	On Grade	AB-CB-3	0.177	0.90	5.00	1.762	10.27	0.540	10.00
AB-CB-3	Combination Type C Grate Type A - Park Curb	On Grade	Dummy Off Site Basin	0.140	0.90	5.00	1.902	10.50	0.000	0.00
AR-48-1B	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	2.415	156.20	2.010	156.20
AR-48-1CA4	Generic Manhole w/ External Flow	On Grade	AR-48-1	0.000	0.00	0.00	2.575	156.32	0.160	5.00
AR-48-1	Grate Type C-L - Grate Type A	On Grade	AR-CB10	1.560	0.42	60.00	3.251	156.39	0.000	0.00
AR-48-3/ AR-CB16	Grate Type C-L - Grate Type A	On Grade	AR-CB15	0.910	0.23	18.63	0.205	18.63	0.000	0.00
AR-CB15	Grate Type C-L - Grate Type A	On Grade	AR-CB18	0.000	0.00	0.00	0.209	18.73	0.000	0.00
AR-CB10	Grate Type C-L - Grate Type A	On Grade	AR-CB8	1.300	0.30	36.00	0.607	36.00	0.000	0.00
AR-CB18	Grate Type C-L - Grate Type A	In Sag		0.060	0.90	5.00	0.066	5.00	0.000	0.00
AR-CB13A	Grate Type C-L - Grate Type A	On Grade	AR-CB18	0.060	0.90	5.00	0.075	5.00	0.000	0.00
AR-CB13	Grate Type C-L - Grate Type A	In Sag		0.060	0.40	5.00	0.104	5.13	0.000	0.00
AR-CB8	Grate Type C-L - Grate Type A	In Sag		0.170	0.38	10.00	0.914	36.15	0.000	0.00
AR-CB-17 (200+66.99)	Grate Type RPW w/o Throat	On Grade	AR-CB13A	0.213	0.90	5.00	0.248	30.01	0.000	0.00
AR-CB14 (200+35.62)	Grate Type C-L DG - Type I - Grate Type A	On Grade	AR-CB13	0.860	0.30	50.00	0.646	50.00	0.000	0.00
AR-CB6	Grate Type C-L - Grate Type A	On Grade	AR-CB7	0.110	0.42	10.00	5.103	157.45	0.000	0.00
AR-CB2	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB14 (200+35.62)	0.520	0.34	22.00	0.184	22.00	0.000	0.00
AR-CB3	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB4	0.220	0.62	5.00	5.644	163.43	0.160	5.00
AR-CB4	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB6	0.140	0.43	10.00	0.061	10.00	0.000	0.00
AR-MH-12	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	3.502	156.61	0.080	5.00
AR-48-2	Grate Type C-L - Grate Type A	On Grade	AR-48-3/ AR-CB16	0.180	0.23	19.00	0.171	19.00	0.130	5.00
AR-48-1C	Combination Type C Grate Type A - Plain Curb	On Grade	AR-48-1	0.370	0.61	10.00	0.405	10.00	0.250	10.00
200+65.76 WALL 111 SWALE CB	Ditch Type C-L Single Grate B	In Sag		0.387	0.23	30.00	0.089	30.00	0.000	0.00
902+85.52	Grate Type CM w/o Throat	On Grade	903+54.91	0.050	0.90	5.00	0.144	5.99	0.000	0.00
903+54.91	Grate Type RPW w/o Throat	On Grade	904+15.54	0.020	0.90	5.00	0.102	5.58	0.000	0.00
904+15.54	Grate Type RPW w/o Throat	On Grade	904+27.54	0.020	0.90	5.00	0.081	5.21	0.000	0.00
904+27.54	Grate Type RPW w/o Throat	In Sag		0.010	0.90	5.00	0.064	5.12	0.000	0.00
904+39.54	Grate Type RPW w/o Throat	On Grade	904+27.54	0.050	0.90	5.00	0.037	5.00	0.000	0.00
904+27.45	Grate Type CM w/o Throat	In Sag		0.010	0.90	5.00	0.009	5.00	0.000	0.00
GB-CB4	Combination Type C Grate Type A - Plain Curb	In Sag		0.559	0.90	10.00	1.036	10.00	0.000	0.00
GB-AS5	Combination Type C Grate Type A - Plain Curb	On Grade	GB-CB4	0.000	0.00	0.00	0.400	0.00	0.000	0.00
GARNER ST CB	Generic Manhole w/ External Flow	On Grade	PARKING LOT CB	0.000	0.00	0.00	0.000	0.00	0.000	0.00
PARKING LOT CB	Generic Manhole w/ External Flow	On Grade	GB-AS2/I-84WB	0.000	0.00	0.00	0.000	0.00	0.000	0.00
GB-SANCB10	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS4	1.088	0.90	5.00	0.837	5.00	0.000	0.00
GB-SANCB7	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB10	0.614	0.90	5.00	0.536	5.00	0.000	0.00
GB-SANCB11	Grate Type C-L - Grate Type A	On Grade	GB-SANCB10	0.890	0.90	5.00	0.702	5.03	0.000	0.00
GB-SANCB12	Grate Type C-L - Grate Type A	On Grade	GB-SANCB10	0.830	0.90	5.00	0.342	5.00	0.000	0.00
GB-SANCB9	Combination Type C Grate Type B - Park Curb	On Grade	GB-AS4	0.167	0.90	5.00	0.294	5.06	0.000	0.00
GB-SANCB8	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS3	0.344	0.90	5.00	0.186	5.00	0.000	0.00
GB-SANCB 1	Combination Type C Grate Type A - Plain Curb	On Grade	FSI-4	0.160	0.71	5.00	0.087	5.00	0.000	0.00
GB-SANCB6	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB5	1.244	0.90	5.00	0.465	5.00	0.000	0.00
GB-SANCB5	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB7	0.461	0.90	5.00	1.405	5.68	0.000	0.00
GB-SANCB4	Combination Type C Grate Type A - Plain Curb	On Grade	GB-B1	0.125	0.90	5.00	0.115	5.00	0.000	0.00
GB-SANCB2	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB4	0.186	0.90	5.00	0.117	5.00	0.000	0.00

Scenario: 10 year

System Data (Busway)

Label	Inlet	Inlet Location	Bypass Target	Area (acres)	Composite Rational C	Time of Concentration (min)	System CA (acres)	System Flow Time (min)	External CA (acres)	External Time of Concentration (min)
GB-SANCB3	Combination Type C Grate Type A - Plain Curb	On Grade	GB-SANCB5	0.640	0.90	5.00	0.409	5.56	0.000	0.00
GULLY BROOK INFLOW	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.000	0.00	0.000	0.00
GB-HB7	Combination Type C Grate Type A - Plain Curb	In Sag		1.412	0.90	10.00	1.271	10.00	0.000	0.00
GB-MH2 CA	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.920	10.00	0.920	10.00
GB-HB2	Combination Type C Grate Type A - Plain Curb	In Sag		0.074	0.90	5.00	1.961	10.38	0.000	0.00
GB-SP1	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	7.862	12.50	5.990	10.00
205+83.27 CB	Grate Type CM w/o Throat	In Sag		0.070	0.90	5.00	0.301	133.11	0.000	0.00
GB-HB1	Combination Type C Grate Type A - Plain Curb	In Sag		0.190	0.90	5.00	0.404	5.14	0.000	0.00
GB-AS6	Combination Type C Grate Type A - Plain Curb	On Grade	206+51.63 CB	0.227	0.90	5.00	0.233	5.00	0.000	0.00
GB-HB3	Grate Type RPW w/o Throat	On Grade	GB-HB2	0.036	0.90	5.00	1.485	10.31	0.000	0.00
GB-HB4	Combination Type C Grate Type A - Plain Curb	On Grade	GB-HB3	0.019	0.90	5.00	1.447	10.19	0.000	0.00
GB-HB5	Combination Type C Grate Type A - Plain Curb	On Grade	GB-HB4	0.189	0.90	5.00	1.389	10.09	0.000	0.00
GB-HB6	Combination Type C Grate Type A - Plain Curb	On Grade	GB-HB2	0.000	0.00	0.00	1.271	10.04	0.000	0.00
GB-AS2/I-84WB	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS5	0.339	0.90	10.00	3.267	10.00	1.600	5.00
GB-AS1/I-84EB	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS6	0.140	0.90	5.00	1.052	5.00	0.800	5.00
GB-AS3	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS1/I-84EB	0.603	0.90	5.00	0.324	5.00	0.000	0.00
GB-FAR2	Grate Type C-L - Grate Type A	On Grade	GB-FAR1	0.150	0.23	10.00	0.032	10.00	0.000	0.00
GB-FAR1	Grate Type C-L - Grate Type A	In Sag		0.847	0.23	10.00	0.888	11.87	0.000	0.00
GB-AS4	Combination Type C Grate Type A - Plain Curb	On Grade	GB-AS2/I-84WB	0.000	0.00	0.00	0.660	0.00	0.000	0.00
GB-B4	Grate Type C-L - Grate Type A	On Grade	GB-FAR1	0.252	0.23	10.00	0.652	10.62	0.000	0.00
GB-B3	Generic Manhole w/ External Flow	On Grade	GB-B2	0.561	0.58	10.00	0.601	10.00	0.000	0.00
GB-B1	Combination Type C Grate Type A - Park Curb	On Grade	9-BCB-1	0.851	0.90	5.00	0.373	5.00	0.000	0.00
GB-B2	Combination Type C Grate Type A - Park Curb	On Grade	9-BCB-3	0.092	0.90	5.00	0.601	5.45	0.000	0.00
205+03.21 CB	Grate Type RPW w/o Throat	On Grade	204+61.66 CB	0.051	0.90	5.00	0.147	5.23	0.000	0.00
204+61.66 CB	Grate Type RPW w/o Throat	In Sag		0.112	0.90	5.00	0.108	5.00	0.000	0.00
206+51.63 CB	Combination Type C Grate Type A - Plain Curb	On Grade	GB-CB4	0.018	0.90	5.00	0.969	7.45	0.000	0.00
490+33.68 CB	Grate Type CM w/o Throat	On Grade	ASYLUM COMBINED MH	0.174	0.90	5.00	0.799	7.31	0.000	0.00
205+81.06 WALL 111 SWALE CB	Ditch Type C-L Single Grate B	In Sag		0.269	0.23	133.05	0.062	133.05	0.000	0.00
489+23.80	Grate Type RPW w/o Throat	On Grade	489+58.08	0.125	0.90	5.00	0.092	5.00	0.000	0.00
487+93.79 CB	Grate Type RPW w/o Throat	On Grade	489+23.80	0.119	0.90	5.00	0.569	6.58	0.000	0.00
481+13.11 CB	Grate Type RPW w/o Throat	On Grade	486+95.62 CB	0.375	0.90	5.00	0.214	6.04	0.000	0.00
485+63.54 CB	Grate Type RPW w/o Throat	On Grade	486+95.62 CB	0.011	0.90	5.00	0.049	5.93	0.000	0.00
484+42.75 CB	Grate Type CM w/o Throat	On Grade	482+98.54 CB	0.044	0.90	5.00	0.040	5.00	0.000	0.00
486+95.62 CB	Grate Type RPW DG Type I w/o Throat	On Grade	487+93.79 CB	0.095	0.90	5.00	0.470	6.39	0.000	0.00
489+58.08	Grate Type RPW w/o Throat	On Grade	490+33.68 CB	0.000	0.00	0.00	0.029	0.00	0.000	0.00
465+25.89 CB	Grate Type CM w/o Throat	On Grade	467+00.00 CB	0.041	0.90	5.00	0.034	5.00	0.000	0.00
10-MH 2	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	3.031	28.23	0.990	5.00
GC-1	Grate Type C-L - Grate Type A	In Sag		0.319	0.90	10.00	0.287	10.00	0.000	0.00
AETNA YD 201	Grate Type C-L - Grate Type B	In Sag		0.137	0.23	10.00	0.032	10.00	0.000	0.00
AETNA CB 202	Combination Type C Grate Type A - Plain Curb	On Grade	AETNA CB 203	0.050	0.90	5.00	0.310	10.00	0.270	10.00
RR-ROW CB1 EXTERNAL CA FROM SC	Grate Type C-L - Grate Type B	In Sag		1.679	0.23	27.00	0.393	27.00	0.000	0.00
AETNA CB 203	Grate Type C-L - Grate Type A	In Sag		0.550	0.90	5.00	0.562	5.00	0.000	0.00
EXISTING AETNA CB (10)	Generic Manhole w/ External Flow	On Grade	AETNA CB 203	0.069	0.90	5.00	0.000	5.00	0.000	0.00
463+46.39 CB	Grate Type RPW w/o Throat	On Grade	461+17.69 CB	0.051	0.90	5.00	0.040	5.00	0.000	0.00
461+17.69 CB	Grate Type CM w/o Throat	On Grade	460+71.43 CB	0.114	0.90	5.00	0.383	5.37	0.000	0.00
460+71.43 CB	Grate Type CM w/o Throat	In Sag		0.062	0.90	5.00	0.303	5.20	0.000	0.00
460+25.17 CB	Grate Type CM w/o Throat	On Grade	460+71.43 CB	0.163	0.90	5.00	0.126	5.00	0.000	0.00
460+86.88 CB	Grate Type CM w/o Throat	In Sag		0.031	0.90	5.00	0.028	5.00	0.000	0.00
41+39.12	Combination DG Type C (Type I) - Grt Type A - Plain	On Grade	13+94.09	0.238	0.90	5.00	0.198	5.00	0.000	0.00
12+04.21	Combination Type C Grate Type A - Plain Curb	In Sag		0.773	0.47	10.00	0.602	10.00	0.000	0.00
13+87.94	Combination Type C Grate Type A - Plain Curb	On Grade	12+04.21	0.020	0.90	5.00	0.905	10.47	0.225	10.00
14+37.13	Combination Type C Grate Type A - Plain Curb	On Grade	13+94.09	0.138	0.90	5.00	3.545	11.45	0.000	0.00
13+05.20	Combination Type C Grate Type A - Plain Curb	On Grade	12+04.21	0.281	0.46	10.00	0.099	10.00	0.000	0.00

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Scenario: 10 year

System Data (Busway)

Label	Inlet	Inlet Location	Bypass Target	Area (acres)	Composite Rational C	Time of Concentration (min)	System CA (acres)	System Flow Time (min)	External CA (acres)	External Time of Concentration (min)
14+28.60	Combination Type C Grate Type A - Plain Curb	On Grade	13+87.94	0.077	0.90	5.00	0.552	5.00	0.496	5.00
11+33.57	Combination DG Type C (Type I) - Grt Type A - Plain	On Grade	11+18.60	1.088	0.57	15.00	0.918	15.00	0.000	0.00
11+65.87	Combination DG Type C (Type I) - Grt Type A - Plain	On Grade	12+04.21	0.922	0.55	10.00	0.413	10.00	0.000	0.00
11+18.60	Combination DG Type C (Type I) - Grt Type A - Plain	On Grade	12+04.21	0.838	0.49	10.00	0.400	10.00	0.000	0.00
454+00 CB	Grate Type RPW w/o Throat	On Grade	455+56.08 CB	0.071	0.90	5.00	0.083	5.00	0.000	0.00
453+09.60 CB	Grate Type RPW w/o Throat	On Grade	454+00 CB	0.168	0.90	5.00	0.188	5.57	0.000	0.00
GATE 11 MH	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	15.689	24.45	0.928	5.00
11-MH92	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	14.761	24.33	0.286	5.00
EXTERNAL CA FROM 155-H025	Generic Manhole w/ External Flow	In Sag		0.000	0.00	21.90	3.355	21.90	3.340	21.90
456+51.83 CB	Grate Type CM w/o Throat	On Grade	458+00 CB	0.105	0.90	5.00	0.071	5.00	0.000	0.00
456+50 CB	Grate Type RPW w/o Throat	On Grade	458+00 CB	0.058	0.90	5.00	0.152	5.59	0.000	0.00
455+56.08 CB	Grate Type RPW w/o Throat	On Grade	456+50 CB	0.097	0.90	5.00	0.087	5.00	0.000	0.00
AETNA PARKING ROOF -1	Generic Manhole w/ External Flow	In Sag		0.880	0.90	10.00	0.792	10.00	0.000	0.00
AETNA CB-103	Grate Type C-L - Grate Type A	On Grade	AETNA CB-104	0.158	0.49	5.00	0.646	10.00	0.583	10.00
AETNA CB-104	Grate Type C-L - Grate Type A	In Sag		0.083	0.23	5.00	0.680	10.58	0.000	0.00
450+44.65 CB	Grate Type RPW w/o Throat	On Grade	EXTERNAL CA FROM 155	0.103	0.90	5.00	0.078	5.00	0.000	0.00
AETNA PARKING ROOF-2	Generic Manhole w/ External Flow	In Sag		1.054	0.90	10.00	0.949	10.00	0.000	0.00
460+25 RT	Grate Type C-L - Grate Type A	In Sag		0.288	0.23	10.00	0.430	10.47	0.000	0.00
AETNA YD MH	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.364	10.00	0.364	10.00
AETNA CB 105	Combination Type C Grate Type A - Plain Curb	In Sag		0.138	0.90	5.00	0.177	5.75	0.000	0.00
AETNA CB 106	Grate Type C-L - Grate Type A	On Grade	AETNA CB 105	0.054	0.90	5.00	0.046	5.16	0.000	0.00
AETNA YD 105	Grate Type C-L - Grate Type A	In Sag		0.015	0.23	5.00	0.004	5.00	0.000	0.00
SIGOURNEY STREET STATION	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.450	5.00	0.450	5.00
458+00 CB	Grate Type RPW w/o Throat	On Grade	460+25.17 CB	0.123	0.90	5.00	0.104	5.00	0.000	0.00
13+94.09	Combination DG Type C (Type I) - Grt Type A - Plain	On Grade	11+42.33	0.245	0.90	5.00	0.666	6.61	0.000	0.00
12+50.00	Combination DG Type C (Type I) - Grt Type B - Plain	On Grade	11+42.33	0.086	0.90	5.00	0.430	5.98	0.000	0.00
11+42.33	Combination DG Type C (Type II) - Grt Type A - Plain	In Sag		0.122	0.90	5.00	0.353	5.48	0.000	0.00
10+41.86	Combination DG Type C (Type I) - Grt Type A - Plain	On Grade	11+42.33	0.229	0.90	5.00	0.181	5.00	0.000	0.00
14+77.17	Grate Type C-L - Grate Type A	In Sag		0.086	0.90	5.00	3.259	11.32	0.000	0.00
42+39.81	Combination Type C Grate Type A - Plain Curb	On Grade	42+70.16	0.112	0.90	5.00	3.181	11.21	0.000	0.00
42+47.41	Combination DG Type C (Type II) - Grt Type A - Plain	On Grade	43+96.70 RT	0.460	0.90	5.00	0.229	5.00	0.000	0.00
42+70.16	Combination City Type C Grate Type A - Granite Curb	In Sag		0.048	0.90	5.00	2.872	11.15	0.000	0.00
15+88.99	Combination City Type C Grate Type A - Granite Curb	In Sag		0.040	0.90	5.00	0.036	5.00	0.000	0.00
43+42.81	Combination City Type C Grate Type A - Granite Curb	In Sag		0.060	0.90	5.00	2.772	11.01	0.000	0.00
SIG-CB2A-2	Grate Type C-L - Grate Type A	In Sag		1.090	0.61	10.00	0.665	10.00	0.000	0.00
SIG-CB2A-1	Grate Type C-L - Grate Type A	In Sag		0.000	0.00	0.00	0.665	10.87	0.000	0.00
SIG-CB2B	Grate Type C-L - Grate Type A	In Sag		0.697	0.69	10.00	0.481	10.00	0.000	0.00
43+84.89	Combination City Type C DG - Type II - Grate Type A - Granite Curb	On Grade	43+96.70 RT	0.052	0.90	5.00	0.204	5.00	0.000	0.00
43+96.70 RT	Combination DG Type C (Type II) - Grt Type A - Plain	In Sag		0.174	0.90	5.00	0.514	5.00	0.000	0.00
45+37.93	Combination Type C Grate Type A - Plain Curb	On Grade	43+76.56	0.620	0.58	10.00	0.214	10.00	0.000	0.00
45+45.55	Combination Type C Grate Type A - Plain Curb	On Grade	43+84.89	1.281	0.52	10.00	0.336	10.00	0.000	0.00
43+76.56	Combination City Type C DG - Type II - Grate Type A - Granite Curb	In Sag		0.176	0.90	5.00	2.718	10.94	0.000	0.00
LOB PARKING LOT	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	1.940	10.00	1.940	10.00
6- MH 90	Combination Type C Grate Type A - Plain Curb	On Grade	GATE 6	0.350	0.23	10.00	1.546	11.07	1.020	10.00
6-CB 2 (97)	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB2	0.310	0.50	10.00	0.457	10.88	0.000	0.00
6- CB1 (98)	Combination Type C Grate Type A - Plain Curb	On Grade	AR-CB3	0.050	0.90	5.00	0.224	10.80	0.000	0.00
6- CB 3	Combination Type C Grate Type A - Plain Curb	On Grade	6- CB1 (98)	0.070	0.09	5.00	0.179	10.52	0.000	0.00
6-CB 4	Combination Type C Grate Type A - Plain Curb	On Grade	6-CB 2 (97)	0.740	0.35	10.00	0.173	10.00	0.000	0.00
6-MH 82	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.911	102.82	0.130	5.00
6-MH 85	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.961	103.30	0.050	5.00
6-CB 79A	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.280	10.00	0.010	10.00
6-MH 79B	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.270	6.49	0.120	5.00
6-MH 79C	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.150	6.02	0.110	5.00

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Scenario: 10 year

System Data (Busway)

Label	Inlet	Inlet Location	Bypass Target	Area (acres)	Composite Rational C	Time of Concentration (min)	System CA (acres)	System Flow Time (min)	External CA (acres)	External Time of Concentration (min)
6-MH 79D	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	0.040	5.00	0.040	5.00
481+64.79 CB	Ditch Type C-L Single Grate B	In Sag		1.340	0.13	102.58	0.454	102.58	0.000	0.00
481+50.00 CB	Grate Type CM w/o Throat	On Grade	480+98.51 CB	0.030	0.90	5.00	0.183	28.40	0.121	28.40
480+98.51 CB	Grate Type CM w/o Throat	On Grade	478+87.00 CB	0.040	0.90	5.00	0.035	5.00	0.000	0.00
481+ 94.76 CB	Grate Type CM w/o Throat	On Grade	I-261	0.090	0.90	5.00	0.136	5.49	0.000	0.00
482+98.54 CB	Grate Type CM w/o Throat	On Grade	481+ 94.76 CB	0.070	0.90	5.00	0.060	5.00	0.000	0.00
I-261	Grate Type CM w/o Throat	On Grade	481+50.00 CB	0.000	0.00	0.00	0.781	102.62	0.000	0.00
475+24.97 CB	Grate Type CM w/o Throat	On Grade	476+45.00 CB	0.068	0.90	5.00	0.064	5.00	0.000	0.00
478+87.00 CB	Grate Type CM w/o Throat	On Grade	477+05.00 CB	0.163	0.90	5.00	0.118	5.00	0.000	0.00
476+45.00 CB	Grate Type CM w/o Throat	On Grade	476+75.00 CB	0.094	0.90	5.00	0.915	86.42	0.000	0.00
476+75.00 CB	Grate Type CM w/o Throat	In Sag		0.057	0.90	5.00	0.832	86.27	0.000	0.00
477+05.00 CB	Grate Type CM w/o Throat	On Grade	476+75.00 CB	0.130	0.90	5.00	0.736	86.13	0.000	0.00
472+50.33 (WALL 104-8A)	Grate Type C-L - Grate Type A	In Sag		0.132	0.13	17.00	0.017	17.00	0.000	0.00
FSRD-1B	Grate Type C-L - Grate Type A	In Sag		0.450	0.90	5.00	1.601	5.00	0.000	0.00
FSPG-2	Generic Manhole w/ External Flow	In Sag		0.360	0.90	10.00	0.324	10.00	0.000	0.00
FSPG-1	Generic Manhole w/ External Flow	In Sag		0.360	0.90	10.00	0.324	10.00	0.000	0.00
FSPG -4	Generic Manhole w/ External Flow	In Sag		0.360	0.90	10.00	0.324	10.00	0.000	0.00
FSPG-3	Generic Manhole w/ External Flow	In Sag		0.360	0.90	10.00	0.324	10.00	0.000	0.00
FSI-1	Combination Type C Grate Type A - Plain Curb	On Grade	FSRD-1B	0.940	0.90	10.00	0.534	10.00	0.000	0.00
FSI-2	Combination Type C Grate Type A - Plain Curb	On Grade	FSRD -1A	0.260	0.90	5.00	0.231	5.00	0.000	0.00
AETNA DI	Grate Type C-L - Grate Type A	On Grade	FSRD-1B	1.190	0.77	10.00	0.423	10.00	0.000	0.00
FSI-3	Grate Type C-L - Grate Type A	On Grade	FSI-2	0.330	0.90	5.00	0.177	5.00	0.000	0.00
FSMH-10	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	1.313	10.12	0.890	10.00
FSRD -1A	Grate Type C-L - Grate Type A	In Sag		0.360	0.90	5.00	8.989	89.92	0.000	0.00
FSMH-2	Generic Manhole w/ External Flow	In Sag		0.000	0.00	0.00	1.580	10.00	1.580	10.00
FSI-4	Combination Type C Grate Type A - Plain Curb	On Grade	FSI-2	0.180	0.90	5.00	0.129	5.00	0.000	0.00
FARM I-1	Combination Type C Grate Type A - Plain Curb	On Grade	FSI-1	1.990	0.39	10.00	0.386	10.00	0.000	0.00
472+00.00 CB	Grate RPW WITH OUT THROAT	On Grade	473+42.00 CB	0.075	0.90	5.00	0.073	5.00	0.000	0.00
473+42.00 CB	Grate RPW WITH OUT THROAT	On Grade	474+39.78 CB	0.105	0.90	5.00	0.085	5.00	0.000	0.00
471+91.74	Grate Type CM Single Barrier	In Sag		0.000	0.00	0.00	1.233	89.89	0.000	0.00
474+39.78 CB	Grate Type CM w/o Throat	On Grade	475+24.97 CB	0.073	0.90	5.00	0.079	5.00	0.000	0.00
EXTERNAL CA FROM RRR	Grate Type C-L - Grate Type A	In Sag		0.000	0.00	0.00	0.500	86.00	0.500	86.00
SCUPPER 205	Grate Type C-L - Grate Type A	In Sag		0.123	0.90	5.00	0.111	5.00	0.000	0.00
EXISTING PARKING LOT CB	Grate Type C-L - Grate Type A	In Sag		0.000	0.00	0.00	0.111	5.06	0.000	0.00
SCUPPER (AREA 202)	Grate Type C-L - Grate Type A	On Grade	SCUPPER (AREA 203)	0.311	0.90	5.00	0.169	5.00	0.000	0.00
SCUPPER (AREA 203)	Grate Type C-L - Grate Type A	On Grade	AREA 9G-2 AND SCUPPE	0.313	0.90	5.00	0.217	5.00	0.000	0.00
470+39.73 CB	Grate RPW WITH OUT THROAT	On Grade	472+00.00 CB	0.087	0.90	5.00	0.076	5.00	0.000	0.00
467+00.00 CB	Grate RPW WITH OUT THROAT	On Grade	468+62.18 CB	0.096	0.90	5.00	0.069	5.00	0.000	0.00
AREA 9G-2 AND SCUPPER 204	Grate Type C-L DG - Type I - Grate Type A	In Sag		0.112	0.90	5.00	0.387	5.29	0.000	0.00
TRENCH DRAIN (9G1)	Grate Type C-L - Grate Type A	In Sag		0.256	0.90	5.00	0.230	5.00	0.000	0.00
AREA 9F-3	Combination Type C Grate Type A - Plain Curb	In Sag		0.142	0.90	5.00	0.128	5.00	0.000	0.00
AREA 9F-2	Combination Type C Grate Type A - Plain Curb	In Sag		0.189	0.90	5.00	0.328	7.15	0.000	0.00
TRENCH DRAIN (9D)	Grate Type C-L - Grate Type A	In Sag		0.303	0.90	5.00	0.273	5.00	0.000	0.00
TRENCH DRAIN (9E)	Grate Type C-L - Grate Type A	In Sag		0.363	0.90	5.00	0.327	5.00	0.000	0.00
MH-9-32	Generic Manhole w/ External Flow	In Sag		0.306	0.90	5.00	3.400	7.85	0.107	5.00
9-BCB-3	Combination Type C Grate Type A - Park Curb	In Sag		0.299	0.90	5.00	0.462	5.00	0.000	0.00
9-BCB-2	Combination Type C Grate Type A - Park Curb	On Grade	9-BCB-3	0.079	0.90	5.00	0.520	5.21	0.000	0.00
9-BCB-1	Combination Type C Grate Type B - Park Curb	In Sag		0.328	0.90	5.00	0.736	5.00	0.000	0.00
AREA 9F-1	Combination Type C Grate Type A - Plain Curb	On Grade	FSRD -1A	0.036	0.90	5.00	0.030	5.00	0.000	0.00
468+62.18 CB	Grate RPW WITH OUT THROAT	On Grade	470+39.73 CB	0.083	0.90	5.00	0.072	5.00	0.000	0.00

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Scenario: 25 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
6- CB 3	Combination Type C Grate Type A - Plain Curb	0.070	0.09	5.00	6.73	0.006	0.000	0.006	0.04	On Grade	0.020000	0.020	0.03	1.74	0.00	0.00	0.000	6- CB1 (98)	0.006	0.0	0.000	0.00
6- CB1 (98)	Combination Type C Grate Type A - Plain Curb	0.050	0.90	5.00	6.73	0.045	0.000	0.045	0.31	On Grade	0.060000	0.060	0.09	1.49	0.00	0.00	0.000	AR-CB3	0.045	0.0	0.000	0.00
6- MH 90	Combination Type C Grate Type A - Plain Curb	0.350	0.23	10.00	5.47	0.081	0.000	0.081	0.44	On Grade	0.020000	0.020	0.08	4.19	0.00	0.08	0.014	GATE 6	0.067	0.0	1.020	10.00
6-CB 2 (97)	Combination Type C Grate Type A - Plain Curb	0.310	0.50	10.00	5.47	0.155	0.092	0.247	1.36	On Grade	0.060000	0.060	0.16	2.61	0.00	0.09	0.016	AR-CB2	0.230	0.0	0.000	0.00
6-CB 4	Combination Type C Grate Type A - Plain Curb	0.740	0.35	10.00	5.47	0.259	0.000	0.259	1.43	On Grade	0.020000	0.020	0.13	6.50	0.00	0.51	0.092	6-CB 2 (97)	0.167	0.0	0.000	0.00
6-CB 79A	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.010	10.00
6-MH 79B	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.120	5.00
6-MH 79C	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.110	5.00
6-MH 79D	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.040	5.00
6-MH 82	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.130	5.00
6-MH 85	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.050	5.00
9-BCB-1	Combination Type C Grate Type B - Park Curb	0.328	0.90	5.00	6.73	0.295	0.456	0.752	5.10	In Sag		0.020	0.34	16.90	0.00	0.00	0.000		0.752	0.0	0.000	0.00
9-BCB-2	Combination Type C Grate Type A - Park Curb	0.079	0.90	5.00	6.73	0.071	0.000	0.071	0.48	On Grade	0.007000	0.020	0.11	5.26	0.00	0.10	0.014	9-BCB-3	0.057	0.0	0.000	0.00
9-BCB-3	Combination Type C Grate Type A - Park Curb	0.299	0.90	5.00	6.73	0.269	0.201	0.470	3.19	In Sag		0.020	0.25	12.29	0.00	0.00	0.000		0.470	0.0	0.000	0.00
10-MH 2	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.990	5.00
10+41.86	Combination DG Type C (Type I) - Grt Type A - Plain	0.229	0.90	5.00	6.73	0.206	0.000	0.206	1.40	On Grade	0.010000	0.020	0.15	7.34	0.00	0.19	0.028	11+42.33	0.178	0.0	0.000	0.00
11-MH92	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.286	5.00
11+18.60	Combination DG Type C (Type I) - Grt Type A - Plain	0.838	0.49	10.00	5.47	0.411	0.116	0.526	2.90	On Grade	0.010000	0.020	0.19	9.65	3.49	0.71	0.129	12+04.21	0.398	0.0	0.000	0.00
11+33.57	Combination DG Type C (Type I) - Grt Type A - Plain	1.088	0.57	15.00	4.61	0.620	0.000	0.620	2.88	On Grade	0.030000	0.020	0.16	7.83	3.49	0.54	0.116	11+18.60	0.504	0.0	0.000	0.00
11+42.33	Combination DG Type C (Type II) - Grt Type A - Plain	0.122	0.90	5.00	6.73	0.110	0.071	0.181	1.23	In Sag		0.020	0.13	6.41	2.50	0.00	0.000		0.181	0.0	0.000	0.00
11+65.87	Combination DG Type C (Type I) - Grt Type A - Plain	0.922	0.55	10.00	5.47	0.507	0.000	0.507	2.80	On Grade	0.020000	0.020	0.17	8.36	3.49	0.58	0.104	12+04.21	0.403	0.0	0.000	0.00
12+04.21	Combination Type C Grate Type A - Plain Curb	0.773	0.47	10.00	5.47	0.363	0.269	0.632	3.49	In Sag		0.020	0.24	12.01	0.00	0.00	0.000		0.632	0.0	0.000	0.00
12+50.00	Combination DG Type C (Type I) - Grt Type B - Plain	0.086	0.90	5.00	6.73	0.077	0.000	0.077	0.53	On Grade	0.020000	0.020	0.09	4.46	0.00	0.01	0.001	11+42.33	0.076	0.0	0.000	0.00
13+05.20	Combination Type C Grate Type A - Plain Curb	0.281	0.46	10.00	5.47	0.129	0.000	0.129	0.71	On Grade	0.010000	0.020	0.11	5.70	0.00	0.18	0.033	12+04.21	0.096	0.0	0.000	0.00
13+87.94	Combination Type C Grate Type A - Plain Curb	0.020	0.90	5.00	6.73	0.018	0.015	0.033	0.22	On Grade	0.017000	0.020	0.07	3.34	0.00	0.02	0.003	12+04.21	0.030	0.0	0.225	10.00
13+94.09	Combination DG Type C (Type I) - Grt Type A - Plain	0.245	0.90	5.00	6.73	0.221	0.057	0.278	1.89	On Grade	0.017000	0.020	0.15	7.43	0.00	0.29	0.043	11+42.33	0.235	0.0	0.000	0.00
14+28.60	Combination Type C Grate Type A - Plain Curb	0.077	0.90	5.00	6.73	0.069	0.000	0.069	0.47	On Grade	0.017000	0.020	0.09	4.41	2.50	0.10	0.015	13+87.94	0.054	0.0	0.496	5.00
14+37.13	Combination Type C Grate Type A - Plain Curb	0.138	0.90	5.00	6.73	0.124	0.000	0.124	0.84	On Grade	0.017000	0.020	0.11	5.49	2.50	0.26	0.038	13+94.09	0.086	25.0	0.000	0.00
14+77.17	Grate Type C-L - Grate Type A	0.086	0.90	5.00	6.73	0.077	0.000	0.077	0.53	In Sag		0.020	0.11	5.72	0.00	0.00	0.000		0.077	0.0	0.000	0.00
15+88.99	Combination City Type C Grate Type A - Granite Curb	0.040	0.90	5.00	6.73	0.036	0.000	0.036	0.24	In Sag		0.020	0.05	2.54	0.00	0.00	0.000		0.036	0.0	0.000	0.00
41+39.12	Combination DG Type C (Type I) - Grt Type A - Plain	0.238	0.90	5.00	6.73	0.214	0.000	0.214	1.45	On Grade	0.030000	0.020	0.12	6.06	0.00	0.13	0.019	13+94.09	0.195	0.0	0.000	0.00
42+39.81	Combination Type C Grate Type A - Plain Curb	0.112	0.90	5.00	6.73	0.101	0.000	0.101	0.68	On Grade	0.030000	0.020	0.09	4.57	0.00	0.15	0.022	42+70.16	0.078	0.0	0.000	0.00
42+47.41	Combination DG Type C (Type II) - Grt Type A - Plain	0.460	0.90	5.00	6.73	0.414	0.000	0.414	2.81	On Grade	0.030000	0.020	0.16	7.76	2.50	1.30	0.192	43+96.70 RT	0.222	0.0	0.000	0.00
42+70.16	Combination City Type C Grate Type A - Granite Curb	0.048	0.90	5.00	6.73	0.043	0.022	0.066	0.44	In Sag		0.020	0.08	3.85	0.00	0.00	0.000		0.066	0.0	0.000	0.00
43+42.81	Combination City Type C Grate Type A - Granite Curb	0.060	0.90	5.00	6.73	0.054	0.000	0.054	0.37	In Sag		0.020	0.07	3.39	0.00	0.00	0.000		0.054	0.0	0.000	0.00
43+76.56	Combination City Type C DG - Type II - Grate Type A - Grar	0.176	0.90	5.00	6.73	0.158	0.153	0.311	2.11	In Sag		0.020	0.17	8.69	0.00	0.00	0.000		0.311	0.0	0.000	0.00
43+84.89	Combination City Type C DG - Type II - Grate Type A - Grar	0.052	0.90	5.00	6.73	0.047	0.342	0.388	2.64	On Grade	0.013400	0.020	0.18	8.81	2.50	1.26	0.186	43+96.70 RT	0.202	0.0	0.000	0.00
43+96.70 RT	Combination DG Type C (Type II) - Grt Type A - Plain	0.174	0.90	5.00	6.73	0.157	0.378	0.534	3.63	In Sag		0.020	0.25	12.30	2.50	0.00	0.000		0.534	0.0	0.000	0.00
45+37.93	Combination Type C Grate Type A - Plain Curb	0.620	0.58	10.00	5.47	0.360	0.000	0.360	1.98	On Grade	0.014000	0.020	0.16	7.85	2.50	0.84	0.153	43+76.56	0.207	0.0	0.000	0.00
45+45.55	Combination Type C Grate Type A - Plain Curb	1.281	0.52	10.00	5.47	0.666	0.000	0.666	3.67	On Grade	0.014000	0.020	0.20	9.90	2.50	1.88	0.342	43+84.89	0.324	0.0	0.000	0.00
200+65.76 WALL 111 SWALE CB	Ditch Type C-L Single Grate B	0.387	0.23	30.00	3.31	0.089	0.000	0.089	0.30	In Sag			0.05	2.19		0.00	0.000		0.089	0.0	0.000	0.00
204+61.66 CB	Grate Type RPW w/o Throat	0.112	0.90	5.00	6.73	0.101	0.008	0.109	0.74	In Sag		0.046	0.20	4.34	8.00	0.00	0.000		0.109	50.0	0.000	0.00
205+03.21 CB	Grate Type RPW w/o Throat	0.051	0.90	5.00	6.73	0.046	0.000	0.046	0.31	On Grade	0.005000	0.030	0.11	3.67	8.00	0.05	0.008	204+61.66 CB	0.038	25.0	0.000	0.00
205+81.06 WALL 111 SWALE CB	Ditch Type C-L Single Grate B	0.269	0.23	133.05	1.31	0.062	0.000	0.062	0.08	In Sag			0.02	2.08		0.00	0.000		0.062	0.0	0.000	0.00
205+83.27 CB	Grate Type CM w/o Throat	0.070	0.90	5.00	6.73	0.063	0.000	0.063	0.43	In Sag		0.020	0.10	5.14	8.00	0.00	0.000		0.063	0.0	0.000	0.00
206+51.63 CB	Combination Type C Grate Type A - Plain Curb	0.018	0.90	5.00	6.73	0.016	0.205	0.221	1.50	On Grade	0.005000	0.044	0.23	5.24	0.00	0.28	0.041	GB-CB4	0.180	0.0	0.000	0.00
450+44.65 CB	Grate Type RPW w/o Throat	0.103	0.90	5.00	6.73	0.093	0.000	0.093	0.63	On Grade	0.019000	0.040	0.13	3.13	4.00	0.11	0.017	EXTERNAL CA	0.076	25.0	0.000	0.00
453+09.60 CB	Grate Type RPW w/o Throat	0.168	0.90	5.00	6.73	0.151	0.000	0.151	1.03	On Grade	0.009000	0.040	0.17	4.66	4.00	0.33	0.048	454+00 CB	0.103	25.0	0.000	0.00
454+00 CB	Grate Type RPW w/o Throat	0.071	0.90	5.00	6.73	0.064	0.048	0.112	0.76	On Grade	0.009000	0.040	0.15	3.87	4.00	0.20	0.030	455+56.08 CB	0.082	25.0	0.000	0.00
455+56.08 CB	Grate Type RPW w/o Throat	0.097	0.90	5.00	6.73	0.087	0.030	0.117	0.80	On Grade	0.009000	0.040	0.16	3.94	4.00	0.21	0.031	456+50 CB	0.086	25.0	0.000	0.00
456+50 CB	Grate Type RPW w/o Throat	0.058	0.90	5.00	6.73	0.052	0.031	0.083	0.57	On Grade	0.009000	0.040	0.14	3.47	4.00	0.12	0.017	458+00 CB	0.066	25.0	0.000	0.00
456+51.83 CB	Grate Type CM w/o Throat	0.105	0.90	5.00	6.73	0.095	0.000	0.095	0.64	On Grade	0.009000	0.028	0.13	4.53	3.25	0.17	0.025	458+00 CB	0.069	25.0	0.000	0.00
458+00 CB	Grate Type RPW w/o Throat	0.123	0.90	5.00	6.73	0.111	0.042	0.153	1.04	On Grade	0.009000	0.040	0.17	4.69	4.00	0.33	0.049	460+25.17 CB	0.104	25.0	0.000	0.00

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Scenario: 25 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
460+25 RT	Grate Type C-L - Grate Type A	0.288	0.23	10.00	5.47	0.066	0.000	0.066	0.37	In Sag		0.020	0.10	4.76	0.00	0.00	0.000		0.066	0.0	0.000	0.00
460+25.17 CB	Grate Type CM w/o Throat	0.163	0.90	5.00	6.73	0.147	0.049	0.196	1.33	On Grade	0.005500	0.040	0.21	6.38	4.00	0.48	0.070	460+71.43 CB	0.125	25.0	0.000	0.00
460+71.43 CB	Grate Type CM w/o Throat	0.062	0.90	5.00	6.73	0.056	0.100	0.156	1.06	In Sag		0.040	0.23	7.51	4.00	0.00	0.000		0.156	50.0	0.000	0.00
460+86.88 CB	Grate Type CM w/o Throat	0.031	0.90	5.00	6.73	0.028	0.000	0.028	0.19	In Sag		0.040	0.11	2.77	4.00	0.00	0.000		0.028	50.0	0.000	0.00
461+17.69 CB	Grate Type CM w/o Throat	0.114	0.90	5.00	6.73	0.103	0.007	0.109	0.74	On Grade	0.005000	0.040	0.17	4.56	4.00	0.20	0.030	460+71.43 CB	0.079	25.0	0.000	0.00
463+46.39 CB	Grate Type RPW w/o Throat	0.051	0.90	5.00	6.73	0.046	0.000	0.046	0.31	On Grade	0.005000	0.040	0.12	3.09	4.00	0.05	0.007	461+17.69 CB	0.039	25.0	0.000	0.00
465+25.89 CB	Grate Type CM w/o Throat	0.041	0.90	5.00	6.73	0.037	0.000	0.037	0.25	On Grade	0.005000	0.040	0.11	2.85	4.00	0.03	0.004	467+00.00 CB	0.033	25.0	0.000	0.00
467+00.00 CB	Grate RPW WITH OUT THROAT	0.096	0.90	5.00	6.73	0.086	0.004	0.090	0.61	On Grade	0.005000	0.040	0.16	3.99	4.00	0.16	0.023	468+62.18 CB	0.067	25.0	0.000	0.00
468+62.18 CB	Grate RPW WITH OUT THROAT	0.083	0.90	5.00	6.73	0.075	0.023	0.098	0.66	On Grade	0.005000	0.040	0.16	4.21	4.00	0.18	0.026	470+39.73 CB	0.071	25.0	0.000	0.00
470+39.73 CB	Grate RPW WITH OUT THROAT	0.087	0.90	5.00	6.73	0.078	0.026	0.105	0.71	On Grade	0.005000	0.040	0.17	4.42	4.00	0.20	0.029	472+00.00 CB	0.075	25.0	0.000	0.00
471+91.74	Grate Type CM Single Barrier	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
472+00.00 CB	Grate RPW WITH OUT THROAT	0.075	0.90	5.00	6.73	0.068	0.029	0.097	0.66	On Grade	0.005000	0.040	0.16	5.78	2.00	0.16	0.024	473+42.00 CB	0.073	25.0	0.000	0.00
472+50.33 (WALL 104-8A)	Grate Type C-L - Grate Type A	0.132	0.13	17.00	4.45	0.017	0.000	0.017	0.08	In Sag		0.020	0.06	2.89	0.00	0.00	0.000		0.017	50.0	0.000	0.00
473+42.00 CB	Grate RPW WITH OUT THROAT	0.105	0.90	5.00	6.73	0.095	0.024	0.119	0.80	On Grade	0.005000	0.040	0.17	6.32	2.00	0.23	0.034	474+39.78 CB	0.085	25.0	0.000	0.00
474+39.78 CB	Grate Type CM w/o Throat	0.073	0.90	5.00	6.73	0.066	0.034	0.099	0.67	On Grade	0.005000	0.040	0.16	4.90	2.00	0.14	0.020	475+24.97 CB	0.079	25.0	0.000	0.00
475+24.97 CB	Grate Type CM w/o Throat	0.068	0.90	5.00	6.73	0.061	0.020	0.081	0.55	On Grade	0.005000	0.028	0.13	4.77	0.00	0.11	0.016	476+45.00 CB	0.065	25.0	0.000	0.00
476+45.00 CB	Grate Type CM w/o Throat	0.094	0.90	5.00	6.73	0.085	0.016	0.101	0.68	On Grade	0.020000	0.040	0.12	4.36	2.00	0.13	0.019	476+75.00 CB	0.082	50.0	0.000	0.00
476+75.00 CB	Grate Type CM w/o Throat	0.057	0.90	5.00	6.73	0.051	0.052	0.103	0.70	In Sag		0.040	0.17	6.57	2.00	0.00	0.000		0.103	25.0	0.000	0.00
477+05.00 CB	Grate Type CM w/o Throat	0.130	0.90	5.00	6.73	0.117	0.033	0.150	1.02	On Grade	0.020000	0.040	0.14	5.14	2.00	0.23	0.033	476+75.00 CB	0.116	0.0	0.000	0.00
478+87.00 CB	Grate Type CM w/o Throat	0.163	0.90	5.00	6.73	0.147	0.001	0.148	1.00	On Grade	0.020000	0.040	0.14	5.11	2.00	0.22	0.033	477+05.00 CB	0.115	0.0	0.000	0.00
480+98.51 CB	Grate Type CM w/o Throat	0.040	0.90	5.00	6.73	0.036	0.000	0.036	0.25	On Grade	0.005000	0.048	0.12	2.52	2.00	0.01	0.001	478+87.00 CB	0.035	25.0	0.000	0.00
481+ 94.76 CB	Grate Type CM w/o Throat	0.090	0.90	5.00	6.73	0.081	0.003	0.084	0.57	On Grade	0.005000	0.048	0.17	3.45	2.00	0.06	0.009	I-261	0.075	25.0	0.000	0.00
481+13.11 CB	Grate Type RPW w/o Throat	0.375	0.90	5.00	6.73	0.338	0.000	0.338	2.29	On Grade	0.049600	0.020	0.13	6.54	8.00	1.23	0.181	486+95.62 CB	0.157	25.0	0.000	0.00
481+50.00 CB	Grate Type CM w/o Throat	0.030	0.90	5.00	6.73	0.027	0.000	0.027	0.18	On Grade	0.005000	0.048	0.11	2.26	0.00	0.00	0.000	480+98.51 CB	0.027	50.0	0.121	28.40
481+64.79 CB	Ditch Type C-L Single Grate B	1.340	0.13	102.58	1.62	0.174	0.000	0.174	0.28	In Sag			0.05	2.21		0.00	0.000		0.174	50.0	0.000	0.00
482+98.54 CB	Grate Type CM w/o Throat	0.070	0.90	5.00	6.73	0.063	0.000	0.063	0.43	On Grade	0.016500	0.048	0.12	2.48	2.00	0.02	0.003	481+ 94.76 CB	0.060	25.0	0.000	0.00
484+42.75 CB	Grate Type CM w/o Throat	0.044	0.90	5.00	6.73	0.040	0.000	0.040	0.27	On Grade	0.022800	0.048	0.09	1.96	0.00	0.00	0.000	482+98.54 CB	0.040	25.0	0.000	0.00
485+63.54 CB	Grate Type RPW w/o Throat	0.011	0.90	5.00	6.73	0.010	0.000	0.010	0.07	On Grade	0.005100	0.043	0.07	1.65	0.00	0.00	0.000	486+95.62 CB	0.010	25.0	0.000	0.00
486+95.62 CB	Grate Type RPW DG Type I w/o Throat	0.095	0.90	5.00	6.73	0.086	0.181	0.266	1.81	On Grade	0.020000	0.043	0.19	4.40	0.00	0.03	0.004	487+93.79 CB	0.262	0.0	0.000	0.00
487+93.79 CB	Grate Type RPW w/o Throat	0.119	0.90	5.00	6.73	0.107	0.004	0.111	0.75	On Grade	0.054000	0.043	0.11	2.63	4.00	0.09	0.013	489+23.80	0.098	25.0	0.000	0.00
489+23.80	Grate Type RPW w/o Throat	0.125	0.90	5.00	6.73	0.113	0.013	0.125	0.85	On Grade	0.043000	0.020	0.09	4.63	0.00	0.23	0.034	489+58.08	0.091	25.0	0.000	0.00
489+58.08	Grate Type RPW w/o Throat	0.000	0.00	0.00	0.00	0.000	0.034	0.034	0.23	On Grade	0.037700	0.021	0.06	2.84	0.00	0.02	0.003	490+33.68 CB	0.032	25.0	0.000	0.00
490+33.68 CB	Grate Type CM w/o Throat	0.174	0.90	5.00	6.73	0.157	0.003	0.159	1.08	On Grade	0.009300	0.050	0.19	3.81	0.00	0.16	0.023	ASYLUM COMI	0.136	25.0	0.000	0.00
902+85.52	Grate Type CM w/o Throat	0.050	0.90	5.00	6.73	0.045	0.000	0.045	0.31	On Grade	0.060000	0.020	0.06	2.96	0.00	0.03	0.004	903+54.91	0.041	25.0	0.000	0.00
903+54.91	Grate Type RPW w/o Throat	0.020	0.90	5.00	6.73	0.018	0.004	0.022	0.15	On Grade	0.060000	0.020	0.05	2.26	0.00	0.00	0.000	904+15.54	0.021	25.0	0.000	0.00
904+15.54	Grate Type RPW w/o Throat	0.020	0.90	5.00	6.73	0.018	0.000	0.018	0.13	On Grade	0.008100	0.020	0.06	3.09	0.00	0.01	0.001	904+27.54	0.017	25.0	0.000	0.00
904+27.45	Grate Type CM w/o Throat	0.010	0.90	5.00	6.73	0.009	0.000	0.009	0.06	In Sag		0.020	0.05	2.69	0.00	0.00	0.000		0.009	50.0	0.000	0.00
904+27.54	Grate Type RPW w/o Throat	0.010	0.90	5.00	6.73	0.009	0.010	0.019	0.13	In Sag		0.020	0.07	3.52	0.00	0.00	0.000		0.019	50.0	0.000	0.00
904+39.54	Grate Type RPW w/o Throat	0.050	0.90	5.00	6.73	0.045	0.000	0.045	0.31	On Grade	0.008100	0.020	0.09	4.31	0.00	0.06	0.009	904+27.54	0.036	25.0	0.000	0.00
AB-CB-1	Combination Type C Grate Type A - Park Curb	0.242	0.90	5.00	6.73	0.218	0.000	0.218	1.48	On Grade	0.067700	0.020	0.10	5.23	0.00	0.45	0.066	AB-CB-2	0.151	0.0	0.920	10.00
AB-CB-2	Grate Type C-L - Grate Type A	0.177	0.90	5.00	6.73	0.159	0.066	0.226	1.53	On Grade	0.037700	0.020	0.12	5.92	0.00	0.55	0.081	AB-CB-3	0.145	0.0	0.540	10.00
AB-CB-3	Combination Type C Grate Type A - Park Curb	0.140	0.90	5.00	6.73	0.126	0.081	0.207	1.40	On Grade	0.037700	0.020	0.11	5.73	0.00	0.46	0.068	Dummy Off Site	0.139	0.0	0.000	0.00
AB-CB-4	Combination Type C Grate Type B - Park Curb	0.493	0.90	5.00	6.73	0.444	0.000	0.444	3.01	On Grade	0.040000	0.020	0.15	7.54	0.00	1.35	0.199	BROAD ST CO	0.245	0.0	0.000	0.00
AETNA CB-103	Grate Type C-L - Grate Type A	0.158	0.49	5.00	6.73	0.077	0.000	0.077	0.53	On Grade	0.020000	0.020	0.09	4.46	0.00	0.11	0.016	AETNA CB-104	0.061	0.0	0.583	10.00
AETNA CB-104	Grate Type C-L - Grate Type A	0.083	0.23	5.00	6.73	0.019	0.016	0.035	0.24	In Sag		0.020	0.08	3.89	0.00	0.00	0.000		0.035	0.0	0.000	0.00
AETNA CB 105	Combination Type C Grate Type A - Plain Curb	0.138	0.90	5.00	6.73	0.124	0.006	0.131	0.89	In Sag		0.020	0.12	6.06	0.00	0.00	0.000		0.131	0.0	0.000	0.00
AETNA CB 106	Grate Type C-L - Grate Type A	0.054	0.90	5.00	6.73	0.049	0.000	0.049	0.33	On Grade	0.027000	0.020	0.07	3.54	0.00	0.04	0.006	AETNA CB 105	0.042	0.0	0.000	0.00
AETNA CB 202	Combination Type C Grate Type A - Plain Curb	0.050	0.90	5.00	6.73	0.045	0.000	0.045	0.31	On Grade	0.020000	0.020	0.07	3.64	0.00	0.04	0.005	AETNA CB 203	0.040	0.0	0.270	10.00
AETNA CB 203	Grate Type C-L - Grate Type A	0.550	0.90	5.00	6.73	0.495	0.067	0.562	3.82	In Sag		0.020	0.36	18.03	0.00	0.00	0.000		0.562	0.0	0.000	0.00
AETNA DI	Grate Type C-L - Grate Type A	1.190	0.77	10.00	5.47	0.916	0.000	0.916	5.05	On Grade	0.020000	0.020	0.21	10.43	0.00	2.81	0.510	FSRD-1B	0.406	0.0	0.000	0.00
AETNA PARKING ROOF-2	Generic Manhole w/ External Flow	1.054	0.90	10.00	5.47	0.949	0.000	0.949	5.23	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.949		0.000	0.00
AETNA PARKING ROOF -1	Generic Manhole w/ External Flow	0.880	0.90	10.00	5.47	0.792	0.000	0.792	4.37	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.792		0.000	0.00
AETNA YD 105	Grate Type C-L - Grate Type A	0.015	0.23	5.00	6.73	0.004	0.000	0.004	0.02	In Sag		0.020	0.03	1.73	0.00	0.00	0.000		0.004	0.0	0.000	0.00

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Scenario: 25 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
AETNA YD 201	Grate Type C-L - Grate Type B	0.137	0.23	10.00	5.47	0.032	0.000	0.032	0.17	In Sag		0.020	0.07	3.38	0.00	0.00	0.000		0.032	0.0	0.000	0.00
AETNA YD MH	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.364	10.00
AR-48-1	Grate Type C-L - Grate Type A	1.560	0.42	60.00	2.17	0.655	0.075	0.730	1.59	On Grade	0.060000	0.060	0.17	2.77	0.00	0.18	0.083	AR-CB10	0.647	0.0	0.000	0.00
AR-48-1B	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		2.010	156.20
AR-48-1C	Combination Type C Grate Type A - Plain Curb	0.370	0.61	10.00	5.47	0.226	0.000	0.226	1.25	On Grade	0.020000	0.020	0.12	6.17	0.00	0.41	0.075	AR-48-1	0.151	0.0	0.250	10.00
AR-48-1CA4	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	On Grade	0.020000	0.020	0.00	0.00	0.00	0.00	0.000	AR-48-1	0.000		0.160	5.00
AR-48-2	Grate Type C-L - Grate Type A	0.180	0.23	19.00	4.25	0.041	0.000	0.041	0.18	On Grade	0.040000	0.060	0.08	1.31	0.00	0.00	0.000	AR-48-3/ AR-CI	0.041	0.0	0.130	5.00
AR-48-3/ AR-CB16	Grate Type C-L - Grate Type A	0.910	0.23	18.63	4.28	0.209	0.000	0.209	0.90	On Grade	0.040000	0.060	0.15	2.42	0.00	0.03	0.006	AR-CB15	0.203	0.0	0.000	0.00
AR-48-4	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00
AR-CB-17 (200+66.99)	Grate Type RPW w/o Throat	0.213	0.90	5.00	6.73	0.192	0.000	0.192	1.30	On Grade	0.015000	0.055	0.19	3.52	10.00	0.24	0.035	AR-CB13A	0.156	0.0	0.000	0.00
AR-CB2	Combination Type C Grate Type A - Plain Curb	0.520	0.34	22.00	4.02	0.177	0.016	0.193	0.78	On Grade	0.060000	0.060	0.13	2.12	0.00	0.01	0.001	AR-CB14 (200+	0.192	0.0	0.000	0.00
AR-CB3	Combination Type C Grate Type A - Plain Curb	0.220	0.62	5.00	6.73	0.136	0.000	0.136	0.93	On Grade	0.060000	0.060	0.14	2.26	0.00	0.01	0.002	AR-CB4	0.134	0.0	0.160	5.00
AR-CB4	Combination Type C Grate Type A - Plain Curb	0.140	0.43	10.00	5.47	0.060	0.002	0.062	0.34	On Grade	0.060000	0.060	0.09	1.56	0.00	0.00	0.000	AR-CB6	0.062	0.0	0.000	0.00
AR-CB6	Grate Type C-L - Grate Type A	0.110	0.42	10.00	5.47	0.046	0.000	0.046	0.25	On Grade	0.020000	0.020	0.07	3.40	0.00	0.03	0.005	AR-CB7	0.041	0.0	0.000	0.00
AR-CB7	Combination Type C Grate Type A - Plain Curb	0.100	0.26	10.00	5.47	0.026	0.005	0.031	0.17	On Grade	0.020000	0.060	0.09	1.48	0.00	0.00	0.000	AR-CB8	0.031	0.0	0.000	0.00
AR-CB8	Grate Type C-L - Grate Type A	0.170	0.38	10.00	5.47	0.065	0.060	0.125	0.69	In Sag		0.035	0.15	4.31	0.00	0.00	0.000		0.125	0.0	0.000	0.00
AR-CB10	Grate Type C-L - Grate Type A	1.300	0.30	36.00	3.07	0.390	0.083	0.473	1.46	On Grade	0.030000	0.050	0.17	3.43	0.00	0.19	0.060	AR-CB8	0.413	0.0	0.000	0.00
AR-CB13	Grate Type C-L - Grate Type A	0.060	0.40	5.00	6.73	0.024	0.008	0.032	0.22	In Sag		0.020	0.07	3.74	0.00	0.00	0.000		0.032	0.0	0.000	0.00
AR-CB13A	Grate Type C-L - Grate Type A	0.060	0.90	5.00	6.73	0.054	0.035	0.089	0.61	On Grade	0.060000	0.030	0.09	2.98	10.00	0.09	0.014	AR-CB18	0.076	0.0	0.000	0.00
AR-CB14 (200+35.62)	Grate Type C-L DG - Type I - Grate Type A	0.860	0.30	50.00	2.56	0.258	0.001	0.259	0.67	On Grade	0.020000	0.020	0.10	4.89	0.00	0.02	0.008	AR-CB13	0.251	0.0	0.000	0.00
AR-CB15	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.006	0.006	0.04	On Grade	0.010000	0.040	0.05	1.29	10.00	0.00	0.000	AR-CB18	0.006	0.0	0.000	0.00
AR-CB18	Grate Type C-L - Grate Type A	0.060	0.90	5.00	6.73	0.054	0.014	0.068	0.46	In Sag		0.035	0.13	3.59	10.00	0.00	0.000		0.068	0.0	0.000	0.00
AR-MH-12	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.080	5.00
AREA 9F-1	Combination Type C Grate Type A - Plain Curb	0.036	0.90	5.00	6.73	0.032	0.000	0.032	0.22	On Grade	0.020000	0.020	0.06	3.21	0.00	0.02	0.003	FSRD -1A	0.030	0.0	0.000	0.00
AREA 9F-2	Combination Type C Grate Type A - Plain Curb	0.189	0.90	5.00	6.73	0.170	0.000	0.170	1.15	In Sag		0.020	0.14	7.17	0.00	0.00	0.000		0.170	0.0	0.000	0.00
AREA 9F-3	Combination Type C Grate Type A - Plain Curb	0.142	0.90	5.00	6.73	0.128	0.000	0.128	0.87	In Sag		0.020	0.12	5.97	0.00	0.00	0.000		0.128	0.0	0.000	0.00
AREA 9G-2 AND SCUPPER 204	Grate Type C-L DG - Type I - Grate Type A	0.112	0.90	5.00	6.73	0.101	0.186	0.286	1.94	In Sag		0.020	0.21	10.31	0.00	0.00	0.000		0.286	0.0	0.000	0.00
AREA A36-7B (LOB)	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.200	10.00
Armory Drainage (Area A36-7) EXTEF	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		4.260	10.00
BROAD ST COMBINED	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.199	0.199	1.35	In Sag		0.020	0.16	7.94	0.00	0.00	0.000		0.199	0.0	0.000	0.00
Dummy Off Site Basin	Combination Type C Grate Type A - Park Curb	0.372	0.90	0.00	6.73	0.335	0.068	0.403	2.73	In Sag		0.020	0.22	11.04	0.00	0.00	0.000		0.403	0.0	0.000	0.00
EXISTING AETNA CB (10)	Generic Manhole w/ External Flow	0.069	0.90	5.00	6.73	0.062	0.000	0.062	0.42	On Grade	0.020000	0.020	0.08	4.11	0.00	0.42	0.062	AETNA CB 203	0.000		0.000	0.00
EXISTING PARKING LOT CB	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
EXTERNAL CA FROM 155-H025	Generic Manhole w/ External Flow	0.000	0.00	21.90	0.00	0.000	0.017	0.017	0.07	In Sag		0.040	0.00	0.00	2.00	0.00	0.000		0.017		3.340	21.90
EXTERNAL CA FROM RRR	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.500	86.00
FARM I-1	Combination Type C Grate Type A - Plain Curb	1.990	0.39	10.00	5.47	0.776	0.000	0.776	4.28	On Grade	0.020000	0.020	0.20	9.80	0.00	2.23	0.405	FSI-1	0.371	0.0	0.000	0.00
FSI-1	Combination Type C Grate Type A - Plain Curb	0.940	0.90	10.00	5.47	0.846	0.405	1.251	6.90	On Grade	0.020000	0.020	0.23	11.73	0.00	4.05	0.733	FSRD-1B	0.517	0.0	0.000	0.00
FSI-2	Combination Type C Grate Type A - Plain Curb	0.260	0.90	5.00	6.73	0.234	0.190	0.424	2.88	On Grade	0.020000	0.020	0.17	8.45	0.00	1.34	0.197	FSRD -1A	0.227	0.0	0.000	0.00
FSI-3	Grate Type C-L - Grate Type A	0.330	0.90	5.00	6.73	0.297	0.000	0.297	2.02	On Grade	0.020000	0.020	0.15	7.39	0.00	0.85	0.125	FSI-2	0.172	0.0	0.000	0.00
FSI-4	Combination Type C Grate Type A - Plain Curb	0.180	0.90	5.00	6.73	0.162	0.029	0.191	1.30	On Grade	0.020000	0.020	0.13	6.26	0.00	0.44	0.065	FSI-2	0.126	0.0	0.000	0.00
FSMH-2	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		1.580	10.00
FSMH-10	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.890	10.00
FSPG-1	Generic Manhole w/ External Flow	0.360	0.90	10.00	5.47	0.324	0.000	0.324	1.79	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG-2	Generic Manhole w/ External Flow	0.360	0.90	10.00	5.47	0.324	0.000	0.324	1.79	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG-3	Generic Manhole w/ External Flow	0.360	0.90	10.00	5.47	0.324	0.000	0.324	1.79	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSPG -4	Generic Manhole w/ External Flow	0.360	0.90	10.00	5.47	0.324	0.000	0.324	1.79	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.324		0.000	0.00
FSRD-1B	Grate Type C-L - Grate Type A	0.450	0.90	5.00	6.73	0.405	1.243	1.648	11.19	In Sag		0.020	0.71	35.61	0.00	0.00	0.000		1.648	0.0	0.000	0.00
FSRD -1A	Grate Type C-L - Grate Type A	0.360	0.90	5.00	6.73	0.324	0.199	0.523	3.55	In Sag		0.020	0.34	17.24	0.00	0.00	0.000		0.523	0.0	0.000	0.00
GARNER ST CB	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	On Grade	0.020000	0.020	0.00	0.00	0.00	0.00	0.000	PARKING LOT	0.000		0.000	0.00
GATE 11 MH	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.928	5.00
GB-AS1/I-84EB	Combination Type C Grate Type A - Plain Curb	0.140	0.90	5.00	6.73	0.126	0.356	0.482	3.27	On Grade	0.020000	0.020	0.18	8.86	0.00	1.58	0.233	GB-AS6	0.249	0.0	0.800	5.00
GB-AS2/I-84WB	Combination Type C Grate Type A - Plain Curb	0.339	0.90	10.00	5.47	0.305	1.306	1.611	8.89	On Grade	0.020000	0.020	0.26	12.89	0.00	5.49	0.996	GB-AS5	0.615	0.0	1.600	5.00
GB-AS3	Combination Type C Grate Type A - Plain Curb	0.603	0.90	5.00	6.73	0.543	0.129	0.671	4.56	On Grade	0.020000	0.020	0.20	10.03	0.00	2.42	0.356	GB-AS1/I-84EB	0.315	0.0	0.000	0.00

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Scenario: 25 year

Inlet Report (BUSWAY)

Label	Inlet	Area (acres)	Inlet C	Time of Concentration (min)	Local Intensity (in/hr)	Inlet CA (acres)	Carryover CA (acres)	Total Inlet CA (acres)	Total Flow To Inlet (cfs)	Inlet Location	Longitudina Slope (ft/ft)	Gutter Cross Slope (ft/ft)	Gutter Ditch Depth (ft)	Gutter Ditch Spread (ft)	Gutter Width (ft)	Total Bypassed Flow (cfs)	Bypassed CA (acres)	Bypass Target	Intercepted CA (acres)	Clogging Factor (%)	External CA (acres)	External Time of Concentration (min)
GB-AS4	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	1.964	1.964	13.33	On Grad	0.020000	0.020	0.30	15.01	0.00	8.86	1.306	GB-AS2/I-84WE	0.658	0.0	0.000	0.00
GB-AS5	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.996	0.996	6.76	On Grad	0.020000	0.020	0.23	11.63	0.00	3.94	0.581	GB-CB4	0.415	0.0	0.000	0.00
GB-AS6	Combination Type C Grate Type A - Plain Curb	0.227	0.90	5.00	6.73	0.204	0.233	0.437	2.97	On Grad	0.020000	0.020	0.17	8.54	0.00	1.39	0.205	206+51.63 CB	0.232	0.0	0.000	0.00
GB-B1	Combination Type C Grate Type A - Park Curb	0.851	0.90	5.00	6.73	0.766	0.052	0.818	5.55	On Grad	0.020000	0.020	0.22	10.81	0.00	3.10	0.456	9-BCB-1	0.362	0.0	0.000	0.00
GB-B2	Combination Type C Grate Type A - Park Curb	0.092	0.90	5.00	6.73	0.083	0.325	0.408	2.77	On Grad	0.020000	0.020	0.17	8.32	0.00	1.27	0.187	9-BCB-3	0.221	0.0	0.000	0.00
GB-B3	Generic Manhole w/ External Flow	0.561	0.58	10.00	5.47	0.325	0.000	0.325	1.79	On Grad	0.020000	0.020	0.14	7.08	0.00	1.79	0.325	GB-B2	0.000		0.000	0.00
GB-B4	Grate Type C-L - Grate Type A	0.252	0.23	10.00	5.47	0.058	0.000	0.058	0.32	On Grad	0.020000	0.020	0.07	3.71	0.00	0.04	0.008	GB-FAR1	0.050	0.0	0.000	0.00
GB-CB4	Combination Type C Grate Type A - Plain Curb	0.559	0.90	10.00	5.47	0.503	0.622	1.125	6.21	In Sag		0.020	0.41	20.66	0.00	0.00	0.000		1.125	0.0	0.000	0.00
GB-FAR1	Grate Type C-L - Grate Type A	0.847	0.23	10.00	5.47	0.195	0.011	0.205	1.13	In Sag		0.020	0.17	8.72	0.00	0.00	0.000		0.205	0.0	0.000	0.00
GB-FAR2	Grate Type C-L - Grate Type A	0.150	0.23	10.00	5.47	0.035	0.000	0.035	0.19	On Grad	0.020000	0.020	0.06	3.05	0.00	0.01	0.003	GB-FAR1	0.032	0.0	0.000	0.00
GB-HB1	Combination Type C Grate Type A - Plain Curb	0.190	0.90	5.00	6.73	0.171	0.000	0.171	1.16	In Sag		0.020	0.14	7.19	0.00	0.00	0.000		0.171	0.0	0.000	0.00
GB-HB2	Combination Type C Grate Type A - Plain Curb	0.074	0.90	5.00	6.73	0.067	0.007	0.073	0.50	In Sag		0.020	0.08	4.16	0.00	0.00	0.000		0.073	0.0	0.000	0.00
GB-HB3	Grate Type RPW w/o Throat	0.036	0.90	5.00	6.73	0.032	0.013	0.046	0.31	On Grad	0.020000	0.020	0.07	3.66	0.00	0.05	0.007	GB-HB2	0.039	0.0	0.000	0.00
GB-HB4	Combination Type C Grate Type A - Plain Curb	0.019	0.90	5.00	6.73	0.017	0.054	0.072	0.49	On Grad	0.020000	0.020	0.09	4.33	0.00	0.09	0.013	GB-HB3	0.058	0.0	0.000	0.00
GB-HB5	Combination Type C Grate Type A - Plain Curb	0.189	0.90	5.00	6.73	0.170	0.000	0.170	1.15	On Grad	0.020000	0.020	0.12	6.00	0.00	0.37	0.054	GB-HB4	0.116	0.0	0.000	0.00
GB-HB6	Combination Type C Grate Type A - Plain Curb	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	On Grad	0.020000	0.020	0.00	0.00	0.00	0.00	0.000	GB-HB2	0.000	0.0	0.000	0.00
GB-HB7	Combination Type C Grate Type A - Plain Curb	1.412	0.90	10.00	5.47	1.271	0.000	1.271	7.01	In Sag		0.020	0.45	22.26	0.00	0.00	0.000		1.271	0.0	0.000	0.00
GB-MH2 CA	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.920	10.00
GB-SANCB 1	Combination Type C Grate Type A - Plain Curb	0.160	0.71	5.00	6.73	0.114	0.000	0.114	0.77	On Grad	0.020000	0.020	0.10	5.15	0.00	0.20	0.029	FSI-4	0.085	0.0	0.000	0.00
GB-SANCB2	Combination Type C Grate Type A - Plain Curb	0.186	0.90	5.00	6.73	0.167	0.000	0.167	1.14	On Grad	0.020000	0.020	0.12	5.96	0.00	0.36	0.053	GB-SANCB4	0.114	0.0	0.000	0.00
GB-SANCB3	Combination Type C Grate Type A - Plain Curb	0.640	0.90	5.00	6.73	0.576	0.000	0.576	3.91	On Grad	0.020000	0.020	0.19	9.47	0.00	1.99	0.293	GB-SANCB5	0.283	0.0	0.000	0.00
GB-SANCB4	Combination Type C Grate Type A - Plain Curb	0.125	0.90	5.00	6.73	0.113	0.053	0.166	1.12	On Grad	0.020000	0.020	0.12	5.94	0.00	0.36	0.052	GB-B1	0.113	0.0	0.000	0.00
GB-SANCB5	Combination Type C Grate Type A - Plain Curb	0.461	0.90	5.00	6.73	0.415	0.963	1.378	9.35	On Grad	0.020000	0.020	0.26	13.14	0.00	5.84	0.860	GB-SANCB7	0.518	0.0	0.000	0.00
GB-SANCB6	Combination Type C Grate Type A - Plain Curb	1.244	0.90	5.00	6.73	1.120	0.000	1.120	7.60	On Grad	0.020000	0.020	0.24	12.16	0.00	4.55	0.670	GB-SANCB5	0.449	0.0	0.000	0.00
GB-SANCB7	Combination Type C Grate Type A - Plain Curb	0.614	0.90	5.00	6.73	0.553	0.860	1.413	9.59	On Grad	0.020000	0.020	0.27	13.26	0.00	6.01	0.886	GB-SANCB10	0.527	0.0	0.000	0.00
GB-SANCB8	Combination Type C Grate Type A - Plain Curb	0.344	0.90	5.00	6.73	0.310	0.000	0.310	2.10	On Grad	0.020000	0.020	0.15	7.51	0.00	0.87	0.129	GB-AS3	0.181	0.0	0.000	0.00
GB-SANCB9	Combination Type C Grate Type B - Park Curb	0.167	0.90	5.00	6.73	0.150	0.000	0.150	1.02	On Grad	0.020000	0.020	0.11	5.72	0.00	0.31	0.045	GB-AS4	0.105	0.0	0.000	0.00
GB-SANCB10	Combination Type C Grate Type A - Plain Curb	1.088	0.90	5.00	6.73	0.979	1.756	2.735	18.56	On Grad	0.020000	0.020	0.34	16.99	0.00	13.02	1.919	GB-AS4	0.816	0.0	0.000	0.00
GB-SANCB11	Grate Type C-L - Grate Type A	0.890	0.90	5.00	6.73	0.801	0.000	0.801	5.44	On Grad	0.020000	0.020	0.21	10.72	0.00	3.08	0.454	GB-SANCB10	0.347	0.0	0.000	0.00
GB-SANCB12	Grate Type C-L - Grate Type A	0.830	0.90	5.00	6.73	0.747	0.000	0.747	5.07	On Grad	0.020000	0.020	0.21	10.44	0.00	2.82	0.416	GB-SANCB10	0.331	0.0	0.000	0.00
GB-SP1	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		5.990	10.00
GC-1	Grate Type C-L - Grate Type A	0.319	0.90	10.00	5.47	0.287	0.000	0.287	1.58	In Sag		0.020	0.21	10.58	0.00	0.00	0.000		0.287	0.0	0.000	0.00
GULLY BROOK INFLOW	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.000	0.00
I-261	Grate Type CM w/o Throat	0.000	0.00	0.00	0.00	0.000	0.009	0.009	0.06	On Grad	0.005000	0.048	0.07	1.48	2.00	0.00	0.000	481+50.00 CB	0.009	25.0	0.000	0.00
Intersection with Broad and Armory (A	Combination Type C Grate Type A - Park Curb	0.132	0.90	5.00	6.73	0.119	0.000	0.119	0.81	In Sag		0.020	0.09	4.29	0.00	0.00	0.000		0.119	0.0	0.000	0.00
LOB Parking and Buliding (Area A36-8	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		5.570	10.00
LOB PARKING LOT	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		1.940	10.00
MH-9-32	Generic Manhole w/ External Flow	0.306	0.90	5.00	6.73	0.275	0.000	0.275	1.87	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.275		0.107	5.00
PARKING LOT CB	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	On Grad	0.020000	0.020	0.00	0.00	0.00	0.00	0.000	GB-AS2/I-84WE	0.000		0.000	0.00
RR-ROW CB1 EXTERNAL CA FROM	Grate Type C-L - Grate Type B	1.679	0.23	27.00	3.58	0.393	0.000	0.393	1.42	In Sag		0.020	0.20	9.93	0.00	0.00	0.000		0.393	0.0	0.000	0.00
SCUPPER (AREA 202)	Grate Type C-L - Grate Type A	0.311	0.90	5.00	6.73	0.280	0.000	0.280	1.90	On Grad	0.020000	0.020	0.14	7.23	0.00	0.79	0.116	SCUPPER (AR	0.164	0.0	0.000	0.00
SCUPPER (AREA 203)	Grate Type C-L - Grate Type A	0.313	0.90	5.00	6.73	0.282	0.116	0.397	2.70	On Grad	0.020000	0.020	0.16	8.24	0.00	1.26	0.186	AREA 9G-2 AN	0.212	0.0	0.000	0.00
SCUPPER 205	Grate Type C-L - Grate Type A	0.123	0.90	5.00	6.73	0.111	0.000	0.111	0.75	In Sag		0.020	0.14	6.93	0.00	0.00	0.000		0.111	0.0	0.000	0.00
SIG-CB2A-1	Grate Type C-L - Grate Type A	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000	0.0	0.000	0.00
SIG-CB2A-2	Grate Type C-L - Grate Type A	1.090	0.61	10.00	5.47	0.665	0.000	0.665	3.67	In Sag		0.020	0.35	17.59	0.00	0.00	0.000		0.665	0.0	0.000	0.00
SIG-CB2B	Grate Type C-L - Grate Type A	0.697	0.69	10.00	5.47	0.481	0.000	0.481	2.65	In Sag		0.020	0.29	14.42	0.00	0.00	0.000		0.481	0.0	0.000	0.00
SIGOURNEY STREET STATION	Generic Manhole w/ External Flow	0.000	0.00	0.00	0.00	0.000	0.000	0.000	0.00	In Sag		0.020	0.00	0.00	0.00	0.00	0.000		0.000		0.450	5.00
TRENCH DRAIN (9D)	Grate Type C-L - Grate Type A	0.303	0.90	5.00	6.73	0.273	0.000	0.273	1.85	In Sag		0.020	0.23	11.61	0.00	0.00	0.000		0.273	0.0	0.000	0.00
TRENCH DRAIN (9E)	Grate Type C-L - Grate Type A	0.363	0.90	5.00	6.73	0.327	0.000	0.327	2.22	In Sag		0.020	0.26	12.93	0.00	0.00	0.000		0.327	0.0	0.000	0.00
TRENCH DRAIN (9G1)	Grate Type C-L - Grate Type A	0.256	0.90	5.00	6.73	0.230	0.000	0.230	1.56	In Sag		0.020	0.21	10.50	0.00	0.00	0.000		0.230	0.0	0.000	0.00

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Scenario: 10 year

Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
(HAWTHORN EXIS	10+32	62.23	62.23	51.63	4.00		Flat	HEC-22 Ener	0.23
6- MH DROP	0+59	45.00	45.00	34.00	4.00		Flat	HEC-22 Ener	0.09
6-MH-88	0+98	41.00	41.00	32.00	4.00		Flat	HEC-22 Ener	0.04
6-MH 100	0+24	42.00	42.00	30.90	4.00		Depresse	HEC-22 Ener	0.03
6-MH 79	4+75	63.21	63.21	56.31	4.00		Flat	HEC-22 Ener	0.01
6-MH 84	3+17	42.40	42.40	35.40	4.00		Flat	HEC-22 Ener	0.01
8MH-1	5+31	49.66	49.66	38.26	4.00		Flat	HEC-22 Ener	0.22
9-BMH-1	11+04	69.85	69.85	58.55	4.00		Depresse	HEC-22 Ener	0.26
9-BMH-2	11+44	70.01	70.01	59.11	4.00		Flat	HEC-22 Ener	0.06
9-MH-34	3+30	52.98	52.98	38.50	5.00		Flat	HEC-22 Ener	0.19
9-MH31	5+60	51.12	51.12	43.07	4.00		Flat	HEC-22 Ener	0.38
9-MH38	2+47	45.00	45.00	38.00	4.00		Flat	HEC-22 Ener	0.52
9-MH39	1+42	45.00	45.00	37.00	4.00		Flat	HEC-22 Ener	0.10
9-MH40	0+10	44.68	44.68	32.85	4.00		Flat	HEC-22 Ener	0.48
9MH-3	10+48	60.00	60.00	56.10	4.00		Flat	HEC-22 Ener	0.48
9MH-30	6+88	48.35	48.35	43.25	4.00		Flat	HEC-22 Ener	0.30
10-MH1	1+19	48.51	48.51	34.31	4.00		Flat	HEC-22 Ener	0.08
11-MH88 (EXISTINC	6+54	55.81	55.81	46.04	4.00		Flat	HEC-22 Ener	1.05
11+43.19 (EXISTINC	10+91	63.13	63.13	56.23	4.00		Flat	HEC-22 Ener	0.05
12+06.76 (EXISTINC	9+80	62.64	62.64	50.12	4.00		Flat	HEC-22 Ener	0.05
13+87.95 (EXISTINC	7+99	66.72	66.72	49.12	4.00		Flat	HEC-22 Ener	0.14
14+68.54 MH	8+92	70.30	70.30	54.20	4.00		Flat	HEC-22 Ener	0.41
14+86.31 (EXISTINC	9+31	70.57	70.57	57.49	4.00		Depresse	HEC-22 Ener	0.00
42+98.18 MH	10+58	69.54	69.54	60.30	4.00		Depresse	HEC-22 Ener	0.07
43+86.69 MH	11+55	69.10	69.10	64.28	4.00		Flat	HEC-22 Ener	0.12
44+43.39 MH	12+13	69.10	69.10	63.81	4.00		Depresse	HEC-22 Ener	0.04
45+17.59 (EXISTINC	12+85	70.61	70.61	65.49	4.00		Flat	HEC-22 Ener	0.06
45+24.65 MH	13+12	71.30	71.30	66.00	4.00		Flat	HEC-22 Ener	0.08
206+33.97 MH	12+31	39.43	39.43	29.13	4.00		Depresse	HEC-22 Ener	0.05
450+44.59 MH	9+76	56.88	56.88	44.16	4.00		Flat	HEC-22 Ener	0.16
452+80 MH	7+11	56.50	56.50	38.85	4.00		Flat	HEC-22 Ener	0.20
455+40.97 MH	5+09	58.71	58.71	44.51	4.00		Flat	HEC-22 Ener	0.21
458+49.30 MH	1+80	51.37	51.37	31.97	5.00		Flat	HEC-22 Ener	0.17
462+00.00 MH	2+36	50.48	50.48	43.00	4.00		Flat	HEC-22 Ener	0.08
463+46.32 MH	0+94	51.05	51.05	34.08	4.00		Flat	HEC-22 Ener	0.01
465+50 MH	3+75	53.12	53.12	37.17	4.00		Flat	HEC-22 Ener	0.32
468+63.19 MH	3+17	49.50	49.50	38.42	5.00		Flat	HEC-22 Ener	0.14
472+00.00 MH	4+67	48.32	48.32	36.34	4.00		Flat	HEC-22 Ener	0.04
472+00.10	4+47	48.06	48.06	36.14	4.00		Flat	HEC-22 Ener	0.12
473+42.04 MH	6+05	47.10	47.10	37.00	4.00		Flat	HEC-22 Ener	0.09
477+05.00 MH	9+83	45.51	45.51	39.07	4.00		Flat	HEC-22 Ener	0.01
478+87.00 MH	11+95	47.01	47.01	41.63	4.00		Flat	HEC-22 Ener	0.06
487+91.93 MH	15+45	48.21	48.21	36.54	4.00		Flat	HEC-22 Ener	0.28
489+23.38 MH	14+17	40.79	40.79	33.98	4.00		Flat	HEC-22 Ener	0.04
902+84.12 MH	6+63	27.76	27.76	25.00	4.00			Absolute	0.00
AB-MH1	12+49	49.81	49.81	42.90	4.00		Flat	HEC-22 Ener	0.40
AB-MH2	12+32	50.47	50.47	41.07	4.00		Flat	HEC-22 Ener	0.06
AB-MH3	11+64	49.48	49.48	34.38	4.00		Flat	HEC-22 Ener	0.07
AB-MH90	9+75	49.87	49.87	34.67	4.00		Flat	HEC-22 Ener	0.19
AETNA MH 201	3+17	62.00	62.00	38.35	4.00		Flat	HEC-22 Ener	0.15
AETNA MH 202	2+83	61.90	61.90	37.90	4.00		Flat	HEC-22 Ener	0.23
AETNA MH 203	2+39	62.00	62.00	37.40	4.00		Flat	HEC-22 Ener	0.07
AETNA MH 204	1+37	54.80	54.80	36.30	4.00		Flat	HEC-22 Ener	0.14

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Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
AETNA MH1	5+70	58.80	58.80	51.30	4.00		Flat	HEC-22 Ener	0.06
AR-MH5	4+43	30.18	30.18	15.78	4.00		Flat	HEC-22 Ener	0.00
AR-MH11	7+59	29.02	29.02	17.92	4.00		Flat	HEC-22 Ener	0.00
AR48-MH	11+92	44.50	44.50	35.15	4.00		Flat	HEC-22 Ener	0.04
ARMH-9	6+67	27.43	27.43	17.03	4.00		Flat	HEC-22 Ener	0.00
ARMORY CAPPED	4+69	30.18	30.18	22.75	4.00		Flat	HEC-22 Ener	0.03
Armory Wet Well	1+05	61.50	61.50	15.00	4.00		Flat	HEC-22 Ener	0.00
BURIED MH 1	9+79	60.00	60.00	54.00	4.00		Flat	HEC-22 Ener	0.31
BURRIED MH 2	9+07	55.00	55.00	53.00	4.00		Flat	HEC-22 Ener	0.06
BURRIED MH 3	7+64	50.00	50.00	47.00	4.00		Flat	HEC-22 Ener	0.07
EXISTING AETNA M	2+25	50.89	50.89	33.89	4.00		Flat	HEC-22 Ener	0.05
EXISTING AETNA M	3+51	49.99	49.99	34.99	4.00		Flat	HEC-22 Ener	0.06
EXISTING MH 458+	2+00	51.72	51.72	32.07	4.00		Flat	HEC-22 Ener	0.19
FSMH-1	11+38	79.56	79.56	69.19	4.00		Flat	HEC-22 Ener	0.01
FSMH-3	9+40	67.34	67.34	60.14	4.00		Flat	HEC-22 Ener	0.09
FSMH-4	9+21	66.60	66.60	56.90	4.00		Flat	HEC-22 Ener	0.10
FSMH-5	8+71	63.77	63.77	55.07	4.00		Flat	HEC-22 Ener	0.07
FSMH-6	7+95	59.94	59.94	51.44	4.00		Flat	HEC-22 Ener	0.06
FSMH-7	6+90	55.21	55.21	46.71	4.00		Flat	HEC-22 Ener	0.07
FSMH-9	5+50	51.00	51.00	40.99	4.00		Flat	HEC-22 Ener	0.01
GATE 8 MH	0+09	47.00	47.00	29.80	4.00		Flat	HEC-22 Ener	0.01
GB-MH1	11+57	40.15	40.15	27.65	4.00		Depress	HEC-22 Ener	0.12
GB-MH2	11+46	39.61	39.61	28.01	4.00		Flat	HEC-22 Ener	0.02
GB-MH3	14+58	52.00	52.00	29.70	4.00		Flat	HEC-22 Ener	0.63
GB-MH4	15+80	67.00	67.00	30.21	4.00		Flat	HEC-22 Ener	0.29
GB-MH6	17+07	68.00	68.00	46.50	4.00		Flat	HEC-22 Ener	0.03
GB-MH7	17+59	69.44	69.44	47.96	4.00		Flat	HEC-22 Ener	0.29
GB-MH8	19+53	74.34	74.34	50.74	4.00		Flat	HEC-22 Ener	0.02
GB-SANMH 1	1+99	42.64	42.64	28.74	4.00		Flat	HEC-22 Ener	0.99
GB-SANMH 2	1+25	39.17	39.17	25.47	4.00		Flat	HEC-22 Ener	2.20
GB-SANMH 3	1+02	38.30	38.30	25.37	4.00		Flat	HEC-22 Ener	1.47
GB-SANMH4	5+74	67.00	67.00	32.65	4.00		Flat	HEC-22 Ener	3.52
GB-SANMH5	6+06	67.00	67.00	54.71	4.00		Flat	HEC-22 Ener	1.02
GB-SANMH6	6+40	67.20	67.20	54.80	4.00		Flat	HEC-22 Ener	0.02
GB-SANMH7	7+25	68.31	68.31	55.47	4.00		Flat	HEC-22 Ener	0.26
GB-SANMH8	8+02	70.65	70.65	57.13	4.00		Flat	HEC-22 Ener	0.11
GB-SANMH9	6+72	68.00	68.00	55.50	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH10	8+83	75.00	75.00	59.90	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH11	10+80	79.00	79.00	67.00	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH12	11+52	80.76	80.76	60.42	4.00		Depress	HEC-22 Ener	0.00
GB-SANMH13	12+21	81.00	81.00	69.80	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH14	13+84	82.17	82.17	70.67	4.00		Flat	HEC-22 Ener	0.01
GB-SANMH15	15+12	81.50	81.50	71.25	4.00		Flat	HEC-22 Ener	0.02
GB-SANMH16	10+20	81.89	81.89	69.49	4.00		Flat	HEC-22 Ener	0.17
GB-SANMH17	12+66	88.58	88.58	76.58	4.00		Flat	HEC-22 Ener	0.13
GB-SANMH19	14+42	91.00	91.00	89.00	4.00		Flat	HEC-22 Ener	0.04
GB-SANMH20	6+91	68.00	68.00	55.19	4.00		Flat	HEC-22 Ener	1.72
GULLY BROOK BE	8+38	34.80	34.80	14.22	4.00		Flat	HEC-22 Ener	0.32
GULLY BROOK CH	11+00	38.30	38.30	20.85	4.00		Flat	HEC-22 Ener	0.16
GULLY BROOK GA	10+82	36.90	36.90	15.97	4.00		Flat	HEC-22 Ener	0.37
J-1	2+69	42.00	42.00	21.59	4.00		Flat	HEC-22 Ener	0.14
J-2	1+27	42.00	42.00	16.09	4.00		Flat	HEC-22 Ener	0.52
J-16	1+47	42.00	42.00	20.96	4.00		Flat	HEC-22 Ener	0.42

Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
J-17	1+99	42.00	42.00	21.24	4.00		Flat	HEC-22 Ener	0.27
J-18	2+17	42.00	42.00	21.33	4.00		Flat	HEC-22 Ener	0.26
J-20	3+71	42.00	42.00	22.09	4.00		Flat	HEC-22 Ener	0.08
J-27	1+13	42.00	42.00	15.01	8.00		Flat	HEC-22 Ener	0.23
J-53	3+01	59.64	59.64	45.00	4.00		Flat	HEC-22 Ener	0.00
J-54	3+31	59.64	59.64	46.00	4.00		Depress	HEC-22 Ener	0.00
J-108	11+10	38.25	38.25	16.15	4.00		Flat	HEC-22 Ener	0.34
J-134	7+88	46.20	46.20	38.00	4.00			Absolute	0.00
J-135	9+07	45.90	45.90	38.59	4.00			Absolute	0.00
J-136	7+04	46.60	46.60	38.00	4.00			Absolute	0.00
MH 2+95	4+50	42.00	42.00	27.26	4.00		Flat	HEC-22 Ener	0.04
MH 3+95	5+44	42.00	42.00	28.60	4.00		Flat	HEC-22 Ener	0.05
MH 4+95	6+34	42.00	42.00	30.10	4.00		Flat	HEC-22 Ener	0.05
MH 5+95	7+61	42.00	42.00	31.58	4.00		Flat	HEC-22 Ener	0.04
RR ROW MH 1	2+68	49.00	49.00	39.43	4.00		Flat	HEC-22 Ener	0.01

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Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
(HAWTHORN EXIS	10+32	62.23	62.23	51.63	4.00		Flat	HEC-22 Ener	0.29
6- MH DROP	0+59	45.00	45.00	34.00	4.00		Flat	HEC-22 Ener	0.11
6-MH-88	0+98	41.00	41.00	32.00	4.00		Flat	HEC-22 Ener	0.05
6-MH 100	0+24	42.00	42.00	30.90	4.00		Depresse	HEC-22 Ener	0.04
6-MH 79	4+75	63.21	63.21	56.31	4.00		Flat	HEC-22 Ener	0.01
6-MH 84	3+17	42.40	42.40	35.40	4.00		Flat	HEC-22 Ener	0.01
8MH-1	5+31	49.66	49.66	38.26	4.00		Flat	HEC-22 Ener	0.24
9-BMH-1	11+04	69.85	69.85	58.55	4.00		Depresse	HEC-22 Ener	0.36
9-BMH-2	11+44	70.01	70.01	59.11	4.00		Flat	HEC-22 Ener	0.10
9-MH-34	3+30	52.98	52.98	38.50	5.00		Flat	HEC-22 Ener	0.29
9-MH31	5+60	51.12	51.12	43.07	4.00		Flat	HEC-22 Ener	0.45
9-MH38	2+47	45.00	45.00	38.00	4.00		Flat	HEC-22 Ener	0.64
9-MH39	1+42	45.00	45.00	37.00	4.00		Flat	HEC-22 Ener	0.13
9-MH40	0+10	44.68	44.68	32.85	4.00		Flat	HEC-22 Ener	0.59
9MH-3	10+48	60.00	60.00	56.10	4.00		Flat	HEC-22 Ener	0.60
9MH-30	6+88	48.35	48.35	43.25	4.00		Flat	HEC-22 Ener	0.45
10-MH1	1+19	48.51	48.51	34.31	4.00		Flat	HEC-22 Ener	0.09
11-MH88 (EXISTINC	6+54	55.81	55.81	46.04	4.00		Flat	HEC-22 Ener	1.71
11+43.19 (EXISTINC	10+91	63.13	63.13	56.23	4.00		Flat	HEC-22 Ener	0.14
12+06.76 (EXISTINC	9+80	62.64	62.64	50.12	4.00		Flat	HEC-22 Ener	0.07
13+87.95 (EXISTINC	7+99	66.72	66.72	49.12	4.00		Flat	HEC-22 Ener	0.28
14+68.54 MH	8+92	70.30	70.30	54.20	4.00		Flat	HEC-22 Ener	0.49
14+86.31 (EXISTINC	9+31	70.57	70.57	57.49	4.00		Depresse	HEC-22 Ener	0.00
42+98.18 MH	10+58	69.54	69.54	60.30	4.00		Depresse	HEC-22 Ener	0.07
43+86.69 MH	11+55	69.10	69.10	64.28	4.00		Flat	HEC-22 Ener	0.14
44+43.39 MH	12+13	69.10	69.10	63.81	4.00		Depresse	HEC-22 Ener	0.04
45+17.59 (EXISTINC	12+85	70.61	70.61	65.49	4.00		Flat	HEC-22 Ener	0.06
45+24.65 MH	13+12	71.30	71.30	66.00	4.00		Flat	HEC-22 Ener	0.09
206+33.97 MH	12+31	39.43	39.43	29.13	4.00		Depresse	HEC-22 Ener	0.05
450+44.59 MH	9+76	56.88	56.88	44.16	4.00		Flat	HEC-22 Ener	0.19
452+80 MH	7+11	56.50	56.50	38.85	4.00		Flat	HEC-22 Ener	0.19
455+40.97 MH	5+09	58.71	58.71	44.51	4.00		Flat	HEC-22 Ener	0.26
458+49.30 MH	1+80	51.37	51.37	31.97	5.00		Flat	HEC-22 Ener	0.20
462+00.00 MH	2+36	50.48	50.48	43.00	4.00		Flat	HEC-22 Ener	0.09
463+46.32 MH	0+94	51.05	51.05	34.08	4.00		Flat	HEC-22 Ener	0.01
465+50 MH	3+75	53.12	53.12	37.17	4.00		Flat	HEC-22 Ener	0.35
468+63.19 MH	3+17	49.50	49.50	38.42	5.00		Flat	HEC-22 Ener	0.20
472+00.00 MH	4+67	48.32	48.32	36.34	4.00		Flat	HEC-22 Ener	0.04
472+00.10	4+47	48.06	48.06	36.14	4.00		Flat	HEC-22 Ener	0.13
473+42.04 MH	6+05	47.10	47.10	37.00	4.00		Flat	HEC-22 Ener	0.14
477+05.00 MH	9+83	45.51	45.51	39.07	4.00		Flat	HEC-22 Ener	0.00
478+87.00 MH	11+95	47.01	47.01	41.63	4.00		Flat	HEC-22 Ener	0.06
487+91.93 MH	15+45	48.21	48.21	36.54	4.00		Flat	HEC-22 Ener	0.31
489+23.38 MH	14+17	40.79	40.79	33.98	4.00		Flat	HEC-22 Ener	0.04
902+84.12 MH	6+63	27.76	27.76	25.00	4.00			Absolute	0.00
AB-MH1	12+49	49.81	49.81	42.90	4.00		Flat	HEC-22 Ener	0.47
AB-MH2	12+32	50.47	50.47	41.07	4.00		Flat	HEC-22 Ener	0.08
AB-MH3	11+64	49.48	49.48	34.38	4.00		Flat	HEC-22 Ener	0.07
AB-MH90	9+75	49.87	49.87	34.67	4.00		Flat	HEC-22 Ener	0.18
AETNA MH 201	3+17	62.00	62.00	38.35	4.00		Flat	HEC-22 Ener	0.10
AETNA MH 202	2+83	61.90	61.90	37.90	4.00		Flat	HEC-22 Ener	0.27
AETNA MH 203	2+39	62.00	62.00	37.40	4.00		Flat	HEC-22 Ener	0.08
AETNA MH 204	1+37	54.80	54.80	36.30	4.00		Flat	HEC-22 Ener	0.16

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Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
AETNA MH1	5+70	58.80	58.80	51.30	4.00		Flat	HEC-22 Ener	0.07
AR-MH5	4+43	30.18	30.18	15.78	4.00		Flat	HEC-22 Ener	0.00
AR-MH11	7+59	29.02	29.02	17.92	4.00		Flat	HEC-22 Ener	0.00
AR48-MH	11+92	44.50	44.50	35.15	4.00		Flat	HEC-22 Ener	0.04
ARMH-9	6+67	27.43	27.43	17.03	4.00		Flat	HEC-22 Ener	0.00
ARMORY CAPPED	4+69	30.18	30.18	22.75	4.00		Flat	HEC-22 Ener	0.03
Armory Wet Well	1+05	61.50	61.50	15.00	4.00		Flat	HEC-22 Ener	0.00
BURIED MH 1	9+79	60.00	60.00	54.00	4.00		Flat	HEC-22 Ener	0.37
BURRIED MH 2	9+07	55.00	55.00	53.00	4.00		Flat	HEC-22 Ener	0.07
BURRIED MH 3	7+64	50.00	50.00	47.00	4.00		Flat	HEC-22 Ener	0.11
EXISTING AETNA M	2+25	50.89	50.89	33.89	4.00		Flat	HEC-22 Ener	0.06
EXISTING AETNA M	3+51	49.99	49.99	34.99	4.00		Flat	HEC-22 Ener	0.06
EXISTING MH 458+	2+00	51.72	51.72	32.07	4.00		Flat	HEC-22 Ener	0.22
FSMH-1	11+38	79.56	79.56	69.19	4.00		Flat	HEC-22 Ener	0.02
FSMH-3	9+40	67.34	67.34	60.14	4.00		Flat	HEC-22 Ener	0.11
FSMH-4	9+21	66.60	66.60	56.90	4.00		Flat	HEC-22 Ener	0.11
FSMH-5	8+71	63.77	63.77	55.07	4.00		Flat	HEC-22 Ener	0.07
FSMH-6	7+95	59.94	59.94	51.44	4.00		Flat	HEC-22 Ener	0.07
FSMH-7	6+90	55.21	55.21	46.71	4.00		Flat	HEC-22 Ener	0.07
FSMH-9	5+50	51.00	51.00	40.99	4.00		Flat	HEC-22 Ener	0.02
GATE 8 MH	0+09	47.00	47.00	29.80	4.00		Flat	HEC-22 Ener	0.02
GB-MH1	11+57	40.15	40.15	27.65	4.00		Depress	HEC-22 Ener	0.14
GB-MH2	11+46	39.61	39.61	28.01	4.00		Flat	HEC-22 Ener	0.03
GB-MH3	14+58	52.00	52.00	29.70	4.00		Flat	HEC-22 Ener	0.84
GB-MH4	15+80	67.00	67.00	30.21	4.00		Flat	HEC-22 Ener	0.40
GB-MH6	17+07	68.00	68.00	46.50	4.00		Flat	HEC-22 Ener	0.04
GB-MH7	17+59	69.44	69.44	47.96	4.00		Flat	HEC-22 Ener	0.23
GB-MH8	19+53	74.34	74.34	50.74	4.00		Flat	HEC-22 Ener	0.03
GB-SANMH 1	1+99	42.64	42.64	28.74	4.00		Flat	HEC-22 Ener	1.18
GB-SANMH 2	1+25	39.17	39.17	25.47	4.00		Flat	HEC-22 Ener	2.60
GB-SANMH 3	1+02	38.30	38.30	25.37	4.00		Flat	HEC-22 Ener	1.74
GB-SANMH4	5+74	67.00	67.00	32.65	4.00		Flat	HEC-22 Ener	4.12
GB-SANMH5	6+06	67.00	67.00	54.71	4.00		Flat	HEC-22 Ener	1.19
GB-SANMH6	6+40	67.20	67.20	54.80	4.00		Flat	HEC-22 Ener	0.03
GB-SANMH7	7+25	68.31	68.31	55.47	4.00		Flat	HEC-22 Ener	0.31
GB-SANMH8	8+02	70.65	70.65	57.13	4.00		Flat	HEC-22 Ener	0.13
GB-SANMH9	6+72	68.00	68.00	55.50	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH10	8+83	75.00	75.00	59.90	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH11	10+80	79.00	79.00	67.00	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH12	11+52	80.76	80.76	60.42	4.00		Depress	HEC-22 Ener	0.00
GB-SANMH13	12+21	81.00	81.00	69.80	4.00		Flat	HEC-22 Ener	0.00
GB-SANMH14	13+84	82.17	82.17	70.67	4.00		Flat	HEC-22 Ener	0.01
GB-SANMH15	15+12	81.50	81.50	71.25	4.00		Flat	HEC-22 Ener	0.03
GB-SANMH16	10+20	81.89	81.89	69.49	4.00		Flat	HEC-22 Ener	0.19
GB-SANMH17	12+66	88.58	88.58	76.58	4.00		Flat	HEC-22 Ener	0.15
GB-SANMH19	14+42	91.00	91.00	89.00	4.00		Flat	HEC-22 Ener	0.05
GB-SANMH20	6+91	68.00	68.00	55.19	4.00		Flat	HEC-22 Ener	2.00
GULLY BROOK BE	8+38	34.80	34.80	14.22	4.00		Flat	HEC-22 Ener	0.32
GULLY BROOK CH	11+00	38.30	38.30	20.85	4.00		Flat	HEC-22 Ener	0.19
GULLY BROOK GA	10+82	36.90	36.90	15.97	4.00		Flat	HEC-22 Ener	0.37
J-1	2+69	42.00	42.00	21.59	4.00		Flat	HEC-22 Ener	0.13
J-2	1+27	42.00	42.00	16.09	4.00		Flat	HEC-22 Ener	0.48
J-16	1+47	42.00	42.00	20.96	4.00		Flat	HEC-22 Ener	0.40

Junction Report BUSWAY

Label	Calculated Station (ft)	Ground Elevation (ft)	Rim Elevation (ft)	Sump Elevation (ft)	Structure Diameter (ft)	Description	HEC-22 Benching Method	Headloss Method	Gravity Element Headloss (ft)
J-17	1+99	42.00	42.00	21.24	4.00		Flat	HEC-22 Ener	0.25
J-18	2+17	42.00	42.00	21.33	4.00		Flat	HEC-22 Ener	0.24
J-20	3+71	42.00	42.00	22.09	4.00		Flat	HEC-22 Ener	0.07
J-27	1+13	42.00	42.00	15.01	8.00		Flat	HEC-22 Ener	0.21
J-53	3+01	59.64	59.64	45.00	4.00		Flat	HEC-22 Ener	0.00
J-54	3+31	59.64	59.64	46.00	4.00		Depress	HEC-22 Ener	0.00
J-108	11+10	38.25	38.25	16.15	4.00		Flat	HEC-22 Ener	0.34
J-134	7+88	46.20	46.20	38.00	4.00			Absolute	0.00
J-135	9+07	45.90	45.90	38.59	4.00			Absolute	0.00
J-136	7+04	46.60	46.60	38.00	4.00			Absolute	0.00
MH 2+95	4+50	42.00	42.00	27.26	4.00		Flat	HEC-22 Ener	0.04
MH 3+95	5+44	42.00	42.00	28.60	4.00		Flat	HEC-22 Ener	0.05
MH 4+95	6+34	42.00	42.00	30.10	4.00		Flat	HEC-22 Ener	0.05
MH 5+95	7+61	42.00	42.00	31.58	4.00		Flat	HEC-22 Ener	0.04
RR ROW MH 1	2+68	49.00	49.00	39.43	4.00		Flat	HEC-22 Ener	0.01

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-82	(HAWTHORN EXISTING MH)	12+06.76 (EXISTING MH)	18 inch	5.33	52.00	3.01	0.14	0.14	0.13	0.002572	51.73	57.00	62.23	50.82	56.86	62.64
P-404	6- CB 3	6- CB1 (98)	18 inch	0.85	92.00	5.54	0.12	0.06	3.11	0.034446	53.00	53.34	60.00	49.80	50.23	55.36
P-190	6- CB1 (98)	6-CB 2 (97)	18 inch	1.06	21.00	3.99	0.14	0.03	-0.02	0.003931	49.80	50.18	55.36	49.56	50.20	55.46
P-238	6- MH 90	6- MH DROP	15 inch	7.22	80.00	11.77	0.64	2.15	4.45	0.036752	46.00	47.07	51.80	42.00	42.63	45.00
P-239	6- MH DROP	6-MH 100	15 inch	7.19	35.00	9.50	0.64	1.24	1.29	0.019883	34.00	35.07	45.00	33.00	33.78	42.00
P-191	6-CB 2 (97)	6- MH 90	18 inch	2.15	85.00	7.78	0.20	0.02	2.58	0.032515	49.56	50.11	55.46	46.00	47.53	51.80
P-403	6-CB 4	6- CB 3	18 inch	0.84	108.00	3.46	0.12	0.10	0.98	0.009244	54.00	54.34	60.00	53.00	53.36	60.00
P-201	6-CB 79A	6-MH 79	18 inch	1.36	41.00	3.53	0.16	0.19	0.30	0.006462	56.88	57.32	61.98	56.61	57.01	63.21
P-194	6-MH-88	6-MH 100	30 inch	3.99	74.00	4.61	0.23	0.33	0.58	0.006473	32.50	33.16	41.00	32.00	32.58	42.00
P-193	6-MH 100	GATE 6	36 inch	6.10	24.00	6.36	0.28	0.55	0.47	0.008153	31.80	32.58	42.00	31.50	32.11	43.00
P-240	6-MH 79	481+64.79 CB	24 inch	1.35	10.00	13.49	0.14	2.83	11.67	0.897796	56.41	56.81	63.21	45.00	45.14	57.11
P-289	6-MH 79B	6-CB 79A	12 inch	1.54	194.00	4.06	0.21	0.26	1.63	0.008162	58.57	59.10	68.17	56.98	57.47	61.98
P-288	6-MH 79C	6-MH 79B	12 inch	0.87	91.00	3.23	0.15	0.10	0.53	0.006409	59.27	59.66	67.07	58.67	59.13	68.17
P-287	6-MH 79D	6-MH 79C	12 inch	0.24	142.00	2.31	0.07	0.06	1.02	0.007246	60.50	60.70	67.00	59.47	59.68	67.07
P-199	6-MH 82	6-MH 84	24 inch	1.26	62.00	6.74	0.14	0.13	2.99	0.048385	39.00	39.39	50.60	36.00	36.39	42.40
P-198	6-MH 84	6-MH 85	24 inch	1.26	100.00	5.11	0.14	0.41	2.32	0.020517	36.00	36.39	42.40	33.80	34.06	41.60
P-405	6-MH 85	6-MH-88	30 inch	1.33	119.00	3.18	0.13	0.02	0.37	0.004049	33.20	33.57	41.60	32.50	33.20	41.00
P-130	8MH-1	FSRD -1A	36 inch	26.41	128.00	6.86	0.67	0.73	0.69	0.004971	38.26	39.92	49.66	37.62	39.23	46.62
P-14	9-BCB-1	9-BMH-1	15 inch	4.47	58.00	3.64	0.23	0.39	0.36	0.003429	65.03	66.17	69.33	64.95	65.81	69.85
P-12	9-BCB-2	9-BMH-2	15 inch	3.13	16.00	9.96	0.29	1.12	1.23	0.024965	64.75	65.46	69.55	63.81	64.24	70.01
P-13	9-BCB-3	9-BCB-2	15 inch	2.81	64.00	5.17	0.27	0.19	0.57	0.010110	65.52	66.19	69.22	64.85	65.62	69.55
P-10	9-BMH-1	9MH-3	15 inch	7.48	56.00	7.96	0.68	0.58	2.97	0.054767	59.55	60.64	69.85	56.10	57.67	60.00
P-11	9-BMH-2	9-BMH-1	15 inch	3.13	40.00	2.55	0.10	0.10	0.32	0.007997	59.81	61.22	70.01	59.55	60.90	69.85
P-454	9-MH-34	468+63.19 MH	24 inch	18.85	13.00	6.00	0.56	0.56	0.09	0.006945	38.50	40.89	52.98	38.42	40.80	49.50
P-6	9-MH31	MH-9-32	18 inch	15.20	124.00	8.60	1.15	1.15	2.60	0.020943	43.07	45.11	51.12	40.32	42.51	52.79
P-3	9-MH38	9-MH39	24 inch	19.79	105.00	7.95	0.84	0.76	0.90	0.009412	38.00	39.60	45.00	37.00	38.70	45.00
P-2	9-MH39	9-MH40	24 inch	19.60	132.00	12.69	0.83	0.60	3.68	0.029564	37.00	38.59	45.00	32.85	34.91	44.68
P-97	9-MH40	GATE 9	24 inch	19.44	10.00	16.09	0.82	1.73	1.05	0.014569	32.85	34.44	44.68	32.25	33.39	44.68
P-9	9MH-3	BURIED MH 1	15 inch	7.44	69.00	9.81	0.67	0.57	1.82	0.027789	56.10	57.19	60.00	54.00	55.37	60.00
P-7	9MH-30	9-MH31	18 inch	12.04	128.00	6.81	0.72	0.72	1.68	0.013135	43.35	47.17	48.35	43.07	45.49	51.12
P-111	10-MH 2	GATE 10	36 inch	8.96	20.00	7.41	0.34	0.67	0.48	0.007793	30.78	31.73	45.00	30.50	31.24	45.00
P-447	10-MH1	463+46.32 MH	24 inch	4.72	25.00	5.52	0.28	0.25	0.19	0.009046	34.31	35.07	48.51	34.08	34.89	51.05
P-412	10+41.86	11+42.33	12 inch	1.10	101.00	3.50	0.17	0.07	0.50	0.005927	59.50	59.94	63.19	58.80	59.45	62.19
P-54	11-MH88 (EXISTING MH)	455+40.97 MH	24 inch	27.20	145.00	8.66	1.16	1.16	2.10	0.014454	46.14	48.70	55.81	44.51	46.60	58.71
P-41	11-MH92	GATE 11 MH	42 inch	48.24	90.00	12.62	0.92	0.73	1.30	0.016642	31.54	33.71	50.24	30.00	32.41	39.25
P-427	11+18.60	11+33.57	12 inch	1.94	32.00	5.17	0.15	0.09	0.04	0.002910	56.76	57.51	61.88	56.33	57.47	62.75
P-85	11+33.57	11+43.19 (EXISTING MH)	15 inch	3.68	5.00	7.04	0.19	0.16	-0.02	0.003136	56.33	57.33	62.75	56.23	57.35	63.13
P-413	11+42.33	12+50.00	15 inch	2.10	107.00	3.56	0.20	0.15	0.43	0.004453	58.80	59.41	62.19	58.30	58.98	62.77
P-431	11+43.19 (EXISTING MH)	(HAWTHORN EXISTING MH)	18 inch	5.34	59.00	12.42	0.28	0.14	0.02	0.002590	56.23	57.24	63.13	51.83	57.22	62.23
P-84	11+65.87	11+43.19 (EXISTING MH)	15 inch	2.00	20.00	10.01	0.22	0.14	1.62	0.084300	58.34	58.90	62.54	56.63	57.29	63.13
P-80	12+04.21	12+06.76 (EXISTING MH)	12 inch	2.92	14.00	11.21	0.35	1.35	1.46	0.032758	57.77	58.50	62.20	56.62	57.04	62.64
P-79	12+06.76 (EXISTING MH)	13+87.95 (EXISTING MH)	24 inch	7.69	181.00	2.45	0.09	0.09	0.21	0.001157	50.12	56.81	62.64	49.22	56.60	66.72
P-414	12+50.00	13+94.09	15 inch	2.51	147.00	3.93	0.24	0.08	0.37	0.003621	58.30	58.94	62.77	57.50	58.58	68.37
P-371	13+05.20	13+87.94	12 inch	0.48	77.00	2.71	0.05	0.01	0.00	0.000618	60.50	60.86	64.83	60.00	60.86	68.15
P-59	13+87.94	13+87.95 (EXISTING MH)	15 inch	4.31	17.00	6.82	0.37	0.62	0.44	0.011378	60.00	60.84	68.15	59.72	60.40	66.72
P-483	13+87.95 (EXISTING MH)	11-MH88 (EXISTING MH)	24 inch	27.36	145.00	8.71	1.18	1.18	2.12	0.014620	49.12	51.86	66.72	46.04	49.74	55.81
P-484	13+94.09	13+87.95 (EXISTING MH)	12 inch	3.79	28.00	6.13	0.46	0.58	0.49	0.013356	57.40	58.23	68.37	57.00	57.74	66.72
P-372	14+28.60	13+87.94	12 inch	3.35	29.00	5.60	0.40	0.29	0.17	0.009618	60.35	61.13	69.45	60.00	60.97	68.15
P-364	14+37.13	13+87.95 (EXISTING MH)	24 inch	16.35	59.00	6.39	0.63	0.69	0.42	0.006184	53.98	55.50	69.59	53.62	55.08	66.72
P-363	14+68.54 MH	14+37.13	24 inch	15.99	34.00	6.53	0.65	0.56	0.11	0.005792	54.20	55.67	70.30	53.98	55.56	69.59
P-509	14+77.17	14+68.54 MH	24 inch	15.09	11.00	4.80	0.36	0.36	0.05	0.004452	54.50	56.97	69.40	54.20	56.92	70.30
P-415	14+86.31 (EXISTING MH)	14+68.54 MH	15 inch	0.00	39.00	0.00	0.00	0.00	0.99	0.025385	59.89	59.89	70.57	58.90	58.90	70.30
P-505	15+88.99	42+70.16	12 inch	0.22	19.00	0.28	0.00	0.00	0.00	0.000038	62.10	63.32	69.16	62.00	63.32	70.03

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-482	41+39.12	14+68.54 MH	15 inch	1.20	58.00	7.64	0.16	0.91	3.72	0.051236	68.72	69.15	73.35	65.20	65.43	70.30
P-508	42+39.81	14+77.17	24 inch	14.79	69.00	10.30	0.63	0.34	0.41	0.010119	56.00	57.39	70.68	54.50	56.97	69.40
P-379	42+47.41	42+98.18 MH	12 inch	1.39	52.00	6.46	0.20	0.65	1.82	0.026309	65.64	66.14	70.48	64.00	64.32	69.54
P-504	42+70.16	42+39.81	24 inch	13.38	30.00	9.09	0.58	1.06	0.79	0.010410	62.00	63.32	70.03	61.50	62.53	70.68
P-365	42+98.18 MH	42+39.81	15 inch	1.38	86.00	5.35	0.17	0.44	1.84	0.018176	63.20	63.66	69.54	61.50	61.83	70.68
P-507	43+42.81	42+70.16	24 inch	12.98	72.00	8.43	0.56	0.54	0.98	0.013880	63.00	64.30	69.05	62.00	63.32	70.03
P-506	43+76.56	43+42.81	24 inch	12.75	35.00	8.48	0.56	0.54	0.49	0.014280	63.50	64.78	68.37	63.00	64.30	69.05
P-70	43+84.89	44+43.39 MH	12 inch	1.24	12.00	3.19	0.16	0.18	0.08	0.005191	65.87	66.36	69.53	65.81	66.28	69.10
P-387	43+86.69 MH	43+76.56	18 inch	6.01	46.00	7.83	0.41	0.18	0.23	0.009842	64.38	65.33	69.10	63.50	65.10	68.37
P-381	43+96.70 RT	43+86.69 MH	12 inch	3.12	9.00	5.35	0.28	0.26	0.03	0.006732	64.60	65.48	68.24	64.50	65.44	69.10
P-69	44+43.39 MH	43+86.69 MH	15 inch	3.60	58.00	4.73	0.32	0.20	0.23	0.006009	64.91	65.68	69.10	64.50	65.45	69.10
P-71	45+17.59 (EXISTING MH)	44+43.39 MH	15 inch	2.65	72.00	4.30	0.26	0.21	0.43	0.006566	65.49	66.14	70.61	65.01	65.72	69.10
P-75	45+24.65 MH	45+17.59 (EXISTING MH)	12 inch	1.03	27.00	4.57	0.16	0.07	0.23	0.012012	66.00	66.43	71.30	65.59	66.20	70.61
P-389	45+37.93	45+24.65 MH	12 inch	1.03	13.00	4.59	0.16	0.10	0.12	0.013648	66.20	66.63	71.58	66.00	66.51	71.30
P-396	45+45.55	45+17.59 (EXISTING MH)	15 inch	1.63	35.00	4.64	0.19	0.10	0.27	0.010331	66.00	66.51	71.70	65.59	66.23	70.61
P-439	200+65.76 WALL 111 SWALE CB	AR-CB-17 (200+66.99)	12 inch	0.25	4.00	5.18	0.07	0.01	-0.00	0.015760	22.76	22.97	30.81	22.48	22.97	26.28
P-359	204+61.66 CB	205+03.21 CB	12 inch	0.66	37.00	2.67	0.11	0.06	0.10	0.003912	35.55	35.90	39.05	35.37	35.80	39.84
P-360	205+03.21 CB	205+83.27 CB	12 inch	0.88	79.00	2.85	0.13	0.15	0.39	0.004712	35.37	35.79	39.84	35.00	35.39	39.57
P-438	205+81.06 WALL 111 SWALE CB	205+83.27 CB	12 inch	0.07	11.00	2.91	0.04	0.00	0.30	0.030411	32.57	32.68	42.00	32.13	32.38	39.57
P-209	205+83.27 CB	206+33.97 MH	12 inch	0.34	52.00	2.83	0.09	0.12	0.53	0.009441	32.13	32.37	39.57	31.63	31.84	39.43
P-210	206+33.97 MH	GB-MH1	18 inch	3.69	74.00	3.78	0.22	0.19	0.24	0.003563	30.63	31.44	39.43	30.35	31.21	40.15
P-398	206+51.63 CB	206+33.97 MH	15 inch	5.30	31.00	5.80	0.45	0.52	0.36	0.009390	32.50	33.43	38.95	32.20	33.07	39.43
P-418	450+44.59 MH	452+80 MH	24 inch	11.81	265.00	9.42	0.52	0.26	4.80	0.019133	44.16	45.39	56.88	38.85	40.59	56.50
P-425	450+44.65 CB	450+44.59 MH	12 inch	0.47	4.00	3.84	0.10	0.18	0.12	0.010357	52.47	52.75	56.38	52.40	52.63	56.88
P-419	452+80 MH	465+50 MH	24 inch	13.86	336.00	5.73	0.51	0.34	1.33	0.004458	38.85	40.29	56.50	37.17	38.96	53.12
P-444	453+09.60 CB	452+80 MH	12 inch	1.12	4.00	3.11	0.15	0.17	0.04	0.005313	50.45	50.91	55.78	50.43	50.88	56.50
P-311	454+00 CB	453+09.60 CB	12 inch	0.50	86.00	2.50	0.10	0.02	0.19	0.003066	50.88	51.18	54.97	50.45	51.00	55.78
P-48	455+40.97 MH	EXISTING MH 458+48.75	30 inch	30.33	309.00	13.52	0.91	2.84	9.32	0.023928	44.51	46.39	58.71	35.90	37.07	51.72
P-313	455+56.08 CB	456+50 CB	12 inch	0.53	90.00	2.53	0.10	0.03	0.28	0.003872	48.82	49.13	53.47	48.37	48.85	52.62
P-422	456+50 CB	465+50 MH	12 inch	0.90	4.00	2.94	0.14	0.15	0.03	0.005223	48.37	48.78	52.62	48.35	48.75	53.12
P-421	456+51.83 CB	465+50 MH	12 inch	0.43	13.00	2.46	0.09	0.10	0.07	0.005390	48.76	49.03	53.44	48.69	48.96	53.12
P-445	458+00 CB	458+49.30 MH	12 inch	0.63	46.00	3.85	0.12	0.23	0.71	0.013019	47.14	47.47	51.37	46.50	46.76	51.37
P-423	458+49.30 MH	11-MH92	42 inch	47.50	82.00	8.07	0.91	0.85	0.36	0.005196	31.97	34.12	51.37	31.54	33.76	50.24
P-308	460+25 RT	EXISTING AETNA MH 2	24 inch	2.05	30.00	8.14	0.18	0.03	0.93	0.035991	36.39	36.89	48.18	34.99	35.95	49.99
P-319	460+25.17 CB	460+71.43 CB	12 inch	0.77	42.00	3.55	0.13	0.03	0.13	0.005613	44.70	45.07	49.46	44.30	44.93	49.36
P-320	460+71.43 CB	461+17.69 CB	12 inch	1.82	42.00	4.02	0.24	0.14	0.16	0.005988	44.30	44.88	49.36	44.00	44.72	49.46
P-321	460+86.88 CB	460+71.43 CB	12 inch	0.17	26.00	2.68	0.03	0.00	-0.02	0.000392	44.69	44.91	49.77	44.30	44.92	49.36
P-446	461+17.69 CB	462+00.00 MH	12 inch	2.29	80.00	5.25	0.28	0.22	0.92	0.012302	44.00	44.65	49.46	43.00	43.73	50.48
P-450	462+00.00 MH	463+46.32 MH	12 inch	2.27	142.00	5.48	0.28	0.47	2.12	0.013634	43.00	43.64	50.48	41.00	41.52	51.05
P-448	463+46.32 MH	10-MH 2	36 inch	6.07	74.00	5.39	0.28	0.45	0.70	0.007137	34.08	34.85	51.05	33.50	34.15	45.00
P-449	463+46.39 CB	463+46.32 MH	12 inch	0.24	4.00	3.30	0.07	0.14	0.12	0.012633	46.10	46.30	50.60	46.02	46.18	51.05
P-451	465+25.89 CB	463+46.32 MH	12 inch	0.20	174.00	3.74	0.06	0.22	5.80	0.032475	46.74	46.93	50.74	41.00	41.12	51.05
P-420	465+50 MH	458+49.30 MH	24 inch	14.28	195.00	5.77	0.52	0.61	1.09	0.005103	37.17	38.64	53.12	36.19	37.55	51.37
P-452	467+00.00 CB	468+63.19 MH	12 inch	0.42	159.00	3.29	0.10	0.17	2.04	0.012364	45.79	46.06	49.87	43.80	44.02	49.50
P-456	468+62.18 CB	468+63.19 MH	12 inch	0.44	4.00	5.44	0.10	0.31	0.29	0.019456	44.20	44.47	49.06	44.00	44.18	49.50
P-455	468+63.19 MH	9-MH38	24 inch	19.96	70.00	6.35	0.63	0.63	0.55	0.007787	38.42	40.66	49.50	38.00	40.12	45.00
P-453	470+39.73 CB	468+63.19 MH	12 inch	0.46	175.00	2.44	0.09	0.10	0.88	0.004974	44.67	44.96	48.17	43.80	44.08	49.50
P-339	471+91.74	FSRD -1A	12 inch	1.87	9.00	4.59	0.24	0.31	0.15	0.008588	35.92	36.50	47.89	35.83	36.36	46.62
P-457	472+00.00 CB	472+00.00 MH	12 inch	0.44	2.00	4.55	0.10	0.20	0.12	0.011253	43.66	43.93	47.66	43.60	43.82	48.32
P-458	472+00.00 MH	472+00.10	12 inch	1.85	20.00	4.58	0.24	0.12	0.00	0.005842	36.30	36.88	48.32	36.10	36.88	48.06
P-338	472+00.10	471+91.74	12 inch	1.87	35.00	3.55	0.18	0.15	0.11	0.004174	36.10	36.76	48.06	35.92	36.65	47.89
P-442	472+50.33 (WALL 104-8A)	472+00.10	12 inch	0.07	51.00	2.56	0.04	0.10	1.53	0.028729	41.50	41.60	48.00	40.00	40.07	48.06
P-460	473+42.00 CB	473+42.04 MH	12 inch	0.52	2.00	5.29	0.11	0.24	0.15	0.012410	42.78	43.08	46.95	42.70	42.93	47.10

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-459	473+42.04 MH	472+00.00 MH	12 inch	1.75	138.00	2.23	0.08	0.08	0.33	0.002416	37.00	38.62	47.10	36.30	38.28	48.32
P-496	474+39.78 CB	J-136	12 inch	0.48	8.00	4.21	0.10	0.24	0.25	0.014473	41.18	41.47	46.18	41.00	41.21	46.60
P-492	475+24.97 CB	J-134	12 inch	0.39	7.00	2.98	0.09	0.13	0.10	0.008618	40.87	41.13	45.87	40.80	41.03	46.20
P-493	476+45.00 CB	J-135	12 inch	1.42	18.00	4.28	0.20	0.11	0.05	0.007456	38.77	39.27	45.29	38.59	39.23	45.90
P-331	476+75.00 CB	476+45.00 CB	12 inch	1.29	30.00	3.23	0.15	0.10	0.06	0.003543	38.92	39.45	45.24	38.77	39.39	45.29
P-463	477+05.00 CB	476+75.00 CB	12 inch	1.15	26.00	3.13	0.15	0.10	0.06	0.003951	39.05	39.53	45.29	38.92	39.47	45.24
P-464	477+05.00 MH	477+05.00 CB	12 inch	0.96	2.00	3.85	0.08	0.07	-0.00	0.002152	39.07	39.61	45.51	39.05	39.61	45.29
P-468	478+87.00 CB	478+87.00 MH	12 inch	0.72	2.00	3.55	0.11	0.09	-0.02	0.003720	41.65	42.03	46.53	41.63	42.04	47.01
P-465	478+87.00 MH	477+05.00 MH	12 inch	0.72	212.00	3.80	0.13	0.04	2.37	0.011591	41.63	41.98	47.01	39.07	39.61	45.51
P-344	480+98.51 CB	481+50.00 CB	12 inch	0.21	51.00	3.09	0.07	0.02	0.81	0.016887	44.03	44.22	47.97	43.09	43.41	47.84
P-486	481+ 94.76 CB	I-261	12 inch	0.81	28.00	5.79	0.14	0.52	1.14	0.027191	43.94	44.32	47.94	42.94	43.17	47.93
P-430	481+13.11 CB	486+95.62 CB	12 inch	1.25	132.00	6.30	0.18	0.05	3.91	0.030630	46.39	46.86	54.99	42.15	42.95	50.97
P-469	481+50.00 CB	I-261	12 inch	0.54	15.00	3.27	0.11	0.17	0.19	0.009046	43.09	43.39	47.84	42.94	43.20	47.93
P-466	481+64.79 CB	I-261	24 inch	0.63	12.00	4.92	0.09	0.04	0.34	0.032473	42.23	42.50	57.11	41.80	42.17	47.93
P-485	482+98.54 CB	481+ 94.76 CB	12 inch	0.37	104.00	3.57	0.09	0.02	1.67	0.016709	45.76	46.01	49.67	43.94	44.34	47.94
P-356	484+42.75 CB	485+63.54 CB	12 inch	0.24	116.00	2.08	0.07	0.04	0.59	0.005300	49.80	50.00	53.70	49.17	49.42	54.78
P-202	485+63.54 CB	481+13.11 CB	12 inch	0.29	37.00	5.54	0.08	0.01	2.43	0.067651	49.17	49.39	54.78	46.39	46.96	54.99
P-204	486+95.62 CB	487+93.79 CB	12 inch	2.70	92.00	7.87	0.32	0.96	3.29	0.028863	42.15	42.85	50.97	39.11	39.56	46.40
P-206	487+91.93 MH	489+23.38 MH	12 inch	3.23	128.00	6.60	0.39	0.28	2.19	0.017969	36.64	37.41	48.21	34.28	35.22	40.79
P-205	487+93.79 CB	487+91.93 MH	12 inch	3.24	34.00	7.15	0.39	0.76	0.97	0.017636	37.81	38.58	46.40	37.04	37.61	48.21
P-443	489+23.38 MH	490+33.68 CB	12 inch	3.70	113.00	5.88	0.45	0.34	1.19	0.011468	34.28	35.10	40.79	32.80	33.91	36.52
P-207	489+23.80	489+23.38 MH	12 inch	0.56	35.00	3.58	0.11	0.01	-0.01	0.002686	34.82	35.13	40.49	34.38	35.14	40.79
P-478	489+58.08	205+83.27 CB	12 inch	0.18	31.00	3.60	0.06	0.02	0.95	0.031820	33.15	33.32	39.27	32.13	32.37	39.57
P-397	490+33.68 CB	206+51.63 CB	15 inch	4.40	42.00	4.95	0.36	0.24	0.10	0.005279	32.80	33.67	36.52	32.50	33.57	38.95
P-502	902+84.12 MH	AR-CB14 (200+35.62)	12 inch	0.84	43.00	5.80	0.14	0.52	1.64	0.029397	25.00	25.38	27.76	23.50	23.74	26.33
P-501	902+85.52	902+84.12 MH	12 inch	0.84	12.00	4.46	0.14	0.28	0.29	0.012005	25.20	25.58	42.85	25.00	25.30	27.76
P-500	903+54.91	902+85.52	12 inch	0.61	72.00	2.95	0.12	0.14	0.51	0.006783	30.91	31.23	38.52	30.42	30.73	42.85
P-353	904+15.54	903+54.91	12 inch	0.49	57.00	2.56	0.10	0.07	0.27	0.005244	31.22	31.51	36.41	30.91	31.25	38.52
P-355	904+27.45	904+27.54	12 inch	0.05	11.00	1.71	0.01	0.00	-0.00	0.000425	31.39	31.53	36.47	31.27	31.53	36.35
P-352	904+27.54	904+15.54	18 inch	0.39	12.00	2.08	0.05	0.04	0.01	0.002362	31.27	31.53	36.35	31.22	31.52	36.41
P-351	904+39.54	904+27.54	12 inch	0.23	12.00	1.72	0.04	0.03	0.02	0.002044	31.31	31.55	36.40	31.27	31.54	36.35
P-27	AB-CB-1	AB-CB-2	15 inch	5.21	154.00	9.43	0.44	0.34	5.18	0.034272	56.36	57.29	62.66	51.05	52.11	55.85
P-26	AB-CB-2	AB-CB-3	15 inch	8.46	150.00	10.75	0.81	0.80	5.36	0.035796	50.85	51.99	55.85	45.48	46.63	50.18
P-25	AB-CB-3	AB-MH1	18 inch	9.06	39.00	11.74	0.59	0.45	1.47	0.041310	45.38	46.54	50.18	43.71	45.07	49.81
P-23	AB-CB-4	AB-MH3	18 inch	10.76	37.00	9.81	0.72	1.30	1.19	0.016492	40.88	42.14	49.58	40.00	40.95	49.48
P-96	AB-MH1	AB-MH2	18 inch	9.04	17.00	10.50	0.59	1.18	0.85	0.015137	43.51	44.67	49.81	42.97	43.82	50.47
P-98	AB-MH2	AB-CB-4	18 inch	9.03	31.00	5.11	0.41	0.41	0.23	0.007392	41.07	42.76	50.47	40.98	42.53	49.58
P-22	AB-MH3	AB-MH90	24 inch	10.23	189.00	3.26	0.20	0.34	0.59	0.002332	34.84	36.57	49.48	34.67	35.98	49.87
P-21	AB-MH90	Armory Drainage (Area A36-7) EXTERNAL CA	24 inch	9.88	107.00	7.37	0.46	0.41	1.20	0.011648	34.67	35.79	49.87	33.42	34.59	48.90
P-88	AETNA CB-103	AETNA CB-104	15 inch	3.13	152.00	4.37	0.29	0.30	0.96	0.006250	53.90	54.61	68.90	52.95	53.66	58.50
P-50	AETNA CB-104	AETNA MH1	15 inch	3.23	75.00	5.39	0.30	0.45	0.91	0.010099	52.85	53.57	58.50	52.05	52.66	58.80
P-435	AETNA CB 105	455+40.97 MH	12 inch	1.04	50.00	4.20	0.16	0.27	0.68	0.011280	52.40	52.83	56.90	51.80	52.15	58.71
P-434	AETNA CB 106	AETNA CB 105	12 inch	0.28	95.00	2.70	0.08	0.01	0.76	0.008615	53.45	53.67	59.86	52.50	52.91	56.90
P-126	AETNA CB 202	AETNA MH 201	12 inch	1.50	10.00	4.34	0.21	0.28	0.16	0.008516	49.40	49.92	61.60	49.30	49.76	62.00
P-119	AETNA CB 203	AETNA MH 202	12 inch	3.41	24.00	5.16	0.41	0.41	0.25	0.009996	57.64	58.43	61.44	57.40	58.18	61.90
P-142	AETNA DI	FSMH-10	12 inch	2.05	34.00	4.85	0.26	0.36	0.45	0.010115	45.07	45.68	49.87	44.70	45.23	50.90
P-125	AETNA MH 201	AETNA MH 202	12 inch	1.50	34.00	1.91	0.06	0.06	0.06	0.001773	38.35	48.90	62.00	38.00	48.84	61.90
P-118	AETNA MH 202	AETNA MH 203	15 inch	4.18	44.00	5.39	0.36	0.45	0.47	0.008762	37.90	38.73	61.90	37.50	38.25	62.00
P-114	AETNA MH 203	AETNA MH 204	24 inch	5.53	102.00	5.90	0.31	0.07	0.29	0.005195	37.40	38.23	62.00	36.40	37.94	54.80
P-113	AETNA MH 204	10-MH1	24 inch	5.62	18.00	11.72	0.32	1.43	1.54	0.023775	36.30	37.14	54.80	35.11	35.59	48.51
P-49	AETNA MH1	455+40.97 MH	24 inch	3.20	61.00	5.35	0.23	0.44	0.83	0.010096	51.30	51.93	58.80	50.60	51.09	58.71
P-108	AETNA PARKING ROOF-2	EXISTING AETNA MH 2	8 inch	4.59	29.00	34.37	2.69	17.78	34.89	0.682791	71.00	71.67	72.00	36.50	36.77	49.99
P-107	AETNA PARKING ROOF -1	EXISTING MH 458+48.75	8 inch	3.83	36.00	31.61	1.88	1.88	37.18	1.032773	71.00	71.66	72.00	32.07	34.49	51.72

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-373	AETNA YD 105	AETNA CB 106	12 inch	0.02	18.00	1.84	0.02	0.00	0.37	0.021557	54.00	54.06	57.00	53.45	53.69	59.86
P-127	AETNA YD 201	AETNA MH 204	12 inch	0.15	9.00	5.24	0.06	0.43	1.08	0.078798	51.00	51.16	54.80	50.00	50.08	54.80
P-426	AETNA YD MH	460+25 RT	24 inch	1.76	182.00	6.48	0.16	0.00	3.62	0.020781	40.11	40.57	74.50	34.19	36.94	48.18
P-185	AR-48-1	AR-MH-12	36 inch	3.34	101.00	7.78	0.20	0.17	3.71	0.037004	25.40	25.97	34.50	21.66	22.26	30.50
P-187	AR-48-1B	AR-48-1CA4	36 inch	2.48	43.00	6.05	0.17	0.15	0.97	0.023194	28.50	28.99	37.50	27.50	28.02	36.50
P-224	AR-48-1C	AR48-MH	15 inch	1.96	177.00	5.23	0.21	0.19	8.47	0.048006	43.65	44.21	53.00	35.15	35.74	44.50
P-186	AR-48-1CA4	AR-48-1	36 inch	2.64	36.00	8.06	0.18	1.01	2.03	0.033190	27.50	28.01	36.50	25.70	25.98	34.50
P-182	AR-48-2	AR-MH-12	15 inch	0.63	70.00	3.09	0.11	0.02	1.61	0.024278	23.57	23.88	32.07	21.66	22.27	30.50
P-180	AR-48-3/ AR-CB16	AR-CB15	18 inch	0.76	31.00	5.42	0.11	0.46	1.23	0.028771	22.73	23.05	27.63	21.62	21.82	25.62
P-161	AR-48-4	Armory Wet Well	48 inch	6.47	23.00	0.52	0.00	0.00	0.00	0.000020	15.10	19.46	42.00	15.00	19.46	61.50
P-170	AR-CB-17 (200+66.99)	AR-CB14 (200+35.62)	15 inch	0.70	65.00	1.37	0.04	0.12	0.20	0.001884	22.48	22.95	26.28	22.43	22.76	26.33
P-164	AR-CB2	AR-CB3	15 inch	0.64	25.00	3.40	0.11	0.18	0.31	0.009598	32.63	32.94	37.93	32.37	32.63	37.07
P-189	AR-CB3	AR-48-4	48 inch	6.49	163.00	4.44	0.00	0.00	0.00	0.000019	15.87	19.47	37.07	15.10	19.46	42.00
P-166	AR-CB4	ARMORY CAPPED MH	15 inch	0.30	22.00	3.05	0.07	0.04	0.28	0.014024	23.07	23.28	30.17	22.75	23.00	30.18
P-168	AR-CB6	AR-MH5	42 inch	6.11	125.00	0.64	0.01	0.01	0.00	0.000037	15.96	19.48	25.76	15.88	19.47	30.18
P-226	AR-CB7	AR-CB8	12 inch	0.15	46.00	1.26	0.02	0.05	0.14	0.002391	21.36	21.57	25.16	21.27	21.43	25.27
P-173	AR-CB8	ARMH-9	24 inch	2.39	12.00	11.21	0.19	0.01	0.52	0.058342	19.47	20.01	25.27	18.03	19.48	27.43
P-177	AR-CB10	AR-CB8	18 inch	1.59	42.00	4.81	0.17	0.36	0.69	0.011961	21.21	21.68	25.31	20.63	20.99	25.27
P-174	AR-CB13	AR-CB8	12 inch	0.63	44.00	2.71	0.11	0.12	0.24	0.005233	21.10	21.44	25.70	20.87	21.20	25.27
P-175	AR-CB13A	AR-CB13	12 inch	0.45	29.00	3.75	0.10	0.22	0.56	0.015136	21.69	21.97	24.79	21.20	21.41	25.70
P-169	AR-CB14 (200+35.62)	AR-CB6	18 inch	2.28	52.00	5.85	0.21	0.03	2.22	0.046243	21.13	21.70	26.33	17.96	19.48	25.76
P-179	AR-CB15	AR-CB10	18 inch	0.78	45.00	2.66	0.11	0.05	0.11	0.003652	21.52	21.85	25.62	21.31	21.75	25.31
P-176	AR-CB18	AR-CB8	12 inch	0.40	55.00	1.50	0.04	0.09	0.18	0.002225	20.85	21.21	24.65	20.77	21.03	25.27
P-183	AR-MH-12	AR-MH11	36 inch	3.59	103.00	7.75	0.21	0.02	2.77	0.028721	21.66	22.25	30.50	18.12	19.48	29.02
P-165	AR-MH5	AR-CB3	48 inch	6.09	152.00	0.94	0.00	0.00	0.00	0.000017	15.88	19.47	30.18	15.87	19.47	37.07
P-184	AR-MH11	ARMH-9	36 inch	3.59	92.00	4.76	0.02	0.01	-0.00	0.000067	18.02	19.48	29.02	17.23	19.48	27.43
P-225	AR48-MH	AR-48-1B	15 inch	1.93	150.00	5.05	0.21	0.40	6.77	0.043868	35.15	35.70	44.50	28.50	28.94	37.50
P-34	AREA 9F-1	AREA 9F-2	12 inch	0.18	30.00	0.23	0.00	0.00	0.00	0.000026	44.92	48.34	48.92	44.48	48.33	48.98
P-32	AREA 9F-2	9MH-30	12 inch	1.82	20.00	2.32	0.08	0.08	0.05	0.002612	44.38	48.24	48.98	44.25	48.19	48.35
P-33	AREA 9F-3	AREA 9F-2	12 inch	0.78	15.00	0.99	0.02	0.02	0.01	0.000474	44.88	48.34	48.58	44.58	48.33	48.98
P-36	AREA 9G-2 AND SCUPPER 204	9-MH31	15 inch	2.33	42.00	7.20	0.24	0.06	0.59	0.018375	46.21	46.82	49.52	44.95	46.23	51.12
P-104	AREA A36-7B (LOB)	AB-MH3	24 inch	0.97	314.00	1.25	0.00	0.00	0.01	0.000017	35.00	36.65	46.80	34.84	36.64	49.48
P-171	ARMH-9	AR-CB6	36 inch	4.51	99.00	5.53	0.01	0.01	0.00	0.000045	17.13	19.48	27.43	16.06	19.48	25.76
P-167	ARMORY CAPPED MH	AR-MH5	12 inch	0.30	26.00	8.61	0.08	0.00	3.50	0.137586	22.75	22.97	30.18	15.98	19.47	30.18
P-99	Armory Drainage (Area A36-7) EXTERNAL CA	MH 5+95	30 inch	26.78	107.00	7.43	0.81	0.86	0.72	0.006335	32.70	34.46	48.90	32.02	33.74	42.00
P-237	Armory Wet Well	Armory Pump Station	8 x 7 ft	18.56	105.00	3.45	0.00	0.00	0.00	0.000007	15.00	19.46	61.50	14.80	19.46	45.00
P-72	BROAD ST COMBINED	TO COMBINED SIPHON	12 inch	1.16	26.00	6.95	0.17	0.73	1.35	0.030278	44.47	44.92	47.97	43.31	43.58	47.21
P-20	BURIED MH 1	BURRIED MH 2	18 inch	7.41	72.00	7.32	0.48	0.35	0.81	0.013144	54.00	55.05	60.00	53.00	54.25	55.00
P-24	BURRIED MH 2	BURRIED MH 3	18 inch	8.96	143.00	11.62	0.58	0.43	5.79	0.041492	53.00	54.16	55.00	47.00	48.37	50.00
P-28	BURRIED MH 3	9MH-30	18 inch	10.78	76.00	12.81	0.72	0.58	0.79	0.012254	47.00	48.26	50.00	43.35	47.47	48.35
P-87	Dummy Off Site Basin	TO GATE 7	18 inch	2.40	33.00	16.46	0.22	4.21	10.96	0.211136	42.83	43.42	44.83	32.25	32.46	45.05
P-117	EXISTING AETNA CB (10)	J-54	12 inch	0.00	78.00	0.00	0.00	0.00	2.57	0.032949	55.57	55.57	59.78	53.00	53.00	59.64
P-433	EXISTING AETNA MH	EXISTING MH 458+48.75	24 inch	6.46	25.00	5.93	0.34	0.33	0.20	0.008772	33.89	34.79	50.89	33.67	34.59	51.72
P-432	EXISTING AETNA MH 2	EXISTING AETNA MH	24 inch	6.56	126.00	4.75	0.35	0.35	0.60	0.004762	34.99	35.90	49.99	34.39	35.29	50.89
P-424	EXISTING MH 458+48.75	458+49.30 MH	42 inch	38.35	20.00	7.53	0.55	0.50	-0.00	0.002546	32.07	34.29	51.72	31.97	34.30	51.37
P-498	EXISTING PARKING LOT CB	AREA 9G-2 AND SCUPPER 204	12 inch	0.67	32.00	2.29	0.05	0.03	0.02	0.001206	46.41	46.90	48.91	46.31	46.88	49.52
P-417	EXTERNAL CA FROM 155-H025	450+44.59 MH	18 inch	11.61	98.00	6.57	0.67	0.79	1.30	0.012046	45.05	47.15	54.42	44.55	45.85	56.88
P-497	EXTERNAL CA FROM RRR	477+05.00 MH	12 inch	0.78	30.00	4.13	0.14	0.05	0.25	0.011145	39.50	39.87	43.60	39.07	39.62	45.51
P-138	FARM I-1	FSMH-1	12 inch	1.87	56.00	11.29	0.24	0.23	4.75	0.084992	73.95	74.53	81.05	69.19	69.78	79.56
P-144	FSI-1	FSMH-6	12 inch	2.59	17.00	10.39	0.31	1.28	1.54	0.033375	53.98	54.67	59.38	52.74	53.13	59.94
P-143	FSI-2	FSMH-6	12 inch	1.40	27.00	8.77	0.20	0.11	1.85	0.071760	54.63	55.13	59.03	52.64	53.28	59.94
P-140	FSI-3	FSMH-5	12 inch	1.07	34.00	9.44	0.17	1.38	4.07	0.083956	60.01	60.45	64.31	56.17	56.37	63.77
P-139	FSI-4	FSMH-1	15 inch	0.78	25.00	7.29	0.12	0.03	1.69	0.071379	71.10	71.45	78.70	69.19	69.75	79.56

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-160	FSMH-1	FSMH-5	24 inch	2.48	267.00	8.51	0.20	0.02	13.42	0.050923	69.19	69.74	79.56	55.07	56.32	63.77
P-152	FSMH-2	FSMH-3	10 inch	7.65	77.00	15.63	3.06	3.56	5.42	0.063957	67.46	68.29	71.66	62.14	62.87	67.34
P-158	FSMH-3	FSMH-4	24 inch	7.63	19.00	17.72	0.38	3.10	3.67	0.049753	60.14	61.12	67.34	57.00	57.46	66.60
P-159	FSMH-4	FSMH-5	24 inch	7.62	50.00	10.38	0.38	0.18	1.47	0.033428	56.90	57.88	66.60	55.07	56.42	63.77
P-136	FSMH-5	FSMH-6	24 inch	10.78	76.00	12.59	0.49	0.28	3.31	0.046215	55.07	56.25	63.77	51.44	52.94	59.94
P-135	FSMH-6	FSMH-7	24 inch	15.89	105.00	13.72	0.67	0.56	4.60	0.044842	51.44	52.88	59.94	46.71	48.28	55.21
P-134	FSMH-7	FSMH-9	24 inch	17.35	140.00	13.23	0.73	2.72	5.99	0.028578	46.71	48.21	55.21	41.35	42.22	51.00
P-131	FSMH-9	8MH-1	36 inch	24.91	19.00	21.85	0.65	3.35	3.17	0.024645	40.99	42.60	51.00	38.56	39.43	49.66
P-132	FSMH-10	FSMH-9	18 inch	6.33	33.00	7.84	0.28	0.20	0.04	0.003527	41.60	42.78	50.90	40.99	42.75	51.00
P-147	FSPG-1	FSMH-6	24 inch	1.57	76.00	4.32	0.15	0.05	0.63	0.009662	53.50	53.93	70.00	52.64	53.31	59.94
P-148	FSPG-2	FSMH-7	24 inch	1.57	42.00	3.63	0.15	0.20	0.33	0.006672	49.00	49.43	70.00	48.71	49.10	55.21
P-145	FSPG-3	FSMH-9	18 inch	1.57	62.00	5.32	0.17	0.02	0.36	0.008233	42.50	42.97	70.00	41.35	42.61	51.00
P-146	FSPG -4	8MH-1	18 inch	1.57	60.00	4.37	0.17	0.30	0.72	0.009975	42.50	42.97	70.00	41.86	42.25	49.66
P-149	FSRD-1B	FSRD -1A	24 inch	9.72	30.00	7.56	0.45	0.37	0.29	0.012242	33.90	35.01	46.62	33.52	34.73	46.62
P-156	FSRD -1A	GATE 8 MH	48 inch	13.65	394.00	7.06	0.39	0.37	3.71	0.009441	33.52	34.60	46.62	29.80	30.89	47.00
P-246	GARNER ST CB	GB-SANMH9	12 inch	0.00	26.00	0.00	0.00	0.00	0.00	0.000000	56.00	67.20	69.50	55.50	67.20	68.00
P-157	GATE 8 MH	GATE 8	48 inch	13.56	9.00	7.46	0.38	0.59	0.25	0.005372	29.80	30.88	47.00	29.70	30.63	47.00
P-37	GATE 11 MH	GATE 11	42 inch	51.12	8.00	23.71	0.96	2.29	1.41	0.010546	30.00	32.24	39.25	29.25	30.83	39.25
P-277	GB-AS1/I-84EB	GB-AS2/I-84WB	18 inch	6.39	81.00	12.20	0.43	0.20	4.31	0.055971	57.00	57.98	60.00	52.00	53.67	57.95
P-278	GB-AS2/I-84WB	GB-MH3	18 inch	15.82	48.00	17.34	1.30	3.75	4.58	0.044300	52.00	53.42	57.95	48.00	48.84	52.00
P-294	GB-AS3	GB-MH6	15 inch	1.97	51.00	5.21	0.21	0.42	0.84	0.012300	58.00	58.56	68.00	57.29	57.72	68.00
P-219	GB-AS4	GB-MH7	15 inch	4.01	16.00	7.96	0.35	0.76	0.64	0.014251	51.50	52.31	69.00	51.08	51.67	69.44
P-272	GB-AS5	GB-SANMH 1	15 inch	2.43	14.00	1.98	0.06	0.06	0.02	0.001414	28.80	42.66	41.70	28.74	42.64	42.64
P-231	GB-AS6	GB-HB1	10 inch	1.42	22.00	2.60	0.10	0.10	0.09	0.004174	42.58	43.55	46.58	42.50	43.46	46.10
P-55	GB-B1	GB-B2	15 inch	2.26	84.00	3.14	0.07	0.06	0.08	0.001170	64.67	65.65	72.97	64.40	65.57	73.80
P-43	GB-B2	GB-B3	15 inch	3.59	68.00	2.92	0.16	0.28	0.36	0.003483	64.40	65.48	73.80	64.31	65.12	74.91
P-282	GB-B3	GB-B4	15 inch	2.91	211.00	5.68	0.28	0.23	2.73	0.013187	64.31	65.00	74.91	61.52	62.26	70.82
P-283	GB-B4	GB-MH8	15 inch	3.09	204.00	5.51	0.29	0.47	2.50	0.011381	61.52	62.23	70.82	59.14	59.72	74.34
P-271	GB-CB4	ASYLUM COMBINED MH	12 inch	5.02	54.00	17.01	0.69	0.63	9.21	0.171487	34.35	35.27	35.85	25.06	26.06	35.86
P-220	GB-FAR1	GB-MH7	18 inch	4.04	129.00	6.88	0.30	0.12	1.94	0.016475	50.46	51.23	73.06	48.14	49.29	69.44
P-221	GB-FAR2	GB-FAR1	15 inch	0.16	155.00	3.54	0.05	0.19	6.03	0.038017	72.44	72.59	76.54	66.46	66.56	73.06
P-232	GB-HB1	GB-HB2	10 inch	2.44	29.00	12.81	0.39	2.38	4.18	0.075662	42.50	43.19	46.10	38.69	39.02	44.79
P-227	GB-HB2	206+33.97 MH	15 inch	9.38	55.00	10.24	0.96	1.54	1.93	0.024624	37.29	38.46	44.79	35.63	36.53	39.43
P-236	GB-HB3	GB-HB2	15 inch	7.12	42.00	9.63	0.63	0.53	1.11	0.028742	39.24	40.31	47.14	37.99	39.20	44.79
P-235	GB-HB4	GB-HB3	15 inch	6.96	65.00	9.63	0.61	1.40	2.30	0.023256	41.30	42.36	50.00	39.34	40.06	47.14
P-234	GB-HB5	GB-HB4	12 inch	6.71	54.00	8.54	1.13	1.13	1.91	0.035453	43.00	44.47	54.00	41.30	42.56	50.00
P-233	GB-HB6	GB-HB5	12 inch	6.14	21.00	7.82	0.95	0.95	0.62	0.029743	43.50	46.30	54.00	43.00	45.67	54.00
P-276	GB-HB7	GB-HB6	12 inch	6.15	20.00	7.83	0.95	0.95	0.60	0.029826	44.00	47.60	54.00	43.50	47.00	54.00
P-211	GB-MH1	GB-MH2	18 inch	3.69	11.00	9.62	0.29	0.89	0.79	0.017128	30.35	31.08	40.15	29.81	30.29	39.61
P-212	GB-MH2	GULLY BROOK CHAMBER	33 inch	17.42	46.00	14.07	0.54	2.34	2.80	0.021572	28.01	29.38	39.61	25.79	26.58	38.30
P-270	GB-MH2 CA	GB-MH2	15 inch	4.45	127.00	7.17	0.39	0.20	1.80	0.015586	30.35	31.21	40.15	28.01	29.41	39.61
P-214	GB-MH3	GB-MH2	33 inch	48.33	312.00	8.14	1.03	1.29	2.79	0.008102	29.70	33.10	52.00	28.01	30.30	39.61
P-215	GB-MH4	GB-MH3	33 inch	34.69	122.00	5.84	0.53	0.53	0.52	0.004302	30.21	34.26	67.00	29.70	33.73	52.00
P-295	GB-MH6	GB-SP1	24 inch	8.37	91.00	6.66	0.11	0.11	0.12	0.001363	46.50	48.45	68.00	45.59	48.33	68.00
P-296	GB-MH7	GB-MH6	18 inch	6.95	52.00	9.37	0.46	0.24	0.12	0.006432	47.96	48.98	69.44	46.50	48.86	68.00
P-222	GB-MH8	GB-FAR1	18 inch	3.03	65.00	1.71	0.05	0.05	0.05	0.000831	50.74	52.81	74.34	50.56	52.75	73.06
P-155	GB-SANCB 1	GB-SANMH15	12 inch	0.53	33.00	9.72	0.11	0.08	7.37	0.224088	78.65	78.95	80.95	71.25	71.58	81.50
P-259	GB-SANCB2	GB-SANMH19	12 inch	0.71	30.00	4.25	0.13	0.11	0.48	0.016605	89.50	89.85	91.00	89.00	89.37	91.00
P-299	GB-SANCB3	GB-SANCB5	12 inch	2.43	63.00	8.32	0.30	0.15	1.75	0.030096	86.37	87.04	90.67	83.76	85.29	89.36
P-298	GB-SANCB4	GB-SANMH17	12 inch	0.70	34.00	7.15	0.13	0.80	2.68	0.059078	87.79	88.14	88.79	85.28	85.46	88.58
P-297	GB-SANCB5	GB-SANMH17	12 inch	8.30	38.00	20.06	1.74	1.74	5.96	0.157121	83.76	84.75	89.36	76.58	78.79	88.58
P-256	GB-SANCB6	GB-SANCB5	12 inch	2.83	65.00	4.42	0.30	0.34	0.52	0.007439	86.04	86.80	89.34	85.56	86.28	89.36
P-252	GB-SANCB7	GB-SANMH17	12 inch	3.25	94.00	6.79	0.39	0.72	2.05	0.018267	83.44	84.21	86.14	81.58	82.17	88.58

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-261	GB-SANCB8	GB-SANCB9	10 inch	1.13	33.00	8.82	0.19	0.09	1.82	0.058097	76.17	76.64	78.97	74.17	74.83	81.17
P-262	GB-SANCB9	GB-SANMH16	10 inch	1.78	26.00	4.31	0.28	0.29	0.18	0.006529	74.17	74.77	81.17	74.00	74.59	81.89
P-260	GB-SANCB10	GB-SANMH16	12 inch	5.08	7.00	20.11	0.70	2.65	2.31	0.051826	77.58	78.50	81.78	75.69	76.19	81.89
P-248	GB-SANCB11	GB-SANMH16	12 inch	4.25	43.00	12.50	0.54	2.29	4.01	0.052575	78.89	79.76	83.49	75.29	75.75	81.89
P-247	GB-SANCB12	GB-SANCB11	12 inch	2.08	14.00	6.83	0.11	0.11	0.04	0.003332	79.27	80.21	82.97	78.89	80.17	83.49
P-273	GB-SANMH 1	GB-SANMH 2	15 inch	15.88	74.00	12.94	2.60	2.60	4.47	0.060448	28.74	41.97	42.64	25.47	37.49	39.17
P-274	GB-SANMH 2	GB-SANMH 3	15 inch	15.84	23.00	12.91	2.59	2.59	1.38	0.060198	25.47	35.29	39.17	25.37	33.91	38.30
P-275	GB-SANMH 3	ASYLUM COMBINED MH	15 inch	15.83	102.00	12.91	2.59	2.59	6.13	0.060120	25.37	32.44	38.30	25.06	26.31	35.86
P-281	GB-SANMH4	GB-SANMH 1	15 inch	14.59	375.00	11.89	2.20	2.20	19.14	0.051047	32.65	61.78	67.00	28.74	42.64	42.64
P-291	GB-SANMH5	GB-SANMH4	15 inch	14.61	32.00	11.90	2.20	2.20	1.64	0.051145	54.71	66.94	67.00	54.67	65.30	67.00
P-290	GB-SANMH6	GB-SANMH5	18 inch	14.63	34.00	8.28	1.07	1.07	0.66	0.019399	54.80	67.66	67.20	54.71	67.00	67.00
P-292	GB-SANMH7	GB-SANMH20	18 inch	14.68	34.00	8.31	1.07	1.07	0.66	0.019541	55.47	68.66	68.31	55.19	68.00	68.00
P-300	GB-SANMH8	GB-SANMH7	24 inch	14.77	77.00	4.70	0.34	0.34	0.33	0.004263	57.13	68.64	70.65	55.47	68.31	68.31
P-245	GB-SANMH9	GB-SANMH6	12 inch	0.00	32.00	0.00	0.00	0.00	0.00	0.000000	55.50	67.20	68.00	54.80	67.20	67.20
P-267	GB-SANMH10	GB-SANMH8	12 inch	0.34	81.00	0.44	0.00	0.00	0.01	0.000093	59.90	70.66	75.00	57.13	70.65	70.65
P-266	GB-SANMH11	GB-SANMH10	12 inch	0.43	197.00	0.54	0.00	0.00	0.03	0.000144	67.00	70.69	79.00	59.90	70.66	75.00
P-265	GB-SANMH12	GB-SANMH11	12 inch	0.47	72.00	0.60	0.01	0.01	0.01	0.000174	69.46	70.70	80.76	67.00	70.69	79.00
P-264	GB-SANMH13	GB-SANMH12	15 inch	0.48	69.00	2.41	0.00	0.00	0.00	0.000058	69.80	70.71	81.00	69.46	70.71	80.76
P-263	GB-SANMH14	GB-SANMH13	15 inch	0.50	163.00	2.51	0.10	0.00	0.24	0.002025	70.67	70.95	82.17	69.80	70.71	81.00
P-154	GB-SANMH15	GB-SANMH14	15 inch	0.52	128.00	2.24	0.08	0.10	0.51	0.003780	71.25	71.56	81.50	70.77	71.05	82.17
P-250	GB-SANMH16	GB-SANMH8	24 inch	22.60	218.00	16.39	0.99	0.80	2.44	0.012004	69.49	71.18	81.89	57.13	68.75	70.65
P-251	GB-SANMH17	GB-SANMH16	18 inch	12.13	246.00	10.85	0.84	0.73	6.54	0.027040	76.58	77.90	88.58	69.49	71.36	81.89
P-258	GB-SANMH19	GB-SANCB3	15 inch	0.71	75.00	2.84	0.12	0.13	0.44	0.005729	89.00	89.33	91.00	88.57	88.89	90.67
P-293	GB-SANMH20	GB-SANMH6	18 inch	14.66	51.00	8.30	1.07	1.07	0.99	0.019484	55.19	68.19	68.00	54.93	67.20	67.20
P-216	GB-SP1	GB-MH4	33 inch	34.79	36.00	9.19	0.91	1.20	0.55	0.007460	45.90	47.86	68.00	45.57	47.31	67.00
P-128	GC-1	AETNA MH 203	15 inch	1.39	26.00	4.42	0.17	0.30	0.39	0.009874	44.50	44.97	50.00	44.20	44.58	62.00
P-242	GULLY BROOK BEND 2	Park River (Gully)	7 x 7 ft	417.40	838.00	6.86	0.73	0.74	1.26	0.001499	14.22	18.56	34.80	12.97	17.30	36.00
P-213	GULLY BROOK CHAMBER	GULLY BROOK GATE	36 inch	17.42	18.00	19.76	0.51	0.40	2.20	0.128317	20.85	22.19	38.30	18.52	19.98	36.90
P-243	GULLY BROOK GATE	GULLY BROOK BEND 2	11 x 9 ft	417.42	244.00	14.28	1.78	1.03	0.65	0.005689	15.97	19.52	36.90	14.22	18.87	34.80
P-285	GULLY BROOK INFLOW	J-108	11 x 9 ft	400.00	107.00	13.45	1.73	1.43	0.33	0.005842	16.82	20.27	37.64	16.15	19.94	38.25
P-467	I-261	6-MH 82	24 inch	1.08	74.00	6.06	0.12	0.03	2.77	0.038678	41.80	42.16	47.93	38.79	39.39	50.60
P-95	Intersection with Broad and Armory (Area A36-	AB-CB-4	15 inch	0.72	51.00	7.80	0.12	0.01	4.11	0.082816	46.05	46.38	49.05	40.98	42.27	49.58
P-39	J-1	J-18	36 inch	47.36	52.00	6.70	0.70	0.70	0.26	0.005044	21.59	24.90	42.00	21.33	24.64	42.00
P-15	J-2	J-27	36 inch	47.04	14.00	6.65	0.69	0.69	0.07	0.004975	16.09	19.80	42.00	16.00	19.73	42.00
P-40	J-16	J-2	36 inch	47.09	20.00	6.66	0.91	1.08	0.28	0.005428	20.96	23.40	42.00	20.89	23.12	42.00
P-16	J-17	J-16	36 inch	47.19	52.00	7.83	0.74	0.72	0.20	0.004334	21.24	24.02	42.00	20.96	23.82	42.00
P-17	J-18	J-17	36 inch	47.24	18.00	6.68	0.69	0.69	0.09	0.005017	21.33	24.38	42.00	21.24	24.29	42.00
P-19	J-20	LOB Parking and Buliding (Area A36-8) EXTERNA	36 inch	26.11	50.00	3.69	0.21	0.21	0.08	0.001533	22.09	25.65	42.00	21.85	25.57	42.00
P-18	J-27	Armory Wet Well	36 inch	47.00	8.00	6.65	0.69	0.69	0.04	0.004967	15.10	19.50	42.00	15.00	19.46	61.50
P-115	J-53	AETNA MH 203	12 inch	0.00	62.00	0.00	0.00	0.00	1.31	0.021129	45.00	45.00	59.64	43.69	43.69	62.00
P-116	J-54	J-53	12 inch	0.00	30.00	0.00	0.00	0.00	1.00	0.033333	46.00	46.00	59.64	45.00	45.00	59.64
P-284	J-108	GULLY BROOK GATE	11 x 9 ft	400.00	28.00	13.57	1.73	1.34	-0.29	0.003581	16.15	19.60	38.25	15.97	19.89	36.90
P-495	J-134	J-136	12 inch	1.51	84.00	1.93	0.06	0.06	0.15	0.001808	38.00	39.08	46.20	37.50	38.92	46.60
P-491	J-135	J-134	12 inch	1.42	119.00	3.29	0.11	0.05	0.15	0.001790	38.59	39.23	45.90	38.00	39.08	46.20
P-494	J-136	473+42.04 MH	12 inch	1.63	99.00	2.07	0.07	0.07	0.21	0.002090	37.50	38.92	46.60	37.00	38.72	47.10
P-38	LOB Parking and Buliding (Area A36-8) EXTEI	J-1	36 inch	47.49	52.00	6.72	0.70	0.70	0.26	0.005070	21.85	25.31	42.00	21.59	25.05	42.00
P-195	LOB PARKING LOT	6-MH-88	15 inch	9.39	139.00	8.82	0.96	0.93	2.96	0.021548	35.00	36.17	42.94	32.00	33.20	41.00
P-5	MH-9-32	9-MH-34	24 inch	18.22	106.00	5.80	0.52	0.52	0.69	0.006490	39.69	42.45	52.79	38.50	41.76	52.98
P-103	MH 2+95	J-20	36 inch	26.21	79.00	6.88	0.67	0.74	0.46	0.005004	27.26	28.91	42.00	26.86	28.45	42.00
P-102	MH 3+95	MH 2+95	30 inch	26.34	94.00	6.76	0.71	0.80	0.58	0.005221	28.60	30.45	42.00	28.12	29.87	42.00
P-101	MH 4+95	MH 3+95	30 inch	26.45	90.00	6.89	0.74	0.80	0.55	0.005394	30.10	31.93	42.00	29.62	31.37	42.00
P-100	MH 5+95	MH 4+95	30 inch	26.65	127.00	5.80	0.58	0.81	0.80	0.004484	31.58	33.66	42.00	31.10	32.86	42.00
P-244	PARKING LOT CB	GB-SANMH9	12 inch	0.00	13.00	0.00	0.00	0.00	0.00	0.000000	56.00	67.20	68.50	55.50	67.20	68.00

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-124	RR-ROW CB1 EXTERNAL CA FROM SCUPP	RR ROW MH 1	15 inch	1.20	90.00	3.86	0.16	0.23	0.86	0.008695	44.99	45.42	48.50	44.19	44.57	49.00
P-123	RR ROW MH 1	10-MH1	18 inch	1.19	149.00	4.61	0.15	0.33	2.42	0.015019	39.43	39.84	49.00	37.11	37.42	48.51
P-481	SCUPPER (AREA 202)	9-MH-34	12 inch	1.03	6.00	14.06	0.16	1.44	1.52	0.040452	46.29	46.72	53.09	45.00	45.19	52.98
P-480	SCUPPER (AREA 203)	MH-9-32	12 inch	1.31	32.00	4.09	0.19	0.26	0.36	0.008894	48.19	48.67	51.59	47.89	48.32	52.79
P-499	SCUPPER 205	EXISTING PARKING LOT CB	12 inch	0.67	12.00	3.48	0.12	0.05	-0.03	0.004017	46.53	46.87	49.00	46.41	46.90	48.91
P-91	SIG-CB2A-1	43+76.56	15 inch	3.13	43.00	9.35	0.29	1.32	2.43	0.032549	66.98	67.69	68.28	64.86	65.26	68.37
P-109	SIG-CB2A-2	SIG-CB2A-1	12 inch	3.22	213.00	4.10	0.26	0.26	1.74	0.008165	66.00	69.54	68.00	63.98	67.80	68.28
P-77	SIG-CB2B	43+76.56	15 inch	2.33	59.00	2.21	0.11	0.24	0.29	0.002891	65.24	66.06	68.84	65.16	65.77	68.37
P-437	SIGOURNEY STREET STATION	452+80 MH	12 inch	2.73	67.00	6.01	0.33	0.56	1.22	0.014673	51.50	52.21	60.00	50.43	50.99	56.50
P-30	TRENCH DRAIN (9D)	BURRIED MH 2	12 inch	1.66	71.00	3.90	0.08	0.07	0.13	0.002099	53.50	54.35	55.00	53.00	54.21	55.00
P-29	TRENCH DRAIN (9E)	BURRIED MH 3	12 inch	1.98	67.00	5.41	0.25	0.10	0.27	0.006286	48.00	48.60	50.00	47.00	48.33	50.00
P-35	TRENCH DRAIN (9G1)	9-MH31	12 inch	1.40	28.00	5.89	0.20	0.52	0.83	0.018124	49.00	49.50	51.00	48.32	48.67	51.12

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-82	(HAWTHORN EXISTING MH)	12+06.76 (EXISTING MH)	18 inch	6.03	52.00	3.41	0.18	0.18	0.17	0.003292	51.73	61.59	62.23	50.82	61.42	62.64
P-404	6- CB 3	6- CB1 (98)	18 inch	0.94	92.00	2.47	0.13	0.07	3.11	0.034425	53.00	53.36	60.00	49.80	50.25	55.36
P-190	6- CB1 (98)	6-CB 2 (97)	18 inch	1.16	21.00	2.26	0.14	0.03	-0.04	0.003364	49.80	50.20	55.36	49.56	50.24	55.46
P-238	6- MH 90	6- MH DROP	15 inch	7.93	80.00	9.43	0.73	2.24	4.45	0.036849	46.00	47.11	51.80	42.00	42.66	45.00
P-239	6- MH DROP	6-MH 100	15 inch	7.89	35.00	7.98	0.73	1.29	1.28	0.020519	34.00	35.11	45.00	33.00	33.83	42.00
P-191	6-CB 2 (97)	6- MH 90	18 inch	2.37	85.00	2.54	0.22	0.03	2.50	0.031607	49.56	50.14	55.46	46.00	47.64	51.80
P-403	6-CB 4	6- CB 3	18 inch	0.92	108.00	2.75	0.13	0.11	0.98	0.009243	54.00	54.36	60.00	53.00	53.38	60.00
P-201	6-CB 79A	6-MH 79	18 inch	1.54	41.00	3.48	0.17	0.21	0.30	0.006451	56.88	57.35	61.98	56.61	57.04	63.21
P-194	6-MH-88	6-MH 100	30 inch	4.66	74.00	4.44	0.25	0.36	0.58	0.006441	32.50	33.21	41.00	32.00	32.63	42.00
P-193	6-MH 100	GATE 6	36 inch	7.11	24.00	5.27	0.30	0.59	0.48	0.007958	31.80	32.64	42.00	31.50	32.16	43.00
P-240	6-MH 79	481+64.79 CB	24 inch	1.54	10.00	8.58	0.15	3.06	11.69	0.877266	56.41	56.84	63.21	45.00	45.15	57.11
P-289	6-MH 79B	6-CB 79A	12 inch	1.72	194.00	3.99	0.23	0.27	1.63	0.008167	58.57	59.13	68.17	56.98	57.50	61.98
P-288	6-MH 79C	6-MH 79B	12 inch	0.98	91.00	2.86	0.16	0.10	0.52	0.006365	59.27	59.68	67.07	58.67	59.16	68.17
P-287	6-MH 79D	6-MH 79C	12 inch	0.27	142.00	2.04	0.08	0.06	1.01	0.007222	60.50	60.71	67.00	59.47	59.71	67.07
P-199	6-MH 82	6-MH 84	24 inch	1.48	62.00	3.05	0.15	0.14	2.99	0.048385	39.00	39.42	50.60	36.00	36.43	42.40
P-198	6-MH 84	6-MH 85	24 inch	1.48	100.00	4.22	0.15	0.45	2.33	0.020351	36.00	36.42	42.40	33.80	34.09	41.60
P-405	6-MH 85	6-MH-88	30 inch	1.55	119.00	2.12	0.14	0.02	0.34	0.003879	33.20	33.61	41.60	32.50	33.26	41.00
P-130	8MH-1	FSRD -1A	36 inch	28.09	128.00	6.84	0.70	0.75	0.69	0.004980	38.26	39.97	49.66	37.62	39.29	46.62
P-14	9-BCB-1	9-BMH-1	15 inch	5.10	58.00	4.73	0.27	0.44	0.41	0.004127	65.03	66.27	69.33	64.95	65.87	69.85
P-12	9-BCB-2	9-BMH-2	15 inch	3.54	16.00	6.61	0.32	1.17	1.24	0.024367	64.75	65.51	69.55	63.81	64.27	70.01
P-13	9-BCB-3	9-BCB-2	15 inch	3.19	64.00	3.99	0.30	0.20	0.55	0.009976	65.52	66.24	69.22	64.85	65.69	69.55
P-10	9-BMH-1	9MH-3	15 inch	8.51	56.00	6.94	0.75	0.75	3.31	0.059188	59.55	61.15	69.85	56.10	57.84	60.00
P-11	9-BMH-2	9-BMH-1	15 inch	3.54	40.00	2.88	0.13	0.13	0.41	0.010223	59.81	61.92	70.01	59.55	61.51	69.85
P-454	9-MH-34	468+63.19 MH	24 inch	21.81	13.00	6.94	0.75	0.75	0.12	0.009299	38.50	41.40	52.98	38.42	41.28	49.50
P-6	9-MH31	MH-9-32	18 inch	17.53	124.00	9.92	1.53	1.53	3.45	0.027839	43.07	47.09	51.12	40.32	43.63	52.79
P-3	9-MH38	9-MH39	24 inch	22.94	105.00	7.80	0.99	0.90	0.89	0.009336	38.00	39.72	45.00	37.00	38.83	45.00
P-2	9-MH39	9-MH40	24 inch	22.70	132.00	7.61	0.99	0.81	3.57	0.028411	37.00	38.70	45.00	32.85	35.13	44.68
P-97	9-MH40	GATE 9	24 inch	22.40	10.00	9.45	0.97	1.87	1.05	0.015342	32.85	34.54	44.68	32.25	33.49	44.68
P-9	9MH-3	BURIED MH 1	15 inch	8.47	69.00	7.07	0.81	0.74	1.74	0.026317	56.10	57.24	60.00	54.00	55.49	60.00
P-7	9MH-30	9-MH31	18 inch	13.79	128.00	7.80	0.95	0.95	2.21	0.017230	43.35	49.74	48.35	43.07	47.54	51.12
P-111	10-MH 2	GATE 10	36 inch	10.51	20.00	5.86	0.38	0.72	0.49	0.007603	30.78	31.81	45.00	30.50	31.31	45.00
P-447	10-MH1	463+46.32 MH	24 inch	5.53	25.00	4.33	0.31	0.27	0.18	0.009020	34.31	35.14	48.51	34.08	34.96	51.05
P-412	10+41.86	11+42.33	12 inch	1.21	101.00	2.73	0.18	0.07	0.47	0.005732	59.50	59.96	63.19	58.80	59.50	62.19
P-54	11-MH88 (EXISTING MH)	455+40.97 MH	24 inch	31.69	145.00	10.09	1.58	1.58	2.85	0.019624	46.14	49.63	55.81	44.51	46.79	58.71
P-41	11-MH92	GATE 11 MH	42 inch	55.95	90.00	7.72	1.04	0.82	1.27	0.016539	31.54	33.88	50.24	30.00	32.61	39.25
P-427	11+18.60	11+33.57	12 inch	2.19	32.00	2.79	0.12	0.12	0.12	0.003795	56.76	62.87	61.88	56.33	62.75	62.75
P-85	11+33.57	11+43.19 (EXISTING MH)	15 inch	4.19	5.00	3.41	0.18	0.18	0.02	0.004206	56.33	62.40	62.75	56.23	62.38	63.13
P-413	11+42.33	12+50.00	15 inch	2.39	107.00	3.43	0.21	0.16	0.42	0.004415	58.80	59.45	62.19	58.30	59.03	62.77
P-431	11+43.19 (EXISTING MH)	(HAWTHORN EXISTING MH)	18 inch	6.06	59.00	3.43	0.18	0.18	0.20	0.003324	56.23	62.07	63.13	51.83	61.88	62.23
P-84	11+65.87	11+43.19 (EXISTING MH)	15 inch	2.22	20.00	1.81	0.05	0.05	0.02	0.001182	58.34	62.24	62.54	56.63	62.22	63.13
P-80	12+04.21	12+06.76 (EXISTING MH)	12 inch	3.49	14.00	4.44	0.31	0.31	0.13	0.009582	57.77	62.77	62.20	56.62	62.64	62.64
P-79	12+06.76 (EXISTING MH)	13+87.95 (EXISTING MH)	24 inch	8.91	181.00	2.84	0.12	0.12	0.28	0.001550	50.12	61.35	62.64	49.22	61.07	66.72
P-414	12+50.00	13+94.09	15 inch	2.84	147.00	3.21	0.26	0.09	0.32	0.003305	58.30	58.99	62.77	57.50	58.68	68.37
P-371	13+05.20	13+87.94	12 inch	0.53	77.00	1.21	0.05	0.01	0.00	0.000546	60.50	60.92	64.83	60.00	60.91	68.15
P-59	13+87.94	13+87.95 (EXISTING MH)	15 inch	4.82	17.00	5.84	0.41	0.66	0.44	0.011614	60.00	60.89	68.15	59.72	60.45	66.72
P-483	13+87.95 (EXISTING MH)	11-MH88 (EXISTING MH)	24 inch	31.82	145.00	10.13	1.59	1.59	2.87	0.019790	49.12	54.22	66.72	46.04	51.35	55.81
P-484	13+94.09	13+87.95 (EXISTING MH)	12 inch	4.23	28.00	6.01	0.53	0.59	0.45	0.013966	57.40	58.27	68.37	57.00	57.81	66.72
P-372	14+28.60	13+87.94	12 inch	3.74	29.00	4.76	0.35	0.35	0.32	0.011007	60.35	61.35	69.45	60.00	61.03	68.15
P-364	14+37.13	13+87.95 (EXISTING MH)	24 inch	18.52	59.00	5.90	0.54	0.54	0.40	0.006706	53.98	56.78	69.59	53.62	56.38	66.72
P-363	14+68.54 MH	14+37.13	24 inch	18.14	34.00	5.77	0.52	0.52	0.22	0.006432	54.20	57.08	70.30	53.98	56.86	69.59
P-509	14+77.17	14+68.54 MH	24 inch	17.14	11.00	5.46	0.46	0.46	0.06	0.005740	54.50	58.44	69.40	54.20	58.38	70.30
P-415	14+86.31 (EXISTING MH)	14+68.54 MH	15 inch	0.00	39.00	0.00	0.00	0.00	0.99	0.025385	59.89	59.89	70.57	58.90	58.90	70.30
P-505	15+88.99	42+70.16	12 inch	0.24	19.00	0.31	0.00	0.00	0.00	0.000047	62.10	63.41	69.16	62.00	63.41	70.03

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-482	41+39.12	14+68.54 MH	15 inch	1.33	58.00	5.57	0.17	0.96	3.73	0.050669	68.72	69.17	73.35	65.20	65.44	70.30
P-508	42+39.81	14+77.17	24 inch	16.87	69.00	5.37	0.45	0.45	0.38	0.005559	56.00	58.83	70.68	54.50	58.44	69.40
P-379	42+47.41	42+98.18 MH	12 inch	1.51	52.00	5.13	0.21	0.68	1.83	0.026090	65.64	66.16	70.48	64.00	64.33	69.54
P-504	42+70.16	42+39.81	24 inch	15.31	30.00	7.49	0.65	1.13	0.80	0.010612	62.00	63.41	70.03	61.50	62.61	70.68
P-365	42+98.18 MH	42+39.81	15 inch	1.50	86.00	4.44	0.18	0.47	1.84	0.018101	63.20	63.68	69.54	61.50	61.84	70.68
P-507	43+42.81	42+70.16	24 inch	14.88	72.00	6.33	0.63	0.61	0.98	0.013881	63.00	64.39	69.05	62.00	63.41	70.03
P-506	43+76.56	43+42.81	24 inch	14.63	35.00	6.31	0.62	0.61	0.49	0.014280	63.50	64.88	68.37	63.00	64.39	69.05
P-70	43+84.89	44+43.39 MH	12 inch	1.37	12.00	3.41	0.17	0.19	0.09	0.005249	65.87	66.40	69.53	65.81	66.31	69.10
P-387	43+86.69 MH	43+76.56	18 inch	6.84	46.00	4.63	0.45	0.23	0.14	0.007885	64.38	65.39	69.10	63.50	65.25	68.37
P-381	43+96.70 RT	43+86.69 MH	12 inch	3.63	9.00	4.62	0.33	0.33	0.09	0.010365	64.60	65.62	68.24	64.50	65.53	69.10
P-69	44+43.39 MH	43+86.69 MH	15 inch	3.98	58.00	4.22	0.35	0.21	0.19	0.005639	64.91	65.72	69.10	64.50	65.53	69.10
P-71	45+17.59 (EXISTING MH)	44+43.39 MH	15 inch	2.91	72.00	4.00	0.28	0.22	0.41	0.006519	65.49	66.18	70.61	65.01	65.76	69.10
P-75	45+24.65 MH	45+17.59 (EXISTING MH)	12 inch	1.14	27.00	2.72	0.17	0.07	0.21	0.011665	66.00	66.45	71.30	65.59	66.24	70.61
P-389	45+37.93	45+24.65 MH	12 inch	1.14	13.00	2.99	0.17	0.11	0.11	0.013433	66.20	66.65	71.58	66.00	66.54	71.30
P-396	45+45.55	45+17.59 (EXISTING MH)	15 inch	1.79	35.00	3.10	0.20	0.11	0.26	0.010104	66.00	66.53	71.70	65.59	66.27	70.61
P-439	200+65.76 WALL 111 SWALE CB	AR-CB-17 (200+66.99)	12 inch	0.30	4.00	1.48	0.08	0.01	-0.02	0.012078	22.76	22.98	30.81	22.48	23.01	26.28
P-359	204+61.66 CB	205+03.21 CB	12 inch	0.74	37.00	2.42	0.12	0.07	0.09	0.003837	35.55	35.92	39.05	35.37	35.83	39.84
P-360	205+03.21 CB	205+83.27 CB	12 inch	0.99	79.00	3.06	0.13	0.16	0.40	0.004718	35.37	35.81	39.84	35.00	35.42	39.57
P-438	205+81.06 WALL 111 SWALE CB	205+83.27 CB	12 inch	0.08	11.00	1.04	0.04	0.00	0.29	0.029549	32.57	32.69	42.00	32.13	32.40	39.57
P-209	205+83.27 CB	206+33.97 MH	12 inch	0.40	52.00	2.71	0.09	0.14	0.53	0.009421	32.13	32.39	39.57	31.63	31.86	39.43
P-210	206+33.97 MH	GB-MH1	18 inch	4.27	74.00	3.79	0.23	0.21	0.24	0.003565	30.63	31.53	39.43	30.35	31.28	40.15
P-398	206+51.63 CB	206+33.97 MH	15 inch	5.72	31.00	5.73	0.49	0.53	0.34	0.009550	32.50	33.47	38.95	32.20	33.13	39.43
P-418	450+44.59 MH	452+80 MH	24 inch	13.85	265.00	5.30	0.60	0.30	4.33	0.017447	44.16	45.50	56.88	38.85	41.17	56.50
P-425	450+44.65 CB	450+44.59 MH	12 inch	0.51	4.00	3.07	0.11	0.19	0.13	0.010239	52.47	52.77	56.38	52.40	52.64	56.88
P-419	452+80 MH	465+50 MH	24 inch	16.01	336.00	5.10	0.40	0.40	1.68	0.005009	38.85	40.89	56.50	37.17	39.21	53.12
P-444	453+09.60 CB	452+80 MH	12 inch	1.22	4.00	3.31	0.16	0.18	0.04	0.005378	50.45	50.94	55.78	50.43	50.90	56.50
P-311	454+00 CB	453+09.60 CB	12 inch	0.56	86.00	1.88	0.10	0.02	0.17	0.002956	50.88	51.20	54.97	50.45	51.03	55.78
P-48	455+40.97 MH	EXISTING MH 458+48.75	30 inch	35.35	309.00	11.19	1.08	3.07	9.35	0.023817	44.51	46.53	58.71	35.90	37.17	51.72
P-313	455+56.08 CB	456+50 CB	12 inch	0.59	90.00	2.03	0.11	0.03	0.26	0.003760	48.82	49.15	53.47	48.37	48.88	52.62
P-422	456+50 CB	465+50 MH	12 inch	1.01	4.00	3.13	0.14	0.16	0.04	0.005259	48.37	48.81	52.62	48.35	48.77	53.12
P-421	456+51.83 CB	465+50 MH	12 inch	0.47	13.00	2.54	0.10	0.10	0.07	0.005389	48.76	49.05	53.44	48.69	48.97	53.12
P-445	458+00 CB	458+49.30 MH	12 inch	0.70	46.00	3.42	0.13	0.25	0.71	0.012961	47.14	47.49	51.37	46.50	46.78	51.37
P-423	458+49.30 MH	11-MH92	42 inch	55.06	82.00	7.97	1.03	0.95	0.35	0.005184	31.97	34.29	51.37	31.54	33.94	50.24
P-308	460+25 RT	EXISTING AETNA MH 2	24 inch	2.26	30.00	2.44	0.19	0.03	0.91	0.035417	36.39	36.91	48.18	34.99	36.00	49.99
P-319	460+25.17 CB	460+71.43 CB	12 inch	0.85	42.00	2.27	0.14	0.04	0.11	0.005192	44.70	45.09	49.46	44.30	44.98	49.36
P-320	460+71.43 CB	461+17.69 CB	12 inch	2.06	42.00	3.63	0.26	0.16	0.15	0.005882	44.30	44.91	49.36	44.00	44.77	49.46
P-321	460+86.88 CB	460+71.43 CB	12 inch	0.19	26.00	0.74	0.02	0.00	-0.01	0.000281	44.69	44.96	49.77	44.30	44.97	49.36
P-446	461+17.69 CB	462+00.00 MH	12 inch	2.57	80.00	4.19	0.31	0.24	0.91	0.012261	44.00	44.69	49.46	43.00	43.78	50.48
P-450	462+00.00 MH	463+46.32 MH	12 inch	2.53	142.00	5.03	0.31	0.49	2.12	0.013654	43.00	43.68	50.48	41.00	41.56	51.05
P-448	463+46.32 MH	10-MH 2	36 inch	7.12	74.00	5.02	0.30	0.49	0.72	0.007057	34.08	34.92	51.05	33.50	34.20	45.00
P-449	463+46.39 CB	463+46.32 MH	12 inch	0.27	4.00	2.65	0.07	0.15	0.13	0.012342	46.10	46.31	50.60	46.02	46.19	51.05
P-451	465+25.89 CB	463+46.32 MH	12 inch	0.22	174.00	2.97	0.07	0.23	5.81	0.032441	46.74	46.93	50.74	41.00	41.13	51.05
P-420	465+50 MH	458+49.30 MH	24 inch	16.50	195.00	6.26	0.53	0.70	1.20	0.005315	37.17	38.86	53.12	36.19	37.65	51.37
P-452	467+00.00 CB	468+63.19 MH	12 inch	0.46	159.00	2.96	0.10	0.18	2.04	0.012354	45.79	46.07	49.87	43.80	44.03	49.50
P-456	468+62.18 CB	468+63.19 MH	12 inch	0.49	4.00	3.58	0.10	0.32	0.30	0.018760	44.20	44.49	49.06	44.00	44.19	49.50
P-455	468+63.19 MH	9-MH38	24 inch	23.09	70.00	7.35	0.84	0.84	0.73	0.010415	38.42	41.09	49.50	38.00	40.36	45.00
P-453	470+39.73 CB	468+63.19 MH	12 inch	0.51	175.00	2.57	0.10	0.11	0.88	0.004975	44.67	44.98	48.17	43.80	44.10	49.50
P-339	471+91.74	FSRD -1A	12 inch	2.22	9.00	4.44	0.27	0.34	0.14	0.008820	35.92	36.56	47.89	35.83	36.41	46.62
P-457	472+00.00 CB	472+00.00 MH	12 inch	0.49	2.00	3.11	0.10	0.20	0.12	0.010948	43.66	43.95	47.66	43.60	43.83	48.32
P-458	472+00.00 MH	472+00.10	12 inch	2.19	20.00	3.42	0.23	0.14	-0.01	0.004203	36.30	36.98	48.32	36.10	36.99	48.06
P-338	472+00.10	471+91.74	12 inch	2.22	35.00	3.37	0.19	0.17	0.13	0.004285	36.10	36.86	48.06	35.92	36.73	47.89
P-442	472+50.33 (WALL 104-8A)	472+00.10	12 inch	0.08	51.00	2.13	0.04	0.11	1.53	0.028653	41.50	41.61	48.00	40.00	40.08	48.06
P-460	473+42.00 CB	473+42.04 MH	12 inch	0.58	2.00	3.34	0.11	0.25	0.16	0.012130	42.78	43.10	46.95	42.70	42.94	47.10

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-459	473+42.04 MH	472+00.00 MH	12 inch	2.07	138.00	2.64	0.11	0.11	0.47	0.003382	37.00	38.92	47.10	36.30	38.46	48.32
P-496	474+39.78 CB	J-136	12 inch	0.54	8.00	3.36	0.11	0.26	0.26	0.014183	41.18	41.48	46.18	41.00	41.23	46.60
P-492	475+24.97 CB	J-134	12 inch	0.44	7.00	2.78	0.10	0.14	0.10	0.008496	40.87	41.14	45.87	40.80	41.04	46.20
P-493	476+45.00 CB	J-135	12 inch	1.68	18.00	2.14	0.07	0.07	0.04	0.002236	38.77	39.88	45.29	38.59	39.84	45.90
P-331	476+75.00 CB	476+45.00 CB	12 inch	1.54	30.00	1.96	0.06	0.06	0.06	0.001861	38.92	40.00	45.24	38.77	39.94	45.29
P-463	477+05.00 CB	476+75.00 CB	12 inch	1.35	26.00	1.72	0.05	0.05	0.04	0.001436	39.05	40.05	45.29	38.92	40.01	45.24
P-464	477+05.00 MH	477+05.00 CB	12 inch	1.13	2.00	1.44	0.03	0.03	0.00	0.001014	39.07	40.09	45.51	39.05	40.09	45.29
P-468	478+87.00 CB	478+87.00 MH	12 inch	0.78	2.00	2.53	0.11	0.09	-0.01	0.003631	41.65	42.05	46.53	41.63	42.06	47.01
P-465	478+87.00 MH	477+05.00 MH	12 inch	0.78	212.00	1.98	0.14	0.02	1.91	0.009558	41.63	42.00	47.01	39.07	40.09	45.51
P-344	480+98.51 CB	481+50.00 CB	12 inch	0.24	51.00	1.55	0.07	0.01	0.79	0.016624	44.03	44.23	47.97	43.09	43.44	47.84
P-486	481+ 94.76 CB	I-261	12 inch	0.89	28.00	4.51	0.15	0.55	1.15	0.026729	43.94	44.33	47.94	42.94	43.19	47.93
P-430	481+13.11 CB	486+95.62 CB	12 inch	1.33	132.00	2.70	0.19	0.06	3.89	0.030514	46.39	46.88	54.99	42.15	42.98	50.97
P-469	481+50.00 CB	I-261	12 inch	0.63	15.00	3.11	0.12	0.18	0.20	0.008951	43.09	43.42	47.84	42.94	43.23	47.93
P-466	481+64.79 CB	I-261	24 inch	0.74	12.00	2.11	0.10	0.04	0.33	0.032163	42.23	42.53	57.11	41.80	42.20	47.93
P-485	482+98.54 CB	481+ 94.76 CB	12 inch	0.41	104.00	1.89	0.09	0.03	1.67	0.016682	45.76	46.02	49.67	43.94	44.36	47.94
P-356	484+42.75 CB	485+63.54 CB	12 inch	0.27	116.00	1.89	0.07	0.04	0.58	0.005287	49.80	50.02	53.70	49.17	49.43	54.78
P-202	485+63.54 CB	481+13.11 CB	12 inch	0.32	37.00	1.49	0.08	0.01	2.42	0.067524	49.17	49.40	54.78	46.39	46.98	54.99
P-204	486+95.62 CB	487+93.79 CB	12 inch	2.91	92.00	6.38	0.35	1.00	3.30	0.028782	42.15	42.88	50.97	39.11	39.58	46.40
P-206	487+91.93 MH	489+23.38 MH	12 inch	3.47	128.00	4.80	0.42	0.30	1.93	0.015921	36.64	37.44	48.21	34.28	35.51	40.79
P-205	487+93.79 CB	487+91.93 MH	12 inch	3.49	34.00	6.13	0.42	0.78	0.97	0.017849	37.81	38.61	46.40	37.04	37.64	48.21
P-443	489+23.38 MH	490+33.68 CB	12 inch	3.96	113.00	5.04	0.40	0.40	1.40	0.012357	34.28	35.39	40.79	32.80	33.99	36.52
P-207	489+23.80	489+23.38 MH	12 inch	0.62	35.00	1.01	0.02	0.01	-0.00	0.000364	34.82	35.42	40.49	34.38	35.42	40.79
P-478	489+58.08	205+83.27 CB	12 inch	0.22	31.00	1.68	0.07	0.03	0.95	0.031813	33.15	33.34	39.27	32.13	32.39	39.57
P-397	490+33.68 CB	206+51.63 CB	15 inch	4.70	42.00	4.36	0.34	0.26	0.14	0.005249	32.80	33.76	36.52	32.50	33.62	38.95
P-502	902+84.12 MH	AR-CB14 (200+35.62)	12 inch	0.93	43.00	4.55	0.15	0.55	1.65	0.029055	25.00	25.40	27.76	23.50	23.75	26.33
P-501	902+85.52	902+84.12 MH	12 inch	0.93	12.00	3.75	0.15	0.30	0.29	0.011918	25.20	25.61	42.85	25.00	25.32	27.76
P-500	903+54.91	902+85.52	12 inch	0.68	72.00	2.94	0.13	0.14	0.51	0.006782	30.91	31.25	38.52	30.42	30.75	42.85
P-353	904+15.54	903+54.91	12 inch	0.54	57.00	2.40	0.11	0.07	0.26	0.005222	31.22	31.53	36.41	30.91	31.27	38.52
P-355	904+27.45	904+27.54	12 inch	0.06	11.00	0.56	0.01	0.00	-0.00	0.000364	31.39	31.55	36.47	31.27	31.55	36.35
P-352	904+27.54	904+15.54	18 inch	0.43	12.00	1.74	0.06	0.04	0.01	0.002296	31.27	31.55	36.35	31.22	31.54	36.41
P-351	904+39.54	904+27.54	12 inch	0.25	12.00	1.45	0.04	0.03	0.01	0.001923	31.31	31.57	36.40	31.27	31.55	36.35
P-27	AB-CB-1	AB-CB-2	15 inch	5.91	154.00	5.39	0.51	0.40	5.17	0.034239	56.36	57.34	62.66	51.05	52.18	55.85
P-26	AB-CB-2	AB-CB-3	15 inch	9.55	150.00	7.90	0.99	0.95	5.31	0.035700	50.85	52.02	55.85	45.48	46.71	50.18
P-25	AB-CB-3	AB-MH1	18 inch	10.22	39.00	6.18	0.67	0.52	1.40	0.039807	45.38	46.61	50.18	43.71	45.21	49.81
P-23	AB-CB-4	AB-MH3	18 inch	12.09	37.00	8.38	0.84	1.37	1.17	0.017259	40.88	42.20	49.58	40.00	41.02	49.48
P-96	AB-MH1	AB-MH2	18 inch	10.18	17.00	7.78	0.67	1.26	0.85	0.015672	43.51	44.74	49.81	42.97	43.89	50.47
P-98	AB-MH2	AB-CB-4	18 inch	10.17	31.00	5.76	0.52	0.52	0.29	0.009380	41.07	42.96	50.47	40.98	42.67	49.58
P-22	AB-MH3	AB-MH90	24 inch	9.63	189.00	3.99	0.18	0.32	0.55	0.002219	34.84	36.50	49.48	34.67	35.95	49.87
P-21	AB-MH90	Armory Drainage (Area A36-7) EXTERNAL CA	24 inch	9.48	107.00	5.26	0.45	0.42	1.22	0.011668	34.67	35.77	49.87	33.42	34.55	48.90
P-88	AETNA CB-103	AETNA CB-104	15 inch	3.55	152.00	4.52	0.31	0.32	0.96	0.006251	53.90	54.67	68.90	52.95	53.71	58.50
P-50	AETNA CB-104	AETNA MH1	15 inch	3.69	75.00	5.09	0.33	0.48	0.91	0.010129	52.85	53.63	58.50	52.05	52.71	58.80
P-435	AETNA CB 105	455+40.97 MH	12 inch	1.13	50.00	3.81	0.17	0.29	0.68	0.011256	52.40	52.85	56.90	51.80	52.17	58.71
P-434	AETNA CB 106	AETNA CB 105	12 inch	0.31	95.00	1.60	0.08	0.01	0.74	0.008475	53.45	53.68	59.86	52.50	52.94	56.90
P-126	AETNA CB 202	AETNA MH 201	12 inch	1.71	10.00	2.17	0.07	0.07	0.02	0.002298	49.40	50.75	61.60	49.30	50.73	62.00
P-119	AETNA CB 203	AETNA MH 202	12 inch	3.82	24.00	5.32	0.41	0.47	0.30	0.010398	57.64	58.53	61.44	57.40	58.23	61.90
P-142	AETNA DI	FSMH-10	12 inch	2.24	34.00	4.59	0.28	0.38	0.45	0.010173	45.07	45.71	49.87	44.70	45.26	50.90
P-125	AETNA MH 201	AETNA MH 202	12 inch	1.70	34.00	2.17	0.07	0.07	0.08	0.002288	38.35	50.63	62.00	38.00	50.55	61.90
P-118	AETNA MH 202	AETNA MH 203	15 inch	4.76	44.00	5.33	0.41	0.48	0.46	0.008889	37.90	38.79	61.90	37.50	38.33	62.00
P-114	AETNA MH 203	AETNA MH 204	24 inch	6.31	102.00	3.45	0.34	0.08	0.19	0.004453	37.40	38.29	62.00	36.40	38.10	54.80
P-113	AETNA MH 204	10-MH1	24 inch	6.39	18.00	7.25	0.34	1.50	1.56	0.022700	36.30	37.20	54.80	35.11	35.63	48.51
P-49	AETNA MH1	455+40.97 MH	24 inch	3.66	61.00	4.76	0.24	0.48	0.84	0.009980	51.30	51.97	58.80	50.60	51.13	58.71
P-108	AETNA PARKING ROOF-2	EXISTING AETNA MH 2	8 inch	5.23	29.00	24.78	3.49	18.57	34.87	0.682548	71.00	71.67	72.00	36.50	36.80	49.99
P-107	AETNA PARKING ROOF -1	EXISTING MH 458+48.75	8 inch	4.37	36.00	12.52	2.44	2.43	36.94	1.026068	71.00	71.66	72.00	32.07	34.73	51.72

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-373	AETNA YD 105	AETNA CB 106	12 inch	0.02	18.00	0.66	0.02	0.00	0.36	0.021175	54.00	54.06	57.00	53.45	53.70	59.86
P-127	AETNA YD 201	AETNA MH 204	12 inch	0.17	9.00	3.70	0.06	0.46	1.09	0.076033	51.00	51.17	54.80	50.00	50.08	54.80
P-426	AETNA YD MH	460+25 RT	24 inch	2.01	182.00	1.99	0.17	0.01	3.63	0.020847	40.11	40.60	74.50	34.19	36.98	48.18
P-185	AR-48-1	AR-MH-12	36 inch	3.75	101.00	3.56	0.21	0.18	3.71	0.037003	25.40	26.00	34.50	21.66	22.29	30.50
P-187	AR-48-1B	AR-48-1CA4	36 inch	2.82	43.00	3.29	0.18	0.15	0.97	0.023188	28.50	29.02	37.50	27.50	28.05	36.50
P-224	AR-48-1C	AR48-MH	15 inch	2.21	177.00	3.72	0.23	0.20	8.47	0.048005	43.65	44.24	53.00	35.15	35.78	44.50
P-186	AR-48-1CA4	AR-48-1	36 inch	3.00	36.00	5.89	0.19	1.07	2.04	0.032210	27.50	28.04	36.50	25.70	26.00	34.50
P-182	AR-48-2	AR-MH-12	15 inch	0.73	70.00	1.95	0.12	0.02	1.59	0.024179	23.57	23.91	32.07	21.66	22.31	30.50
P-180	AR-48-3/ AR-CB16	AR-CB15	18 inch	0.88	31.00	4.23	0.12	0.50	1.24	0.028115	22.73	23.08	27.63	21.62	21.83	25.62
P-161	AR-48-4	Armory Wet Well	48 inch	6.84	23.00	0.54	0.00	0.00	0.00	0.000023	15.10	19.46	42.00	15.00	19.46	61.50
P-170	AR-CB-17 (200+66.99)	AR-CB14 (200+35.62)	15 inch	0.82	65.00	2.30	0.05	0.13	0.21	0.001946	22.48	22.99	26.28	22.43	22.78	26.33
P-164	AR-CB2	AR-CB3	15 inch	0.78	25.00	3.21	0.12	0.20	0.32	0.009479	32.63	32.97	37.93	32.37	32.66	37.07
P-189	AR-CB3	AR-48-4	48 inch	7.02	163.00	0.57	0.01	0.00	0.00	0.000023	15.87	19.47	37.07	15.10	19.47	42.00
P-166	AR-CB4	ARMORY CAPPED MH	15 inch	0.34	22.00	2.00	0.08	0.05	0.28	0.013951	23.07	23.30	30.17	22.75	23.02	30.18
P-168	AR-CB6	AR-MH5	42 inch	6.68	125.00	0.69	0.01	0.01	0.01	0.000044	15.96	19.48	25.76	15.88	19.48	30.18
P-226	AR-CB7	AR-CB8	12 inch	0.17	46.00	1.63	0.03	0.06	0.14	0.002420	21.36	21.58	25.16	21.27	21.44	25.27
P-173	AR-CB8	ARMH-9	24 inch	2.95	12.00	2.46	0.22	0.02	0.58	0.064454	19.47	20.07	25.27	18.03	19.49	27.43
P-177	AR-CB10	AR-CB8	18 inch	1.93	42.00	4.30	0.19	0.40	0.70	0.011737	21.21	21.73	25.31	20.63	21.03	25.27
P-174	AR-CB13	AR-CB8	12 inch	0.73	44.00	2.86	0.12	0.13	0.24	0.005234	21.10	21.46	25.70	20.87	21.23	25.27
P-175	AR-CB13A	AR-CB13	12 inch	0.51	29.00	2.58	0.11	0.10	0.48	0.016887	21.69	21.99	24.79	21.20	21.50	25.70
P-169	AR-CB14 (200+35.62)	AR-CB6	18 inch	2.55	52.00	2.63	0.23	0.03	2.25	0.046976	21.13	21.74	26.33	17.96	19.49	25.76
P-179	AR-CB15	AR-CB10	18 inch	0.90	45.00	2.26	0.12	0.05	0.07	0.003154	21.52	21.88	25.62	21.31	21.81	25.31
P-176	AR-CB18	AR-CB8	12 inch	0.46	55.00	2.10	0.04	0.10	0.18	0.002276	20.85	21.23	24.65	20.77	21.05	25.27
P-183	AR-MH-12	AR-MH11	36 inch	4.03	103.00	2.53	0.22	0.03	2.81	0.029120	21.66	22.29	30.50	18.12	19.48	29.02
P-165	AR-MH5	AR-CB3	48 inch	6.65	152.00	0.56	0.00	0.00	0.00	0.000020	15.88	19.47	30.18	15.87	19.47	37.07
P-184	AR-MH11	ARMH-9	36 inch	4.02	92.00	0.94	0.02	0.01	-0.01	0.000084	18.02	19.48	29.02	17.23	19.49	27.43
P-225	AR48-MH	AR-48-1B	15 inch	2.16	150.00	4.52	0.23	0.42	6.77	0.043846	35.15	35.74	44.50	28.50	28.96	37.50
P-34	AREA 9F-1	AREA 9F-2	12 inch	0.20	30.00	0.26	0.00	0.00	0.00	0.000032	44.92	48.53	48.92	44.48	48.53	48.98
P-32	AREA 9F-2	9MH-30	12 inch	2.06	20.00	2.62	0.11	0.11	0.07	0.003338	44.38	48.42	48.98	44.25	48.35	48.35
P-33	AREA 9F-3	AREA 9F-2	12 inch	0.87	15.00	1.10	0.02	0.02	0.01	0.000593	44.88	48.54	48.58	44.58	48.53	48.98
P-36	AREA 9G-2 AND SCUPPER 204	9-MH31	15 inch	2.62	42.00	2.14	0.07	0.07	0.07	0.001647	46.21	49.39	49.52	44.95	49.32	51.12
P-104	AREA A36-7B (LOB)	AB-MH3	24 inch	1.10	314.00	0.40	0.00	0.00	0.01	0.000024	35.00	36.58	46.80	34.84	36.57	49.48
P-171	ARMH-9	AR-CB6	36 inch	5.07	99.00	0.79	0.01	0.01	0.00	0.000057	17.13	19.48	27.43	16.06	19.48	25.76
P-167	ARMORY CAPPED MH	AR-MH5	12 inch	0.34	26.00	1.39	0.09	0.00	3.52	0.138360	22.75	22.99	30.18	15.98	19.48	30.18
P-99	Armory Drainage (Area A36-7) EXTERNAL CA	MH 5+95	30 inch	25.71	107.00	7.24	0.78	0.85	0.74	0.006318	32.70	34.43	48.90	32.02	33.69	42.00
P-237	Armory Wet Well	Armory Pump Station	8 x 7 ft	19.66	105.00	0.54	0.00	0.00	0.00	0.000008	15.00	19.46	61.50	14.80	19.46	45.00
P-72	BROAD ST COMBINED	TO COMBINED SIPHON	12 inch	1.35	26.00	5.32	0.19	0.79	1.36	0.029470	44.47	44.96	47.97	43.31	43.60	47.21
P-20	BURIED MH 1	BURRIED MH 2	18 inch	8.42	72.00	5.51	0.55	0.40	0.79	0.013040	54.00	55.12	60.00	53.00	54.33	55.00
P-24	BURRIED MH 2	BURRIED MH 3	18 inch	10.13	143.00	6.14	0.67	0.51	4.71	0.034021	53.00	54.23	55.00	47.00	49.52	50.00
P-28	BURRIED MH 3	9MH-30	18 inch	12.07	76.00	6.83	0.72	0.72	1.00	0.013197	47.00	49.35	50.00	43.35	48.35	48.35
P-87	Dummy Off Site Basin	TO GATE 7	18 inch	2.73	33.00	10.50	0.24	4.55	10.99	0.202372	42.83	43.46	44.83	32.25	32.47	45.05
P-117	EXISTING AETNA CB (10)	J-54	12 inch	0.00	78.00	0.00	0.00	0.00	2.57	0.032949	55.57	55.57	59.78	53.00	53.00	59.64
P-433	EXISTING AETNA MH	EXISTING MH 458+48.75	24 inch	7.08	25.00	4.26	0.37	0.21	-0.01	0.005685	33.89	34.83	50.89	33.67	34.85	51.72
P-432	EXISTING AETNA MH 2	EXISTING AETNA MH	24 inch	7.19	126.00	4.87	0.37	0.37	0.60	0.004762	34.99	35.94	49.99	34.39	35.34	50.89
P-424	EXISTING MH 458+48.75	458+49.30 MH	42 inch	44.51	20.00	6.11	0.60	0.56	0.01	0.002712	32.07	34.50	51.72	31.97	34.50	51.37
P-498	EXISTING PARKING LOT CB	AREA 9G-2 AND SCUPPER 204	12 inch	0.75	32.00	0.95	0.01	0.01	0.01	0.000438	46.41	49.45	48.91	46.31	49.43	49.52
P-417	EXTERNAL CA FROM 155-H025	450+44.59 MH	18 inch	13.61	98.00	7.87	0.92	1.00	1.72	0.016725	45.05	47.64	54.42	44.55	45.92	56.88
P-497	EXTERNAL CA FROM RRR	477+05.00 MH	12 inch	0.92	30.00	1.55	0.06	0.02	-0.01	0.000830	39.50	40.09	43.60	39.07	40.10	45.51
P-138	FARM I-1	FSMH-1	12 inch	2.05	56.00	4.02	0.26	0.24	4.75	0.084990	73.95	74.56	81.05	69.19	69.81	79.56
P-144	FSI-1	FSMH-6	12 inch	2.85	17.00	6.97	0.34	1.33	1.55	0.032909	53.98	54.70	59.38	52.74	53.16	59.94
P-143	FSI-2	FSMH-6	12 inch	1.54	27.00	3.10	0.21	0.10	1.79	0.070469	54.63	55.16	59.03	52.64	53.36	59.94
P-140	FSI-3	FSMH-5	12 inch	1.16	34.00	6.51	0.17	1.45	4.08	0.082532	60.01	60.46	64.31	56.17	56.38	63.77
P-139	FSI-4	FSMH-1	15 inch	0.86	25.00	2.20	0.13	0.04	1.68	0.071108	71.10	71.46	78.70	69.19	69.78	79.56

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-160	FSMH-1	FSMH-5	24 inch	2.73	267.00	2.46	0.21	0.02	13.40	0.050865	69.19	69.77	79.56	55.07	56.37	63.77
P-152	FSMH-2	FSMH-3	10 inch	8.72	77.00	15.98	3.97	3.97	7.21	0.093642	67.46	70.18	71.66	62.14	62.97	67.34
P-158	FSMH-3	FSMH-4	24 inch	8.70	19.00	5.17	0.42	0.41	3.13	0.165257	60.14	61.19	67.34	57.00	58.06	66.60
P-159	FSMH-4	FSMH-5	24 inch	8.68	50.00	4.44	0.42	0.21	1.48	0.033689	56.90	57.95	66.60	55.07	56.47	63.77
P-136	FSMH-5	FSMH-6	24 inch	11.59	76.00	5.09	0.52	0.30	3.30	0.046185	55.07	56.29	63.77	51.44	52.99	59.94
P-135	FSMH-6	FSMH-7	24 inch	16.96	105.00	6.50	0.71	0.60	4.59	0.044831	51.44	52.92	59.94	46.71	48.33	55.21
P-134	FSMH-7	FSMH-9	24 inch	18.46	140.00	10.27	0.78	2.81	6.01	0.028382	46.71	48.26	55.21	41.35	42.25	51.00
P-131	FSMH-9	8MH-1	36 inch	26.49	19.00	10.70	0.67	3.41	3.19	0.024167	40.99	42.65	51.00	38.56	39.46	49.66
P-132	FSMH-10	FSMH-9	18 inch	7.13	33.00	4.18	0.29	0.25	0.11	0.004473	41.60	42.92	50.90	40.99	42.81	51.00
P-147	FSPG-1	FSMH-6	24 inch	1.79	76.00	2.45	0.16	0.04	0.57	0.009141	53.50	53.96	70.00	52.64	53.39	59.94
P-148	FSPG-2	FSMH-7	24 inch	1.79	42.00	3.51	0.16	0.22	0.34	0.006645	49.00	49.46	70.00	48.71	49.13	55.21
P-145	FSPG-3	FSMH-9	18 inch	1.79	62.00	2.26	0.18	0.02	0.33	0.008055	42.50	43.00	70.00	41.35	42.67	51.00
P-146	FSPG -4	8MH-1	18 inch	1.79	60.00	3.99	0.18	0.32	0.73	0.009919	42.50	43.00	70.00	41.86	42.27	49.66
P-149	FSRD-1B	FSRD -1A	24 inch	11.19	30.00	5.38	0.50	0.40	0.26	0.011978	33.90	35.10	46.62	33.52	34.84	46.62
P-156	FSRD -1A	GATE 8 MH	48 inch	16.12	394.00	5.19	0.42	0.41	3.71	0.009441	33.52	34.70	46.62	29.80	30.99	47.00
P-246	GARNER ST CB	GB-SANMH9	12 inch	0.00	26.00	0.00	0.00	0.00	0.00	0.000000	56.00	67.20	69.50	55.50	67.20	68.00
P-157	GATE 8 MH	GATE 8	48 inch	15.97	9.00	5.79	0.42	0.63	0.26	0.005256	29.80	30.97	47.00	29.70	30.71	47.00
P-37	GATE 11 MH	GATE 11	42 inch	59.23	8.00	10.46	1.09	2.44	1.44	0.010521	30.00	32.41	39.25	29.25	30.98	39.25
P-277	GB-AS1/I-84EB	GB-AS2/I-84WB	18 inch	7.12	81.00	4.76	0.47	0.25	4.27	0.055327	57.00	58.03	60.00	52.00	53.77	57.95
P-278	GB-AS2/I-84WB	GB-MH3	18 inch	18.01	48.00	13.14	1.65	3.97	4.54	0.046077	52.00	53.45	57.95	48.00	48.91	52.00
P-294	GB-AS3	GB-MH6	15 inch	2.14	51.00	4.57	0.23	0.44	0.84	0.012241	58.00	58.58	68.00	57.29	57.74	68.00
P-219	GB-AS4	GB-MH7	15 inch	4.47	16.00	6.08	0.39	0.80	0.64	0.014323	51.50	52.36	69.00	51.08	51.71	69.44
P-272	GB-AS5	GB-SANMH 1	15 inch	2.81	14.00	2.29	0.08	0.08	0.03	0.001897	28.80	42.67	41.70	28.74	42.64	42.64
P-231	GB-AS6	GB-HB1	10 inch	1.58	22.00	2.89	0.13	0.13	0.11	0.005183	42.58	43.66	46.58	42.50	43.54	46.10
P-55	GB-B1	GB-B2	15 inch	2.46	84.00	2.11	0.08	0.06	0.10	0.001303	64.67	65.73	72.97	64.40	65.63	73.80
P-43	GB-B2	GB-B3	15 inch	3.86	68.00	3.80	0.17	0.29	0.37	0.003676	64.40	65.54	73.80	64.31	65.17	74.91
P-282	GB-B3	GB-B4	15 inch	3.22	211.00	4.18	0.30	0.25	2.73	0.013185	64.31	65.03	74.91	61.52	62.30	70.82
P-283	GB-B4	GB-MH8	15 inch	3.41	204.00	5.06	0.31	0.50	2.51	0.011384	61.52	62.26	70.82	59.14	59.76	74.34
P-271	GB-CB4	ASYLUM COMBINED MH	12 inch	6.21	54.00	7.95	1.00	0.97	9.25	0.171788	34.35	35.31	35.85	25.06	26.06	35.86
P-220	GB-FAR1	GB-MH7	18 inch	4.48	129.00	3.56	0.33	0.10	1.60	0.014153	50.46	51.27	73.06	48.14	49.67	69.44
P-221	GB-FAR2	GB-FAR1	15 inch	0.18	155.00	2.78	0.06	0.21	6.04	0.037971	72.44	72.60	76.54	66.46	66.56	73.06
P-232	GB-HB1	GB-HB2	10 inch	2.73	29.00	9.01	0.45	2.48	4.19	0.074631	42.50	43.23	46.10	38.69	39.04	44.79
P-227	GB-HB2	206+33.97 MH	15 inch	10.68	55.00	9.50	1.21	1.61	1.86	0.026645	37.29	38.49	44.79	35.63	36.63	39.43
P-236	GB-HB3	GB-HB2	15 inch	8.11	42.00	6.80	0.76	0.68	0.92	0.023918	39.24	40.36	47.14	37.99	39.44	44.79
P-235	GB-HB4	GB-HB3	15 inch	7.93	65.00	6.83	0.74	0.72	1.94	0.030138	41.30	42.41	50.00	39.34	40.47	47.14
P-234	GB-HB5	GB-HB4	12 inch	7.63	54.00	9.72	1.47	1.47	2.48	0.045881	43.00	45.14	54.00	41.30	42.66	50.00
P-233	GB-HB6	GB-HB5	12 inch	7.00	21.00	8.92	1.24	1.24	0.81	0.038634	43.50	47.89	54.00	43.00	47.08	54.00
P-276	GB-HB7	GB-HB6	12 inch	7.01	20.00	8.93	1.24	1.24	0.77	0.038717	44.00	49.65	54.00	43.50	48.87	54.00
P-211	GB-MH1	GB-MH2	18 inch	4.27	11.00	6.15	0.32	0.94	0.81	0.016587	30.35	31.14	40.15	29.81	30.33	39.61
P-212	GB-MH2	GULLY BROOK CHAMBER	33 inch	20.10	46.00	9.40	0.59	2.47	2.84	0.020790	28.01	29.49	39.61	25.79	26.65	38.30
P-270	GB-MH2 CA	GB-MH2	15 inch	5.07	127.00	4.71	0.43	0.27	1.75	0.015075	30.35	31.26	40.15	28.01	29.52	39.61
P-214	GB-MH3	GB-MH2	33 inch	53.75	312.00	9.42	1.27	1.49	3.40	0.010213	29.70	33.81	52.00	28.01	30.41	39.61
P-215	GB-MH4	GB-MH3	33 inch	38.43	122.00	6.47	0.65	0.65	0.64	0.005282	30.21	35.29	67.00	29.70	34.65	52.00
P-295	GB-MH6	GB-SP1	24 inch	9.25	91.00	2.94	0.13	0.13	0.15	0.001672	46.50	48.65	68.00	45.59	48.50	68.00
P-296	GB-MH7	GB-MH6	18 inch	7.72	52.00	4.37	0.30	0.30	0.28	0.005394	47.96	49.44	69.44	46.50	49.16	68.00
P-222	GB-MH8	GB-FAR1	18 inch	3.33	65.00	1.88	0.06	0.06	0.07	0.001003	50.74	53.02	74.34	50.56	52.96	73.06
P-155	GB-SANCB 1	GB-SANMH15	12 inch	0.57	33.00	2.54	0.11	0.09	7.37	0.224086	78.65	78.96	80.95	71.25	71.60	81.50
P-259	GB-SANCB2	GB-SANMH19	12 inch	0.78	30.00	2.85	0.14	0.12	0.48	0.016597	89.50	89.87	91.00	89.00	89.39	91.00
P-299	GB-SANCB3	GB-SANCB5	12 inch	2.64	63.00	3.94	0.32	0.18	1.68	0.028972	86.37	87.07	90.67	83.76	85.38	89.36
P-298	GB-SANCB4	GB-SANMH17	12 inch	0.77	34.00	5.16	0.14	0.84	2.69	0.058167	87.79	88.16	88.79	85.28	85.47	88.58
P-297	GB-SANCB5	GB-SANMH17	12 inch	8.97	38.00	11.44	2.04	2.03	5.80	0.152853	83.76	84.75	89.36	76.58	78.95	88.58
P-256	GB-SANCB6	GB-SANCB5	12 inch	3.05	65.00	4.64	0.31	0.36	0.55	0.007554	86.04	86.86	89.34	85.56	86.31	89.36
P-252	GB-SANCB7	GB-SANMH17	12 inch	3.57	94.00	6.10	0.43	0.75	2.04	0.018368	83.44	84.25	86.14	81.58	82.20	88.58

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HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-261	GB-SANCB8	GB-SANCB9	10 inch	1.23	33.00	3.09	0.21	0.10	1.80	0.057789	76.17	76.66	78.97	74.17	74.86	81.17
P-262	GB-SANCB9	GB-SANMH16	10 inch	1.93	26.00	4.38	0.29	0.30	0.18	0.006546	74.17	74.80	81.17	74.00	74.62	81.89
P-260	GB-SANCB10	GB-SANMH16	12 inch	5.54	7.00	10.26	0.81	2.75	2.31	0.052702	77.58	78.52	81.78	75.69	76.21	81.89
P-248	GB-SANCB11	GB-SANMH16	12 inch	4.59	43.00	9.25	0.60	2.35	4.01	0.052491	78.89	79.78	83.49	75.29	75.77	81.89
P-247	GB-SANCB12	GB-SANCB11	12 inch	2.25	14.00	2.86	0.13	0.13	0.06	0.003974	79.27	80.30	82.97	78.89	80.25	83.49
P-273	GB-SANMH 1	GB-SANMH 2	15 inch	17.29	74.00	14.09	3.09	3.09	5.30	0.071673	28.74	44.47	42.64	25.47	39.17	39.17
P-274	GB-SANMH 2	GB-SANMH 3	15 inch	17.24	23.00	14.06	3.07	3.07	1.64	0.071306	25.47	36.95	39.17	25.37	35.31	38.30
P-275	GB-SANMH 3	ASYLUM COMBINED MH	15 inch	17.23	102.00	14.04	3.07	3.07	7.26	0.071192	25.37	33.57	38.30	25.06	26.31	35.86
P-281	GB-SANMH4	GB-SANMH 1	15 inch	15.78	375.00	12.86	2.57	2.57	22.39	0.059704	32.65	65.03	67.00	28.74	42.64	42.64
P-291	GB-SANMH5	GB-SANMH4	15 inch	15.79	32.00	12.87	2.57	2.57	1.91	0.059800	54.71	68.91	67.00	54.67	67.00	67.00
P-290	GB-SANMH6	GB-SANMH5	18 inch	15.81	34.00	8.95	1.24	1.24	0.77	0.022671	54.80	67.77	67.20	54.71	67.00	67.00
P-292	GB-SANMH7	GB-SANMH20	18 inch	15.86	34.00	8.98	1.25	1.25	0.78	0.022809	55.47	68.78	68.31	55.19	68.00	68.00
P-300	GB-SANMH8	GB-SANMH7	24 inch	15.94	77.00	5.07	0.40	0.40	0.38	0.004966	57.13	68.69	70.65	55.47	68.31	68.31
P-245	GB-SANMH9	GB-SANMH6	12 inch	0.00	32.00	0.00	0.00	0.00	0.00	0.000000	55.50	67.20	68.00	54.80	67.20	67.20
P-267	GB-SANMH10	GB-SANMH8	12 inch	0.37	81.00	0.47	0.00	0.00	0.01	0.000107	59.90	70.66	75.00	57.13	70.65	70.65
P-266	GB-SANMH11	GB-SANMH10	12 inch	0.43	197.00	0.55	0.00	0.00	0.03	0.000148	67.00	70.69	79.00	59.90	70.66	75.00
P-265	GB-SANMH12	GB-SANMH11	12 inch	0.46	72.00	0.59	0.01	0.01	0.01	0.000169	69.46	70.71	80.76	67.00	70.69	79.00
P-264	GB-SANMH13	GB-SANMH12	15 inch	0.51	69.00	0.48	0.00	0.00	0.00	0.000065	69.80	70.71	81.00	69.46	70.71	80.76
P-263	GB-SANMH14	GB-SANMH13	15 inch	0.55	163.00	1.57	0.10	0.01	0.25	0.002115	70.67	70.96	82.17	69.80	70.71	81.00
P-154	GB-SANMH15	GB-SANMH14	15 inch	0.57	128.00	2.44	0.08	0.10	0.51	0.003781	71.25	71.57	81.50	70.77	71.06	82.17
P-250	GB-SANMH16	GB-SANMH8	24 inch	24.29	218.00	8.05	1.09	0.93	2.41	0.011784	69.49	71.23	81.89	57.13	68.82	70.65
P-251	GB-SANMH17	GB-SANMH16	18 inch	13.16	246.00	7.64	0.95	0.86	6.51	0.026826	76.58	77.94	88.58	69.49	71.43	81.89
P-258	GB-SANMH19	GB-SANCB3	15 inch	0.77	75.00	2.86	0.12	0.13	0.44	0.005728	89.00	89.34	91.00	88.57	88.91	90.67
P-293	GB-SANMH20	GB-SANMH6	18 inch	15.84	51.00	8.97	1.25	1.25	1.16	0.022754	55.19	68.36	68.00	54.93	67.20	67.20
P-216	GB-SP1	GB-MH4	33 inch	38.54	36.00	8.54	1.01	1.27	0.54	0.007739	45.90	47.97	68.00	45.57	47.43	67.00
P-128	GC-1	AETNA MH 203	15 inch	1.58	26.00	4.01	0.19	0.32	0.39	0.009814	44.50	45.00	50.00	44.20	44.61	62.00
P-242	GULLY BROOK BEND 2	Park River (Gully)	7 x 7 ft	420.05	838.00	6.91	0.74	0.75	1.27	0.001511	14.22	18.57	34.80	12.97	17.30	36.00
P-213	GULLY BROOK CHAMBER	GULLY BROOK GATE	36 inch	20.09	18.00	5.89	0.56	0.52	2.29	0.129316	20.85	22.29	38.30	18.52	20.00	36.90
P-243	GULLY BROOK GATE	GULLY BROOK BEND 2	11 x 9 ft	420.09	244.00	9.44	1.78	1.04	0.64	0.005689	15.97	19.54	36.90	14.22	18.89	34.80
P-285	GULLY BROOK INFLOW	J-108	11 x 9 ft	400.00	107.00	10.06	1.73	1.43	0.33	0.005842	16.82	20.27	37.64	16.15	19.94	38.25
P-467	I-261	6-MH 82	24 inch	1.28	74.00	2.22	0.14	0.03	2.76	0.038721	41.80	42.19	47.93	38.79	39.43	50.60
P-95	Intersection with Broad and Armory (Area A36-	AB-CB-4	15 inch	0.81	51.00	1.75	0.13	0.01	4.04	0.081630	46.05	46.40	49.05	40.98	42.36	49.58
P-39	J-1	J-18	36 inch	45.49	52.00	6.44	0.64	0.64	0.24	0.004654	21.59	24.72	42.00	21.33	24.48	42.00
P-15	J-2	J-27	36 inch	45.15	14.00	6.39	0.63	0.63	0.06	0.004584	16.09	19.77	42.00	16.00	19.71	42.00
P-40	J-16	J-2	36 inch	45.19	20.00	7.84	0.88	1.04	0.27	0.005278	20.96	23.35	42.00	20.89	23.08	42.00
P-16	J-17	J-16	36 inch	45.32	52.00	6.72	0.72	0.68	0.17	0.004046	21.24	23.92	42.00	20.96	23.74	42.00
P-17	J-18	J-17	36 inch	45.36	18.00	6.47	0.65	0.65	0.07	0.004092	21.33	24.24	42.00	21.24	24.17	42.00
P-19	J-20	LOB Parking and Buliding (Area A36-8) EXTERNA	36 inch	25.07	50.00	3.55	0.20	0.20	0.07	0.001413	22.09	25.40	42.00	21.85	25.32	42.00
P-18	J-27	Armory Wet Well	36 inch	45.11	8.00	6.38	0.63	0.63	0.04	0.004577	15.10	19.50	42.00	15.00	19.46	61.50
P-115	J-53	AETNA MH 203	12 inch	0.00	62.00	0.00	0.00	0.00	1.31	0.021129	45.00	45.00	59.64	43.69	43.69	62.00
P-116	J-54	J-53	12 inch	0.00	30.00	0.00	0.00	0.00	1.00	0.033333	46.00	46.00	59.64	45.00	45.00	59.64
P-284	J-108	GULLY BROOK GATE	11 x 9 ft	400.00	28.00	9.89	1.73	1.33	-0.30	0.003379	16.15	19.60	38.25	15.97	19.90	36.90
P-495	J-134	J-136	12 inch	1.79	84.00	2.28	0.08	0.08	0.21	0.002527	38.00	39.57	46.20	37.50	39.36	46.60
P-491	J-135	J-134	12 inch	1.68	119.00	2.14	0.07	0.07	0.27	0.002232	38.59	39.84	45.90	38.00	39.57	46.20
P-494	J-136	473+42.04 MH	12 inch	1.93	99.00	2.45	0.09	0.09	0.29	0.002927	37.50	39.36	46.60	37.00	39.07	47.10
P-38	LOB Parking and Buliding (Area A36-8) EXTEI	J-1	36 inch	45.62	52.00	6.46	0.65	0.65	0.24	0.004681	21.85	25.09	42.00	21.59	24.85	42.00
P-195	LOB PARKING LOT	6-MH-88	15 inch	10.70	139.00	8.72	1.18	1.18	3.82	0.027447	35.00	37.08	42.94	32.00	33.27	41.00
P-5	MH-9-32	9-MH-34	24 inch	21.03	106.00	6.69	0.70	0.70	0.92	0.008644	39.69	43.52	52.79	38.50	42.61	52.98
P-103	MH 2+95	J-20	36 inch	25.18	79.00	6.64	0.65	0.72	0.47	0.004995	27.26	28.88	42.00	26.86	28.41	42.00
P-102	MH 3+95	MH 2+95	30 inch	25.30	94.00	6.89	0.70	0.77	0.56	0.005175	28.60	30.39	42.00	28.12	29.83	42.00
P-101	MH 4+95	MH 3+95	30 inch	25.41	90.00	6.96	0.73	0.78	0.53	0.005364	30.10	31.87	42.00	29.62	31.34	42.00
P-100	MH 5+95	MH 4+95	30 inch	25.58	127.00	6.56	0.57	0.78	0.77	0.004377	31.58	33.59	42.00	31.10	32.82	42.00
P-244	PARKING LOT CB	GB-SANMH9	12 inch	0.00	13.00	0.00	0.00	0.00	0.00	0.000000	56.00	67.20	68.50	55.50	67.20	68.00

Scenario: 25 year

HYDRAULIC GRADE LINE REPORT BUSWAY

Label	Upstream Node	Downstream Node	Section Size	Total System Flow (cfs)	Length (ft)	Average Velocity (ft/s)	Velocity Head In (ft)	Velocity Head Out (ft)	Gravity Element Headloss (ft)	Energy Slope (ft/ft)	Upstream Invert Elevation (ft)	Hydraulic Grade Line In (ft)	Upstream Ground Elevation (ft)	Downstream Invert Elevation (ft)	Hydraulic Grade Line Out (ft)	Downstream Ground Elevation (ft)
P-124	RR-ROW CB1 EXTERNAL CA FROM SCUPP	RR ROW MH 1	15 inch	1.42	90.00	3.70	0.17	0.25	0.86	0.008679	44.99	45.46	48.50	44.19	44.60	49.00
P-123	RR ROW MH 1	10-MH1	18 inch	1.40	149.00	4.02	0.16	0.36	2.43	0.014958	39.43	39.87	49.00	37.11	37.44	48.51
P-481	SCUPPER (AREA 202)	9-MH-34	12 inch	1.11	6.00	6.51	0.17	1.47	1.53	0.038780	46.29	46.73	53.09	45.00	45.20	52.98
P-480	SCUPPER (AREA 203)	MH-9-32	12 inch	1.44	32.00	3.89	0.20	0.27	0.36	0.008899	48.19	48.70	51.59	47.89	48.34	52.79
P-499	SCUPPER 205	EXISTING PARKING LOT CB	12 inch	0.75	12.00	0.96	0.01	0.01	0.01	0.000445	46.53	48.92	49.00	46.41	48.91	48.91
P-91	SIG-CB2A-1	43+76.56	15 inch	3.59	43.00	7.03	0.32	1.40	2.45	0.031921	66.98	67.74	68.28	64.86	65.29	68.37
P-109	SIG-CB2A-2	SIG-CB2A-1	12 inch	3.67	213.00	4.67	0.34	0.34	2.26	0.010599	66.00	70.13	68.00	63.98	67.87	68.28
P-77	SIG-CB2B	43+76.56	15 inch	2.65	59.00	3.46	0.12	0.26	0.32	0.003134	65.24	66.13	68.84	65.16	65.81	68.37
P-437	SIGOURNEY STREET STATION	452+80 MH	12 inch	3.05	67.00	5.50	0.36	0.59	1.22	0.014768	51.50	52.25	60.00	50.43	51.03	56.50
P-30	TRENCH DRAIN (9D)	BURRIED MH 2	12 inch	1.85	71.00	2.36	0.09	0.09	0.19	0.002689	53.50	54.48	55.00	53.00	54.29	55.00
P-29	TRENCH DRAIN (9E)	BURRIED MH 3	12 inch	2.22	67.00	2.82	0.12	0.12	0.26	0.003873	48.00	49.72	50.00	47.00	49.46	50.00
P-35	TRENCH DRAIN (9G1)	9-MH31	12 inch	1.56	28.00	4.83	0.21	0.55	0.84	0.017907	49.00	49.53	51.00	48.32	48.69	51.12

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APPENDIX D-5

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

H. W. LOCHNER, INC.

Project 06H137
Subject Sag Analysis
Calc. By MM Date 6/7/10
Checked By _____ Date _____

Sheet 1 of _____
Job No. _____

Reference

$$X = (200 \times (.0378)(12))^{0.5} = 9.525$$

$$\therefore X = 10'$$

∴ STATIONS for flankers are at

$$904+27.54 \pm 10' =$$

904 + 37.54

904 + 17.54

SEE SPREADSHEET FOR ADDITIONAL LOCATIONS.

H. W. LOCHNER, INC.

Project 06H131
Subject SAG Analysis
Calc. By MM Date 6/7/10
Checked By _____ Date _____

Sheet 1 of _____
Job No. _____

Reference

I. Flanking Inlet Analysis using Hec-22

A. SB on RAMP 904 + 27.54

1) GIVEN:

a) From profile the sag vertical curve is 12 feet.

$$\therefore K = 12^{FT}/_{\%}$$

From section the cross slope is 2%

$$\therefore S_x = 2\%$$

b) Determine depth at design SPREAD

MAX SPREAD = 8' = T

$$d = S_x T$$

$$= .02 \times 8'$$

$$d = 0.16$$

c) Determine depth for the next

$$d = 63\%$$

$$= 0.63 \times (.06) < 0.038$$

d) INLet SPACing

$$X = (200 d K)^{0.5}$$

FLANKER INLET ANALYSIS
NEW BRITAIN-HARTFORD BUSWAY
HARTFORD NORTH

COMPUTED BY:	M.M
DATE:	6/7/10
CHECKED BY:	
DATE:	

Station: **476+75.00**

NB Busway

K from Profile	100 ft/%
Cross Slope (Sw)	
Croos Slope 1	2 %
Cross Slope 2	2 %
Width lane	12 ft
Width Shoulder	2 ft
Coposite Cross Slope (Sw)	2 %
Max Spread (ft)	8
Max Depth (ft)	0.16
Flanker depth (ft)	0.1008
Inlet spacing (ft)	44.89989

Therefore flankers need to be located at the following stations:

47630.10011	47719.9
476+30.10	477+19.90

FLANKER INLET ANALYSIS
NEW BRITAIN-HARTFORD BUSWAY
HARTFORD NORTH

COMPUTED BY:	M.M
DATE:	6/7/10
CHECKED BY:	
DATE:	

Station: 460+71.43

NB Busway

K from Profile	107 ft/%	
Cross Slope (Sw)		
Croos Slope 1	2 %	
Cross Slope 2	4 %	
Width lane	12 ft	
Width Shoulder	4 ft	
Coposite Cross Slope (Sw)	2.5 %	
Max Spread (ft)	10	
Max Depth (ft)	0.25	
Flanker depth (ft)	0.1575	
Inlet spacing (ft)	58.05601	
Therefore:	46013.37	46129.49
	460+13.37	461+29.49

Step 20 *Col. 5* $V = 3.5$ ft/s *(step 8)*
$t_c = L/[60\ V] = 360/[(60)(3.5)]$
$t_c = 1.7$ min (use 5 min minimum) *(equation 3-6)*

Step 21 *Col. 6* $I = 7.1$ in/hr *(figure 3-1)*

Step 22 *Col. 7* $Q = CIA/K_u$ *(equation 3-1)*
$Q = (0.73)(7.1)(0.35)/(1) = 1.81\ ft^3/s$

Step 23 *Col. 11* Col. 11 = Col. 10 + Col. 7 = 0.93 + 1.81 = $2.74\ ft^3/s$

Step 24 *Col. 14* $T = 5.6$ ft *(equation 4-2 or chart 1)*
$T < T$ allowable
Col. 12 $d = (5.6)(0.4) = 0.22$ ft
$d <$ curb height

Since the actual spread is less than the allowable spread, a larger invert spacing could be used here. However, in this case, maintenance considerations limit the spacing to 360 ft.

Step 25 *Col. 16* *Select P 50 x 100 grate 2 ft wide by 3 ft long.*

Step 26 *Col. 17* $Q_i = 2.05\ ft^3/s$ *(step 17)*

Step 27 *Col. 18* $Q_b = Q - Q_i$
Col. 18 $= Col.\ 11 - Col.\ 17$
Col. 18 $= 2.74 - 2.05 = 0.69\ ft^3/s$

Step 28 *Repeat steps 19 through 27 for each additional inlet.*

For inlet spacing in areas with changing grades, the spacing will vary as the grade changes. If the grade becomes flatter, inlets may be spaced at closer intervals because the spread will exceed the allowable. Conversely, for an increase in slope, the inlet spacing will become longer because of increased capacity in the gutter sections. Additionally, individual transportation agencies may have limitations for spacing due to maintenance constraints.

4.4.6.3 Flanking Inlets

As discussed in the previous section, inlets should always be located at the low or sag points in the gutter profile. In addition, it is good engineering practice to place flanking inlets on each side of the low point inlet when in a depressed area that has no outlet except through the system. This is illustrated in figure 4-22. The purpose of the flanking inlets is to act in relief of the inlet at the low point if it should become clogged or if the design spread is exceeded.

FLANKER INLET ANALYSIS
NEW BRITAIN-HARTFORD BUSWAY
HARTFORD NORTH

COMPUTED BY:	MM
DATE:	6/7/10
CHECKED BY:	
DATE:	

Station: **SB BUSWAY RAMP 904+27.54**

NB Busway

K from Profile	12 ft/%
Cross Slope (Sw)	
Croos Slope 1	2 %
Cross Slope 2	2 %
Width lane	12 ft
Width Shoulder	2 ft
Coposite Cross Slope (Sw)	2 %
Max Spread (ft)	3
Max Depth (ft)	0.06
Flanker depth (ft)	0.0378
Inlet spacing (ft)	9.524705

Therefore flankers need to be located at the following stations:

90418.0153	90437.06
904+18.015	904+37.06

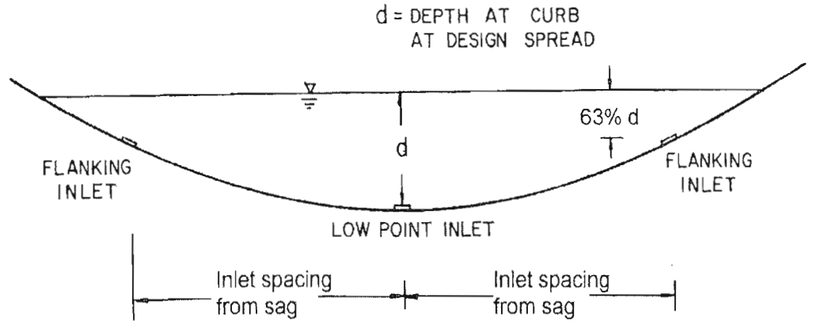

Figure 4-22. Example of flanking inlets.

Flanking inlets can be located so they will function before water spread exceeds the allowable spread at the sump location. The flanking inlets should be located so that they will receive all of the flow when the primary inlet at the bottom of the sag is clogged. They should do this without exceeding the allowable spread at the bottom of the sag. If the flanking inlets are the same dimension as the primary inlet, they will each intercept one-half the design flow when they are located so that the depth of ponding at the flanking inlets is 63 percent of the depth of ponding at the low point. If the flanker inlets are not the same size as the primary inlet, it will be necessary to either develop a new factor or do a trial and error solution using assumed depths with the weir equation to determine the capacity of the flanker inlet at the given depths [18].

Table 4-7 shows the spacing required for various depth at curb criteria and vertical curve lengths defined by $K = L / (G_2 - G_1)$, where L is the length of the vertical curve in meters (feet) and G_1 and G_2 are the approach grades in percent. The AASHTO policy on geometrics specifies maximum K values for various design speeds and a maximum K of 50 (167 English) considering drainage. The use of table 4-7 is illustrated in example 4-16.

Example 4-16

Given: A 150 m (500 ft)(L) sag vertical curve at an underpass on a 4-lane divided highway with begin and end slopes of -2.5% and +2.5% respectively. The spread at design Q is not to exceed the shoulder width of 3.0 m (9.8 ft).

$S_x = 0.02$

Find: *The location of the flanking inlets if located to function in relief of the inlet at the low point when the inlet at the low point is clogged.*

Solution:

SI Units

Step 1. Find the rate of vertical curvature, K.

$K = L/(S_{end} - S_{beginning})$
$K = 150\ m/(2.5\% - (-2.5\%))$
$K = 30\ m/\%$

Step 2. Determine depth at design spread.

$d = S_x T = (0.02)(3.0)$
$d = 0.06\ m$

Step 3. Determine the depth for the flanker locations.

d = 63% of depth over inlet at bottom of sag
$= 0.63\ (.06)$
$= 0.04\ m$

Step 4. For use with table 4-7;

$d = 0.06 - 0.04 = 0.02\ m$

$X = (200\ d\ K)^{0.5}$
$= \{(200)(0.02)(30)\}^{0.5}$
$= 10.95\ m$

Inlet spacing = 10.95 m from the sag point.

English Units

Step 1. Find the rate of vertical curvature, K.

$K = L/(S_{end} - S_{beginning})$
$K = 500\ ft/(2.5\% - (-2.5\%))$
$K = 100\ ft/\%$

Step 2. Determine depth at design spread.

$d = S_x T = (0.02)(9.84)$
$d = 0.2\ ft$

Step 3. Determine the depth for the flanker locations.

d = 63% of depth over inlet at bottom of sag
$= 0.63\ (0.2)$
$= 0.13$

Step 4. For use with table 4-7;

$d = 0.20 - 0.13 = 0.07\ ft$

$X = (200\ d\ K)^{0.5}$
$= \{(200)(0.07)(100)\}^{0.5}$
$= 37.4\ ft$

Inlet spacing = 37.4 ft from the sag point.

Example problem solutions in section 4.4.5 illustrate the total interception capacity of inlets in sag locations. Except where inlets become clogged, spread on low gradient approaches to the low point is a more stringent criterion for design than the interception capacity of the sag inlet. AASHTO [21] recommends that a gradient of 0.3 percent be maintained within 15 m (50 ft) of the level point in order to provide for adequate drainage. It is considered advisable to use spread on the pavement at a gradient comparable to that recommended by the AASHTO Committee on Design to evaluate the location and excessive spread in the sag curve. Standard inlet locations may need to be adjusted to avoid excessive spread in the sag curve. Inlets may be needed between the flankers and the ends of the curves also. For major sag points, the flanking inlets are added as a safety factor, and are not considered as intercepting flow to reduce the bypass flow to the sag point. They are installed to assist the sag point inlet in the event of clogging.

Table 4-7. Distance to Flanking Inlets in Sag Vertical Curve Using Depth at Curb Criteria.[19] -

SI Units

	K (m/%)	4	8	11	15	20	25	30	37	43	50
d (m)											
0.01		2.8	4.0	4.7	5.5	6.3	7.1	7.7	8.6	9.3	10.0
0.02		4.0	5.7	6.6	7.7	8.9	10.0	11.0	12.2	13.1	14.1
0.03		4.9	7.0	8.2	9.6	11.0	12.3	13.5	15.0	16.2	17.5
0.06		7.0	9.9	11.6	13.5	15.6	17.5	19.1	21.2	22.9	24.7
0.09		8.6	12.1	14.2	16.6	19.1	21.4	23.4	26.0	28.0	30.2
0.12		9.9	14.0	16.4	19.1	22.1	24.7	27.1	30.0	32.4	34.9
0.15		11.0	15.6	18.3	21.4	24.7	27.6	30.2	33.6	36.2	39.0
0.18		12.1	17.1	20.1	23.4	27.1	30.2	33.1	36.8	39.7	42.8
0.21		13.1	18.5	21.7	25.3	29.2	35.8	35.8	39.7	42.8	46.2
0.24		14.0	19.8	23.2	27.1	31.2	38.2	38.3	42.5	45.8	49.4

NOTES: 1. $x = (200\ dK)^{0.5}$ where x = distance from sag point.
2. $d = Y - Y_f$ where Y = depth of ponding and Y_f = depth at the flanker inlet
3. Drainage maximum K = 50

English Units

	K (ft/%)	20	30	40	50	70	90	110	130	160	167
d (m)											
0.1		20	24	28	32	37	42	47	51	57	58
0.2		28	35	40	45	53	60	66	72	80	82
0.3		35	42	49	55	65	73	81	88	98	100
0.4		40	49	57	63	75	85	94	102	113	116
0.5		45	55	63	71	84	95	105	114	126	129
0.6		49	60	69	77	92	104	115	125	139	142
0.7		53	65	75	84	99	112	124	135	150	153
0.8		57	69	80	89	106	120	133	144	160	163

NOTES: 1. $x = (200\ dK)^{0.5}$ where x = distance from sag point.
2. $d = Y - Y_f$ where Y = depth of ponding and Y_f = depth at the flanker inlet
3. Drainage maximum K =167

4.4.7 Median, Embankment, and Bridge Inlets

Flow in median and roadside ditches is discussed briefly in chapter 5 and in Hydraulic Engineering Circular No. 15[34] and Hydraulic Design Series No. 4[7]. It is sometimes necessary to place inlets in medians at intervals to remove water that could cause erosion. Inlets are sometimes used in roadside ditches at the intersection of cut and fill slopes to prevent erosion downstream of cut sections.

Where adequate vegetative cover can be established on embankment slopes to prevent erosion, it is preferable to allow storm water to discharge down the slope with as little concentration of flow

APPENDIX D-6

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-87	Dummy Off Site Basin	TO GATE 7	0.372	0.90	0.335	0.396	6.02	2.40	59.47	33.00	0.320606	18 inch	0.013	42.83	32.25	44.83	45.05	0.50	11.30	43.42	32.46	Concrete
P-72	BROAD ST COMBINED	TO COMBINED SIPHON	0.000	0.00	0.000	0.191	6.02	1.16	7.53	26.00	0.044615	12 inch	0.013	44.47	43.31	47.97	47.21	2.50	2.90	44.92	43.58	Concrete
P-16	J-17	J-16	N/A	N/A	N/A	12.303	3.81	47.19	48.59	52.00	0.005308	36 inch	0.013	21.24	20.96	42.00	42.00	17.76	18.04	24.02	23.82	Concrete
P-17	J-18	J-17	N/A	N/A	N/A	12.303	3.81	47.24	47.16	18.00	0.005000	36 inch	0.013	21.33	21.24	42.00	42.00	17.67	17.76	24.38	24.29	Concrete
P-19	J-20	LOB Parking and Buliding (Area A36-8) EX	N/A	N/A	N/A	6.733	3.85	26.11	46.69	50.00	0.004900	36 inch	0.013	22.09	21.85	42.00	42.00	16.91	17.15	25.65	25.57	Concrete
P-38	LOB Parking and Buliding (Area A36-8)	J-1	0.000	0.00	0.000	12.303	3.83	47.49	47.16	52.00	0.005000	36 inch	0.013	21.85	21.59	42.00	42.00	17.15	17.41	25.31	25.05	Concrete
P-39	J-1	J-18	N/A	N/A	N/A	12.303	3.82	47.36	47.16	52.00	0.005000	36 inch	0.013	21.59	21.33	42.00	42.00	17.41	17.67	24.90	24.64	Concrete
P-40	J-16	J-2	N/A	N/A	N/A	12.303	3.80	47.09	41.11	20.00	0.003800	36 inch	0.013	20.96	20.89	42.00	42.00	18.04	18.11	23.40	23.12	Concrete
P-21	AB-MH90	Armory Drainage (Area A36-7) EXTERNAL	N/A	N/A	N/A	2.473	3.96	9.88	24.45	107.00	0.011682	24 inch	0.013	34.67	33.42	49.87	48.90	13.20	13.48	35.79	34.59	Concrete
P-22	AB-MH3	AB-MH90	N/A	N/A	N/A	2.473	4.10	10.23	6.78	189.00	0.000899	24 inch	0.013	34.84	34.67	49.48	49.87	12.64	13.20	36.57	35.98	Concrete
P-23	AB-CB-4	AB-MH3	0.493	0.90	0.444	2.273	4.69	10.76	16.20	37.00	0.023784	18 inch	0.013	40.88	40.00	49.58	49.48	7.20	7.98	42.14	40.95	Concrete
P-95	Intersection with Broad and Armory (Are	AB-CB-4	0.132	0.90	0.119	0.119	6.02	0.72	20.37	51.00	0.099412	15 inch	0.013	46.05	40.98	49.05	49.58	1.75	7.35	46.38	42.27	Concrete
P-25	AB-CB-3	AB-MH1	0.140	0.90	0.126	1.902	4.72	9.06	21.74	39.00	0.042821	18 inch	0.013	45.38	43.71	50.18	49.81	3.30	4.60	46.54	45.07	Concrete
P-26	AB-CB-2	AB-CB-3	0.177	0.90	0.159	1.762	4.76	8.46	12.22	150.00	0.035800	15 inch	0.013	50.85	45.48	55.85	50.18	3.75	3.45	51.99	46.63	Concrete
P-27	AB-CB-1	AB-CB-2	0.242	0.90	0.218	1.075	4.80	5.21	11.99	154.00	0.034481	15 inch	0.013	56.36	51.05	62.66	55.85	5.05	3.55	57.29	52.11	Concrete
P-96	AB-MH1	AB-MH2	N/A	N/A	N/A	1.902	4.71	9.04	18.72	17.00	0.031765	18 inch	0.013	43.51	42.97	49.81	50.47	4.80	6.00	44.67	43.82	Concrete
P-98	AB-MH2	AB-CB-4	N/A	N/A	N/A	1.902	4.71	9.03	5.66	31.00	0.002903	18 inch	0.013	41.07	40.98	50.47	49.58	7.90	7.10	42.76	42.53	Concrete
P-99	Armory Drainage (Area A36-7) EXTERN	MH 5+95	0.000	0.00	0.000	6.733	3.95	26.78	32.70	107.00	0.006355	30 inch	0.013	32.70	32.02	48.90	42.00	13.70	7.48	34.46	33.74	Concrete
P-100	MH 5+95	MH 4+95	N/A	N/A	N/A	6.733	3.93	26.65	25.22	127.00	0.003780	30 inch	0.013	31.58	31.10	42.00	42.00	7.92	8.40	33.66	32.86	Concrete
P-101	MH 4+95	MH 3+95	N/A	N/A	N/A	6.733	3.90	26.45	29.95	90.00	0.005333	30 inch	0.013	30.10	29.62	42.00	42.00	9.40	9.88	31.93	31.37	Concrete
P-102	MH 3+95	MH 2+95	N/A	N/A	N/A	6.733	3.88	26.34	29.31	94.00	0.005106	30 inch	0.013	28.60	28.12	42.00	42.00	10.90	11.38	30.45	29.87	Concrete
P-103	MH 2+95	J-20	N/A	N/A	N/A	6.733	3.86	26.21	47.46	79.00	0.005063	36 inch	0.013	27.26	26.86	42.00	42.00	11.74	12.14	28.91	28.45	Concrete
P-104	AREA A36-7B (LOB)	AB-MH3	0.000	0.00	0.000	0.200	4.80	0.97	5.11	314.00	0.000510	24 inch	0.013	35.00	34.84	46.80	49.48	9.80	12.64	36.65	36.64	Concrete
P-15	J-2	J-27	N/A	N/A	N/A	12.303	3.79	47.04	53.47	14.00	0.006429	36 inch	0.013	16.09	16.00	42.00	42.00	22.91	23.00	19.80	19.73	Concrete
P-18	J-27	Armory Wet Well	N/A	N/A	N/A	12.303	3.79	47.00	74.57	8.00	0.012500	36 inch	0.013	15.10	15.00	42.00	61.50	23.90	43.50	19.50	19.46	Concrete
P-161	AR-48-4	Armory Wet Well	0.000	0.00	0.000	5.644	0.98	6.47	94.71	23.00	0.004348	48 inch	0.013	15.10	15.00	42.00	61.50	22.90	42.50	19.46	19.46	Concrete
P-164	AR-CB2	AR-CB3	0.520	0.34	0.177	0.184	3.43	0.64	6.59	25.00	0.010400	15 inch	0.013	32.63	32.37	37.93	37.07	4.05	3.45	32.94	32.63	Concrete
P-165	AR-MH5	AR-CB3	N/A	N/A	N/A	5.165	1.00	6.09	11.65	152.00	0.000066	48 inch	0.013	15.88	15.87	30.18	37.07	10.30	17.20	19.47	19.47	Concrete
P-166	AR-CB4	ARMORY CAPPED MH	0.140	0.43	0.060	0.061	4.80	0.30	7.79	22.00	0.014545	15 inch	0.013	23.07	22.75	30.17	30.18	5.85	6.18	23.28	23.00	Concrete
P-167	ARMORY CAPPED MH	AR-MH5	N/A	N/A	N/A	0.061	4.78	0.30	18.18	26.00	0.260385	12 inch	0.013	22.75	15.98	30.18	30.18	6.43	13.20	22.97	19.47	Concrete
P-168	AR-CB6	AR-MH5	0.110	0.42	0.046	5.103	1.01	6.11	25.45	125.00	0.000640	42 inch	0.013	15.96	15.88	25.76	30.18	6.30	10.80	19.48	19.47	Concrete
P-169	AR-CB14 (200+35.62)	AR-CB6	0.860	0.30	0.258	0.646	2.13	2.28	14.05	52.00	0.060962	18 inch	0.024	21.13	17.96	26.33	25.76	3.70	6.30	21.70	19.48	CMP
P-170	AR-CB-17 (200+66.99)	AR-CB14 (200+35.62)	0.213	0.90	0.192	0.248	2.79	0.70	1.79	65.00	0.000769	15 inch	0.013	22.48	22.43	26.28	26.33	2.55	2.65	22.95	22.76	Concrete
P-171	ARMH-9	AR-CB6	N/A	N/A	N/A	4.416	1.01	4.51	69.34	99.00	0.010808	36 inch	0.013	17.13	16.06	27.43	25.76	7.30	6.70	19.48	19.48	Concrete
P-173	AR-CB8	ARMH-9	0.170	0.38	0.065	0.914	2.59	2.39	78.36	12.00	0.120000	24 inch	0.013	19.47	18.03	25.27	27.43	3.80	7.40	20.01	19.48	Concrete
P-174	AR-CB13	AR-CB8	0.060	0.40	0.024	0.104	5.99	0.63	2.58	44.00	0.005227	12 inch	0.013	21.10	20.87	25.70	25.27	3.60	3.40	21.44	21.20	Concrete
P-175	AR-CB13A	AR-CB13	0.060	0.90	0.054	0.075	6.02	0.45	4.63	29.00	0.016897	12 inch	0.013	21.69	21.20	24.79	25.70	2.10	3.50	21.97	21.41	Concrete
P-176	AR-CB18	AR-CB8	0.060	0.90	0.054	0.066	6.02	0.40	1.36	55.00	0.001455	12 inch	0.013	20.85	20.77	24.65	25.27	2.80	3.50	21.21	21.03	Concrete
P-177	AR-CB10	AR-CB8	1.300	0.30	0.390	0.607	2.60	1.59	12.34	42.00	0.013810	18 inch	0.013	21.21	20.63	25.31	25.27	2.60	3.14	21.68	20.99	Concrete
P-179	AR-CB15	AR-CB10	0.000	0.00	0.000	0.209	3.68	0.78	7.18	45.00	0.004667	18 inch	0.013	21.52	21.31	25.62	25.31	2.60	2.50	21.85	21.75	Concrete
P-180	AR-48-3/ AR-CB16	AR-CB15	0.910	0.23	0.209	0.205	3.69	0.76	19.88	31.00	0.035806	18 inch	0.013	22.73	21.62	27.63	25.62	3.40	2.50	23.05	21.82	Concrete
P-182	AR-48-2	AR-MH-12	0.180	0.23	0.041	0.171	3.66	0.63	5.78	70.00	0.027286	15 inch	0.024	23.57	21.66	32.07	30.50	7.25	7.59	23.88	22.27	CMP
P-183	AR-MH-12	AR-MH11	0.000	0.00	0.000	3.502	1.02	3.59	123.64	103.00	0.034369	36 inch	0.013	21.66	18.12	30.50	29.02	5.84	7.90	22.25	19.48	Concrete
P-184	AR-MH11	ARMH-9	N/A	N/A	N/A	3.502	1.02	3.59	61.80	92.00	0.008587	36 inch	0.013	18.02	17.23	29.02	27.43	8.00	7.20	19.48	19.48	Concrete
P-185	AR-48-1	AR-MH-12	1.560	0.42	0.655	3.251	1.02	3.34	128.34	101.00	0.037030	36 inch	0.013	25.40	21.66	34.50	30.50	6.10	5.84	25.97	22.26	Concrete
P-186	AR-48-1CA4	AR-48-1	0.000	0.00	0.000	2.575	1.02	2.64	149.13	36.00	0.050000	36 inch	0.013	27.50	25.70	36.50	34.50	6.00	5.80	28.01	25.98	Concrete
P-187	AR-48-1B	AR-48-1CA4	0.000	0.00	0.000	2.415	1.02	2.48	101.71	43.00	0.023256	36 inch	0.013	28.50	27.50	37.50	36.50	6.00	6.00	28.99	28.02	Concrete
P-189	AR-CB3	AR-48-4	0.220	0.62	0.136	5.644	0.98	6.49	98.72	163.00	0.004724	48 inch	0.013	15.87	15.10	37.07	42.00	17.20	22.90	19.47	19.46	Concrete
P-224	AR-48-1C	AR48-MH	0.370	0.61	0.226	0.405	4.80	1.96	7.67	177.00	0.048023	15 inch	0.024	43.65	35.15	53.00	44.50	8.10	8.10	44.21	35.74	CMP
P-225	AR48-MH	AR-48-1B	N/A	N/A	N/A	0.405	4.71	1.93	7.37	150.00	0.044333	15 inch	0.024	35.15	28.50	44.50	37.50	8.10	7.75	35.70	28.94	CMP
P-226	AR-CB7	AR-CB8	0.100	0.26	0.026	0.030	4.80	0.15	1.58	46.00	0.001957	12 inch	0.013	21.36	21.27	25.16	25.27	2.80	3.00	21.57	21.43	Concrete

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Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-237	Armory Wet Well	Armory Pump Station	N/A	N/A	N/A	17.947	0.98	18.56	423.52	105.00	0.001905	8 x 7 ft	0.013	15.00	14.80	61.50	45.00	39.50	23.20	19.46	19.46	Concrete
P-439	200+65.76 WALL 111 SWALE CB	AR-CB-17 (200+66.99)	0.387	0.23	0.089	0.089	2.80	0.25	9.43	4.00	0.070000	12 inch	0.013	22.76	22.48	30.81	26.28	7.05	2.80	22.97	22.97	Concrete
P-351	904+39.54	904+27.54	0.050	0.90	0.045	0.037	6.02	0.23	2.06	12.00	0.003333	12 inch	0.013	31.31	31.27	36.40	36.35	4.09	4.08	31.55	31.54	Concrete
P-352	904+27.54	904+15.54	0.010	0.90	0.009	0.064	6.00	0.39	6.78	12.00	0.004167	18 inch	0.013	31.27	31.22	36.35	36.41	3.58	3.69	31.53	31.52	Concrete
P-353	904+15.54	903+54.91	0.020	0.90	0.018	0.081	5.97	0.49	2.63	57.00	0.005439	12 inch	0.013	31.22	30.91	36.41	38.52	4.19	6.61	31.51	31.25	Concrete
P-355	904+27.45	904+27.54	0.010	0.90	0.009	0.009	6.02	0.05	3.72	11.00	0.010909	12 inch	0.013	31.39	31.27	36.47	36.35	4.08	4.08	31.53	31.53	Concrete
P-500	903+54.91	902+85.52	0.020	0.90	0.018	0.102	5.89	0.61	2.94	72.00	0.006806	12 inch	0.013	30.91	30.42	38.52	42.85	6.61	11.43	31.23	30.73	Concrete
P-501	902+85.52	902+84.12 MH	0.050	0.90	0.045	0.144	5.79	0.84	4.60	12.00	0.016667	12 inch	0.013	25.20	25.00	42.85	27.76	16.65	1.76	25.58	25.30	Concrete
P-502	902+84.12 MH	AR-CB14 (200+35.62)	N/A	N/A	N/A	0.144	5.78	0.84	6.65	43.00	0.034884	12 inch	0.013	25.00	23.50	27.76	26.33	1.76	1.83	25.38	23.74	Concrete
P-271	GB-CB4	ASYLUM COMBINED MH	0.559	0.90	0.503	1.036	4.80	5.02	14.78	54.00	0.172037	12 inch	0.013	34.35	25.06	35.85	35.86	0.50	9.80	35.27	26.06	Concrete
P-272	GB-AS5	GB-SANMH 1	0.000	0.00	0.000	0.400	6.02	2.43	4.23	14.00	0.004286	15 inch	0.013	28.80	28.74	41.70	42.64	11.65	12.65	42.66	42.64	Concrete
P-273	GB-SANMH 1	GB-SANMH 2	N/A	N/A	N/A	4.375	3.60	15.88	13.58	74.00	0.044189	15 inch	0.013	28.74	25.47	42.64	39.17	12.65	12.45	41.97	37.49	Concrete
P-274	GB-SANMH 2	GB-SANMH 3	N/A	N/A	N/A	4.375	3.59	15.84	4.26	23.00	0.004348	15 inch	0.013	25.47	25.37	39.17	38.30	12.45	11.68	35.29	33.91	Concrete
P-275	GB-SANMH 3	ASYLUM COMBINED MH	N/A	N/A	N/A	4.375	3.59	15.83	3.56	102.00	0.003039	15 inch	0.013	25.37	25.06	38.30	35.86	11.68	9.55	32.44	26.31	Concrete
P-281	GB-SANMH4	GB-SANMH 1	N/A	N/A	N/A	3.975	3.64	14.59	6.60	375.00	0.010427	15 inch	0.013	32.65	28.74	67.00	42.64	33.10	12.65	61.78	42.64	Concrete
P-244	PARKING LOT CB	GB-SANMH9	0.000	0.00	0.000	0.000	0.00	0.00	6.99	13.00	0.038462	12 inch	0.013	56.00	55.50	68.50	68.00	11.50	11.50	67.20	67.20	Concrete
P-245	GB-SANMH9	GB-SANMH6	N/A	N/A	N/A	0.000	0.00	0.00	5.27	32.00	0.021875	12 inch	0.013	55.50	54.80	68.00	67.20	11.50	11.40	67.20	67.20	Concrete
P-246	GARNER ST CB	GB-SANMH9	0.000	0.00	0.000	0.000	0.00	0.00	4.94	26.00	0.019231	12 inch	0.013	56.00	55.50	69.50	68.00	12.50	11.50	67.20	67.20	Concrete
P-290	GB-SANMH6	GB-SANMH5	N/A	N/A	N/A	3.975	3.65	14.63	5.40	34.00	0.002647	18 inch	0.013	54.80	54.71	67.20	67.00	10.90	10.79	67.66	67.00	Concrete
P-291	GB-SANMH5	GB-SANMH4	N/A	N/A	N/A	3.975	3.65	14.61	2.28	32.00	0.001250	15 inch	0.013	54.71	54.67	67.00	67.00	11.04	11.08	66.94	65.30	Concrete
P-292	GB-SANMH7	GB-SANMH20	N/A	N/A	N/A	3.975	3.66	14.68	9.53	34.00	0.008235	18 inch	0.013	55.47	55.19	68.31	68.00	11.34	11.31	68.66	68.00	Concrete
P-293	GB-SANMH20	GB-SANMH6	N/A	N/A	N/A	3.975	3.66	14.66	7.50	51.00	0.005098	18 inch	0.013	55.19	54.93	68.00	67.20	11.31	10.77	68.19	67.20	Concrete
P-247	GB-SANCB12	GB-SANCB11	0.830	0.90	0.747	0.342	6.02	2.08	5.87	14.00	0.027143	12 inch	0.013	79.27	78.89	82.97	83.49	2.70	3.60	80.21	80.17	Concrete
P-248	GB-SANCB11	GB-SANMH16	0.890	0.90	0.801	0.702	6.02	4.25	10.31	43.00	0.083721	12 inch	0.013	78.89	75.29	83.49	81.89	3.60	5.60	79.76	75.75	Concrete
P-250	GB-SANMH16	GB-SANMH8	N/A	N/A	N/A	3.889	5.77	22.60	53.86	218.00	0.056697	24 inch	0.013	69.49	57.13	81.89	70.65	10.40	11.52	71.18	68.75	Concrete
P-251	GB-SANMH17	GB-SANMH16	N/A	N/A	N/A	2.055	5.85	12.13	17.83	246.00	0.028821	18 inch	0.013	76.58	69.49	88.58	81.89	10.50	10.90	77.90	71.36	Concrete
P-252	GB-SANCB7	GB-SANMH17	0.614	0.90	0.553	0.536	6.02	3.25	5.01	94.00	0.019787	12 inch	0.013	83.44	81.58	86.14	88.58	1.70	6.00	84.21	82.17	Concrete
P-260	GB-SANCB10	GB-SANMH16	1.088	0.90	0.979	0.837	6.02	5.08	18.51	7.00	0.270000	12 inch	0.013	77.58	75.69	81.78	81.89	3.20	5.20	78.50	76.19	Concrete
P-261	GB-SANCB8	GB-SANCB9	0.344	0.90	0.310	0.186	6.02	1.13	6.37	33.00	0.060606	10 inch	0.011	76.17	74.17	78.97	81.17	1.97	6.17	76.64	74.83	Vitrified Clay
P-262	GB-SANCB9	GB-SANMH16	0.167	0.90	0.150	0.294	6.01	1.78	2.09	26.00	0.006538	10 inch	0.011	74.17	74.00	81.17	81.89	6.17	7.06	74.77	74.59	Vitrified Clay
P-154	GB-SANMH15	GB-SANMH14	N/A	N/A	N/A	0.087	6.01	0.52	3.96	128.00	0.003750	15 inch	0.013	71.25	70.77	81.50	82.17	9.00	10.15	71.56	71.05	Concrete
P-155	GB-SANCB 1	GB-SANMH15	0.160	0.71	0.114	0.087	6.02	0.53	16.87	33.00	0.224242	12 inch	0.013	78.65	71.25	80.95	81.50	1.30	9.25	78.95	71.58	Concrete
P-263	GB-SANMH14	GB-SANMH13	N/A	N/A	N/A	0.087	5.79	0.50	4.72	163.00	0.005337	15 inch	0.013	70.67	69.80	82.17	81.00	10.25	9.95	70.95	70.71	Concrete
P-264	GB-SANMH13	GB-SANMH12	N/A	N/A	N/A	0.087	5.53	0.48	4.53	69.00	0.004928	15 inch	0.013	69.80	69.46	81.00	80.76	9.95	10.05	70.71	70.71	Concrete
P-265	GB-SANMH12	GB-SANMH11	N/A	N/A	N/A	0.087	5.39	0.47	6.59	72.00	0.034167	12 inch	0.013	69.46	67.00	80.76	79.00	10.30	11.00	70.70	70.69	Concrete
P-266	GB-SANMH11	GB-SANMH10	N/A	N/A	N/A	0.087	4.90	0.43	6.76	197.00	0.036041	12 inch	0.013	67.00	59.90	79.00	75.00	11.00	14.10	70.69	70.66	Concrete
P-267	GB-SANMH10	GB-SANMH8	N/A	N/A	N/A	0.087	3.93	0.34	6.59	81.00	0.034198	12 inch	0.013	59.90	57.13	75.00	70.65	14.10	12.52	70.66	70.65	Concrete
P-256	GB-SANCB6	GB-SANCB5	1.244	0.90	1.120	0.465	6.02	2.83	3.06	65.00	0.007385	12 inch	0.013	86.04	85.56	89.34	89.36	2.30	2.80	86.80	86.28	Concrete
P-297	GB-SANCB5	GB-SANMH17	0.461	0.90	0.415	1.405	5.86	8.30	15.49	38.00	0.188947	12 inch	0.013	83.76	76.58	89.36	88.58	4.60	11.00	84.75	78.79	Concrete
P-298	GB-SANCB4	GB-SANMH17	0.125	0.90	0.113	0.115	6.02	0.70	9.68	34.00	0.073824	12 inch	0.013	87.79	85.28	88.79	88.58	0.00	2.30	88.14	85.46	Concrete
P-258	GB-SANMH19	GB-SANCB3	N/A	N/A	N/A	0.117	6.00	0.71	4.89	75.00	0.005733	15 inch	0.013	89.00	88.57	91.00	90.67	0.75	0.85	89.33	88.89	Concrete
P-259	GB-SANCB2	GB-SANMH19	0.186	0.90	0.167	0.117	6.02	0.71	4.60	30.00	0.016667	12 inch	0.013	89.50	89.00	91.00	91.00	0.50	1.00	89.85	89.37	Concrete
P-299	GB-SANCB3	GB-SANCB5	0.640	0.90	0.576	0.409	5.89	2.43	7.25	63.00	0.041429	12 inch	0.013	86.37	83.76	90.67	89.36	3.30	4.60	87.04	85.29	Concrete
P-300	GB-SANMH8	GB-SANMH7	N/A	N/A	N/A	3.975	3.69	14.77	33.21	77.00	0.021558	24 inch	0.013	57.13	55.47	70.65	68.31	11.52	10.84	68.64	68.31	Concrete
P-209	205+83.27 CB	206+33.97 MH	0.070	0.90	0.063	0.301	1.13	0.34	3.49	52.00	0.009615	12 inch	0.013	32.13	31.63	39.57	39.43	6.44	6.80	32.37	31.84	Concrete
P-210	206+33.97 MH	GB-MH1	N/A	N/A	N/A	3.232	1.13	3.69	6.46	74.00	0.003784	18 inch	0.013	30.63	30.35	39.43	40.15	7.30	8.30	31.44	31.21	Concrete
P-211	GB-MH1	GB-MH2	N/A	N/A	N/A	3.232	1.13	3.69	23.27	11.00	0.049091	18 inch	0.013	30.35	29.81	40.15	39.61	8.30	8.30	31.08	30.29	Concrete
P-212	GB-MH2	GULLY BROOK CHAMBER	N/A	N/A	N/A	15.281	1.13	17.42	116.18	46.00	0.048261	33 inch	0.013	28.01	25.79	39.61	38.30	8.85	9.76	29.38	26.58	Concrete
P-213	GULLY BROOK CHAMBER	GULLY BROOK GATE	N/A	N/A	N/A	15.281	1.13	17.42	239.96	18.00	0.129444	36 inch	0.013	20.85	18.52	38.30	36.90	14.45	15.38	22.19	19.98	Concrete
P-214	GB-MH3	GB-MH2	N/A	N/A	N/A	11.129	4.31	48.33	38.92	312.00	0.005417	33 inch	0.013	29.70	28.01	52.00	39.61	19.55	8.85	33.10	30.30	Concrete
P-215	GB-MH4	GB-MH3	N/A	N/A	N/A	7.862	4.38	34.69	34.19	122.00	0.004180	33 inch	0.013	30.21	29.70	67.00	52.00	34.04	19.55	34.26	33.73	Concrete

Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-216	GB-SP1	GB-MH4	0.000	0.00	0.000	7.862	4.39	34.79	50.63	36.00	0.009167	33 inch	0.013	45.90	45.57	68.00	67.00	19.35	18.68	47.86	47.31	Concrete
P-227	GB-HB2	206+33.97 MH	0.074	0.90	0.067	1.961	4.74	9.38	11.22	55.00	0.030182	15 inch	0.013	37.29	35.63	44.79	39.43	6.25	2.55	38.46	36.53	Concrete
P-231	GB-AS6	GB-HB1	0.227	0.90	0.204	0.233	6.02	1.42	1.32	22.00	0.003636	10 inch	0.013	42.58	42.50	46.58	46.10	3.17	2.77	43.55	43.46	Concrete
P-232	GB-HB1	GB-HB2	0.190	0.90	0.171	0.404	5.99	2.44	7.94	29.00	0.131379	10 inch	0.013	42.50	38.69	46.10	44.79	2.77	5.27	43.19	39.02	Concrete
P-233	GB-HB6	GB-HB5	0.000	0.00	0.000	1.271	4.80	6.14	5.50	21.00	0.023810	12 inch	0.013	43.50	43.00	54.00	54.00	9.50	10.00	46.30	45.67	Concrete
P-234	GB-HB5	GB-HB4	0.189	0.90	0.170	1.389	4.79	6.71	6.32	54.00	0.031481	12 inch	0.013	43.00	41.30	54.00	50.00	10.00	7.70	44.47	42.56	Concrete
P-235	GB-HB4	GB-HB3	0.019	0.90	0.017	1.447	4.77	6.96	11.22	65.00	0.030154	15 inch	0.013	41.30	39.34	50.00	47.14	7.45	6.55	42.36	40.06	Concrete
P-236	GB-HB3	GB-HB2	0.036	0.90	0.032	1.485	4.76	7.12	11.14	42.00	0.029762	15 inch	0.013	39.24	37.99	47.14	44.79	6.65	5.55	40.31	39.20	Concrete
P-242	GULLY BROOK BEND 2	Park River (Gully)	N/A	N/A	N/A	15.281	1.13	417.40	628.26	838.00	0.001492	7 x 7 ft	0.013	14.22	12.97	34.80	36.00	13.58	16.03	16.56	17.30	Concrete
P-243	GULLY BROOK GATE	GULLY BROOK BEND 2	N/A	N/A	N/A	15.281	1.13	417.42	1,753.45	244.00	0.007172	11 x 9 f	0.013	15.97	14.22	36.90	34.80	11.93	11.58	19.52	18.87	Concrete
P-270	GB-MH2 CA	GB-MH2	0.000	0.00	0.000	0.920	4.80	4.45	8.77	127.00	0.018425	15 inch	0.013	30.35	28.01	40.15	39.61	8.55	10.35	31.21	29.41	Concrete
P-276	GB-HB7	GB-HB6	1.412	0.90	1.271	1.271	4.80	6.15	5.63	20.00	0.025000	12 inch	0.013	44.00	43.50	54.00	54.00	9.00	9.50	47.60	47.00	Concrete
P-277	GB-AS1/I-84EB	GB-AS2/I-84WB	0.140	0.90	0.126	1.052	6.02	6.39	26.10	81.00	0.061728	18 inch	0.013	57.00	52.00	60.00	57.95	1.50	4.45	57.98	53.67	Concrete
P-278	GB-AS2/I-84WB	GB-MH3	0.339	0.90	0.305	3.267	4.80	15.82	30.32	48.00	0.083333	18 inch	0.013	52.00	48.00	57.95	52.00	4.45	2.50	53.42	48.84	Concrete
P-284	J-108	GULLY BROOK GATE	N/A	N/A	N/A	0.000	0.00	400.00	1,660.07	28.00	0.006429	11 x 9 f	0.013	16.15	15.97	38.25	36.90	13.10	11.93	19.60	19.89	Concrete
P-285	GULLY BROOK INFLOW	J-108	0.000	0.00	0.000	0.000	0.00	400.00	1,638.38	107.00	0.006262	11 x 9 f	0.013	16.82	16.15	37.64	38.25	11.82	13.10	20.27	19.94	Concrete
P-294	GB-AS3	GB-MH6	0.603	0.90	0.543	0.324	6.02	1.97	7.62	51.00	0.013922	15 inch	0.013	58.00	57.29	68.00	68.00	8.75	9.46	58.56	57.72	Concrete
P-295	GB-MH6	GB-SP1	N/A	N/A	N/A	1.872	4.43	8.37	22.62	91.00	0.010000	24 inch	0.013	46.50	45.59	68.00	68.00	19.50	20.41	48.45	48.33	Concrete
P-219	GB-AS4	GB-MH7	0.000	0.00	0.000	0.660	6.02	4.01	10.47	16.00	0.026250	15 inch	0.013	51.50	51.08	69.00	69.44	16.25	17.11	52.31	51.67	Concrete
P-220	GB-FAR1	GB-MH7	0.847	0.23	0.195	0.888	4.51	4.04	14.09	129.00	0.017984	18 inch	0.013	50.46	48.14	73.06	69.44	21.10	19.80	51.23	49.29	Concrete
P-221	GB-FAR2	GB-FAR1	0.150	0.23	0.035	0.032	4.80	0.16	12.69	155.00	0.038581	15 inch	0.013	72.44	66.46	76.54	73.06	2.85	5.35	72.59	66.56	Concrete
P-222	GB-MH8	GB-FAR1	N/A	N/A	N/A	0.652	4.61	3.03	5.53	65.00	0.002769	18 inch	0.013	50.74	50.56	74.34	73.06	22.10	21.00	52.81	52.75	Concrete
P-55	GB-B1	GB-B2	0.851	0.90	0.766	0.373	6.02	2.26	3.66	84.00	0.003214	15 inch	0.013	64.67	64.40	72.97	73.80	7.05	8.15	65.65	65.57	Concrete
P-43	GB-B2	GB-B3	0.092	0.90	0.083	0.601	5.92	3.59	2.35	68.00	0.001324	15 inch	0.013	64.40	64.31	73.80	74.91	8.15	9.35	65.48	65.12	Concrete
P-282	GB-B3	GB-B4	0.561	0.58	0.325	0.601	4.80	2.91	7.43	211.00	0.013223	15 inch	0.013	64.31	61.52	74.91	70.82	9.35	8.05	65.00	62.26	Concrete
P-283	GB-B4	GB-MH8	0.252	0.23	0.058	0.652	4.71	3.09	6.98	204.00	0.011667	15 inch	0.013	61.52	59.14	70.82	74.34	8.05	13.95	62.23	59.72	Concrete
P-296	GB-MH7	GB-MH6	N/A	N/A	N/A	1.548	4.45	6.95	17.60	52.00	0.028077	18 inch	0.013	47.96	46.50	69.44	68.00	19.98	20.00	48.98	48.86	Concrete
P-359	204+61.66 CB	205+03.21 CB	0.112	0.90	0.101	0.108	6.02	0.66	2.48	37.00	0.004865	12 inch	0.013	35.55	35.37	39.05	39.84	2.50	3.47	35.90	35.80	Concrete
P-360	205+03.21 CB	205+83.27 CB	0.051	0.90	0.046	0.147	5.97	0.88	2.44	79.00	0.004684	12 inch	0.013	35.37	35.00	39.84	39.57	3.47	3.57	35.79	35.39	Concrete
P-397	490+33.68 CB	206+51.63 CB	0.174	0.90	0.157	0.799	5.47	4.40	5.46	42.00	0.007143	15 inch	0.013	32.80	32.50	36.52	38.95	2.47	5.20	33.67	33.57	Concrete
P-398	206+51.63 CB	206+33.97 MH	0.018	0.90	0.016	0.969	5.43	5.30	6.35	31.00	0.009677	15 inch	0.013	32.50	32.20	38.95	39.43	5.20	5.98	33.43	33.07	Concrete
P-438	205+81.06 WALL 111 SWALE CB	205+83.27 CB	0.269	0.23	0.062	0.062	1.13	0.07	7.13	11.00	0.040000	12 inch	0.013	32.57	32.13	42.00	39.57	8.43	6.44	32.68	32.38	Concrete
P-204	486+95.62 CB	487+93.79 CB	0.095	0.90	0.086	0.470	5.70	2.70	6.48	92.00	0.033043	12 inch	0.013	42.15	39.11	50.97	46.40	7.82	6.29	42.85	39.56	Concrete
P-205	487+93.79 CB	487+91.93 MH	0.119	0.90	0.107	0.569	5.65	3.24	5.36	34.00	0.022647	12 inch	0.013	37.81	37.04	46.40	48.21	7.59	10.17	38.58	37.61	Concrete
P-206	487+91.93 MH	489+23.38 MH	N/A	N/A	N/A	0.569	5.63	3.23	4.84	128.00	0.018437	12 inch	0.013	36.64	34.28	48.21	40.79	10.57	5.51	37.41	35.22	Concrete
P-207	489+23.80	489+23.38 MH	0.125	0.90	0.113	0.092	6.02	0.56	3.99	35.00	0.012571	12 inch	0.013	34.82	34.38	40.49	40.79	4.67	5.41	35.13	35.14	Concrete
P-202	485+63.54 CB	481+13.11 CB	0.011	0.90	0.010	0.049	5.80	0.29	9.77	37.00	0.075135	12 inch	0.013	49.17	46.39	54.78	54.99	4.61	7.60	49.39	46.96	Concrete
P-356	484+42.75 CB	485+63.54 CB	0.044	0.90	0.040	0.040	6.02	0.24	2.63	116.00	0.005431	12 inch	0.013	49.80	49.17	53.70	54.78	2.90	4.61	50.00	49.42	Concrete
P-430	481+13.11 CB	486+95.62 CB	0.375	0.90	0.338	0.214	5.78	1.25	6.39	132.00	0.032121	12 inch	0.013	46.39	42.15	54.99	50.97	7.60	7.82	46.86	42.95	Concrete
P-443	489+23.38 MH	490+33.68 CB	N/A	N/A	N/A	0.661	5.55	3.70	4.08	113.00	0.013097	12 inch	0.013	34.28	32.80	40.79	36.52	5.51	2.72	35.10	33.91	Concrete
P-478	489+58.08	205+83.27 CB	0.000	0.00	0.000	0.029	6.02	0.18	6.46	31.00	0.032903	12 inch	0.013	33.15	32.13	39.27	39.57	5.12	6.44	33.32	32.37	Concrete
P-111	10-MH 2	GATE 10	0.000	0.00	0.000	3.031	2.93	8.96	78.91	20.00	0.014000	36 inch	0.013	30.78	30.50	45.00	45.00	11.22	11.50	31.73	31.24	Concrete
P-113	AETNA MH 204	10-MH1	N/A	N/A	N/A	1.191	4.68	5.62	58.16	18.00	0.066111	24 inch	0.013	36.30	35.11	54.80	48.51	16.50	11.40	37.14	35.59	Concrete
P-114	AETNA MH 203	AETNA MH 204	N/A	N/A	N/A	1.159	4.73	5.53	22.40	102.00	0.009804	24 inch	0.013	37.40	36.40	62.00	54.80	22.60	16.40	38.23	37.94	Concrete
P-115	J-53	AETNA MH 203	N/A	N/A	N/A	0.000	0.00	0.00	2.81	62.00	0.021129	12 inch	0.024	45.00	43.69	59.64	62.00	13.64	17.31	45.00	43.69	CMP
P-116	J-54	J-53	N/A	N/A	N/A	0.000	0.00	0.00	6.50	30.00	0.033333	12 inch	0.013	46.00	45.00	59.64	59.64	12.64	13.64	46.00	45.00	Concrete
P-117	EXISTING AETNA CB (10)	J-54	0.069	0.90	0.062	0.000	0.00	0.00	6.47	78.00	0.032949	12 inch	0.013	55.57	53.00	59.78	59.64	3.21	5.64	55.57	53.00	Concrete
P-118	AETNA MH 202	AETNA MH 203	N/A	N/A	N/A	0.872	4.75	4.18	6.16	44.00	0.009091	15 inch	0.013	37.90	37.50	61.90	62.00	22.75	23.25	38.73	38.25	Concrete
P-119	AETNA CB 203	AETNA MH 202	0.550	0.90	0.495	0.562	6.02	3.41	3.56	24.00	0.010000	12 inch	0.013	57.64	57.40	61.44	61.90	2.80	3.50	58.43	58.18	Concrete
P-123	RR ROW MH 1	10-MH1	N/A	N/A	N/A	0.393	3.00	1.19	13.11	149.00	0.015570	18 inch	0.013	39.43	37.11	49.00	48.51	8.07	9.90	39.84	37.42	Concrete
P-124	RR-ROW CB1 EXTERNAL CA FROM S	RR ROW MH 1	1.679	0.23	0.393	0.393	3.03	1.20	6.09	90.00	0.008889	15 inch	0.013	44.99	44.19	48.50	49.00	2.26	3.56	45.42	44.57	Concrete

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Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-125	AETNA MH 201	AETNA MH 202	N/A	N/A	N/A	0.310	4.80	1.50	3.61	34.00	0.010294	12 inch	0.013	38.35	38.00	62.00	61.90	22.65	22.90	48.90	48.84	Concrete
P-126	AETNA CB 202	AETNA MH 201	0.050	0.90	0.045	0.310	4.80	1.50	3.56	10.00	0.010000	12 inch	0.013	49.40	49.30	61.60	62.00	11.20	11.70	49.92	49.76	Concrete
P-127	AETNA YD 201	AETNA MH 204	0.137	0.23	0.032	0.032	4.80	0.15	11.88	9.00	0.111111	12 inch	0.013	51.00	50.00	54.80	54.80	2.80	3.80	51.16	50.08	Concrete
P-128	GC-1	AETNA MH 203	0.319	0.90	0.287	0.287	4.80	1.39	6.94	26.00	0.011538	15 inch	0.013	44.50	44.20	50.00	62.00	4.25	16.55	44.97	44.58	Concrete
P-447	10-MH1	463+46.32 MH	N/A	N/A	N/A	1.584	2.96	4.72	21.70	25.00	0.009200	24 inch	0.013	34.31	34.08	48.51	51.05	12.20	14.97	35.07	34.89	Concrete
P-448	463+46.32 MH	10-MH 2	N/A	N/A	N/A	2.041	2.95	6.07	59.05	74.00	0.007838	36 inch	0.013	34.08	33.50	51.05	45.00	13.97	8.50	34.85	34.15	Concrete
P-449	463+46.39 CB	463+46.32 MH	0.051	0.90	0.046	0.040	6.02	0.24	5.04	4.00	0.020000	12 inch	0.013	46.10	46.02	50.60	51.05	3.50	4.03	46.30	46.18	Concrete
P-319	460+25.17 CB	460+71.43 CB	0.163	0.90	0.147	0.126	6.02	0.77	3.48	42.00	0.009524	12 inch	0.013	44.70	44.30	49.46	49.36	3.76	4.06	45.07	44.93	Concrete
P-320	460+71.43 CB	461+17.69 CB	0.062	0.90	0.056	0.303	5.98	1.82	3.01	42.00	0.007143	12 inch	0.013	44.30	44.00	49.36	49.46	4.06	4.46	44.88	44.72	Concrete
P-321	460+86.88 CB	460+71.43 CB	0.031	0.90	0.028	0.028	6.02	0.17	4.36	26.00	0.015000	12 inch	0.013	44.69	44.30	49.77	49.36	4.08	4.06	44.91	44.92	Concrete
P-446	461+17.69 CB	462+00.00 MH	0.114	0.90	0.103	0.383	5.94	2.29	3.98	80.00	0.012500	12 inch	0.013	44.00	43.00	49.46	50.48	4.46	6.48	44.65	43.73	Concrete
P-450	462+00.00 MH	463+46.32 MH	N/A	N/A	N/A	0.383	5.88	2.27	4.23	142.00	0.014085	12 inch	0.013	43.00	41.00	50.48	51.05	6.48	9.05	43.64	41.52	Concrete
P-451	465+25.89 CB	463+46.32 MH	0.041	0.90	0.037	0.034	6.02	0.20	6.47	174.00	0.032989	12 inch	0.013	46.74	41.00	50.74	51.05	3.00	9.05	46.93	41.12	Concrete
P-59	13+87.94	13+87.95 (EXISTING MH)	0.020	0.90	0.018	0.905	4.73	4.31	8.29	17.00	0.016471	15 inch	0.013	60.00	59.72	68.15	66.72	6.90	5.75	60.84	60.40	Concrete
P-79	12+06.76 (EXISTING MH)	13+87.95 (EXISTING MH)	N/A	N/A	N/A	1.934	3.95	7.69	15.95	181.00	0.004972	24 inch	0.013	50.12	49.22	62.64	66.72	10.52	15.50	56.81	56.60	Concrete
P-80	12+04.21	12+06.76 (EXISTING MH)	0.773	0.47	0.363	0.602	4.80	2.92	10.21	14.00	0.082143	12 inch	0.013	57.77	56.62	62.20	62.64	3.43	5.02	58.50	57.04	Concrete
P-82	(HAWTHORN EXISTING MH)	12+06.76 (EXISTING MH)	N/A	N/A	N/A	1.331	3.97	5.33	13.90	52.00	0.017500	18 inch	0.013	51.73	50.82	62.23	62.64	9.00	10.32	57.00	56.86	Concrete
P-363	14+68.54 MH	14+37.13	N/A	N/A	N/A	3.457	4.59	15.99	18.20	34.00	0.006471	24 inch	0.013	54.20	53.98	70.30	69.59	14.10	13.61	55.67	55.56	Concrete
P-364	14+37.13	13+87.95 (EXISTING MH)	0.138	0.90	0.124	3.545	4.58	16.35	17.67	59.00	0.006102	24 inch	0.013	53.98	53.62	69.59	66.72	13.61	11.10	55.50	55.08	Concrete
P-371	13+05.20	13+87.94	0.281	0.46	0.129	0.099	4.80	0.48	2.87	77.00	0.006494	12 inch	0.013	60.50	60.00	64.83	68.15	3.33	7.15	60.86	60.86	Concrete
P-372	14+28.60	13+87.94	0.077	0.90	0.069	0.552	6.02	3.35	3.91	29.00	0.012069	12 inch	0.013	60.35	60.00	69.45	68.15	8.10	7.15	61.13	60.97	Concrete
P-419	14+86.31 (EXISTING MH)	14+68.54 MH	N/A	N/A	N/A	0.000	0.00	0.00	10.29	39.00	0.025385	15 inch	0.013	59.89	58.90	70.57	70.30	9.43	10.15	59.89	58.90	Concrete
P-84	11+65.87	11+43.19 (EXISTING MH)	0.922	0.55	0.507	0.413	4.80	2.00	18.89	20.00	0.085500	15 inch	0.013	58.34	56.63	62.54	63.13	2.95	5.25	58.90	57.29	Concrete
P-85	11+33.57	11+43.19 (EXISTING MH)	1.088	0.57	0.620	0.918	3.98	3.68	9.14	5.00	0.020000	15 inch	0.013	56.33	56.23	62.75	63.13	5.17	5.65	57.33	57.35	Concrete
P-427	11+18.60	11+33.57	0.838	0.49	0.411	0.400	4.80	1.94	4.13	32.00	0.013437	12 inch	0.013	56.76	56.33	61.88	62.75	4.12	5.42	57.51	57.47	Concrete
P-431	11+43.19 (EXISTING MH)	(HAWTHORN EXISTING MH)	N/A	N/A	N/A	1.331	3.98	5.34	28.68	59.00	0.074576	18 inch	0.013	56.23	51.83	63.13	62.23	5.40	8.90	57.24	57.22	Concrete
P-482	41+39.12	14+68.54 MH	0.238	0.90	0.214	0.198	6.02	1.20	15.91	58.00	0.060690	15 inch	0.013	68.72	65.20	73.35	70.30	3.38	3.85	69.15	65.43	Concrete
P-311	454+00 CB	453+09.60 CB	0.071	0.90	0.064	0.083	6.02	0.50	2.52	86.00	0.005000	12 inch	0.013	50.88	50.45	54.97	55.78	3.09	4.33	51.18	51.00	Concrete
P-37	GATE 11 MH	GATE 11	0.000	0.00	0.000	15.689	3.23	51.12	308.04	8.00	0.093750	42 inch	0.013	30.00	29.25	39.25	39.25	5.75	6.50	32.24	30.83	Concrete
P-41	11-MH92	GATE 11 MH	0.000	0.00	0.000	14.761	3.24	48.24	131.60	90.00	0.017111	42 inch	0.013	31.54	30.00	50.24	39.25	15.20	5.75	33.71	32.41	Concrete
P-417	EXTERNAL CA FROM 155-H025	450+44.59 MH	0.000	0.00	0.000	3.355	3.43	11.61	7.50	98.00	0.005102	18 inch	0.013	45.05	44.55	54.42	56.88	7.87	10.83	47.15	45.85	Concrete
P-418	450+44.59 MH	452+80 MH	N/A	N/A	N/A	3.433	3.41	11.81	32.02	265.00	0.020038	24 inch	0.013	44.16	38.85	56.88	56.50	10.72	15.65	45.39	40.59	Concrete
P-419	452+80 MH	465+50 MH	N/A	N/A	N/A	4.071	3.38	13.86	16.00	336.00	0.005000	24 inch	0.013	38.85	37.17	56.50	53.12	15.65	13.95	40.29	38.96	Concrete
P-420	465+50 MH	458+49.30 MH	N/A	N/A	N/A	4.294	3.30	14.28	16.04	195.00	0.005026	24 inch	0.013	37.17	36.19	53.12	51.37	13.95	13.18	38.64	37.55	Concrete
P-421	456+51.83 CB	465+50 MH	0.105	0.90	0.095	0.071	6.02	0.43	2.61	13.00	0.005385	12 inch	0.013	48.76	48.69	53.44	53.12	3.68	3.43	49.03	48.96	Concrete
P-313	455+56.08 CB	456+50 CB	0.097	0.90	0.087	0.087	6.02	0.53	2.52	90.00	0.005000	12 inch	0.013	48.82	48.37	53.47	52.62	3.65	3.25	49.13	48.85	Concrete
P-422	456+50 CB	465+50 MH	0.058	0.90	0.052	0.152	5.88	0.90	2.52	4.00	0.005000	12 inch	0.013	48.37	48.35	52.62	53.12	3.25	3.77	48.78	48.75	Concrete
P-423	458+49.30 MH	11-MH92	N/A	N/A	N/A	14.475	3.26	47.50	72.85	82.00	0.005244	42 inch	0.013	31.97	31.54	51.37	50.24	15.90	15.20	34.12	33.76	Concrete
P-48	455+40.97 MH	EXISTING MH 458+48.75	N/A	N/A	N/A	7.906	3.81	30.33	68.46	309.00	0.027864	30 inch	0.013	44.51	35.90	58.71	51.72	11.70	13.32	46.39	37.07	Concrete
P-49	AETNA MH1	455+40.97 MH	N/A	N/A	N/A	0.680	4.68	3.20	24.23	61.00	0.011475	24 inch	0.013	51.30	50.60	58.80	58.71	5.50	6.11	51.93	51.09	Concrete
P-50	AETNA CB-104	AETNA MH1	0.083	0.23	0.019	0 680	4.71	3.23	6.67	75.00	0.010667	15 inch	0.013	52.85	52.05	58.50	58.80	4.40	5.50	53.57	52.66	Concrete
P-54	11-MH88 (EXISTING MH)	455+40.97 MH	N/A	N/A	N/A	7.050	3.83	27.20	23.98	145.00	0.011241	24 inch	0.013	46.14	44.51	55.81	58.71	7.67	12.20	48.70	46.60	Concrete
P-88	AETNA CB-103	AETNA CB-104	0.158	0.49	0.077	0.646	4.80	3.13	5.11	152.00	0.006250	15 inch	0.013	53.90	52.95	68.90	58.50	13.75	4.30	54.61	53.66	Concrete
P-107	AETNA PARKING ROOF -1	EXISTING MH 458+48.75	0.880	0.90	0.792	0.792	4.80	3.83	12.57	36.00	1.081389	8 inch	0.013	71.00	32.07	72.00	51.72	0.33	18.98	71.66	34.49	Concrete
P-424	EXISTING MH 458+48.75	458+49.30 MH	N/A	N/A	N/A	10.077	3.78	38.35	71.14	20.00	0.005000	42 inch	0.013	32.07	31.97	51.72	51.37	16.15	15.90	34.29	34.30	Concrete
P-425	450+44.65 CB	450+44.59 MH	0.103	0.90	0.093	0.078	6.02	0.47	4.71	4.00	0.017500	12 inch	0.013	52.47	52.40	56.38	56.88	2.91	3.48	52.75	52.63	Concrete
P-433	EXISTING AETNA MH	EXISTING MH 458+48.75	N/A	N/A	N/A	1.379	4.65	6.46	21.22	25.00	0.008800	24 inch	0.013	33.89	33.67	50.89	51.72	15.00	16.05	34.79	34.59	Concrete
P-108	AETNA PARKING ROOF-2	EXISTING AETNA MH 2	1.054	0.90	0.949	0.949	4.80	4.59	13.18	29.00	1.189655	8 inch	0.013	71.00	36.50	72.00	49.99	0.33	12.82	71.67	36.77	Concrete
P-308	460+25 RT	EXISTING AETNA MH 2	0.288	0.23	0.066	0.430	4.73	2.05	52.94	30.00	0.046667	24 inch	0.012	36.39	34.99	48.18	49.99	9.79	13.00	36.89	35.95	Concrete
P-426	AETNA YD MH	460+25 RT	0.000	0.00	0.000	0.364	4.80	1.76	40.80	182.00	0.032527	24 inch	0.013	40.11	34.19	74.50	48.18	32.39	11.99	40.57	36.94	Steel
P-432	EXISTING AETNA MH 2	EXISTING AETNA MH	N/A	N/A	N/A	1.379	4.72	6.56	15.61	126.00	0.004762	24 inch	0.013	34.99	34.39	49.99	50.89	13.00	14.50	35.90	35.29	Concrete

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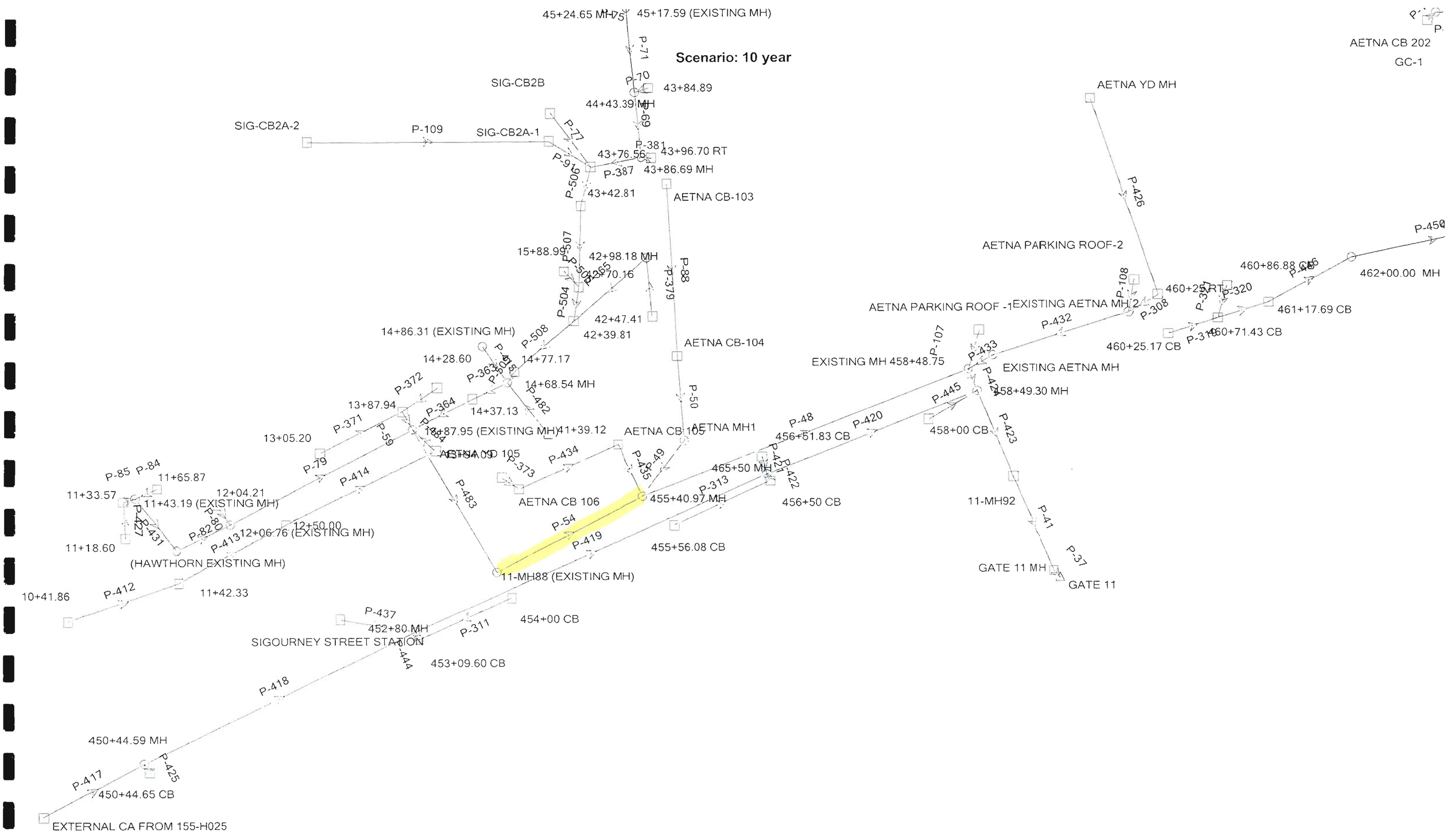

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Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-373	AETNA YD 105	AETNA CB 106	0.015	0.23	0.004	0.004	6.02	0.02	6.23	18.00	0.030556	12 inch	0.013	54.00	53.45	57.00	59.86	2.00	5.41	54.06	53.69	Concrete
P-434	AETNA CB 106	AETNA CB 105	0.054	0.90	0.049	0.046	5.99	0.28	3.56	95.00	0.010000	12 inch	0.013	53.45	52.50	59.86	56.90	5.41	3.40	53.67	52.91	Concrete
P-435	AETNA CB 105	455+40.97 MH	0.138	0.90	0.124	0.177	5.85	1.04	3.90	50.00	0.012000	12 inch	0.013	52.40	51.80	56.90	58.71	3.50	5.91	52.83	52.15	Concrete
P-437	SIGOURNEY STREET STATION	452+80 MH	0.000	0.00	0.000	0.450	6.02	2.73	4.50	67.00	0.015970	12 inch	0.013	51.50	50.43	60.00	56.50	7.50	5.07	52.21	50.99	Concrete
P-444	453+09.60 CB	452+80 MH	0.168	0.90	0.151	0.188	5.89	1.12	2.52	4.00	0.005000	12 inch	0.013	50.45	50.43	55.78	56.50	4.33	5.07	50.91	50.88	Concrete
P-445	458+00 CB	458+49.30 MH	0.123	0.90	0.111	0.104	6.02	0.63	4.20	46.00	0.013913	12 inch	0.013	47.14	46.50	51.37	51.37	3.23	3.87	47.47	46.76	Concrete
P-483	13+87.95 (EXISTING MH)	11-MH88 (EXISTING MH)	N/A	N/A	N/A	7.050	3.85	27.36	32.97	145.00	0.021241	24 inch	0.013	49.12	46.04	66.72	55.81	15.60	7.77	51.86	49.74	Concrete
P-412	10+41.86	11+42.33	0.229	0.90	0.206	0.181	6.02	1.10	2.97	101.00	0.006931	12 inch	0.013	59.50	58.80	63.19	62.19	2.69	2.39	59.94	59.45	Concrete
P-413	11+42.33	12+50.00	0.122	0.90	0.110	0.353	5.91	2.10	4.42	107.00	0.004673	15 inch	0.013	58.80	58.30	62.19	62.77	2.14	3.22	59.41	58.98	Concrete
P-414	12+50.00	13+94.09	0.086	0.90	0.077	0.430	5.79	2.51	4.77	147.00	0.005442	15 inch	0.013	58.30	57.50	62.77	68.37	3.22	9.62	58.94	58.58	Concrete
P-484	13+94.09	13+87.95 (EXISTING MH)	0.245	0.90	0.221	0.666	5.64	3.79	4.26	28.00	0.014286	12 inch	0.013	57.40	57.00	68.37	66.72	9.97	8.72	58.23	57.74	Concrete
P-365	42+98.18 MH	42+39.81	N/A	N/A	N/A	0.229	5.99	1.38	9.08	86.00	0.019767	15 inch	0.013	63.20	61.50	69.54	70.68	5.09	7.93	63.66	61.83	Concrete
P-379	42+47.41	42+98.18 MH	0.460	0.90	0.414	0.229	6.02	1.39	6.33	52.00	0.031538	12 inch	0.013	65.64	64.00	70.48	69.54	3.84	4.54	66.14	64.32	Concrete
P-504	42+70.16	42+39.81	0.048	0.90	0.043	2.872	4.62	13.38	29.20	30.00	0.016667	24 inch	0.013	62.00	61.50	70.03	70.68	6.03	7.18	63.32	62.53	Concrete
P-505	15+88.99	42+70.16	0.040	0.90	0.036	0.036	6.02	0.22	2.58	19.00	0.005263	12 inch	0.013	62.10	62.00	69.16	70.03	6.06	7.03	63.32	63.32	Concrete
P-77	SIG-CB2B	43+76.56	0.697	0.69	0.481	0.481	4.80	2.33	2.38	59.00	0.001356	15 inch	0.013	65.24	65.16	68.84	68.37	2.35	1.96	66.06	65.77	Concrete
P-91	SIG-CB2A-1	43+76.56	0.000	0.00	0.000	0.665	4.67	3.13	14.34	43.00	0.049302	15 inch	0.013	66.98	64.86	68.28	68.37	0.05	2.26	67.69	65.26	Concrete
P-109	SIG-CB2A-2	SIG-CB2A-1	1.090	0.61	0.665	0.665	4.80	3.22	3.47	213.00	0.009484	12 inch	0.013	66.00	63.98	68.00	68.28	1.00	3.30	69.54	67.80	Concrete
P-69	44+43.39 MH	43+86.69 MH	N/A	N/A	N/A	0.754	4.74	3.60	5.43	58.00	0.007069	15 inch	0.013	64.91	64.50	69.10	69.10	2.94	3.35	65.68	65.45	Concrete
P-70	43+84.89	44+43.39 MH	0.052	0.90	0.047	0.204	6.02	1.24	2.52	12.00	0.005000	12 inch	0.013	65.87	65.81	69.53	69.10	2.66	2.29	66.36	66.28	Concrete
P-71	45+17.59 (EXISTING MH)	44+43.39 MH	N/A	N/A	N/A	0.550	4.78	2.65	5.27	72.00	0.006667	15 inch	0.013	65.49	65.01	70.61	69.10	3.87	2.84	66.14	65.72	Concrete
P-75	45+24.65 MH	45+17.59 (EXISTING MH)	N/A	N/A	N/A	0.214	4.80	1.03	4.39	27.00	0.015185	12 inch	0.013	66.00	65.59	71.30	70.61	4.30	4.02	66.43	66.20	Concrete
P-381	43+96.70 RT	43+86.69 MH	0.174	0.90	0.157	0.514	6.02	3.12	3.76	9.00	0.011111	12 inch	0.013	64.60	64.50	68.24	69.10	2.64	3.60	65.48	65.44	Concrete
P-387	43+86.69 MH	43+76.56	N/A	N/A	N/A	1.268	4.70	6.01	14.53	46.00	0.019130	18 inch	0.013	64.38	63.50	69.10	68.37	3.22	3.37	65.33	65.10	Concrete
P-389	45+37.93	45+24.65 MH	0.620	0.58	0.360	0.214	4.80	1.03	4.42	13.00	0.015385	12 inch	0.013	66.20	66.00	71.58	71.30	4.38	4.30	66.63	66.51	Concrete
P-396	45+45.55	45+17.59 (EXISTING MH)	1.281	0.52	0.666	0.336	4.80	1.63	6.99	35.00	0.011714	15 inch	0.013	66.00	65.59	71.70	70.61	4.45	3.77	66.51	66.23	Concrete
P-506	43+76.56	43+42.81	0.176	0.90	0.158	2.718	4.65	12.75	27.04	35.00	0.014286	24 inch	0.013	63.50	63.00	68.37	69.05	2.87	4.05	64.78	64.30	Concrete
P-507	43+42.81	42+70.16	0.060	0.90	0.054	2.772	4.64	12.98	26.66	72.00	0.013889	24 inch	0.013	63.00	62.00	69.05	70.03	4.05	6.03	64.30	63.32	Concrete
P-508	42+39.81	14+77.17	0.112	0.90	0.101	3.181	4.61	14.79	33.35	69.00	0.021739	24 inch	0.013	56.00	54.50	70.68	69.40	12.68	12.90	57.39	56.97	Concrete
P-509	14+77.17	14+68.54 MH	0.086	0.90	0.077	3.259	4.60	15.09	37.36	11.00	0.027273	24 inch	0.013	54 50	54.20	69.40	70.30	12.90	14.10	56.97	56.92	Concrete
P-193	6-MH 100	GATE 6	N/A	N/A	N/A	4.447	1.36	6.10	74.57	24.00	0.012500	36 inch	0.013	31.80	31.50	42.00	43.00	7.20	8.50	32.58	32.11	Concrete
P-194	6-MH-88	6-MH 100	N/A	N/A	N/A	2.901	1.36	3.99	33.71	74.00	0.006757	30 inch	0.013	32.50	32.00	41.00	42.00	6.00	7.50	33.16	32.58	Concrete
P-195	LOB PARKING LOT	6-MH-88	0.000	0.00	0.000	1.940	4.80	9.39	9.49	139.00	0.021583	15 inch	0.013	35.00	32.00	42.94	41.00	6.69	7.75	36.17	33.20	Concrete
P-190	6- CB1 (98)	6-CB 2 (97)	0.050	0.90	0.045	0.224	4.68	1.06	11.23	21.00	0.011429	18 inch	0.013	49.80	49.56	55 36	55.46	4.06	4.40	50.18	50.20	Concrete
P-191	6-CB 2 (97)	6- MH 90	0.310	0.50	0.155	0.457	4.66	2.15	21.50	85.00	0.041882	18 inch	0.013	49.56	46.00	55 46	51.80	4.40	4.30	50.11	47.53	Concrete
P-238	6- MH 90	6- MH DROP	0.350	0.23	0.081	1.546	4.64	7.22	14.44	80.00	0.050000	15 inch	0.013	46.00	42.00	51 80	45.00	4.55	1.75	47.07	42.63	Steel
P-239	6- MH DROP	6-MH 100	N/A	N/A	N/A	1.546	4.62	7.19	10.92	35.00	0.028571	15 inch	0.013	34.00	33.00	45.00	42.00	9.75	7.75	35.07	33.78	Steel
P-403	6-CB 4	6- CB 3	0.740	0.35	0.259	0.173	4.80	0.84	10.11	108.00	0.009259	18 inch	0.013	54.00	53.00	60.00	60.00	4.50	5.50	54.34	53.36	Concrete
P-404	6- CB 3	6- CB1 (98)	0.070	0.09	0.006	0.179	4.72	0.85	19.59	92.00	0.034783	18 inch	0.013	53.00	49.80	60.00	55.36	5.50	4.06	53.34	50.23	Concrete
P-198	6-MH 84	6-MH 85	N/A	N/A	N/A	0.911	1.37	1.26	33.55	100.00	0.022000	24 inch	0.013	36.00	33.80	42.40	41.60	4.40	5.80	36.39	34.06	Concrete
P-199	6-MH 82	6-MH 84	0.000	0.00	0.000	0.911	1.37	1.26	49.76	62.00	0.048387	24 inch	0.013	39.00	36.00	50.60	42.40	9.60	4.40	39.39	36.39	Concrete
P-405	6-MH 85	6-MH-88	0.000	0.00	0.000	0.961	1.37	1.33	31.46	119.00	0.005882	30 inch	0.013	33.20	32.50	41.60	41.00	5.90	6.00	33.57	33.20	Concrete
P-201	6-CB 79A	6-MH 79	0.000	0.00	0.000	0.280	4.80	1.36	8.52	41.00	0.006585	18 inch	0.013	56.88	56.61	61.98	63.21	3.60	5.10	57.32	57.01	Concrete
P-240	6-MH 79	481+64.79 CB	N/A	N/A	N/A	0.280	4.77	1.35	130.89	10.00	1.141000	24 inch	0.024	56.41	45.00	63.21	57.11	4.80	10.11	56.81	45.14	CMP
P-287	6-MH 79D	6-MH 79C	0.000	0.00	0.000	0.040	6.02	0.24	3.03	142.00	0.007254	12 inch	0.013	60.50	59.47	67.00	67.07	5.50	6.60	60.70	59.68	Concrete
P-288	6-MH 79C	6-MH 79B	0.000	0.00	0.000	0.150	5.78	0.87	2.89	91.00	0 006593	12 inch	0.013	59.27	58.67	67.07	68.17	6.80	8.50	59.66	59.13	Concrete
P-289	6-MH 79B	6-CB 79A	0.000	0.00	0.000	0.270	5.67	1.54	3.23	194.00	0.008196	12 inch	0.013	58.57	56.98	68.17	61.98	8.60	4.00	59.10	57.47	Concrete
P-466	481 +64.79 CB	I-261	1.340	0.13	0.174	0.454	1.38	0.63	42.82	12.00	0.035833	24 inch	0.013	42.23	41.80	57.11	47.93	12.88	4.13	42.50	42.17	Concrete
P-467	I-261	6-MH 82	0.000	0.00	0.000	0.781	1.38	1.08	45.62	74.00	0.040676	24 inch	0.013	41.80	38.79	47.93	50.60	4.13	9.81	42.16	39.39	Concrete
P-344	480 +98.51 CB	481+50.00 CB	0.040	0.90	0.036	0.035	6.02	0.21	4.84	51.00	0.018431	12 inch	0.013	44.03	43.09	47.97	47.84	2.94	3.75	44.22	43.41	Concrete
P-469	481 +50.00 CB	I-261	0.030	0.90	0.027	0.183	2.92	0.54	3.56	15.00	0.010000	12 inch	0.013	43.09	42.94	47.84	47.93	3.75	3.99	43.39	43.20	Concrete

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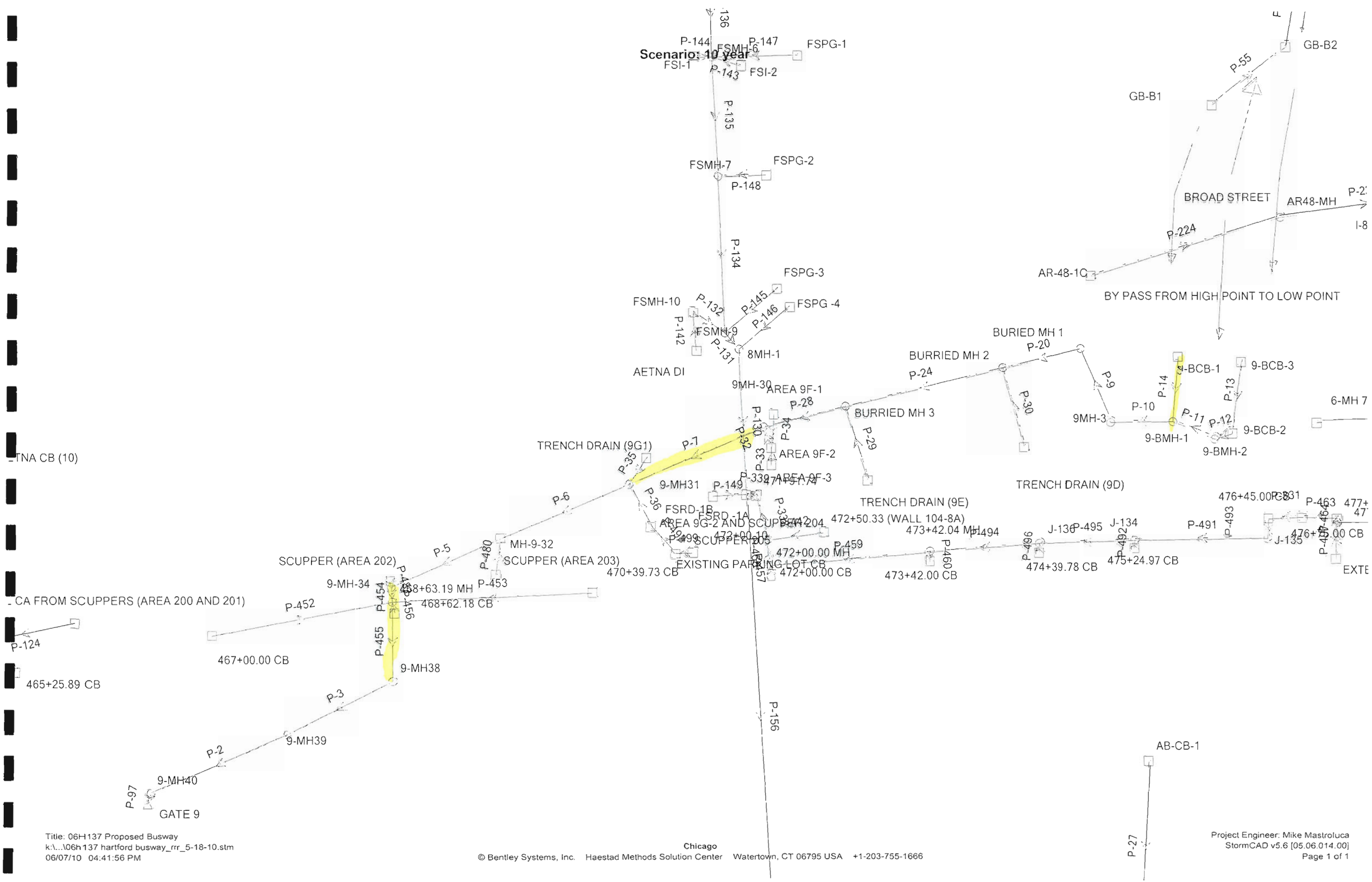
Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-485	482+98.54 CB	481+ 94.76 CB	0.070	0.90	0.063	0.060	6.02	0.37	4.71	104.00	0.017500	12 inch	0.013	45.76	43.94	49.67	47.94	2.91	3.00	46.01	44.34	Concrete
P-486	481+ 94.76 CB	I-261	0.090	0.90	0.081	0.136	5.91	0.81	6.73	28.00	0.035714	12 inch	0.013	43.94	42.94	47.94	47.93	3.00	3.99	44.32	43.17	Concrete
P-491	J-135	J-134	N/A	N/A	N/A	0.915	1.54	1.42	2.51	119.00	0.004958	12 inch	0.013	38.59	38.00	45.90	46.20	6.31	7.20	39.23	39.08	Concrete
P-492	475+24.97 CB	J-134	0.068	0.90	0.061	0.064	6.02	0.39	3.56	7.00	0.010000	12 inch	0.013	40.87	40.80	45.87	46.20	4.00	4.40	41.13	41.03	Concrete
P-331	476+75.00 CB	476+45.00 CB	0.057	0.90	0.051	0.832	1.54	1.29	2.52	30.00	0.005000	12 inch	0.013	38.92	38.77	45.24	45.29	5.32	5.52	39.45	39.39	Concrete
P-463	477+05.00 CB	476+75.00 CB	0.130	0.90	0.117	0.736	1.54	1.15	2.52	26.00	0.005000	12 inch	0.013	39.05	38.92	45.29	45.24	5.24	5.32	39.53	39.47	Concrete
P-464	477+05.00 MH	477+05.00 CB	N/A	N/A	N/A	0.618	1.55	0.96	3.56	2.00	0.010000	12 inch	0.013	39.07	39.05	45.51	45.29	5.44	5.24	39.61	39.61	Concrete
P-465	478+87.00 MH	477+05.00 MH	N/A	N/A	N/A	0.118	6.02	0.72	3.91	212.00	0.012075	12 inch	0.013	41.63	39.07	47.01	45.51	4.38	5.44	41.98	39.61	Concrete
P-466	478+87.00 CB	478+87.00 MH	0.163	0.90	0.147	0.118	6.02	0.72	3.56	2.00	0.010000	12 inch	0.013	41.65	41.63	46.53	47.01	3.88	4.38	42.03	42.04	Concrete
P-493	476+45.00 CB	J-135	0.094	0.90	0.085	0.915	1.54	1.42	3.56	18.00	0.010000	12 inch	0.013	38.77	38.59	45.29	45.90	5.52	6.31	39.27	39.23	Concrete
P-130	8MH-1	FSRD -1A	N/A	N/A	N/A	5.645	4.64	26.41	47.16	128.00	0.005000	36 inch	0.013	38.26	37.62	49.66	46.62	8.40	6.00	39.92	39.23	Concrete
P-131	FSMH-9	8MH-1	N/A	N/A	N/A	5.321	4.64	24.91	238.52	19.00	0.127895	36 inch	0.013	40.99	38.56	51.00	49.66	7.01	8.10	42.60	39.43	Concrete
P-132	FSMH-10	FSMH-9	0.000	0.00	0.000	1.313	4.78	6.33	14.28	33.00	0.018485	18 inch	0.013	41.60	40.99	50.90	51.00	7.80	8.51	42.78	42.75	Concrete
P-134	FSMH-7	FSMH-9	N/A	N/A	N/A	3.684	4.67	17.35	44.26	140.00	0.038286	24 inch	0.013	46.71	41.35	55.21	51.00	6.50	7.65	48.21	42.22	Concrete
P-135	FSMH-6	FSMH-7	N/A	N/A	N/A	3.360	4.69	15.89	48.01	105.00	0.045048	24 inch	0.013	51.44	46.71	59.94	55.21	6.50	6.50	52.88	48.28	Concrete
P-136	FSMH-5	FSMH-6	N/A	N/A	N/A	2.271	4.71	10.78	49.44	76.00	0.047763	24 inch	0.013	55.07	51.44	63.77	59.94	6.70	6.50	56.25	52.94	Concrete
P-140	FSI-3	FSMH-5	0.330	0.90	0.297	0.177	6.02	1.07	11.97	34.00	0.112941	12 inch	0.013	60.01	56.17	64.31	63.77	3.30	6.60	60.45	56.37	Concrete
P-142	AETNA DI	FSMH-10	1.190	0.77	0.916	0.423	4.80	2.05	3.72	34.00	0.010882	12 inch	0.013	45.07	44.70	49.87	50.90	3.80	5.20	45.68	45.23	Concrete
P-143	FSI-2	FSMH-6	0.260	0.90	0.234	0.231	6.02	1.40	9.67	27.00	0.073704	12 inch	0.013	54.63	52.64	59.03	59.94	3.40	6.30	55.13	53.28	Concrete
P-144	FSI-1	FSMH-6	0.940	0.90	0.846	0.534	4.80	2.59	9.62	17.00	0.072941	12 inch	0.013	53.98	52.74	59.38	59.94	4.40	6.20	54.67	53.13	Concrete
P-145	FSPG-3	FSMH-9	0.360	0.90	0.324	0.324	4.80	1.57	14.31	62.00	0.018548	18 inch	0.013	42.50	41.35	70.00	51.00	26.00	8.15	42.97	42.61	Concrete
P-146	FSPG -4	8MH-1	0.360	0.90	0.324	0.324	4.80	1.57	10.85	60.00	0.010667	18 inch	0.013	42.50	41.86	70.00	49.66	26.00	6.30	42.97	42.25	Concrete
P-147	FSPG-1	FSMH-6	0.360	0.90	0.324	0.324	4.80	1.57	24.06	76.00	0.011316	24 inch	0.013	53.50	52.64	70.00	59.94	14.50	5.30	53.93	53.31	Concrete
P-148	FSPG-2	FSMH-7	0.360	0.90	0.324	0.324	4.80	1.57	18.80	42.00	0.006905	24 inch	0.013	49.00	48.71	70.00	55.21	19.00	4.50	49.43	49.10	Concrete
P-149	FSRD-1B	FSRD -1A	0.450	0.90	0.405	1.601	6.02	9.72	25.46	30.00	0.012667	24 inch	0.013	33.90	33.52	46.62	46.62	10.72	11.10	35.01	34.73	Concrete
P-156	FSRD -1A	GATE 8 MH	0.360	0.90	0.324	8.989	1.51	13.65	139.57	394.00	0.009442	48 inch	0.013	33.52	29.80	46.62	47.00	9.10	13.20	34.60	30.89	Concrete
P-157	GATE 8 MH	GATE 8	N/A	N/A	N/A	8.989	1.50	13.56	151.41	9.00	0.011111	48 inch	0.013	29.80	29.70	47.00	47.00	13.20	13.30	30.88	30.63	Concrete
P-152	FSMH-2	FSMH-3	0.000	0.00	0.000	1.580	4.80	7.65	7.49	77.00	0.069091	10 inch	0.010	67.46	62.14	71.66	67.34	3.37	4.37	68.29	62.87	PVC
P-158	FSMH-3	FSMH-4	N/A	N/A	N/A	1.580	4.79	7.63	91.96	19.00	0.165263	24 inch	0.013	60.14	57.00	67.34	66.60	5.20	7.60	61.12	57.46	Concrete
P-159	FSMH-4	FSMH-5	N/A	N/A	N/A	1.580	4.79	7.62	43.28	50.00	0.036600	24 inch	0.013	56.90	55.07	66.60	63.77	7.70	6.70	57.88	56.42	Concrete
P-138	FARM I-1	FSMH-1	1.990	0.39	0.776	0.386	4.80	1.87	12.28	56.00	0.085000	12 inch	0.011	73.95	69.19	81.05	79.56	6.10	9.37	74.53	69.78	Vitrified Clay
P-139	FSI-4	FSMH-1	0.180	0.90	0.162	0.129	6.02	0.78	17.85	25.00	0.076400	15 inch	0.013	71.10	69.19	78.70	79.56	6.35	9.12	71.45	69.75	Concrete
P-160	FSMH-1	FSMH-5	N/A	N/A	N/A	0.514	4.79	2.48	52.02	267.00	0.052884	24 inch	0.013	69.19	55.07	79 56	63.77	8.37	6.70	69.74	56.32	Concrete
P-338	472+00.10	471+91.74	N/A	N/A	N/A	1.233	1.51	1.87	2.55	35.00	0.005143	12 inch	0.013	36.10	35.92	48 06	47.89	10.96	10.97	36.76	36.65	Concrete
P-339	471+91.74	FSRD -1A	0.000	0.00	0.000	1.233	1.51	1.87	3.56	9.00	0.010000	12 inch	0.013	35.92	35.83	47.89	46.62	10.97	9.79	36.50	36.36	Concrete
P-442	472+50.33 (WALL 104-8A)	472+00.10	0.132	0.13	0.017	0.017	3.82	0.07	6.11	51.00	0.029412	12 inch	0.013	41.50	40.00	48.00	48.06	5.50	7.06	41.60	40.07	Concrete
P-457	472+00.00 CB	472+00.00 MH	0.075	0.90	0.068	0.073	6.02	0.44	6.17	2.00	0.030000	12 inch	0.013	43.66	43.60	47.66	48.32	3.00	3.72	43.93	43.82	Concrete
P-458	472+00.00 MH	472+00.10	N/A	N/A	N/A	1.216	1.51	1.85	3.56	20.00	0.010000	12 inch	0.013	36.30	36.10	48.32	48.06	11.02	10.96	36.88	36.88	Concrete
P-459	473+42.04 MH	472+00.00 MH	N/A	N/A	N/A	1.143	1.52	1.75	2.54	138.00	0.005072	12 inch	0.013	37.00	36.30	47.10	48.32	9.10	11.02	38.62	38.28	Concrete
P-460	473+42.00 CB	473+42.04 MH	0.105	0.90	0.095	0.085	6.02	0.52	7.13	2.00	0.040000	12 inch	0.013	42.78	42.70	46.95	47.10	3.17	3.40	43.08	42.93	Concrete
P-494	J-136	473+42.04 MH	N/A	N/A	N/A	1.058	1.53	1.63	2.53	99.00	0.005051	12 inch	0.013	37.50	37.00	46.60	47.10	8.10	9.10	38.92	38.72	Concrete
P-495	J-134	J-136	N/A	N/A	N/A	0.979	1.54	1.51	2.75	84.00	0.005952	12 inch	0.013	38.00	37.50	46.20	46.60	7.20	8.10	39.08	38.92	Concrete
P-496	474+39.78 CB	J-136	0.073	0.90	0.066	0.079	6.02	0.48	5.34	8.00	0.022500	12 inch	0.013	41.18	41.00	46.18	46.60	4.00	4.60	41.47	41.21	Concrete
P-497	EXTERNAL CA FROM RRR	477+05.00 MH	0.000	0.00	0.000	0.500	1.55	0.78	4.27	30.00	0.014333	12 inch	0.013	39.50	39.07	43.60	45.51	3.10	5.44	39.87	39.62	Concrete
P-2	9-MH39	9-MH40	N/A	N/A	N/A	3.786	5.13	19.60	40.11	132.00	0.031439	24 inch	0.013	37.00	32.85	45.00	44.68	6.00	9.83	38.59	34.91	Concrete
P-3	9-MH38	9-MH39	N/A	N/A	N/A	3.786	5.19	19.79	22.08	105.00	0.009524	24 inch	0.013	38.00	37.00	45.00	45.00	5.00	6.00	39.60	38.70	Concrete
P-97	9-MH40	GATE 9	N/A	N/A	N/A	3.786	5.09	19.44	55.41	10.00	0.060000	24 inch	0.013	32.85	32.25	44.68	44.68	9.83	10.43	34.44	33.39	Concrete
P-452	467+00.00 CB	468+63.19 MH	0.096	0.90	0.086	0.069	6.02	0.42	3.99	159.00	0.012516	12 inch	0.013	45.79	43.80	49.87	49.50	3.08	4.70	46.06	44.02	Concrete
P-453	470+39.73 CB	468+63.19 MH	0.087	0.90	0.078	0.076	6.02	0.46	2.51	175.00	0.004971	12 inch	0.013	44.67	43.80	48.17	49.50	2.50	4.70	44.96	44.08	Concrete
P-5	MH-9-32	9-MH-34	0.306	0.90	0.275	3.400	5.32	18.22	23.97	106.00	0.011226	24 inch	0.013	39.69	38.50	52.79	52.98	11.10	12.48	42.45	41.76	Concrete
P-6	9-MH31	MH-9-32	N/A	N/A	N/A	2.801	5.38	15.20	15.64	124.00	0.022177	18 inch	0.013	43.07	40.32	51.12	52.79	6.55	10.97	45.11	42.51	Concrete



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Chicago
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Project Engineer: Mike Mastroluca
StormCAD v5.6 [05.06.014.00]
Page 1 of 1

Scenario: 10 year

Pipe Report LOCHNER

Label	Upstream Node	Downstream Node	Upstream Inlet Area (acres)	Upstream Inlet Rational Coefficient	Upstream Inlet CA (acres)	Upstream Calculated System CA (acres)	System Intensity (in/hr)	Total System Flow (cfs)	Full Capacity (cfs)	Length (ft)	Constructed Slope (ft/ft)	Section Size	Mannings n	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Downstream Ground Elevation (ft)	Upstream Cover (ft)	Downstream Cover (ft)	Hydraulic Grade Line In (ft)	Hydraulic Grade Line Out (ft)	Material
P-7	9MH-30	9-MH31	N/A	N/A	N/A	2.184	5.47	12.04	4.91	128.00	0.002188	18 inch	0.013	43.35	43.07	48.35	51.12	3.50	6.55	47.17	45.49	Concrete
P-9	9MH-3	BURIED MH 1	N/A	N/A	N/A	1.256	5.88	7.44	11.27	69.00	0.030435	15 inch	0.013	56.10	54.00	60.00	60.00	2.65	4.75	57.19	55.37	Concrete
P-10	9-BMH-1	9MH-3	N/A	N/A	N/A	1.256	5.91	7.48	8.68	56.00	0.061607	15 inch	0.024	59.55	56.10	69.85	60.00	9.05	2.65	60.64	57.67	CMP
P-11	9-BMH-2	9-BMH-1	N/A	N/A	N/A	0.520	5.97	3.13	2.82	40.00	0.006500	15 inch	0.024	59.81	59.55	70.01	69.85	8.95	9.05	61.22	60.90	CMP
P-12	9-BCB-2	9-BMH-2	0.079	0.90	0.071	0.520	5.97	3.13	15.66	16.00	0.058750	15 inch	0.013	64.75	63.81	69.55	70.01	3.55	4.95	65.46	64.24	Concrete
P-13	9-BCB-3	9-BCB-2	0.299	0.90	0.269	0.462	6.02	2.81	6.61	64.00	0.010469	15 inch	0.013	65.52	64.85	69.22	69.55	2.45	3.45	66.19	65.62	Concrete
P-14	9-BCB-1	9-BMH-1	0.328	0.90	0.295	0.736	6.02	4.47	2.84	58.00	0.001379	15 inch	0.011	65.03	64.95	69.33	69.85	3.05	3.65	66.17	65.81	Vitrified Clay
P-20	BURIED MH 1	BURRIED MH 2	N/A	N/A	N/A	1.256	5.85	7.41	12.38	72.00	0.013889	18 inch	0.013	54.00	53.00	60.00	55.00	4.50	0.50	55.05	54.25	Concrete
P-24	BURRIED MH 2	BURRIED MH 3	N/A	N/A	N/A	1.529	5.81	8.96	21.52	143.00	0.041958	18 inch	0.013	53.00	47.00	55.00	50.00	0.50	1.50	54.16	48.37	Concrete
P-28	BURRIED MH 3	9MH-30	N/A	N/A	N/A	1.856	5.76	10.78	23.02	76.00	0.048026	18 inch	0.013	47.00	43.35	50.00	48.35	1.50	3.50	48.26	47.47	Concrete
P-29	TRENCH DRAIN (9E)	BURRIED MH 3	0.363	0.90	0.327	0.327	6.02	1.98	4.35	67.00	0.014925	12 inch	0.013	48.00	47.00	50.00	50.00	1.00	2.00	48.60	48.33	Concrete
P-30	TRENCH DRAIN (9D)	BURRIED MH 2	0.303	0.90	0.273	0.273	6.02	1.66	2.99	71.00	0.007042	12 inch	0.013	53.50	53.00	55.00	55.00	0.50	1.00	54.35	54.21	Concrete
P-32	AREA 9F-2	9MH-30	0.189	0.90	0.170	0.328	5.51	1.82	2.87	20.00	0.006500	12 inch	0.013	44.38	44.25	48.98	48.35	3.60	3.10	48.24	48.19	Concrete
P-33	AREA 9F-3	AREA 9F-2	0.142	0.90	0.128	0.128	6.02	0.78	5.04	15.00	0.020000	12 inch	0.013	44.88	44.58	48.58	48.98	2.70	3.40	48.34	48.33	Concrete
P-34	AREA 9F-1	AREA 9F-2	0.036	0.90	0.032	0.030	6.02	0.18	4.31	30.00	0.014667	12 inch	0.013	44.92	44.48	48.92	48.98	3.00	3.50	48.34	48.33	Concrete
P-35	TRENCH DRAIN (9G1)	9-MH31	0.256	0.90	0.230	0.230	6.02	1.40	5.55	28.00	0.024286	12 inch	0.013	49.00	48.32	51.00	51.12	1.00	1.80	49.50	48.67	Concrete
P-36	AREA 9G-2 AND SCUPPER 204	9-MH31	0.112	0.90	0.101	0.387	5.95	2.33	11.19	42.00	0.030000	15 inch	0.013	46.21	44.95	49.52	51.12	2.06	4.92	46.82	46.23	Concrete
P-454	9-MH-34	468+63.19 MH	N/A	N/A	N/A	3.570	5.24	18.85	17.75	13.00	0.006154	24 inch	0.013	38.50	38.42	52.98	49.50	12.48	9.08	40.89	40.80	Concrete
P-455	468+63.19 MH	9-MH38	N/A	N/A	N/A	3.786	5.23	19.96	17.52	70.00	0.006000	24 inch	0.013	38.42	38.00	49.50	45.00	9.08	5.00	40.66	40.12	Concrete
P-456	468+62.18 CB	468+63.19 MH	0.083	0.90	0.075	0.072	6.02	0.44	7.97	4.00	0.050000	12 inch	0.013	44.20	44.00	49.06	49.50	3.86	4.50	44.47	44.18	Concrete
P-480	SCUPPER (AREA 203)	MH-9-32	0.313	0.90	0.282	0.217	6.02	1.31	3.45	32.00	0.009375	12 inch	0.013	48.19	47.89	51.59	52.79	2.40	3.90	48.67	48.32	Concrete
P-481	SCUPPER (AREA 202)	9-MH-34	0.311	0.90	0.280	0.169	6.02	1.03	21.47	6.00	0.215000	12 inch	0.010	46.29	45.00	53.09	52.98	5.80	6.98	46.72	45.19	PVC
P-498	EXISTING PARKING LOT CB	AREA 9G-2 AND SCUPPER 204	0.000	0.00	0.000	0.111	6.01	0.67	1.99	32.00	0.003125	12 inch	0.013	46.41	46.31	48.91	49.52	1.50	2.21	46.90	46.88	Concrete
P-499	SCUPPER 205	EXISTING PARKING LOT CB	0.123	0.90	0.111	0.111	6.02	0.67	3.56	12.00	0.010000	12 inch	0.013	46.53	46.41	49.00	48.91	1.47	1.50	46.87	46.90	Concrete

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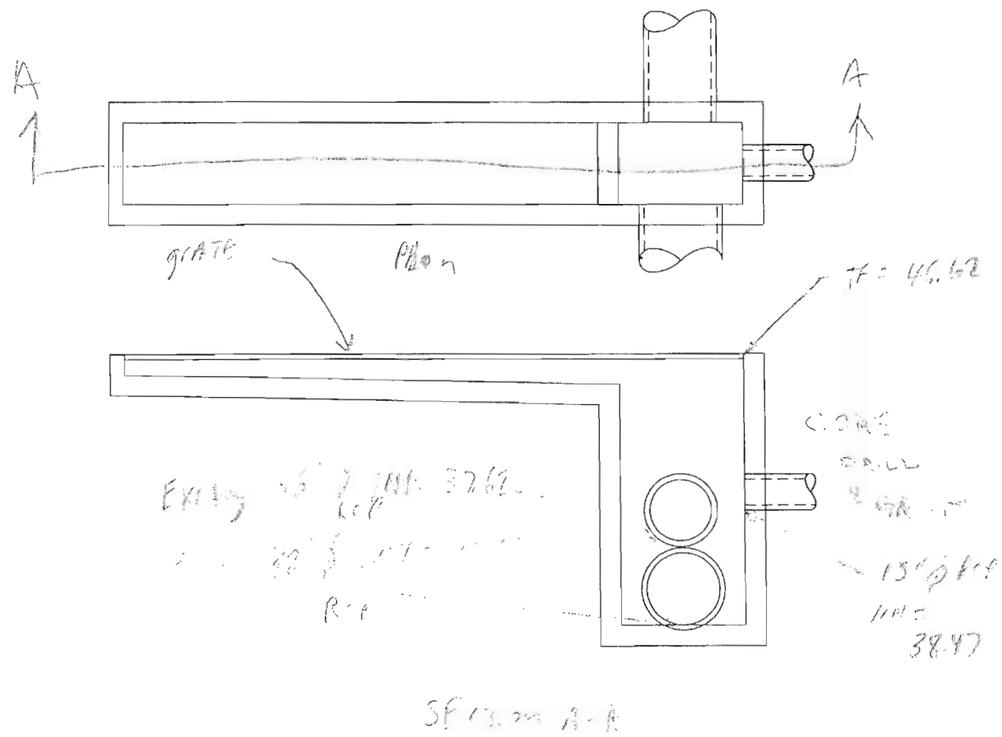
APPENDIX D-7

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003



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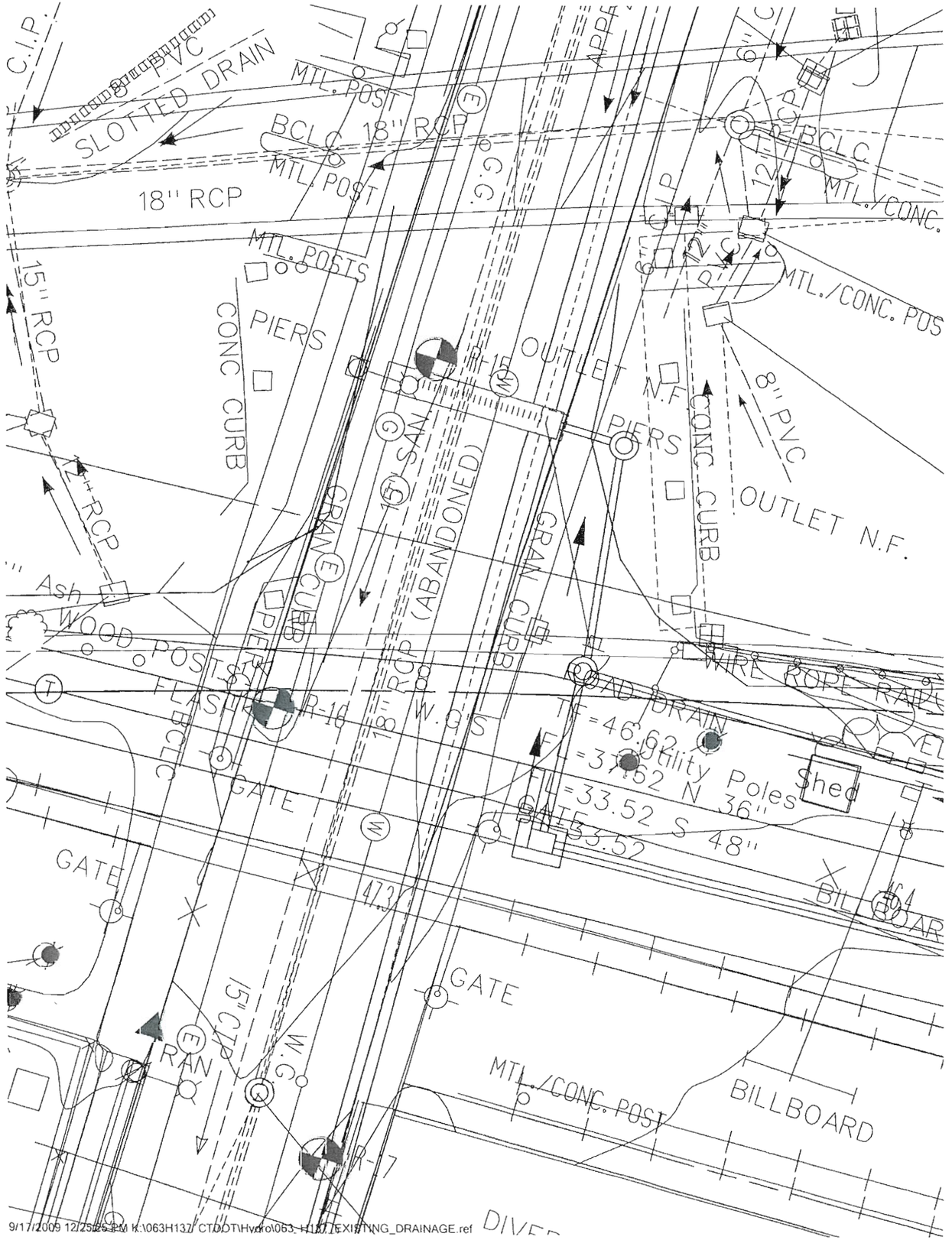

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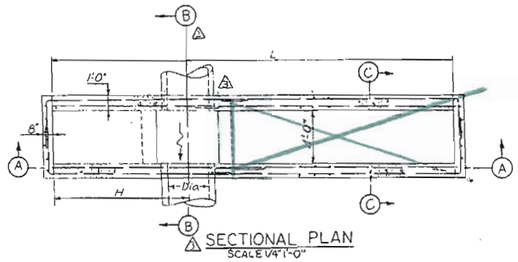

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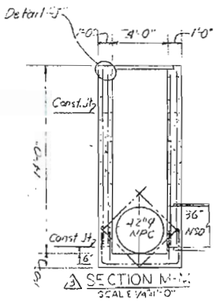

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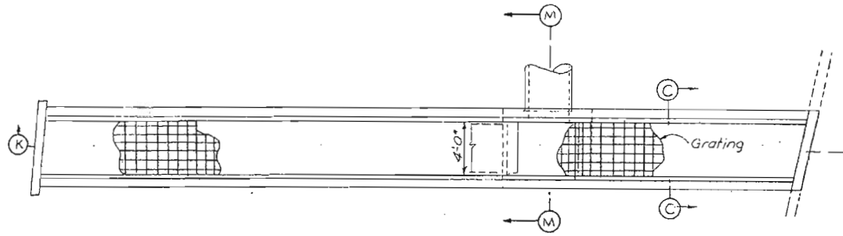

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STREET INLET NO. 5
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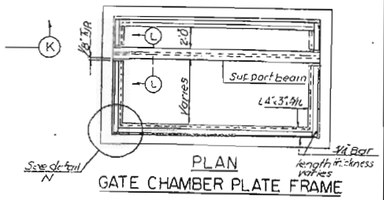
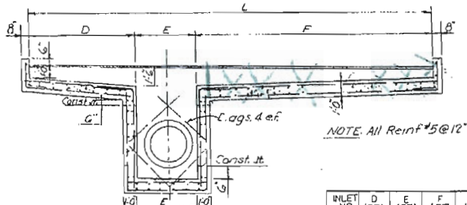


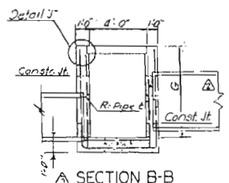
PLAN
GATE CHAMBER PLATE FRAME



△ SECTION A-A
SCALE 1/4"=1'-0"

NOTE: All Reinf #5@12"

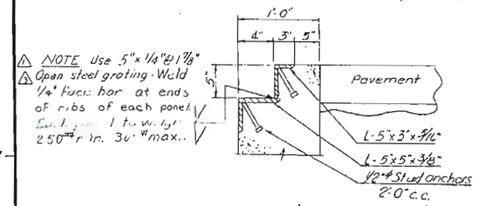
INLET NO.	D (FT.)	E (FT.)	F (FT)	G (FT.)	H (FT.)	J (FT.)	DIA. (IN.)
△ 1	7.75	4.5	17.75	12.0	10.0	30.0	36
△ 2	8.00	4.0	18.00	11.0	10.0	30.0	30
△ 3	9.25	4.5	16.25	14.5	11.5	30.0	36
△ 4	7.75 △	4.5	23.75 △	15.5	10.0 △	36.0	36
△ 6	2.40	6.0	0.0	13.2	27.0	30.0	48



△ SECTION B-B
SCALE 1/4"=1'-0"

CHAMBER NO.	A	B	C	D	t	d
1	9'-11⅜"	7'-5⅝"	2'-5¾"	7'-2¾"	⅝"	1⅝"
2	9'-9¾"	7'-3⅛"	2'-5¾"	5'-7¾"	⅝"	1⅝"
3	12'-5¾"	11'-11⅜"	2'-5¾"	10'-2¾"	⅝"	1⅝"
4	8'-1¾"	5'-7⅛"	2'-5¾"	5'-7¾"	⅝"	1⅝"
5	10'-9¾"	8'-3⅝"	2'-6⅛"	7'-8¾"	1¼"	1¼"
6	6'-11¾"	4'-5⅛"	2'-5⅝"	4'-11¾"	1¼"	1¼"
7	6'-5¾"	3'-11⅜"	2'-5⅛"	2'-11⅜"	1¼"	1¼"

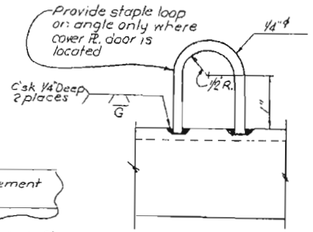
SECTION C-C
SCALE 1/4"=1'-0"



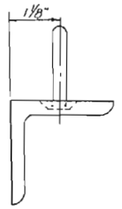
△ NOTE Use 5"x1/4"@1 7/8" Open steel grating. Weld 1/4" fusion bar at ends of ribs of each panel. Total load = 1 ton w. f. = 250 lbs/sq ft in. 30" max.

DETAIL "J"
SCALE 1 1/2"=1'-0"

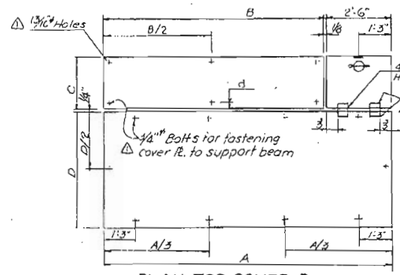
STREET INLETS NOS. 1-4 & 6



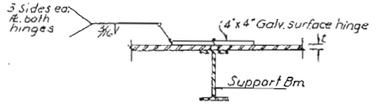
FRONT



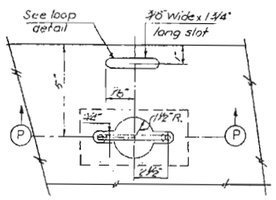
SIDE
LOOP DETAIL



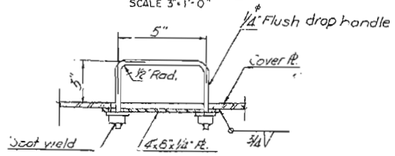
PLAN TOP COVER ℞.
SCALE 1½"=1'-0"



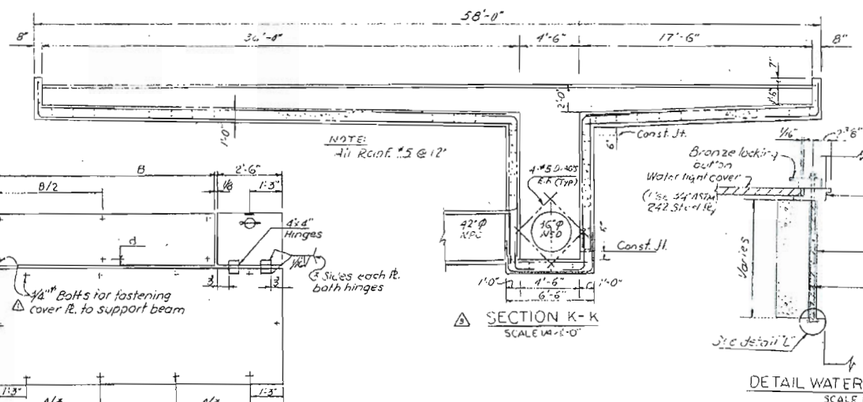
HINGE DETAIL
SCALE 3"=1'-0"



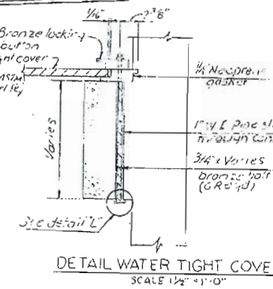
PLAN-FLUSH DROP HANDLE
SCALE 3"=1'-0"



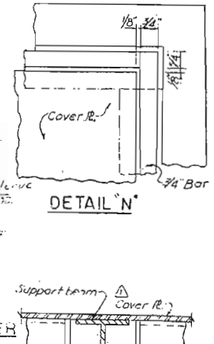
SECTION P-P
SCALE 3"=1'-0"



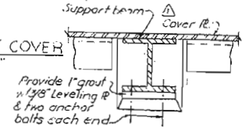
△ SECTION K-K
SCALE 1/4"=1'-0"



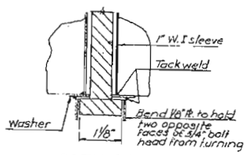
DETAIL WATER TIGHT COVER
SCALE 1½"=1'-0"



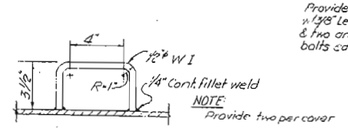
DETAIL "N"



SECTION L-L

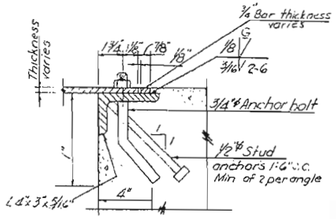


DETAIL "L"



NOTE: Provide two per cover

HANDLE FOR WATER TIGHT COVER
SCALE 3"=1'-0"



GATE CHAMBER PLATE FRAME
SCALE 3"=1'-0"

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

GRAPHIC SCALES

1/4"=1'-0" 4' 0 4' 8'
1 1/2"=1'-0" 12" 9" 6" 3" 0 6" 12"
3"=1'-0" 6' 0 3' 6' 9'
3/4"=1'-0" 1' 0 1' 2' 3'

As Built Drawing
Date 7-30-00 98

NOTE:
See notes Sh. 123.

REVISION	DATE	DESCRIPTION	BY
△ 5	5 APR 79	Plans, sections, inlet table, Detail "J" revised.	W.S.
△ 2	1 Nov 76	Chamber table and section revised (Am. #2)	
△ 1	1 Nov 76	Plan & section revised (Am #3)	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY J.E. | DR. BY A.Z. | CK. BY J.F.

SUBMITTED: Colonel M. Tarn
CHIEF, R.B. TRUST SECTION

APPROVED RECOMMENDED: Chief, Hydraulics Br.
CHIEF, HYDRAULICS BRANCH

REVIEWED: Project Engineer

APPROVED RECOMMENDED: Chief, Project Branch

WATER RESOURCES DEVELOPMENT PROJECT
PARK RIVER LOCAL PROTECTION
DRAINAGE STRUCTURES
REINFORCEMENT DETAILS NO. 2

HARTFORD CONNECTICUT

APPROVED DATE MARCH 1976
CHIEF, ENGINEERING DIVISION

SCALE AS SHOWN | SPEC. NO. DACW33-76-B-0040

DRAWING NUMBER
PAR - 1

SHEET 124

121-28

157-58

STATE OF CONNECTICUT

N

N/F THE HARTFORD COURANT COMPANY

N/F NATIONAL RAILROAD PASSENGER CORPORATION

PARK RIVER CONDUIT

EXISTING STREET LINE
PROPOSED STREET LINE
PROPOSED CURB LINE
EXISTING CURB LINE

N.C. TO FORMER BUILDING #15 (ABANDONED)

PROBABLE LOCATION JACKING PIT

PROPOSED RELOCATION OF 24" INCH GAS MAIN (BID ITEM NO. 12)

FLOWER STREET

PROPOSED 12" C.B. DRAIN

PROPOSED CB WITH TRAP & BULKHEAD

RECONNECT TO STORM

RECONNECT TO SANITARY

RECONNECT TO SAN. OR STORM

REMOVE TOP FRAME & SAND FILL C.B.

REMOVE TOP FRAME & COVER-SAND FILL MH'S

RECONNECT TO STORM

DIVERSION M.H.

EXISTING GATE CHAMBER

SAND FILL EXISTING 24" BRICK SEWER

EXISTING 24" BRICK SEWER

EXISTING HIGH LEVEL STORM DRAIN

EXISTING 48" R.C.P. STORM DRAIN

EXISTING 36" R.C.P. STORM DRAIN

EXISTING 18" R.C.P. STORM DRAIN

EXISTING 15" R.C.P. SANITARY SEWER

EXISTING 8" WATER

EXISTING 8" GAS

EXISTING 6" SIPHON

EXISTING 8"x10" SANITARY SIPHON

EXISTING 8" WIDE CONC. WEIR

EXISTING CURB LINE
PROPOSED CURB LINE
EXISTING STREET LINE
PROPOSED STREET LINE

PIER FOUNDATION
TOP ELEV. 49.0
BOTTOM ELEV. 46.0
(STATE CONTR. #63-130, SHT. #17)

STATE OF CONNECTICUT
PIER FOUNDATION
TOP ELEV. 49.0
BOTTOM ELEV. 46.0
(STATE CONTR. #63-130, SHT. #74)

ELEVATIONS REFER TO MDC

CODE: FLOWER STREET, HARTFORD

CONTRACT NO. 83-11

THE METROPOLITAN DISTRICT
TOWN HARTFORD
STREET FLOWER ST
HO# (RANGE) 10
FLOWER STREET
HARTFORD
SCALE 1"=20' HOR.; 1"=10' VER.
DRAWN J.D. ENGINEER R.M. DATE FEB. 23, 1983
SUBMITTED
APPROVED
DEPUTY MANAGER - ENGINEERING
SHEET NO. 17495
1 inch

SHEET 1 OF 3 SHEETS

PLAN

(COMPILED FROM: N.B. P-506 & P-639, RECORD PLAN 19-102 & PLAN FROM C.E. MAGUIRE, MAY 1982.)

N/F THE HARTFORD COURANT COMPANY

285 BROAD STREET HARTFORD COURANT

PIPE DESIGNATIONS:

C-76 ASTM C-76 REINFORCED CONCRETE PIPE CLASS IV
D-3033 ASTM D-3033 TYPE PSP POLY(VINYL CHLORIDE)(PVC) SEWER PIPE & FITTINGS, DESIGNATION SDR-41 OR SDR-35.
D-3034 ASTM D-3034 TYPE PSM POLY(VINYL CHLORIDE)(PVC) SEWER PIPE & FITTINGS, DESIGNATION SDR-35 OR 26
F-679 ASTM F-679 PVC(POLYVINYLCHLORIDE) LARGE DIA PLASTIC GRAVITY SEWER PIPE & FITTINGS (18", 21", 24" & 27")

NOTES: ALL 6" PLASTIC PIPE SHALL BE SDR-35.

PRIOR TO PLACING BACKFILL A LAYER OF 6-MIL POLYETHYLENE PLASTIC, OR EQUAL, SHALL BE PLACED, SMOOTH AND LAPPED OVER THE STONE BEDDING AND THE SEWER, SEWER APPURTENANCES, AND PLASTIC SHALL BE FOLDED AT THE ENDS OF THE TRENCH AND FITTING & UNDER UP THE SIDES OF THE EXCAVATION TO THE GROUND LEVEL. SLITS OR HOLES AND EXTEND OUT FOOT OF THE MANHOLE ALL TAPE THE PLASTIC SHALL BE MINIMUM OF ONE FOOT LAPS.
COSTS FOR PLACING POLYESTHYLENE LAYER OVER THE LATERALS, RECONNECTIONS AND C.B. DRAINS SHALL BE INCLUDED IN THE APPROPRIATE BID ITEMS FOR THE ABOVE PIPE, FOOT OF LATERAL PIPE.

"CALL BEFORE YOU DIG"
THE CONTRACTOR IS HEREBY REMINDED THAT TITLE 16 CHAPTER 293 OF THE CONN. GENERAL STATUTES, REQUIRES NOTIFICATION OF THE CONNECTICUT UNDERGROUND UTILITIES PROTECTION SERVICE FOR MARKING UTILITIES. THE CONTRACTOR SHALL CALL 1-800-922-4455 AT LEAST 48 HOURS PRIOR TO BEGINNING THE EXCAVATION.

UNDERGROUND UTILITY CHECK			
APPROXIMATE LOCATION	BY	DATE	
ELEC. AS SHOWN	JB	OCT. 1982	
TEL. AS SHOWN	"	"	
GAS AS SHOWN	"	"	
WATER AS SHOWN	"	"	
RECHECKED BY R.M.	DATE 1-18-83		

NOTES:
INFORMATION GIVEN REGARDING TYPE OF SOIL WAS TAKEN FROM DATA SUPPLIED ON PERMITS FOR THE CONSTRUCTION OR REPAIR OF VARIOUS HOUSE CONNECTIONS IN THE AREA. SAID SOIL INFORMATION SHOWN PERTAINS ONLY TO THE MATERIALS FOUND AT THE LOCATIONS FOR CONSTRUCTION OR REPAIRS TO SAID HOUSE CONNECTIONS.
BORINGS SHOWN ON STATE PLANS TAKEN BY C.E. MAGUIRE, INC., JUNE 1982.
THE NUMBERS IN THE BOXING PROFILE INDICATE THE NUMBER OF BLOWS REQUIRED TO DRIVE A 2" SAMPLER 1 INCH BY USING A 140 LB HAMMER FALLING 30 INCHES.
ALL MANHOLE, HAND CATCH BASIN FRAMES & COVERS REMOVED FROM THE EXISTING MANHOLES & CATCH BASINS SHALL BE DELIVERED TO THE HARTFORD WITHIN THE LIMITS OF CONSTRUCTION CONTRACT. REMAINING OLD MANHOLE FRAMES AND COVERS SHALL BE DISPOSED OF BY THE CONTRACTOR.
MANHOLES SHALL HAVE APPROPRIATELY MARKED COVERS "SEWER" OR "STORM DRAIN".
INSTALL ALL LATERALS AND CATCH BASIN DRAINS AT NOT LESS THAN 1% GRADE.
COSTS FOR GRADING AND FILLING ABANDONED CATCH BASINS, MANHOLES, DRIVEWAYS AND COVERS TO THE NEW PROPOSED GRADE AND CONNECTING NEW PIPES TO THE EXISTING SEWER SHALL BE INCLUDED IN THE UNIT PRICE BID ITEMS FOR THE NEW PIPE OF THE SAME SIZE.
COSTS FOR CRADLING AND PLACING CRUSHED STONE FOUNDATION AND HAUNCHING TO THE 6" INCHES ABOVE THE TOP OF THE PIPE FOR TWO PIPES IN THE SAME TRENCH SHALL BE INCLUDED IN THE APPROPRIATE BID ITEM FOR THE PRICE PER FOOT OF PIPE.
COSTS FOR CRADLED STONE FOUNDATION AND HAUNCHING FOR SINGLE PIPE IN THE SAME TRENCH SHALL BE PAID AS STIPULATED IN THE SPECIAL PROVISIONS OF THIS CONTRACT.

DETAIL
DIVERSION MANHOLE
SCALE: 1"=4'-0"

SECTION A-A

PLAN

PROFILE

PRESENT SURFACE - BIT CONC. (C.E. MAGUIRE, MAR. 1982)

Final Meas. Sewer 165.00'
165' 18" STORM DRAIN @ 0.6% GRADE
PIPE TO BE ASTM (C-76 CLASS IV) OR F-679

Final Meas. 87.50'
39' 18" STORM DRAIN @ 0.6% GRADE
PIPE TO BE ASTM (F-679)

215' 15" SANITARY SEWER @ 0.6% GRADE (PVC F-789)
Final Meas. San. 213.97'
PIPE TO BE ASTM D-3034 DESIGNATION SDR-35

313' 12" SANITARY SEWER @ 0.6% GRADE
Final Meas. San. 311.50'

Note: No Poly Layer or Micafi MON Used
192' 36" STORM DRAIN @ 0.6% GRADE
Final Meas. 727.30' (Spread)
PIPE TO BE ASTM C-76 CLASS IV Capitol

Pickled on 7-21-88

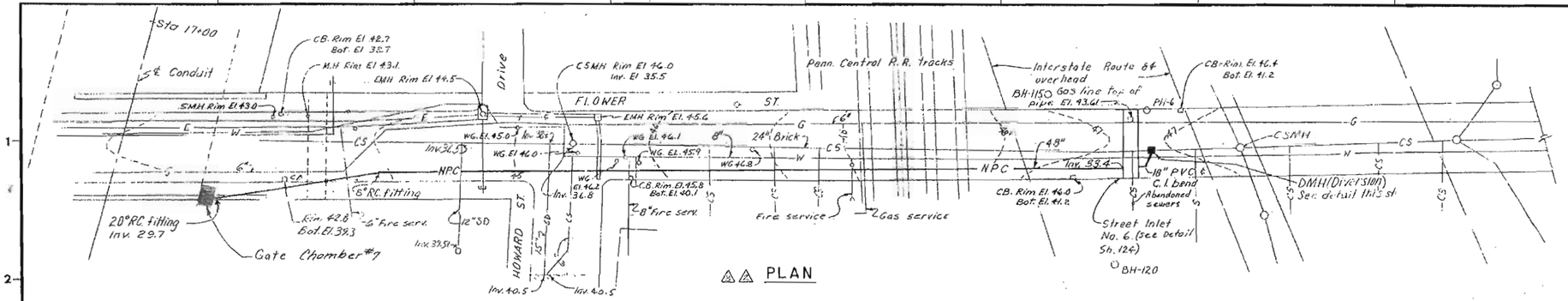
Pickled 10/12/88

THIS SECTION OF SANITARY SEWER TO BE JACKED
SEE SHEET 3 FOR DETAILS OF RAILROAD CROSSING

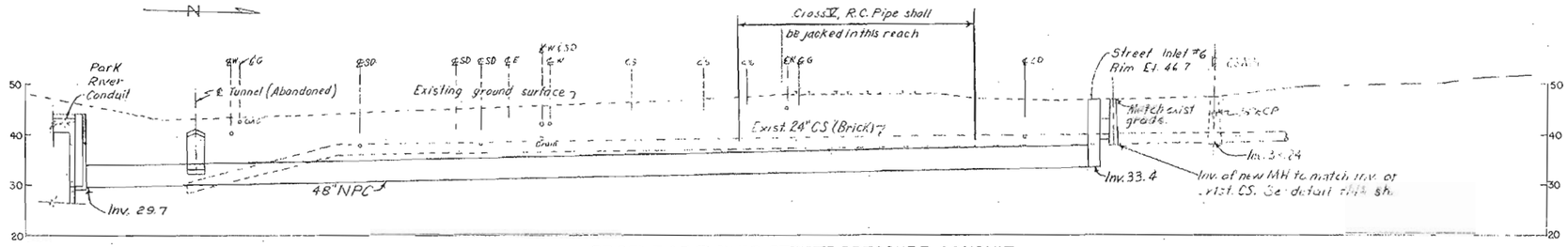
SEE SHEET 2

Final Measure — Book No. P 639

CORPS OF ENGINEERS — U. S. ARMY

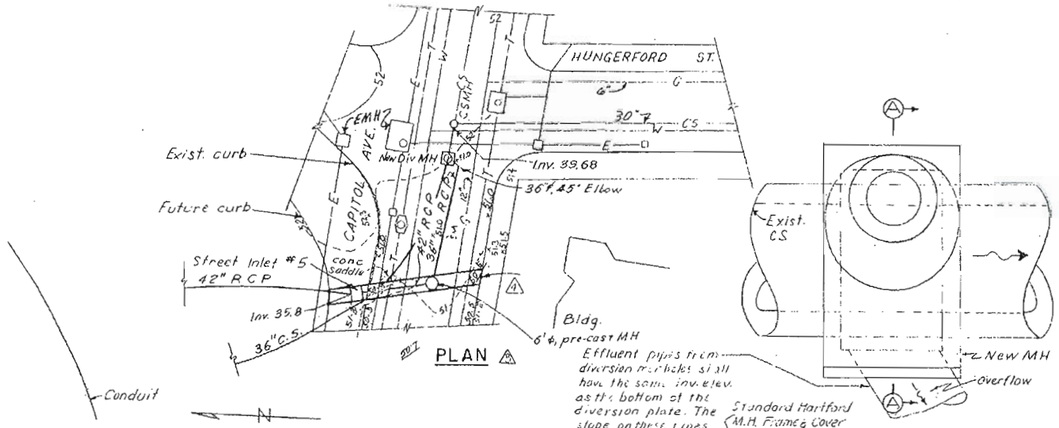


⚠⚠ PLAN



⚠⚠ PROFILE OF FLOWER STREET PRESSURE CONDUIT

SCALE 1" = 20' HOR
1" = 10' VERT



⚠⚠ PLAN

PLAN

Effluent pipes from diversion manholes shall have the same inv. elev. as the bottom of the diversion plate. The slope on these pipes shall be a min. of 1%.

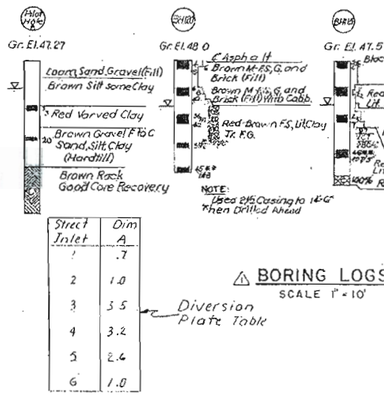
Standard Hartford M.H. Frame & Cover

Strect Inlet	Dim A
1	.7
2	1.0
3	3.5
4	3.2
5	2.4
6	1.0

Diversion Plate Table

⚠ BORING LOGS

SCALE 1" = 10'



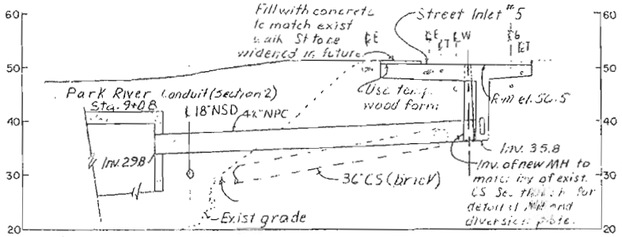
Key
Boring Number
Ground Elevation
Dry (Drive) Sample Recovered
Casing Blows/Ft.
Sampler Penetration w/o Recovery
Sampler Spoon Blows for each 6" Penetration
Limit of Discription
Undisturbed Sample
Water table
% Core Recovery
Bedrock

ABBREVIATIONS
C. — Coarse
F. — Fine
M. — Medium
G. — Gravel
S. — Sand
Boul. — Boulders
Cobb. — Cobbles
Lt. — Little
Tr. — Trace
Misc. — Miscellaneous
Org. — Organic
w/H — Weight of Hammer
Cem. — Cemented
V. — Very

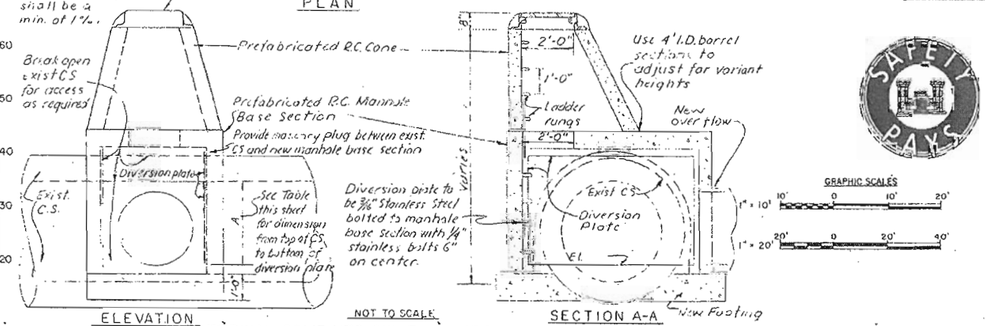
Cored Sample

Casing I.D. = 2½"
Hammer Wt. = 300 #
Hammer Fall = 24"
** Open end A Rod with 140 # @ 30" Drop

Sample I.D. = 1⅜"
Hammer Wt. = 140 lbs.
Hammer Fall = 30"
** Open end A Rod w/300 Lb. Hammer @ 24" Drop



⚠⚠ PROFILE CAPITOL AVENUE PRESSURE CONDUIT



NOT TO SCALE

⚠ TYPICAL COMBINED SEWER DIVERSION MANHOLE

GRAPHIC SCALES
1" = 10'
1" = 20'

As Built Drawing
Contract No. DACW 33-76-C-0098

VALUE ENGINEERING PAYS DIVIDENDS

SAFETY PAYS

REVISION	DATE	DESCRIPTION	BY
	4-8-85	Final field corrections	
⚠	25 Feb. 77	Plan revised	
⚠	5 Feb. 77	Plans and profiles revised. Detail added.	
⚠	7 May 76	Flower St. plan and profile and Capitol Ave. profile revised (Am. #3)	
⚠	4-20-76	Boring logs and legend added (Am. #2)	

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

DES. BY W.F. | DR. BY W.F. | CK. BY W.F.

DISTRIBUTION: Dist. Mgr. Sec. Sta. Chief, Utilities Section

APPROVAL RECOMMENDED: Chief, Design Br. | Chief, Tech. Eng. Section | Chief, Project Section

REVIEWED: Chief, Project Mgt. Br.

APPROVED FOR PUBLICATION: Chief, Project Branch

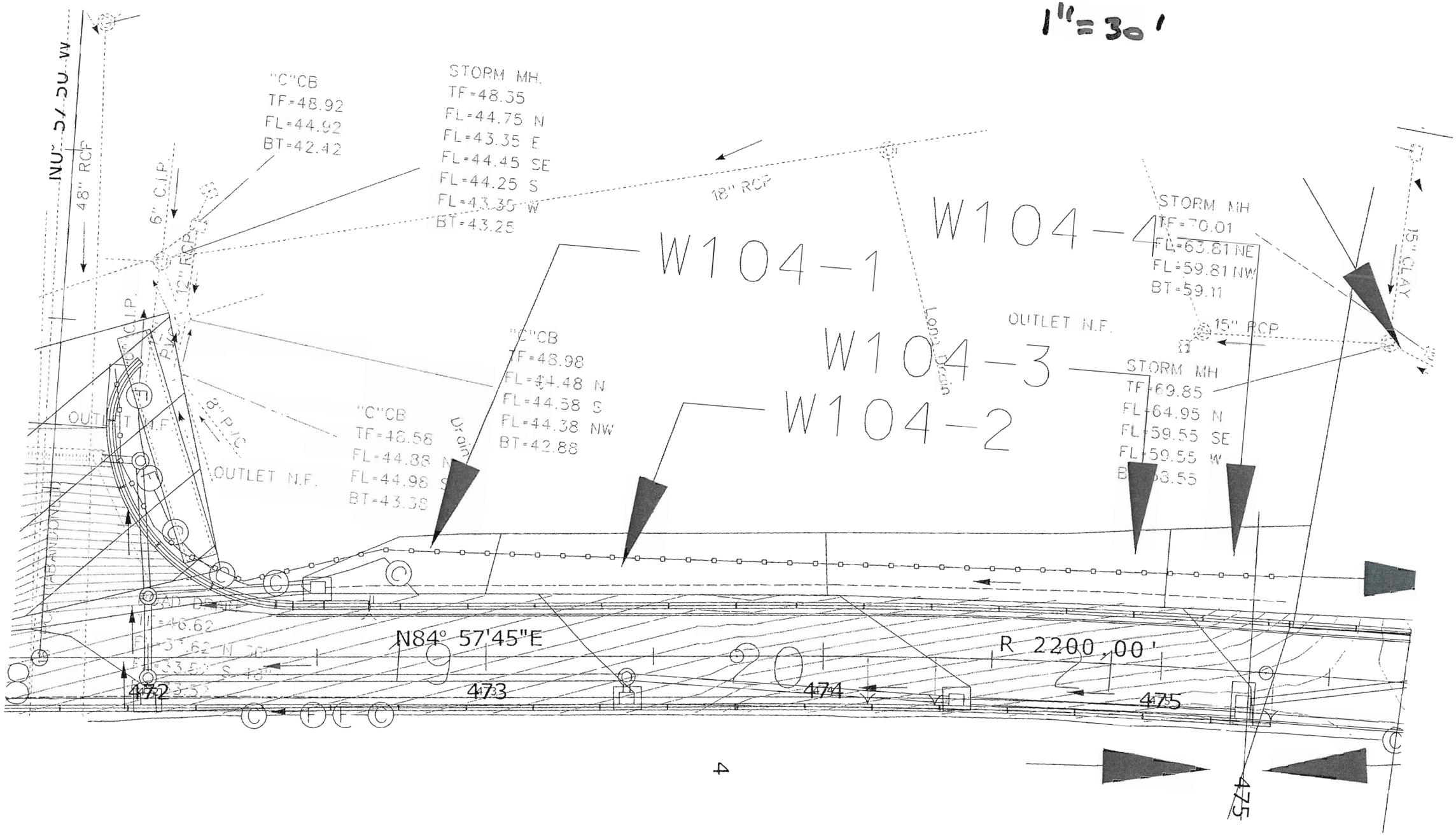
APPROVED: Chief, Engineering Division

WATER RESOURCES DEVELOPMENT PROJECT
PARK RIVER LOCAL PROTECTION
HIGH LEVEL DRAINAGE
PLAN AND PROFILE NO. 4
HARTFORD CONNECTICUT
DATE MARCH 1976
SCALE AS SHOWN | SPEC. NO. DACW 33-76-B-0040
DRAWING NUMBER PAR-1
SHEET 119

APPENDIX D-8

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

WALL 104
1"=30'


"C"CB
TF=48.92
FL=44.92
BT=42.42
STORM MH.
TF=48.35
FL=44.75 N
FL=43.35 E
FL=44.45 SE
FL=44.25 S
FL=43.35 W
BT=43.25
48" RCP
6" C.I.P.
12" RCP
18" RCP
W104-1
W104-4
W104-3
W104-2
"C"CB
TF=48.98
FL=44.48 N
FL=44.58 S
FL=44.38 NW
BT=42.88
"C"CB
TF=48.58
FL=44.88 N
FL=44.98 S
BT=43.38
OUTLET N.F.
OUTLET N.F.
STORM MH
TF=70.01
FL=63.81 NE
FL=59.81 NW
BT=59.11
15" RCP
STORM MH
TF=69.85
FL=64.95 N
FL=59.55 SE
FL=59.55 W
15" CLAY
N84° 57'45"E
R 2200.00'
472
473
474
475
475

COMPUTED BY: MM
DATE: 6/7/10

CHECKED BY:
DATE:

TIMES OF CONCENTRATION FOR FLEXIBLE LINING DESIGN FOR SWALES WALL 104

104-1	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	36	0.361		0.09	5.5
GRAVEL	0.025	45	0.020		0.06	3.4
						8.86

104-2	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	36	0.361		0.09	5.5
GRAVEL	0.025	85	0.057		0.06	3.7
						9.20

104-3	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	36	0.361		0.09	5.5
GRAVEL	0.025	116	0.010		0.16	9.6
						15.04

104-4	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	36	0.361		0.09	5.5
GRAVEL	0.025	20	0.500		0.01	0.5
						5.95

TC 104-1+104-2+104-3						22.17
TC 104-2+104-3						18.77

COMPUTED BY: MY

DATE: 6/7/10

CHECKED BY:

DATE:

10 YEAR DISCHARGES

FLEXIBLE LINING DESIGN FOR SWALES
WALLS 104

LOCATION	DESCRIPTION	Swale #	Return Period yrs	Drainage Area name	Run Off Coef. C C	Individual Area acres	Composite Area acres	Tc	Tc Used	Intensity in/hr	Q
475+11	gravel swale	4	10	104-4	0.130	0.023	0.023	5.953	6	5.790	0.017
473+95	gravel swale	3	10	104-3	0.130	0.047	0.069	15.036	15	3.980	0.036
473+10	gravel swale	2	10	104-2	0.130	0.041	0.110	18.771	19	3.660	0.052
472+65	gravel swale	1	10	104-1	0.130	0.018	0.128	22.173	22	3.430	0.057

COMPUTED BY: MM
DATE: 6/7/18

CHECKED BY:
DATE:

DRAINAGE AREAS
FLEXIBLE LINING DESIGN FOR SWALES
WALL 104

Area name	Area (sqft)	Area (acres)
104-1	783.78	0.02
104-2	1782.60	0.04
104-3	2026.59	0.05
104-4	982.92	0.02

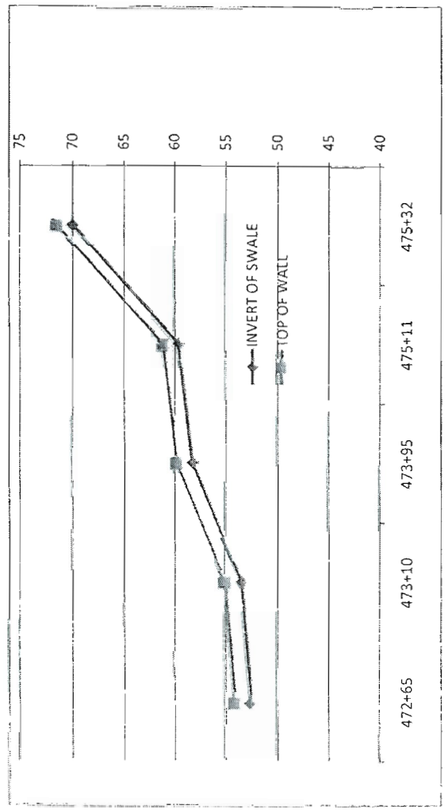
COMPUTED BY: MM
DATE: 6/7/18

CHECKED BY:
DATE:

PROFILE
FLEXIBLE LINING DESIGN FOR SWALES
WALL 104

wall 104

sta	invert	slope	top wall	Swale #
	70	hp	71.5	
12.67	475+32	59.62	0.499759	61.12	4
12.46	475+11	58.24	0.011798	59.74	3
11.3	473+95	53.46	0.056235	54.96	2
10.45	473+10	52.5	0.021333	54	1
10	472+65				lp



Commands Read From File: W104-3.CHL

```
      JOB W104-3
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.011   0.036
      TRP 2      1.5    2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE************
```

W104-3

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES):	40.80
DESIGN PARAMETERS:	
DESIGN DISCHARGE (CFS):	.04
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.011

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.04
MAX DEPTH (FT)	.08
AREA (FT^2)	.17
WETTED PERIMETER (FT)	2.32
HYDRAULIC RADIUS (FT)	.07
AVG VELOCITY (FT/SEC)	.22
MANNINGS EQUIVALENT	.126
Davg / D50	.88
FROUDE NUMBER	.14
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.05	7.52	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.04	5.10	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: W104-4.CHL

```
      JOB W104-4
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.50   0.017
*** WARNING *** DATA IS OUT OF REASONABLE RANGE
      TRP 2      1.5    2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE************
```

W104-4

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES):	40.80
DESIGN PARAMETERS:	
DESIGN DISCHARGE (CFS):	.02
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.500

*** WARNING *** DEPTH DID NOT CONVERGE. PROGRAM WILL CONTINUE
WITH MOST RECENT VALUE

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.02
MAX DEPTH (FT)	.01
AREA (FT^2)	.02
WETTED PERIMETER (FT)	2.05
HYDRAULIC RADIUS (FT)	.01
AVG VELOCITY (FT/SEC)	.72
MANNINGS EQUIVALENT	.637
Davg / D50	.14
FROUDE NUMBER	1.44
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.24	1.65	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.19	1.12	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: W104-1.CHL

```
      JOB W104-1
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.02   0.057
      TRP 2      1.5    2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE*************
```

W104-1

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES): 40.80
DESIGN PARAMETERS:

DESIGN DISCHARGE (CFS):	.06
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.020

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.06
MAX DEPTH (FT)	.07
AREA (FT^2)	.16
WETTED PERIMETER (FT)	2.30
HYDRAULIC RADIUS (FT)	.07
AVG VELOCITY (FT/SEC)	.36
MANNINGS EQUIVALENT	.098
Davg / D50	.84
FROUDE NUMBER	.23
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.09	4.36	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.07	2.95	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: W104-2.CHL

```
      JOB W104-2
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.056   0.052
      TRP 2      1.5    2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE*************
```

W104-2

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES): 40.80
DESIGN PARAMETERS:

DESIGN DISCHARGE (CFS):	.05
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.056

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.05
MAX DEPTH (FT)	.05
AREA (FT^2)	.10
WETTED PERIMETER (FT)	2.19
HYDRAULIC RADIUS (FT)	.04
AVG VELOCITY (FT/SEC)	.54
MANNINGS EQUIVALENT	.081
Davg / D50	.53
FROUDE NUMBER	.45
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.16	2.50	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.13	1.70	STABLE

*** NORMAL END OF HYCHL ***

Project Name: Walls
Description:
Horizontal Alignment Name: Wall-104-RH
Description: Wall 104 RH
Style: designroad_040
Vertical Alignment Name: 104-TW
Description: Wall 104 Top of Wall
Style: designroad_040

	STATION	ELEVATION
Element: Linear		
POB	10+00.00	52.50
PVI	10+45.00	53.46
Tangent Grade:	2.14	
Tangent Length:	45.00	
Element: Linear		
PVI	10+45.00	53.46
PVI	11+30.00	58.24
Tangent Grade:	5.62	
Tangent Length:	85.00	
Element: Linear		
PVI	11+30.00	58.24
PVI	12+46.97	59.62
Tangent Grade:	1.18	
Tangent Length:	116.97	
Element: Linear		
PVI	12+46.97	59.62
PVI	12+67.74	70.00
Tangent Grade:	50.00	
Tangent Length:	20.77	
Element: Linear		
PVI	12+67.74	70.00
POE	12+71.74	70.00
Tangent Grade:	0.00	
Tangent Length:	4.00	

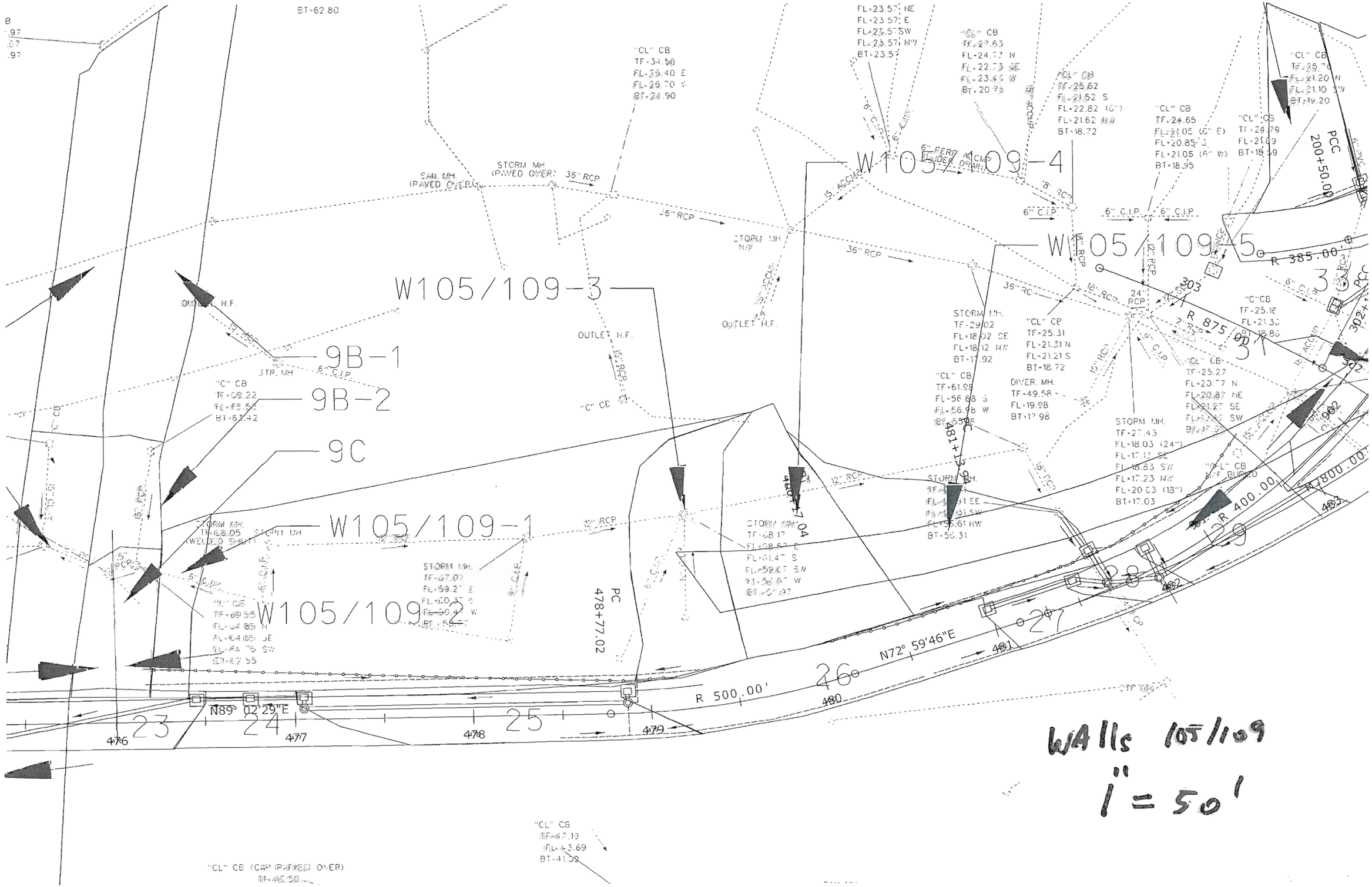
Station Base Report

Report Created: 1/12/2010
Time: 11:05am

Project: Walls
Description:
Baseline (Active) Alignment: NB Busway-check
File Name: G:\CTDOT_PROJECTS\063H137_CTDOT\Highways\civil_data\geometry\DD_IRD_063_H137_Hartford-Busway-Walls.alg
Last Revised: dmullaney 1/12/2010 10:57:47 AM
Input Grid Factor: 1.00000000

Note: All units in this report are in feet unless specified otherwise.

Baseline Alignment			Offset Alignment		
Station	Distance to Offset Point	Radial Direction	Station	Distance to Offset Point	Radial Direction
Offset (Specified) Alignment: Wall-104-RH					
472+65.711	0.000	S 5°02'15" E	10+00.000	-18.000	S 5°02'15" E
473+10.711	0.000	S 5°02'15" E	10+45.000	-18.000	S 5°02'15" E
473+74.507	0.000	S 5°02'15" E	11+08.796	-18.000	S 5°02'15" E
473+95.539	0.000	S 4°29'23" E	11+30.000	-18.000	S 4°29'23" E
475+11.561	0.000	S 1°28'05" E	12+46.971	-18.000	S 1°28'05" E
475+31.118	0.000	S 0°57'31" E	12+66.689	-18.000	S 0°57'31" E
475+32.170	0.000	S 0°57'31" E	12+67.740	-18.000	S 0°57'31" E
475+36.170	0.000	S 0°57'31" E	12+71.740	-18.000	S 0°57'31" E



WALLS 105/109

1" = 50'

COMPUTED BY: MM
DATE: 6/7/10

CHECKED BY:
DATE:

TIMES OF CONCENTRATION FOR FLEXIBLE LINING DESIGN FOR SWALES WALLS 105 AND 109

Cumulative Tc

105/109-1	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	21.42	0.700		0.05	5.0
GRAVEL	0.025	10	0.500		0.00	5.0
						10.00

105/109-2	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	230	0.065		0.80	47.8
GRAVEL	0.025	143	0.005		0.25	14.9
						62.69

Area 105/109-3	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	143	0.112		0.44	26.3
GRAVEL	0.025	90	0.090		0.05	5.0
						31.31

Area 105/109-4	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	122	0.131		0.36	21.7
GRAVEL	0.025	100	0.008		0.16	9.4
						31.2

AREA 105/109-5	n	L	s	V	Tc (hr)	Tc (min)
BRUSH	0.24	189	0.085		0.61	36.8
GRAVEL	0.025	40	0.005		0.09	5.4
						42.2

105/109- 1+2	n	L	s	V	Tc (hr)	Tc (min)
use 105/109-2						62.7

105/109- 1+2+3	n	L	s	V	Tc (hr)	Tc (min)
from 3						5.0
1+2						62.69
Total						67.69

AREA 105/109-2+3+4	n	L	s	V	Tc (hr)	Tc (min)
2						62.7
3						14.4
4						5.0
Total						82.1

AREA 105/109-2+3+4+5	n	L	s	V	Tc (hr)	Tc (min)
2						62.7
3						5.0
4						9.4
5						5.4
						82.5

82.81
31.31
35.7
42.2

COMPUTED BY: MM

DATE: 6/7/16

CHECKED BY:

DATE:

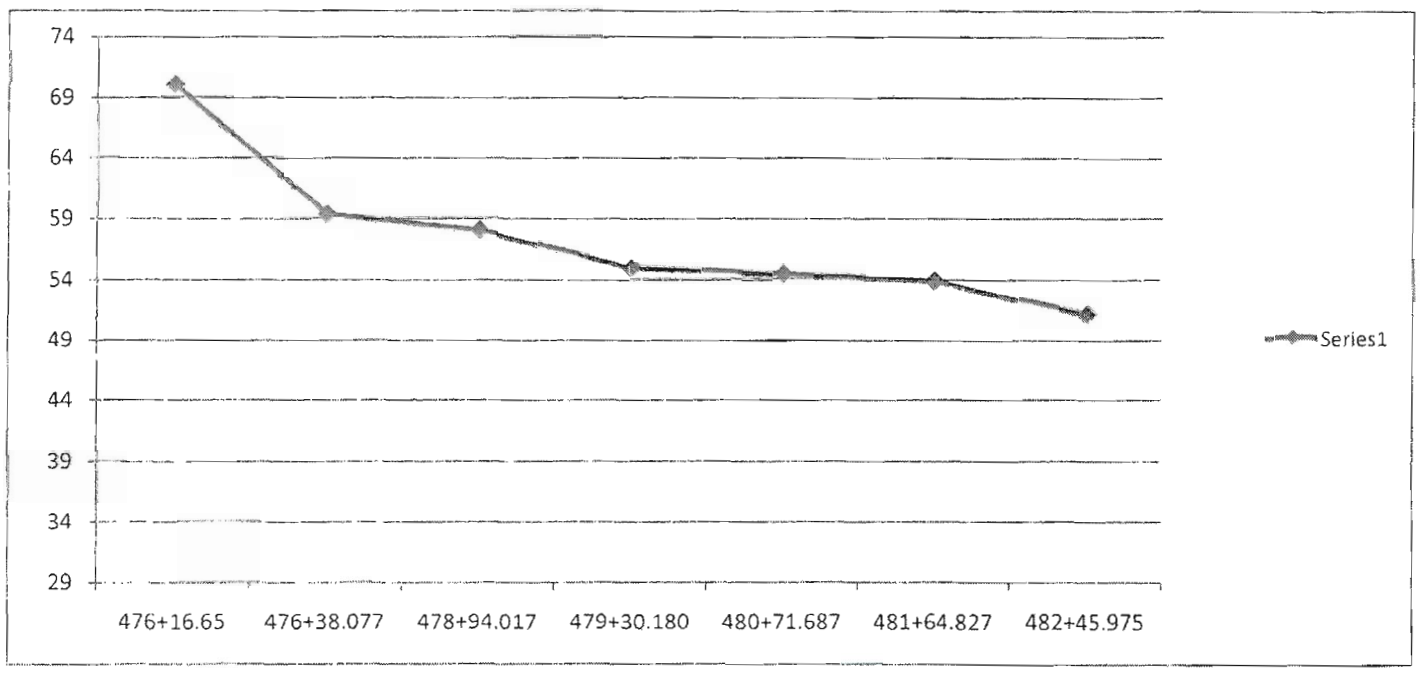
10 YEAR DISCHARGES

FLEXIBLE LINING DESIGN FOR SWALES
WALLS 105 AND 109

LOCATION	DESCRIPTION	Swale #	Return Period yrs	Drainage Area name	Run Off Coef. C C	Individual Area acres	Composite Area acres	Tc	Tc Used	Intensity in/hr	Q
	gravel swale	1	10	105/109-1	0.130	0.031	0.031	10.000	10	4.800	0.020
	gravel swale	2	10	105/109-2	0.130	0.438	0.470	62.689	63	1.800	0.110
	gravel swale	3	10	105/109-3	0.130	0.080	0.550	67.689	68	1.700	0.121
	gravel swale	4	10	105/109-4	0.130	0.147	0.697	82.129	82	1.500	0.136
	gravel swale	5	10	105/109-5	0.130	0.106	0.803	82.519	83	1.500	0.157

wall 105 and 109

sta	invert	LENGTH	slope	top wall	Swale #
476+16.65	70		hp	71.5	
476+38.077	59.28	21.43	0.500233	60.78	1
478+94.017	58	255.3	0.005014	59.5	2
479+30.180	54.93	34.86	0.088067	56.43	3
480+71.687	54.38	71.12	0.007733	55.88	4
481+64.827	53.92	92	0.005	55.42	5
482+45.975	51.07	79.35	0.035917	52.57	6



DRAINAGE AREAS FOR
FLEXIBLE LINING DESIGN FOR SWALES
WALLS 105 AND 109

COMPUTED BY:
DATE:

CHECKED BY:
DATE:

Drainage Area name	Area square ft	Area square ft	Delta Area square ft	Area acres
105/109-1	2187.920	818.028	1369.892	0.031
105/109-2	29908.000	10809.050	19098.950	0.438
105/109-3	6994.740	3519.250	3475.490	0.080
105/109-4	8865.270	2460.500	6404.770	0.147
105/109-5	7361.000	2746.320	4614.680	0.106

Commands Read From File: w105-2.chl

```
      JOB W105_109-2
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.0050   0.110
      TRP 2      2     1.5
** LEFT SIDE SLOPE    2.0 AND RIGHT SIDE SLOPE    1.5
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE************
```

W105_109-2

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES): 40.80
DESIGN PARAMETERS:
DESIGN DISCHARGE (CFS): .11
CHANNEL SHAPE: TRAPEZOIDAL
CHANNEL SLOPE (FT/FT): .005

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.11
MAX DEPTH (FT)	.14
AREA (FT^2)	.31
WETTED PERIMETER (FT)	2.55
HYDRAULIC RADIUS (FT)	.12
AVG VELOCITY (FT/SEC)	.36
MANNINGS EQUIVALENT	.073
Davg / D50	1.49
FROUDE NUMBER	.17
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.04	9.40	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.03	6.37	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: w105-1.chl

```
      JOB W105_109-1
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.50   0.020
*** WARNING *** DATA IS OUT OF REASONABLE RANGE
      TRP 2      2     1.5
** LEFT SIDE SLOPE    2.0 AND RIGHT SIDE SLOPE    1.5
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE************
```

W105_109-1

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES): 40.80
DESIGN PARAMETERS:
DESIGN DISCHARGE (CFS): .02
CHANNEL SHAPE: TRAPEZOIDAL
CHANNEL SLOPE (FT/FT): .500

*** WARNING *** DEPTH DID NOT CONVERGE. PROGRAM WILL CONTINUE
WITH MOST RECENT VALUE

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.02
MAX DEPTH (FT)	.01
AREA (FT^2)	.02
WETTED PERIMETER (FT)	2.05
HYDRAULIC RADIUS (FT)	.01
AVG VELOCITY (FT/SEC)	.83
MANNINGS EQUIVALENT	.480
Davg / D50	.14
FROUDE NUMBER	1.64
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.25	1.62	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.19	1.10	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: w105-4.chl

```
      JOB W105_109-4
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.0077   0.136
      TRP 2      2     1.5
** LEFT SIDE SLOPE    2.0 AND RIGHT SIDE SLOPE    1.5
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE*************
```

W105_109-4

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES):	40.80
DESIGN PARAMETERS:	
DESIGN DISCHARGE (CFS):	.14
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.008

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.14
MAX DEPTH (FT)	.13
AREA (FT^2)	.29
WETTED PERIMETER (FT)	2.53
HYDRAULIC RADIUS (FT)	.12
AVG VELOCITY (FT/SEC)	.46
MANNINGS EQUIVALENT	.068
Davg / D50	1.44
FROUDE NUMBER	.23
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.06	6.36	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.05	4.31	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: w105-3.chl

```
      JOB W105_109-3
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.0880   0.121
      TRP 2      2     1.5
** LEFT SIDE SLOPE    2.0 AND RIGHT SIDE SLOPE    1.5
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE*************
```

W105_109-3

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES):	40.80
DESIGN PARAMETERS:	
DESIGN DISCHARGE (CFS):	.12
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.088

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.12
MAX DEPTH (FT)	.05
AREA (FT^2)	.10
WETTED PERIMETER (FT)	2.20
HYDRAULIC RADIUS (FT)	.05
AVG VELOCITY (FT/SEC)	1.17
MANNINGS EQUIVALENT	.049
Davg / D50	.57
FROUDE NUMBER	.93
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.27	1.49	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.21	1.01	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: w105-5.chl

```
      JOB W105_109-5
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.005   0.157
      TRP 2      2     1.5
** LEFT SIDE SLOPE    2.0 AND RIGHT SIDE SLOPE    1.5
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE************
```

W105_109-5

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES): 40.80
DESIGN PARAMETERS:
DESIGN DISCHARGE (CFS): .16
CHANNEL SHAPE: TRAPEZOIDAL
CHANNEL SLOPE (FT/FT): .005

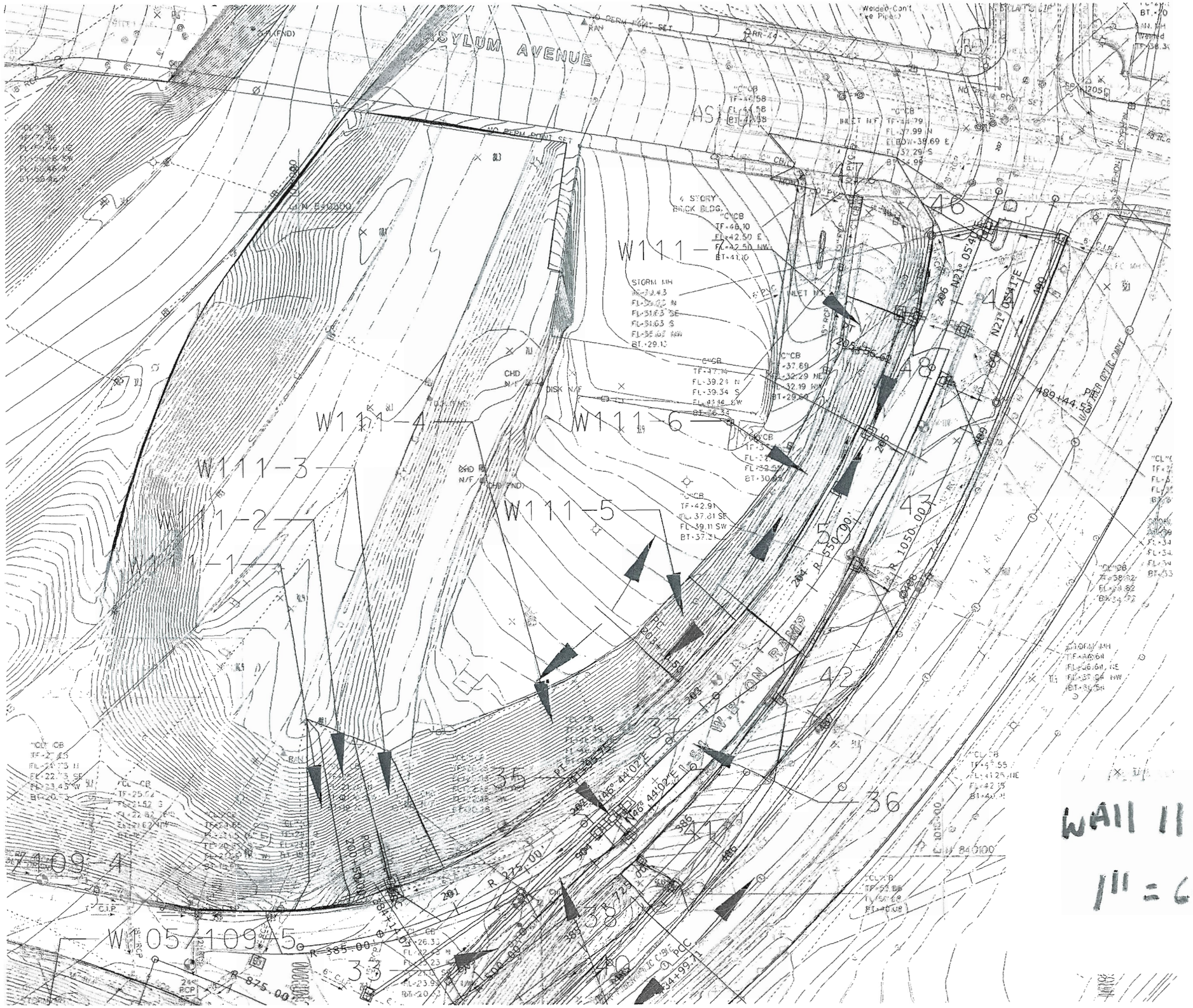
HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.16
MAX DEPTH (FT)	.15
AREA (FT^2)	.35
WETTED PERIMETER (FT)	2.63
HYDRAULIC RADIUS (FT)	.13
AVG VELOCITY (FT/SEC)	.45
MANNINGS EQUIVALENT	.063
Davg / D50	1.67
FROUDE NUMBER	.20
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.05	8.34	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.04	5.65	STABLE

*** NORMAL END OF HYCHL ***


ASYLUM AVENUE
W111-1
W111-2
W111-3
W111-4
W111-5
W111-6
W105/109-5
W.B. ON RAMP
4 STORY BRICK BLDG.
STORM MH
R 275.00
R 385.00
R 875.00
R 550.00
R 1050.00
N21° 05'41"E
489+44.55
WALL 111
1" = 60'

COMPUTED BY: GM

DATE: 6/7/10

CHECKED BY:

DATE:

10 YEAR DISCHARGES

FLEXIBLE LINING DESIGN FOR SWALES

I-84 West Bound On Ramp

LOCATION	DESCRIPTION	Swale #	Return Period yrs	Drainage Area name	Run Off Coef. C C	Individual Area acres	Composite Area acres	Tc	Tc Used	Intensity in/hr	Q
	gravel swale	4	10	4	0.120	0.242	0.242	15.000	15	4.000	0.116
	gravel swale	3	10	3	0.120	0.054	0.296	20.000	20	3.600	0.128
	gravel swale	1	10	1	0.120	0.042	0.042	18.138	18	3.800	0.019
	gravel swale	2	10	2	0.120	0.058	0.100	23.138	23	3.400	0.041
	grass swale	5	10	5	0.120	0.048	0.048	20.266	20	3.600	0.021
	grass swale	6	10	6	0.120	0.141	0.189	54.282	54	2.000	0.045
	grass swale	7	10	7	0.120	0.022	0.212	59.282	59	1.800	0.046

COMPUTED BY: MM

DATE: 6/7/10

CHECKED BY:

DATE:

TIMES OF CONCENTRATION FOR FLEXIBLE LINING DESIGN FOR SWALES

I-84 West Bound On Ramp

Cumulative Tc

Area 111-1	n	L	s	V	Tc (hr)	Tc (min)
GRASS	0.24	112	0.390		0.22	13.1
GRAVEL	0.025	20.95	0.250		0.01	5.0
						18.1

Area 111-2	n	L	s	V	Tc (hr)	Tc (min)
GRAVEL	0.025	120	0.366		0.04	5.0
GRAVEL	0.025	13.61	0.004		0.04	5.0
						10.0

Area 111-3	n	L	s	V	Tc (hr)	Tc (min)
GRAVEL	0.025	93	0.427		0.03	5.0
GRAVEL	0.025	30	0.005		0.07	5.0
						10.0

Area 111-4	n	L	s	V	Tc (hr)	Tc (min)
GRAVEL	0.025	142	0.261		0.05	5.0
GRAVEL	0.025	35	0.389		0.01	5.0
GRAVEL	0.025	150.3	0.107		0.08	5.0
						15.0

Area 1+2	n	L	s	V	Tc (hr)	Tc (min)
1						18.1
2						5.0
						23.1

Area 3 +4	n	L	s	V	Tc (hr)	Tc (min)
3						5.0
4						15.0
						20.0

Area 111-5	n	L	s	V	Tc (hr)	Tc (min)
GRASS	0.24	52	0.058		0.25	15.3
GRAVEL	0.025	36.24	0.406		0.01	5.0
						20.3

Area 111-6	n	L	s	V	Tc (hr)	Tc (min)
GRASS	0.24	169	0.033		0.82	49.3
GRAVEL	0.025	30	0.279		0.01	5.0
						54.3

Area 111-7	n	L	s	V	Tc (hr)	Tc (min)
GRASS	0.24	20	0.050		0.13	7.5
GRAVEL	0.025	28	0.304		0.01	5.0
						12.5

Area 5+6	n	L	s	V	Tc (hr)	Tc (min)
5						0.0
6						54.3
						54.3

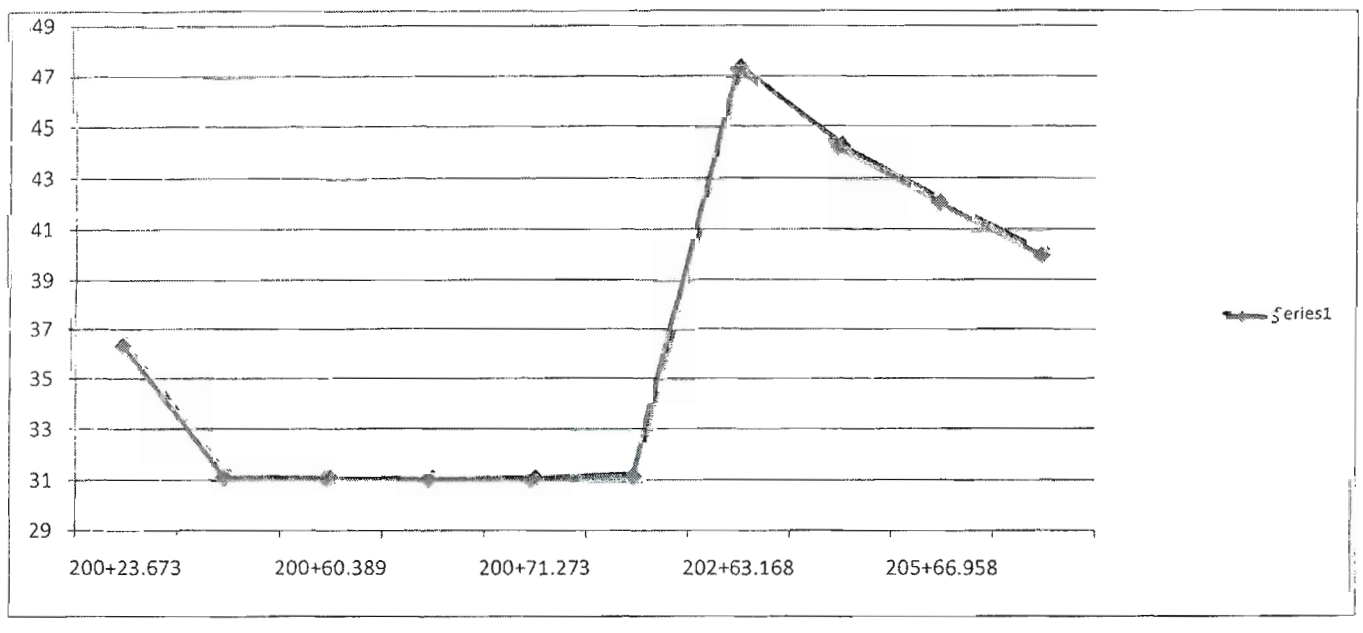
Area 5+6+7	n	L	s	V	Tc (hr)	Tc (min)
5						0.0
6						54.3
7						5.0
						59.3

DRAINAGE AREAS FOR
FLEXIBLE LINING DESIGN FOR SWALES
I-84 West Bound On Ramp

COMPUTED BY:	[illegible]
DATE:	6/7/16
CHECKED BY:	
DATE:	

Drainage Area name	Area square ft.	Area acres
111-1	1830.100	0.042
111-2	2514.100	0.058
111-3	2342.260	0.054
111-4	10532.870	0.242
111-5	2088.210	0.048
111-6	6154.150	0.141
111-7	972.792	0.022

		sta	invert	length	slope	top wall	Swale #
	9+98.43	200+23.673	36.37				
	10+19.39	200+45.809	31.13	20.95	0.250119		1
	10+33.00	200+60.389	31.07	13.61	0.004409	32.57	2
LP	10+43.00	200+71.273	31.07	10	0	32.57	
LP	10+43.00	200+71.273	31.07	30.5	-0.00492	32.57	3
	10+73.00	201+04.384	31.22	150.13	-0.10757	32.72	4
HP	12+23.18	202+63.168	47.37		0	48.87	
	13+00.00	203+41.347	44.29	76.82	0.040094	45.79	5
	15+16.24	205+66.958	42.13	216.24	0.009989	43.63	6
	15+24.59	205+75.00	40.05	8.35	0.249102	41.55	7



Commands Read From File: W111-2.CHL

```
      JOB W111-2
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.005  0.041
      TRP 2 1.5 2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE*************
```

W111-2

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES): 40.80
DESIGN PARAMETERS:
DESIGN DISCHARGE (CFS): .04
CHANNEL SHAPE: TRAPEZOIDAL
CHANNEL SLOPE (FT/FT): .005

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.04
MAX DEPTH (FT)	.10
AREA (FT^2)	.22
WETTED PERIMETER (FT)	2.41
HYDRAULIC RADIUS (FT)	.09
AVG VELOCITY (FT/SEC)	.19
MANNINGS EQUIVALENT	.116
Davg / D50	1.12
FROUDE NUMBER	.10
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.03	12.78	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.02	8.66	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: W111-1.CHL

```
      JOB W111-1
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.25   0.019
      TRP 2      1.5    2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083  1 0 2.65   0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE*************
```

W111-1

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES): 40.80
DESIGN PARAMETERS:
DESIGN DISCHARGE (CFS): .02
CHANNEL SHAPE: TRAPEZOIDAL
CHANNEL SLOPE (FT/FT): .250

*** WARNING *** DEPTH DID NOT CONVERGE. PROGRAM WILL CONTINUE
WITH MOST RECENT VALUE

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.02
MAX DEPTH (FT)	.01
AREA (FT^2)	.03
WETTED PERIMETER (FT)	2.07
HYDRAULIC RADIUS (FT)	.02
AVG VELOCITY (FT/SEC)	.56
MANNINGS EQUIVALENT	.323
Davg / D50	.20
FROUDE NUMBER	.87
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.20	1.98	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.16	1.34	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: W111-4.CHL

```
      JOB W111-4
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.10  0.116
      TRP 2 1.5 2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE************
```

W111-4

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES):	40.80
DESIGN PARAMETERS:	
DESIGN DISCHARGE (CFS):	.12
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.100

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.12
MAX DEPTH (FT)	.04
AREA (FT^2)	.09
WETTED PERIMETER (FT)	2.18
HYDRAULIC RADIUS (FT)	.04
AVG VELOCITY (FT/SEC)	1.29
MANNINGS EQUIVALENT	.044
Davg / D50	.50
FROUDE NUMBER	1.09
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.27	1.49	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.21	1.01	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: W111-3.CHL

```
      JOB W111-3
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.005  0.128
      TRP 2 1.5 2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE************
```

W111-3

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES):	40.80
DESIGN PARAMETERS:	
DESIGN DISCHARGE (CFS):	.13
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.005

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.13
MAX DEPTH (FT)	.14
AREA (FT^2)	.32
WETTED PERIMETER (FT)	2.58
HYDRAULIC RADIUS (FT)	.13
AVG VELOCITY (FT/SEC)	.39
MANNINGS EQUIVALENT	.068
Davg / D50	1.56
FROUDE NUMBER	.18
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.04	8.93	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.04	6.05	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: W111-6.CHL

```
      JOB W111-6
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.01  0.045
      TRP 2 1.5 2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE*************
```

W111-6

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES):	40.80
DESIGN PARAMETERS:	
DESIGN DISCHARGE (CFS):	.04
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.010

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.04
MAX DEPTH (FT)	.09
AREA (FT^2)	.18
WETTED PERIMETER (FT)	2.35
HYDRAULIC RADIUS (FT)	.08
AVG VELOCITY (FT/SEC)	.24
MANNINGS EQUIVALENT	.113
Davg / D50	.97
FROUDE NUMBER	.15
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.05	7.53	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.04	5.10	STABLE

*** NORMAL END OF HYCHL ***

Commands Read From File: W111-5.CHL

```
      JOB W111-5
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.04  0.021
      TRP 2 1.5 2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE*************
```

W111-5

INPUT REVIEW

DEFAULT ANGLE OF REPOSE (DEGREES):	40.80
DESIGN PARAMETERS:	
DESIGN DISCHARGE (CFS):	.02
CHANNEL SHAPE:	TRAPEZOIDAL
CHANNEL SLOPE (FT/FT):	.040

*** WARNING *** DEPTH DID NOT CONVERGE. PROGRAM WILL CONTINUE
WITH MOST RECENT VALUE

HYDRAULIC CALCULATIONS USING BATHURST

FLOW (CFS)	.02
MAX DEPTH (FT)	.04
AREA (FT^2)	.09
WETTED PERIMETER (FT)	2.17
HYDRAULIC RADIUS (FT)	.04
AVG VELOCITY (FT/SEC)	.25
MANNINGS EQUIVALENT	.141
Davg / D50	.48
FROUDE NUMBER	.21
REYNOLDS NUMBER (10^5)	.03

STABILITY ANALYSIS

CONDITION	LINING TYPE	PERMIS SHR (LB/FT^2)	CALC. SHR (LB/FT^2)	STAB. FACTOR	REMARKS
BOTTOM; STRAIGHT	RIPRAP	.40	.10	3.91	STABLE
SIDE; STRAIGHT	RIPRAP	.21	.08	2.65	STABLE

*** NORMAL END OF HYCHL ***

Station Base Report

Report Created: 1/12/2010
Time: 11:31am

Project: Walls
Description:
Baseline (Active) Alignment: (30 MPH) I-84 WB On From Asylum
File Name: G:\CTDOT_PROJECTS\063H137_CTDOT\Highways\civil_data\geometry\DD_IRD_063_H137_Hartford-Busway-Walls.alg
Last Revised: dmullaney 1/12/2010 10:57:47 AM
Input Grid Factor: 1.00000000

Note: All units in this report are in feet unless specified otherwise.

-------- Baseline Alignment -------			-------- Offset Alignment --------		
Station	Distance to Offset Point	Radial Direction	Station	Distance to Offset Point	Radial Direction
Offset (Specified) Alignment: Wall-111-RH					
200+23.673	0.000	S 8°58'52" E	9+98.434	-20.961	S 7°04'11" E
200+45.809	0.000	S 12°16'32" E	10+19.388	-21.730	S 18°23'45" E
200+55.520	0.000	S 14°02'57" E	10+28.492	-22.960	S 23°19'00" E
200+60.389	0.000	S 15°03'49" E	10+33.000	-23.647	S 23°19'00" E
200+71.273	0.000	S 17°19'53" E	10+43.000	-24.887	S 23°19'00" E
201+00.000	0.000	S 23°19'00" E	10+69.080	-26.250	S 23°19'00" E
201+04.384	0.000	S 24°13'47" E	10+73.045	-26.250	S 24°13'47" E
201+77.919	0.000	S 39°33'03" E	11+39.562	-26.250	S 39°33'03" E
202+18.412	0.000	S 43°15'58" E	11+78.422	-24.255	S 39°33'03" E
202+63.168	0.000	S 43°15'58" E	12+23.179	-24.255	S 43°15'58" E
203+12.733	0.000	S 43°29'57" E	12+72.645	-24.250	S 43°15'58" E
203+41.347	0.000	S 46°28'48" E	13+00.000	-24.147	S 46°16'52" E
205+55.959	0.000	S 68°50'13" E	15+05.267	-23.911	S 68°54'20" E
205+66.958	0.000	S 68°54'20" E	15+16.238	-23.911	S 68°54'20" E
205+75.000	0.000	S 68°54'20" E	15+24.280	-23.911	S 68°54'20" E

```
                                    W111-7.OUT
        ******  HYCHL  ****** (Version 5.0) ******          Date 01-19-10

Commands Read From File: W111-7.CHL


      JOB W111-7
      UNI 0
** UNITS PARAMETER = 0  (ENGLISH)
      CHL 0.25  0.046
      TRP 2 1.5 2
** LEFT SIDE SLOPE    1.5 AND RIGHT SIDE SLOPE    2.0
** THE BASE WIDTH OF THE TRAPEZOID (FT)    2.00
      LRR 0.083 1 0 2.65 0.047
** D50 (FT)    .08
** SPECIFIC GRAVITY    2.65
** SHIELDS PARAMETER    .047
      END
***************END OF COMMAND FILE************

W111-7
------------
INPUT REVIEW
------------
  DEFAULT ANGLE OF REPOSE (DEGREES):      40.80
  DESIGN PARAMETERS:
      DESIGN DISCHARGE (CFS):                .05
      CHANNEL SHAPE:                   TRAPEZOIDAL
      CHANNEL SLOPE (FT/FT):                 .250
-------------------------------------
HYDRAULIC CALCULATIONS USING BATHURST
-------------------------------------

FLOW (CFS)                  .05
MAX DEPTH (FT)              .02
AREA (FT^2)                 .04

WETTED PERIMETER (FT)      2.08
HYDRAULIC RADIUS (FT)       .02
AVG VELOCITY (FT/SEC)      1.10
MANNINGS EQUIVALENT         .193
Davg / D50                  .24
FROUDE NUMBER              1.51
REYNOLDS NUMBER (10^5)      .03
------------------
STABILITY ANALYSIS
------------------

                      LINING    PERMIS SHR   CALC. SHR  STAB.
   CONDITION          TYPE      (LB/FT^2)    (LB/FT^2)  FACTOR   REMARKS
   ---------          ------    ----------   ---------  ------   -------
  BOTTOM; STRAIGHT    RIPRAP          .40        .26      1.57   STABLE
  SIDE; STRAIGHT      RIPRAP          .21        .20      1.07   STABLE

*** NORMAL END OF HYCHL ***
```

Project Name: Walls
Description:
Horizontal Alignment Name: Wall-111-RH
Description: revised 2009-01-08
Style: designroad_040
Vertical Alignment Name: 111-TW
Description: Wall 111 TW RH
Style: designroad_040

		STATION	ELEVATION
Element: Linear			
	POB	9+98.43	36.37
	PVI	10+19.39	31.13
Tangent Grade:		-25.00	
Tangent Length:		20.95	
Element: Linear			
	PVI	10+19.39	31.13
	PVI	10+33.00	31.07
Tangent Grade:		-0.50	
Tangent Length:		13.61	
Element: Linear			
	PVI	10+33.00	31.07
	PVI	10+43.00	31.07
Tangent Grade:		0.00	
Tangent Length:		10.00	
Element: Linear			
	PVI	10+43.00	31.07
	PVI	10+73.05	31.22
Tangent Grade:		0.50	
Tangent Length:		30.05	
Element: Linear			
	PVI	10+73.05	31.22
	PVI	12+23.18	47.37
Tangent Grade:		10.76	
Tangent Length:		150.13	
Element: Linear			
	PVI	12+23.18	47.37
	PVI	13+00.00	44.29
Tangent Grade:		-4.00	
Tangent Length:		76.82	
Element: Linear			
	PVI	13+00.00	44.29
	PVI	15+16.24	42.13
Tangent Grade:		-1.00	
Tangent Length:		216.24	
Element: Linear			
	PVI	15+16.24	42.13
	POE	15+24.59	40.05
Tangent Grade:		-25.00	
Tangent Length:		8.35	

APPENDIX D-9

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

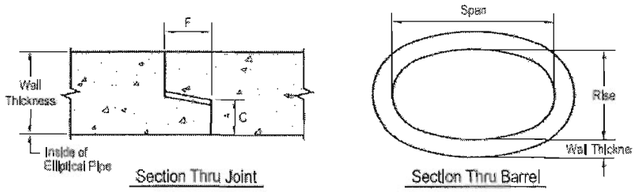
COMPUTED BY: MJM
DATE: 6/7/2010

CHECKED BY:
DATE:

MANHOLE SIZING
NEW BRITAIN- HARTFORD BUSWAY
HARTFORD NORTH

Station	Mat.	Dia mm	R_1 mm	T_1 mm	Mat.	Dia mm	R_2 mm	T_2 mm	Δ °	K mm/°	MH req. Table 11-6 mm	Max. pipe mm	MH DIAM REQ mm	MH Used mm	Notes
													M507A		
453+09.60	RCP	600	300	75	RCP	600	300	75	180	6.14	1200	600	1200	**1200**	
456+50.00	RCP	600	300	75	RCP	600	300	75	180	6.14	1200	600	1200	**1200**	
458+49.30	RCP	1050	525	112.5	RCP	1050	525	112.5	180	9.06	1200	1050	1500	**1500**	
462+00	RCP	375	187.5	75	RCP	375	187.5	75	160	5.50	1200	375	1200	**1200**	
463+46	RCP	900	450	100	RCP	900	450	100	180	8.08	1200	900	1500	**1500**	
468+63.19	RCP	600	300	75	RCP	600	300	75	180	6.14	1200	600	1200	**1200**	
472+00	RCP	375	187.5	75	RCP	375	187.5	75	90	9.78	1200	375	1200	**1200**	
472+00.10	RCP	375	187.5	75	RCP	375	187.5	75	180	4.89	1200	375	1200	**1200**	
473+42.04	RCP	375	187.5	75	RCP	375	187.5	75	160	5.50	1200	375	1200	**1200**	
477+05.00	RCP	300	150	75	RCP	300	150	75	90	8.94	1200	300	1200	**1200**	
478+87	RCP	300	150	75	RCP	300	150	75	90	8.94	1200	300	1200	**1200**	
481+67	RCP	600	300	75	RCP	600	300	75	180	6.14	1200	600	1200	**1200**	TYPE CL BASIN
481+95	RCP	300	150	75	RCP	300	150	75	80	10.06	1200	300	1200	**1200**	
903+54	RCP	300	150	75	RCP	300	150	75	90	8.94	1200	300	1200	**1200**	

Concrete Elliptical Pipe
18" - 144" Equivalent Diameter



Section Thru Joint | Section Thru Barrel

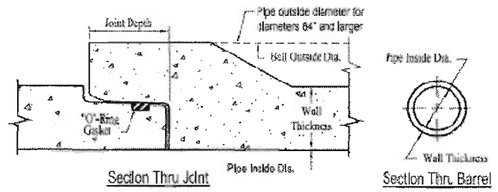
Table Of Dimensions And Weights

Round Equivalent	Inside Dimension (Inches)		Wall Thickness	C	F	Full Flow Water Area	Approx. Weight
(Inches)	Rise	Span	(Inches)	(Inches)	(Inches)	(Sq. Ft.)	(Lbs / Ft.)
18	14	23	2 3/4	1 1/8	2	1.83	200
24	19	30	3 1/4	1 1/4	2	3.28	310
27	22	34	3 1/2	1 3/8	2 1/4	4.12	380
30	24	38	3 3/4	1 3/8	2 1/2	5.10	450
33	27	42	3 3/4	1 3/8	3	6.33	495
36	29	45	4 1/2	1 3/4	3	7.36	650
39	32	49	4 3/4	1 13/16	3 1/4	8.79	750
42	34	53	5	1 7/8	3 1/2	10.2	850
48	38	60	5 1/2	2 3/16	3 3/4	12.8	1,040
54	43	68	6	2 3/8	4	16.7	1,285
60	48	76	6 1/2	2 5/8	4	20.5	1,535
66	53	83	7	2 3/4	5	24.8	1,815
72	58	91	7 1/2	2 7/8	5 1/2	29.4	2,120
78	63	98	8	3	6	34.8	2,440
84	68	106	8 1/2	3 1/4	6	40.1	2,790
90	72	113	9	3 1/2	6	46.1	3,170
96	77	121	9 1/2	3 3/4	6	52.4	3,560
102	82	128	9 3/4	3 7/8	6	59.1	3,880
108	87	136	10	4	6	66.4	4,200
114	92	143	10 1/2	4 1/4	6	73.9	4,650
120	97	151	11	4 1/2	6	82.1	5,130
132	106	166	12	5	6	99.2	6,150
144	116	180	13	5 1/2	6	118	7,300

Pipe dimensions may vary depending upon equipment availability.

Notes:
1. Produced to meet ASTM Specifications.
2. Contact a Concrete Pipe Division representative for details not listed on this sheet.

Reinforced Concrete Pipe
O-Ring Joint
12" - 96" Diameter



Section Thru Joint | Section Thru Barrel

Table of Dimensions and Weights

Pipe Inside Diameter (Inches)	Wall Thickness (Inches)	Joint Depth (Inches)	Bell Outside Diameter (Inches)	Length (Feet)	Weight (Lbs./Ft.)
12	3	4 5/8	23	8	120
15	3	4 5/8	26	8, 8	155
18	3	4 5/8	29	8, 8	175
21	3	4 5/8	32	8, 8	225
24	3	4 5/8	35	8, 8	290
27	3 1/4	4 5/8	38 3/4	8, 8	350
30	3 1/2	4 5/8	42 1/4	8, 12	410
33	3 3/4	4 3/4	46 3/4	8, 12	480
36	4	4 7/8	50 1/4	8, 12	563
39	4 1/4	5	54	8, 12	645
42	4 1/2	5 1/4	58	8, 12	745
48	5	5 1/2	64	8, 12	920
54	5 1/2	5 1/2	70	8, 12	1125
60	6	5 1/2	76	8, 12	1340
66	6 1/2	5 1/2	82	8, 12	1580
72	7	5 1/2	88	8, 12	1840
78	7 1/2	5 1/2	94	8, 12	2110
84	8	5 3/4	100	8, 12	2410
90	8 1/2	6 1/8	107	8, 12	2740
96	9	6 5/8	114	8, 12	3095

Pipe dimensions may vary depending upon equipment availability.

Notes:
1. Pipe manufactured to meet current ASTM specifications.
2. Pipe diameters larger than 96" are available.
3. Contact a Concrete Pipe Division representative for details not listed on this sheet.

DIMENSIONS AND WEIGHTS

Dimensions & Approximate Weights of Circular Concrete Pipe (Metric)

ASTM C 76 - Reinforced Concrete Culvert, Storm Drain and Sewer Pipe						
			WALL B		WALL C	
Internal Diameter, inches	Internal Diameter, mm	Waterway Area, square meters	Minimum Wall Thickness, mm	Approximate Weight, kg., per meter	Minimum Wall Thickness, mm	Approximate Weight, kg., per meter
8*	200	0.03	51	90	---	---
10*	250	0.05	51	130	---	---
12	300	0.07	51	140	---	---
15	375	0.11	57	190	---	---
18	450	0.16	64	250	---	---
21	525	0.22	70	320	---	---
24	600	0.29	76	390	95	545
27	675	0.37	83	480	102	625
30	750	0.46	89	570	108	710
33	825	0.55	95	670	114	820
36	900	0.66	102	780	121	975
42	1050	0.89	114	1020	133	1205
48	1200	1.17	127	1290	146	1505
54	1350	1.48	140	1590	159	1800
60	1500	1.82	152	1925	171	2190
66	1650	2.21	165	2295	184	2580
72	1800	2.62	178	2695	197	3000
78	1950	3.08	190	3125	210	3585
84	2100	3.57	203	3585	222	3960
90	2250	4.10	216	4075	235	4495
96	2400	4.67	229	4600	248	4990
102	2550	5.27	241	5180	260	5595
108	2700	5.91	254	5750	273	6190

NOTE. All size and shapes of concrete pipe may not be available in all areas. Please contact local manufacturers or the Illinois Concrete Pipe Association for availability in your specifying area.

* Although not specifically called out in ASTM C76, 8 inch and 10 inch diameter circular concrete pipe are routinely manufactured.

Table 11-6 Manhole Sizing

MH Dia. mm (in)	K * mm (in)/degree	Max Pipe Size mm (in)
1200 (48)	10.67 (.42)	750 (30)
1500 (60)	13.21 (.52)	1050 (42)
1800 (72)	16.00 (.63)	1350 (54)

* When the computed K value exceeds 16 (.63), a junction chamber or double catch basin will be required.

11.10.3 Standard ConnDOT Manholes (Standard Sheet M507-A)

The following guidelines should be followed when specifying a manhole.

- When the storm drain pipe diameter is 750 mm (30 in) or less, a 1200-mm (48 in) diameter manhole should be provided.
- When the storm drain pipe diameter is > 750mm to 1050 mm (30 in to 42 in) inclusive, a 1500-mm (60 in) diameter manhole should be provided.
- When the storm drain pipe diameter is 1050 mm to 1350 mm (42 in to 54 in), a 1800-mm (72 in) diameter manhole should be provided.
- When the storm drain pipe diameter is larger than 1350mm (54 in), a reinforced concrete pipe tee; ConnDOT standard type "C" or "C-L" catch basin double grate type I or II; or if necessary a special design junction box should be provided.

APPENDIX E

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

od insurance is available in this community, contact yo
nal Flood Insurance Program at (800) 638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0368F

FIRM

FLOOD INSURANCE RATE MAP

HARTFORD COUNTY, CONNECTICUT (ALL JURISDICTIONS)

PANEL 368 OF 675

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAST HARTFORD, TOWN OF	090026	0368	F
HARTFORD, CITY OF	095080	0368	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
09003C0368F

EFFECTIVE DATE:
SEPTEMBER 26, 2008

Federal Emergency Management Agency

Proposed Busway Project

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

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onal Flood Insurance Program at (800) 638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0364F

FIRM

FLOOD INSURANCE RATE MAP

HARTFORD COUNTY, CONNECTICUT (ALL JURISDICTIONS)

PANEL 364 OF 675

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
HARTFORD, CITY OF	090120	0364	F
WEST HARTFORD, TOWN OF	090122	0364	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
09003C0364F

EFFECTIVE DATE:
SEPTEMBER 26, 2008

Federal Emergency Management Agency

PROPOSED BUSWAY PROJECT

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

June 2009 NDDB Map   Busway-

APPENDIX F

H. W. Lochner, Inc.
2110 Silas Deane Hwy.
Rocky Hill, CT 06067
860/513-4003

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

subject: Design Measures for Stormwater Permits Phase II

memorandum

date: June 16, 2003

to: Mr. Arthur W. Gruhn
Chief Engineer
Bureau of Engr. and Highway Oper.

from: Edgar T. Hurle
Director of Env. Planning
Bureau of Policy and Planning

The Department continues to coordinate activities with the Department of Environmental Protection (DEP) with respect to the General Permit for Stormwater discharge, as well as related issues. With the onset of NPDES Phase II, this coordination takes on added importance.

The following information is being provided to update and clarify previously established guidelines for the evaluation and treatment of stormwater systems and their discharges. This memo also outlines the criteria to be used if a DOT project requires DEP permits or approvals, including Inland Wetland, Section 401 Water Quality, Stream Channel Encroachment Lines, Coastal Area Management, Structures and Dredging or Tidal Wetlands.

The following are areas of concern that should be investigated for possible treatment measures. All drainage and appurtenant facilities should be designed in accordance with the procedures contained within the Department's Drainage Manual, and the application of engineering judgement in the use of these guidelines is advised.

1) *Any drainage system containing four to ten catches basins, which discharges within fifty feet of a regulated area. Note: The number of catch basins refers to the combined total of existing and proposed State maintained structures. The following items describe situations wherein catch basin inlets need not be included in the overall structure count:*

- *Inlets on town maintained systems or within private developments adjoining State highways which connect to the State system as long as a distinct separation point (catch basin or manhole) exists or will be constructed at the junction of the two facilities. This will allow access for testing purposes should water quality issues arise at the discharge point of the State system.*
- *Catch basins located in grassed areas 20 feet or more from the pavement edge.*
- *Ancillary catch basins that are internal to the drainage area and contribute no additional runoff to the storm sewer system such as flanker basins, basins intended to improve intersection drainage or inlets placed on steep grades to increase interception.*

Consider a combination of the following treatment measures:

a) Eliminate curbing, design for sheet flow and utilize natural vegetation to help filter particulates. On steep embankment slopes, erosion protection measures should be employed.

b) Utilize oversized catch basins with four-foot deep sumps. It may be justified to provide six-foot sumps at the last two catch basins in the system if there are no conflicts with groundwater, ledge rock, rights-of-way or underground utilities. If end treatments such as hydrodynamic separators (gross particle separators) wet ponds or detention basins are constructed at the terminus of the drainage system, deep catch basin sumps can be eliminated. Additionally, sumps (any depth) should not be specified for any manholes or for catch basins on storm drainage systems which are 36 inches or greater in diameter.

   At all locations where deep sumps are specified, the maximum depth of structure shall not exceed twelve feet as measured from the top-of-grate elevation.

c) Utilize outlet protection such as riprap energy dissipators; scour holes, stone check dams erosion control matting and vegetative linings in outlet channels.

2) *Any drainage system containing ten or more catch basins which discharges within fifty feet of a regulated area. Note: Same criteria applies as in Item No. 1 above with respect to qualifying inlets.*

Recommended treatment measures:

a) Outlet areas shall be designed so that an open channel with check dams, a sediment basin, or a combination of both is specified, these shall be designed to accommodate the peak runoff associated with the "first flush", known as Water Quality Flow (WQF). The last option is to specify a *Hydrodynamic Separator also known as a Gross Particle Separator.*

Studies related to the efficiency of these chambers with respect to storm water treatment are ongoing. Pending the publication and review of specific performance data, the following guidelines shall be applied:

a) Hydrodynamic separators shall be designed to accommodate the peak runoff associated with the "first flush", known as the Water Quality Flow (WQF). The WQF shall be determined using the procedures outlined in Chapter 11, Appendix C of the Drainage Manual.

b) Chambers shall be placed "off-line" and a bypass system shall be designed to convey the peak flow rate for the design storm.

c) Hydrodynamic separators are best suited for the treatment of storm runoff from site drainage related to transportation facilities such as bus or train stations, maintenance garages, rest areas or commuter parking lots. Roadway applications should be limited primarily to urban areas.

The original version of Design Measures for Stormwater Permits dated February 5, 1998 is superseded with this memo. Please ensure that these criteria are addressed on all DOT projects, which require DEP review. This will meet the concerns of DEP, as identified in various meetings, and expedite the review and approval process.

If you or your staff have any questions on this matter, please contact Mr. Paul Corrente of my staff at 594-2932.

Bcc: Charles Evans, DEP
Chris Stone, DEP

Paul Corrente /pnc
Cc: James H. Boice
Edgar T. Hurle – Mark Alexander
Michael W. Lonergan
Carl F. Bard
James H. Norman
Joseph J. Obara – Michael E. Masayda

Design Measures for
Stormwater Permits

February 5, 1998

Mr. James F. Byrnes, Jr.
Chief Engineer
Bureau of Engr. and Highway Oper.

Mr. Edgar T. Hurle
Director of Environmental Planning
Bureau of Policy and Planning

The Department has coordinated with the Department of Environmental Protection (DEP) on the new General Permit for Stormwater Discharge, which became effective October 1, 1997.

The following information is being provided to establish DEP approved criteria for all DOT projects. These criteria are intended to help evaluate stormwater discharges and the methods that may be used for the treatment of stormwater before it reaches an outlet. This memo outlines what criteria are to be used if the project requires approval of DEP permits, including Inland Wetlands, Section 401 Water Quality, Stream Channel Encroachment Lines, Coastal Area Management, Structures and Dredging or Tidal Wetlands.

The following are areas of concern that should be investigated for possible treatment measures. All drainage must be designed as per the DOT drainage manual:

1) Any drainage system containing four to ten catch basins which discharges within fifty feet of a regulated area;

1a - Eliminate curbing, design for sheet flow, utilize natural vegetation to help filter particulates.

1b - Utilize oversized catch basin with sumps four to six feet deep. The last two catch basins are to be six foot deep (if there are no conflicts with groundwater, rock ledge, ROW or with underground utilities).

1c - Utilize outlet protection. Utilize rip rap energy dissipation, scour bowls, stone check dams, erosion control matting in the outlet channels, vegetation in drainage channels.

2) Any drainage system containing ten or more catch basins which discharges within fifty feet of a regulated area;

2a - Outlet areas shall be designed so that an open channel with check dams, a sediment basin or a combination of these is used. The last option is to design a gross particle separator off line only for the first flush.

Attached is a list of required items that need to be addressed in the project plans and construction contract to ensure full compliance with the new NPDES Stormwater Permits.

Please ensure that these criteria are addressed in all DOT projects which require DEP review. This will meet the concerns of the DEP, as identified in various meetings, and expedite the review and approval process.

If you or your staff have any questions on this matter, please contact Mr. Paul Corrente of my staff at 594-2932.

Attachment

cc: Robert Smith, DEP
Charles Berger, DEP
Charles Evans, DEP
Michael Harder - Richard D. Mason, DEP
Chris Stone - Julie Kiritsis, DEP

Paul Corrente/jm
cc: Richard A. Martinez - William H. Messner
Edgar T. Hurle
Judith S. Cantwell - Steve Ladd - Paul Corrente
Arthur W. Gruhn - L. Brian Castler
Bradley J. Smith - Gordon D. Barton
Stephen M. Barton - William R. Stark
Walter H. Coughlin
Joseph J. Obara