Briar Branch Channel Improvements
(Unit W140-01-00)

Impact Analysis Report

Prepared for:
Memorial City Redevelopment Authority

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AUTHORITY

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EXECUTIVE SUMMARY

Lockwood, Andrews & Newnam, Inc. (LAN) was authorized by the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) to preform preliminary engineering for potential channel improvements to Harris County Flood Control (HCFCD) Unit No. W140-01-00 (Briar Branch) from Gessner Rd east to Oak Tree Dr (1750 feet east of Bunker Hill Rd). It is the desire of TIRZ 17 to construct the proposed channel improvements within the existing HCFCD right-of-way and for the improvements to be maintained by HCFCD. The proposed channel improvements will terminate at the Briar Branch Stormwater Detention Basin that is currently under construction. The basin downstream of Bunker Hill Rd is the first phase of a multi-phase regional drainage solution for the Briar Branch watershed north of IH-10 and west of Blalock Rd, and is scheduled for completion in February 2014. The proposed regional drainage solution is a flood damage reduction initiative intended to reduce the risk of structural flooding for community drainage to the channel. The proposed channel improvements, which are the focus of this report, are the second phase of the regional drainage solution. The third and final phase involves storm sewer improvements that drain to the proposed improved channel.

An Impact Analysis Report was submitted to HCFCD for the Phase 1 - Basin, which received No Objection from HCFCD on May 28th, 2013. This impact analysis report is an extension of that prior report to demonstrate no adverse impact for Proposed Phase 2- Channel Improvements. Future Phase 3 - Storm Sewer Improvements, will submit a separate impact analyses at a later date.

Phase 2 – Channel Improvements is currently in preliminary engineering with the primary purpose to determine a proposed channel improvement that is functional, maintainable, cost efficient, and effective at providing flood damage reduction. Through coordination with HCFCD a proposed channel improvement is recommended and summarized in this impact analysis. As the detailed design phase progresses, it may be necessary to update this impact analysis to capture design modifications and to demonstrate that the changes have no adverse impact. LAN and TIRZ 17 understand that the final approved design plans must be represented in the HCFCD approved (no objection) impact analysis.

The Right-of-Way (ROW) for Briar Branch is approximately 50' from Gessner Rd to Bunker Hill Rd and approximately 60' downstream of Bunker Hill Rd. The existing channel section does not meet current HCFCD criteria outlined in the Policy, Criteria and Procedures Manual (PCPM). For much of the existing channel the maintenance berm width is less than the minimum required width in the PCPM and the side slopes exceed the typical minimums in the PCPM. Improvements to the channel will require similar variances from the PCPM without the acquisition of additional ROW which is prohibitively expensive and disruptive to the community. Requested variances are summarized below and a variance request is included in **Appendix H**.

1. Maintenance Berms – Proposed maintenance berm widths are 15 feet along the north ROW and 10 feet along the south ROW for the entire project limits. The PCPM standard is 20 to 30 feet maintenance berms.
2. Vertical retaining wall structures – Downstream of Bunker Hill Rd, a vertical wall channel section is necessary for capacity instead of the more standard 2:1 concrete slope-paving. This variance is requested downstream of Bunker Hill Rd.
3. Channel Enclosure box sizes – Upstream of Bunker Hill Rd, Briar Branch channel will be enclosed into storm sewer boxes. For capacity, 2-10'x7' RCBs are necessary instead of the 2-6'x6' allowed using the standard PCPM criteria for ROW. This variance is requested upstream of Bunker Hill Rd.

These variances are requested because they allow for the construction of an improvement providing significant flood damage reduction benefits and they align with the draft guidelines under development by the Urban Channel Design planning committee.

The proposed Phase 2 channel improvements consist of enclosing the channel with reinforced concrete boxes (RCBs) upstream of Bunker Hill Rd, and widening the channel to a 35' wide concrete-lined section using vertical retaining walls downstream of Bunker Hill Rd. The RCB enclosure portion will consists of 2-8'x6' RCBs between Gessner Rd and Witte Rd, and 2-10'x7' RCBs between Witte Rd and Bunker Hill Rd. Proposed typical sections are shown in **Exhibit 6**. The proposed channel sections generally maximize the use of the HCFCD ROW.

The vertical retaining wall section located downstream of Bunker Hill Rd is sized to provide adequate conveyance to the new detention basin currently under construction. An enclosed section that provided adequate conveyance was determined to be non-constructible within the given ROW. Through coordination and correspondence with HCFCD (Appendix I), it is understood that HCFCD requires that the structural stability of the vertical retaining wall section be demonstrated prior to final approval. This requirement will be fulfilled as part of final design process. The ongoing preliminary engineering efforts have included a general review of the ability to construct a structurally stable channel section with the desired dimensions, but they do not include a complete structural evaluation and design. In-lieu of a final approval, we request a conditional approval based on the demonstration of structural stability during the detailed design project phase, which is slated to begin immediately after the preliminary engineering phase.

Because this is an interim phase of a regional solution, the proposed channel improvements were analyzed with the new detention basin and compared to the pre-regional solution conditions to evaluate impacts. The proposed channel improvements were analyzed for potential impacts both with and without the future Phase 3 storm sewer improvements. The analysis performed was identical in terms of approach to the previously approved Phase 1 (basin) impact analysis. Analysis was performed using the InfoWorks 2 dimensional (2D) dynamic model developed as part of the Phase 1 Basin impact analysis. To demonstrate no downstream impacts beyond the limits of the 2D model, HEC-HMS and HEC-RAS analyses were performed utilizing information from both the InfoWorks improvement models and the effective models. Phase 2 will lower water surface elevations in the channel approximately 2.5 feet for the 10-Year event and 2.1 feet for the 100-Year event relative to the pre-regional solution. Phase 3 will lower water surfaces in the neighborhood north of the channel by 2.8 feet for the 10-Year event and 1.1 feet for the 100-Year event. The water surface elevation reductions of each phase are summarized in the following table:

	10-Year		100-Year	
	WSEL Reduction in Channel	WSEL Reduction in Neighborhood	WSEL Reduction in Channel	WSEL Reduction in Neighborhood
Phase 1	-0.7	-1.0	-0.6	-0.4
Phase 2	-2.5	-1.1	-2.1	-0.7
Phase 3	-2.2	-2.8	-1.7	-1.1

Each phase of the proposed improvements will have no adverse hydraulic impact up to and including the 100-Year events. Zero rise in water surface elevation is demonstrated on **Exhibits 8 and 9**.

This impact analysis has been produced based on conceptual designs before final design has been completed. Once final construction drawings are produced, it is anticipated that this report will be updated to include all design changes during final design and then resubmitted to HCFCD. This report submittal requests that the preliminary design for the Phase 2 channel improvements, including the attached variance requests, be reviewed for conditional approval to allow final design to proceed.

1.0 INTRODUCTION

1.0 Project Description

In March 2011, Lockwood, Andrews & Newnam, Inc. (LAN) was authorized by the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) to perform preliminary engineering for channel improvements that were originally identified by the TIRZ 17 Regional Drainage Study (RDS). The RDS included W151, W153, and portions of the W140-01-00 subwatershed. The focus of the RDS was on the identification and confirmation of drainage problems in the RDS study area, and the identification of efficient and effective solutions. The channel improvements discussed in this report are for the W140-01-00 (Briar Branch) subwatershed and are part of a regional solution identified in the RDS that includes a regional detention basin (currently under construction) and future storm sewer improvements for systems draining to Briar Branch.

LAN submitted an Impact Analysis Report to HCFCD for the Phase 1 Basin on May 1st, 2013. HCFCD responded with a Letter of No Objection on May 28th, 2013. This report demonstrates no adverse impact for Proposed Phase 2 based on preliminary engineering efforts. Deviations during the design phase from the improvements identified during preliminary engineering will likely require a revised impact analysis submittal to HCFCD. Future Phase 3 improvements will submit a separate impact analyses as part of their detailed design efforts that will build on this report and further document the final regional solution. As all three phases function collectively as a complete regional solution each subsequent phase will build on the previous phases and will be compared back to the pre-project existing conditions prior to phase 1.

1.1 Project Limits

The Proposed Phase 2 Channel Improvements begin at Gessner Rd and continue east to the Phase 1 Basin site, approximately 1300 feet east of Bunker Hill Rd. The stretch of channel is approximately 6000 feet long. The primary study area limits used to evaluate the basin are along Briar Branch, beginning at Gessner Rd and extending approximately 4000 feet east of the proposed basin site. The study area is shown on **Exhibit 1**, Project Location Map. The study limit extents are largely consistent with the FEMA effective contributing area for subbasin W140C.

1.2 Project Objectives

The objective of this project is to reduce flooding and flood damages for the area contributing to Briar Branch between Gessner Rd and the proposed basin site with a focus on the area south of the Long Point Fault and north of IH-10. This area is shown on **Exhibit 2**, Effective Floodplain and W140C Drainage Area Map. The proposed channel improvements are the second phase of a regional solution that will benefit the target area. The channel improvements will increase conveyance out of the target area, and will be mitigated by the Phase 1 Basin. Future Phase 3 Storm Sewer Improvements for key systems that drain to the channel improvements will serve to further reduce flooding in the neighborhoods north of the channel. Collectively, the storm sewer and channel improvements together meet the project objectives and are mitigated for through the regional detention basin.

1.3 Report Objectives

This report serves to demonstrate no adverse impact for the conceptual design of the proposed Phase 2 channel improvements. Additionally, this report serves to define the potential benefits of the complete regional solution. It is anticipated that separate impact analysis will be submitted for the Phase 3 improvements.

This impact analysis demonstrates no adverse impact for the conceptual Phase 2 design. Once final design is complete and construction drawings are produced, it is anticipated that this report will be updated to include all design changes during final design and then resubmitted to HCFCD. This report submittal requests that the preliminary design for the Phase 2 channel improvements be conditionally approved so that final design may begin.

Additionally, this report summarizes the non-HCFCD standard channel improvements necessary to provide the targeted flood damage reduction benefits. Preliminary and conditional confirmation of the proposed channel sections with regard to maintenance was received via correspondence from HCFCD dated December 27, 2013 and included in Appendix I. This report submittal provides additional information requested in the December 27th correspondence and requests direction on the development of an inter-local agreement to advance the project.

1.4 Assumptions and Constraints

1.4.1 Modeling Approach

The hydrologic and hydraulic analysis for this project primarily utilizes the Infoworks ICM model platform to evaluate improvements and to demonstrate no adverse impact within the limits of the model. Beyond the limits of the Infoworks model, the use of conventional HEC-HMS and HEC-RAS models was employed to evaluate and demonstrate no adverse impacts. The use of a dynamic and two-dimensional (2D) overland flow model such as Infoworks ICM was implemented to help understand the interaction of the full drainage system including the many interconnected drainage systems, how and when water accesses the channel, what benefit the various improvement alternatives result in, and understanding the potential for impacts as a result of the proposed improvements.

The Infoworks ICM 2D model that was used to evaluate both the proposed regional detention basin and the full regional improvements builds on the dynamic model developed for the TIRZ 17 RDS. To meet the goals and objectives of this analysis the RDS model was extended downstream 4000 feet to Campbell Rd. This model extension allowed for 2700 feet of overlap with the FEMA effective HEC-RAS model and terminates the project specific dynamic model with the termination point for the FEMA effective subbasin W140C.

For the purpose of evaluating project impacts resulting from hydraulic changes to the channel, the dynamic model was used to compare existing water surface elevations to proposed water surface elevations to insure no increases occur. As a method for further evaluating the dynamic model, the existing water surface elevations were also compared to the corresponding FEMA effective water surface elevations for the 2700 feet of Briar Branch that overlap between the two models. The results demonstrate a close relationship between the FEMA effective water surface elevation and those of the dynamic model for the 100-Year event, and demonstrate no increase in water surface elevation. Modeling results are further discussed and documented in subsequent report sections.

To evaluate the effects of the proposed basin on the Buffalo Bayou watershed, the pre- and post-basin conditions and the future regional solution model were evaluated in the FEMA effective HEC-HMS model. As discussed above, the dynamic model extents match the extents for the HMS subbasin W140C. In order to accurately compare the effects of the proposed basin on the full watershed, a proposed conditions HEC-HMS model was developed that modified TC and R values from the effective model for subbasin W140C such that the resulting difference in the timing and peak flow rate from the existing to the proposed analysis closely resemble the change in peak flow rate and time to peak produced by the existing and proposed dynamic models. This modeling procedure was performed for the both the proposed basin-only model and the future regional solution model. Peak flows at junctions downstream were compared between the existing conditions (effective) HEC-HMS model, the proposed conditions (pond-only) HEC-HMS model, and the future regional solutions HEC-HMS model. The resulting flows were inserted into the FEMA-effective HEC-RAS models for W140-01-00, W140-00-00, and W100-00-00. The results demonstrate no increase in water surface elevation. Modeling results are further discussed and documented in subsequent report sections.

1.4.2 Design Criteria

The proposed channel improvements were analyzed and preliminarily designed to meet the requirements and technical guidance provided in the December 2010 HCFCD Policy, Criteria & Procedure Manual and the HCFCD Hydrology and Hydraulics Guidance Manual where possible. Exceptions or variances to the requirements of the PCPM are identified in section 4.4.1 of this report and documented through a variance request included in Appendix H. The design event established for determining benefit for the basin and for the associated regional improvements is the 10-Year event checked with the 100-Year event. This is consistent with the TIRZ 17 RDS and other related reports including the 2009 HCFCD W151 report.

1.5 Project Survey and Datum

All project data sources, engineering and analysis results reference the TSARP Benchmark Network and the NAV Datum 1988 with 2001 Adjustment. The following sources were used for topographic information:

- A survey of the channel was performed by Kuo & Associates, Inc. in August 2012. This data was used as the basis of the existing conditions channel cross sections, as well as the pipe outfall and other elevation information.

- The proposed design and existing survey data for the HCFCD Briar Branch Sediment Removal project, constructed in late 2010 and early 2011, was used as a basis for the existing channel conditions.
- A survey done in 2007 by Martinez, Guy, and Maybik Inc. for the area along Briar Branch within the limits of this study. This survey detailed data collection and channel cross-sections at the existing culverts and bridge crossings.
- For overbank cross section information where survey data was unavailable, the HCFCD 2008 LiDAR data was utilized.

1.6 Prior Studies

The following studies have been completed in this area and were utilized in the development of the RDS and/or specifically for this analysis effort:

- Katy Freeway Program – 2002 - TxDOT – An XP-SWMM model was developed for the drainage system that connects to W151 and drains N. Gessner and Witte Rds. A series of oversized box culverts were used under the IH-10 frontage roads to mitigate the impacts of the IH-10 highway expansion.
- Tropical Storm Allison Recovery Project (TSARP) – HCFCD/FEMA – Completed effective models for the entire Harris County area, with effective maps updated June 18, 2007. This study included Briar Branch up to Adkins Rd and did not include Blalock Rd just upstream of this bridge structure.
- Drainage Study of Briar Branch – August 2007 – Memorial City Redevelopment Authority (TIRZ 17) – This study extended Briar Branch effective models to Gessner Rd, and looked at the level of service for this channel, and investigated potential improvements in the area.
- W151 Implementation Study – 2009 – HCFCD – This study focused on areas in the W151-00-00 watershed downstream of IH-10; however it included the TxDOT Katy Freeway Program drainage models and improvements to the IH-10 corridor. This included the large Briar Branch drainage areas north of IH-10, but did not look at the hydraulics of Briar Branch. The assumptions used in the TxDOT – Katy Freeway Program analysis of the IH-10 area were kept in this modeling.
- TIRZ 17 Regional Drainage Study (RDS) – 2012 – Memorial City Redevelopment Authority (TIRZ 17) – studied portions of the W140-01-00, W151-00-00 and W153-00-00 watersheds that drain the TIRZ 17 area that were heavily impacted by the April 2009 storm event. This model is an inlet-level, 2D analysis of more than 3,000 acres, using InfoWorks.
- TIRZ 17 Briar Branch Stormwater Detention Basin Impact Analysis Report – 2013 – Memorial City Redevelopment Authority (TIRZ 17) – studied Briar Branch upstream of the proposed detention basin. This impact analysis demonstrated that the Phase 1 Basin had no adverse hydraulic impacts for the 10-Year and 100-Year event. It received No Objection from HCFCD on May 28th, 2013.

2.0 EXISTING CONDITIONS

The Briar Branch watershed covers a relatively flat area north of IH-10, south of Neuens Rd, east Conrad Sauer Rd, and west of Campbell Rd. Portions of the area have been documented as being susceptible to flooding, especially the areas located immediately north of Briar Branch and south of the Long Point Fault line that traverses this area. This report section reviews the existing conditions of the area.

2.1 Location and Topography

This study reviews the portion of Briar Branch within the W140C subbasin as defined for the FEMA Effective Model for the Buffalo Bayou watershed. Subbasin W140C has an area of 2.75 sq. miles at a slope of approximately 0.14% from the northwest corner of the subbasin down to the southeast corner. Redevelopment has occurred on much of the land between Briar Branch and IH-10, and areas along N. Gessner Rd are currently under development. The most distinguishing characteristic of the area is the Long Point Fault that runs from the southwest corner to the northeast corner of W140C, just north of Briar Branch. There is approximately 3-5 feet of drop across the fault in this area.

Many of the roadways north of Briar Branch within the Spring Branch Woods and Long Point Woods subdivisions are at elevations lower than the top of bank at Briar Branch, which limits conveyance into Briar Branch. Storm sewer systems drain these areas to Briar Branch, but there are not many effective overland pathways and elevation to effectively drain the surface water overflows into Briar Branch.

2.2 Land Use

The northern portion of the study area is mostly residential, while the portion along IH-10 is mostly commercial. The FEMA Effective model determined that this area is 58.8% impervious cover and is considered fully developed. The existing conditions dynamic model uses data from the Harris County Appraisal District (HCAD and aerial imagery to determine that the area draining to Briar Branch is approximately 61.3% impervious. The current land use is shown on **Exhibit 3**, Land Use Map.

2.3 HCFCD Facilities and Unit Numbers

Briar Branch is HCFCD Unit #W140-01-00 and is the focus of this analysis and the proposed improvements. Briar Branch drains to Spring Branch (HCFCD Unit #W140-00-00) near Wirt Rd, and eventually Buffalo Bayou (HCFCD Unit #W100-00-00) near Chimney Rock Rd. Other channels that drain to Briar Branch within the vicinity of the proposed improvements include an existing drainage channel between Springrock Ln and Confederate Rd named W140-01-05 connects to Briar Branch via a 72" CMP.

2.4 Right-of-Way

Briar Branch right-of-way varies from 50-feet wide at Gessner Rd to 45-feet wide just west of Witte Rd, to 50-feet wide from Witte Rd to Bunker Hill Rd to 60' downstream of Bunker Hill Rd to the Briar Branch Detention Basin. Additional ROW is proposed west of Witte Rd where the existing is 45-feet. The right-of-way is made up of various fee, deed, and easement strips, which are shown in **Exhibit 10**, Right-of-Way Map. Proposed right-of-way acquisition is also shown on **Exhibit 10**. In some locations these property descriptions overlap as shown just north of the Briar Branch Detention Basin.

A previous maintenance project by HCFCD in 2011 removed a number of encroachments to the channel; however there are a number of remaining encroachments along the project that will be subject to removal for this project.

2.5 Pipelines and Utilities

Within the Briar Branch Channel project limits there are a number of utilities and easements. The following is a listing of pipelines and utilities that are crossing or are parallel with the project. These utilities can be seen on **Exhibit 10**, Right-of-Way Map.

- Witte Rd
  - 21" and 10" sanitary sewer lines
  - 20" water line
- Bunker Hill Rd
  - 6" and 8" sanitary sewer lines
  - 12" water line.
- Briar Branch Basin
  - An 8" water line crossing at the downstream property line of the basin site.
- Utilities parallel to Briar Branch (generally on north side of the channel):
  - Centerpoint overhead power lines (Gessner Rd to Confederate Rd)
  - 2-inch Centerpoint gas line (From Gessner Rd to Witte Rd, and from Bunker Hill Rd to Confederate Rd)
  - 10-inch Sanitary Sewer (From Witte Rd to just west of Bunker Hill Rd)
  - 6, 8, and 10-inch Sanitary Sewer from Bunker Hill Rd to Confederate Rd)
  - 4-inch Centerpoint Gas along South right-of-way from Demeret Ln to Bunker Hill Rd
- Utility Crossings
  - 8-inch Sanitary at river station 19900
  - 21-inch Sanitary at river station 19680
  - 10-inch Sanitary at river station 195400
  - 20-inch Water at river station 19500
  - SBC Buried Cable at river station 19390
  - 10-inch Sanitary at river station 19310
  - Two 4-inch Steel Pipes at river station 19310
  - ½ - inch Steel Pipe at river station 19310

2.6 Other Considerations

2.6.1 Phase 1 Basin

After receiving approval from HCFCD, construction of the Phase 1 Briar Branch Stormwater Detention Basin began in August 2013. Construction is currently scheduled for completion in February 2014. Because this impact analysis report is an extension of the original Briar Branch Stormwater Detention Basin Impact Analysis, this report is based on the same existing conditions models. For the purpose of this report, the Phase 1 Basin is considered the interim condition as opposed to an existing condition or a proposed condition. The Phase 2 channel improvements and Phase 3 storm sewer improvements will be evaluated against the existing conditions (pre-basin), not the interim conditions, to demonstrate no adverse impact.

2.6.2 Waters of the U.S.

LAN, on behalf of TIRZ 17, requested a U.S. Army Corps of Engineers (ASACE) jurisdictional determination on February 3rd, 2012. USACE responded on February 20th, 2013 that Briar Branch between Gessner Rd and 1730 LF downstream of Bunker Hill Rd "does not contain waters of the United States. Therefore, any work, structures, or the discharge of fill material on the project site is not subject to Section 10 of the Rivers and Harbors Act or Section 404 of the Clean Water Act (CWA) and does not require a Department of the Army permit." The letter of jurisdictional determination has been attached as **Appendix J**.

3.0 HYDROLOGY & HYDRAULICS

3.1 Analysis Objectives

The primary analysis objective was to evaluate the benefit of improvement alternatives for Briar Branch and to demonstrate the lack of adverse impacts. Two separate models were created to achieve these objectives: A dynamic model consisting of detailed calculations of inlet-level areas for the purpose of evaluating improvement benefit and reviewing potential impacts, and a watershed-level model to assist with evaluating the potential for downstream adverse impacts. The dynamic models capture the inter-basin transfer of runoff between W140-01-00 and W151-00-0 at a more detailed level than the watershed-level models. The dynamic and watershed-level models are further described below.

For the dynamic model, the Infoworks 2D model from the TIRZ 17 Regional Drainage Study (RDS) was extended east by approximately 4000 feet, from the proposed detention basin site to Campbell Rd, to match the limits of the FEMA Effective Model subbasin W140C. Infoworks was also used to calculate flow rates and water surface elevations within Briar Branch channel, using an inlet-level analysis. The dynamic model gives an analysis of the effective model's subbasin W140C in greater detail than is possible with a watershed level model. The FEMA Effective Model and the existing conditions dynamic model have approximately equivalent total drainage area sizes, and their outflow is measured at the same location, just downstream of Campbell Rd.

The existing conditions watershed level hydrologic model (used to evaluate potential impacts on Buffalo Bayou) is identical to the FEMA effective model. The overall analysis objective for this model is to analyze the regional benefit of improvements and provide a means to evaluate and demonstrate no adverse impacts.

3.2 Hydrologic Modeling Methodology

3.2.1 Dynamic Model Hydrology

Hydrology for the dynamic model was developed using an inlet level analysis between Conrad Sauer Rd and Campbell Rd. See **Table 1** for a summary of contributing drainage areas for Subbasin W140C.

Drainage area boundaries were delineated utilizing 2008 LiDAR data in combination with field visit verification. Boundaries from previous studies, as-built drawings, or models were confirmed prior to inclusion in the study. Percent impervious values were calculated for each drainage area based on the most recent land use data available from Harris County Appraisal District (HCAD), and reviewed with aerial imagery and updated as necessary. For the proposed conditions, planned storm sewer improvements that are part of the regional solution were considered. These roadways include both Gessner Rd and Witte Rd from IH-10 to Long Point Rd. The slope for each drainage area was calculated using GIS and the 2008 LiDAR data. A drainage width parameter for each drainage area was assigned based on its physical dimensions. Drainage area boundaries are shown on **Exhibit 4**, Dynamic Model Drainage System Map.

Losses were computed using the Green & Ampt method with loss rates set according to the values in the TSARP white paper titled "Recommendation for: Replacing HEC-1 Exponential Loss Function in HEC-HMS." Note that this is different from the FEMA effective model for Buffalo Bayou, which used calibrated values outside the ranges recommended in the TSARP white paper; the differences between these values is shown in **Table 2**.

Total subcatchment runoff volume was determined using initial abstractions for impervious surfaces and Green & Ampt infiltration for pervious surfaces. Subcatchment runoff routing was determined using Storm Water Management Model (SWMM) routing utilizing two of the three normally used surfaces; impervious area with initial abstraction, and pervious area with initial abstraction. To be consistent with the HCFCD W151-00-00 implementation study methods, impervious area without initial abstraction was not determined.

A comparison of FEMA effective and existing conditions dynamic model peak flows for subbasin W140C can be found in **Table 3** below. The differences between the FEMA effective flows and the dynamic model flows can be attributed to several factors including the Green & Ampt values differences, contributing drainage area differences, average drainage area size, and fundamental modeling methodology differences. A summary of modeling methods including a comparison of methods between the FEMA effective model and the dynamic model can be found in **Appendix A**.

3.2.2 HEC-HMS Model Hydrology

The FEMA effective hydrologic model was utilized to analyze the downstream effects of the proposed regional detention basin. The dynamic model extents match the extents of the W140C subbasin to allow comparisons between the dynamic model and the FEMA effective model. The revised existing conditions model is entirely identical to the effective model.

Table 3 compares the peak flow differences for key junctions along Buffalo Bayou, Spring Branch, and Briar Branch. The comparison is between the FEMA effective model and the revised existing conditions model.

3.3 Hydraulic Modeling Methodology

Hydraulic models were developed at an inlet-level for the dynamic model of the W140C subbasin and at a watershed-level using HEC-RAS for the purpose of evaluating the potential for impacts.

3.3.1 Dynamic Model Hydraulics

Hydraulics calculations for the W140C subbasin are performed with the Infoworks ICM model. The model consists of an inlet-level analysis between Conrad Sauer Rd and Campbell Rd. The study area between the proposed basin location and Campbell Rd was added to the dynamic model study area to better match the extents of the W140C subbasin of the FEMA effective model. Hydraulic parameters for storm sewers and box culverts were assigned according to the Manning's roughness "n" values set forth in the City of Houston Infrastructure Design Manual. Harris County Flood Control drainage channels are modeled with roughness values according to those outlined in the HCFCD *Hydrology & Hydraulics Guidance Manual* and the HCFCD *Policy Criteria & Procedure Manual*. Briar Branch is modeled using one dimensional (1D) river reaches that are similar to HEC-RAS sections, in order to more accurately define channel cross sections. Overbank flows are handled with the Infoworks ICM 2D computation engine, as are inlet ponding and overland flow computations.

Pipe and channel hydraulic calculations are handled using dynamic pipe flow calculations and a 2D mesh surface for storage and surface flow routing. The InfoWorks ICM software utilizes a combination of numeric methods for solving the Saint Venant equations to determine hydraulic states within the model. Once subsurface storm sewer capacity is exceeded, water will overflow onto the 2D mesh surface (ground surface) of the model.

The 2D surface was developed using the 2008 Harris County LiDAR supplemented with survey data in areas where topographic changes were known to have occurred. Vertical structures within the study area are modeled as void spaces to prevent flow through or storage within structures. Overland roughness values for the 2D surface were developed from land use data, Harris County Appraisal District information, aerial imagery, and field visits. The river sections for Briar Branch are linked to the 2D surface along the banks of the channel in order to represent over bank flow entering and leaving Briar Branch.

The dynamic model has several discharge or outflow locations. Dynamic tailwater conditions were developed where these systems are backwater-controlled. The system outfalls include:

- W140-01-00 at Campbell Rd. For the Briar Branch outfall, normal depth in the channel was used. Because the proposed improvements will include changes in the channel flow rates, using a dynamic water surface elevation for this outfall would not accurately reflect the small changes in timing caused by the proposed improvements. Rather, a normal depth tailwater was used to all changes in tailwater elevation to accompany the changes in channel flow rates.
- W151-00-00 underneath IH-10 near Witte Rd. For the W151-00-00 system, the entire storm sewer and overland flow drainage system was modeled as part of the RDS. This model was utilized to create a dynamic water surface elevation at the outfall.

- W156-00-00 via multiple small storm sewers east of Conrad Sauer Rd. These systems do not appear to be backwater controlled so a dynamic tailwater was not used.
- W140-00-00 via a 96" RCP under Nuens Rd. Because this is the most upstream link of the entire Spring Branch system, it does not appear to be backwater controlled. This system also did not use a dynamic tailwater.

3.3.2 HEC-RAS Model Hydraulics

There is an overlap between the dynamic model and the watershed-level models which is approximately 2700 feet in length, between Blalock Rd and Campbell Rd. While these two models vary greatly in their methods and calculations, there is a high degree of correlation between their computed water surface elevations, as shown in **Table 4**.

A set of Revised Existing Conditions HEC-RAS Models were created for Briar Branch, Spring Branch, and Buffalo Bayou by updating the flow distributions in the FEMA effective models per the Effective HEC-HMS model. Flow tables from the effective HEC-RAS model did not match the peak flow values from the FEMA effective HEC-HMS model. No changes to the SVSQ tables, channel geometry, or computational parameters were made.

3.4 Existing Conditions

The results of the existing conditions dynamic model are shown in **Exhibit 5**, Existing Conditions 10-Year Inundation Map. This model indicates that the existing drainage system is severely limited, resulting in structural flooding across much of the target area.

4.0 PROPOSED DRAINAGE PLAN

4.1 Description

Improvements to the Briar Branch watershed are proposed to be constructed in three phases. First, a detention basin is currently under construction to provide a mitigation bank for a channel and storm sewer improvements. Proposed Phase 2 includes channel conveyance improvements upstream of the proposed detention basin to increase conveyance into the basin and lower water surface elevations in Briar Branch. Phase 2 is the focus of this report. A third phase will include storm sewer conveyance improvements to increase conveyance to the channel and lower the water surface elevations in the neighborhoods adjacent to Briar Branch between Gessner Rd and Bunker Hill Rd.

Only the Phase 2 Channel Improvements are planned for construction at this time. This impact analysis refers to the first phase as the “interim conditions”, to Phase 2 as “proposed”, and to the Phase 3 storm sewer improvements as “future”.

4.2 Hydrologic Analysis

The proposed drainage plan does not include any changes to the dynamic model drainage areas or hydrologic parameters. Only the storm sewer and channel hydraulics include proposed changes. To evaluate downstream impacts, the proposed conditions dynamic model outflow results were then modeled in HEC-HMS to by modifying the TC & R values for subbasin W140C such that the resulting difference peak flow rate from the existing to the proposed analysis closely resemble the change in peak flow rate produced by the existing and proposed dynamic models. No other changes were made to the HEC-HMS models.

4.3 Hydraulic Analysis

The proposed Phase 2 improvements consist of channel modifications between Gessner Rd and Oak Tree Dr, as shown on **Exhibit 6** Typical Sections. The proposed conditions dynamic models were created from the existing conditions model by adding the detention basin (Phase 1), channel improvements (Phase 2), and storm sewer improvements (Phase 3). **Exhibit 7**, Proposed (Phase 2) 10-Year Inundation Reduction Map shows the flood-reduction benefits of the proposed channel improvements for the target area. **Exhibit 8,** Proposed Dynamic Model Impact Analysis Results, shows the changes in water surface elevation in the channel for the target area, as calculated by the 2D Infoworks model. **Exhibit 9**, Proposed Watershed Level Impact Analysis Results, shows the HEC-RAS water surface elevations downstream of the project. Together, **Exhibits 8 and 9** demonstrate that the Proposed Phase 2 channel improvements have no adverse impact.

Table 5 shows the water surface elevation results for all 3 phases for the project area. **Table 6** shows the flow rate results downstream of the project; the comparison is between the revised existing conditions HEC-HMS model and Phase 1, Phase 2, and Phase 3 watershed-level models. Similarly, **Table 7** shows the water surface elevation results downstream of the project.

4.4 Channel Improvements Layout

Multiple channel improvement alternatives were evaluated as part of the preliminary engineering process. Because of the extremely limited existing ROW and the expense of land in the area, all alternatives considered included different degrees of variances from standard HCFCD channel criteria. Through meetings and discussions with the HCFCD maintenance and watershed departments, a preferred alternative was selected which includes storm sewer box enclosures upstream of Bunker Hill Rd and a 35’ wide concrete-lined section with vertical retaining walls downstream of Bunker Hill Rd. These sections are shown on **Exhibit 6**. The proposed channel improvements include the following items:

4.4.1 Variances Requested

The ROW for Briar Branch is approximately 50’ from Gessner Rd to Bunker Hill Rd and 60’ downstream of Bunker Hill Rd. The existing channel sections do not comply with the standards set in the HCFCD Policy, Criteria, & Procedures Manual (PCPM) in terms of berm width and side slopes. The proposed channel improvements will require similar variances. Because the proposed improvements are intended for flood damage reduction, significant increases in capacity of the existing channels are needed. Effort was made to select the channel configuration which will best serve the District’s maintenance requirements while still allowing for significant flood damage reduction. **Table 8** lists the requested variances from the HCFCD PCPM Criteria.

4.4.2 Storm Sewer and Open Channel Configuration

The proposed channel improvements consist of enclosing Briar Branch into storm sewer boxes upstream of Bunker Hill Rd and enlarging the open channel section using vertical retaining walls downstream of Bunker Hill Rd. While the detailed design of this concept has not yet been completed, the following items outline the configurations necessary to ensure that the channel improvements have no adverse hydraulic impact.

4.4.2.1 Connection to Gessner Rd Storm Sewer

The existing connection of the Gessner Rd storm sewer system to Briar Branch consists of a 36” RCP which slopes to carry flow from Briar Branch into the Gessner Rd trunkline. However, the upstream end of this pipe is located in an isolated depressed area which does not receive significant overflow from Briar Branch. Instead, the existing conditions model indicates that the 10-Year HGL for the Gessner Rd trunkline is above the natural ground elevations east of the depressed area. This causes the existing 36” RCP to backflow, spilling water from the Gessner Rd trunkline into Briar Branch once the natural ground’s spillover elevation of approximately 79.90 feet is reached. This means that the Gessner Rd storm sewer does contribute flow to Briar Branch during large storm events.

Analysis of the proposed system indicates that alteration of this existing configuration leads to potential downstream impacts on either Briar Branch (if the existing connection is enlarged) or on Gessner Rd (if the existing connection is removed). Thus, the existing pipe and overflow elevations will remain. The proposed improvements will begin the channel improvements and storm sewer box just east of the overflow route. At the upstream end of the proposed box, large inlets will be installed to capture any overflows from the Gessner Rd system. Modeling indicates that this is the optimal configuration to benefit both Briar Branch and Gessner Rd.

4.4.2.2 Gessner Rd to Witte Rd

From Gessner Rd to Witte Rd, the proposed channel improvements consist of enclosing the existing channel into 2-8'x6' RCBs and constructing a grass-lined swale above. The storm sewer boxes will be constructed according to either HCFCD or City of Houston criteria, whichever is more stringent. Maintenance access to the boxes will be provided via maintenance access vaults, as discussed in section 4.11.2, below. The grass-lined swale with 4:1 side slopes will vary in depth between 2 and 3 feet, which will allow sufficient depth of cover on top of the boxes. This swale will serve as the collection system for surface runoff accessing the channel with inlets located on top of the storm sewer boxes. Maintenance berms along the channel will be 15' along the north ROW line and 10' along the south ROW line.

4.4.2.3 Witte Rd Crossing

The existing Witte Rd storm sewer, flowing north to south, connects with Briar Branch, flowing from west to east. The combined Witte Rd storm sewer system and Briar Branch channel flow south along Witte Rd for a distance of approximately 150 feet before being discharged into the Briar Branch open channel to the east and the continuation of the Witte Rd storm sewer system to the south. The proposed channel improvements will maintain the existing configuration allowing runoff from Briar Branch and the Witte Rd storm sewer to join before splitting. The connections will be made with two large junction boxes located within Witte Rd. The connecting conduit between the junction boxes is dual 10'x7' RCBs. The configuration within the Witte Rd ROW will be designed to accommodate future improvements to Witte Rd. MWitte RdWitte Rdaintenance access vaults will be constructed immediately upstream and just downstream of the Witte Rd crossing, within HCFCD ROW. Coordination with HCFCD on approval of the final maintenance access plan is proposed as a key step during detailed design.

4.4.2.4 Witte Rd to Bunker Hill Rd

From Witte Rd to Bunker Hill Rd, the proposed channel improvements consist of enclosing the existing channel with 2-10'x7' RCBs and constructing a grass-lined swale above the enclosed boxes. The storm sewer boxes will be constructed according to either HCFCD or City of Houston criteria, whichever is more stringent. Maintenance access to the boxes will be provided via maintenance access vaults, as discussed in section 4.11.2, below. The grass-lined swale with 4:1 side slopes will vary in depth between 2 and 3 feet, which will allow sufficient depth of cover on top of the boxes. The purpose of the swale is to carry flows toward inlets located on top of the storm sewer boxes and also to allow flood conveyance during extreme events. Maintenance berms along the channel will be 15’ along the north ROW line and 10’ along the south ROW line.

4.4.2.5 Bunker Hill Rd Crossing

The existing Bunker Hill Rd Crossing consists of 2-7’x7’ RCB culverts with mitered concreted sloped headwalls. Immediately upstream, Briar Branch passes through a riprap lined drop structure which transitions the channel from approximately 7 deep to 11 feet deep. Immediately downstream of Bunker Hill Rd, a 7’x6’ RCB storm sewer outfalls to Briar Branch; this storm sewer system drains Bunker Hill Rd north of Briar Branch channel.

With modification to the entrance and exit to improve the performance of the existing 2-7’x7’ RCBs, the crossing provide sufficient capacity to convey the proposed flows. A large junction box is proposed upstream of the existing crossing to join the proposed 2-10’x7’ RCBs to the existing 2-7’x7’ RCBs that make up the crossing. On the downstream end, a new vertical headwall will be constructed to tie the existing 2-7’x7’ RCBs into the proposed open channel section. The downstream face of this crossing will also include a maintenance access ramp, as discussed in section 4.11.3 below. The proposed maintenance access ramp was determined to pose a conveyance restriction that potentially results in an adverse impact to the Bunker Hill Rd system north of the channel without necessary modifications. To avoid these impacts, the existing 1-7’x6’ RCB which drains Bunker Hill Rd will be extended parallel to and in the north bank of the Briar Branch channel for a short distance of approximately 160 feet. The extended box will outfall into the channel at the downstream end of the maintenance access ramp.

4.4.2.6 Bunker Hill Rd to Oak Tree Dr

From Bunker Hill Rd to the downstream edge of the Phase 1 Basin, the ROW for Briar Branch is approximately 60 feet. The existing section consists of an 8’ wide by 4’ high rectangular concrete low-flow channel with 2:1 grass-lined side slopes. For flood damage reduction, the proposed section consists of a 35’ wide concrete-lined channel with vertical retaining walls at each side. This large section is necessary to adequately convey increased discharge to the new basin, including the junction of major runoff contributors from the Bunker Hill Rd trunk line and the lateral channel W140-01-05. Details and considerations related to the large vertical wall channel can be found in section 4.4.2.7 of this report. Maintenance berms will be 15’ along the north ROW line and 10’ along the south ROW line. Maintenance access will be provided in the bottom of the channel via access ramps as described in section 4.11.3. Storm sewer outfalls into the proposed channel will be concrete and tied to the retaining walls.

4.4.2.7 Vertical Retaining Wall Design

The structural design of the vertical retaining wall structure will be performed as part of the detailed design, including demonstration that the wall design meets all structural stability and geotechnical requirements to HCFCD standards. It is anticipated that the channel bottom will be concrete and will be a structural component of the overall channel design. Surface drainage accessing the channel and sub-surface drainage behind the wall will be adequately addressed during detailed design and reviewed with HCFCD. Wall safety is discussed in detail in section 4.4.5.

4.4.2.8 Basin Inflow Weir Structure

The Phase 1 Basin is currently under construction but scheduled for completion in February 2014. The inflow weir structure consists of a 200' wide sheet pile wall which can be notched to specific widths and elevations to allow modifications. The sheet pile wall is surrounded by concrete slope paving.

The optimal weir configuration for the Phase 2 channel improvements is a 70' wide notch at elevation 74.00 and a 150' notch at elevation 76.00; these modifications will be made by cutting and/or welding additional material to the existing weir wall. Additionally, because the proposed channel cross section will continue until the property limit of the basin site, the concrete side slopes will be saw-cut and the proposed vertical retaining wall will be tied to the weir structure.

4.4.3 Restrictors

Restrictors are necessary in multiple locations to utilize the proposed channel improvements as storage and to ensure that the channel improvements have no adverse hydraulic impact. The design process considered many different alternatives for the location, size, and general concept of the restrictors. The configuration which best suits the maintenance needs and hydraulic performance of the channel were selected. Restrictors were sized to be equal to or larger than the storm sewer connections to the box upstream of the restrictor to prevent debris blockages. The restrictors were modeled as orifices using the orifice coefficients specified in the HCFCD PCPM section 6.7.6. Three restrictors are proposed to be installed: 20' upstream of Witte Rd, 120' downstream of Witte Rd, and just upstream of Windhover Ln. Each restrictor will be configured to allow maintenance equipment to access the enclosed system, as discussed in section 4.11.2, below. While the exact design will be specified during detailed design, an example restrictor configuration may consist of a metal wall that is held in place by removable bolts and/or hinges. **Table 9** below lists the sizes and hydraulic results for each restrictor.

4.4.4 Inlets

Because the swales between Gessner Rd and Bunker Hill Rd reside on top of the proposed storm sewer, inlets will be needed to drain the Briar Branch ROW. Inlet type and spacing will be specified as part of detailed design, but may consist of City of Houston "Type E" inlets, spaced at approximately 500'.

4.4.5 Vertical Wall Safety

The proposed open channel section downstream of Bunker Hill Rd will consist of vertical retaining walls approximately 13' high. To ensure the safety of pedestrians and maintenance personnel, a handrail or fencing is proposed. Details and specifics for the barrier will be determined as part of detailed design. Considerations include a possible slotted curb to act as an additional barrier while allowing surface runoff to maintain access to the channel. Because the channel banks are perched and higher than the surrounding areas, as discussed in section 2.1 above, debris and blockage due to the proposed hand rail are not anticipated. The 100-Year WSEL in the channel is lower than the top of bank. Thus, the base of the fencing will be set at elevations above the 100-Year WSEL so as not to impede flow or debris transport. Hand rail type fencing will be designed during final design. Periodic spacing of recessed step ladders is proposed to allow evacuation or escape.

4.4.6 Future Phase 3 Storm Sewer Improvements

The channel improvements discussed in section 4.4 are Phase 2 of the 3-Phase Briar Branch Regional Drainage Improvements project. The third phase will consist of increased storm sewer capacity from the neighborhoods north of the channel. Only Phase 2 is proposed at this time, and Phase 3 will submit a separate impact analysis before construction begins. However, to minimize construction cost and avoid re-constructing storm sewer outfalls, one or two segments of pipe of the proposed size and elevation will be installed at each outfall location and tied to the existing storm sewer via an appropriately sized manhole. The preliminary design for these Phase 3 storm sewer sizes is shown in **Table 10**, below.

The Future Phase 3 storm sewer improvements offer significant flood damage reduction benefit for areas adjacent to Briar Branch channel without any adverse hydraulic impacts. The downstream water surface elevations are shown in **Exhibits 8 and 9**, while the proposed inundation reduction for Phase 3 is shown in **Exhibit 12**.

Utilizing all of these features, a proposed Infoworks hydraulic model was created. The resulting flowrates were then modeled in the proposed conditions HEC-HMS models discussed in section 4.2, above. The resulting flowrates were modeled in a HEC-RAS model that was developed using the geometry of the FEMA effective model and the flow rates of the proposed conditions HEC-HMS models. This model was used to evaluate hydraulic impacts downstream of the project, which are shown in **Exhibit 9,** Proposed Watershed Level Impact Analysis Results. **Tables 6 and 7** show the calculated flowrates and water surface elevations at nodes downstream of the project. These tables demonstrate that the Phase 2 channel improvements have no adverse hydraulic impact for the 10-Year and 100-Year100-Year events.

The proposed improvement results are summarized on **Exhibit 13A and 13B**, which show the water surface elevation profiles proposed by the dynamic model.

4.5 Right-of-Way Requirements

The channel improvements are intended to fit within the existing right-of-way. However, additional right-of-way is needed to provide sufficient room to construct and maintain the proposed channel improvements just upstream of Witte Rd. A 10' x 210' strip of property is proposed to be acquired. Currently this property has no fences or other obstructions. This potential acquisition is shown on **Exhibit 10**, Right-of-Way Map.

4.6 Special Erosion Control Features

The proposed channel improvements consist of enclosed concrete boxes and a concrete lined open channel, leaving little concern with typical erosion issues. Erosion considerations include surface runoff to the channel, the transition to the existing channel section downstream, the grass lined swale above the enclosed box storm sewer, and storm sewer connections. Bunker Hill RdBunker Hill RdDownstream of Bunker Hill Rd, the improvements consist of vertical retaining walls with a concrete lined bottom. Analysis indicates that velocities are close to 2 ft/s for a 10-Year storm frequency and peak velocities are not expected above 4 ft/s during transition periods when downstream tailwaters are lower. The transition to the existing channel section is proposed to be concrete with standard bolder rip-rap downstream of the transition. Storm sewer outfalls will be structurally tied to the retaining wall and if necessary will include a hydrophilic water stop. Minimal conveyance is expected for the grass lined swale above the enclosed boxes limiting the need for extensive erosion control.

4.7 Stormwater Quality Enhancements

Stormwater quality enhancements will be limited to surface the grass swale above the proposed channel enclosure.

4.8 Potential Pipeline and Utility Conflicts

Water, gas, and electric lines that cross the project will be relocated below the lowered profile of Briar Branch. However, a gravity-flow 21" sanitary sewer crosses the project beneath Witte Rd that has approximately the same elevation as the proposed improvements. Conflict resolution will be determined as part of detailed design. A potential solution is to reconstruct the sanitary sewer with pressure pipe with joints sufficient to span through the proposed storm sewer box culvert. Because this will block a portion of the conveyance area of the storm sewer, 1-2-feet of additional opening can be added under the sanitary pipe to allow for siphon flow and provide depth for sedimentation. A manhole will be located at the crossing location so that sediment levels can be monitored by the City of Houston. No other utility or pipeline conflicts are anticipated.

4.9 Geotechnical Requirements

A geotechnical investigation was performed by Geotech Engineering and Testing on behalf of TIRZ 17 in May 2013. This report is attached as **Appendix F**. A brief summary of the findings are:

- 4:1 side slopes are recommended for earthen grass slopes; however 3:1 slopes generally meet minimum factors of safety.
- Ground water was encountered at depths between 15 and 24 feet.

- Crumb and Pin Hole test show no dispersive soils.
- Weep holes for slope paving or wall structures should be at 15-ft intervals.
- Net allowable bearing capacity for clay soils is 1,500 psi, and for silty soils 1,000 psi
- Groundwater control is recommended for the project, and well point systems are recommended in the silty sand areas.
- Trench excavations on unsupported slopes should not be steeper that 1.5:1. Benched excavations should be at 1:1 with steps not higher than five feet. Shoring is recommended for vertical soil cuts.

4.10 Environmental Issues

The current projects limits have been determined by the USACE to be non-jurisdictional, meaning that the USACE does not require any environmental permitting. This letter is included as **Appendix B**.

A Phase I Environmental Site Assessment (ESA) was conducted by LAN on behalf of TIRZ 17 in April 2013. The report is included as **Appendix G**. This ESA identified two potential Recognized Environmental Condition (REC) facilities near Briar Branch Channel which warrant further investigation. A Phase II ESA was recommended and will be conducted. During the feasibility study for the Briar Branch Stormwater Detention Basin site, Phase I and Phase II ESAs were conducted. The Phase II soil sampling and analyses indicated that the soil at the site did not require any special protective measures during excavation because the soils at the site pose no threat of adverse environmental impact.

4.11 Maintenance Access Plan Requirements

Maintenance access to the proposed channel improvements will be by maintenance access vaults upstream of Bunker Hill Rd and by ramps to the channel bottom downstream of Bunker Hill Rd. These features will serve to allow maintenance equipment continuous access to the flowline of the channel from the detention basin all the way to Gessner Rd without roadway closures. These items are shown in **Exhibit 11**, Maintenance Access Plan. The proposed plan will be reviewed with HCFCD as part of detailed design and modifications made to further accommodate maintenance activities.

4.11.1 Maintenance Access Berms

Maintenance access berms will be provided along the north and south ROW lines along the entire project. Because of the limited ROW available for Briar Branch, the standard berm widths specified in the HCFCD PCPM criteria is not available in all areas. A variance is requested to allow maintenance access berms to be only 15 feet along the north ROW line and 10 feet along the south ROW line, as discussed in section 4.4.1 above.

4.11.2 Maintenance Access Vaults

Upstream of Bunker Hill Rd, Briar Branch will be enclosed into storm sewer. To facilitate desiltation of the proposed boxes and general access, access vaults are proposed to allow insertion of equipment and removal of sediment. While the design of these structures will be part of final design, the general concept is a large concrete junction box with a removable lid. Because the channel improvements also require restrictors which are too small to allow the passage of this equipment, the restrictors will be designed as metal walls that are held in place by removable bolts and/or hinges.

Additional access into the storm sewer boxes can be accomplished by manholes located at every Type E inlet. These structures will also include access ladders to serve as an emergency escape route for personnel inside the storm sewer.

4.11.3 Maintenance Access Ramps

Ramps will be constructed which allow maintenance access to the open channel flowline. The proposed retaining walls for the channel improvements are approximately 11 feet to 13 feet tall, so access the channel flowline will be provided with 15’ wide ramps which are approximately 160 feet in length. These ramps will have vertical walls along each side and a slope of 8%. These maintenance access ramps will be located partially with the Briar Branch ROW and partially within the public street ROW. While the detailed design of these ramps is still preliminary, it is recommended that one ramp be placed east of Bunker Hill Rd and another be placed at Oak Tree Dr, which is at the downstream end of the channel improvements. This would allow maintenance equipment to enter the channel bottom at either end and drive continuously along the channel flowline before exiting at the opposite end.

4.11.4 All Weather Maintenance Access

The channel bottom downstream of Bunker Hill Rd will be constructed as an all-weather maintenance access, using the standards set in section 16.3.4 of the HCFCD PCPM.

4.12 Operation Plan for Pumped Detention basins

No pumping will be required for this project.

4.13 Other Considerations

The intent of this impact analysis report is to demonstrate no adverse impact to the Briar Branch channel and the area downstream of the basin as well as the W151-00-00 subwatershed. W151-00-00 experiences minor ancillary benefits from the W140-01-00 regional solution in the form of reduced flows contributing to W151. The minor benefits to W151-00-00 are a natural effect of improvements to W140-01-00. There are no intentions of utilizing flow reductions to W151-00-00 to mitigate for any flow increases to W151-00-00. The minor ancillary benefits to W151-00-00 are to remain as benefits to W151-00-00.

5.0 CONCLUSION

Improvements to the Briar Branch watershed are planned in three phases. Phase 1 consists of a detention basin which provides mitigation for the Phase 2 channel improvements and Phase 3 storm sewer improvements. The Phase 1 basin is currently under construction and scheduled for completion in February 2014.

Phase 2 consists of channel improvements to Briar Branch from Gessner Rd east to Oak Tree Dr. It is the desire of TIRZ 17 to construct the proposed channel improvements within the existing HCFCD right-of-way and for the improvements to be maintained by HCFCD. To meet the project goal of flood damage reduction, variances from the criteria set by the HCFCD PCPM are requested, namely:

- 15 feet maintenance berm along the north ROW and 10 feet along the south ROW line, as opposed to the standard 20 to 30 feet berms. This variance is requested for the entire project limits.
- Vertical retaining wall structures instead of the standard 2:1 concrete slope-paving. This variance is requested downstream of Bunker Hill Rd.
- Reinforced Concrete Box channel enclosure using 2-10'x7' RCBs instead of the 2-6'x6' RCB section that is standard for this ROW width and depth. This variance is requested upstream of Bunker Hill Rd.

These variances are requested because they serve the District's maintenance requirements while still allowing for significant flood damage reduction.

The proposed Phase 2 channel improvements consist of enclosing the channel with reinforced concrete boxes (RCBs) upstream of Bunker Hill Rd, and widening the channel to a 35' wide concrete-lined section using vertical retaining walls downstream of Bunker Hill Rd. The RCB enclosure portion will consists of 2-8'x6' RCBs between Gessner Rd and Witte Rd, and 2-10'x7' RCBs between Witte Rd and Bunker Hill Rd. Phase 2 will lower water surface elevations in the channel approximately 2.5 feet for the 10-Year event and 2.1 feet for the 100-Year event relative to the pre-regional solution. Each phase of the proposed improvements will have no adverse hydraulic impact for the 10-Year and 100-Year events. Zero rise in water surface elevation is demonstrated on **Exhibits 8 and 9**.

This impact analysis has been produced based on conceptual designs before final design has been completed. Once final construction drawings are produced, it is anticipated that this report will be updated to include all design changes during final design and then resubmitted to HCFCD. This report submittal requests that the preliminary design for the Phase 2 channel improvements receive conditional approval from HCFCD so that final design may begin.

TABLES

Table 1: Drainage Area Information for Subbasin W140C

Model	Drainage Area (Ac)	Impervious (%)
FEMA Effective	1760	58.2%
Dynamic Model	1984	61.3%

Table 2: Loss Rate Information for Subbasin W140C

Model	Method	Impervious (%)	TC (hrs)	R (hrs)	Parameters	100-Year Q (CFS)	100-Year Runoff
FEMA Effective	Green & Ampt	58.2	0.55	9.93	Calibrated	1088	13.2" - 3.61" = 9.59"
Revised Existing (HMS)	Green & Ampt	58.2	0.55	9.93	Calibrated	1088	13.2" - 3.61" = 9.59"
Revised Existing (Infoworks)	Green & Ampt	61.3	n/a	n/a	TSARP Whitepaper	1989	13.2" - 1.11" = 12.09"

Table 3: Existing Peak Flow Comparisons						
Location	10-yr FEMA Effective Flow (CFS)	10-yr Existing Conditons Flow (CFS)	Difference (%)	100-yr FEMA Effective Flow (CFS)	100-yr Existing Conditons Flow (CFS)	Difference (%)
Briar Branch @ Campbell Rd	589	589	0.00%	1088	1088	0.00%
Briar Branch @ Spring Branch	1158	1158	0.00%	2142	2142	0.00%
Spring Branch @ Buffalo Bayou	3853	3853	0.00%	7104	7104	0.00%
Buffalo Bayou @ W138-00-00	8093	7953	-1.73%	15757	15423	-2.12%
Buffalo Bayou @ W137-00-00	8390	8152	-2.84%	16564	15903	-3.99%
Buffalo Bayou @ Woodway Dr	8437	8431	-0.07%	16690	16676	-0.08%
Buffalo Bayou @ W129-00-00	8840	8840	0.00%	17497	17497	0.00%
Buffalo Bayou @ Montrose Blvd.	8535	8535	0.00%	17393	17393	0.00%
Buffalo Bayou @ White Oak Bayou	38563	38563	0.00%	59499	59499	0.00%
Buffalo Bayou @ End	39606	39606	0.00%	61636	61636	0.00%

Table 4: Existing Water Surface Elevation Comparisons					
Location	RAS Station	Existing HEC-RAS WSEL* (10-yr)	Existing Infoworks WSEL* (10-yr)	Existing HEC-RAS WSEL* (100-yr)	Existing Infoworks WSEL* (100-yr)
Adkins Rd.	13075.6	72.69	73.15	72.50	74.03
	13030.8	72.52	73.00	72.33	73.83
	12896.2	72.31	72.77	72.12	73.57
	12527.9	72.00	72.13	71.81	72.85
Anne St.	12065.3	71.48	72.13	71.30	72.89
	11519.3	70.75	71.07	70.57	71.85
	11029.3	70.13	70.11	69.95	70.92
Campbell Rd.	11002.1	70.11	69.98	69.93	70.75
	10923.3	69.87	69.59	69.71	70.25
End of W140C	10764.8	69.80	69.26	69.63	69.82

*WSEL = Water Surface Elevation

Table 5: Proposed Dynamic Model Water Surface Elevation Results

Node	Station	10-Year WSEL Results							100-Year WSEL Results						
		Existing	Interim Phase 1	Diff. (Ft)	Proposed Phase 2	Diff. (Ft)	Future Phase 3	Diff. (Ft)	Existing	Interim Phase 1	Diff. (Ft)	Proposed Phase 2	Diff. (Ft)	Future Phase 3	Diff. (Ft)
1	21076	81.01	80.82	-0.20	80.82	-0.19	80.68	-0.34	81.62	81.55	-0.06	81.44	-0.18	81.31	-0.30
2	20481	80.08	79.52	-0.56	79.27	-0.81	79.32	-0.76	80.89	80.70	-0.19	80.50	-0.39	80.48	-0.40
3	19981	80.08	79.47	-0.61	79.17	-0.91	79.24	-0.84	80.86	80.69	-0.17	80.44	-0.42	80.43	-0.44
4	19701	80.09	79.53	-0.57	78.75	-1.34	78.83	-1.26	80.98	80.80	-0.17	80.22	-0.75	80.25	-0.73
5	19510	79.52	78.81	-0.70	78.68	-0.84	78.75	-0.76	80.21	80.07	-0.14	80.13	-0.08	80.15	-0.06
6	18481	78.28	77.76	-0.52	76.99	-1.28	77.27	-1.01	79.10	78.84	-0.26	78.77	-0.33	79.07	-0.03
7	18066	77.47	76.99	-0.48	74.95	-2.52	75.25	-2.21	78.45	78.19	-0.26	76.40	-2.05	76.77	-1.68
8	16756	75.31	74.73	-0.58	74.70	-0.61	74.94	-0.36	76.77	76.30	-0.47	75.97	-0.80	76.24	-0.53
9	16681	75.20	74.66	-0.54	74.56	-0.64	74.76	-0.45	76.47	76.04	-0.43	75.73	-0.75	75.91	-0.56
10	15863	74.80	74.16	-0.63	74.53	-0.26	74.71	-0.09	76.18	75.62	-0.56	75.64	-0.53	75.80	-0.38
11	15381	74.66	73.98	-0.68	74.50	-0.16	74.66	0.00	75.86	75.38	-0.48	75.60	-0.26	75.74	-0.11
12	14232	73.91	73.38	-0.54	73.68	-0.23	73.82	-0.10	74.98	74.55	-0.43	74.65	-0.33	74.79	-0.19
13	13031	73.00	72.58	-0.43	72.82	-0.18	72.93	-0.07	73.83	73.50	-0.33	73.56	-0.27	73.68	-0.15
14	12065	72.13	71.78	-0.35	71.99	-0.14	72.08	-0.05	72.89	72.59	-0.31	72.65	-0.24	72.75	-0.14
15	11029	70.11	69.83	-0.29	70.01	-0.11	70.08	-0.03	70.92	70.57	-0.35	70.63	-0.29	70.73	-0.19
16	10765	69.26	69.06	-0.19	69.19	-0.07	69.24	-0.02	69.82	69.56	-0.25	69.61	-0.21	69.67	-0.14

Table 6: Proposed HEC-RAS Peak Flow Results

Location	10-Year Exist Flow (CFS)	10-Year Phase 1 Interim (Basin) Flow (CFS)	10-Year Diff. (%)	10-Year Phase 2 Proposed (Channel Impvs) Flow (CFS)	10-Year Diff. (%)	10-Year Phase 3 Future (Storm Sewers) Flow (CFS)	10-Year Diff. (%)	100-Year Exist Flow (CFS)	100-Year Phase 1 Interim (Basin) Flow (CFS)	100-Year Diff. (%)	100-Year Phase 2 Proposed (Channel Impvs) Flow (CFS)	100-Year Diff. (%)	100-Year Phase 3 Future (Storm Sewers) Flow (CFS)	100-Year Diff. (%)
Briar Branch @ Campbell Rd	589	552	-6.20%	552	-6.20%	576	-2.16%	1088	1016	-6.65%	1016	-6.65%	1035	-4.85%
Briar Branch @ Spring Branch	1158	1119	-3.39%	1119	-3.39%	1144	-1.18%	2142	2065	-3.59%	2065	-3.59%	2086	-2.58%
Spring Branch @ Buffalo Bayou	3853	3808	-1.16%	3808	-1.16%	3837	-0.40%	7104	7026	-1.11%	7026	-1.11%	7046	-0.82%
Buffalo Bayou @ W138-00-00	7953	7951	-0.04%	7951	-0.04%	7953	-0.01%	15423	15409	-0.09%	15409	-0.09%	15413	-0.06%
Buffalo Bayou @ W137-00-00	8152	8149	-0.04%	8149	-0.04%	8152	-0.01%	15903	15888	-0.09%	15888	-0.09%	15893	-0.06%
Buffalo Bayou @ Woodway Dr	8431	8427	-0.05%	8427	-0.05%	8430	-0.01%	16676	16661	-0.09%	16661	-0.09%	16665	-0.07%
Buffalo Bayou @ W129-00-00	8840	8809	-0.36%	8809	-0.36%	8829	-0.12%	17497	17479	-0.10%	17479	-0.10%	17484	-0.07%
Buffalo Bayou @ Montrose Blvd.	8535	8526	-0.11%	8526	-0.11%	8532	-0.04%	17393	17367	-0.15%	17367	-0.15%	17375	-0.11%
Buffalo Bayou @ White Oak Bayou	38442	38425	-0.04%	38425	-0.04%	38436	-0.01%	59250	59201	-0.08%	59201	-0.08%	59214	-0.06%
Buffalo Bayou @ End	39606	39590	-0.04%	39590	-0.04%	39600	-0.01%	61636	61588	-0.08%	61588	-0.08%	61601	-0.06%

Table 7: Proposed HEC-RAS Water Surface Elevation Results

Location	10-Year Exist WSEL*	10-Year Phase 1 Interim (Basin) WSEL (ft)	10-Year Diff. (ft)	10-Year Phase 2 Proposed (Channel Impvs) WSEL (ft)	10-Year Diff. (ft)	10-Year Phase 3 Future (Storm Sewers) WSEL (ft)	10-Year Diff. (ft)	100-Year Exist WSEL*	100-Year Phase 1 Interim (Basin) WSEL (ft)	100-Year Diff. (ft)	100-Year Phase 2 Proposed (Channel Impvs) WSEL (ft)	100-Year Diff. (ft)	100-Year Phase 3 Future (Storm Sewers) WSEL (ft)	100-Year Diff. (ft)
Briar Branch @ Campbell Rd	69.80	69.60	-0.20	69.73	-0.07	69.78	-0.02	72.25	72.11	-0.14	72.16	-0.09	72.14	-0.11
Briar Branch @ Spring Branch	32.76	32.62	-0.14	32.71	-0.05	32.76	0.00	35.82	35.56	-0.26	35.61	-0.21	35.67	-0.15
Spring Branch @ Buffalo Bayou	26.11	26.06	-0.05	26.09	-0.02	26.11	0.00	29.35	29.27	-0.08	29.28	-0.07	29.30	-0.05
Buffalo Bayou @ W138-00-00	39.17	39.16	-0.01	39.17	0.00	39.17	0.00	47.14	47.12	-0.02	47.13	-0.01	47.13	-0.01
Buffalo Bayou @ W137-00-00	36.75	36.74	-0.01	36.75	0.00	36.75	0.00	44.52	44.49	-0.03	44.50	-0.02	44.50	-0.02
Buffalo Bayou @ Woodway Dr	35.99	35.97	-0.02	35.98	-0.01	35.99	0.00	43.67	43.65	-0.02	43.66	-0.01	43.66	-0.01
Buffalo Bayou @ W129-00-00	33.07	33.06	-0.01	33.07	0.00	33.07	0.00	40.67	40.65	-0.02	40.66	-0.01	40.66	-0.01
Buffalo Bayou @ Montrose Blvd.	30.59	30.58	-0.01	30.59	0.00	30.59	0.00	37.65	37.62	-0.03	37.63	-0.02	37.63	-0.02
Buffalo Bayou @ White Oak Bayou	22.33	22.32	-0.01	22.32	-0.01	22.33	0.00	30.43	30.41	-0.02	30.42	-0.01	30.42	-0.01
Buffalo Bayou @ End	0.08	0.08	0.00	0.08	0.00	0.08	0.00	7.09	7.07	-0.02	7.07	-0.02	7.08	-0.01

*WSEL = Water Surface Elevation

Table 8: Requested Variances from HCFCD PCPM Criteria

Item and Location	PC&P Manual Section	HCFCD Standard	Variance Requested	Reason
Walls, Downstream of Bunker Hill Rd	5.4.2	"Side slopes no steeper than 2:1" for concrete-lined channels	Vertical walls requested instead of concrete-lined slopes.	HCFCD standard channel section does not provide adequate conveyance from Bunker Hill to the detention basin. A large conveyance area achieved through vertical wall construction is requested to provide the necessary capacity. The variance request is part of and critial to a flood damage reduction effort.
Berms, Downstream of Bunker Hill Rd	5.5.3	"Minimum Berm Widths on each side are 20 feet one side, 10 feet other side" for concrete-lined channels.	Berm widths requested are 15 feet on north side, 10 feet on south side.	HCFCD standard channel berm widths do not allow for adequate conveyance from Bunker Hill to the detention basin. A reduction in berm width is requested to achieve the necessary conveyance capacity. The variance request is part of and critial to a flood damage reduction effort.
Channel Enclosure, Upstream of Bunker Hill Rd	12.2.5	"The right-of-way width for an enclosed channel shall be the outside width of the [...] boxes plus" the depth on each side "rounded up to the nearest 5 feet"	The existing 50' ROW will meet criteria with 2-6'x6' boxes at the proposed depths. Proposed size is 2-10'x7' boxes.	2-10'x7' boxes provide more capacity and storage for flood damage reduction.
Berms, Upstream of Bunker Hill Rd	5.5.3	"Minimum Berm Widths on each side are 20 feet" for grass-lined channels with a depth of < 7 feet.	Berm widths requested are 15 feet on north side, 10 feet on south side.	For the existing 50' ROW, this standard would leave less than 10' available for conveyance. This is insufficient to provide even 2 feet of depth with 4:1 grass-lined side slopes.

Table 9: Restrictor Information Summary Table

River Station	Description	Orifice Type	Size	10yr Peak Flow (CFS)	10yr Peak Velocity (ft/s)	10yr Max Headloss (Ft)	100yr Peak Flow (CFS)	100yr Peak Velocity (ft/s)	100yr Max Headloss (Ft)
19700	Upstream of Witte	Removable Steel Wall	Dual Openings 28"(W) by 36" (H)	45	3.2	0.31	47	3.3	0.35
19320	Downstream of Witte	Removable Steel Wall	Dual Openings 40"(W) by 51" (H)	214	7.5	1.77	218	7.7	1.83
18075	Upstream of Winhover	Removable Steel Wall	Dual Openings 42"(W) by 54" (H)	265	8.3	2.15	300	9.4	2.77

Table 10: Future Phase 3 Storm Sewer Improvement Sizes and Results

#	Location	Exist Size	Prop Size	Exist 10-Year Flow (CFS)	Future Phase 3 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Future Phase 3 100-Year Flow (CFS)
1	Gessner	36"	36"	73.0	49.2	78.3	71.5
2	Larston	15”	42”	7.6	37.0	7.7	48.7
3	Cedardale	36"	42"	24.8	40.6	27.9	41.5
4	Witte	1-8'x5'	1-8'x5' and 1-5'x5'	143.1	269.3	151.9	273.2
5	Demeret	24"	36"	12.0	38.6	11.8	52.2
6	Windhover	2-24"	1-42"	29.9	81.3	30.0	121.3
7	Springrock	36"	1-8'x5'	85.2	167.2	191.4	289.2

Table 11: Dynamic Model Water Surface Elevation Reduction Results

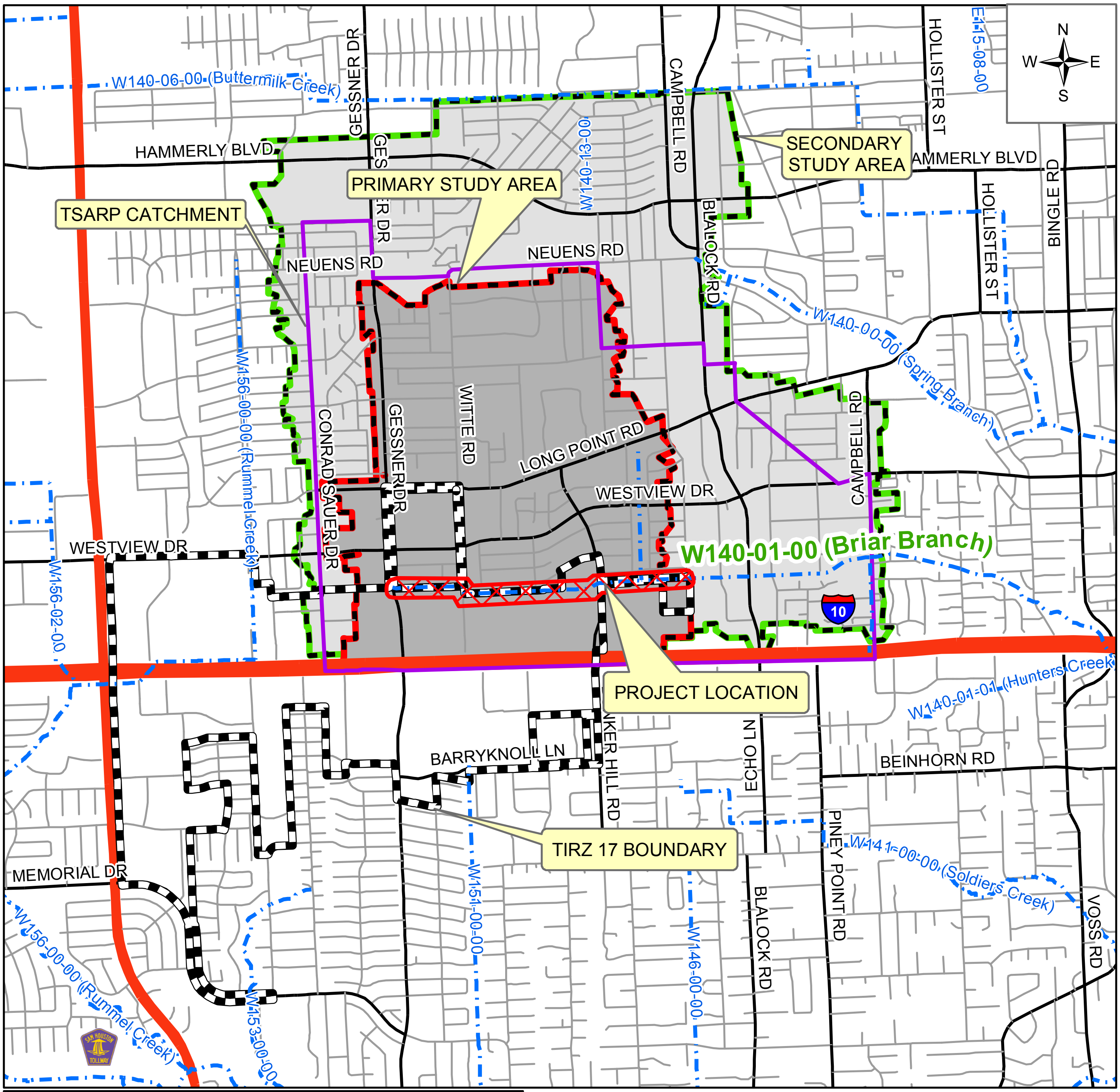
Node*	10-Year							100-Year						
	Exist WSEL*	Phase 1 Interim (Basin) WSEL (ft)	Diff. (ft)	Phase 2 Proposed (Channel Impvs) WSEL (ft)	Diff. (ft)	Phase 3 Future (Storm Sewers) WSEL (ft)	Diff. (ft)	Exist WSEL*	Phase 1 Interim (Basin) WSEL (ft)	Diff. (ft)	Phase 2 Proposed (Channel Impvs) WSEL (ft)	Diff. (ft)	Phase 3 Future (Storm Sewers) WSEL (ft)	Diff. (ft)
A	85.29	85.24	-0.05	85.22	-0.07	84.92	-0.36	86.27	86.25	-0.01	86.22	-0.05	86.02	-0.25
B	82.38	82.26	-0.12	82.24	-0.15	81.43	-0.96	83.01	82.98	-0.03	82.90	-0.11	82.14	-0.86
C	81.59	81.44	-0.16	81.40	-0.20	80.88	-0.71	82.19	82.14	-0.05	82.02	-0.17	81.54	-0.65
D	81.01	80.82	-0.20	80.82	-0.19	80.68	-0.34	81.62	81.55	-0.06	81.44	-0.18	81.31	-0.30
E	80.78	80.50	-0.27	80.46	-0.32	80.51	-0.27	81.37	81.30	-0.07	81.18	-0.19	81.16	-0.21
F	80.32	79.91	-0.41	79.91	-0.42	80.27	-0.05	80.92	80.78	-0.14	80.72	-0.20	80.91	-0.01
G	80.25	79.91	-0.34	80.09	-0.16	79.42	-0.84	80.80	80.74	-0.06	80.69	-0.12	80.58	-0.22
H	80.46	80.13	-0.34	80.04	-0.43	79.92	-0.55	81.05	80.98	-0.07	80.92	-0.13	80.83	-0.22
I	80.32	79.96	-0.36	80.10	-0.22	79.87	-0.45	80.87	80.81	-0.06	80.72	-0.16	80.58	-0.29
J	83.54	83.25	-0.29	83.11	-0.43	82.97	-0.57	84.93	84.78	-0.15	84.70	-0.23	84.52	-0.41
K	81.47	80.81	-0.65	80.53	-0.94	79.93	-1.53	83.05	82.82	-0.23	82.90	-0.16	82.29	-0.76
L	80.67	80.10	-0.57	79.82	-0.85	79.60	-1.07	81.74	81.59	-0.15	81.64	-0.10	81.46	-0.28
M	79.87	79.26	-0.61	78.74	-1.14	78.82	-1.05	80.61	80.48	-0.14	80.20	-0.41	80.23	-0.38
N	79.51	78.54	-0.97	78.51	-1.00	78.57	-0.94	80.26	80.11	-0.15	80.11	-0.15	80.12	-0.14
O	79.57	79.43	-0.14	79.22	-0.35	78.11	-1.46	80.14	80.12	-0.03	80.03	-0.11	79.84	-0.31
P	80.08	79.98	-0.10	79.93	-0.15	79.91	-0.16	80.51	80.45	-0.07	80.39	-0.13	80.34	-0.18
Q	79.48	79.28	-0.19	79.17	-0.30	78.87	-0.61	80.00	79.93	-0.07	79.90	-0.10	79.76	-0.23
R	79.53	79.33	-0.19	79.21	-0.31	76.76	-2.76	80.00	79.94	-0.06	79.90	-0.10	79.50	-0.50
S	78.54	78.41	-0.13	78.49	-0.05	78.51	-0.03	78.84	78.80	-0.04	78.80	-0.04	78.81	-0.03
T	75.20	74.66	-0.54	74.56	-0.64	74.76	-0.45	76.47	76.04	-0.43	75.73	-0.75	75.91	-0.56
U	73.54	73.54	0.00	73.54	0.00	73.54	0.00	78.54	78.40	-0.13	78.41	-0.13	78.42	-0.12
V	77.04	76.88	-0.16	76.95	-0.08	76.27	-0.76	78.15	77.93	-0.22	77.91	-0.24	77.32	-0.83
W	76.15	75.90	-0.25	76.05	-0.10	75.17	-0.98	77.46	77.25	-0.21	77.26	-0.20	76.40	-1.06
X	74.96	74.38	-0.59	74.74	-0.23	74.96	0.00	76.73	76.29	-0.44	76.32	-0.41	76.06	-0.67
Y	75.63	75.61	-0.02	75.60	-0.03	75.60	-0.03	76.31	76.15	-0.17	76.11	-0.20	76.08	-0.23
Z	75.14	74.71	-0.43	75.00	-0.14	75.10	-0.04	76.15	75.96	-0.19	75.89	-0.26	75.92	-0.23

* See Exhibit 12 for Node Locations

**WSEL = Water Surface Elevation

EXHIBITS

APPENDICES



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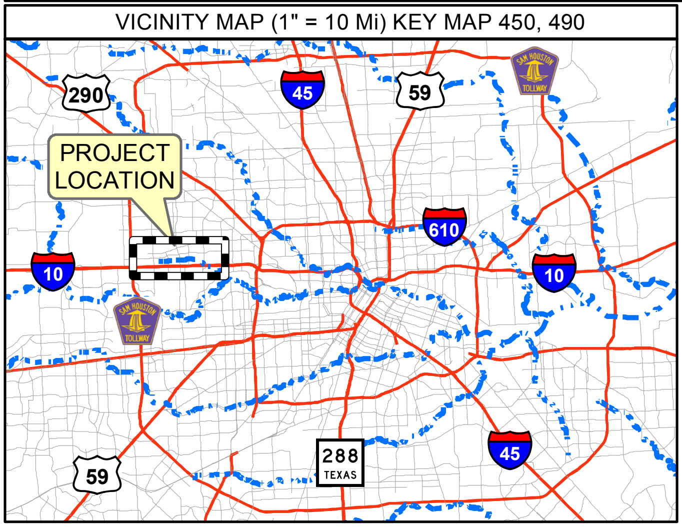

0 3,000 6,000 Feet

TIRZ 17
REDEVELOPMENT
AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

EXHIBIT 1 - PROJECT LOCATION MAP

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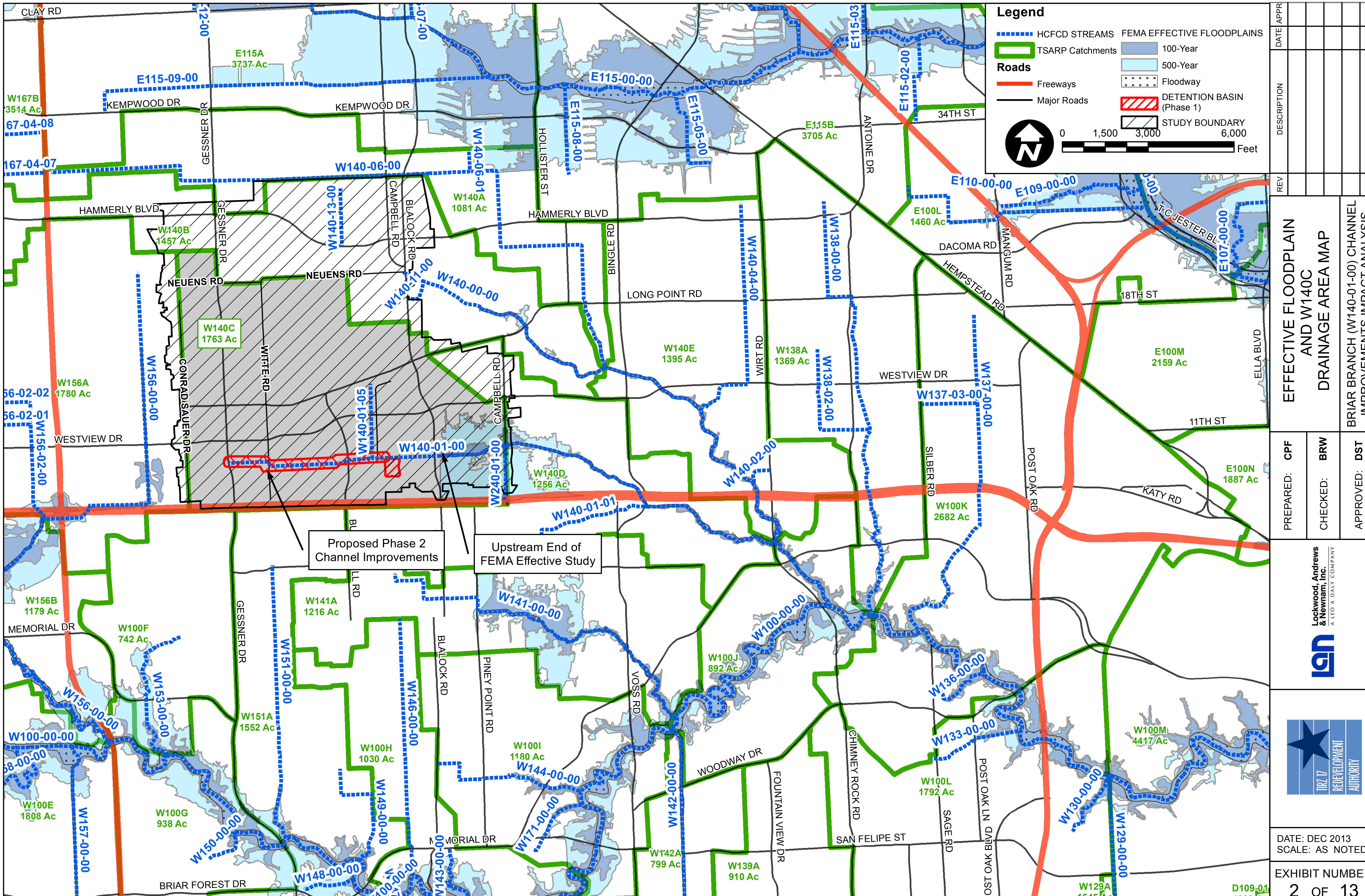

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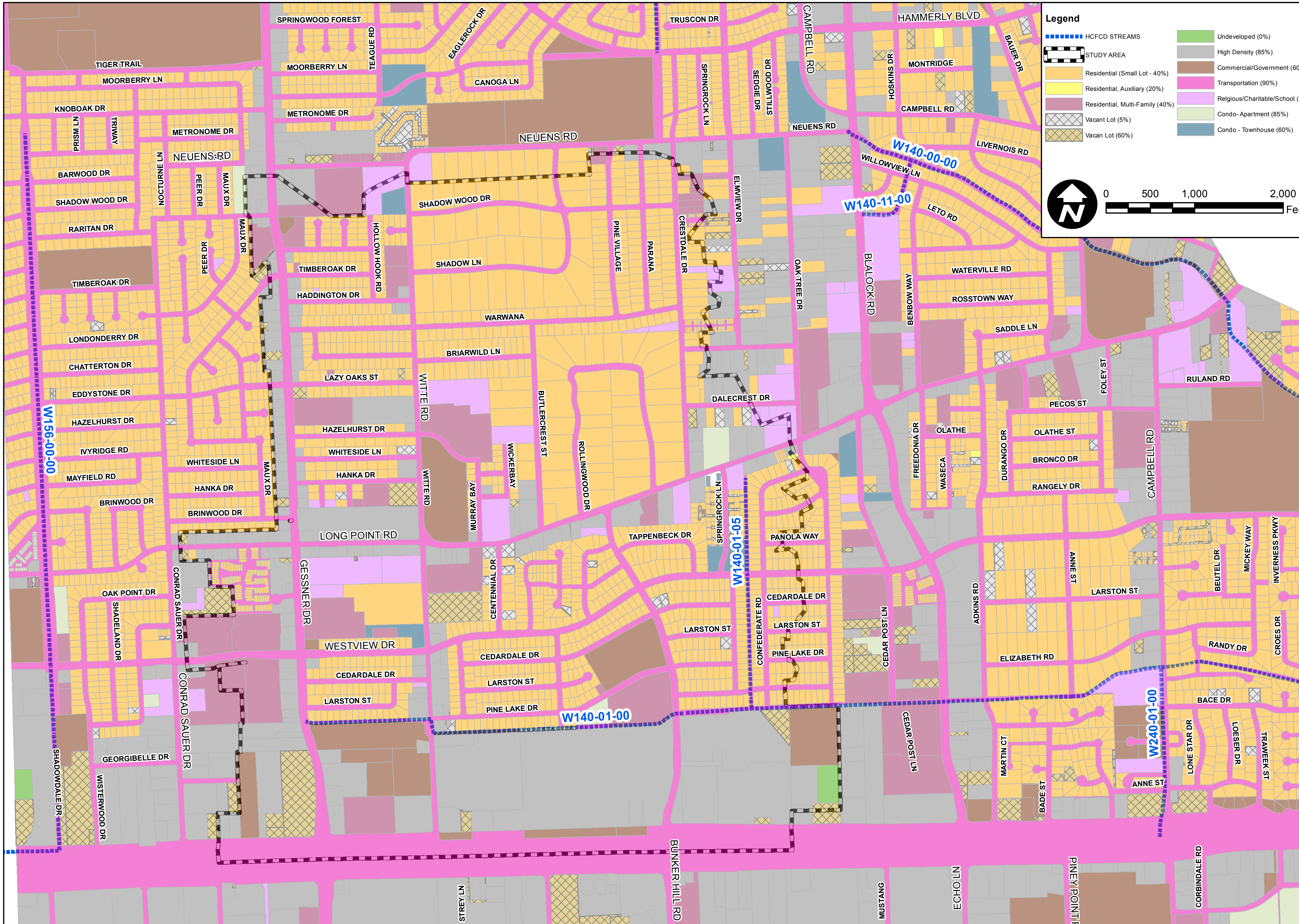


REV	DESCRIPTION	DATE	APPR

LANDUSE MAP

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

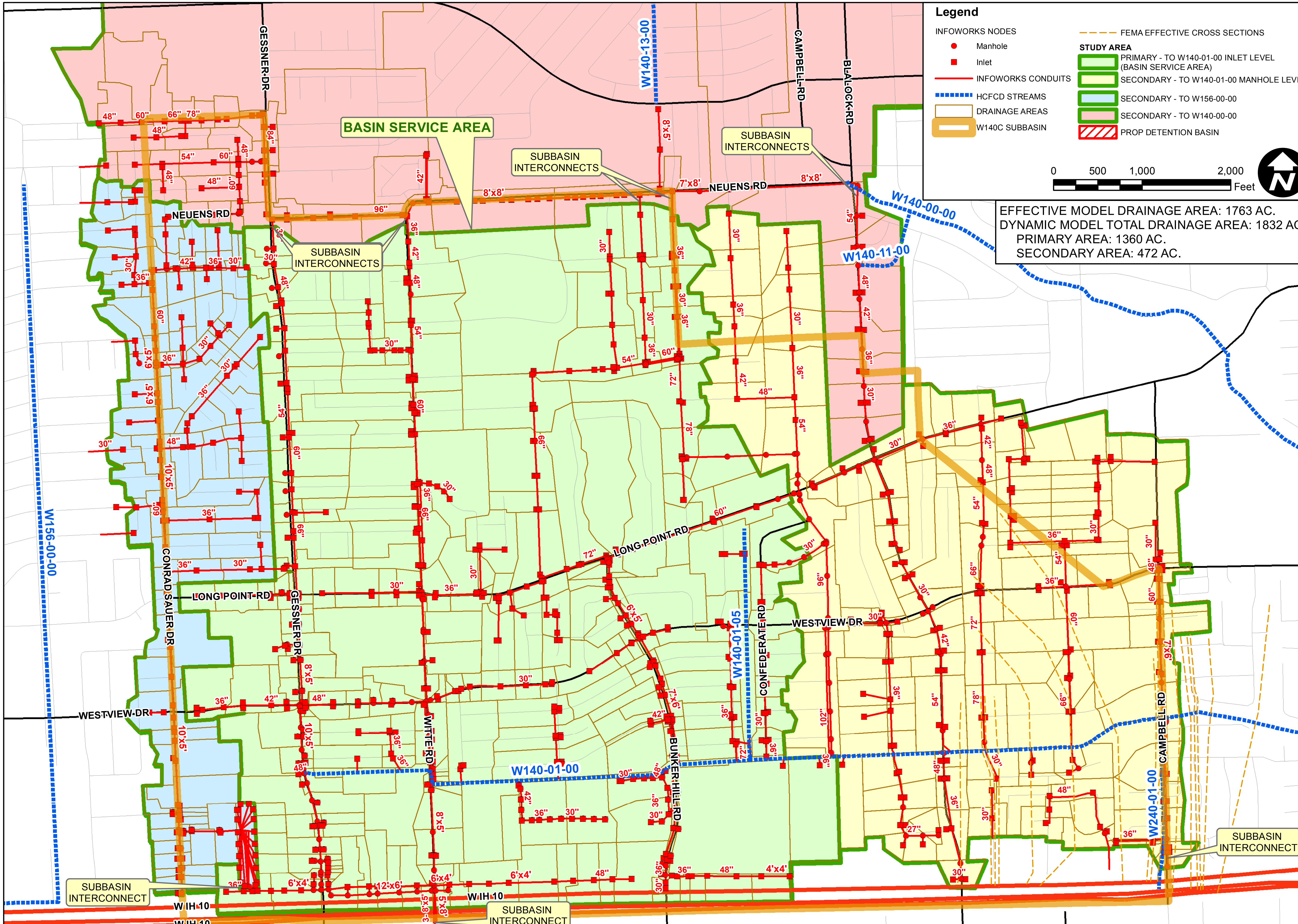
PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
3 OF 13



PREPARED: CPF
CHECKED: BRW
APPROVED: DST

REV	DESCRIPTION	DATE	APPR

DYNAMIC MODEL DRAINAGE SYSTEM MAP

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

Lockwood, Andrews & Newnam, Inc.
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TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
4 OF 13

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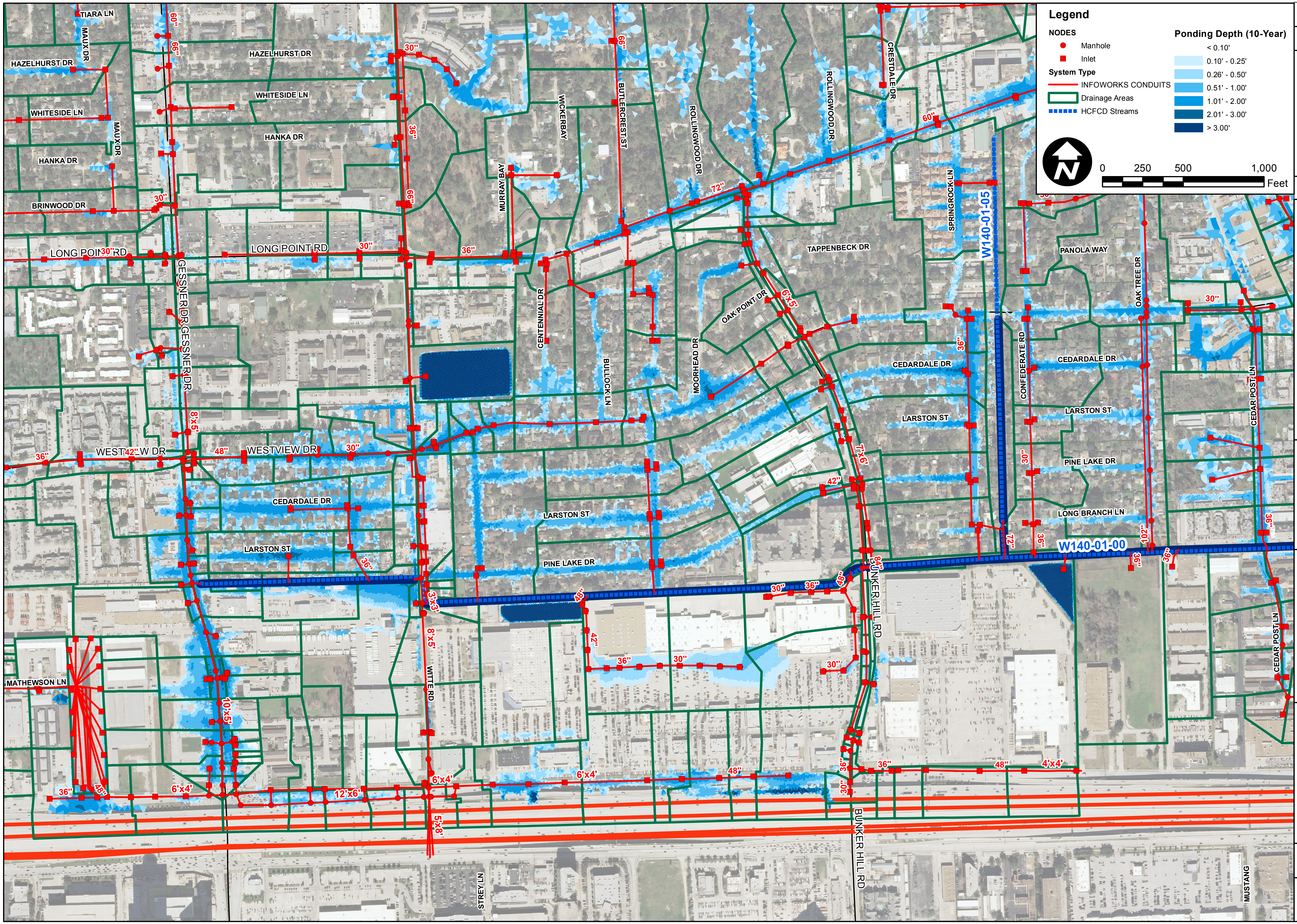

REV | DESCRIPTION | DATE | APPR

EXISTING CONDITIONS 10-YEAR INUNDATION MAP

BRIAR BRANCH CHANNEL IMPROVEMENTS (W140-01-00) IMPACT ANALYSIS

PREPARED: CPF

CHECKED: BRW

APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
5 OF 13

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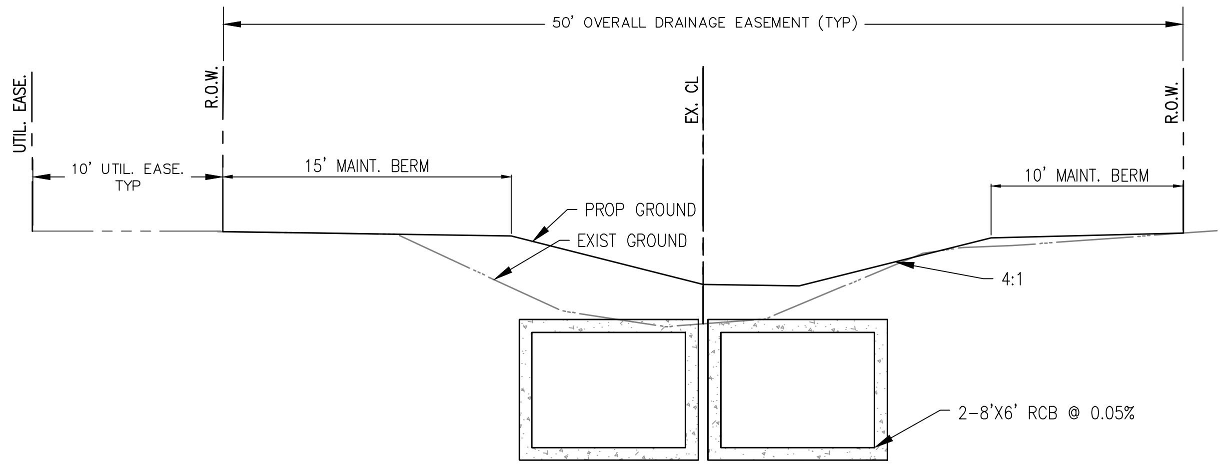
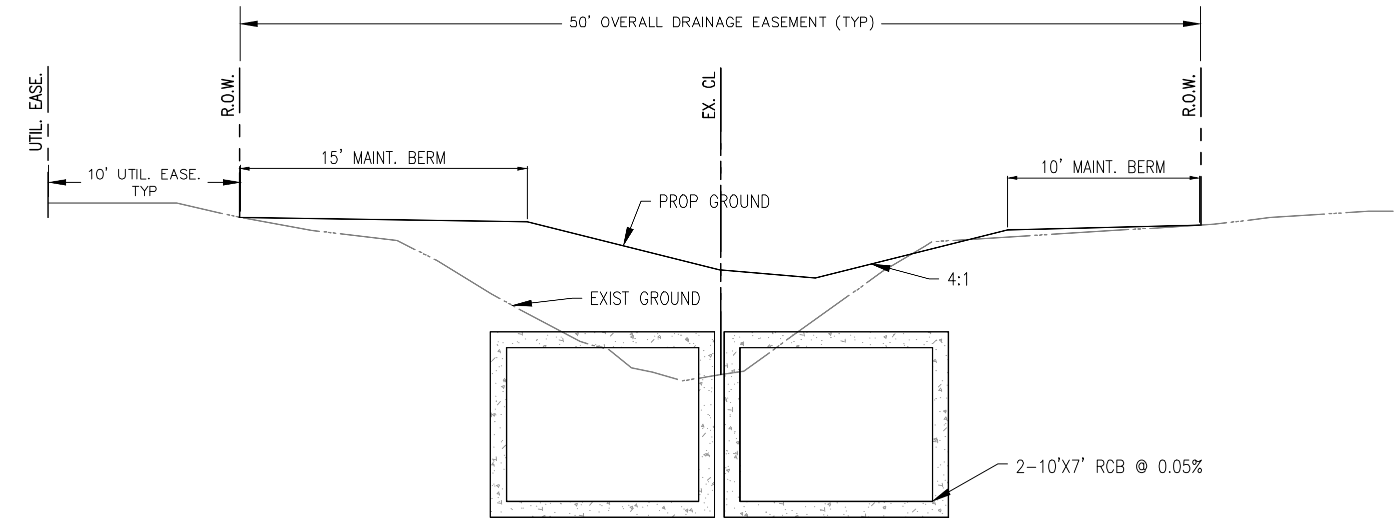
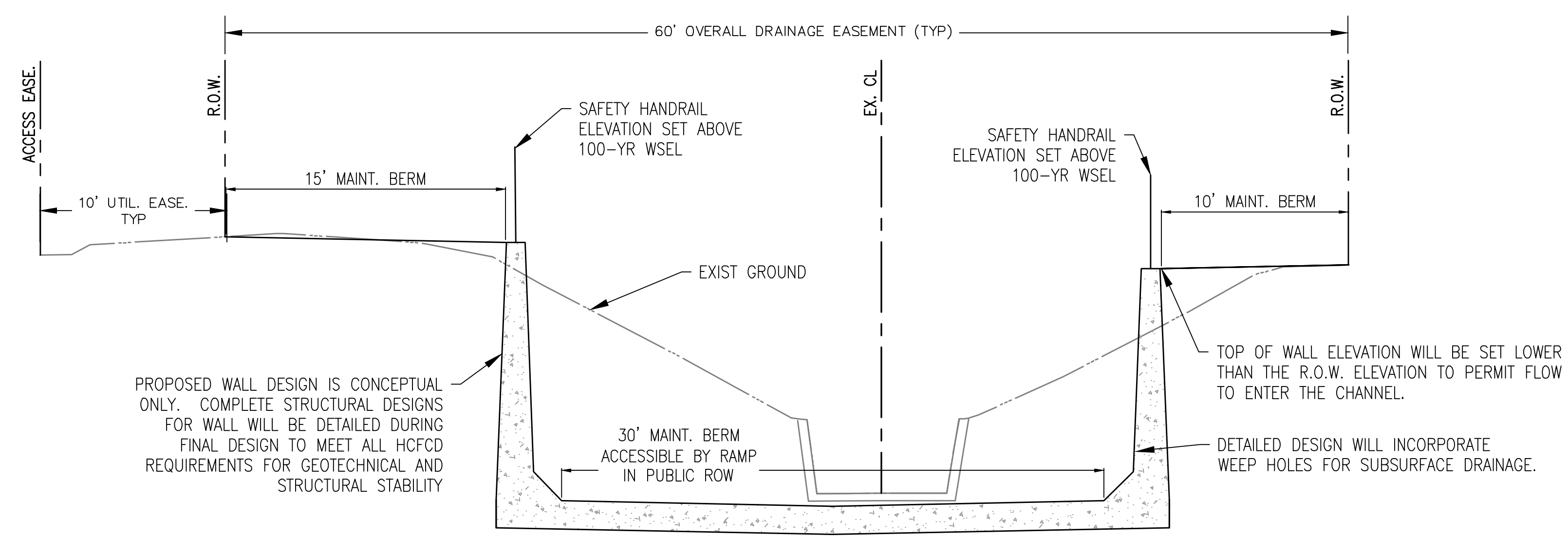


SECTON 1
GESSNER RD TO WITTE RD
W140-01-00 CHANNEL
PROP CHANNEL AREA = 115 SF
EXIST CHANNEL AREA = 55 SF



SECTON 2
WITTE RD TO BUNKER HILL RD
W140-01-00 CHANNEL
PROP CHANNEL AREA = 162 SF
EXIST CHANNEL AREA = 120 SF



SECTON 3
BUNKER HILL RD TO POND
W140-01-00 CHANNEL
PROP CHANNEL AREA = 430 SF
EXIST CHANNEL AREA = 220 SF

0 5 10
1"=10'-0"

PRELIMINARY NOT FOR CONSTRUCTION

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 6
PROPOSED BRIAR BRANCH
TYPICAL SECTIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: HORZ:		
SHEET: 6 OF 13		

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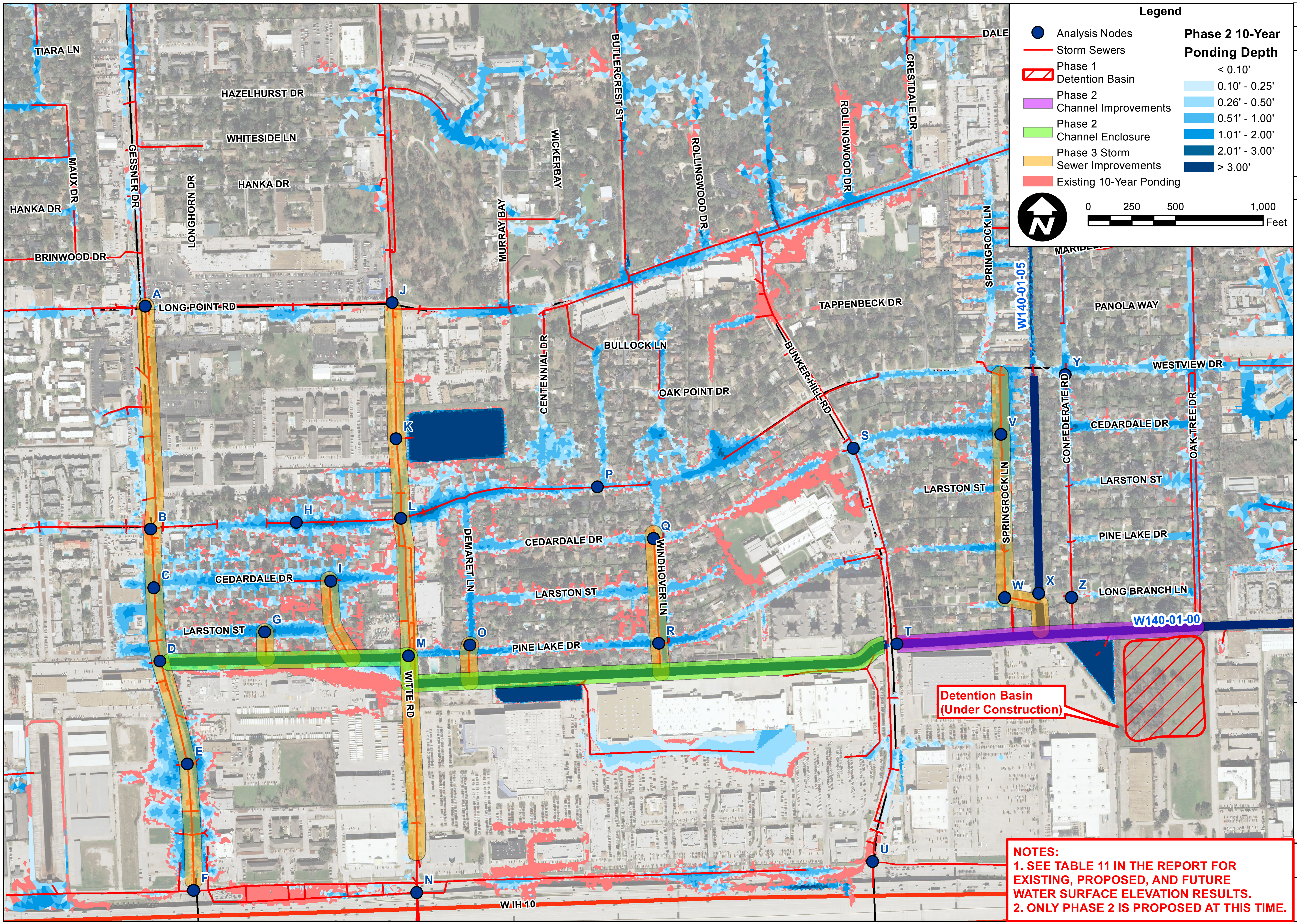

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REV	DESCRIPTION	DATE	APPR

PROPOSED (PHASE 2) 10-YEAR INUNDATION REDUCTION MAP

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

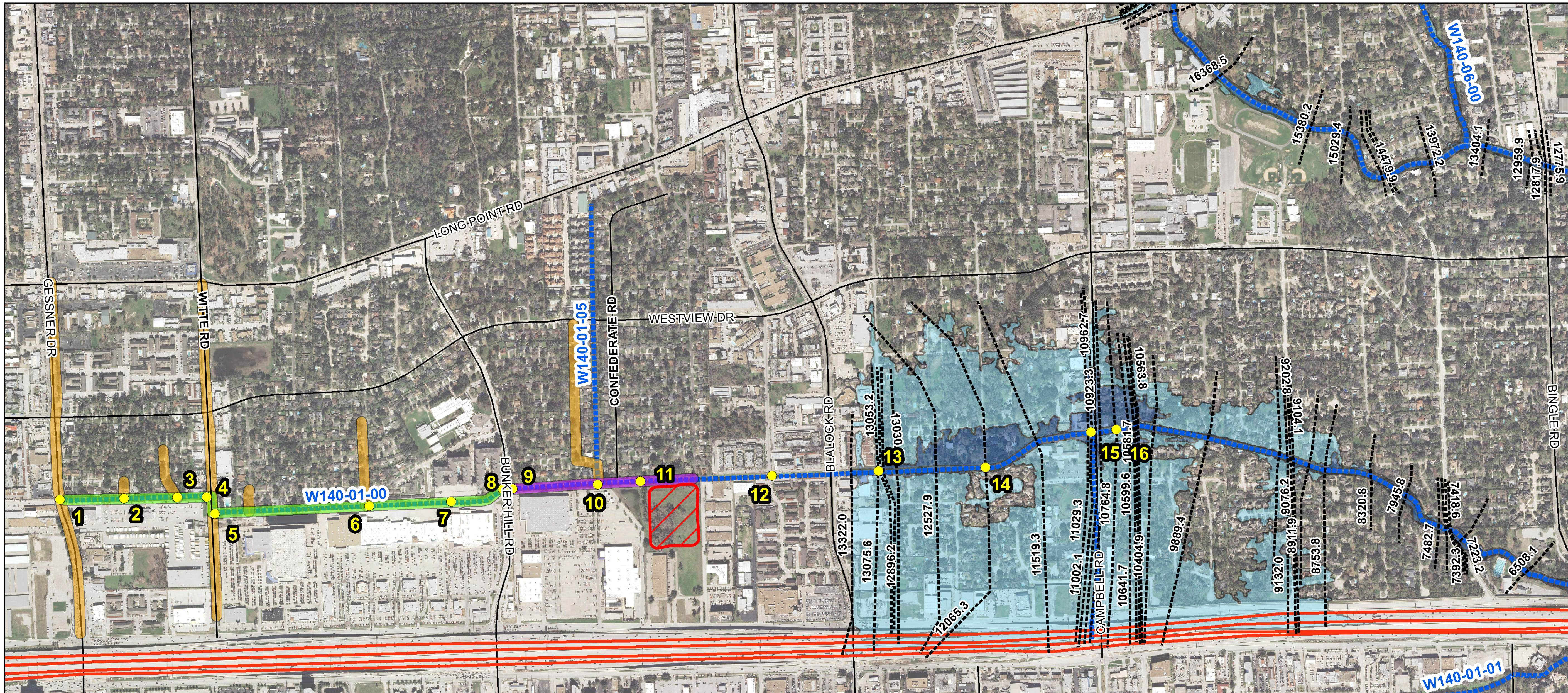
PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
7 OF 13



Node	Station	10-YEAR WSEL RESULTS EXISTING	INTERIM PHASE 1	DIFFERENCE (FT)	PROPOSED PHASE 2	DIFFERENCE (FT)	FUTURE PHASE 3	DIFFERENCE (FT)	100-YEAR WSEL RESULTS EXISTING	INTERIM PHASE 1	DIFFERENCE (FT)	PROPOSED PHASE 2	DIFFERENCE (FT)	FUTURE PHASE 3	DIFFERENCE (FT)
1	21076	81.01	80.82	-0.20	80.82	-0.19	80.68	-0.34	81.62	81.55	-0.06	81.44	-0.18	81.31	-0.30
2	20481	80.08	79.52	-0.56	79.27	-0.81	79.32	-0.76	80.89	80.70	-0.19	80.50	-0.39	80.48	-0.40
3	19981	80.08	79.47	-0.61	79.17	-0.91	79.24	-0.84	80.86	80.69	-0.17	80.44	-0.42	80.43	-0.44
4	19701	80.09	79.53	-0.57	78.75	-1.34	78.83	-1.26	80.98	80.80	-0.17	80.22	-0.75	80.25	-0.73
5	19510	79.52	78.81	-0.70	78.68	-0.84	78.75	-0.76	80.21	80.07	-0.14	80.13	-0.08	80.15	-0.06
6	18481	78.28	77.76	-0.52	76.99	-1.28	77.27	-1.01	79.10	78.84	-0.26	78.77	-0.33	79.07	-0.03
7	18066	77.47	76.99	-0.48	74.95	-2.52	75.25	-2.21	78.45	78.19	-0.26	76.40	-2.05	76.77	-1.68
8	16756	75.31	74.73	-0.58	74.70	-0.61	74.94	-0.36	76.77	76.30	-0.47	75.97	-0.80	76.24	-0.53
9	16681	75.20	74.66	-0.54	74.56	-0.64	74.76	-0.45	76.47	76.04	-0.43	75.73	-0.75	75.91	-0.56
10	15863	74.80	74.16	-0.63	74.53	-0.26	74.71	-0.09	76.18	75.62	-0.56	75.64	-0.53	75.80	-0.38
11	15381	74.66	73.98	-0.68	74.50	-0.16	74.66	0.00	75.86	75.38	-0.48	75.60	-0.26	75.74	-0.11
12	14232	73.91	73.38	-0.54	73.68	-0.23	73.82	-0.10	74.98	74.55	-0.43	74.65	-0.33	74.79	-0.19
13	13031	73.00	72.58	-0.43	72.82	-0.18	72.93	-0.07	73.83	73.50	-0.33	73.56	-0.27	73.68	-0.15
14	12065	72.13	71.78	-0.35	71.99	-0.14	72.08	-0.05	72.89	72.59	-0.31	72.65	-0.24	72.75	-0.14
15	11029	70.11	69.83	-0.29	70.01	-0.11	70.08	-0.03	70.92	70.57	-0.35	70.63	-0.29	70.73	-0.19
16	10765	69.26	69.06	-0.19	69.19	-0.07	69.24	-0.02	69.82	69.56	-0.25	69.61	-0.21	69.67	-0.14

Dynamic Model Impact Analysis Results

NOTE: ONLY PHASE 2 IS PROPOSED AT THIS TIME

Legend

- Analysis Nodes
- Phase 1 Detention Basin
- Phase 2 Channel Improvements
- Phase 2 Channel Enclosure
- Phase 3 Storm Sewer Improvements
- Effective Model Cross Sections
- FEMA Effective Floodplains
  - 100-Year
  - 500-Year

0 500 1,000 2,000 Feet

REV | DESCRIPTION | DATE | APPR

PROPOSED (PHASE 2) DYNAMIC MODEL IMPACT ANALYSIS RESULTS

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER 8 OF 13

Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\Impact Analysis December 2013\08_Prop_Dynamic Model Impact Analysis Results.mxd
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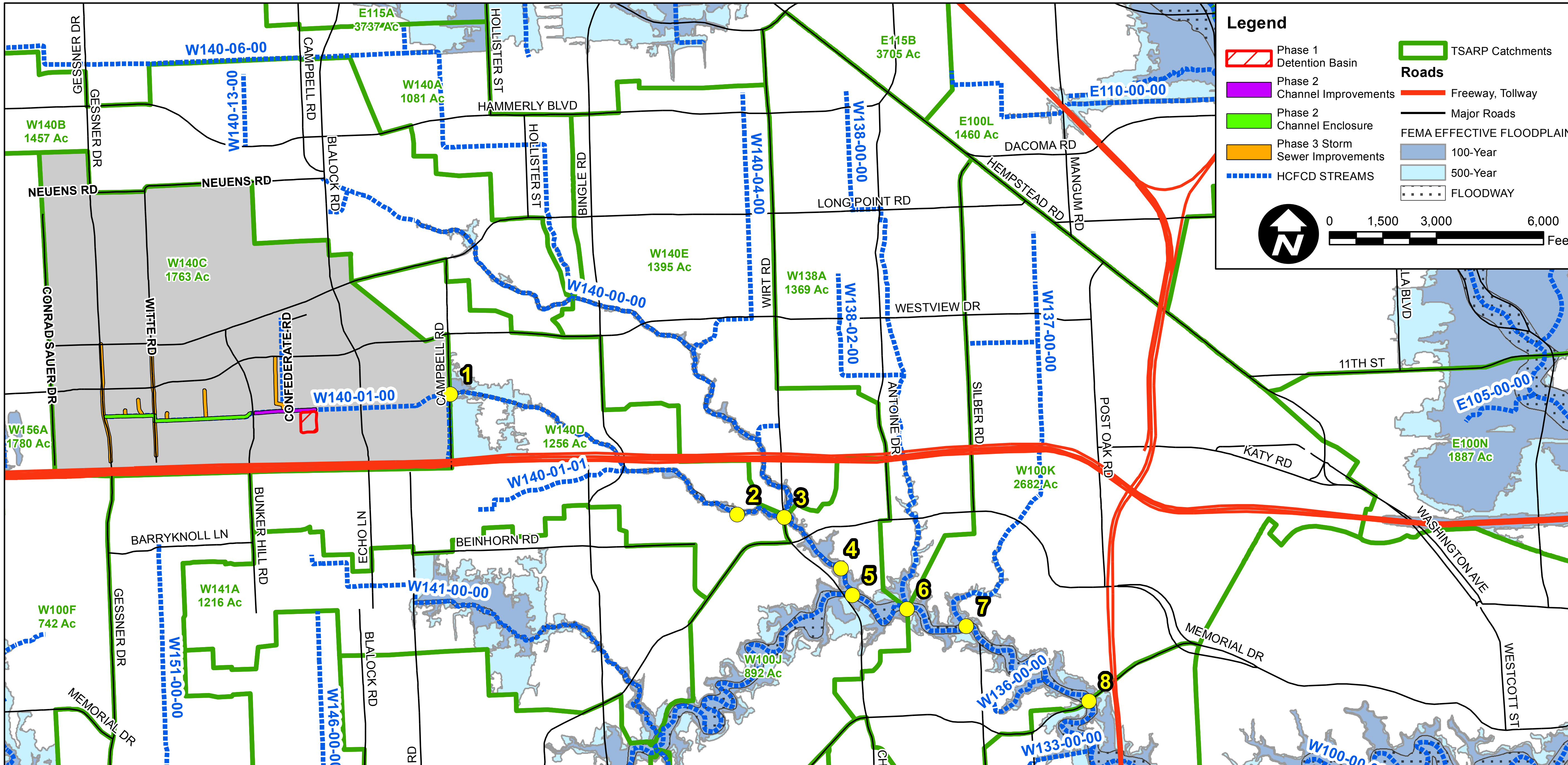


Location	10-Year Exist WSEL*	10-Year Phase 1 Interim (Basin) WSEL (ft)	Diff. (ft)	10-Year Phase 2 Proposed (Channel Impvs) WSEL (ft)	Diff. (ft)	10-Year Phase 3 Future (Storm Sewers) WSEL (ft)	Diff. (ft)	100-Year Exist WSEL*	100-Year Phase 1 Interim (Basin) WSEL (ft)	Diff. (ft)	100-Year Phase 2 Proposed (Channel Impvs) WSEL (ft)	Diff. (ft)	100-Year Phase 3 Future (Storm Sewers) WSEL (ft)	Diff. (ft)
Briar Branch @ Campbell Rd	69.80	69.60	-0.20	69.73	-0.07	69.78	-0.02	72.25	72.11	-0.14	72.16	-0.09	72.14	-0.11
Briar Branch @ Spring Branch	32.76	32.62	-0.14	32.71	-0.05	32.76	0.00	35.82	35.56	-0.26	35.61	-0.21	35.67	-0.15
Spring Branch @ Buffalo Bayou	26.11	26.06	-0.05	26.09	-0.02	26.11	0.00	29.35	29.27	-0.08	29.28	-0.07	29.30	-0.05
Buffalo Bayou @ W138-00-00	39.17	39.16	-0.01	39.17	0.00	39.17	0.00	47.14	47.12	-0.02	47.13	-0.01	47.13	-0.01
Buffalo Bayou @ W137-00-00	36.75	36.74	-0.01	36.75	0.00	36.75	0.00	44.52	44.49	-0.03	44.50	-0.02	44.50	-0.02
Buffalo Bayou @ Woodway Dr	35.99	35.97	-0.02	35.98	-0.01	35.99	0.00	43.67	43.65	-0.02	43.66	-0.01	43.66	-0.01
Buffalo Bayou @ W129-00-00	33.07	33.06	-0.01	33.07	0.00	33.07	0.00	40.67	40.65	-0.02	40.66	-0.01	40.66	-0.01
Buffalo Bayou @ Montrose Blvd.	30.59	30.58	-0.01	30.59	0.00	30.59	0.00	37.65	37.62	-0.03	37.63	-0.02	37.63	-0.02
Buffalo Bayou @ White Oak Bayou	22.33	22.32	-0.01	22.32	-0.01	22.33	0.00	30.43	30.41	-0.02	30.42	-0.01	30.42	-0.01
Buffalo Bayou @ End	0.08	0.08	0.00	0.08	0.00	0.08	0.00	7.09	7.07	-0.02	7.07	-0.02	7.08	-0.01

*WSEL = Water Surface Elevation

NOTE: ONLY PHASE 2 IS PROPOSED AT THIS TIME.

REV | DESCRIPTION | DATE | APPR

PROPOSED POND-ONLY WATERSHED LEVEL IMPACT ANALYSIS RESULTS

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

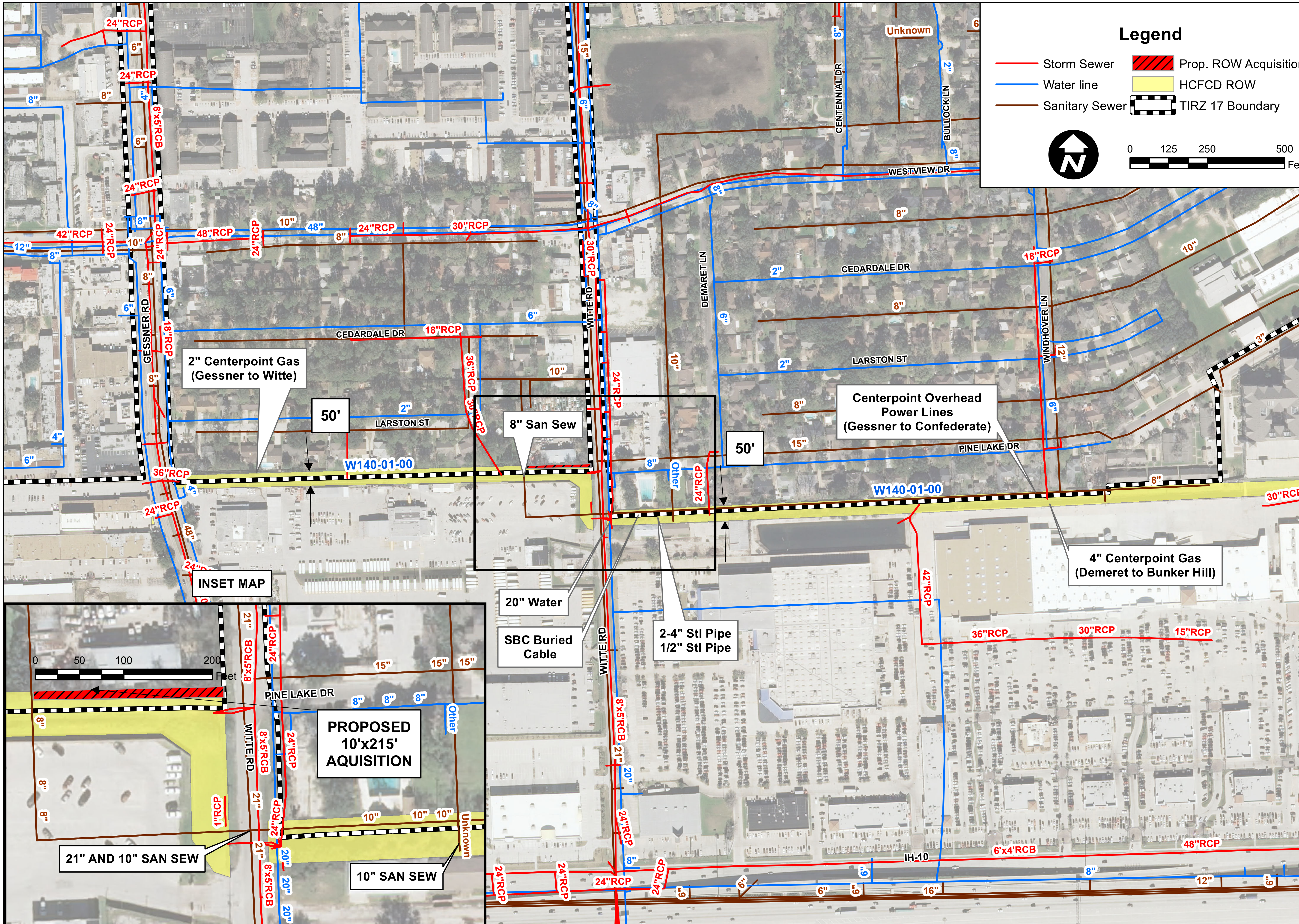
Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER 9 OF 13

Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\Impact Analysis December 2013\09_Prop_Watershed_Impact_Analysis_Results.mxd 12/31/2013 10:35:14 AM DGGreaney



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REV	DESCRIPTION	DATE	APPR

RIGHT-OF-WAY MAP

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

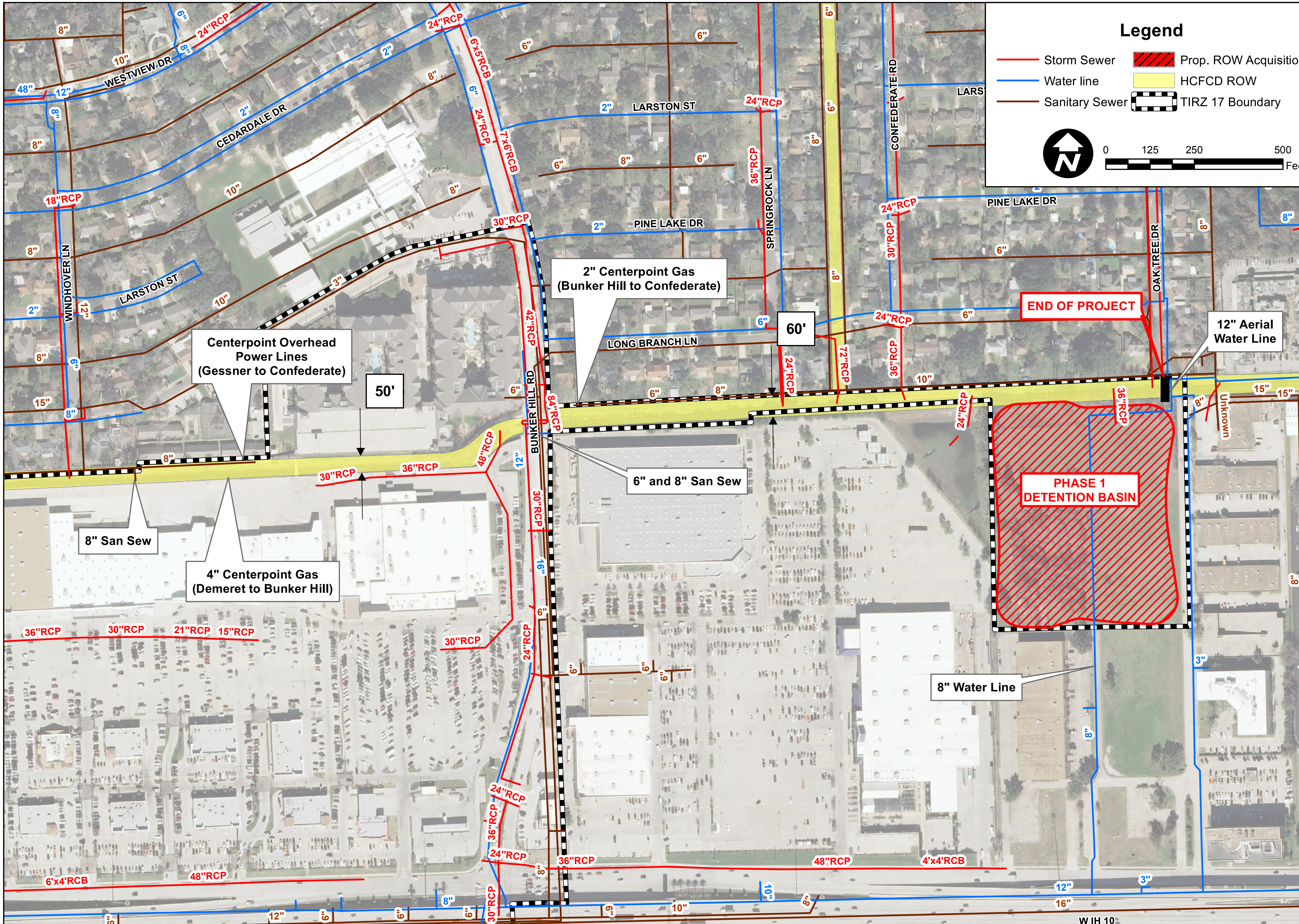
PREPARED: DGG
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
10a OF 13



DATE | APPR

DESCRIPTION

REV

RIGHT-OF-WAY MAP

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

PREPARED: DGG

CHECKED: BRW

APPROVED: DST

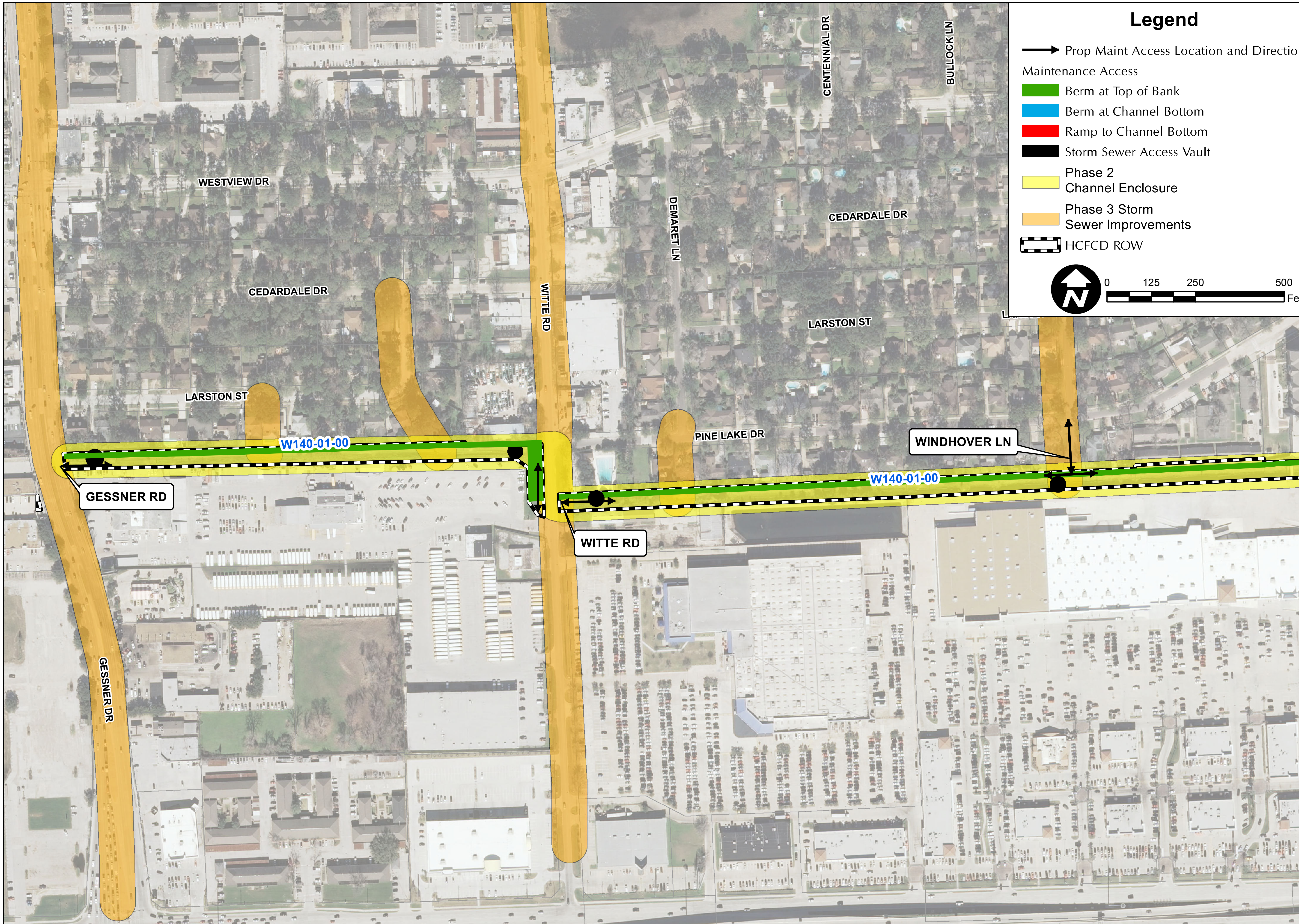
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
10b OF 13

Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\Impact Analysis December 2013\10b_ROW_Requirements.mxd 12/19/2013 8:18:01 AM DGGreaney



REV	DESCRIPTION	DATE	APPR

MAINTENANCE ACCESS PLAN

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

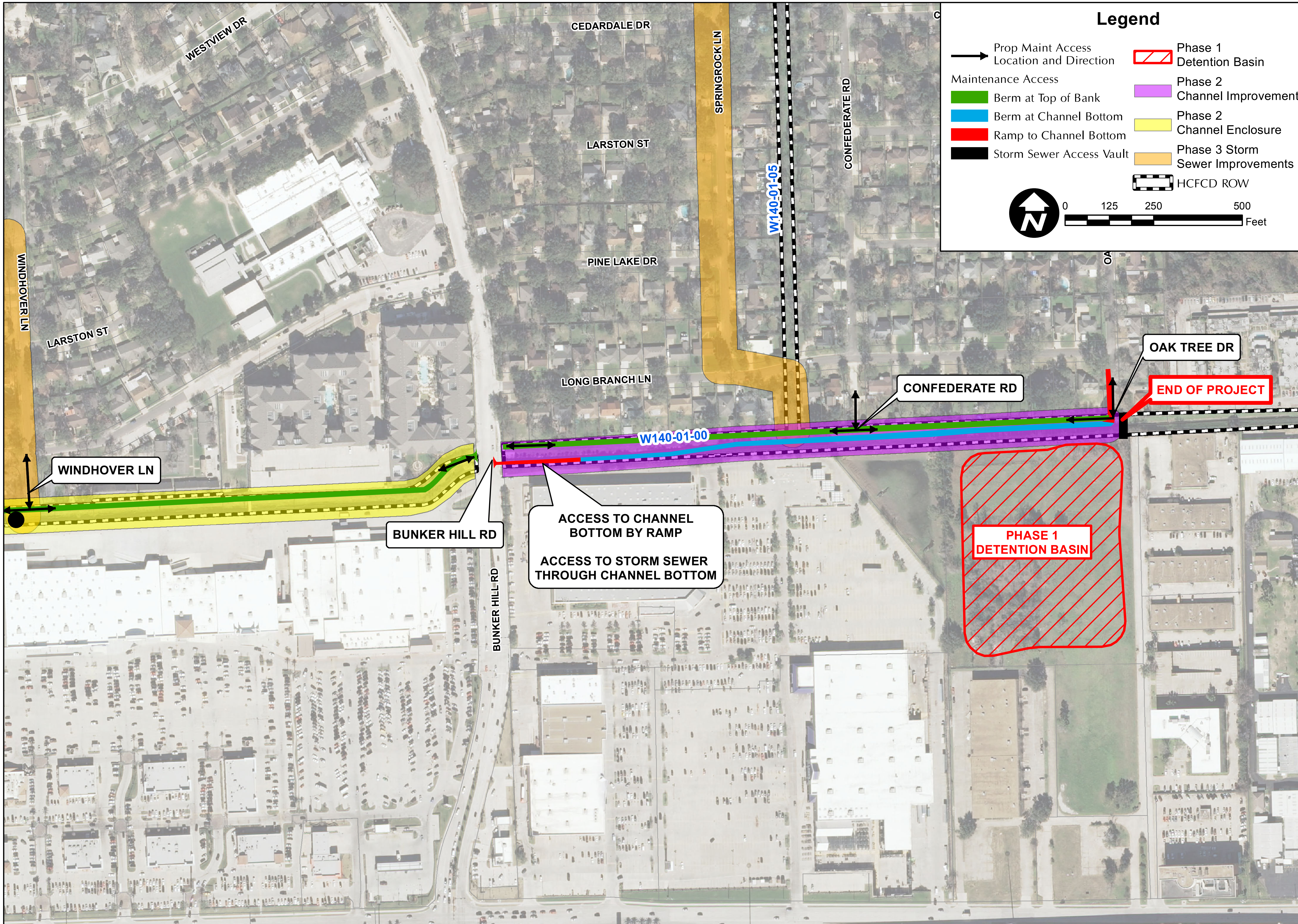
PREPARED: DGG
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
11A OF 13



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REV	DESCRIPTION	DATE	APPR

MAINTENANCE ACCESS PLAN

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

PREPARED: DGG
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

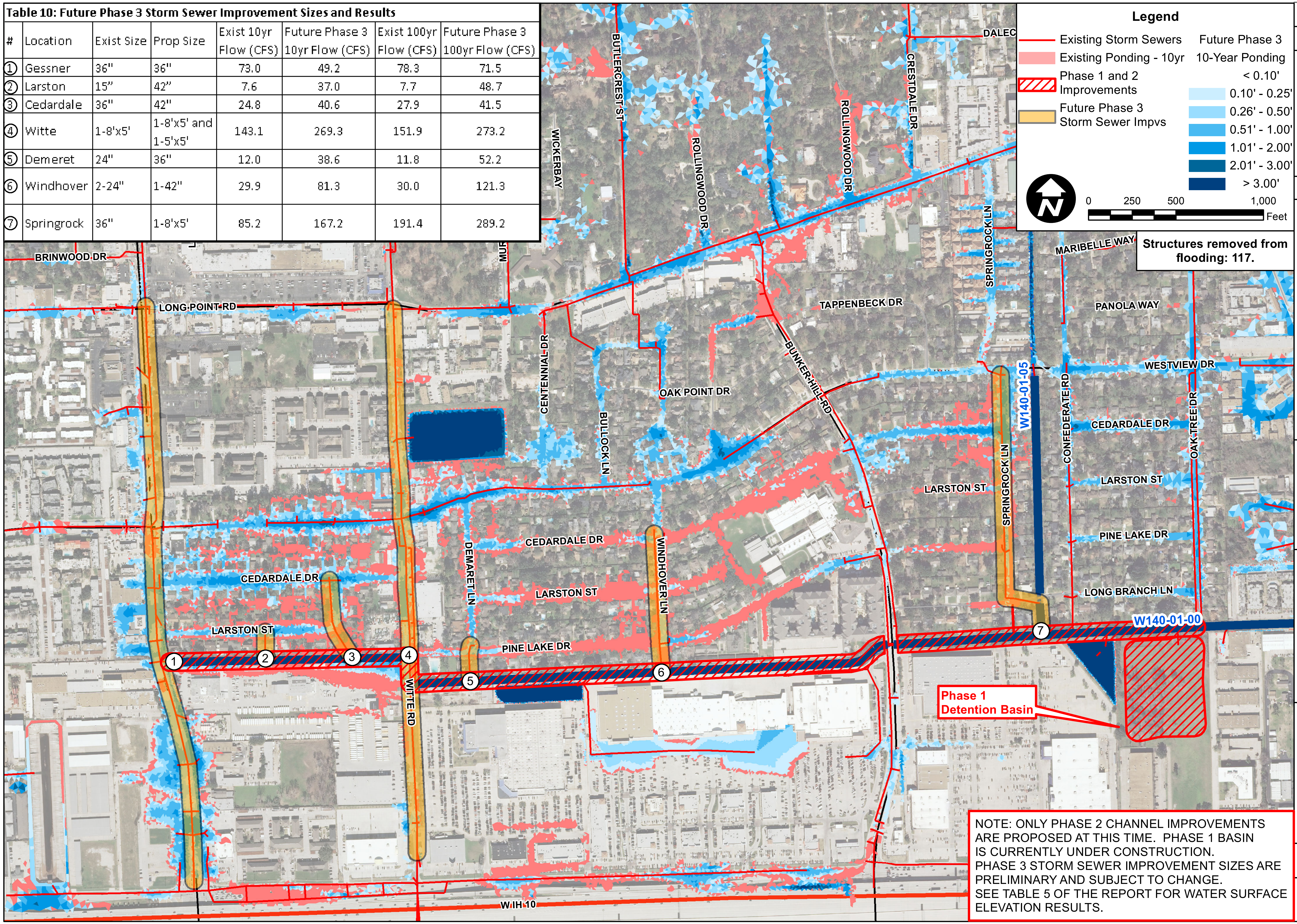
DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
11B OF 13

Map Document: L:\130-10384-0174-0-Production\4-08-GIS\MXD\Impact Analysis December 2013\12_Future_Phase 3_Inundation Reduction Map_v10.mxd 12/30/2013 3:41:05 PM DGGreaney

Table 10: Future Phase 3 Storm Sewer Improvement Sizes and Results

#	Location	Exist Size	Prop Size	Exist 10yr Flow (CFS)	Future Phase 3 10yr Flow (CFS)	Exist 100yr Flow (CFS)	Future Phase 3 100yr Flow (CFS)
1	Gessner	36"	36"	73.0	49.2	78.3	71.5
2	Larston	15"	42"	7.6	37.0	7.7	48.7
3	Cedardale	36"	42"	24.8	40.6	27.9	41.5
4	Witte	1-8'x5'	1-8'x5' and 1-5'x5'	143.1	269.3	151.9	273.2
5	Demeret	24"	36"	12.0	38.6	11.8	52.2
6	Windhover	2-24"	1-42"	29.9	81.3	30.0	121.3
7	Springrock	36"	1-8'x5'	85.2	167.2	191.4	289.2



NOTE: ONLY PHASE 2 CHANNEL IMPROVEMENTS ARE PROPOSED AT THIS TIME. PHASE 1 BASIN IS CURRENTLY UNDER CONSTRUCTION.
PHASE 3 STORM SEWER IMPROVEMENT SIZES ARE PRELIMINARY AND SUBJECT TO CHANGE.
SEE TABLE 5 OF THE REPORT FOR WATER SURFACE ELEVATION RESULTS.

REV	DESCRIPTION	DATE	APPR

FUTURE STORM SEWER IMPROVEMENTS (PHASE 3) 10-YEAR INUNDATION REDUCTION MAP

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

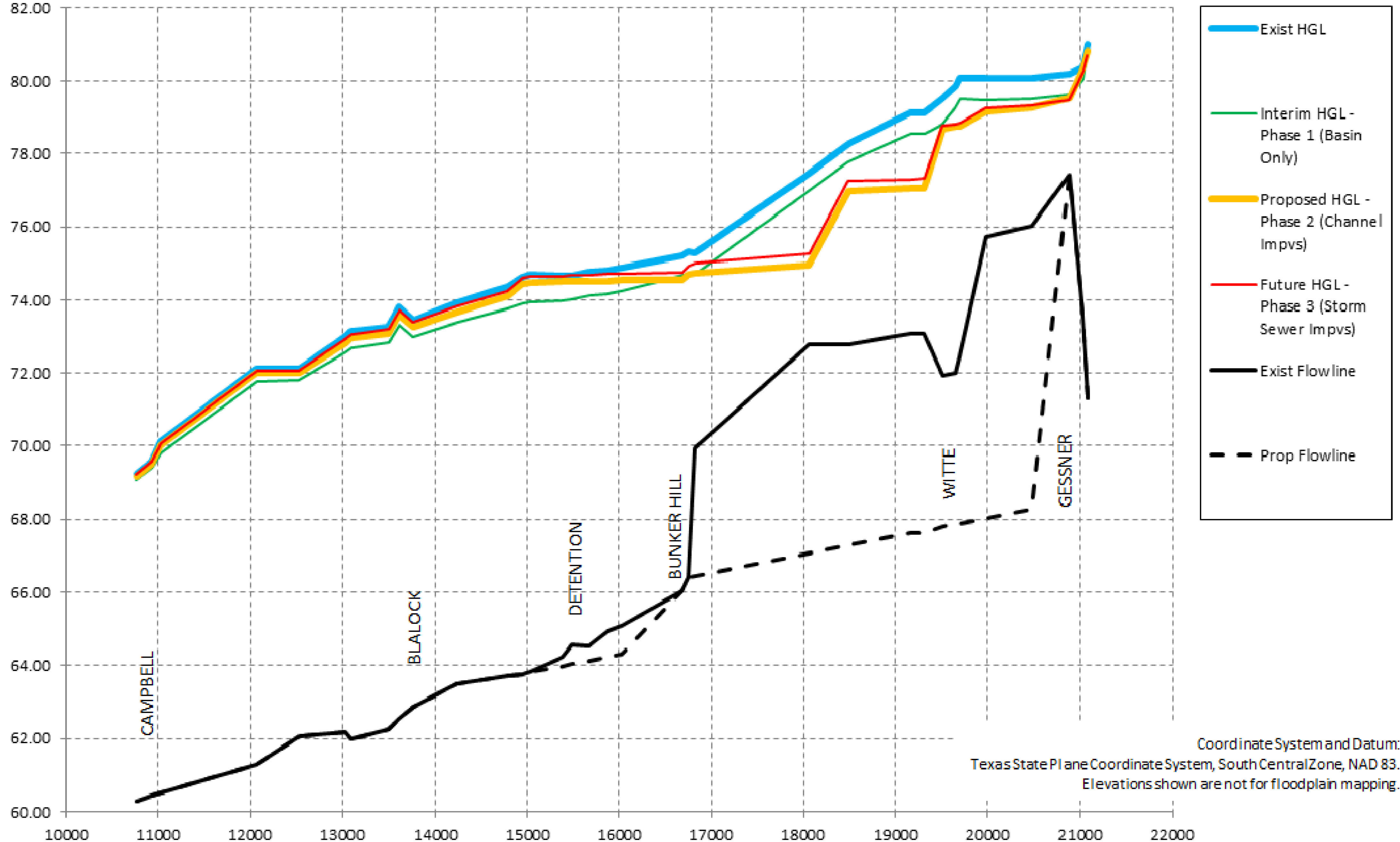
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
12 OF 13

W140-01-00 - Results for 10-Year (10%AC) Event



Coordinate System and Datum:
Texas State Plane Coordinate System, South Central Zone, NAD 83.
Elevations shown are not for floodplain mapping.

Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\Impact Analysis December 2013\13a_10yr_Profile_v10.mxd 12/18/2013 3:33:56 PM Infoworks

NOTE: ONLY PHASE 2 IS PROPOSED AT THIS TIME.

REV	DESCRIPTION	DATE	APPR

BRIAR BRANCH (W140-01-00)
10-YEAR RESULTS PROFILE

BRIAR BRANCH CHANNEL IMPROVEMENTS
(W140-01-00) IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

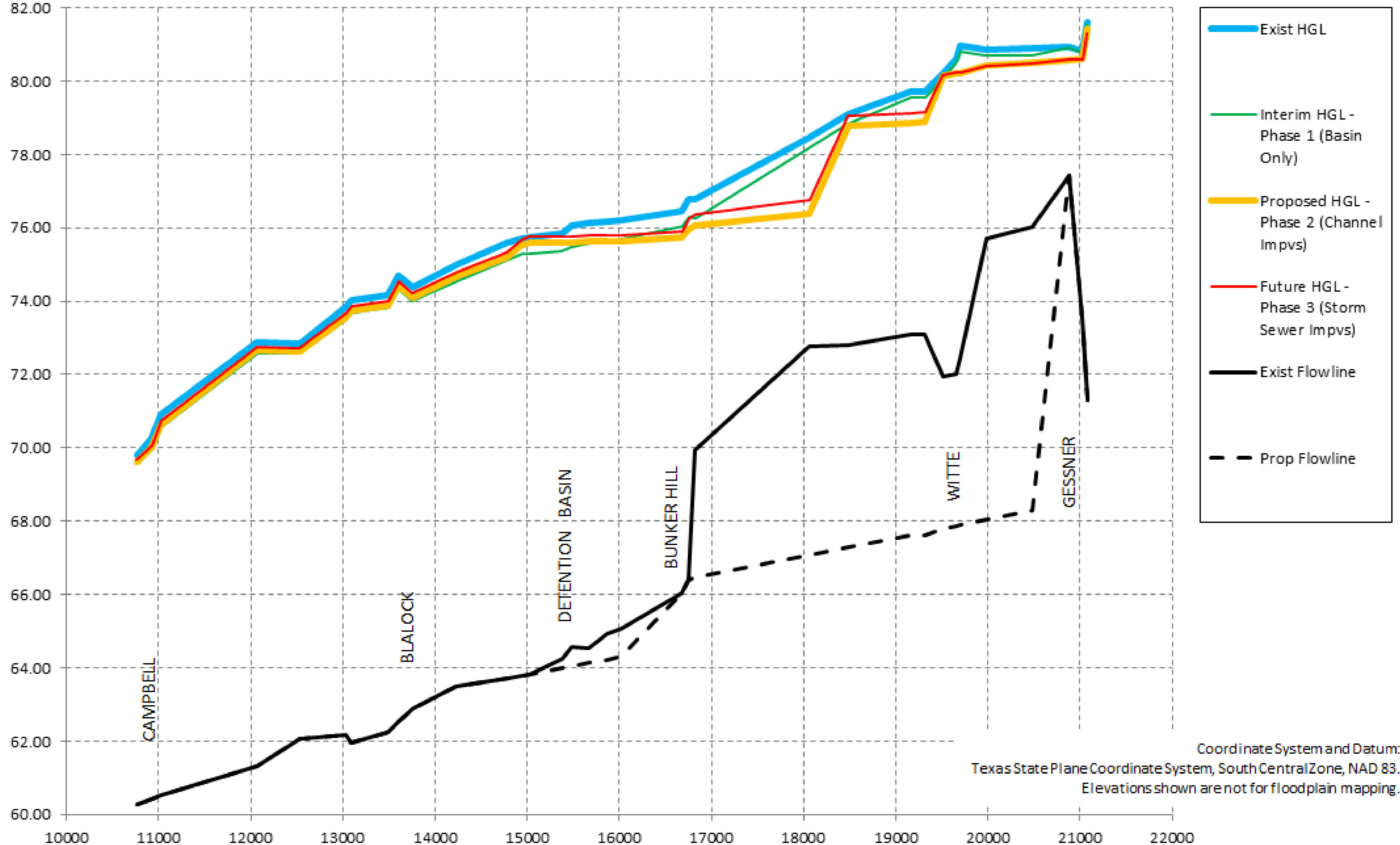
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
13A OF 13

W140-01-00 - Results for 100-Year (1%AC) Event



Coordinate System and Datum:
Texas State Plane Coordinate System, South Central Zone, NAD 83.
Elevations shown are not for floodplain mapping.

NOTE: ONLY PHASE 2 IS PROPOSED AT THIS TIME.

Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\Impact Analysis December 2013\13b_100yr_Profile_v10.mxd 12/18/2013 3:36:25 PM Infoworks

REV	DESCRIPTION	DATE	APPR

BRIAR BRANCH (W140-01-00)
100-YEAR RESULTS PROFILE

BRIAR BRANCH CHANNEL IMPROVEMENTS
(W140-01-00) IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
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TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
13B OF 13

Appendix A: Briar Branch Stormwater Detention Basin Impact Analysis Report

Briar Branch Stormwater Detention Basin
(Units W140-01-00)

Impact Analysis Report

Prepared for:
Memorial City Redevelopment Authority

TIRZ 17
REDEVELOPMENT
AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

Texas Registered Engineering Firm
F-2614

April 29, 2013

STATE OF TEXAS
DEREK ST. JOHN
96623
LICENSED
PROFESSIONAL ENGINEER

5-1-2013

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EXECUTIVE SUMMARY

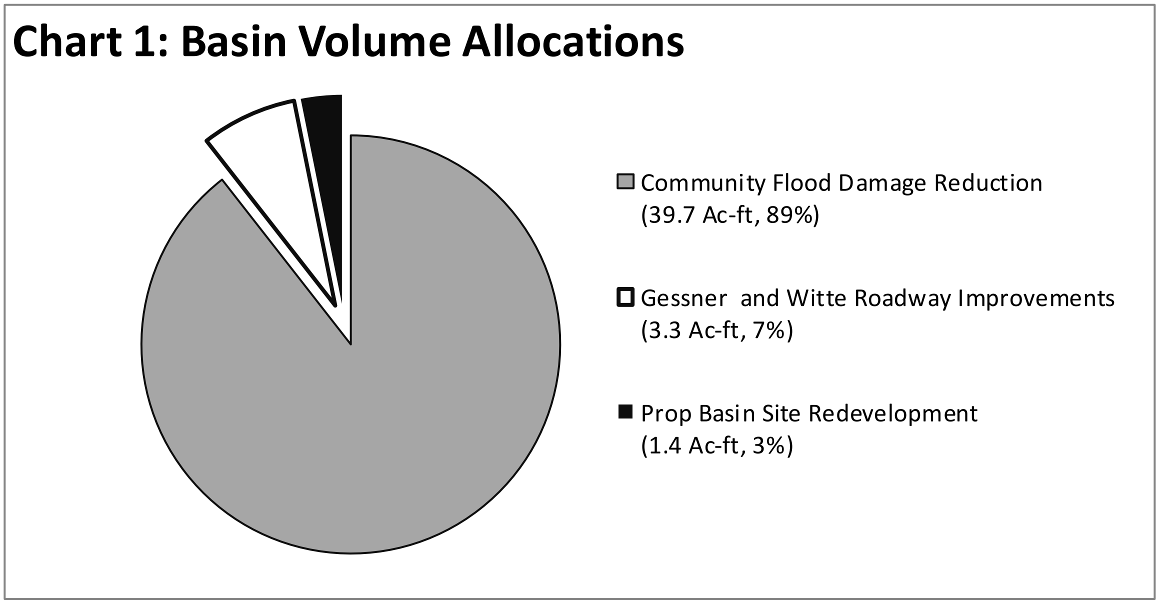
Lockwood, Andrews & Newnam, Inc. (LAN) was authorized by the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) to prepare an Impact Analysis for a proposed detention basin located adjacent to W140-01-00 (Briar Branch), between Bunker Hill Road and Blalock Road.

The Briar Branch drainage area covers a relatively flat region just north of IH-10 and south of Neuens Road. The region has been documented through City of Houston flooding complaints as well as evidence from the April 2009 storm event as being susceptible to flooding, with an emphasis on the areas located immediately north of Briar Branch and south of the Long Point Fault line that traverses this area.

TIRZ 17 recently completed a Regional Drainage Study (RDS) for the purpose of identifying regional solutions to existing storm water problems. The upstream most subbasin of Briar Branch (W140C) was analyzed as part of the regional drainage study along with W151-00-00 and W153-00-00. The recommended solution for the Briar Branch Watershed included channel improvements to Briar Branch between the proposed basin site and Gessner Road to lower the water surface elevation in the channel, storm sewer improvements also between the proposed basin and Gessner Road to improve the interior drainage to Briar Branch, and a regional detention basin to mitigate for the channel and storm sewer improvements. This impact analysis is for the regional detention basin recommended from the RDS that is part of the regional solution for the Briar Branch watershed.

The improvements for the Briar Branch watershed are planned in three phases. The first phase is the proposed detention basin which, as described above, serves as mitigation for channel improvements (Phase 2) and storm sewer conveyance improvements (Phase 3). This impact analysis demonstrates no adverse impact for the basin only phase (Phase 1) and the complete regional solution (Phases 1, 2 & 3). Preliminary engineering is currently underway for the channel improvement phase (Phase 2). The Phase 2 and Phase 3 improvements will submit a separate impact analyses as part of their preliminary engineering or detailed design efforts that will build on this report and further document the final regional solution.

The proposed basin is intended to mitigate for the areas draining to Briar Branch upstream of the basin only. Specifically, benefits from the proposed basin are intended to mitigate for the Phase 2 and 3 improvements including necessary roadway improvements and increases in impervious cover associated with the recommended storm sewer improvements. Additionally, the proposed basin will serve as mitigation for the future development of the adjacent tract of land located between the basin and IH-10. **Chart 1** summarizes the allocation of basin storage:



Multiple alternative designs for the basin were originally prepared and through the design review process with HCFCD a preferred alternative was selected which features a dry bottom, tapered side slopes, a maintenance access ramp, and concrete pilot channels. This design meets all maintenance criteria outlined by HCFCD and does not require a variance.

The preferred basin alternative was analyzed for potential impacts both as an isolated improvement (without the future regional solution) as well as together with a future regional solution. Analysis was performed using an updated version of the InfoWorks 2 dimensional (2D) dynamic model developed as part of the RDS. To demonstrate no downstream impacts beyond the limits of the 2D model for both the detention basin only scenario as well as the future regional solution, a HEC-HMS and HEC-RAS analysis was performed utilizing information from the InfoWorks improvement models and the effective models.

The analysis of the basin as a standalone project demonstrates that the proposed basin lowers water surface elevations in the Briar Branch channel by up to 0.8 feet for the 100-year event. The standalone basin project project will have no adverse impacts up to and including the 100-year event. Zero rise in water surface elevation is demonstrated on Exhibits 7 and 8.

The future regional solution will lower water surface elevations in Briar Branch channel by up to 1.5 feet for the 100-year event. The combined regional solution will have no adverse impacts up to and including the 100-year event. Zero rise in water surface elevation is demonstrated on Exhibits 11 and 12.

1.0 INTRODUCTION

1.1 Project Description

In March 2011, Lockwood, Andrews & Newnam, Inc. (LAN) was authorized by the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) to prepare a drainage impact analysis for a regional detention basin that was originally identified as an improvement in the TIRZ 17 Regional Drainage Study (RDS). The RDS included W151, W153, and portions of the W140-01-00 subwatershed. The focus of the RDS was on the identification and or confirmation of drainage problems in the RDS study area, and the identification of efficient and effective solutions. The regional detention basin that is the focus of this report is in the W140-01-00 (Briar Branch) subwatershed and is part of a regional solution identified in the RDS that includes channel improvements to Briar Branch as well as storm sewer improvements for systems draining to Briar Branch.

1.2 Project Limits

The proposed regional detention site is located 1300 feet east of Bunker Hill Road and on the south side of Briar Branch. The basin site is immediately adjacent to and east of a major shopping center located at the northeast corner of Bunker Hill Road and IH-10. The primary study area limits used to evaluate the basin are along Briar Branch, beginning at Gessner Road and extending approximately 4000 feet east of the proposed basin site. The study area is shown on **Exhibit 1**, Project Location Map. The study limit extents are largely consistent with the FEMA effective contributing area for subbasin W140C.

1.3 Project Objectives

The objective of this project is to reduce flooding and flood damages for the area contributing to Briar Branch between Gessner Rd and the proposed basin site with a focus on the area south of the Long Point Fault and north of IH-10. This area is shown on **Exhibit 2**, Effective Floodplain and W140C Drainage Area Map. The proposed detention basin is the first phase of a regional solution that will benefit the target area. The objective of the basin is to serve as mitigation for future channel improvements to Briar Branch between the proposed basin and Gessner Road and storm sewer improvements for key systems that drain to the channel improvements. Collectively, the storm sewer and channel improvements together meet the project objectives and are mitigated for through the proposed regional detention basin.

1.4 Report Objectives

This report serves to demonstrate no adverse impact for the preferred basin alternative as a standalone project. Additionally, this report serves to define the potential benefits of the future regional solution as a means to justify the basin construction and to demonstrate no adverse impact for the future regional solution. Because this detention basin is intended to benefit upstream properties, this report serves to reserve the capacity of the proposed detention basin for the future regional solution. While the subject will be discussed here, this report is not intended for regulatory approval of the future regional solution. It is anticipated that separate impact analysis will be submitted for future regional solution improvements.

1.5 Assumptions and Constraints

1.5.1 Modeling Approach

The hydrologic and hydraulic analysis for this project primarily utilizes the Infoworks ICM model platform to evaluate improvements and to demonstrate no adverse impact within the limits of the model. Beyond the limits of the Infoworks model, the use of conventional HEC-HMS and HEC-RAS models was employed to evaluate and demonstrate no adverse impacts. The use of a dynamic and two-dimensional (2D) overland flow model such as Infoworks ICM was implemented to help understand the interaction of the full drainage system including the many interconnected drainage systems, how and when water accesses the channel, what benefit the various improvement alternatives result in, and understanding the potential for impacts as a result of the proposed improvements.

The Infoworks ICM 2D model that was used to evaluate both the proposed regional detention basin and the full regional improvements builds on the dynamic model developed for the TIRZ 17 RDS. To meet the goals and objectives of this analysis the RDS model was extended downstream 4000 feet to Campbell Road. This model extension allowed for 2700 feet of overlap with the FEMA effective HEC-RAS model and terminates the project specific dynamic model with the termination point for the FEMA effective subbasin W140C.

For the purpose of evaluating project impacts resulting from hydraulic changes to the channel, the dynamic model was used to compare existing water surface elevations to proposed water surface elevations to insure no increases occur. As a method for further evaluating the dynamic model, the existing water surface elevations were also compared to the corresponding FEMA effective water surface elevations for the 2700 feet of Briar Branch that overlap between the two models. The results demonstrate a close relationship between the FEMA effective water surface elevation and those of the dynamic model for the 100-year event, and demonstrate no increase in water surface elevation. Modeling results are further discussed and documented in subsequent report sections.

To evaluate the effects of the proposed basin on the Buffalo Bayou watershed, the pre- and post-basin conditions and the future regional solution model were evaluated in the FEMA effective HEC-HMS model. As discussed above, the dynamic model extents match the extents for the HMS subbasin W140C. In order to accurately compare the effects of the proposed basin on the full watershed, a proposed conditions HEC-HMS model was developed that modified TC and R values from the effective model for subbasin W140C such that the resulting difference in the timing and peak flow rate from the existing to the proposed analysis closely resemble the change in peak flow rate and time to peak produced by the existing and proposed dynamic models. This modeling procedure was performed for the both the proposed basin-only model and the future regional solution model. Peak flows at junctions downstream were compared between the existing conditions (effective) HEC-HMS model, the proposed conditions (pond-only) HEC-HMS model, and the future regional solutions HEC-HMS model. The resulting flows were inserted into the FEMA-effective HEC-RAS models for W140-01-00, W140-00-00, and W100-00-00. The results demonstrate no increase in water surface elevation. Modeling results are further discussed and documented in subsequent report sections.

1.5.2 Design Criteria

The proposed detention basin was analyzed and preliminarily designed to meet the requirements and technical guidance provided in the December 2010 HCFCD Policy, Criteria & Procedure Manual and the HCFCD Hydrology and Hydraulics Guidance Manual. The design event established for determining benefit for the basin and for the associated regional improvements is the 10-year event. This is consistent with the TIRZ 17 RDS and other related reports including the 2009 HCFCD W151 report.

1.6 Project Survey and Datum

All project data sources, engineering and analysis results reference the TSARP Benchmark Network and the NAV Datum 1988 with 2001 Adjustment. The following sources were used for topographic information:

- The proposed design and existing survey data for the HCFCD Briar Branch Sediment Removal project, constructed in late 2010 and early 2011, was used as a basis for the existing channel conditions.
- A survey done in 2007 by Martinez, Guy, and Maybik Inc. for the area along Briar Branch within the limits of this study. This survey detailed data collection and channel cross-sections at the existing culverts and bridge crossings.
- For overbank cross section information where survey data was unavailable, the HCFCD 2008 LiDAR data was utilized.

1.7 Prior Studies

The following studies have been completed in this area and were utilized in the development of the RDS and/or specifically for this analysis effort:

- Katy Freeway Program – 2002 - TxDOT – An XP-SWMM model was developed for the drainage system that connects to W151 and drains N. Gessner and Witte Roads. A series of oversized box culverts were used under the IH-10 frontage roads to mitigate the impacts of the IH-10 highway expansion.
- Tropical Storm Allison Recovery Project (TSARP) – HCFCD/FEMA – Completed effective models for the entire Harris County area, with effective maps updated June 18, 2007. This study included Briar Branch up to Adkins Road and did not include Blalock Road just upstream of this bridge structure.
- Drainage Study of Briar Branch – August 2007 – Memorial City Redevelopment Authority (TIRZ 17) – This study extended Briar Branch effective models to Gessner Road, and looked at the level of service for this channel, and investigated potential improvements in the area.
- W151 Implementation Study – 2009 – HCFCD – This study focused on areas in the W151-00-00 watershed downstream of IH-10; however it included the TxDOT Katy Freeway Program drainage models and improvements to the IH-10

corridor. This included the large Briar Branch drainage areas north of IH-10, but did not look at the hydraulics of Briar Branch. The assumptions used in the TxDOT – Katy Freeway Program analysis of the IH-10 area were kept in this modeling.

- TIRZ 17 Regional Drainage Study (RDS) – 2010 – Memorial City Redevelopment Authority (TIRZ 17) – studied portions of the W140-01-00, W151-00-00 and W153-00-00 watersheds that drain the TIRZ 17 area that were heavily impacted by the April 2009 storm event. This model is an inlet-level, 2D analysis of more than 3,000 acres, using InfoWorks .

2.0 EXISTING CONDITIONS

The Briar Branch watershed covers a relatively flat area north of IH-10, south of Neuens Road, east Conrad Sauer Road, and west of Campbell Road. Portions of the area have been documented as being susceptible to flooding, especially the areas located immediately north of Briar Branch and south of the Long Point Fault line that traverses this area. This report section reviews the existing conditions of the area.

2.1 Location and Topography

This study reviews the portion of Briar Branch within the W140C subbasin as defined for the FEMA Effective Model for the Buffalo Bayou watershed. Subbasin W140C has an area of 2.75 sq. miles at a slope of approximately 0.14% from the northwest corner of the subbasin down to the southeast corner. Redevelopment has occurred on much of the land between Briar Branch and IH-10, and areas along N. Gessner are currently under development. The most distinguishing characteristic of the area is the Long Point Fault that runs from the southwest corner to the northeast corner of W140C, just north of Briar Branch. There is approximately 3-5 feet of drop across the fault in this area.

Many of the roadways north of Briar Branch within the Spring Branch Woods and Long Point Woods subdivisions are at elevations lower than the top of bank at Briar Branch, which limits conveyance into Briar Branch. Storm sewer systems drain these areas to Briar Branch, but there are not many effective overland pathways and elevation to effectively drain the surface water overflows into Briar Branch.

2.2 Land Use

The northern portion of the study area is mostly residential, while the portion along IH-10 is mostly commercial. The FEMA Effective model determined that this area is 58.8% impervious cover and is considered fully developed. The existing conditions dynamic model uses data from the Harris County Appraisal District (HCAD and aerial imagery to determine that the area draining to Briar Branch is approximately 61.3% impervious. The current land use is shown on **Exhibit 3**, Land Use Map.

2.3 HCFCD Facilities and Unit Numbers

Briar Branch is HCFCD Unit #W140-01-00 and is the focus of this analysis and the proposed improvements. Briar Branch drains to Spring Branch (HCFCD Unit #W140-00-00) near Wirt Road, and eventually Buffalo Bayou (HCFCD Unit #W100-00-00) near Chimney Rock Road. Other channels that drain to Briar Branch within the vicinity of the proposed improvements include an existing drainage channel between Springrock Lane and Confederate Road named W140-01-05 connects to Briar Branch via a 72” CMP.

2.4 Right-of-Way

The purchase of the proposed regional detention facility by the Memorial City Redevelopment Authority is final. The proposed basin is adjacent to Briar Branch, which at this location has two drainage easements, owned by HCFCD, which total 50’ wide.

2.5 Pipelines and Utilities

The proposed detention site is crossed by an 8-inch AC water line and an 8-inch sanitary sewer line, which are currently being relocated to a 20' City of Houston utility easement in order to accommodate construction of the detention basin.

3.0 HYDROLOGY & HYDRAULICS

3.1 Analysis Objectives

The primary analysis objective was to evaluate the benefit of improvement alternatives for Briar Branch and to demonstrate the lack of adverse impacts. Two separate models were created to achieve these objectives: A dynamic model consisting of detailed calculations of inlet-level areas for the purpose of evaluating improvement benefit and reviewing potential impacts, and a watershed-level model to assist with evaluating the potential for downstream adverse impacts. The dynamic and watershed-level models are further described below.

For the dynamic model, the Infoworks 2D model from the TIRZ 17 Regional Drainage Study (RDS) was extended east by approximately 4000 feet, from the proposed detention basin site to Campbell Road, to match the limits of the FEMA Effective Model subbasin W140C. Infoworks was also used to calculate flow rates and water surface elevations within Briar Branch channel, using an inlet-level analysis. The dynamic model gives an analysis of the effective model's subbasin W140C in greater detail than is possible with a watershed level model. The FEMA Effective Model and the existing conditions dynamic model have approximately equivalent total drainage area sizes, and their outflow is measured at the same location, just downstream of Campbell Road.

The existing conditions watershed hydrologic model is identical to the FEMA effective model. The overall analysis objective for this model is to analyze the regional benefit of improvements and provide a means to evaluate and demonstrate no adverse impacts.

3.2 Hydrologic Modeling Methodology

3.2.1 Dynamic Model Hydrology

Hydrology for the dynamic model was developed using an inlet level analysis between Conrad Sauer Rd and Campbell Rd. See **Table 1** for a summary of contributing drainage areas for Subbasin W140C.

Drainage area boundaries were delineated utilizing 2008 LiDAR data in combination with field visit verification. Boundaries from previous studies, as-built drawings, or models were confirmed prior to inclusion in the study. Percent impervious values were calculated for each drainage area based on the most recent land use data available from Harris County Appraisal District (HCAD), and reviewed with aerial imagery and updated as necessary. For the proposed conditions, planned storm sewer improvements that are part of the regional solution were considered. These roadways include both Gessner and Witte from IH-10 to Long Point Road. The slope for each drainage area was calculated using GIS and the 2008 LiDAR data. A drainage width parameter for each drainage area was assigned based on its physical dimensions. Drainage area boundaries are shown on **Exhibit 4**, Dynamic Model Drainage System Map.

Losses were computed using the Green & Ampt method with loss rates set according to the values in the TSARP white paper titled "Recommendation for: Replacing HEC-1 Exponential Loss Function in HEC-HMS." Note that this is different from the FEMA effective model for Buffalo Bayou, which used calibrated values outside the ranges recommended in the TSARP white paper; the differences between these values is shown in **Table 2**.

Total subcatchment runoff volume was determined using initial abstractions for impervious surfaces and Green & Ampt infiltration for pervious surfaces. Subcatchment runoff routing was determined using Storm Water Management Model (SWMM) routing utilizing two of the three normally used surfaces; impervious area with initial abstraction, and pervious area with initial abstraction. To be consistent with the HCFCD W151-00-00 implementation study methods, impervious area without initial abstraction was not determined.

A comparison of FEMA effective and existing conditions dynamic model peak flows for subbasin W140C can be found in **Table 3** below. The differences between the FEMA effective flows and the dynamic model flows can be attributed to several factors including the Green & Ampt values differences, contributing drainage area differences, average drainage area size, and fundamental modeling methodology differences. A summary of modeling methods including a comparison of methods between the FEMA effective model and the dynamic model can be found in **Appendix A**.

3.2.2 HEC-HMS Model Hydrology

The FEMA effective hydrologic model was utilized to analyze the downstream effects of the proposed regional detention basin. The dynamic model extents match the extents of the W140C subbasin to allow comparisons between the dynamic model and the FEMA effective model. The revised existing conditions model is entirely identical to the effective model.

Table 3 compares the peak flow differences for key junctions along Buffalo Bayou, Spring Branch, and Briar Branch. The comparison is between the FEMA effective model and the revised existing conditions model.

3.3 Hydraulic Modeling Methodology

Hydraulic models were developed at an inlet-level for the dynamic model of the W140C subbasin and at a watershed-level using HEC-RAS for the purpose of evaluating the potential for impacts.

3.3.1 Dynamic Model Hydraulics

Hydraulics calculations for the W140C subbasin are performed with the Infoworks ICM model. The model consists of an inlet-level analysis between Conrad Sauer Road and Campbell Road. The study area between the proposed basin location and Campbell Road was added to the dynamic model study area to better match the extents of the W140C subbasin of the FEMA effective model. Hydraulic parameters for storm sewers and box culverts were assigned according to the Manning's roughness "n" values set forth in the City of Houston Infrastructure Design Manual. Harris County Flood Control drainage channels are modeled with roughness values according to those outlined in the HCFCD *Hydrology & Hydraulics Guidance Manual* and the HCFCD *Policy Criteria & Procedure Manual*. Briar Branch is modeled using one dimensional (1D) river reaches that are similar to HEC-RAS sections, in order to more accurately define channel cross sections. Overbank flows are handled with the Infoworks ICM 2D computation engine, as are inlet ponding and overland flow computations.

Pipe and channel hydraulic calculations are handled using dynamic pipe flow calculations and a 2D mesh surface for storage and surface flow routing. The InfoWorks ICM software utilizes a combination of numeric methods for solving the Saint Venant equations to determine hydraulic states within the model. Once subsurface storm sewer capacity is exceeded, water will overflow onto the 2D mesh surface (ground surface) of the model.

The 2D surface was developed using the 2008 Harris County LiDAR supplemented with survey data in areas where topographic changes were known to have occurred. Vertical structures within the study area are modeled as void spaces to prevent flow through or storage within structures. Overland roughness values for the 2D surface were developed from land use data, Harris County Appraisal District information, aerial imagery, and field visits. The river sections for Briar Branch are linked to the 2D surface along the banks of the channel in order to represent over bank flow entering and leaving Briar Branch.

The dynamic model has several discharge or outflow locations. Dynamic tailwater conditions were developed where these systems are backwater-controlled. The system outfalls include:

- W140-01-00 at Campbell Road. For the Briar Branch outfall, a tailwater condition was developed by adjusting the timing of a stage-time rate table developed with the FEMA effective model to match the timing of the dynamic model.
- W151-00-00 underneath IH-10 near Witte Road. For the W151-00-00 system, the entire storm sewer and overland flow drainage system was modeled as part of the RDS. This model was utilized to create a dynamic water surface elevation at the outfall.
- W156-00-00 via multiple small storm sewers east of Conrad Sauer Road. These systems do not appear to be backwater controlled so a dynamic tailwater was not used.
- W140-00-00 via a 96" RCP under Nuens Road. This system also did not use a dynamic tailwater.

3.3.2 HEC-RAS Model Hydraulics

There is an overlap between the dynamic model and the watershed-level models which is approximately 2700 feet in length, between Blalock Road and Campbell Road. While these two models vary greatly in their methods and calculations, there is a high degree of correlation between their computed water surface elevations, as shown in **Table 4**.

A set of Revised Existing Conditions HEC-RAS Models were created for Briar Branch, Spring Branch, and Buffalo Bayou by updating the flow distributions in the FEMA effective models per the Effective HEC-HMS model. Flow tables from the effective HEC-RAS model did not match the peak flow values from the FEMA effective HEC-HMS model. No changes to the SVSQ tables, channel geometry, or computational parameters were made.

3.4 Existing Conditions

The results of the existing conditions dynamic model are shown in **Exhibit 5**, Existing Conditions 10-Year Inundation Map. This model indicates several limitations of the existing drainage system.

4.0 PROPOSED DRAINAGE PLAN

4.1 Description

Improvements to the Briar Branch watershed are proposed to be constructed in three phases. First, a detention basin is proposed to provide a mitigation bank for a future regional solution. The second phase would include channel conveyance improvements upstream of the proposed detention basin to increase conveyance into the basin and lower water surface elevations in Briar Branch. A third phase would include storm sewer conveyance improvements to increase conveyance to the channel and lower the water surface elevations in the neighborhoods adjacent to Briar Branch between Gessner Road and Bunker Hill Road.

Only the first of these three phases, the proposed detention basin, is planned for construction at this time. This impact analysis refers to the first phase as the “proposed conditions” and to all subsequent phases as the “future regional solution”. Only the proposed detention basin is discussed in this section; the future regional solution is discussed in chapter 5, below.

4.2 Hydrologic Analysis

A storage node representing the proposed basin was added to the existing conditions dynamic model, as were links representing the inflow and outflow structures. The node was given a stage-storage curve, which was calculated using the areas bounded by the contours generated with AutoCAD Civil3D.

The proposed conditions dynamic model outflow results were then modeled in HEC-HMS to by modifying the TC & R values for subbasin W140C such that the resulting difference peak flow rate from the existing to the proposed analysis closely resemble the change in peak flow rate produced by the existing and proposed dynamic models. No other changes were made to the HEC-HMS models. **Table 5** shows the hydrologic results; the comparison is between the revised existing conditions model and the proposed conditions (Basin-Only) model.

Exhibit 6, Proposed Basin-Only 10-Year Inundation Reduction Map shows the flood-reduction benefits of the proposed basin for the target area.

4.3 Hydraulic Analysis

The proposed basin was analyzed for upstream and downstream impact. **Exhibit 7**, Proposed Basin-Only Dynamic Model Impact Analysis Results shows the changes in water surface elevation in the channel for the area nearest the pond, as calculated by the proposed conditions dynamic model.

A proposed conditions HEC-RAS model was developed using the geometry of the FEMA effective model and the flow rates of the proposed conditions HEC-HMS model. This model was used to evaluate hydraulic impacts downstream of the basin, which are shown in **Exhibit 8**, Proposed Basin-Only Watershed Level Impact Analysis Results. **Table 6** shows the calculated hydraulic impacts at corresponding HEC-HMS junctions downstream of the proposed detention basin. It demonstrates that the basin has no adverse hydraulic impact on Briar Branch, Spring Branch, or Buffalo Bayou for the 100-year event.

4.4 Detention Basin Layout

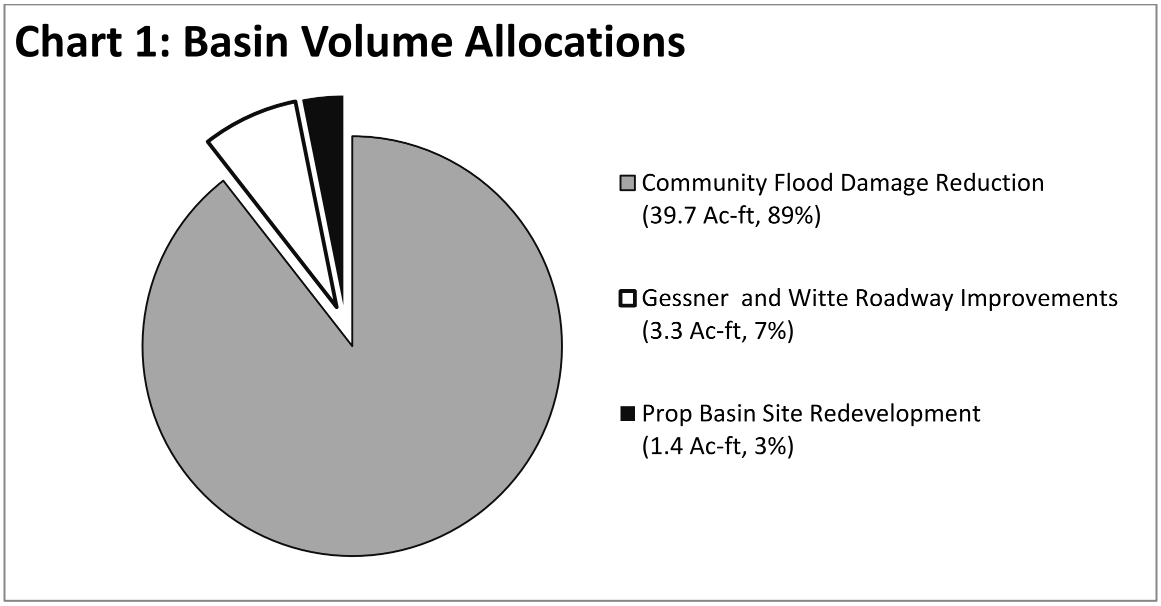
4.4.1 Detention Layout

Due to the highly developed characteristic of the watershed, minimal undeveloped land is available for detention. An 8.23-acre tract was identified and obtained by TIRZ 17 for use in providing drainage improvements to areas neighboring TIRZ 17 north of IH-10. A regional detention basin on this tract is the focus of this report.

Multiple alternatives for the basin were designed, evaluated, and considered. Through the design review process with the Harris County Flood Control District, a preferred alternative was selected which features a dry bottom, tapered side slopes, a maintenance access ramp, and concrete pilot channels. This design meets all maintenance criteria outlined in the District's Policy, Criteria & Procedure Manual. The proposed basin stage-storage curve is shown in **Appendix E**, Preferred Basin Layout Volume Analysis.

4.4.2 Basin Volume Allocation

The proposed basin is designed to function as a component of a regional flood damage reduction project that includes channel improvements to lower the water surface elevation in the channel and storm sewer improvements to efficiently convey runoff from the adjacent neighborhood to the channel. The approximate volume of the basin is 44.4 ac-ft during the 100-yr event. Additionally, the basin will serve as mitigation for the future development of the adjacent tract of land located between the basin and IH-10 (Identified as Future Detention Tract on **Exhibit 6**). This report documents that the proposed basin provides mitigation for the entire 6.78 acre tract being improved from 64% impervious to 100% impervious. Using the most recent City of Houston criteria for detention volumes, the basin volume allocated for the tract of land is approximately 1.4 acre-feet, as shown in Appendix E. 3.3 acre-feet is dedicated for the TIRZ 17 Capital Improvement Projects Gessner and Witte. The remaining 39.7 Ac-ft, or approximately 89% of the 100-year basin volume, is dedicated for flood damage reduction. This information is summarized in Chart 1: Basin Volume Allocation.



4.5 Right-of-Way Requirements
The proposed detention basin site has already been purchased by TIRZ 17. No additional right-of-way is required for this phase of the project.

4.6 Special Erosion Control Features
The proposed detention basin will utilize concrete low-flow channels in the basin bottom, as well as armored slope protection at the inflow weir.

4.7 Stormwater Quality Enhancements
Stormwater quality enhancements were considered for the basin. Per direction by HCFCD, off-line detention basin water quality features are not considered effective and have not been added.

Stormwater quality enhancements will be considered for future regional drainage improvements during the preliminary engineering phase.

4.8 Potential Pipeline and Utility Conflicts
An existing 8" waterline and an existing 8" sanitary sewer line cross the proposed detention basin site. These will be relocated to run along the south and east property edges within a dedicated 20' utility easement. Utility relocation efforts are currently under way.

4.9 Geotechnical Requirements
A geotechnical investigation was commissioned by LAN on behalf of the Memorial City Redevelopment Authority on June 13, 2011, and performed by Geotest Engineering, Inc. The report of findings, titled "Geotechnical Investigation" and dated August 19, 2011, is attached as **Appendix G.** This investigation included drilling and sampling six soil borings to depths from 20 to 30 feet and performing appropriate laboratory tests on

recovered soil samples. The geotechnical report was reviewed and approved by HCFCD on August 2nd, 2012. The principal findings include:

- Soils include Addicks-Urban land complex and Gessner-Urban land complex, based on USDA NRCS database information.
- The subsurface soils consist predominately of cohesive soils to the termination depths, with intermittent cohesionless soils encountered in three borings.
- Groundwater was encountered during drilling at depths ranging between 15.3 feet and 24 feet.
- Recommended stable slope, based on the results of slope stability analysis and HCFCD requirements, is 3:1 along the north and west banks and 4:1 along the east and south banks.
- Based on the presence of cohesionless soils, it is recommended that at the toe and bottom of the eastern and southern banks of the detention basin be covered with a low permeability clay liner or geotextile fabric to prevent erosion.
- Dewatering may be required to lower and maintain the groundwater level at least five feet below the level of excavation prior to and during the excavation.

4.10 Environmental Issues

A Phase I Environmental Site Assessment (ESA) for the W140 Detention Basin was conducted as part of the feasibility study prior to the TIRZ 17 RDA's purchase of the property (LAN, August 2011). This ESA is included as **Appendix H** to this report. The ESA identified three (3) potential Recognized Environmental Conditions and recommended further investigation of only one of these sites to determine soil handling and disposal requirements.

Subsequent soil sampling and analyses indicate that the soil at the site does not require any special protective measures during excavation other than normal dust suppression and is not a waste requiring regulated means of disposal. These analyses further indicate that the soils at the site pose no threat of adverse environmental impact (GSI Environmental, December 2011 and Geotest Engineering, October 2011). These reports are included as **Appendix I** and **Appendix J** to this report.

4.11 Maintenance Access Plan Requirements

Maintenance access to the proposed detention basin is via a 20' wide permanent joint access easement on the east side of the property, which connects the site to the west-bound IH-10 frontage road. Maintenance access paths within the site include:

- A 50' maintenance access berm between the western property line and the detention basin top bank
- A 30' maintenance access berm between the northern property line and the detention basin top bank
- A 45' maintenance access berm, including 20' of which are concrete-paved, between the eastern property line and the detention basin top bank
- A 30' maintenance access berm between the southern property line and the detention basin top bank

- A 20’ maintenance access ramp in the southeast corner of the site to allow access from the paved access drive into the basin bottom.

4.12 Operation Plan for Pumped Detention basins

This facility will not be pumped, so no operation plan is required. Pumped detention was considered as an option for the proposed basin, but was not pursued given a lifecycle cost that was unacceptably higher than a traditional basin and a volume increase of only 27%.

5.0 FUTURE REGIONAL DRAINAGE SOLUTION

5.1 Description

Improvements to the Briar Branch watershed are proposed to be constructed in three phases. The first phase includes the detention basin discussed in Chapter 4, above. The next phase will include channel conveyance improvements upstream of the proposed detention basin to lower water surface elevations in Briar Branch. A third phase would include storm sewer conveyance improvements to increase conveyance to the channel and lower the water surface elevations in the neighborhoods adjacent to Briar Branch between Gessner Road and Bunker Hill Road. This section details the last two phases, which are referred to here as the “Future Regional Solution”.

5.2 Hydrologic Analysis

Just as the proposed conditions dynamic model discussed in section 4.2 above was created from the existing conditions dynamic model, the Future Phase 2 (Channel Improvements) and Future Phase 3 (Storm Sewer Improvements) dynamic models build on the Proposed Phase 1 (Pond-Only) dynamic model. All dynamic modeling was performed in Infoworks ICM. The future regional solutions models include changes to the Briar Branch channel sections as well as the storm sewers which convey storm flows into the channel. These components are shown on **Exhibit 9**, Future Regional Solution Components Map.

It is important to note that these improvements are not intended for construction or permitting at this time. All sizes are subject to change as part of the Briar Branch Channel Improvements Preliminary Engineering Report, which is currently under production. The sizes and sections shown represent a potential scenario but are intended only for general information. All future projects must prove no-impact status independently from this report. The flood damage reduction benefits that the future projects offer is shown on **Exhibit 10**, Future Regional Solution 10-Year Inundation Reduction Map. The future regional solution will offer substantial flood damage reduction benefit for the areas upstream of Bunker Hill Drive. Although the results are preliminary and not intended for construction or permitting at this time, the water surface elevations for the nodes which are shown on **Exhibit 10** are quantified in **Table 7**, Future Regional Solutions Node Results.

The future phase 2 and future phase 3 dynamic model outflow results were then modeled in HEC-HMS in a similar fashion as the basin only analysis by modifying the TC & R values for subbasin W140C such that the resulting difference peak flow rate from the existing to the future analysis closely resemble the change in peak flow rate produced by the existing and future dynamic models. No other changes were made to the HEC-HMS models. **Table 8** shows the hydrologic results; the comparison is between the Revised Existing Conditions model, the Future Phase 2 (Channel Improvements) model, and the Future Phase 3 (Storm Sewer Improvements) model.

5.3 Hydraulic Analysis

As discussed in section 4.3, above, the future regional solutions hydraulic models were developed from the FEMA effective geometry and the future regional solutions HEC-HMS flows. The results of this model are also displayed in **Table 9**; the comparison is between the Revised Existing Conditions model, the Future Phase 2 (Channel Improvements) model, and the Future Phase 3 (Storm Sewer Improvements) model.

Results of the future regional solution impact analysis efforts are shown on **Exhibit 11**, Future Regional Solution Dynamic Model Impact Analysis Results and **Exhibit 12**, Future Regional Solution Watershed Level Impact Analysis Results.

5.4 Detention & Channel Layout

5.4.1 Detention Layout

Detention will be required to mitigate the impacts of any future regional solution. Detention is the first phase of the regional plan, and is discussed in detail in chapter 4, above.

Modifications to the basin inflow weir will be necessary as part of construction of channel conveyance improvements. The basin inflow weir has been designed so that steel sheet piling can be cut off or welded onto the basin inflow weir in such a way that the major concrete structures need not be modified.

5.4.2 Channel Layout

Future channel improvements will be necessary to meet the project objectives discussed in Section 1.3 and fully utilize the detention basin discussed in this study. The channel improvements which were modeled include a rectangular concrete low flow channel (8’ wide x 4’ high) and trapezoidal concrete channel similar to the existing channel downstream of Bunker Hill. Storm sewer improvements are also planned to increase conveyance into the channel; preliminary information on these improvements, including outfall size, location, and flowrate, are shown on **Exhibit 9**, Future Regional Solution Components Map. The future regional solution was modeled with InfoWorks ICM in order to quantify potential future water surface elevation (WSEL) decreases and ensure that future projects can feasibly achieve no-impact. Results are shown on **Exhibit 13**, Proposed and Future Briar Branch Channel Profile Results.

5.5 Right of Way

The future regional solution construction will be designed to fit in the existing ROW and easements where possible. No significant ROW acquisitions are planned.

5.6 Other Requirements

5.6.1 USACE Jurisdictional Determination

LAN, on behalf of TIRZ 17, requested a U.S. Army Corps of Engineers (ASACE) jurisdictional determination on February 3rd, 2012. USACE responded on February 20th, 2013 that Briar Branch between Gessner Road and 1730 LF downstream of

Bunker Hill Rd "does not contain waters of the United States. Therefore, any work, structures, or the discharge of fill material on the project site is not subject to Section 10 of the Rivers and Harbors Act or Section 404 of the Clean Water Act (CWA) and does not require a Department of the Army permit." The letter of jurisdictional determination has been attached as Appendix J.

5.6.2 W151-00-00 Interaction

The intent of this impact analysis report is to demonstrate no adverse impact to the contributing drainage area to the basin, the area downstream of the basin, and to the W151-00-00 watershed. W151-00-00 experiences ancillary benefits from the W140-01-00 regional solution in the form of reduced flows contributing to W151. Benefits to W151-00-00 as a result of the W140-01-00 regional solution are dependent on the chosen channel configuration. There are no intentions of utilizing flow reductions to W151-00-00 to mitigate for any flow increases to W151-00-00. The ancillary benefits to W151-00-00 are to remain as benefits to W151-00-00.

6.0 CONCLUSION

The proposed regional detention basin located 1300 feet east of Bunker Hill Road and south of Briar Branch is the first phase of a planned regional solution that includes future channel improvement and storm sewer improvement phases. The future improvement phases are located upstream of the proposed basin between the basin and Gessner Road.

The proposed basin meets all maintenance criteria outlined by HCFCD. TIRZ 17 will maintain the proposed basin for up to three years. Upon completion of the standard 1-year establishment period, TIRZ 17 will file for maintenance responsibility transfer to HCFCD. The proposed basin includes 44.4 acre feet of total volume, of which 39.7 acre feet will be used for flood damage reduction.

The proposed basin as a standalone project was reviewed for impacts to the immediate and adjacent areas, and to the region downstream of the basin. The basin was analyzed using a dynamic 2D model. Results from this analysis were reviewed at an inlet level and at a watershed level for potential impacts. The preferred basin alternative has no adverse hydraulic impact up to and including the 100-year event.

In addition to the basin as a standalone project, the future regional solution was also analyzed. The future regional solution will lower water surface elevations in Briar Branch channel up to 2.0 feet for the 10-yr event and up to 1.5 feet for the 100-year event. The analysis demonstrates that the future regional solution will have no adverse hydraulic impact up to and including the 100-yr event. The channel and storm sewer improvements are not intended for construction at this time. The basin as a standalone project is recommended for approval, permitting, and construction.

TABLES

Table 1: Drainage Area Information for Subbasin W140C		
Model	Drainage Area (Ac)	Impervious (%)
FEMA Effective	1760	58.2%
Dynamic Model	1984	61.3%

Table 2: Loss Rate Information for Subbasin W140C							
Model	Method	Impervious (%)	TC (hrs)	R (hrs)	Parameters	100-Year Q (CFS)	100-Year Runoff
FEMA Effective	Green & Ampt	58.2	0.55	9.93	Calibrated	1088	13.2" - 3.61" = 9.59"
Revised Existing (HMS)	Green & Ampt	58.2	0.55	9.93	Calibrated	1088	13.2" - 3.61" = 9.59"
Revised Existing (Infoworks)	Green & Ampt	61.3	n/a	n/a	TSARP Whitepaper	1989	13.2" - 1.11" = 12.09"

Table 3: Existing Peak Flow Comparisons						
Location	10-yr FEMA Effective Flow (CFS)	10-yr Existing Conditons Flow (CFS)	Difference (%)	100-yr FEMA Effective Flow (CFS)	100-yr Existing Conditons Flow (CFS)	Difference (%)
Briar Branch @ Campbell Rd	589	589	0.00%	1088	1088	0.00%
Briar Branch @ Spring Branch	1158	1158	0.00%	2142	2142	0.00%
Spring Branch @ Buffalo Bayou	3853	3853	0.00%	7104	7104	0.00%
Buffalo Bayou @ W138-00-00	8093	7953	-1.73%	15757	15423	-2.12%
Buffalo Bayou @ W137-00-00	8390	8152	-2.84%	16564	15903	-3.99%
Buffalo Bayou @ Woodway Dr	8437	8431	-0.07%	16690	16676	-0.08%
Buffalo Bayou @ W129-00-00	8840	8840	0.00%	17497	17497	0.00%
Buffalo Bayou @ Montrose Blvd.	8535	8535	0.00%	17393	17393	0.00%
Buffalo Bayou @ White Oak Bayou	38563	38563	0.00%	59499	59499	0.00%
Buffalo Bayou @ End	39606	39606	0.00%	61636	61636	0.00%

Table 4: Existing Water Surface Elevation Comparisons					
Location	RAS Station	Existing HEC-RAS WSEL* (10-yr)	Existing Infoworks WSEL* (10-yr)	Existing HEC-RAS WSEL* (100-yr)	Existing Infoworks WSEL* (100-yr)
Adkins Rd.	13075.6	72.69	73.18	72.50	74.07
	13030.8	72.52	73.03	72.33	73.87
	12896.2	72.31	72.91	72.12	73.74
	12527.9	72.00	72.64	71.81	73.44
Anne St.	12065.3	71.48	72.15	71.30	72.92
	11519.3	70.75	71.09	70.57	71.88
	11029.3	70.13	70.14	69.95	70.94
Campbell Rd.	11002.1	70.11	70.01	69.93	70.77
	10923.3	69.87	69.62	69.71	70.27
End of W140C	10764.8	69.80	69.27	69.63	69.83

*WSEL = Water Surface Elevation

Table 5: Proposed Peak Flow Comparisons

Location	10-Year			100-Year		
	Existing Conditons Flow (CFS)	Prop Phase 1 (Pond-Only) Flow (CFS)	Difference (%)	Existing Conditons Flow (CFS)	Prop Phase 1 (Pond-Only) Flow (CFS)	Difference (%)
Briar Branch @ Campbell Rd	589	557	-5.35%	1088	999	-8.20%
Briar Branch @ Spring Branch	1158	1124	-2.93%	2142	2047	-4.42%
Spring Branch @ Buffalo Bayou	3853	3814	-1.00%	7104	7008	-1.35%
Buffalo Bayou @ W138-00-00	7953	7951	-0.03%	15423	15405	-0.11%
Buffalo Bayou @ W137-00-00	8152	8150	-0.03%	15903	15884	-0.12%
Buffalo Bayou @ Woodway Dr	8431	8428	-0.04%	16676	16656	-0.12%
Buffalo Bayou @ W129-00-00	8840	8813	-0.31%	17497	17475	-0.12%
Buffalo Bayou @ Montrose Blvd.	8535	8527	-0.09%	17393	17361	-0.19%
Buffalo Bayou @ White Oak Bayou	38442	38427	-0.04%	59250	59189	-0.10%
Buffalo Bayou @ End	39606	39592	-0.04%	61636	61576	-0.10%

Table 6: Proposed Water Surface Elevation Comparisons

Location	10-Year			100-Year		
	Exist WSEL*	Prop Phase 1 (Pond-Only) WSEL*	Diff. (ft)	Exist WSEL*	Prop Phase 1 (Pond-Only) WSEL*	Diff. (ft)
Briar Branch @ Campbell Rd	69.80	69.71	-0.09	72.25	72.15	-0.10
Briar Branch @ Spring Branch	32.76	32.63	-0.13	72.25	72.15	-0.10
Spring Branch @ Buffalo Bayou	26.11	26.07	-0.04	29.35	29.26	-0.09
Buffalo Bayou @ W138-00-00	39.16	39.15	-0.01	47.14	47.12	-0.02
Buffalo Bayou @ W137-00-00	36.73	36.72	-0.01	44.52	44.50	-0.02
Buffalo Bayou @ Woodway Dr	35.96	35.94	-0.02	43.68	43.66	-0.02
Buffalo Bayou @ W129-00-00	33.03	33.02	-0.01	40.68	40.66	-0.02
Buffalo Bayou @ Montrose Blvd.	30.59	30.59	0.00	37.66	37.64	-0.02
Buffalo Bayou @ White Oak Bayou	22.33	22.32	-0.01	30.44	30.42	-0.02
Buffalo Bayou @ End	0.08	0.08	0.00	7.09	7.07	-0.02

*WSEL = Water Surface Elevation

Table 7: Future Regional Solution Node Results

Node	Label (See Exhibit 10)	10-Year WSEL (ft) Existing	10-Year Proposed Phase 1 (Pond-Only)	10-Year Future Phase 2 (Channel Impvs)	10-Year Future Phase 3 (Storm Sew Impvs)	10-Year Proposed Phase 1 (Pond-Only) Diff.	10-Year Future Phase 2 (Channel Impvs) Diff.	10-Year Future Phase 3 (Storm Sew Impvs) Diff.	100-Year WSEL (ft) Existing	100-Year Proposed Phase 1 (Pond-Only)	100-Year Future Phase 2 (Channel Impvs)	100-Year Future Phase 3 (Storm Sew Impvs)	100-Year Proposed Phase 1 (Pond-Only) Diff.	100-Year Future Phase 2 (Channel Impvs) Diff.	100-Year Future Phase 3 (Storm Sew Impvs) Diff.
C092	A	85.28	85.28	85.27	84.82	0.00	-0.01	-0.46	86.27	86.27	86.27	85.96	0.00	0.00	-0.31
C065	B	82.38	82.38	82.34	81.13	0.00	-0.04	-1.24	83.01	83.01	82.98	81.91	0.00	-0.03	-1.10
C055	C	81.59	81.59	81.53	80.83	0.00	-0.06	-0.76	82.19	82.19	82.14	81.57	0.00	-0.05	-0.63
C047	D	81.01	81.01	80.93	80.60	0.00	-0.07	-0.41	81.62	81.62	81.55	81.32	0.00	-0.07	-0.30
C035	E	80.77	80.77	80.71	80.45	0.00	-0.06	-0.32	81.38	81.38	81.32	81.17	0.00	-0.06	-0.21
C004	F	80.35	80.35	80.32	80.23	0.00	-0.03	-0.12	80.91	80.87	80.84	80.91	-0.04	-0.07	0.00
3146769	G	80.25	80.24	80.12	79.94	-0.01	-0.13	-0.30	80.83	80.79	80.71	80.58	-0.04	-0.12	-0.25
D12	H	80.45	80.45	80.26	79.84	0.00	-0.19	-0.62	81.04	81.04	80.95	80.73	0.00	-0.09	-0.31
3146601	I	80.37	80.37	80.24	80.04	0.00	-0.13	-0.33	80.92	80.91	80.84	80.65	-0.01	-0.08	-0.26
B48	J	83.54	83.52	83.38	82.99	-0.02	-0.16	-0.55	84.95	84.94	84.80	84.54	-0.01	-0.15	-0.41
B36	K	81.43	81.43	81.05	80.02	0.00	-0.39	-1.41	83.00	82.93	82.85	82.52	-0.07	-0.15	-0.48
B29	L	80.64	80.64	80.28	79.30	0.00	-0.36	-1.34	81.70	81.67	81.52	80.96	-0.04	-0.19	-0.74
B18	M	79.89	79.86	79.35	78.89	-0.03	-0.54	-1.00	80.67	80.56	80.23	80.23	-0.11	-0.44	-0.44
IH-10_JUNCTION_E01	N	79.52	79.51	79.48	78.44	-0.01	-0.04	-1.08	80.27	80.27	80.25	80.08	0.00	-0.02	-0.18
20116	O	79.58	79.55	79.58	79.12	-0.03	-0.01	-0.46	80.14	80.10	80.13	80.10	-0.03	-0.01	-0.03
6029708	P	80.06	80.06	80.02	79.91	0.00	-0.04	-0.15	80.51	80.51	80.44	80.34	0.00	-0.07	-0.18
20132	Q	79.44	79.44	79.31	79.05	-0.01	-0.13	-0.39	79.97	79.97	79.86	79.79	0.00	-0.11	-0.18
20142	R	79.48	79.48	79.33	78.96	-0.01	-0.15	-0.52	79.95	79.95	79.82	79.74	0.00	-0.13	-0.21
5005	S	78.53	78.48	78.53	78.51	-0.05	0.00	-0.02	78.84	78.81	78.82	78.81	-0.02	-0.02	-0.03
W14001_sta16681	T	75.25	74.92	75.10	75.00	-0.33	-0.15	-0.25	76.63	76.06	76.24	76.27	-0.57	-0.38	-0.35
4165583	U	77.21	76.96	77.03	76.98	-0.25	-0.18	-0.23	78.78	78.76	78.71	78.60	-0.02	-0.07	-0.18
6029809	V	77.03	76.87	76.93	76.91	-0.16	-0.10	-0.12	77.67	77.55	77.63	77.61	-0.12	-0.04	-0.05
5816	W	75.40	75.06	75.40	75.39	-0.34	0.00	-0.01	77.21	76.93	77.22	77.19	-0.28	0.00	-0.02
W1400105_sta0213	X	74.99	74.54	75.00	74.99	-0.45	0.00	-0.01	76.92	76.32	76.87	76.92	-0.60	-0.06	0.00
5861	Y	75.64	75.62	75.63	75.61	-0.01	-0.01	-0.03	76.31	76.15	76.31	76.25	-0.16	0.00	-0.07
5826	Z	75.12	74.81	75.12	75.10	-0.31	0.00	-0.02	76.19	75.97	76.18	76.17	-0.22	-0.01	-0.03

Table 8: Future Regional Solution Peak Flow Comparisons

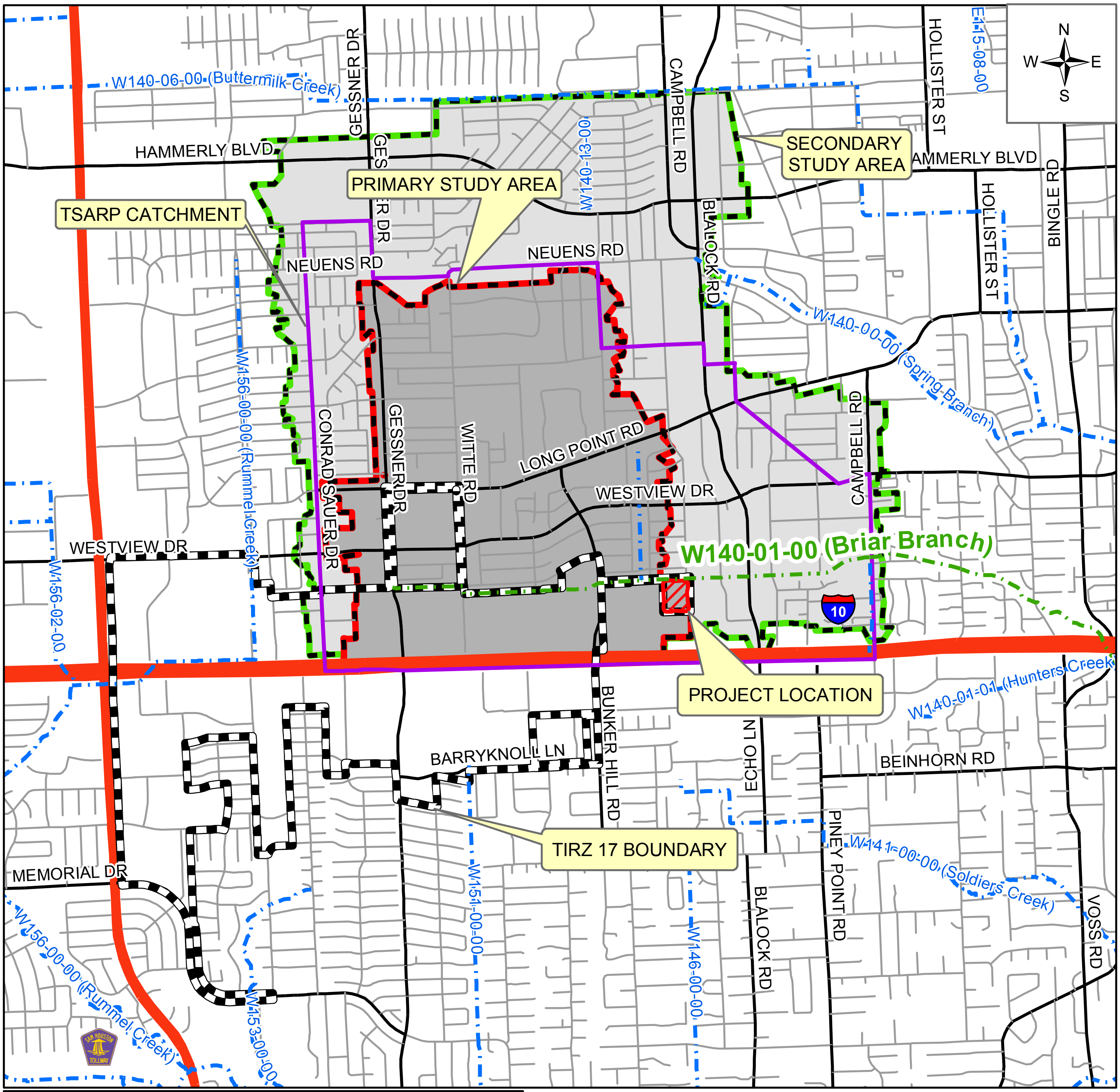
	10-Year					100-Year				
Location	Existing Conditons Flow (CFS)	Future Phase 2 (Channel Impvs) Flow (CFS)	Diff. (%)	Future Phase 3 (Storm Sew Impvs) Flow (CFS)	Diff. (%)	Existing Conditons Flow (CFS)	Future Phase 2 (Channel Impvs) Flow (CFS)	Diff. (%)	Future Phase 3 (Storm Sew Impvs) Flow (CFS)	Diff. (%)
Briar Branch @ Campbell Rd	589	557	-5.35%	577	-1.94%	1088	1038	-4.59%	1037	-4.72%
Briar Branch @ Spring Branch	1158	1124	-2.93%	1144	-1.16%	2142	2089	-2.44%	2088	-2.51%
Spring Branch @ Buffalo Bayou	3853	3814	-1.00%	3836	-0.44%	7104	7050	-0.77%	7048	-0.79%
Buffalo Bayou @ W138-00-00	7953	7951	-0.03%	7953	0.00%	15423	15414	-0.06%	15414	-0.06%
Buffalo Bayou @ W137-00-00	8152	8150	-0.03%	8152	0.00%	15903	15893	-0.06%	15893	-0.06%
Buffalo Bayou @ Woodway Dr	8431	8428	-0.04%	8431	-0.01%	16676	16666	-0.06%	16666	-0.06%
Buffalo Bayou @ W129-00-00	8840	8813	-0.31%	8830	-0.12%	17497	17485	-0.07%	17485	-0.07%
Buffalo Bayou @ Montrose Blvd.	8535	8527	-0.09%	8533	-0.03%	17393	17376	-0.10%	17375	-0.10%
Buffalo Bayou @ White Oak Bayou	38442	38427	-0.04%	38436	-0.02%	59250	59216	-0.06%	59215	-0.06%
Buffalo Bayou @ End	39606	39592	-0.04%	39600	-0.01%	61636	61603	-0.05%	61602	-0.06%

Table 9: Future Regional Solution Water Surface Elevation Comparisons

Location	10-Year					100-Year				
	Exist WSEL*	Future Phase 2 (Channel Impvs) WSEL (ft)	Diff. (ft)	Future Phase 3 (Storm Sew Impvs) WSEL (ft)	Diff. (ft)	Exist WSEL*	Future Phase 2 (Channel Impvs) WSEL (ft)	Diff. (ft)	Future Phase 3 (Storm Sew Impvs) WSEL (ft)	Diff. (ft)
Briar Branch @ Campbell Rd	69.80	69.73	-0.07	69.69	-0.11	72.25	72.17	-0.08	72.16	-0.09
Briar Branch @ Spring Branch	32.76	32.71	-0.05	32.68	-0.08	35.82	35.68	-0.14	35.67	-0.15
Spring Branch @ Buffalo Bayou	26.11	26.09	-0.02	26.09	-0.02	29.35	29.30	-0.05	29.30	-0.05
Buffalo Bayou @ W138-00-00	39.16	39.15	-0.01	39.15	-0.01	47.14	47.13	-0.01	47.13	-0.01
Buffalo Bayou @ W137-00-00	36.73	36.72	-0.01	36.72	-0.01	44.52	44.51	-0.01	44.51	-0.01
Buffalo Bayou @ Woodway Dr	35.96	35.95	-0.01	35.95	-0.01	43.68	43.67	-0.01	43.67	-0.01
Buffalo Bayou @ W129-00-00	33.03	33.03	0.00	33.02	-0.01	40.68	40.67	-0.01	40.67	-0.01
Buffalo Bayou @ Montrose Blvd.	30.59	30.59	0.00	30.59	0.00	37.66	37.65	-0.01	37.65	-0.01
Buffalo Bayou @ White Oak Bayou	22.33	22.33	0.00	22.33	0.00	30.44	30.43	-0.01	30.43	-0.01
Buffalo Bayou @ End	0.08	0.08	0.00	0.08	0.00	7.09	7.08	-0.01	7.08	-0.01

*WSEL = Water Surface Elevation

EXHIBITS



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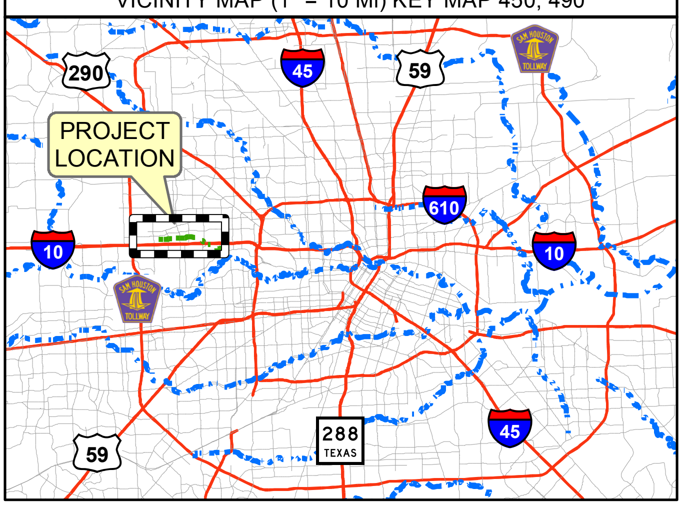

0 3,000 6,000
Feet

TIRZ 17
REDEVELOPMENT
AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

BRIAR BRANCH (W140-01-00)
IMPACT ANALYSIS

EXHIBIT 1 - PROJECT LOCATION MAP

Map Document: L:\130-10384-011\4-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\01_Project_Location1.mxd 4/8/2013 10:18:53 AM DGGreaney

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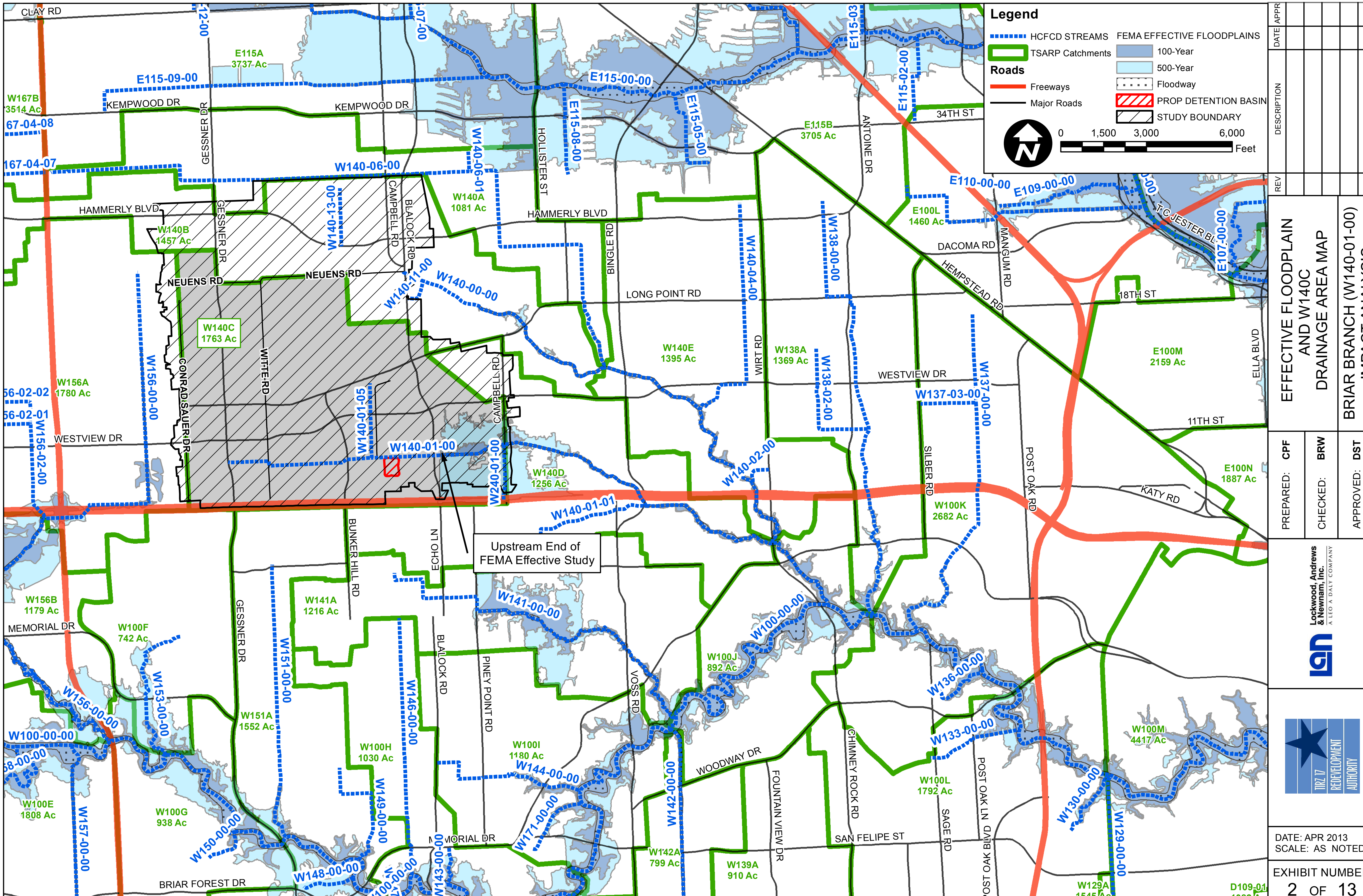

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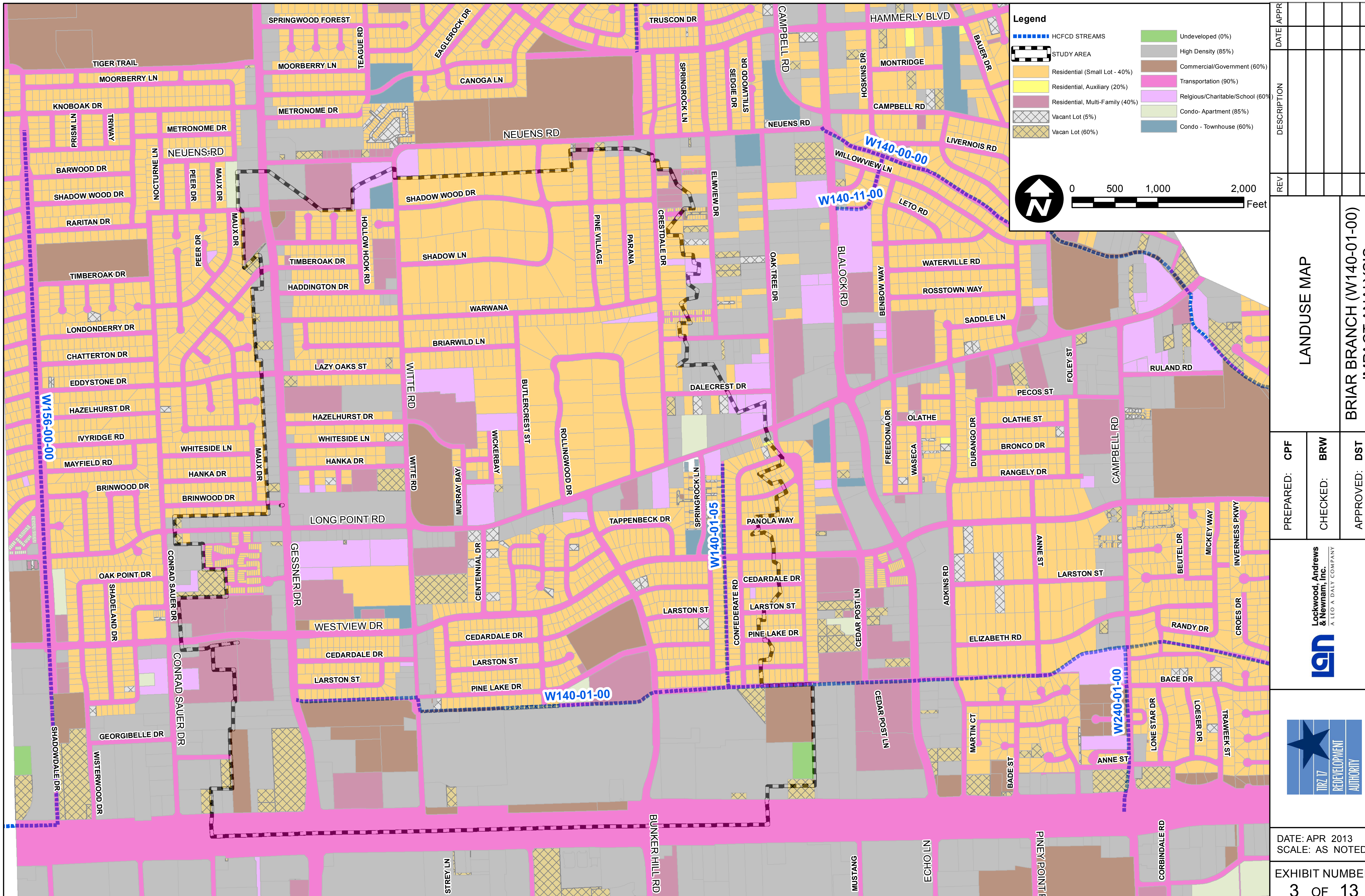

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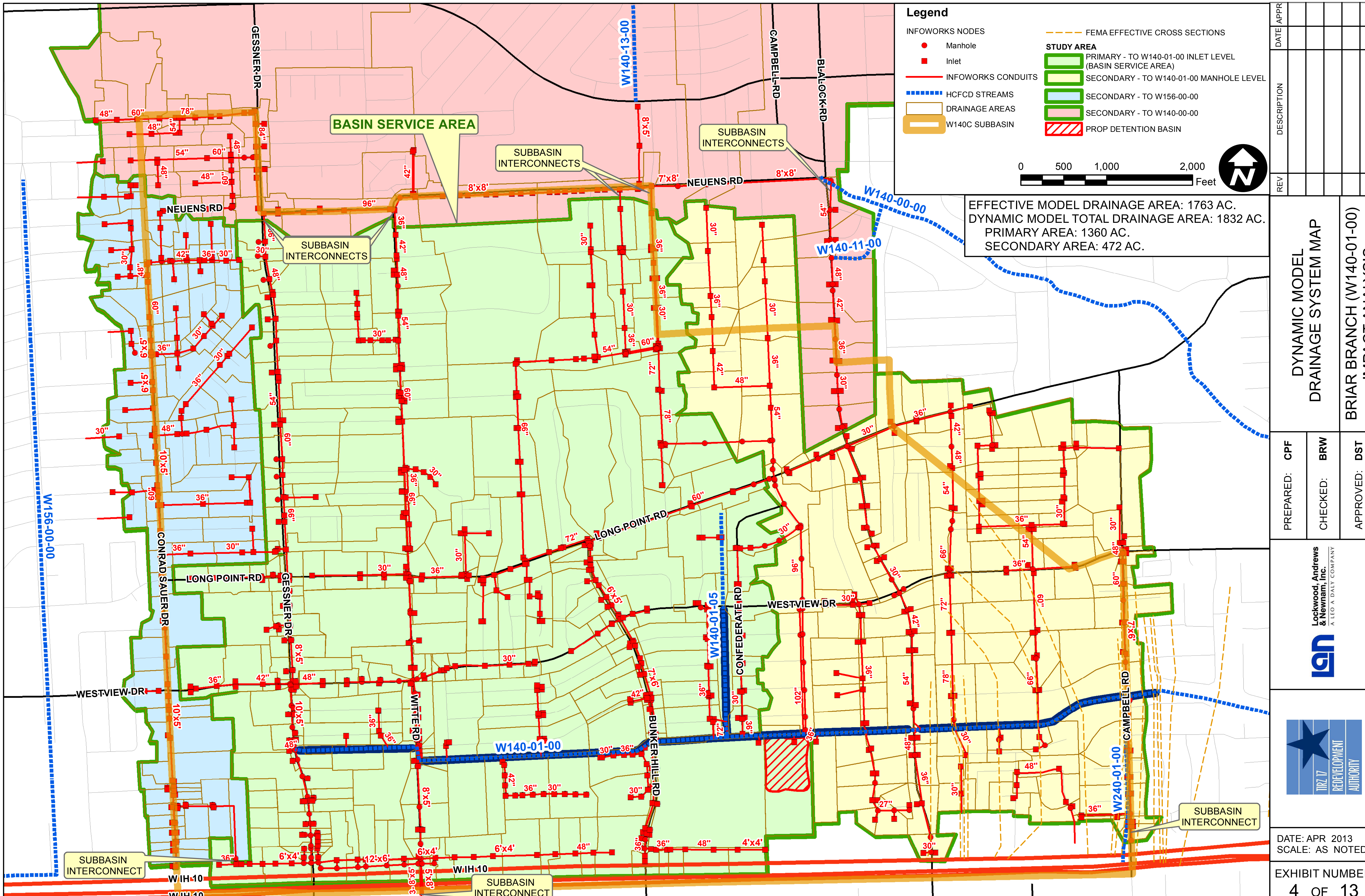

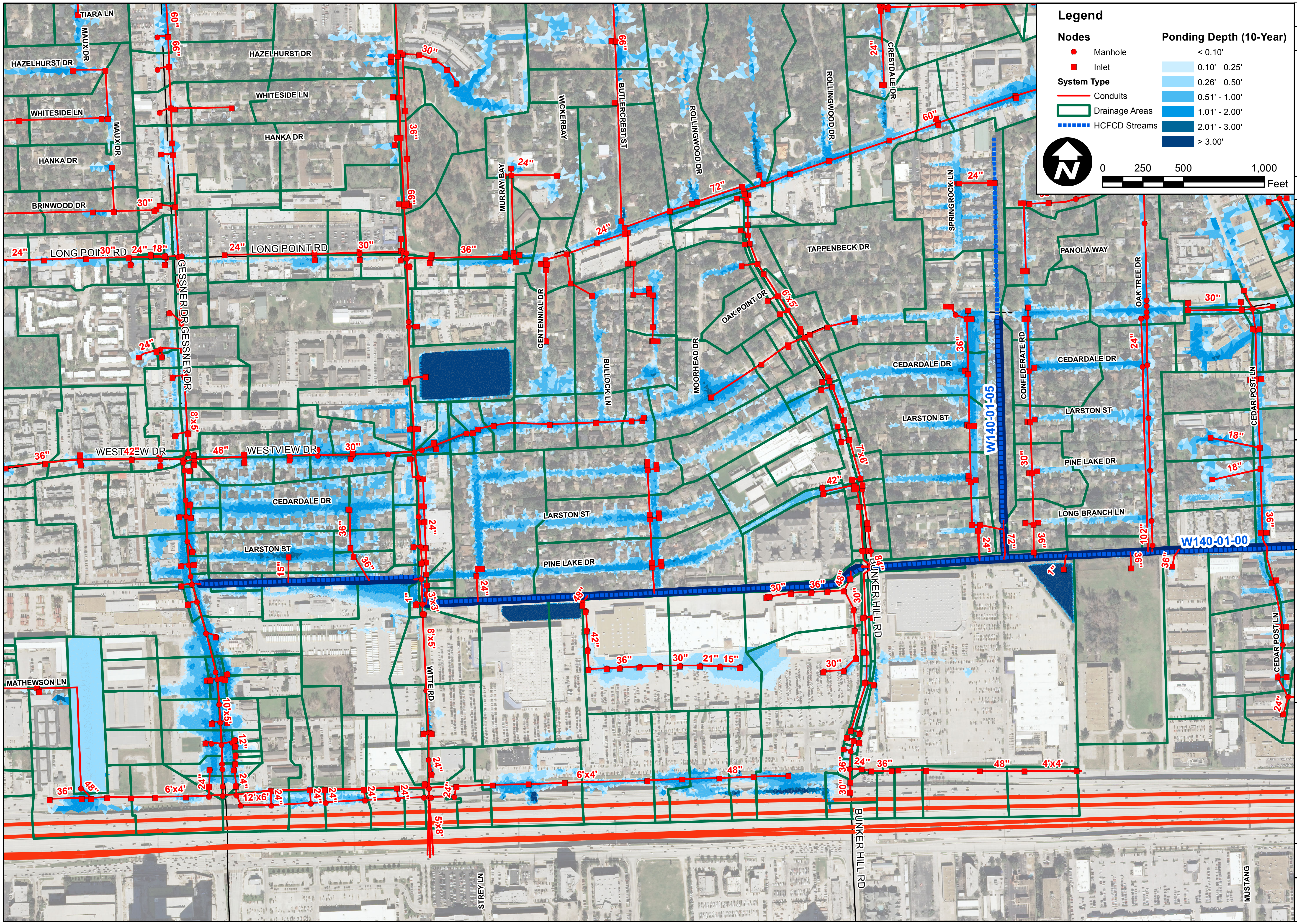

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REV	DESCRIPTION	DATE	APPR

EXISTING CONDITIONS
10-YEAR INUNDATION MAP

BRIAR BRANCH (W140-01-00)
IMPACT ANALYSIS

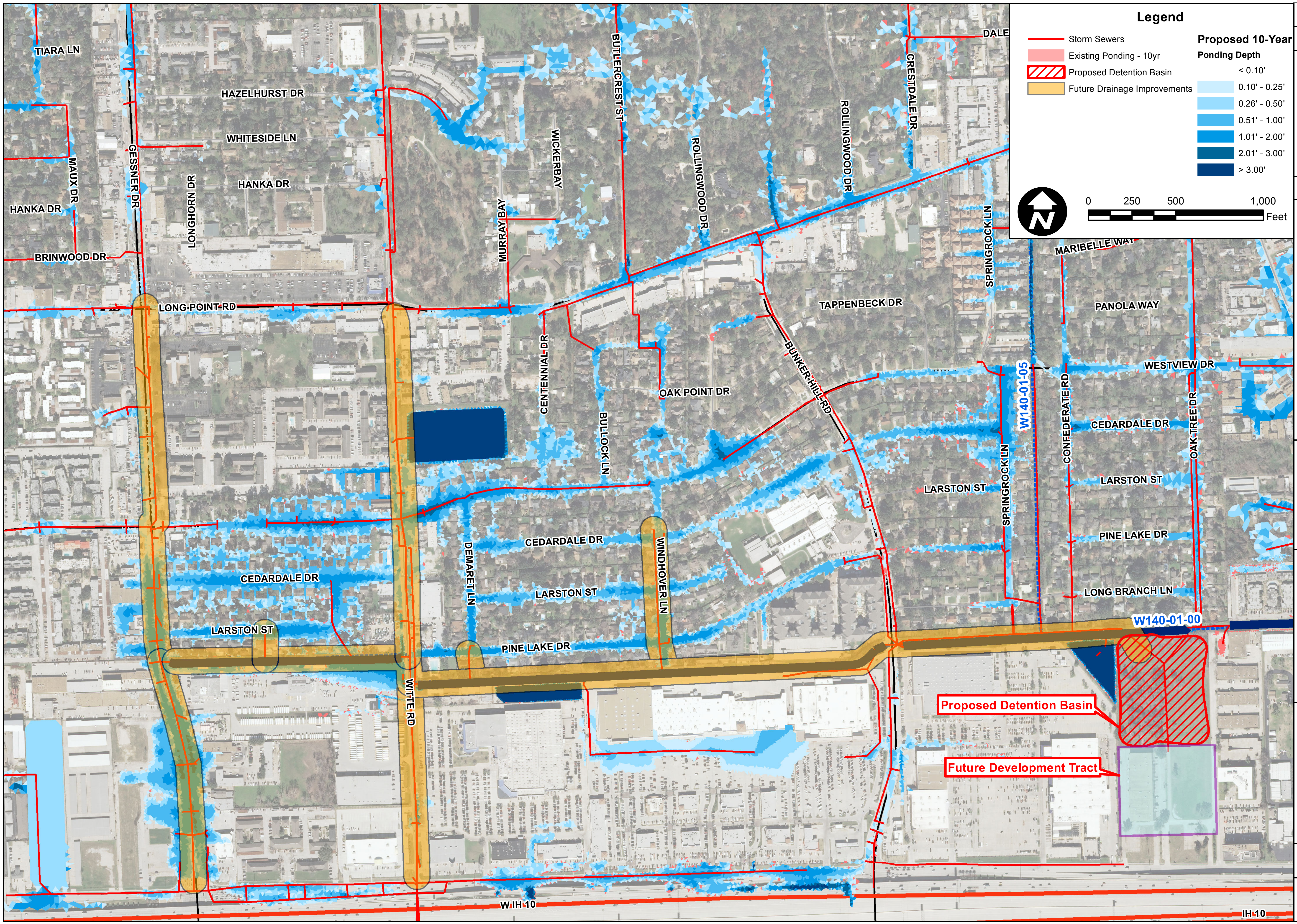
PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: APR 2013
SCALE: AS NOTED

EXHIBIT NUMBER
5 OF 13



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REV	DESCRIPTION	DATE	APPR

PROPOSED POND-ONLY 10-YEAR INUNDATION REDUCTION MAP

BRIAR BRANCH (W140-01-00) IMPACT ANALYSIS

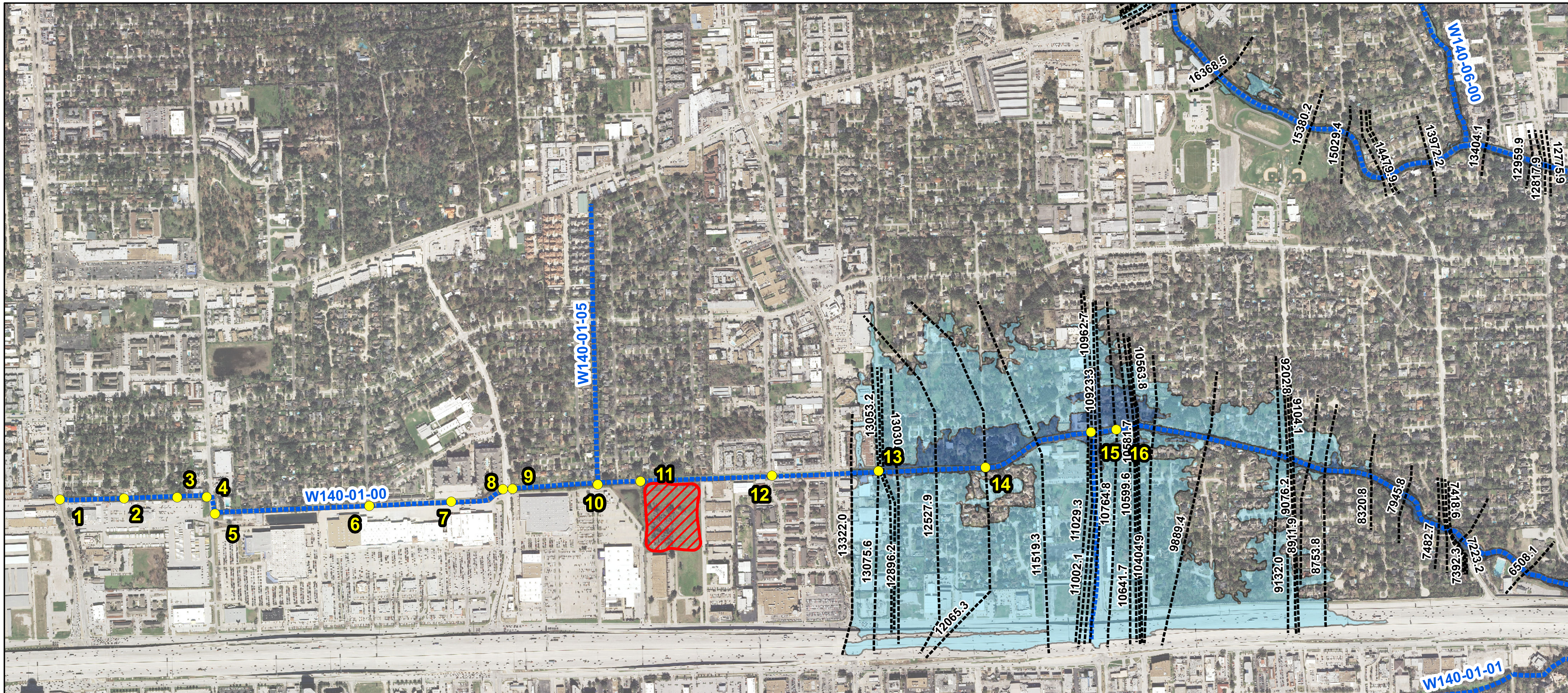
PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: APR 2013
SCALE: AS NOTED

EXHIBIT NUMBER
6 OF 13



Proposed Dynamic Model Impact Analysis Results

Node	Station	10-Year Water Surface Elevations				100-Year Water Surface Elevations			
		FEMA Effective	Existing	Prop Phase 1	Difference (ft)	FEMA Effective	Existing	Prop Phase 1	Difference (ft)
1	21026	-	80.25	80.25	0.00	-	80.87	80.81	-0.06
2	20481	-	80.09	80.06	-0.03	-	80.99	80.74	-0.25
3	19981	-	80.07	80.07	0.00	-	80.92	80.73	-0.19
4	19701	-	80.12	80.10	-0.02	-	80.97	80.78	-0.19
5	19481	-	79.42	79.38	-0.04	-	80.02	79.97	-0.05
6	18066	-	77.48	77.45	-0.04	-	78.47	78.28	-0.19
7	16821	-	75.27	74.93	-0.34	-	76.65	76.10	-0.55
8	16756	-	75.26	74.93	-0.33	-	76.64	76.10	-0.54
9	16681	-	75.25	74.92	-0.33	-	76.63	76.06	-0.57
10	15863	-	74.86	74.32	-0.54	-	76.42	75.64	-0.78
11	15381	-	74.73	74.08	-0.65	-	75.93	75.37	-0.56
12	14232	-	73.96	73.47	-0.49	-	75.03	74.55	-0.48
13	13031	72.52	73.03	72.65	-0.38	72.33	73.87	73.50	-0.37
14	12065	71.48	72.15	71.85	-0.31	71.30	72.92	72.59	-0.33
15	11029	70.13	69.62	69.44	-0.18	69.95	70.27	69.96	-0.30
16	10765	69.80	69.27	69.11	-0.17	69.63	69.83	69.57	-0.26

PROPOSED CONDITIONS INCLUDE ONLY THE PROPOSED DETENTION BASIN WITHOUT CHANNEL OR STORM SEWER IMPROVEMENTS.

Legend

- Analysis Nodes
- Proposed Detention Pond
- Effective Model Cross Sections

FEMA Effective Floodplains

- 100-Year
- 500-Year

0 500 1,000 2,000 Feet

REV | DESCRIPTION | DATE | APPR

PROPOSED POND-ONLY DYNAMIC MODEL IMPACT ANALYSIS RESULTS

BRIAR BRANCH (W140-01-00) IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: APR 2013
SCALE: AS NOTED

EXHIBIT NUMBER 7 OF 13

Map Document: \\hou\Production\130-10384-011\4-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\07_Prop_dynamic_model_results.mxd
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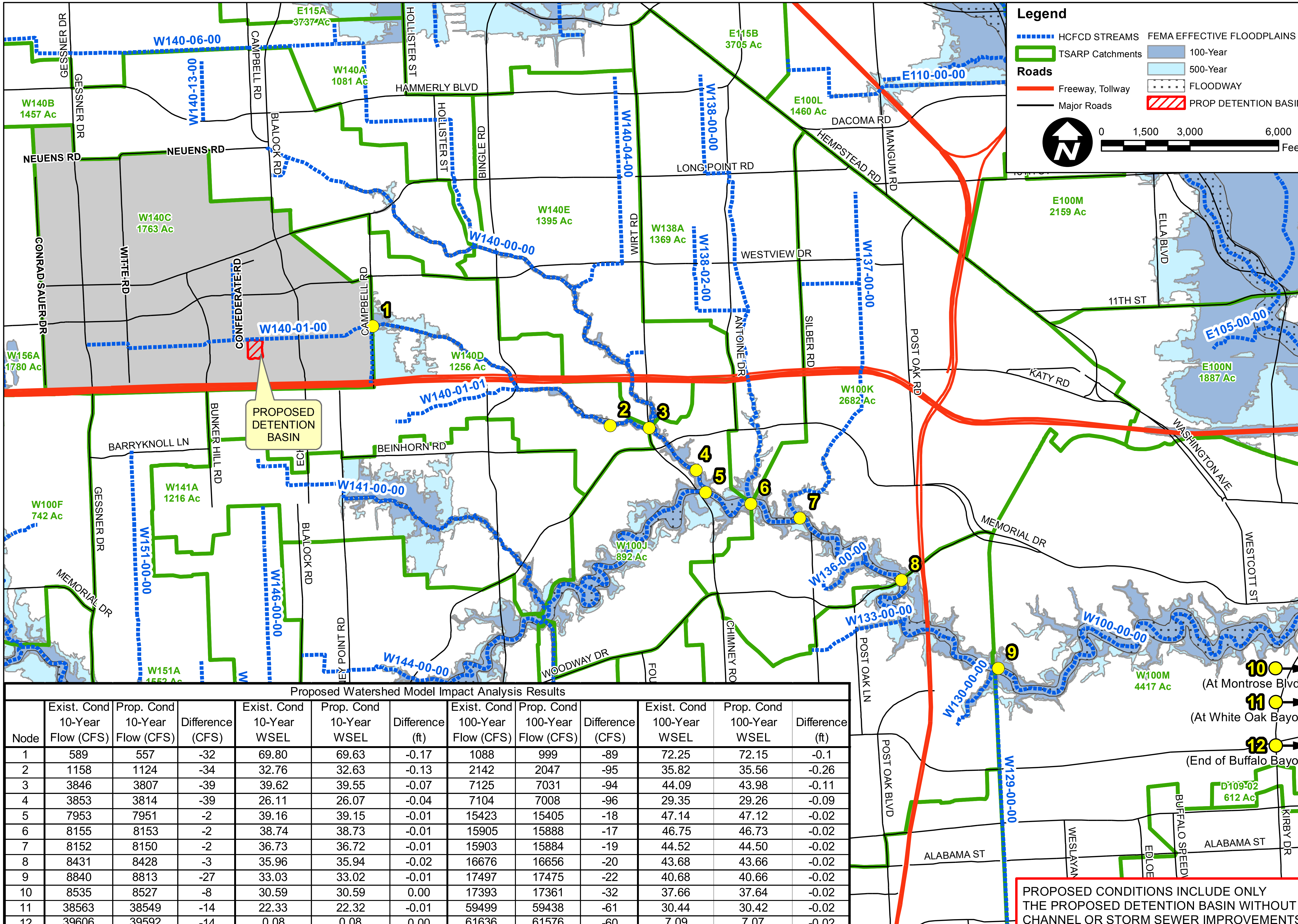


Proposed Watershed Model Impact Analysis Results

Node	Exist. Cond 10-Year Flow (CFS)	Prop. Cond 10-Year Flow (CFS)	Difference (CFS)	Exist. Cond 10-Year WSEL	Prop. Cond 10-Year WSEL	Difference (ft)	Exist. Cond 100-Year Flow (CFS)	Prop. Cond 100-Year Flow (CFS)	Difference (CFS)	Exist. Cond 100-Year WSEL	Prop. Cond 100-Year WSEL	Difference (ft)
1	589	557	-32	69.80	69.63	-0.17	1088	999	-89	72.25	72.15	-0.1
2	1158	1124	-34	32.76	32.63	-0.13	2142	2047	-95	35.82	35.56	-0.26
3	3846	3807	-39	39.62	39.55	-0.07	7125	7031	-94	44.09	43.98	-0.11
4	3853	3814	-39	26.11	26.07	-0.04	7104	7008	-96	29.35	29.26	-0.09
5	7953	7951	-2	39.16	39.15	-0.01	15423	15405	-18	47.14	47.12	-0.02
6	8155	8153	-2	38.74	38.73	-0.01	15905	15888	-17	46.75	46.73	-0.02
7	8152	8150	-2	36.73	36.72	-0.01	15903	15884	-19	44.52	44.50	-0.02
8	8431	8428	-3	35.96	35.94	-0.02	16676	16656	-20	43.68	43.66	-0.02
9	8840	8813	-27	33.03	33.02	-0.01	17497	17475	-22	40.68	40.66	-0.02
10	8535	8527	-8	30.59	30.59	0.00	17393	17361	-32	37.66	37.64	-0.02
11	38563	38549	-14	22.33	22.32	-0.01	59499	59438	-61	30.44	30.42	-0.02
12	39606	39592	-14	0.08	0.08	0.00	61636	61576	-60	7.09	7.07	-0.02

PROPOSED POND-ONLY WATERSHED LEVEL IMPACT ANALYSIS RESULTS

BRIAR BRANCH (W140-01-00) IMPACT ANALYSIS

PREPARED: CPF CHECKED: BRW APPROVED: DST

Lockwood, Andrews & Newnam, Inc.

DATE: APR 2013
SCALE: AS NOTED

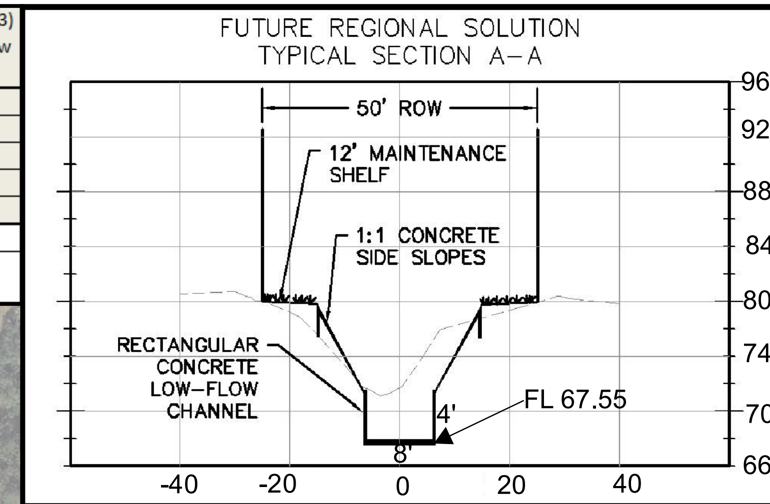
EXHIBIT NUMBER 8 OF 13

Map Document: \\hou\Production\130-10384-01\14-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\08_Prop_Watershed_Results.mxd 4/23/2013 12:53:03 PM DGGreaney

Num.	Project Name	Outfall Location (Briar Branch Station)	Exist Outfall Size	Prop Outfall Size*	Future Regional Solution Outfall Size**	Exist 10yr Peak Flow Rate (CFS)	Prop 10yr Peak Flow Rate (CFS)*	Future (Phase 3) 10yr Peak Flow Rate (CFS)**	Exist 100yr Peak Flow Rate (CFS)	Prop 100yr Peak Flow Rate (CFS)*	Future (Phase 3) 100yr Peak Flow Rate (CFS)**
1	North Gessner Road	21026	36" RCP	36" RCP	36" RCP	72.7	72.7	69.9	78.6	78.4	83.2
2	Larston Inlets	20481	15" RCP	15" RCP	36" CMP	7.7	7.6	15.9	7.8	7.8	16.6
3	Witte Road	19481	2-48" RCP	2-48" RCP	5'x4' RCB	203.8	198.7	314.2	243.1	234.4	359.6
4	Demaret Lane	19161	24" CMP	24" CMP	30" CMP	12.1	12.1	26.9	12.0	12.0	26.8
5	Windhover Lane	18066	2-24" CMP	2-24" CMP	36" CMP	30.2	30.1	42.7	30.1	29.9	41.2

* Proposed Project includes only the basin. Only the basin is intended for permitting, approval, and construction at this time.

**Future Regional Solution is preliminary. All sizes and flow rates are subject to change. Separate impact analyses will be submitted for future projects at a future date.

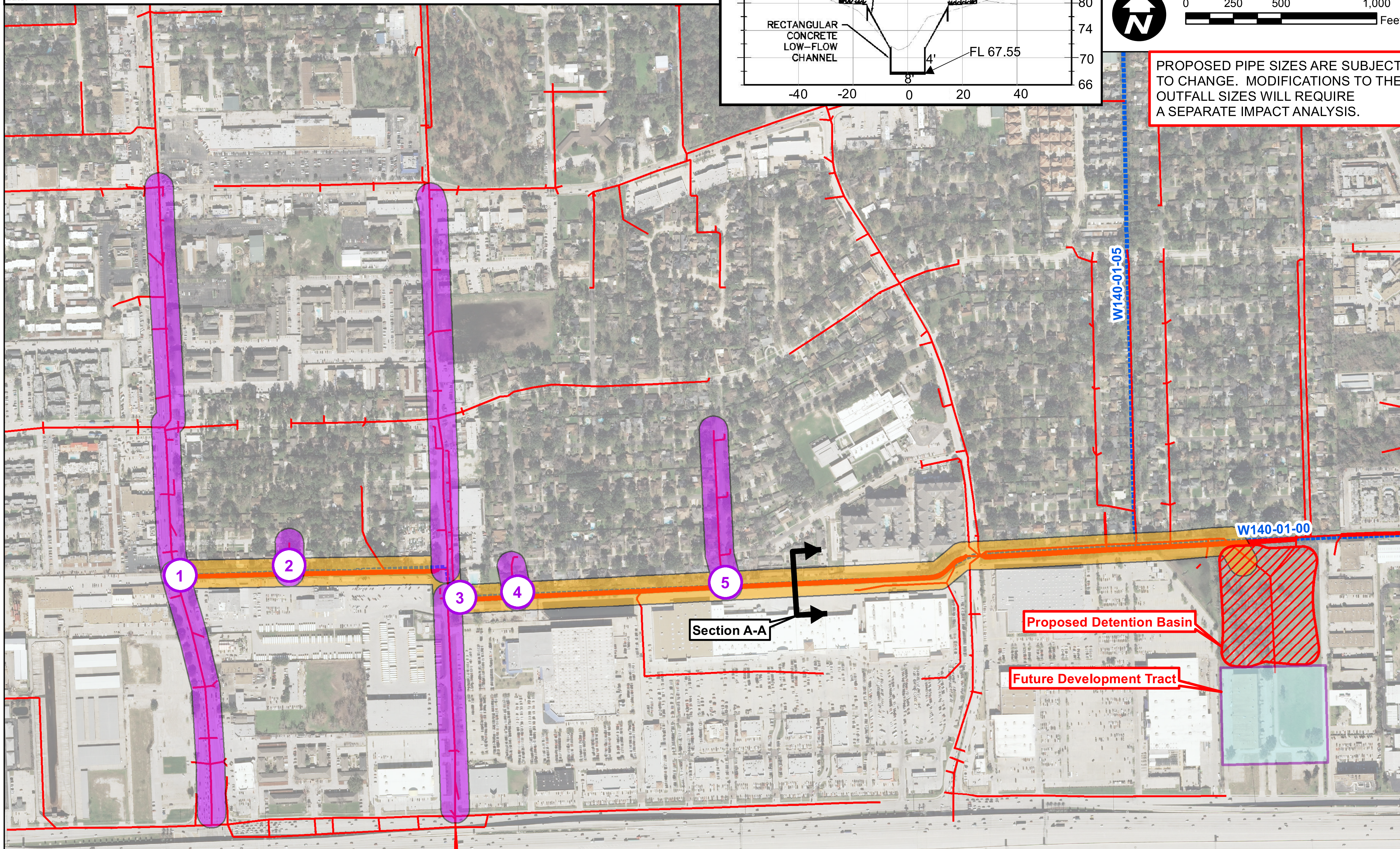


Legend

- Existing Storm Sewers
- Proposed Detention Basin (Phase 1)
- Future Channel Improvements (Phase 2)
- Future Storm Sewer Improvements (Phase 3)

0 250 500 1,000 Feet

PROPOSED PIPE SIZES ARE SUBJECT TO CHANGE. MODIFICATIONS TO THE OUTFALL SIZES WILL REQUIRE A SEPARATE IMPACT ANALYSIS.



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REV | DESCRIPTION | DATE | APPR

FUTURE REGIONAL SOLUTION COMPONENTS MAP

BRIAR BRANCH (W140-01-00) IMPACT ANALYSIS

PREPARED: CPF

CHECKED: BRW

APPROVED: DST

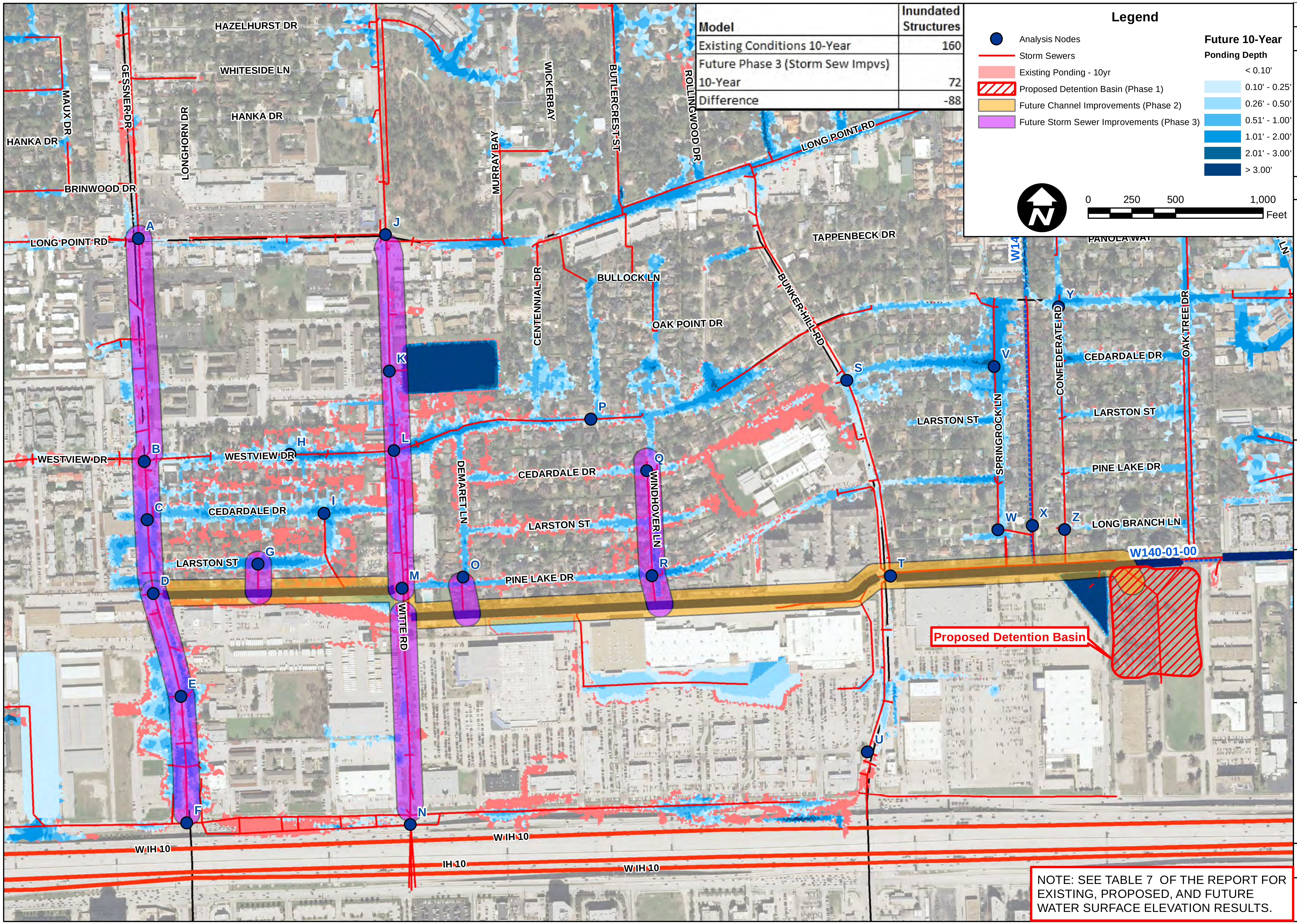
Lockwood, Andrews & Newnam, Inc. A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: MAY 2013
SCALE: AS NOTED

EXHIBIT NUMBER
9 OF 13

Model	Inundated Structures
Existing Conditions 10-Year	160
Future Phase 3 (Storm Sew Impvs) 10-Year	72
Difference	-88



NOTE: SEE TABLE 7 OF THE REPORT FOR EXISTING, PROPOSED, AND FUTURE WATER SURFACE ELEVATION RESULTS.

Map Document: L:\130-10384-011\4-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\10_Future_Inundation.mxd 5/1/2013 3:41:00 PM cpfrerich

REV	DATE	DESCRIPTION	APPR

FUTURE REGIONAL SOLUTION 10-YEAR INUNDATION REDUCTION MAP

BRIAR BRANCH (W140-01-00) IMPACT ANALYSIS

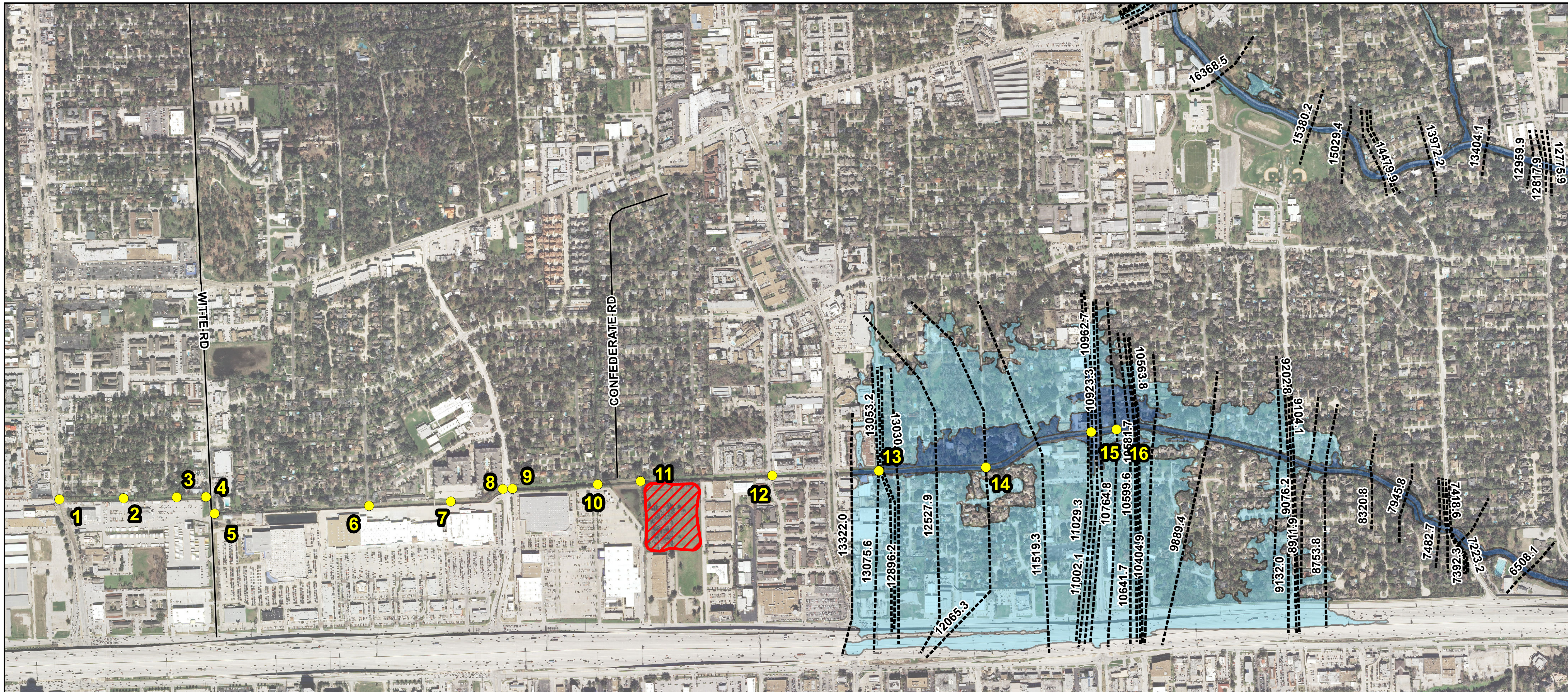
PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: MAY 2013
SCALE: AS NOTED

EXHIBIT NUMBER 10 OF 13



Future Regional Solution Dynamic Model Impact Analysis Results

Node	Station	Existing	Future Phase 2	Difference (ft)	Future Phase 3	Difference (ft)	Existing	Future Phase 2	Difference (ft)	Future Phase 3	Difference (ft)
1	21026	80.25	79.95	-0.29	79.81	-0.43	80.87	80.68	-0.19	80.38	-0.49
2	20481	80.09	79.84	-0.25	79.27	-0.82	80.99	80.65	-0.34	80.29	-0.70
3	19981	80.07	79.84	-0.23	79.26	-0.81	80.92	80.64	-0.28	80.30	-0.62
4	19701	80.12	79.87	-0.25	79.29	-0.83	80.97	80.67	-0.30	80.38	-0.59
5	19481	79.42	77.94	-1.48	77.40	-2.02	80.02	78.62	-1.40	78.54	-1.48
6	18066	77.48	77.11	-0.37	77.32	-0.16	78.47	78.13	-0.34	78.45	-0.03
7	16821	75.27	75.05	-0.22	75.04	-0.23	76.65	76.25	-0.39	76.34	-0.31
8	16756	75.26	75.17	-0.09	75.16	-0.10	76.64	76.33	-0.31	76.44	-0.20
9	16681	75.25	75.01	-0.24	75.00	-0.25	76.63	76.19	-0.44	76.29	-0.33
10	15863	74.86	74.74	-0.12	74.72	-0.14	76.42	76.05	-0.37	76.11	-0.30
11	15381	74.73	74.63	-0.10	74.60	-0.12	75.93	75.93	0.00	75.98	0.04
12	14232	73.96	73.72	-0.24	73.69	-0.27	75.03	74.81	-0.22	74.87	-0.17
13	13031	73.03	72.86	-0.17	72.83	-0.20	73.87	73.69	-0.17	73.74	-0.13
14	12065	72.15	72.02	-0.13	71.99	-0.16	72.92	72.77	-0.15	72.80	-0.12
15	11029	69.62	69.54	-0.07	69.51	-0.10	70.27	70.10	-0.17	70.12	-0.15
16	10765	69.27	69.21	-0.06	69.18	-0.09	69.83	69.69	-0.14	69.71	-0.13

PROPOSED CONDITIONS INCLUDE ONLY THE PROPOSED DETENTION BASIN WITHOUT CHANNEL OR STORM SEWER IMPROVEMENTS.

FUTURE REGIONAL SOLUTION INCLUDES CHANNEL AND STORM SEWER IMPROVEMENTS THAT ARE NOT PROPOSED AT THIS TIME.

Legend

- Analysis Nodes
- Proposed Detention Pond
- Effective Model Cross Sections

FEMA Effective Floodplains

- 100-Year
- 500-Year

0 500 1,000 2,000 Feet

REV	DESCRIPTION	DATE	APPR

FUTURE REGIONAL SOLUTION DYNAMIC MODEL IMPACT ANALYSIS RESULTS

BRIAR BRANCH (W140-01-00) IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

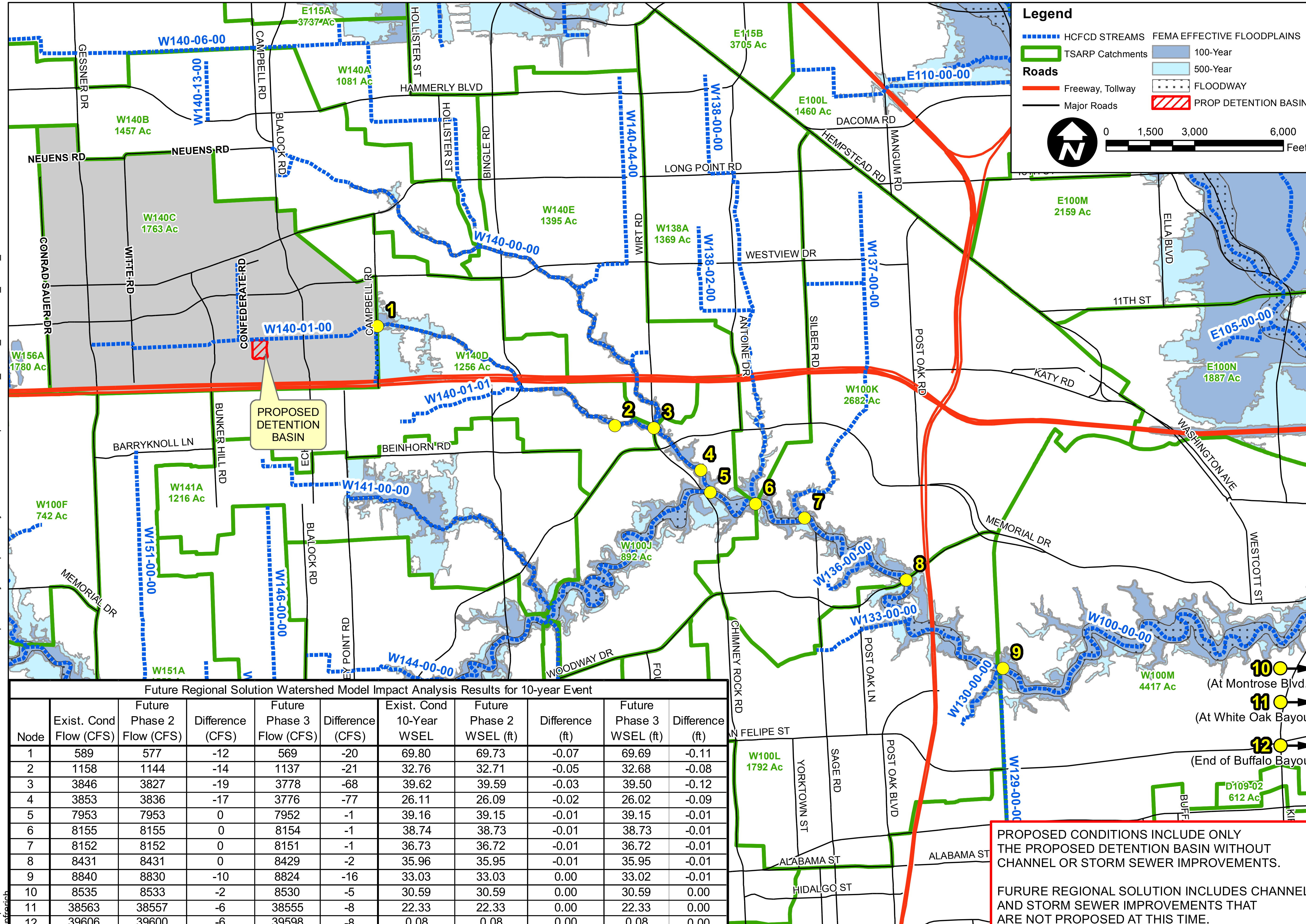
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: APR 2013
SCALE: AS NOTED

EXHIBIT NUMBER
11 OF 13

Map Document: \\hou\Production\130-10384-011\4-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\11_Future_Dynamic_Model_Results.mxd
4/23/2013 1:13:54 PMDGGreaney



Future Regional Solution Watershed Model Impact Analysis Results for 10-year Event

Node	Exist. Cond Flow (CFS)	Future Phase 2 Flow (CFS)	Difference (CFS)	Future Phase 3 Flow (CFS)	Difference (CFS)	Exist. Cond 10-Year WSEL	Future Phase 2 WSEL (ft)	Difference (ft)	Future Phase 3 WSEL (ft)	Difference (ft)
1	589	577	-12	569	-20	69.80	69.73	-0.07	69.69	-0.11
2	1158	1144	-14	1137	-21	32.76	32.71	-0.05	32.68	-0.08
3	3846	3827	-19	3778	-68	39.62	39.59	-0.03	39.50	-0.12
4	3853	3836	-17	3776	-77	26.11	26.09	-0.02	26.02	-0.09
5	7953	7953	0	7952	-1	39.16	39.15	-0.01	39.15	-0.01
6	8155	8155	0	8154	-1	38.74	38.73	-0.01	38.73	-0.01
7	8152	8152	0	8151	-1	36.73	36.72	-0.01	36.72	-0.01
8	8431	8431	0	8429	-2	35.96	35.95	-0.01	35.95	-0.01
9	8840	8830	-10	8824	-16	33.03	33.03	0.00	33.02	-0.01
10	8535	8533	-2	8530	-5	30.59	30.59	0.00	30.59	0.00
11	38563	38557	-6	38555	-8	22.33	22.33	0.00	22.33	0.00
12	39606	39600	-6	39598	-8	0.08	0.08	0.00	0.08	0.00

FUTURE REGIONAL SOLUTION WATERSHED LEVEL 10-YEAR IMPACT ANALYSIS RESULTS

BRIAR BRANCH (W140-01-00) IMPACT ANALYSIS

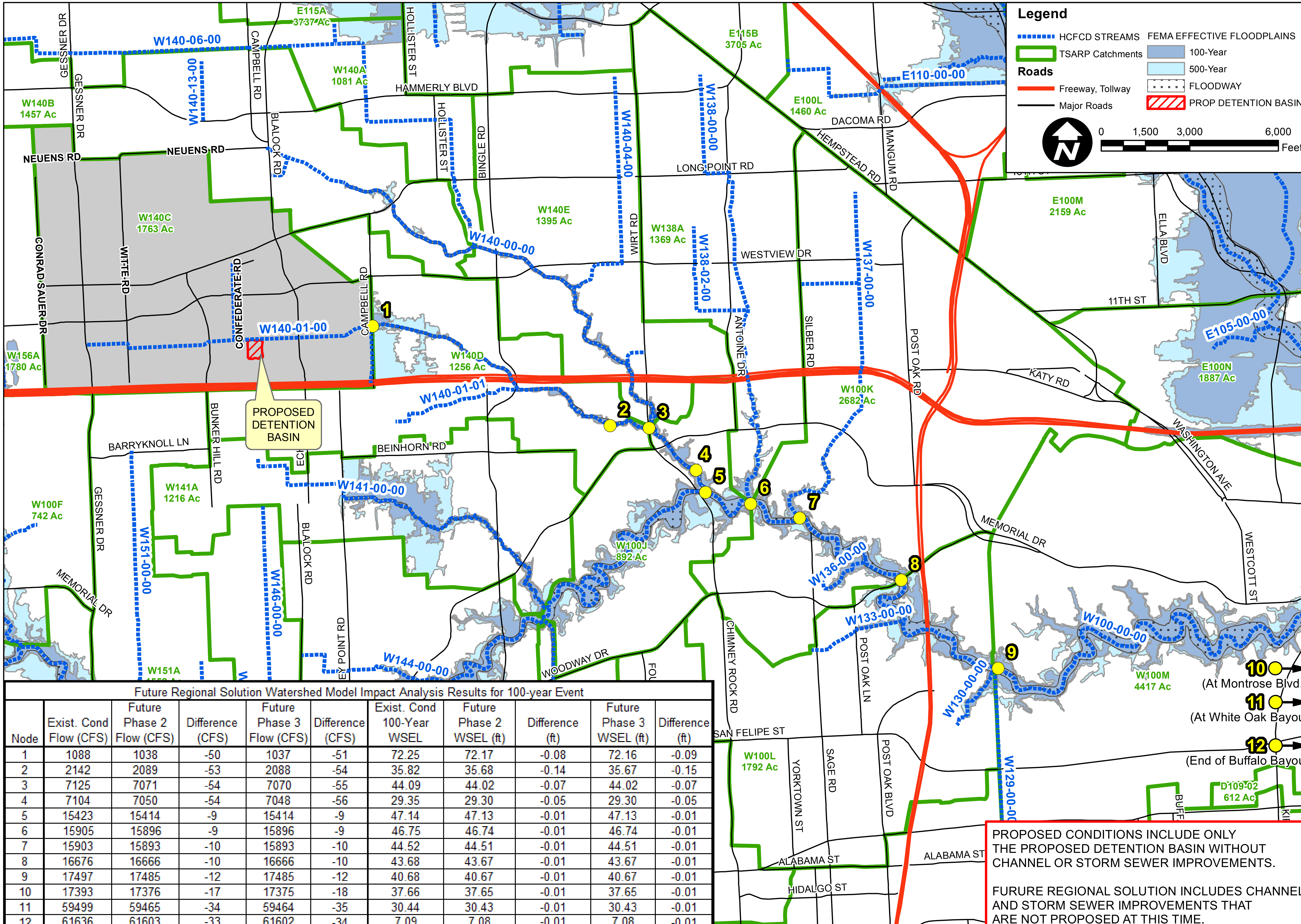
PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.

DATE: APR 2013
SCALE: AS NOTED

EXHIBIT NUMBER 12A OF 13

Map Document: L:\130-10384-011\4-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\12a_Future_Watershed_Model_Results.mxd 4/30/2013 2:41:21 PM



Future Regional Solution Watershed Model Impact Analysis Results for 100-year Event

Node	Exist. Cond Flow (CFS)	Future Phase 2 Flow (CFS)	Difference (CFS)	Future Phase 3 Flow (CFS)	Difference (CFS)	Exist. Cond 100-Year WSEL	Future Phase 2 WSEL (ft)	Difference (ft)	Future Phase 3 WSEL (ft)	Difference (ft)
1	1088	1038	-50	1037	-51	72.25	72.17	-0.08	72.16	-0.09
2	2142	2089	-53	2088	-54	35.82	35.68	-0.14	35.67	-0.15
3	7125	7071	-54	7070	-55	44.09	44.02	-0.07	44.02	-0.07
4	7104	7050	-54	7048	-56	29.35	29.30	-0.05	29.30	-0.05
5	15423	15414	-9	15414	-9	47.14	47.13	-0.01	47.13	-0.01
6	15905	15896	-9	15896	-9	46.75	46.74	-0.01	46.74	-0.01
7	15903	15893	-10	15893	-10	44.52	44.51	-0.01	44.51	-0.01
8	16676	16666	-10	16666	-10	43.68	43.67	-0.01	43.67	-0.01
9	17497	17485	-12	17485	-12	40.68	40.67	-0.01	40.67	-0.01
10	17393	17376	-17	17375	-18	37.66	37.65	-0.01	37.65	-0.01
11	59499	59465	-34	59464	-35	30.44	30.43	-0.01	30.43	-0.01
12	61636	61603	-33	61602	-34	7.09	7.08	-0.01	7.08	-0.01

PROPOSED CONDITIONS INCLUDE ONLY THE PROPOSED DETENTION BASIN WITHOUT CHANNEL OR STORM SEWER IMPROVEMENTS.

FURURE REGIONAL SOLUTION INCLUDES CHANNEL AND STORM SEWER IMPROVEMENTS THAT ARE NOT PROPOSED AT THIS TIME.

FUTURE REGIONAL SOLUTION WATERSHED LEVEL 100-YEAR IMPACT ANALYSIS RESULTS

BRIAR BRANCH (W140-01-00) IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

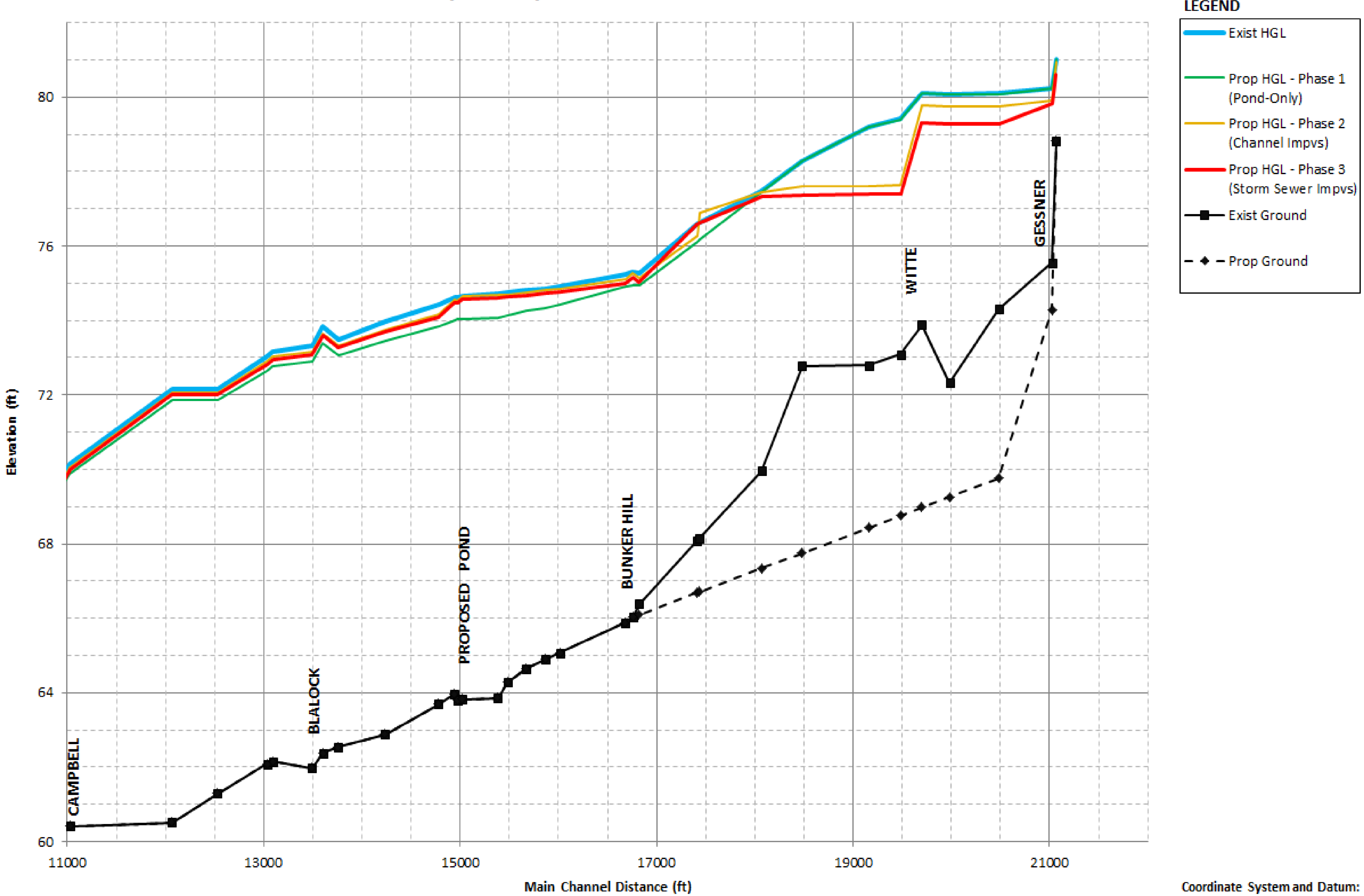
Lockwood, Andrews & Newnam, Inc.

DATE: APR 2013
SCALE: AS NOTED

EXHIBIT NUMBER 12B OF 13

Map Document: L:\130-10384-011\4-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\12b_Future_Watershed_Model_Results_100yr.mxd 4/30/2013 2:46:59 PM cpferich

W140-01-00 - Results for 10-Year (10%AC) Event



Coordinate System and Datum:
Texas State Plane Coordinate System, South Central Zone, NAD 83.
Elevations shown are not for floodplain mapping.

NOTE: ONLY PHASE 1 IS PROPOSED AT THIS TIME.

Map Document: L:\130-10384-01\14-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\13a_10yr_Profile.mxd 5/13/2013 1:35:23 PM cpfreich

REV	DESCRIPTION	DATE	APPR

BRIAR BRANCH (W140-01-00)
10-YEAR RESULTS PROFILE

BRIAR BRANCH (W140-01-00)
IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

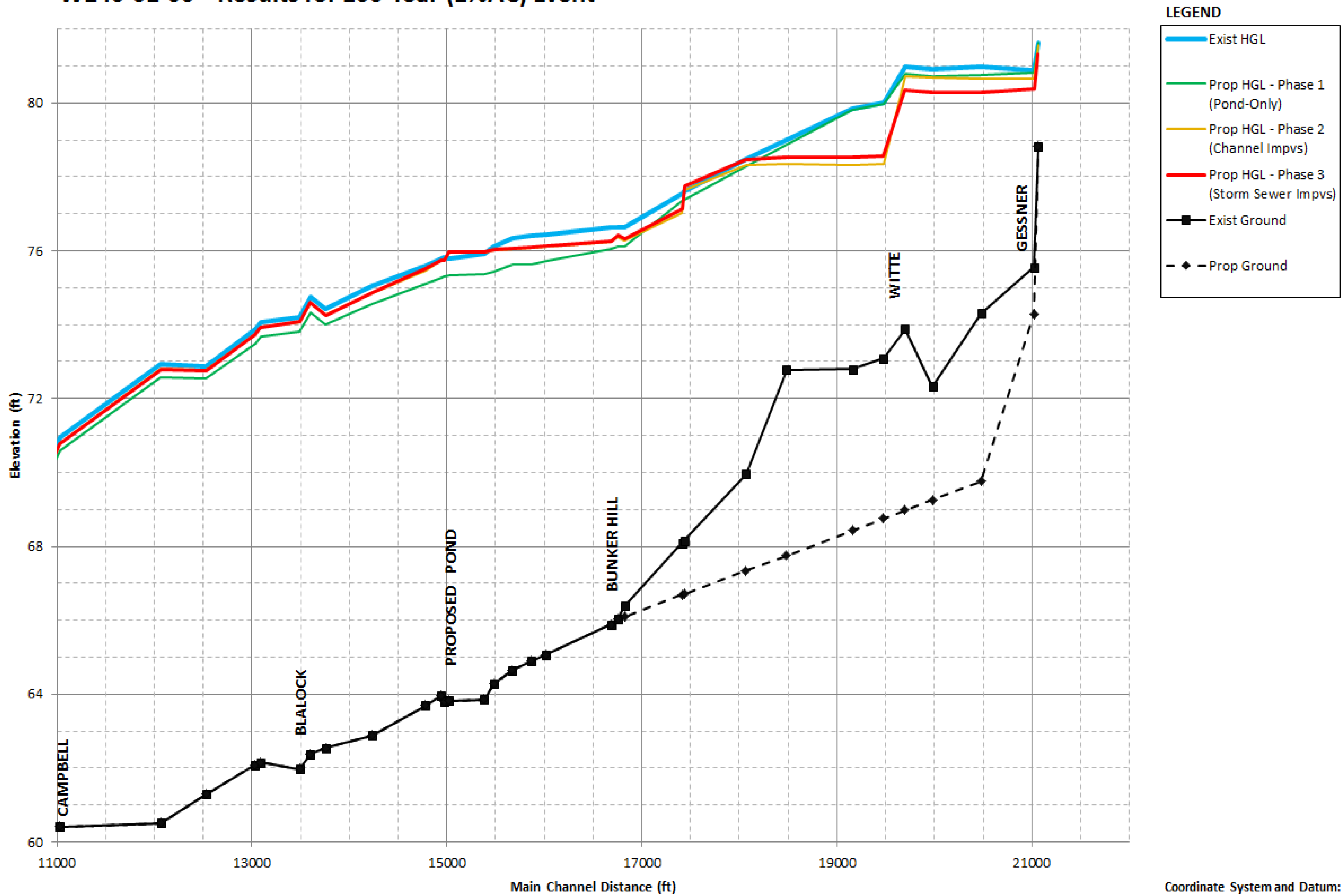
Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: MAY 2013
SCALE: AS NOTED

EXHIBIT NUMBER
13A OF 13

W140-01-00 - Results for 100-Year (1%AC) Event



Coordinate System and Datum:
Texas State Plane Coordinate System, South Central Zone, NAD 83.
Elevations shown are not for floodplain mapping.

NOTE: ONLY PHASE 1 IS PROPOSED AT THIS TIME.

Map Document: L:\130-10384-011\4-0-Production\4-08-GIS\MXD\Impact Analysis\Impact Analysis Resubmittal - Apr 2013\13b_100yr_Profile.mxd 5/13/2013 1:37:47 PM cpferich

REV	DESCRIPTION	DATE	APPR

BRIAR BRANCH (W140-01-00)
100-YEAR RESULTS PROFILE

BRIAR BRANCH (W140-01-00)
IMPACT ANALYSIS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: MAY 2013
SCALE: AS NOTED

EXHIBIT NUMBER
13B OF 13

Appendix B: U.S. Army Corps of Engineers Jurisdictional Determination Letter

MAR 06 2013

DEPARTMENT OF THE ARMY
GALVESTON DISTRICT, CORPS OF ENGINEERS
P. O. BOX 1229
GALVESTON TEXAS 77553-1229

February 20, 2013

Compliance Section

SUBJECT: SWG 2012-00174; TIRZ 17 Redevelopment Authority, Jurisdictional Determination, Proposed Drainage Improvement Project, Located Along a Drainage Ditch South of the Intersection of Bunker Hill Road and Long Branch Lane, City of Houston, Harris County, Texas

Lockwood, Andrews & Newnam, Inc.
MAR 11 2013
Project Number: 130-10384-017
Data Code: 1.1

Muhammad Ali, P.E.
TIRZ 17 Redevelopment Authority
2925 Briarpark Drive, Suite 400
Houston, Texas 77042-3720

Dear Mr. Ali:

This letter is in response to your request for a jurisdictional determination received February 12, 2012, for the proposed drainage improvement project on behalf of TIRZ 17 Redevelopment Authority. The project is located along a drainage ditch south of the intersection of Bunker Hill Road and Long Branch Lane, City of Houston, Harris County, Texas.

Based on our desk review and the June 4, 2012 site visit, we determined that the project site (see attached map) does not contain waters of the United States. Therefore, any work, structures, or the discharge of fill material on the project site is not subject to Section 10 of the Rivers and Harbors Act or Section 404 of the Clean Water Act (CWA) and does not require a Department of the Army permit.

This determination has been conducted to identify the limits of the Corps' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

This letter contains an approved jurisdictional determination for your subject site, which is valid for 5 years from the date of this letter unless new information warrants a revision prior to the expiration date. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeals Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination, you must submit a completed RFA form to the Southwest Division Office at the following address:

MAR 0 6 2013

Mr. Elliott Carman
Regulatory Appeals Officer
Southwest Division USACE (CESWD-PD-O)
1100 Commerce Street, Suite 831
Dallas, Texas 75242-1731
Telephone: 469-487-7061; FAX: 469-487-7199

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete; that it meets the criteria for appeal under 33 CFR Part 331.5, and that it has been received by the Division Office within **60 days** of the date of the NAP. It is not necessary to submit an RFA form to the Division office if you do not object to the determination in this letter.

If you have questions concerning this matter, please reference file number **SWG 2012-00174** and contact Ms. Diana Stevens at the letterhead address, by telephone at 409-766-6380 or email at diana.d.stevens@usace.army.mil. To assist us in improving our service to you, please complete the survey found at http://per2.nwp.usace.army.mil/survey.html. If you would prefer a hard copy of the survey form, please let us know, and one will be mailed to you.

Sincerely,

Kenny Jaynes
Chief, Compliance Section

Enclosure

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

8

Applicant: **TIRZ 17 REDEVELOPMENT AUTHORITY**	File Number: **SWG-2012-00174**	Date: **02/20/2013**
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of Permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of Permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I – The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg/ or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved jurisdictional determination (JD) or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

MAR 06 2013

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Ms Diana Sevens
Regulatory Specials, Compliance Section
CESWG-PE-RC
U.S. Army Corps of Engineers
P.O. Box 1229
Galveston, Texas 77553-1229
409-766-6380 FAX: 409-766-3931

If you only have questions regarding the appeal process you may also contact:

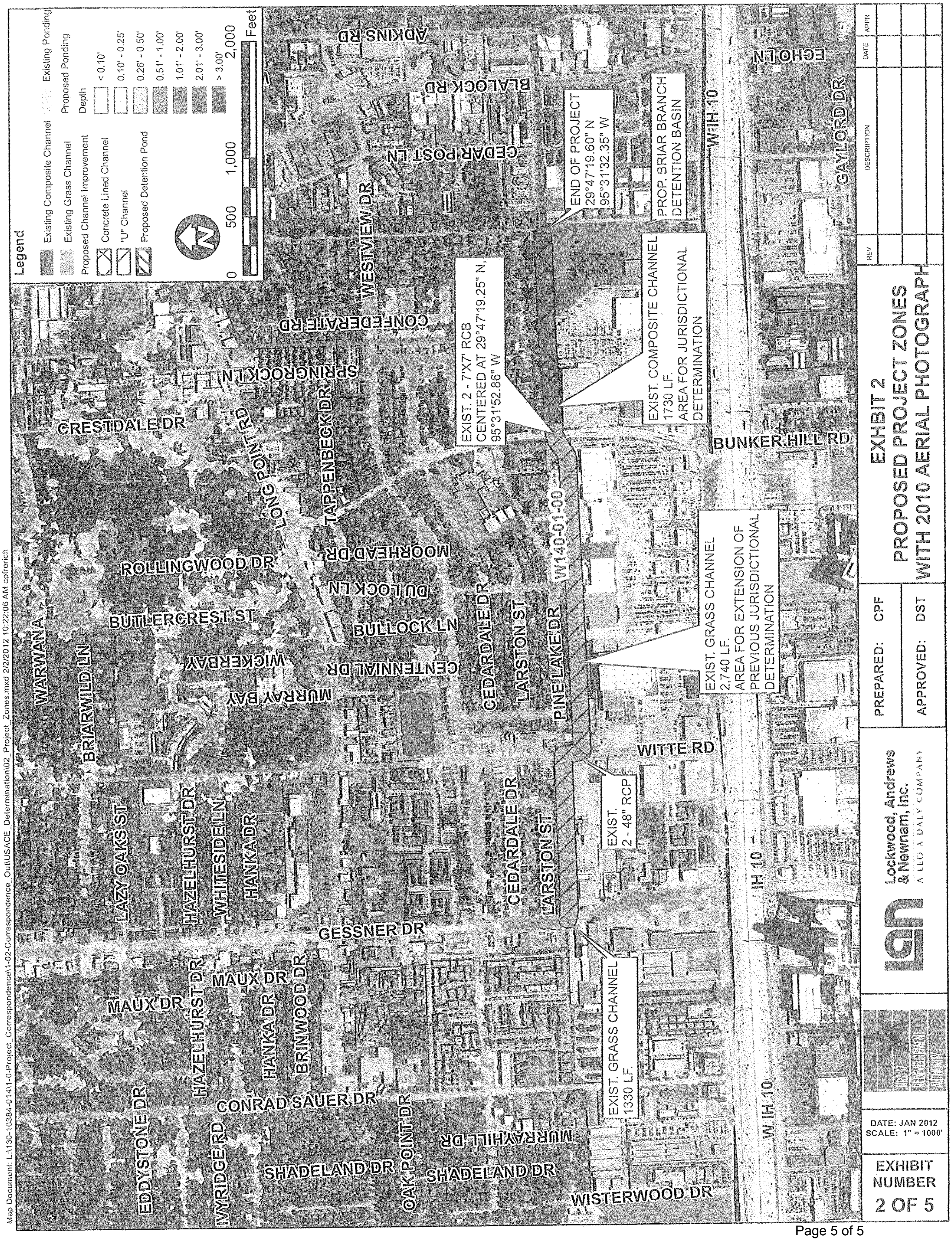
Mr. Elliott Carman
Appeal Review Officer, (CESWD-PD-O)
U.S. Army Corps of Engineers
1100 Commerce Street, Suite 831
Dallas, Texas 75242-1731
Telephone: 469-487-7061; FAX: 469-487-7199

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation, and will have the opportunity to participate in all site investigations.

Signature of appellant or authorized agent.	Date:	Telephone number:

MAR 0 6 2013

FEB 0 9 2012



Appendix C: Dynamic Model Results

DATE: DEC 2013
SCALE: AS NOTED

APPENDIX C-1

TIRZ 17 REDEVELOPMENT AUTHORITY

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

DYNAMIC MODEL DRAINAGE AREA, NODE, AND LINK INFORMATION

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS IMPACT ANALYSIS

REV	DESCRIPTION	DATE	APPR

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
-1018	36.943	83.73	3.2	715.7	154.2	280.9
10008	0.241	89.89	3	58	1.1	2.0
10009	6.84	41.19	3.2	425.2	31.5	55.6
10010	2.884	61.92	3.2	130	13.3	23.5
10011	0.897	60.62	3.4	133	4.3	7.4
10033	2.762	81.54	2.7	195.7	13.0	22.8
10034	0.41	86.16	3.9	75.4	2.0	3.4
10035	1.181	85.52	1.8	128	5.6	9.8
10036	0.692	85.44	3.8	98	3.3	5.8
10044	0.97	58.98	3.4	118	4.6	8.0
10048	0.087	90	3.4	176.5	0.4	0.7
10049	0.504	73.65	3.4	70	2.4	4.2
10051	0.66	59.06	3.2	168	3.1	5.5
10052	0.58	77.28	3.2	70	2.8	4.8
10053	0.539	63.17	3.2	160	2.6	4.4
10054	1.023	63.59	3.2	289	4.9	8.4
10055	0.177	72.76	3.2	85	0.8	1.5
10056	0.644	55.95	3.2	85	3.1	5.3
10057	0.208	55.42	3.2	52	1.0	1.7
10058	0.114	57.01	3.2	85	0.5	0.9
10059	0.284	89.26	3	60	1.4	2.3
10115	46.246	45.48	5.6	800.8	196.0	355.5
10121	4.894	50.71	8.6	260.5	23.0	40.2
10245	7.156	85.04	3.3	315.1	32.9	58.3
10247	7.766	83.6	4	400	36.3	63.9
10258	1.919	80.04	1.9	219.1	9.1	15.9
10260	0.188	89.82	3	60	0.9	1.6
10261	0.118	89.52	3	56	0.6	1.0
10262	0.769	90	12	103.3	3.7	6.4
10263	0.133	90	1.4	42.9	0.6	1.1
10264	3.083	89.46	10.4	206.8	14.6	25.4
10265	3.813	89.87	10.9	229.9	18.0	31.4
10266	1.273	89.98	12	132.9	6.1	10.5
10289	0.089	90	1.4	35.1	0.4	0.7
10290	0.078	89.05	3	55	0.4	0.6
20107	8.681	84.87	12	769.6	41.6	72.3
20113	8.402	84.99	12	769.6	40.3	69.9
20117	11.255	51.75	0.2	514.5	43.1	80.4
20121	4.84	84.87	12	769.6	23.1	40.0
20128	6.699	85	12	769.6	31.9	55.4
20132	5.998	52.66	0.8	329	26.6	47.7
20137	6.817	53.63	0.3	258.1	25.9	48.4
20141	10.46	79.61	0.2	384.6	38.6	72.5
30016	16.245	51.52	1	540	67.6	123.3
30021	10.346	53.81	1	550	45.8	82.1
30023	7.33	60.64	1	300	31.7	57.3
30029	129.378	64.77	1	1265	411.8	794.1
30032	1.072	85.67	3.3	120	5.1	8.8
30033	0.933	69.53	8.6	75	4.4	7.7
30034	0.779	86.59	8.6	175	3.7	6.4
30035	0.698	87.91	8.6	70	3.3	5.8
30036	0.435	89.35	3.4	25	2.0	3.5

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
30037	2.67	52.05	3.3	290	12.6	22.0
3143189	4.903	61.15	4.1	260.7	23.1	40.5
3143195	2.676	51.29	5.5	192.6	12.7	22.2
3143196	1.856	86.59	4.5	160.4	8.8	15.4
3143206	2.722	85.65	1.8	194.3	12.7	22.3
3143209	2.607	85.71	2	190.1	12.2	21.4
3143214	3.67	77.92	2.5	257.5	17.3	30.3
3143216	3.02	76.17	1.9	204.6	14.1	24.9
3143228	9.848	67.43	0.2	602.8	40.6	74.4
3144582	18.055	53.27	3.5	500.3	79.7	142.9
3144583	1.039	66.42	8.3	120	5.0	8.6
3144584	5.205	53.73	6.3	268.6	24.6	43.0
3144586	3.887	49.64	5.3	232.2	18.2	31.9
3144598	5.986	55.76	5.7	288.1	28.2	49.4
3144600	7.527	60.53	5	323.1	35.0	61.5
3144603	14.526	49.65	8.6	482.2	67.1	118.3
3144610	3.856	63.55	9.4	231.2	18.4	32.0
3144613	12.702	68.07	8.8	419.7	59.2	104.0
3144627	1.369	68.35	3.7	137.8	6.5	11.3
3144628	5.076	64.27	3	265.3	23.7	41.8
3144631	2.382	50.52	3.2	181.7	11.2	19.6
3144642	3.46	53.87	4.2	219	16.2	28.4
3144643	5.212	50.34	3.6	268.8	24.1	42.5
3144647	2.407	48.42	6.7	182.7	11.4	19.8
3144648	5.732	40.48	3.3	281.9	26.3	46.6
3144912	3.462	77.68	3.2	219.1	16.3	28.6
3144913	3.285	85.42	4.9	213.4	15.6	27.2
3144914	1.754	86.18	3.6	155.9	8.3	14.6
3144915	1.287	85.51	4.4	133.6	6.1	10.7
3144916	0.716	86.06	3.6	99.6	3.4	6.0
3144917	1.613	86.11	4.4	149.6	7.7	13.4
3144931	1.682	64.55	5.9	152.7	8.0	14.0
3144932	2.385	67.2	4.2	182	11.4	19.8
3144962	19.501	42.81	11	520	88.9	157.4
3146012	1.736	73.48	2.5	219.2	8.3	14.4
3146014	1.573	80.06	2.4	227.1	7.5	13.1
3146601	2.18	57.46	0.4	273.4	10.1	17.8
3146604	1.132	60.67	0.5	138.7	5.3	9.3
3146605	1.077	55.28	0.6	131.7	5.0	8.9
3146608	0.432	84.28	3.1	116.2	2.1	3.6
3146737	0.184	71.83	3.2	57.2	0.9	1.5
3146738	0.216	65.43	2.6	60.2	1.0	1.8
3146767	5.593	49.86	0.1	300	22.1	40.9
3146769	4.58	51.96	0.4	256	19.5	35.5
3175098	1.193	87.21	4.7	128.6	5.7	9.8
3175100	0.847	87.63	2.9	108.4	4.0	7.0
3175104	2.689	86.79	4.2	193.1	12.6	22.1
3175109	0.958	83.05	5.3	115.3	4.6	7.9
3175112	3.449	86.45	7.6	218.7	16.4	28.6
3175113	3.792	85.97	2.7	229.3	17.7	31.1
3175115	3.909	67.75	2.6	232.8	18.3	32.2
3175121	2.822	58.07	2.9	197.8	13.3	23.3

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
3176094	51.98	59.8	1	1600	215.8	394.3
3176100	6.846	36.26	1	590	30.8	54.8
3176102	5.3	63.74	7.1	271.1	25.0	43.6
3176104	12.237	54.28	7.2	411.9	56.5	99.7
3176110	10.38	50.37	5.9	379.4	47.7	84.3
3176112	12.409	58.44	5.4	414.8	57.0	100.7
3176247	14.621	51.23	2.5	450.3	64.0	115.1
3176275	4.237	48.83	8.8	242.4	20.0	34.9
3177638	7.902	54.51	5.9	331	37.0	65.0
3177642	5.184	63.47	4.6	268.1	24.4	42.8
3177646	3.153	58.67	5.1	209.1	15.0	26.1
3177653	6.757	68.98	6	306.1	31.9	55.9
3177664	8.32	70.46	3.4	339.6	38.5	68.0
3177675	5.031	53.23	7	264.1	23.8	41.6
3177677	2.754	87.37	3.4	195.4	13.0	22.8
3177683	6.736	55.05	2.8	305.6	31.0	54.9
3178751	6.568	52.37	6.7	301.8	30.7	53.8
3178753	5.584	49.45	6.9	278.3	26.1	45.8
3178754	8.623	45.25	5.6	345.8	39.6	70.0
3178755	4.012	52.68	4.9	235.9	18.8	32.9
3178758	2.975	63.77	3.1	203.1	14.0	24.4
3178763	3.543	51.79	6.9	221.6	16.7	29.2
3178767	12.285	47.93	9.3	412.7	56.8	100.1
3178775	8.38	47.12	9.9	340.9	39.1	68.6
3178778	5.838	52.35	8.4	284.5	27.4	48.0
3178779	8.882	50.84	5.7	350.9	41.3	72.8
3178783	15.61	47.66	3.3	465.2	68.8	123.3
3178785	5.631	48.59	7.2	279.4	26.3	46.2
3178787	4.875	52.3	6.5	260	23.0	40.3
3178791	11.373	47.7	6.2	397.1	52.1	92.1
3178794	9.642	71.19	5.3	365.6	45.0	79.3
3218806	2.559	55.58	12	188.4	12.2	21.1
3218819	5.273	66.38	3.5	270.4	24.5	43.1
3218829	17.242	52.82	7.1	487.1	78.7	139.4
3218832	10.962	54.96	5.5	389.9	50.4	89.1
3218873	0.296	50.29	3.4	75	1.4	2.4
3219152	2.11	85	2	171	9.8	17.3
3219153	9.122	84.44	1.8	355.6	40.2	72.0
3221259	0.271	71.75	3.4	70	1.3	2.2
3234001	249.358	54.29	1	3000	834.1	1594.2
3234049	6.922	51.91	10.4	309.8	32.5	56.9
3234051	5.126	55.27	7	266.6	24.1	42.1
3234054	3.436	51.84	5.3	218.3	16.2	28.2
3234059	4.681	52.16	10.5	254.8	22.1	38.6
3234315	4.114	78.43	12	238.8	19.5	34.0
3236559	2.862	52.22	9.1	199.2	13.6	23.6
3236585	9.72	50.01	11.1	367.1	45.4	79.7
3236593	2.47	56.83	9.1	185.1	11.7	20.4
3236615	14.995	47.88	6.2	456	68.0	120.8
3236632	8.429	82.5	3.8	341.9	38.6	68.3
35021	2.463	63.79	3.4	135	11.5	20.2
35029	0.145	60.62	3.4	176.5	0.7	1.2

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
4161810	1.13	86.06	3.3	114.2	5.4	9.4
4161812	0.251	68.82	4.5	59	1.2	2.1
4165583	0.148	88.96	3	55	0.7	1.2
4165604	0.324	89.88	3	52	1.5	2.7
4165605	0.307	90	2.2	65.2	1.5	2.5
4165607	0.258	90	1.7	59.8	1.2	2.1
4165610	0.045	90	1.4	25	0.2	0.4
4165616	1.272	90	1.7	132.8	6.0	10.4
4165616-2	0.352	90	1.1	98.9	1.7	2.9
4165616-3	0.364	90	12	100.6	1.7	3.0
5009	1.127	80.39	5.8	276.4	5.4	9.4
5013	8.281	66.19	5	338.9	38.8	68.2
5023	0.405	85.3	3.4	60	1.9	3.3
5027	0.541	73.91	3.4	25	2.5	4.4
5029	1.106	63.79	3.4	434.7	5.3	9.1
5030	1.887	60	3.4	176	8.9	15.6
5057	0.756	90	3.2	50	3.5	6.2
5058	4.816	57.47	3.4	265	22.4	39.4
5225	4.345	52.96	3.1	245.5	20.1	35.5
5665	6.029	87	3.3	289.2	27.9	49.3
5671	4.576	81.27	2.3	251.9	21.2	37.4
5708686	6.47	48.87	2.8	299.5	29.5	52.2
5708689	6.847	48.68	3	308.1	31.2	55.3
5763	6.802	83.41	2.9	460	32.0	56.1
5765	2.9	82.01	2.9	224	13.7	24.0
5770	4.521	83.43	5.5	240	21.3	37.4
5771	2.911	82.87	4	188	13.8	24.1
5784	4.694	60.17	5.3	255.1	11.6	12.2
5788-1	0.488	83.35	0.4	100	2.3	4.0
5805	6.139	58.66	2	291.8	27.9	49.5
5817	5.199	50.61	3.9	290	24.2	42.5
5825	3.204	52.42	2.8	210.8	14.9	26.2
5826	2.488	57.28	3.9	185.7	11.7	20.5
5839	0.812	87.23	0.6	86.5	3.7	6.6
5854	1.795	57.68	2.9	157.8	8.5	14.8
5860	5.483	50.96	4.4	275.7	25.5	44.8
5861	4.212	56.09	4.6	241.7	19.7	34.6
5874	4.29	50.71	9.2	243.9	20.2	35.3
5876	8.121	51.01	5.3	335.6	37.5	66.1
5879	4.732	50.12	3.3	350	22.2	38.8
5906134	1.937	72.14	2.2	163.9	9.2	16.0
5906136	1.767	54.2	3.2	156.5	8.4	14.6
5906138	4.434	52.44	2.3	248	20.5	36.3
5906139	5.035	51.25	1.6	264.2	22.9	40.7
5906141	1.772	54.94	2	156.7	8.4	14.7
5906143	4.238	49.5	2	242.4	19.5	34.5
5906183	3.075	51.16	2.5	206.5	14.4	25.3
5906232	5.562	51.32	1.8	277.7	25.3	45.0
5906234	5.765	51.92	1.7	282.7	26.2	46.6
5906250	4.665	51.78	2.6	254.3	21.6	38.2
5906258	3.687	53.25	2.8	226.1	17.3	30.3
5906313	3.534	52.95	2	221.4	16.4	28.9

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
5906318	5.001	53.65	2	263.3	23.0	40.7
5906321	3.647	52.09	2	224.9	16.9	29.8
5906330	3.265	52.47	4.6	212.8	15.4	27.0
5906331	3.474	56.39	3.3	219.5	16.4	28.7
5906359	3.451	54.21	3.5	218.7	16.3	28.5
5906361	3.825	53.21	3	230.3	17.9	31.5
5906410	4.924	53.72	2.9	261.3	22.9	40.4
5906481	3.304	58.96	2.3	214	15.5	27.2
6013	1.645	61.71	1.4	151	7.7	13.5
6016	72.411	54.88	1	1000	251.8	478.1
6029677	0.645	63.98	0.5	117.5	3.1	5.3
6029685	1.109	53.08	3.6	124	5.3	9.2
6029695	1.242	52.21	4.7	131.2	5.9	10.3
6029697	2.976	55.22	2.1	203.1	13.9	24.5
6029708	2.259	55.53	2.2	177	10.6	18.7
6029724	6.374	53.21	3.8	297.3	29.4	51.9
6029730	1.356	51.43	3.4	137.1	6.4	11.2
6029738	1.37	57.59	2.2	137.8	6.5	11.3
6029751	1.025	52.76	3.4	176.5	4.9	8.5
6029762	1.655	53.5	3.4	165	7.8	13.6
6029772	14.369	49.86	3.4	481.2	64.3	114.8
6029809	4.971	60.42	3.9	262.5	23.2	40.7
6052590	4.585	45.35	2.5	252.1	21.1	37.4
6052591	1.022	62.83	8.5	140.7	4.9	8.5
6052608	5.858	47.21	2.3	285	26.7	47.4
6052609	1.147	72.12	4.9	155.2	5.5	9.5
6052620	7.106	70.6	3.5	308.5	33.0	58.3
6061230	2.537	50.41	2.1	187.6	11.9	20.9
6061276	5.129	49.37	2.6	266.7	23.7	41.8
6061295	4.628	52.75	3.2	253.3	21.6	38.0
6061308	3.016	53.66	2.5	204.5	14.1	24.8
6061320	1.33	59.91	2.6	135.8	6.3	11.0
6061322	4.506	45.35	3.1	250	20.9	36.9
6061338	1.811	54.01	2.6	158.5	8.6	15.0
6061347	2.192	48.74	2.2	174.3	10.3	18.1
6061355	2.092	54.38	2.3	170.3	9.9	17.3
6061365	1.223	54.95	3.4	130.2	5.8	10.2
6061377	2.695	51.03	2.6	193.3	12.7	22.2
6061387	2.902	49.19	2.2	200.6	13.5	23.8
6061405	1.319	55.26	3.3	135.2	6.3	11.0
6061415	4.181	59	3.6	240.8	19.7	34.5
6061431	2.38	56.4	2.3	181.7	11.2	19.7
6061441	4.012	53.14	2	235.9	18.6	32.8
6061468	0.271	89.85	1.8	61.3	1.3	2.3
6061471	1.017	53.4	2.1	118.7	4.8	8.4
6061479	3.12	51.93	2	208	14.5	25.6
6061497	5.792	51.42	1.5	283.4	26.1	46.6
6062507	1.603	55.34	2.3	149.1	7.6	13.3
6062515	2.108	49.56	2.4	171	9.9	17.4
6062528	2.394	49.29	2.3	182.2	11.2	19.7
6062544	2.227	52.61	3.7	175.7	10.6	18.5
6062552	0.234	89.95	2.9	57	1.1	1.9

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
6062554	1.865	49.04	3.9	160.8	8.9	15.5
6062570	1.224	58.34	3.4	130.3	5.8	10.2
6062580	2.022	50.19	2.2	167.4	9.5	16.7
6062588	2.829	81.22	2.7	198.1	13.3	23.4
6062598	0.889	84.3	3.4	111	4.3	7.4
6073349	1.483	57.28	2.2	143.4	7.0	12.3
6073352	1.518	54.85	2.1	145.1	7.2	12.6
6073420	3.401	50.72	2.3	217.2	15.8	27.9
6073424	1.11	57.9	3.9	124.1	5.3	9.2
6073433	4.404	52.45	1.8	247.1	20.2	35.9
6073436	7.094	60.32	1	450	32.4	57.5
6073447	4.207	61.75	4.2	241.5	19.9	34.8
6073447-2	9.682	61.75	1	586	44.0	78.4
6073451	3.097	60.49	5.9	207.2	14.7	25.7
6073459	2.255	64.41	3.9	176.8	10.7	18.7
6073463	2.693	54.54	1.1	193.2	12.4	22.0
6073491	1.367	61.94	3.6	137.7	6.5	11.4
6075003	2.995	55.28	2.9	203.8	14.1	24.7
6075006	1.204	63.25	1.5	129.2	5.7	10.0
6075008	2.746	52.51	1.6	195.1	12.8	22.5
6075011	2.497	54.19	2.3	186.1	11.7	20.6
6075013	2.504	56.61	1.8	186.3	11.7	20.6
6075019	4.644	52.8	2.9	253.8	21.6	38.1
6075024	2.206	53.25	2.4	174.9	10.4	18.2
6075027	1.738	83.1	1.7	155.2	8.1	14.2
6075045	3.925	49.87	2.2	233.3	18.2	32.1
6075097	1.174	84.4	2.8	127.6	5.6	9.7
6075103	1.534	55.25	2.5	145.8	7.3	12.7
6075121	1.764	53.14	2.4	156.4	8.3	14.6
6075451	2.234	62.8	1.9	176	10.5	18.3
6075463	97.362	69.63	1	3100	407.6	743.0
6075465	2.019	76.43	2.2	167.3	9.5	16.6
6076632	2.887	52.73	2.2	200.1	13.5	23.8
6198711	10.318	69.34	3.7	378.2	47.5	84.2
6198730	4.267	52.09	2.1	243.2	19.7	34.9
6198788	2.563	51.42	2.5	175.2	12.0	21.1
6198792	6.705	47.02	3.3	304.9	30.8	54.6
6198793	1.973	78.12	3.8	165.4	9.4	16.4
6198800	7.27	85.03	3.9	317.5	33.6	59.4
6198813	1.109	86.23	4.1	124	5.3	9.2
6198814	1.28	86.15	10.2	133.2	6.1	10.7
6198825	0.4	85.56	2.5	74.5	1.9	3.3
6198826	0.34	85.46	2.4	68.7	1.6	2.8
6198837	1.093	85.47	2.8	123.1	5.2	9.1
6198838	0.253	87.36	3.6	59.2	1.2	2.1
6198839	0.287	87.31	3.3	63.1	1.4	2.4
6198853	2.564	85.74	2	188.6	12.0	21.1
6198854	0.29	85	3	63.4	1.4	2.4
6198859	2.235	85.29	2.2	176	10.5	18.4
6198860	2.163	74.22	2.3	173.2	10.2	17.9
6198873	0.361	86.29	3.3	70.7	1.7	3.0
6198874	1.017	85.46	2.2	118.7	4.8	8.4

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
6198885	1.169	77.31	2.2	127.3	5.6	9.7
6198886	0.669	85.53	2.3	96.3	3.2	5.6
7204174	8.677	65.28	12	346.9	40.9	71.4
A10	3.272	52.26	0.2	413.7	14.6	26.0
A11	2.283	55.34	0.1	289.4	10.2	18.2
A13	4.632	45.57	0	404.5	19.5	35.4
A15	4.659	45.52	0	378.4	19.4	35.4
A17	4.583	50	0.3	388.8	19.8	35.7
A18	3.568	45.18	0.3	402	15.9	28.4
A2	10.817	47.14	0	656.9	43.1	79.4
A20	0.436	58.09	1.4	142.4	2.1	3.6
A21	2.269	54.05	0.2	160.9	9.5	17.3
A22	1.937	50.08	0.3	160.3	8.5	15.2
A25	1.619	50.83	0.3	183.4	7.3	13.0
A26	1.624	51.12	2.3	160.4	7.6	13.4
A28	1.631	50.78	0.4	171.3	7.4	13.1
A29	1.657	50.65	0.4	166.3	7.4	13.2
A3	3.953	48.42	0.3	311.9	17.1	30.8
A31	1.682	50.76	0.2	189.5	7.4	13.3
A32	4.562	50.35	0.2	477.8	20.0	35.9
A34	0.445	68.95	0.1	39	1.9	3.5
A35	2.716	44.86	0.3	332.4	12.1	21.6
A41	1.87	50.66	0.8	163.3	8.5	15.1
A42	1.869	45.32	0.3	159.7	8.1	14.6
A43	1.85	50.34	0.7	168.3	8.4	14.9
A46	4.974	75.58	0.7	387.2	22.5	40.1
A47	1.869	51.06	0.4	178.4	8.4	14.9
A48	1.204	86.77	0.4	188.2	5.6	9.8
A5	2.14	50.51	0.1	224.8	9.3	16.8
A6	3.509	48.81	0.2	292.6	15.0	27.1
A8	12.573	43.61	0	473.9	44.8	84.4
A9	5.62	39.86	0.3	362.4	22.8	41.8
AM19	0.865	51.3	0.4	201.1	4.1	7.1
AM23	2.156	54.1	0	160.8	9.0	16.4
AM24	1.095	49.48	1.2	166.5	5.2	9.0
AM27	1.041	55.85	0.1	179.8	4.8	8.4
AM30	1.696	52.81	0.1	185.3	7.4	13.4
AM37	1.044	50.53	0.7	144.6	4.9	8.5
AM38	1.536	72.23	0	191.8	6.9	12.3
AM39	0.981	58.26	0.6	171.1	4.6	8.1
AM40	1.871	49.66	0.4	160.7	8.3	14.9
AM44	1.149	55.66	0	169.5	5.2	9.2
AM45	0.482	63.28	0.1	129.8	2.3	4.0
AM49	5.206	83.95	0.1	345.9	21.2	38.8
B01	1.111	80.72	2.2	129.1	5.3	9.2
B03	0.72	86.23	0.5	191	3.4	6.0
B05	0.985	85.74	0.3	218.3	4.6	8.1
B06	1.772	75.55	0.3	182.6	8.0	14.3
B08	3.116	85.28	0.3	340.5	14.1	25.1
B12	0.3	82.13	1.7	65.6	1.4	2.5
B13	0.174	83.28	0.1	42.3	0.8	1.4
B15	4.893	80.59	0	343.2	20.4	37.2

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
B19	1.275	83.33	0.7	150.1	6.0	10.5
B20	3.52	85.71	0	219.4	14.2	26.2
B26	0.994	86.66	0.1	144.9	4.5	8.0
B30	3.697	59.18	0.6	220.8	16.4	29.4
B31	0.97	86.7	0.2	159.5	4.5	7.9
B35	18.037	51.33	0.3	673.5	68.5	127.9
B36	5.24	62.33	0.4	351.7	23.1	41.6
B38	0.253	88.18	0.2	30.8	1.1	2.0
B39	5.055	44.01	0.2	347.5	20.6	37.8
B46	0.286	88.23	0.5	58.5	1.4	2.4
B50	0.916	86.42	0.6	145.7	4.3	7.6
BM29	1.649	87.3	0.5	248.1	7.6	13.5
BM40	2.057	87.44	0.1	242.6	9.0	16.2
BM7	2.102	79.05	0.1	167.4	8.9	16.1
C006	0.428	77.86	0.5	153.5	2.0	3.6
C008	0.276	89.17	0.1	122.4	1.3	2.3
C009	0.657	70.42	0.5	75.2	3.1	5.4
C011	0.357	87.13	1	77.4	1.7	3.0
C013	0.16	85.07	0.9	39.5	0.8	1.3
C014	0.135	85.03	0.2	35.2	0.6	1.1
C019	1.642	64.57	0.5	224.1	7.7	13.5
C022	0.333	89.89	0.6	69.6	1.6	2.8
C023	0.245	85	0.7	59.2	1.2	2.0
C024	0.281	85	0.8	73.1	1.3	2.3
C028	1.595	64.55	0.3	190.7	7.3	12.9
C030	1.085	86.14	0.7	196.1	5.1	9.0
C036	0.306	90	0.9	53.6	1.5	2.5
C036A	1.846	60.32	0.5	262.1	8.7	15.2
C038	0.3	89.62	0.5	52	1.4	2.5
C038A	1.529	85	0.6	143.3	7.0	12.4
C038B	1.357	83.63	0.4	123.9	6.1	10.9
C040	6.154	81.52	0.1	310.7	24.1	44.7
C041	3.038	68.9	0.1	242.1	13.0	23.6
C044	0.302	89.93	0.5	63.8	1.4	2.5
C045	1.746	63.47	0.5	161.9	8.0	14.2
C046	6.961	42.5	0.5	236.9	26.8	49.8
C048	1.739	85.88	0.4	247.3	8.1	14.3
C051B	0.304	68.56	1.1	117.2	1.5	2.5
C054	0.425	64.61	1	129.1	2.0	3.5
C057	0.755	61.05	0.6	150.7	3.6	6.3
C060	4.308	64.61	0.8	398.1	20.0	35.3
C062	0.897	64.46	0.4	224	4.3	7.4
C064	0.141	90	1	58.8	0.7	1.2
C067	0.081	90	0.1	31.4	0.4	0.7
C068	0.203	85.84	1.2	78.9	1.0	1.7
C070	0.135	82.73	1.9	53.3	0.6	1.1
C072	2.714	46.64	0.1	153.5	10.7	19.9
C073	1.175	86.16	0.9	207.4	5.6	9.7
C080	1.21	86.02	0.5	211.5	5.7	10.0
C082	2.578	46.03	0.1	256	11.1	20.1
C083	2.155	59.4	0.5	246.4	10.0	17.7
C084	0.296	88.07	0.7	125	1.4	2.5

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
C086	0.519	87.13	0.5	168.1	2.5	4.3
C088	1.044	83.53	1.2	163.4	5.0	8.7
C090	0.994	67.78	0.8	212.5	4.7	8.3
C092B	0.553	76.3	0.4	115.3	2.6	4.6
C093	1.471	86.36	0.5	262.7	6.9	12.2
C095	0.499	87.43	0.1	102	2.3	4.1
C096	0.425	89.86	0.5	51.2	2.0	3.5
C098	0.671	86.81	0.7	157.6	3.2	5.6
C103	0.711	84.76	0	165	3.3	5.8
CP00	1.199	55.34	0.4	462.3	5.7	9.9
CP03	3.315	41.79	1.5	354.9	15.4	27.1
CP04	3.322	64.48	0.6	376.6	15.4	27.1
CP06	2.608	59.57	0.2	294.6	11.6	20.7
CP07	2.716	40	0	327.2	11.8	21.2
CP10	0.831	40	0.3	120.1	3.8	6.7
CP114	2.656	65.77	0.6	393.4	12.4	21.8
CP16	1.847	40.02	0.9	212.1	8.5	15.0
CP17	3.163	41.1	0.3	310.1	13.8	24.8
CP18	1.849	66.68	0.5	340.9	8.7	15.2
CP20	3.81	51.82	0.3	330.9	16.7	30.0
CP22	3.805	82.95	0.7	325.1	17.3	30.7
CP24	3.125	47.47	0.1	262.2	13.1	23.9
CP25	1.48	52.74	0.5	298.1	7.0	12.2
CP27	3.81	41.12	0.6	449.4	17.3	30.7
CP28	0.555	89.99	0.6	61.7	2.5	4.5
CP33	0.424	86.75	0.6	125.2	2.0	3.5
CP35	1.233	85.24	0.1	172.8	5.5	9.8
CPM12	1.388	58.02	0.1	249.5	6.4	11.3
CPM19	2.166	51.42	0.4	368.8	10.1	17.7
CPM21	2.222	65.16	0.4	362.7	10.4	18.2
CPM30	0.434	89.99	0.1	105.8	2.0	3.5
CPM31	14.602	61.54	0.6	486.4	58.6	108.0
CPM32	0.395	90	0.2	41.2	1.7	3.1
CPM9	2.78	61	0.1	297.2	12.3	22.0
D02	1.488	56.46	0.5	91.5	6.5	11.8
D04	0.514	85.42	0.6	79.7	2.4	4.2
D05	1.443	57.53	1.1	148.9	6.8	11.9
D07	1.621	57.44	0	173.3	7.2	12.9
D08	0.974	53.92	1.6	157.1	4.6	8.1
D10	0.822	52.35	0.2	157.3	3.8	6.7
D11	1.002	59.03	2	119.2	4.8	8.3
D13	1.583	57.83	0.8	271.9	7.5	13.1
D15	1.645	60.23	0.2	140.5	7.1	12.9
E04	0.736	81.69	0.7	172.9	3.5	6.1
E06	0.783	86.32	0.9	218.1	3.7	6.5
E13	5.142	73.56	0.4	506.8	23.2	41.2
E14	3.56	51.45	0.2	291.2	15.2	27.5
E16	3.376	59.82	0.2	360.4	14.9	26.8
E17	2.714	63.2	0.3	332.9	12.4	22.0
E21	3.674	85.21	0.6	442.3	17.0	29.9
E22	3.586	47.15	0.4	444.9	16.2	28.8
E25	2.215	50.88	0.5	298.3	10.2	18.0

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
E26	4.293	85.56	0.7	387.9	19.5	34.6
E4	2.468	81.17	0.3	178.7	10.6	19.2
E5	2.686	63.84	0.5	305	12.3	21.8
E8	7.497	61.27	0.1	530.2	31.3	57.1
E9	5.037	83.68	0.1	454.5	21.5	38.9
F1	5.032	66.09	2.7	554.5	23.8	41.5
F2	2.328	85.83	0.2	350.8	10.5	18.7
F3	3.328	65.64	0.2	381	14.8	26.5
G2	2.846	50.68	0.2	173.6	11.4	21.0
GM1	6.765	85	0	288.7	25.1	47.0
GM3	3.996	48.2	0.4	516.8	18.2	32.3
GM4	3.495	51.26	0.1	226.5	14.2	26.1
GM5	4.203	50.07	0.2	490.2	18.7	33.4
GM6	1.276	52.14	0.4	200.2	5.9	10.4
GM7	3.201	51.52	0.2	231.3	13.5	24.5
H1	2.641	46.77	0.7	353.4	12.3	21.6
H3	1.517	63.01	0	167.8	6.7	12.0
IH-10_JUNCTION_E116	1.89	80.62	1.6	188.9	8.9	15.6
IH-10_MH_C1	2.376	84.97	0.1	186	10.0	18.2
IH-10_MH_C105A	1.519	53.68	0.5	128.2	6.9	12.2
IH-10_MH_C107	2.968	57.72	0.4	177.9	12.8	23.2
IH-10_MH_C121	1.578	63.51	0.1	146.5	6.9	12.5
IH-10_MH_C2A	1.237	90	4.3	247.2	5.9	10.3
IH-10_MH_C7	3.03	48.67	0.5	196.4	13.2	23.8
IH-10_MH_WD13	0.728	90	3.4	246.6	3.5	6.1
IH-10_MH_WD3	2.269	90	5.7	244.7	10.9	18.9
IH-10_MH_WD4	1.292	90	9	250	6.2	10.8
IH-10_MH_WD7	1.57	90	5.5	249.9	7.5	13.1
J1	2.109	49.87	1	305.6	9.9	17.3
J3	3.585	53.3	0.2	332	15.4	27.9
L01	1.464	80.72	0.3	228.4	6.8	11.9
L03	1.419	87.8	0.2	207.9	6.4	11.3
L06	2.218	72.06	0.3	153.8	9.6	17.3
L08	2.913	83.91	0.3	264	12.7	22.8
L09	0.997	66.91	0.8	96.5	4.6	8.1
L11	0.382	68.04	5.8	101.9	1.8	3.2
L12	1.107	86.67	4	218.4	5.3	9.1
L15	5.362	86.1	0.3	303.5	22.0	40.3
L16	5.827	66.48	0.3	312.2	23.9	43.9
L19	1.613	85.92	0.2	296.2	7.4	13.1
L21	1.781	85.72	0.4	256.4	8.2	14.5
L22	2.844	60.59	0.4	287	12.8	22.9
L23	1.916	85.82	0.8	308	9.0	15.7
L26	2.184	85.63	0	299.4	9.8	17.4
L27	2.052	68.6	0.3	226.2	9.3	16.5
L35	1.106	86.16	0.4	234.2	5.2	9.1
L36	9.888	62.33	0.2	377.7	36.6	68.7
L37	1.014	86.23	0.2	198.7	4.7	8.2
L39	8.826	53.28	0.3	313.5	33.4	62.3
M03	1.345	55.54	2.4	239.7	6.4	11.1
M04	5.658	60.61	0.2	321.7	22.7	41.9
M06	4.739	62.79	0.3	424	21.0	37.6

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
M07	1.949	54.95	0.3	209	8.7	15.6
M09	3.39	67.13	0.2	280.7	14.5	26.3
M10	1.365	64.83	0.1	237.7	6.3	11.1
M12	4.465	60.84	0	346	18.9	34.3
M13	1.579	86.55	0	184.7	6.9	12.4
M16	0.165	90	0.2	33.4	0.8	1.3
M18	0.347	89.9	0.1	32	1.5	2.7
M20	0.493	63.26	0.6	143.2	2.3	4.1
M21	0.654	69.45	0.2	97.5	3.0	5.3
M23	0.926	68.7	0.3	218	4.4	7.6
M24	0.474	72.42	0	109	2.2	3.9
MM15	0.147	90	0.1	32.6	0.7	1.2
MM17	0.264	90	0.1	32.3	1.2	2.1
N02	5.326	68.79	0.2	406.7	22.7	41.2
N03	1.677	53.2	0.7	191.9	7.8	13.7
N06	9.098	58.84	0.3	435.3	36.6	67.4
N07	1.466	51.48	0.7	205.2	6.8	12.0
N09	2.876	84.97	0.5	378	13.3	23.4
N10	3.095	52.68	0.2	226.6	13.0	23.7
N13	1.53	43.34	0.1	122.2	6.3	11.5
N14	1.187	42.23	0.2	154.2	5.2	9.4
N16	0.601	81.26	0.1	78.7	2.7	4.8
N17	0.628	60.08	0	96.6	2.9	5.1
N19	0.708	86.88	0.3	116.6	3.2	5.7
N20	2.474	65.34	0.1	225.6	10.7	19.4
N21	0.471	88.58	0.2	83.6	2.2	3.8
N22	0.626	87.11	0	138.7	2.9	5.1
N24	3.194	85.54	0.1	279.9	13.5	24.5
N25	8.199	47.77	0.6	527.9	35.8	64.3
N26	0.646	85.83	0.4	122.2	3.0	5.3
N27	6.04	77.46	0.5	244.7	24.5	45.0
OM0	12.828	58.96	0	639.7	50.2	93.1
OM1	10.385	70.46	0.1	769.2	43.7	79.6
OM10	8.094	70.35	0	664.8	34.6	62.7
OM11	6.53	66.78	0.2	677.8	28.8	51.6
OM2	6.774	72.64	0.3	568.5	29.7	53.4
OM3	6.096	80.38	0	455.8	25.5	46.4
OM4	3.366	64.1	0.4	412.6	15.4	27.3
OM5	6.188	71.99	0.1	504.3	26.4	47.9
OM6	10.104	78.36	0	478.1	39.0	72.4
OM7	5.377	68.6	0.1	376.5	22.5	41.0
OM8	4.706	73.7	0	403.6	20.2	36.6
OM9	3.426	56.48	0.1	269.9	14.5	26.3
P04	3.153	85.93	0.4	199.5	13.3	24.1
P05	2.478	40.64	0.1	162.1	9.8	18.1
P06	3.037	85.81	0.5	191.1	13.1	23.7
P08	1.534	86.31	0.5	195.7	7.1	12.5
P09	2.167	37.58	0	267.9	9.4	16.9
P12	3.764	66.46	0.7	205.1	16.5	29.7
P13	3.605	53.42	0.1	270.8	15.1	27.5
P17	2.647	43.83	0.8	273.5	12.1	21.4
P18	1.902	50.21	0.8	167.6	8.7	15.4

Drainage Area	Size (Ac)	Impervious (%)	Slope (%)	Width (ft)	Peak 10-yr Runoff (CFS)	Peak 100-yr Runoff (CFS)
P23	4.15	49.89	0.7	490.8	19.2	33.8
P24	2.242	76.12	0.4	231	10.2	18.1
P27	0.796	84.7	1.2	173.3	3.8	6.6
P28	2.709	42.76	0.6	262	12.2	21.7
P30	4.748	64.3	0.6	320.8	21.1	37.8
P31	1.873	78.54	0.9	249.2	8.8	15.4
P33	1.595	79.09	0.4	215.3	7.3	13.0
P34	0.409	90	0	55.7	1.8	3.2
P36	3.347	61.02	0.3	388.1	15.1	26.8
P38	1.524	86.06	0	145.7	6.5	11.8
P40	0.697	77.8	0.5	91.5	3.2	5.7
P41	1.714	85.36	0.2	274.3	7.8	13.8
P43	2.992	85.74	0.2	252.2	12.6	22.9
P44	1.702	87.07	0.1	181.2	7.4	13.3
P46	1.379	86.34	0.3	193.1	6.3	11.1
P47	1.422	86.22	0.8	215	6.7	11.7
P49	1.705	64.53	1.7	219.3	8.1	14.1
P50	1.131	86.4	0.9	160.2	5.3	9.3
PM2	4.555	50.28	0.2	287.9	18.4	33.8
PM20	4.787	50.57	0.4	320.5	20.4	37.0
PM21	1.559	49.94	0	160.7	6.8	12.2
PM26	1.506	41.54	0.3	236.8	6.9	12.2
W14001_sta15863	0.51	83.89	12	84.1	2.4	4.2
W14001_sta16671	1.49	88.29	5	70	6.9	12.2
W14001_sta16821	1.633	54.84	5	45	7.4	13.2
W14001_sta18481	4.324	55	0.5	208.9	18.2	33.2
W14001_sta19161	9.556	55	0.5	440.6	39.9	72.9
W14001_sta19981	9.478	62.38	0.4	315.7	37.3	69.2
W14001_sta20481	3.995	60.33	2	294.2	18.8	33.0
W14001_sta20781	0.825	58.33	1.6	112.7	3.9	6.9
W54001 in Exist Model	14.962	56.31	0	548.8	54.5	102.6
W54001 in Prop Models	17.892	80.55	0	548.8	73.0	142.8
* The Phase 1 Basin Impact Analysis includes allocation for development of the tract south of the ba						

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
-1018	Manhole	2D	67.03	67.04	75.32	74.82	75.45	75.53	77.74	77.61	77.40	77.40
-1027	Manhole	2D	78.09	78.19	79.97	79.34	78.39	78.43	80.73	80.50	79.64	79.62
-1027	Manhole	2D	78.09	78.19	79.97	79.34	78.39	78.43	80.73	80.50	79.64	79.62
-1018	Manhole	2D	67.03	67.04	75.32	74.82	75.45	75.53	77.74	77.61	77.40	77.40
5000	Manhole	Sealed	69.54	78.15	76.61	76.35	76.26	76.40	78.09	77.91	77.81	77.64
5001	Manhole	2D	79.15	86.18	86.76	86.73	86.70	86.68	87.35	87.33	87.34	87.33
5001	Manhole	2D	79.15	86.18	86.76	86.73	86.70	86.68	87.35	87.33	87.34	87.33
5005	Manhole	2D	67.93	77.93	78.54	78.41	78.49	78.51	78.84	78.80	78.80	78.81
5005	Manhole	2D	67.93	77.93	78.54	78.41	78.49	78.51	78.84	78.80	78.80	78.81
5007	Manhole	2D	70.48	82.14	83.64	83.33	83.25	83.25	83.99	83.91	83.82	83.81
5007	Manhole	2D	70.48	82.14	83.64	83.33	83.25	83.25	83.99	83.91	83.82	83.81
5010	Manhole	2D	75.73	83.90	83.23	83.14	83.16	82.67	84.09	84.08	84.09	83.82
5010	Manhole	2D	75.73	83.90	83.23	83.14	83.16	82.67	84.09	84.08	84.09	83.82
5013	Manhole	2D	74.77	85.74	86.50	86.48	86.46	86.36	87.38	87.38	87.37	87.32
5013	Manhole	2D	74.77	85.74	86.50	86.48	86.46	86.36	87.38	87.38	87.37	87.32
5022	Manhole	Sealed	70.05	82.53	83.85	82.82	82.84	82.84	83.61	83.52	83.51	83.51
5022	Manhole	Sealed	70.05	82.53	83.85	82.82	82.84	82.84	83.61	83.52	83.51	83.51
5023	Manhole	2D	69.70	82.26	83.07	82.39	82.38	82.39	83.32	83.29	83.29	83.28
5023	Manhole	2D	69.70	82.26	83.07	82.39	82.38	82.39	83.32	83.29	83.29	83.28
5025	Manhole	2D	69.64	82.43	82.47	81.73	81.74	81.75	82.86	82.85	82.84	82.84
5025	Manhole	2D	69.64	82.43	82.47	81.73	81.74	81.75	82.86	82.85	82.84	82.84
5026	Manhole	2D	69.21	82.67	82.12	81.49	81.50	81.51	82.61	82.59	82.58	82.58
5026	Manhole	2D	69.21	82.67	82.12	81.49	81.50	81.51	82.61	82.59	82.58	82.58
5027	Manhole	2D	69.20	82.76	81.40	81.03	81.04	81.05	82.08	82.06	82.05	82.06
5027	Manhole	2D	69.20	82.76	81.40	81.03	81.04	81.05	82.08	82.06	82.05	82.06
5028	Manhole	2D	67.58	77.88	77.97	77.72	77.91	77.96	78.52	78.37	78.39	78.40
5028	Manhole	2D	67.58	77.88	77.97	77.72	77.91	77.96	78.52	78.37	78.39	78.40
5029	Manhole	2D	72.36	78.87	78.97	78.96	78.98	78.98	79.17	79.16	79.18	79.18
5029	Manhole	2D	72.36	78.87	78.97	78.96	78.98	78.98	79.17	79.16	79.18	79.18
5030	Manhole	2D	70.22	78.20	78.44	78.39	78.45	78.46	78.66	78.64	78.66	78.66
5030	Manhole	2D	70.22	78.20	78.44	78.39	78.45	78.46	78.66	78.64	78.66	78.66
5031	Manhole	2D	69.43	77.19	76.31	75.98	75.91	76.07	78.01	77.81	77.75	77.54
5031	Manhole	2D	69.43	77.19	76.31	75.98	75.91	76.07	78.01	77.81	77.75	77.54
5032	Manhole	2D	69.07	77.09	75.98	75.58	75.52	75.70	77.95	77.61	77.49	77.25
5032	Manhole	2D	69.07	77.09	75.98	75.58	75.52	75.70	77.95	77.61	77.49	77.25
5033	Manhole	Sealed	66.69	77.94	75.84	75.36	75.75	75.89	77.13	76.76	76.82	76.64
5033	Manhole	Sealed	66.69	77.94	75.84	75.36	75.75	75.89	77.13	76.76	76.82	76.64
5034	Manhole	2D	68.29	77.93	75.46	74.97	74.92	75.13	76.94	76.60	76.38	76.42
5034	Manhole	2D	68.29	77.93	75.46	74.97	74.92	75.13	76.94	76.60	76.38	76.42
5057	Manhole	Sealed	70.12	77.11	77.24	77.10	76.99	77.07	78.29	78.18	77.94	77.88
5057	Manhole	Sealed	70.12	77.11	77.24	77.10	76.99	77.07	78.29	78.18	77.94	77.88
5058	Manhole	2D	75.00	78.19	78.63	78.58	78.62	78.63	78.93	78.91	78.93	78.93
5058	Manhole	2D	75.00	78.19	78.63	78.58	78.62	78.63	78.93	78.91	78.93	78.93
5059	Manhole	2D	69.58	82.77	83.65	83.27	83.20	83.21	83.93	83.88	83.79	83.78
5059	Manhole	2D	69.58	82.77	83.65	83.27	83.20	83.21	83.93	83.88	83.79	83.78
5218	Outfall	Sealed	70.05	80.39	79.42	78.20	78.20	78.20	80.23	80.06	80.06	80.06
5218	Outfall	Sealed	70.05	80.39	79.42	78.20	78.20	78.20	80.23	80.06	80.06	80.06
5225	Manhole	2D	68.99	76.36	76.62	76.36	76.51	75.46	77.91	77.69	77.71	76.81
5225	Manhole	2D	68.99	76.36	76.62	76.36	76.51	75.46	77.91	77.69	77.71	76.81
5251	Outfall	Sealed	70.05	82.23	79.46	78.27	78.27	78.27	80.25	80.07	80.07	80.07
5251	Outfall	Sealed	70.05	82.23	79.46	78.27	78.27	78.27	80.25	80.07	80.07	80.07
5360	Manhole	2D	72.04	77.99	73.54	73.54	73.54	73.54	78.61	78.55	78.54	78.55
5360	Manhole	2D	72.04	77.99	73.54	73.54	73.54	73.54	78.61	78.55	78.54	78.55
5361	Manhole	Sealed	71.93	78.87	73.54	73.54	73.54	73.54	78.54	78.40	78.41	78.42
5361	Manhole	Sealed	71.93	78.87	73.54	73.54	73.54	73.54	78.54	78.40	78.41	78.42
5632	Outfall	Sealed	70.05	82.31	79.45	78.24	78.24	78.24	80.24	80.06	80.06	80.06
5632	Outfall	Sealed	70.05	82.31	79.45	78.24	78.24	78.24	80.24	80.06	80.06	80.06
5654	Manhole	2D	72.17	78.84	80.60	80.19	80.17	80.32	81.63	81.63	81.58	81.59
5654	Manhole	2D	72.17	78.84	80.60	80.19	80.17	80.32	81.63	81.63	81.58	81.59
5659	Manhole	2D	71.87	79.35	80.61	80.22	80.20	80.36	81.65	81.65	81.59	81.60
5659	Manhole	2D	71.87	79.35	80.61	80.22	80.20	80.36	81.65	81.65	81.59	81.60
5665	Manhole	2D	72.01	80.28	80.44	80.19	80.17	80.35	81.50	81.48	81.41	81.42
5665	Manhole	2D	72.01	80.28	80.44	80.19	80.17	80.35	81.50	81.48	81.41	81.42
5669	Manhole	2D	71.87	81.55	80.39	80.10	80.09	80.32	81.34	81.26	81.21	81.25
5669	Manhole	2D	71.87	81.55	80.39	80.10	80.09	80.32	81.34	81.26	81.21	81.25
5671	Manhole	2D	71.54	79.60	80.36	79.98	79.98	80.30	81.09	80.92	80.91	81.01

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
5671	Manhole	2D	71.54	79.60	80.36	79.98	79.98	80.30	81.09	80.92	80.91	81.01
5744	Manhole	Sealed	71.93	71.33	80.86	80.43	80.42	80.57	81.91	81.90	81.84	81.86
5750	Manhole	2D	70.83	78.63	79.51	78.80	78.76	78.81	80.03	79.94	79.98	79.99
5750	Manhole	2D	70.83	78.63	79.51	78.80	78.76	78.81	80.03	79.94	79.98	79.99
5763	Manhole	2D	71.77	78.85	79.55	79.16	79.13	79.15	80.07	79.96	79.94	79.95
5763	Manhole	2D	71.77	78.85	79.55	79.16	79.13	79.15	80.07	79.96	79.94	79.95
5765	Manhole	2D	71.99	77.90	79.54	79.16	79.15	79.16	80.07	79.93	79.94	79.95
5765	Manhole	2D	71.99	77.90	79.54	79.16	79.15	79.16	80.07	79.93	79.94	79.95
5770	Manhole	2D	72.22	79.20	79.75	79.43	79.36	79.38	80.37	80.28	80.21	80.22
5770	Manhole	2D	72.22	79.20	79.75	79.43	79.36	79.38	80.37	80.28	80.21	80.22
5771	Manhole	2D	72.42	79.15	79.77	79.43	79.37	79.38	80.37	80.29	80.23	80.23
5771	Manhole	2D	72.42	79.15	79.77	79.43	79.37	79.38	80.37	80.29	80.23	80.23
5774	Manhole	2D	70.59	78.56	71.93	71.93	71.93	71.93	74.42	74.31	74.28	74.29
5774	Manhole	2D	70.59	78.56	71.93	71.93	71.93	71.93	74.42	74.31	74.28	74.29
5776	Manhole	2D	68.49	77.39	70.81	70.81	70.81	70.81	72.24	72.20	72.19	72.19
5776	Manhole	2D	68.49	77.39	70.81	70.81	70.81	70.81	72.24	72.20	72.19	72.19
5779	Manhole	2D	69.08	76.90	71.46	71.46	71.46	71.46	73.61	73.55	73.52	73.53
5804	Manhole	2D	74.54	79.97	79.71	78.94	79.27	79.24	80.41	80.32	80.29	80.25
5804	Manhole	2D	74.54	79.97	79.71	78.94	79.27	79.24	80.41	80.32	80.29	80.25
5809	Manhole	2D	74.58	79.72	79.93	79.01	79.51	79.40	80.57	80.50	80.44	80.40
5809	Manhole	2D	74.58	79.72	79.93	79.01	79.51	79.40	80.57	80.50	80.44	80.40
5816	Manhole	2D	68.32	76.86	75.35	74.93	75.21	75.07	77.19	76.82	76.91	76.21
5816	Manhole	2D	68.32	76.86	75.35	74.93	75.21	75.07	77.19	76.82	76.91	76.21
5817	Manhole	2D	68.46	75.99	76.15	75.90	76.05	75.17	77.46	77.25	77.26	76.40
5817	Manhole	2D	68.46	75.99	76.15	75.90	76.05	75.17	77.46	77.25	77.26	76.40
5819	Manhole	2D	74.60	79.59	80.10	79.11	79.88	79.70	80.76	80.68	80.62	80.56
5819	Manhole	2D	74.60	79.59	80.10	79.11	79.88	79.70	80.76	80.68	80.62	80.56
5822	Manhole	2D	74.60	79.56	80.04	79.18	79.86	79.70	80.67	80.60	80.52	80.45
5822	Manhole	2D	74.60	79.56	80.04	79.18	79.86	79.70	80.67	80.60	80.52	80.45
5825	Manhole	2D	66.42	75.31	75.43	75.32	75.41	75.45	76.19	76.03	75.96	75.96
5825	Manhole	2D	66.42	75.31	75.43	75.32	75.41	75.45	76.19	76.03	75.96	75.96
5826	Manhole	2D	65.41	75.39	75.08	74.71	75.00	75.10	76.15	75.96	75.89	75.92
5826	Manhole	2D	65.41	75.39	75.08	74.71	75.00	75.10	76.15	75.96	75.89	75.92
5827	Manhole	2D	65.23	76.75	74.85	74.32	74.68	74.83	76.08	75.71	75.72	75.83
5827	Manhole	2D	65.23	76.75	74.85	74.32	74.68	74.83	76.08	75.71	75.72	75.83
5830	Manhole	2D	74.85	79.65	79.85	79.25	79.75	79.68	80.35	80.28	80.14	80.06
5830	Manhole	2D	74.85	79.65	79.85	79.25	79.75	79.68	80.35	80.28	80.14	80.06
5837	Manhole	2D	73.62	77.80	79.99	79.85	79.76	79.61	80.50	80.44	80.42	80.31
5837	Manhole	2D	73.62	77.80	79.99	79.85	79.76	79.61	80.50	80.44	80.42	80.31
5839	Manhole	2D	73.62	77.95	79.87	79.73	79.56	79.41	80.38	80.32	80.20	80.10
5839	Manhole	2D	73.62	77.95	79.87	79.73	79.56	79.41	80.38	80.32	80.20	80.10
5849	Manhole	2D	70.16	75.26	77.04	76.88	76.95	76.27	78.15	77.93	77.91	77.32
5849	Manhole	2D	70.16	75.26	77.04	76.88	76.95	76.27	78.15	77.93	77.91	77.32
5850	Manhole	2D	69.55	76.10	77.23	76.85	76.90	75.86	78.46	78.21	78.19	77.16
5850	Manhole	2D	69.55	76.10	77.23	76.85	76.90	75.86	78.46	78.21	78.19	77.16
5854	Manhole	2D	66.74	74.96	75.54	75.49	75.54	75.56	76.25	76.09	76.09	76.07
5854	Manhole	2D	66.74	74.96	75.54	75.49	75.54	75.56	76.25	76.09	76.09	76.07
5860	Manhole	Sealed	67.44	74.21	75.64	75.62	75.64	75.65	76.26	76.24	76.25	76.26
5860	Manhole	Sealed	67.44	74.21	75.64	75.62	75.64	75.65	76.26	76.24	76.25	76.26
5861	Manhole	2D	66.41	74.17	75.63	75.61	75.60	75.60	76.31	76.15	76.11	76.08
5861	Manhole	2D	66.41	74.17	75.63	75.61	75.60	75.60	76.31	76.15	76.11	76.08
5868	Manhole	Sealed	71.01	76.74	76.98	76.87	76.91	76.33	77.76	77.67	77.68	77.45
5868	Manhole	Sealed	71.01	76.74	76.98	76.87	76.91	76.33	77.76	77.67	77.68	77.45
5870	Manhole	2D	71.07	78.32	77.05	76.90	76.94	76.36	78.03	77.99	77.98	77.83
5870	Manhole	2D	71.07	78.32	77.05	76.90	76.94	76.36	78.03	77.99	77.98	77.83
5874	Manhole	2D	73.00	77.31	78.07	78.06	78.10	78.11	78.53	78.50	78.54	78.55
5874	Manhole	2D	73.00	77.31	78.07	78.06	78.10	78.11	78.53	78.50	78.54	78.55
5876	Manhole	2D	71.91	78.58	79.05	79.01	79.05	79.07	79.63	79.58	79.61	79.62
5876	Manhole	2D	71.91	78.58	79.05	79.01	79.05	79.07	79.63	79.58	79.61	79.62
5879	Manhole	2D	77.00	81.66	82.46	82.06	82.08	82.08	83.40	83.78	83.81	83.80
5879	Manhole	2D	77.00	81.66	82.46	82.06	82.08	82.08	83.40	83.78	83.81	83.80
5881	Manhole	2D	74.32	87.25	84.66	84.66	84.63	84.62	87.19	87.19	87.18	87.17
5881	Manhole	2D	74.32	87.25	84.66	84.66	84.63	84.62	87.19	87.19	87.18	87.17
5887	Manhole	2D	71.86	78.74	79.04	78.99	79.05	79.07	79.62	79.57	79.61	79.61
5887	Manhole	2D	71.86	78.74	79.04	78.99	79.05	79.07	79.62	79.57	79.61	79.61
5888	Manhole	2D	71.65	78.78	79.02	78.92	79.02	79.04	79.71	79.63	79.68	79.69

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
5888	Manhole	2D	71.65	78.78	79.02	78.92	79.02	79.04	79.71	79.63	79.68	79.69
5890	Manhole	2D	72.85	86.68	84.86	84.71	84.63	84.54	86.14	86.06	86.03	85.93
5890	Manhole	2D	72.85	86.68	84.86	84.71	84.63	84.54	86.14	86.06	86.03	85.93
5891	Manhole	2D	73.41	86.98	85.65	85.59	85.54	85.48	86.77	86.73	86.72	86.66
5891	Manhole	2D	73.41	86.98	85.65	85.59	85.54	85.48	86.77	86.73	86.72	86.66
5895	Manhole	Sealed	71.38	79.22	78.97	78.82	78.96	79.00	79.85	79.68	79.78	79.79
5895	Manhole	Sealed	71.38	79.22	78.97	78.82	78.96	79.00	79.85	79.68	79.78	79.79
5896	Manhole	Sealed	71.06	80.70	78.92	78.71	78.90	78.95	80.00	79.73	79.88	79.91
5896	Manhole	Sealed	71.06	80.70	78.92	78.71	78.90	78.95	80.00	79.73	79.88	79.91
5897	Manhole	2D	71.01	77.23	79.91	79.91	79.93	79.93	80.49	80.49	80.48	80.48
5897	Manhole	2D	71.01	77.23	79.91	79.91	79.93	79.93	80.49	80.49	80.48	80.48
5902	Manhole	2D	77.62	87.35	87.01	87.01	86.98	86.97	87.97	87.97	87.91	87.91
5902	Manhole	2D	77.62	87.35	87.01	87.01	86.98	86.97	87.97	87.97	87.91	87.91
5905	Manhole	2D	74.25	87.86	86.24	86.24	86.20	86.16	87.17	87.16	87.16	87.13
5905	Manhole	2D	74.25	87.86	86.24	86.24	86.20	86.16	87.17	87.16	87.16	87.13
5916	Manhole	2D	75.91	87.40	87.60	87.59	87.57	87.57	88.55	88.55	88.54	88.53
5916	Manhole	2D	75.91	87.40	87.60	87.59	87.57	87.57	88.55	88.55	88.54	88.53
5921	Manhole	2D	74.00	87.91	86.65	86.62	86.64	86.62	87.34	87.32	87.34	87.33
5921	Manhole	2D	74.00	87.91	86.65	86.62	86.64	86.62	87.34	87.32	87.34	87.33
5923	Manhole	2D	75.17	87.83	86.70	86.66	86.68	86.67	87.34	87.33	87.34	87.33
5923	Manhole	2D	75.17	87.83	86.70	86.66	86.68	86.67	87.34	87.33	87.34	87.33
5926	Manhole	2D	75.41	87.25	86.71	86.67	86.70	86.69	87.32	87.31	87.32	87.31
5926	Manhole	2D	75.41	87.25	86.71	86.67	86.70	86.69	87.32	87.31	87.32	87.31
5928	Manhole	2D	77.97	86.42	87.39	87.39	87.39	87.37	87.74	87.74	87.75	87.74
5928	Manhole	2D	77.97	86.42	87.39	87.39	87.39	87.37	87.74	87.74	87.75	87.74
5929	Manhole	2D	78.04	86.68	87.77	87.76	87.77	87.75	88.14	88.13	88.15	88.14
5929	Manhole	2D	78.04	86.68	87.77	87.76	87.77	87.75	88.14	88.13	88.15	88.14
5940	Manhole	Sealed	76.45	87.51	88.10	88.10	88.08	88.08	88.74	88.73	88.73	88.73
5940	Manhole	Sealed	76.45	87.51	88.10	88.10	88.08	88.08	88.74	88.73	88.73	88.73
5942	Manhole	2D	79.70	81.74	83.39	83.38	83.32	83.32	84.00	84.00	83.92	83.92
5952	Manhole	2D	75.96	86.68	86.75	86.72	86.75	86.74	87.25	87.24	87.25	87.24
5960	Manhole	2D	76.44	86.83	86.76	86.73	86.77	86.76	87.49	87.47	87.45	87.44
5963	Manhole	2D	76.77	84.92	86.67	86.66	86.68	86.67	87.00	86.99	87.00	86.99
5967	Manhole	2D	73.20	87.38	87.61	87.60	87.59	87.59	88.19	88.18	88.13	88.13
5968	Manhole	2D	73.07	87.74	87.48	87.46	87.44	87.44	88.00	87.99	87.96	87.95
5974	Manhole	2D	72.69	87.07	86.95	86.92	86.86	86.86	87.45	87.44	87.35	87.35
5979	Manhole	2D	68.55	86.16	85.13	85.06	84.91	84.91	85.58	85.54	85.27	85.27
5982	Manhole	2D	68.34	84.50	84.81	84.64	84.59	84.59	85.16	85.08	84.96	84.96
5985	Manhole	2D	68.14	84.64	84.77	84.35	84.27	84.27	84.81	84.78	84.65	84.65
5988	Manhole	2D	67.97	83.10	84.23	84.21	84.14	84.14	84.75	84.73	84.61	84.61
5990	Manhole	2D	67.84	83.17	84.07	84.05	83.99	83.99	84.65	84.64	84.52	84.52
5993	Manhole	2D	67.77	83.07	83.97	83.95	83.90	83.90	84.60	84.59	84.48	84.48
5997	Manhole	2D	67.64	84.99	83.84	83.82	83.77	83.77	84.60	84.58	84.47	84.47
5999	Manhole	2D	67.58	85.14	83.78	83.76	83.72	83.72	84.59	84.58	84.47	84.47
6003	Manhole	2D	67.45	84.29	83.69	83.67	83.63	83.63	84.59	84.57	84.47	84.47
6006	Manhole	2D	67.20	84.46	83.54	83.52	83.49	83.49	84.58	84.57	84.46	84.46
6013	Manhole	2D	67.00	84.79	83.01	82.92	82.90	82.90	84.48	84.47	84.35	84.35
6016	Manhole	Sealed	66.60	83.54	82.21	82.19	82.18	82.18	84.26	84.25	84.14	84.14
6018	Manhole	2D	67.16	84.05	83.74	83.71	83.68	83.68	84.71	84.70	84.64	84.64
6021	Manhole	2D	73.84	87.51	88.51	88.50	88.53	88.52	88.94	88.93	88.94	88.94
6023	Manhole	2D	73.94	87.72	88.68	88.67	88.68	88.68	89.11	89.11	89.11	89.11
6028	Manhole	2D	76.19	88.55	88.99	88.99	88.99	88.99	89.40	89.40	89.40	89.40
6028	Manhole	2D	76.19	88.55	88.99	88.99	88.99	88.99	89.40	89.40	89.40	89.40
6031	Manhole	2D	76.39	87.76	89.21	89.21	89.21	89.21	89.61	89.61	89.61	89.61
6031	Manhole	2D	76.39	87.76	89.21	89.21	89.21	89.21	89.61	89.61	89.61	89.61
6037	Manhole	2D	78.64	88.59	89.64	89.64	89.65	89.65	89.89	89.89	89.90	89.90
6037	Manhole	2D	78.64	88.59	89.64	89.64	89.65	89.65	89.89	89.89	89.90	89.90
6040	Manhole	2D	77.59	90.17	89.78	89.78	89.78	89.78	90.19	90.19	90.19	90.19
6040	Manhole	2D	77.59	90.17	89.78	89.78	89.78	89.78	90.19	90.19	90.19	90.19
6046	Manhole	2D	73.40	80.90	80.60	80.19	80.17	80.32	81.54	81.54	81.49	81.50
6046	Manhole	2D	73.40	80.90	80.60	80.19	80.17	80.32	81.54	81.54	81.49	81.50
6049	Manhole	2D	69.54	69.60	77.89	77.73	78.22	78.30	79.80	80.11	79.61	79.61
6049	Manhole	2D	69.54	69.60	77.89	77.73	78.22	78.30	79.80	80.11	79.61	79.61
6050	Outfall	Sealed	68.13	75.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6050	Outfall	Sealed	68.13	75.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10002	Manhole	2D	80.43	81.41	83.04	83.03	82.99	82.99	83.42	83.42	83.36	83.36

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
10002	Manhole	2D	80.43	81.41	83.04	83.03	82.99	82.99	83.42	83.42	83.36	83.36
10003	Manhole	2D	80.43	81.57	82.71	82.70	82.66	82.66	83.03	83.03	82.99	82.99
10003	Manhole	2D	80.43	81.57	82.71	82.70	82.66	82.66	83.03	83.03	82.99	82.99
10008	Manhole	Sealed	72.54	79.00	76.46	76.49	76.04	76.23	78.49	78.21	78.01	78.08
10008	Manhole	Sealed	72.54	79.00	76.46	76.49	76.04	76.23	78.49	78.21	78.01	78.08
10009	Manhole	Sealed	73.23	77.80	77.65	77.58	77.59	77.63	78.52	78.42	78.41	78.28
10009	Manhole	Sealed	73.23	77.80	77.65	77.58	77.59	77.63	78.52	78.42	78.41	78.28
10010	Manhole	Sealed	73.23	77.87	77.29	77.17	77.02	77.09	78.30	78.20	77.71	77.70
10010	Manhole	Sealed	73.23	77.87	77.29	77.17	77.02	77.09	78.30	78.20	77.71	77.70
10011	Manhole	2D	71.50	78.19	78.65	78.58	78.61	78.62	78.86	78.83	78.84	78.84
10011	Manhole	2D	71.50	78.19	78.65	78.58	78.61	78.62	78.86	78.83	78.84	78.84
10032	Manhole	Sealed	76.24	80.65	81.01	81.01	81.00	81.00	81.66	81.65	81.61	81.62
10032	Manhole	Sealed	76.24	80.65	81.01	81.01	81.00	81.00	81.66	81.65	81.61	81.62
10033	Manhole	2D	75.88	81.44	81.35	81.35	81.34	81.34	81.74	81.73	81.72	81.73
10034	Manhole	2D	75.76	80.60	80.82	80.82	80.76	80.76	81.70	81.69	81.69	81.71
10035	Manhole	2D	75.64	80.83	80.85	80.85	80.80	80.80	81.68	81.67	81.64	81.65
10036	Manhole	2D	76.32	81.82	78.11	77.23	77.19	77.29	81.60	81.57	81.56	81.59
10037	Manhole	2D	75.41	81.10	78.14	77.26	77.22	77.32	81.63	81.62	81.60	81.61
10044	Manhole	2D	69.72	82.30	82.75	82.06	82.06	82.07	83.12	83.10	83.09	83.09
10044	Manhole	2D	69.72	82.30	82.75	82.06	82.06	82.07	83.12	83.10	83.09	83.09
10046	Manhole	2D	68.98	82.18	80.94	80.64	80.66	80.67	81.58	81.56	81.55	81.56
10046	Manhole	2D	68.98	82.18	80.94	80.64	80.66	80.67	81.58	81.56	81.55	81.56
10048	Manhole	2D	68.09	78.12	78.86	78.75	78.80	78.81	79.10	79.07	79.08	79.09
10048	Manhole	2D	68.09	78.12	78.86	78.75	78.80	78.81	79.10	79.07	79.08	79.09
10049	Manhole	2D	67.65	78.60	78.31	78.00	78.14	78.18	78.65	78.57	78.58	78.59
10049	Manhole	2D	67.65	78.60	78.31	78.00	78.14	78.18	78.65	78.57	78.58	78.59
10051	Manhole	2D	67.20	77.24	77.32	77.03	77.27	77.33	78.20	77.98	77.96	77.83
10051	Manhole	2D	67.20	77.24	77.32	77.03	77.27	77.33	78.20	77.98	77.96	77.83
10052	Manhole	2D	70.00	77.29	77.32	77.03	77.28	77.34	78.11	77.93	77.89	77.79
10052	Manhole	2D	70.00	77.29	77.32	77.03	77.28	77.34	78.11	77.93	77.89	77.79
10053	Manhole	Sealed	66.95	76.84	76.87	76.54	76.83	76.91	77.95	77.67	77.67	77.49
10053	Manhole	Sealed	66.95	76.84	76.87	76.54	76.83	76.91	77.95	77.67	77.67	77.49
10054	Manhole	2D	66.72	78.00	76.39	75.99	76.33	76.43	77.65	77.29	77.31	77.11
10054	Manhole	2D	66.72	78.00	76.39	75.99	76.33	76.43	77.65	77.29	77.31	77.11
10055	Manhole	Sealed	72.70	78.01	76.31	75.98	75.91	76.07	77.85	77.72	77.69	77.52
10055	Manhole	Sealed	72.70	78.01	76.31	75.98	75.91	76.07	77.85	77.72	77.69	77.52
10056	Manhole	Sealed	72.67	77.96	75.98	75.59	75.52	75.70	77.93	77.63	77.51	77.27
10056	Manhole	Sealed	72.67	77.96	75.98	75.59	75.52	75.70	77.93	77.63	77.51	77.27
10057	Manhole	2D	73.84	78.39	75.84	75.36	75.76	75.89	77.13	76.76	76.82	76.64
10057	Manhole	2D	73.84	78.39	75.84	75.36	75.76	75.89	77.13	76.76	76.82	76.64
10058	Manhole	Sealed	73.84	77.99	75.46	74.97	74.92	75.13	76.94	76.60	76.38	76.42
10058	Manhole	Sealed	73.84	77.99	75.46	74.97	74.92	75.13	76.94	76.60	76.38	76.42
10059	Manhole	Sealed	73.10	78.72	76.61	76.75	76.24	76.43	78.54	78.43	78.33	78.36
10059	Manhole	Sealed	73.10	78.72	76.61	76.75	76.24	76.43	78.54	78.43	78.33	78.36
10095	Manhole	2D	80.43	82.75	83.66	83.65	83.69	83.69	84.01	84.01	84.03	84.03
10095	Manhole	2D	80.43	82.75	83.66	83.65	83.69	83.69	84.01	84.01	84.03	84.03
10096	Manhole	2D	80.23	82.08	82.97	82.97	83.02	83.02	83.25	83.25	83.29	83.29
10096	Manhole	2D	80.23	82.08	82.97	82.97	83.02	83.02	83.25	83.25	83.29	83.29
10097	Manhole	2D	78.40	82.54	78.46	78.46	78.46	78.46	78.46	78.46	78.46	78.46
10097	Manhole	2D	78.40	82.54	78.46	78.46	78.46	78.46	78.46	78.46	78.46	78.46
10098	Manhole	2D	75.08	82.52	83.27	83.27	83.26	83.26	83.70	83.70	83.68	83.68
10098	Manhole	2D	75.08	82.52	83.27	83.27	83.26	83.26	83.70	83.70	83.68	83.68
10099	Manhole	2D	81.58	83.82	83.73	83.71	83.74	83.74	84.20	84.19	84.20	84.20
10099	Manhole	2D	81.58	83.82	83.73	83.71	83.74	83.74	84.20	84.19	84.20	84.20
10100	Manhole	2D	74.68	83.24	83.42	83.32	83.28	83.28	84.60	83.99	83.89	83.89
10100	Manhole	2D	74.68	83.24	83.42	83.32	83.28	83.28	84.60	83.99	83.89	83.89
10101	Manhole	2D	79.43	81.96	82.93	82.99	82.82	82.82	83.25	83.42	83.23	83.23
10101	Manhole	2D	79.43	81.96	82.93	82.99	82.82	82.82	83.25	83.42	83.23	83.23
10102	Manhole	2D	75.48	83.20	83.66	83.62	83.63	83.63	84.07	84.04	84.06	84.06
10102	Manhole	2D	75.48	83.20	83.66	83.62	83.63	83.63	84.07	84.04	84.06	84.06
10103	Manhole	2D	79.83	83.30	83.70	83.68	83.69	83.69	84.33	84.34	84.31	84.31
10103	Manhole	2D	79.83	83.30	83.70	83.68	83.69	83.69	84.33	84.34	84.31	84.31
10106	Manhole	2D	80.43	82.13	83.58	83.58	83.57	83.57	83.89	83.89	83.87	83.87
10106	Manhole	2D	80.43	82.13	83.58	83.58	83.57	83.57	83.89	83.89	83.87	83.87
10107	Manhole	2D	80.43	81.95	83.23	83.23	83.22	83.22	83.52	83.52	83.51	83.51
10107	Manhole	2D	80.43	81.95	83.23	83.23	83.22	83.22	83.52	83.52	83.51	83.51

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
10108	Manhole	2D	75.58	83.35	84.31	84.30	84.33	84.33	84.64	84.64	84.66	84.66
10108	Manhole	2D	75.58	83.35	84.31	84.30	84.33	84.33	84.64	84.64	84.66	84.66
10109	Manhole	2D	75.58	82.70	83.00	83.00	83.00	83.00	83.28	83.28	83.28	83.28
10109	Manhole	2D	75.58	82.70	83.00	83.00	83.00	83.00	83.28	83.28	83.28	83.28
10110	Manhole	2D	79.10	86.10	84.23	84.22	84.22	84.22	84.86	84.91	84.92	84.92
10110	Manhole	2D	79.10	86.10	84.23	84.22	84.22	84.22	84.86	84.91	84.92	84.92
10111	Manhole	2D	79.35	85.69	84.39	84.38	84.40	84.40	85.14	85.16	85.18	85.18
10111	Manhole	2D	79.35	85.69	84.39	84.38	84.40	84.40	85.14	85.16	85.18	85.18
10112	Manhole	2D	77.70	83.72	84.29	84.28	84.29	84.29	84.40	84.40	84.40	84.40
10112	Manhole	2D	77.70	83.72	84.29	84.28	84.29	84.29	84.40	84.40	84.40	84.40
10113	Manhole	2D	78.30	81.99	82.85	82.85	82.83	82.83	83.28	83.28	83.27	83.27
10113	Manhole	2D	78.30	81.99	82.85	82.85	82.83	82.83	83.28	83.28	83.27	83.27
10114	Manhole	2D	78.30	82.98	83.38	83.38	83.36	83.36	83.70	83.71	83.67	83.67
10114	Manhole	2D	78.30	82.98	83.38	83.38	83.36	83.36	83.70	83.71	83.67	83.67
10115	Manhole	2D	82.21	82.21	84.49	84.49	84.43	84.43	85.12	85.12	85.06	85.06
10115	Manhole	2D	82.21	82.21	84.49	84.49	84.43	84.43	85.12	85.12	85.06	85.06
10118	Manhole	2D	79.20	82.82	83.61	83.60	83.67	83.67	84.25	84.25	84.29	84.29
10118	Manhole	2D	79.20	82.82	83.61	83.60	83.67	83.67	84.25	84.25	84.29	84.29
10119	Manhole	2D	79.08	82.50	83.17	83.13	83.22	83.23	83.78	83.74	83.84	83.84
10119	Manhole	2D	79.08	82.50	83.17	83.13	83.22	83.23	83.78	83.74	83.84	83.84
10120	Manhole	2D	79.08	81.15	82.38	82.35	82.36	82.37	82.52	82.51	82.50	82.50
10120	Manhole	2D	79.08	81.15	82.38	82.35	82.36	82.37	82.52	82.51	82.50	82.50
10121	Manhole	2D	78.08	82.03	83.27	83.25	83.29	83.29	83.83	83.80	83.84	83.84
10121	Manhole	2D	78.08	82.03	83.27	83.25	83.29	83.29	83.83	83.80	83.84	83.84
10123	Manhole	2D	78.26	81.11	82.46	82.44	82.42	82.43	82.78	82.77	82.72	82.72
10123	Manhole	2D	78.26	81.11	82.46	82.44	82.42	82.43	82.78	82.77	82.72	82.72
10124	Manhole	2D	77.08	79.95	80.61	80.61	80.56	80.56	81.22	81.20	81.09	81.09
10124	Manhole	2D	77.08	79.95	80.61	80.61	80.56	80.56	81.22	81.20	81.09	81.09
10128	Manhole	2D	78.88	82.30	83.00	82.99	83.02	83.02	83.32	83.32	83.34	83.34
10128	Manhole	2D	78.88	82.30	83.00	82.99	83.02	83.02	83.32	83.32	83.34	83.34
10135	Manhole	2D	81.48	83.25	84.42	84.40	84.45	84.45	85.07	85.09	85.08	85.08
10135	Manhole	2D	81.48	83.25	84.42	84.40	84.45	84.45	85.07	85.09	85.08	85.08
10136	Manhole	2D	81.48	82.19	83.26	83.24	83.18	83.18	83.86	83.88	83.77	83.78
10136	Manhole	2D	81.48	82.19	83.26	83.24	83.18	83.18	83.86	83.88	83.77	83.78
10138	Manhole	2D	84.42	85.68	85.86	85.85	85.88	85.88	86.00	86.03	86.04	86.04
10138	Manhole	2D	84.42	85.68	85.86	85.85	85.88	85.88	86.00	86.03	86.04	86.04
10245	Manhole	2D	71.05	78.21	79.59	78.94	78.89	78.94	80.07	79.99	79.99	80.00
10245	Manhole	2D	71.05	78.21	79.59	78.94	78.89	78.94	80.07	79.99	79.99	80.00
10247	Manhole	2D	72.63	78.35	79.90	79.43	79.37	79.38	80.56	80.47	80.40	80.40
10247	Manhole	2D	72.63	78.35	79.90	79.43	79.37	79.38	80.56	80.47	80.40	80.40
10251	Manhole	2D	71.72	80.66	80.37	80.03	80.02	80.31	81.18	81.05	81.03	81.09
10260	Manhole	2D	71.98	78.16	73.54	73.54	73.54	73.54	78.59	78.52	78.53	78.54
10260	Manhole	2D	71.98	78.16	73.54	73.54	73.54	73.54	78.59	78.52	78.53	78.54
10261	Manhole	2D	72.08	78.41	73.54	73.54	73.54	73.54	78.67	78.61	78.61	78.61
10261	Manhole	2D	72.08	78.41	73.54	73.54	73.54	73.54	78.67	78.61	78.61	78.61
10262	Manhole	2D	70.33	77.07	71.69	71.69	71.69	71.69	74.05	73.96	73.93	73.94
10262	Manhole	2D	70.33	77.07	71.69	71.69	71.69	71.69	74.05	73.96	73.93	73.94
10263	Manhole	2D	71.80	78.99	72.69	72.69	72.69	72.69	75.88	75.74	75.71	75.72
10263	Manhole	2D	71.80	78.99	72.69	72.69	72.69	72.69	75.88	75.74	75.71	75.72
10264	Manhole	2D	68.15	75.67	70.09	70.09	70.09	70.09	71.15	71.13	71.12	71.13
10264	Manhole	2D	68.15	75.67	70.09	70.09	70.09	70.09	71.15	71.13	71.12	71.13
10265	Manhole	2D	68.76	76.52	71.31	71.31	71.31	71.31	73.22	73.16	73.14	73.14
10265	Manhole	2D	68.76	76.52	71.31	71.31	71.31	71.31	73.22	73.16	73.14	73.14
10266	Manhole	2D	69.25	76.83	71.55	71.55	71.55	71.55	73.84	73.76	73.73	73.74
10266	Manhole	2D	69.25	76.83	71.55	71.55	71.55	71.55	73.84	73.76	73.73	73.74
10285	Manhole	2D	71.26	79.35	79.58	79.01	78.97	79.00	80.05	79.95	79.93	79.94
10285	Manhole	2D	71.26	79.35	79.58	79.01	78.97	79.00	80.05	79.95	79.93	79.94
10289	Manhole	2D	72.15	78.81	73.54	73.54	73.54	73.54	79.15	79.00	78.96	79.00
10289	Manhole	2D	72.15	78.81	73.54	73.54	73.54	73.54	79.15	79.00	78.96	79.00
10290	Manhole	2D	72.15	78.11	73.54	73.54	73.54	73.54	78.36	78.34	78.34	78.34
10290	Manhole	2D	72.15	78.11	73.54	73.54	73.54	73.54	78.36	78.34	78.34	78.34
10297	Manhole	2D	76.52	81.31	80.37	80.13	80.16	80.17	80.92	80.90	80.90	80.90
10297	Manhole	2D	76.52	81.31	80.37	80.13	80.16	80.17	80.92	80.90	80.90	80.90
10302	Manhole	2D	68.19	74.36	75.81	75.79	75.81	75.82	76.52	76.35	76.35	76.32
10302	Manhole	2D	68.19	74.36	75.81	75.79	75.81	75.82	76.52	76.35	76.35	76.32
10304	Manhole	2D	71.30	74.67	75.56	75.51	75.54	75.55	76.26	76.10	76.08	76.06

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
10304	Manhole	2D	71.30	74.67	75.56	75.51	75.54	75.55	76.26	76.10	76.08	76.06
10306	Manhole	2D	70.60	74.86	75.14	75.13	75.14	75.15	75.53	75.40	75.41	75.39
10306	Manhole	2D	70.60	74.86	75.14	75.13	75.14	75.15	75.53	75.40	75.41	75.39
10308	Manhole	2D	71.32	74.65	75.06	75.02	75.10	75.13	75.68	75.54	75.56	75.56
10308	Manhole	2D	71.32	74.65	75.06	75.02	75.10	75.13	75.68	75.54	75.56	75.56
10309	Manhole	2D	70.46	74.97	75.30	75.25	75.29	75.31	75.85	75.71	75.66	75.65
10309	Manhole	2D	70.46	74.97	75.30	75.25	75.29	75.31	75.85	75.71	75.66	75.65
10311	Manhole	2D	70.47	75.21	75.08	74.71	75.00	75.10	76.29	76.11	76.00	76.02
10311	Manhole	2D	70.47	75.21	75.08	74.71	75.00	75.10	76.29	76.11	76.00	76.02
10313	Manhole	2D	71.03	75.00	75.08	74.71	75.00	75.10	76.01	75.85	75.77	75.79
10313	Manhole	2D	71.03	75.00	75.08	74.71	75.00	75.10	76.01	75.85	75.77	75.79
20053	Manhole	Sealed	72.10	78.48	75.40	74.84	74.89	75.15	77.15	76.36	76.24	76.59
20053	Manhole	Sealed	72.10	78.48	75.40	74.84	74.89	75.15	77.15	76.36	76.24	76.59
20102	Manhole	Sealed	73.67	76.48	78.49	77.94	77.13	77.39	79.47	79.31	78.94	79.23
20102	Manhole	Sealed	73.67	76.48	78.49	77.94	77.13	77.39	79.47	79.31	78.94	79.23
20103	Manhole	Sealed	73.66	79.39	78.56	77.99	77.19	77.45	79.63	79.47	79.10	79.40
20103	Manhole	Sealed	73.66	79.39	78.56	77.99	77.19	77.45	79.63	79.47	79.10	79.40
20104	Manhole	Sealed	73.63	79.36	78.71	78.16	77.41	77.71	79.80	79.68	79.28	79.48
20104	Manhole	Sealed	73.63	79.36	78.71	78.16	77.41	77.71	79.80	79.68	79.28	79.48
20105	Manhole	Sealed	73.98	79.62	78.81	78.29	77.68	77.95	79.81	79.71	79.40	79.53
20105	Manhole	Sealed	73.98	79.62	78.81	78.29	77.68	77.95	79.81	79.71	79.40	79.53
20106	Manhole	Sealed	74.19	79.23	78.90	78.43	77.93	78.18	79.81	79.72	79.48	79.58
20106	Manhole	Sealed	74.19	79.23	78.90	78.43	77.93	78.18	79.81	79.72	79.48	79.58
20107	Manhole	Sealed	74.28	78.84	79.22	78.95	78.60	78.79	79.85	79.80	79.70	79.74
20107	Manhole	Sealed	74.28	78.84	79.22	78.95	78.60	78.79	79.85	79.80	79.70	79.74
20108	Manhole	Sealed	74.91	78.94	79.31	79.12	78.88	79.01	79.84	79.80	79.71	79.74
20108	Manhole	Sealed	74.91	78.94	79.31	79.12	78.88	79.01	79.84	79.80	79.71	79.74
20109	Manhole	Sealed	75.06	79.28	79.34	79.18	78.99	79.10	79.84	79.80	79.71	79.74
20109	Manhole	Sealed	75.06	79.28	79.34	79.18	78.99	79.10	79.84	79.80	79.71	79.74
20110	Manhole	Sealed	75.27	79.19	79.39	79.28	79.16	79.23	79.82	79.79	79.73	79.75
20110	Manhole	Sealed	75.27	79.19	79.39	79.28	79.16	79.23	79.82	79.79	79.73	79.75
20111	Manhole	Sealed	74.93	78.72	79.36	79.23	79.09	79.17	79.82	79.78	79.71	79.74
20111	Manhole	Sealed	74.93	78.72	79.36	79.23	79.09	79.17	79.82	79.78	79.71	79.74
20112	Manhole	Sealed	75.45	79.13	79.46	79.38	79.30	79.34	79.86	79.83	79.78	79.79
20112	Manhole	Sealed	75.45	79.13	79.46	79.38	79.30	79.34	79.86	79.83	79.78	79.79
20113	Manhole	Sealed	75.56	78.98	79.55	79.49	79.43	79.46	79.98	79.96	79.91	79.93
20113	Manhole	Sealed	75.56	78.98	79.55	79.49	79.43	79.46	79.98	79.96	79.91	79.93
20114	Manhole	Sealed	75.95	79.18	79.55	79.49	79.44	79.47	79.93	79.91	79.87	79.88
20114	Manhole	Sealed	75.95	79.18	79.55	79.49	79.44	79.47	79.93	79.91	79.87	79.88
20115	Manhole	Sealed	76.62	78.83	79.38	79.34	79.31	79.32	79.65	79.64	79.61	79.62
20115	Manhole	Sealed	76.62	78.83	79.38	79.34	79.31	79.32	79.65	79.64	79.61	79.62
20116	Manhole	2D	75.20	77.88	79.57	79.65	79.22	78.11	80.14	80.32	80.03	79.84
20116	Manhole	2D	75.20	77.88	79.57	79.65	79.22	78.11	80.14	80.32	80.03	79.84
20117	Manhole	2D	75.35	78.13	79.26	79.62	78.75	78.56	79.83	80.30	79.39	79.27
20117	Manhole	2D	75.35	78.13	79.26	79.62	78.75	78.56	79.83	80.30	79.39	79.27
20118	Manhole	2D	75.47	77.86	79.52	79.40	78.32	78.14	80.10	80.08	79.09	78.97
20118	Manhole	2D	75.47	77.86	79.52	79.40	78.32	78.14	80.10	80.08	79.09	78.97
20119	Manhole	Sealed	71.85	77.93	75.40	74.84	74.89	75.15	77.15	76.36	76.24	76.59
20119	Manhole	Sealed	71.85	77.93	75.40	74.84	74.89	75.15	77.15	76.36	76.24	76.59
20120	Manhole	Sealed	71.77	78.20	75.40	74.84	74.89	75.15	77.14	76.36	76.23	76.59
20120	Manhole	Sealed	71.77	78.20	75.40	74.84	74.89	75.15	77.14	76.36	76.23	76.59
20121	Manhole	Sealed	71.38	79.00	75.40	74.84	74.89	75.15	77.13	76.36	76.23	76.59
20121	Manhole	Sealed	71.38	79.00	75.40	74.84	74.89	75.15	77.13	76.36	76.23	76.59
20122	Manhole	Sealed	71.33	78.44	75.38	74.82	74.87	75.13	77.10	76.36	76.18	76.52
20122	Manhole	Sealed	71.33	78.44	75.38	74.82	74.87	75.13	77.10	76.36	76.18	76.52
20123	Manhole	Sealed	71.13	78.78	75.36	74.80	74.85	75.11	77.04	76.36	76.12	76.47
20123	Manhole	Sealed	71.13	78.78	75.36	74.80	74.85	75.11	77.04	76.36	76.12	76.47
20124	Manhole	Sealed	71.17	77.09	75.30	74.75	74.78	75.04	76.82	76.29	76.06	76.39
20124	Manhole	Sealed	71.17	77.09	75.30	74.75	74.78	75.04	76.82	76.29	76.06	76.39
20125	Manhole	Sealed	72.15	79.12	75.53	74.93	75.03	75.27	77.49	76.58	76.53	76.88
20125	Manhole	Sealed	72.15	79.12	75.53	74.93	75.03	75.27	77.49	76.58	76.53	76.88
20126	Manhole	Sealed	72.24	79.31	75.64	75.01	75.14	75.39	77.82	76.79	76.82	77.17
20126	Manhole	Sealed	72.24	79.31	75.64	75.01	75.14	75.39	77.82	76.79	76.82	77.17
20127	Manhole	Sealed	72.31	78.91	75.86	75.13	75.32	75.58	78.35	77.28	77.36	77.72
20127	Manhole	Sealed	72.31	78.91	75.86	75.13	75.32	75.58	78.35	77.28	77.36	77.72
20128	Manhole	Sealed	72.41	78.63	75.99	75.20	75.43	75.70	78.69	77.62	77.69	78.04

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
20128	Manhole	Sealed	72.41	78.63	75.99	75.20	75.43	75.70	78.69	77.62	77.69	78.04
20129	Manhole	Sealed	73.26	78.64	76.00	75.20	75.43	75.70	78.86	77.82	77.69	78.05
20129	Manhole	Sealed	73.26	78.64	76.00	75.20	75.43	75.70	78.86	77.82	77.69	78.05
20131	Manhole	2D	75.72	78.69	79.49	79.29	79.17	78.87	80.00	79.93	79.90	79.76
20131	Manhole	2D	75.72	78.69	79.49	79.29	79.17	78.87	80.00	79.93	79.90	79.76
20132	Manhole	2D	75.63	78.40	79.48	79.28	79.17	78.87	80.00	79.93	79.90	79.76
20132	Manhole	2D	75.63	78.40	79.48	79.28	79.17	78.87	80.00	79.93	79.90	79.76
20133	Manhole	2D	75.92	78.85	79.67	79.49	79.38	78.87	80.19	80.12	80.10	79.92
20133	Manhole	2D	75.92	78.85	79.67	79.49	79.38	78.87	80.19	80.12	80.10	79.92
20134	Manhole	2D	75.78	78.93	79.51	79.33	79.24	78.87	80.00	79.94	79.90	79.77
20134	Manhole	2D	75.78	78.93	79.51	79.33	79.24	78.87	80.00	79.94	79.90	79.77
20135	Manhole	2D	75.77	79.42	79.67	79.33	79.18	78.87	80.23	80.16	80.14	79.99
20135	Manhole	2D	75.77	79.42	79.67	79.33	79.18	78.87	80.23	80.16	80.14	79.99
20136	Manhole	2D	76.33	78.03	78.66	78.49	78.37	78.32	79.14	79.08	79.04	78.93
20136	Manhole	2D	76.33	78.03	78.66	78.49	78.37	78.32	79.14	79.08	79.04	78.93
20137	Manhole	2D	76.04	78.42	79.81	79.63	79.53	78.83	80.32	80.26	80.24	79.96
20137	Manhole	2D	76.04	78.42	79.81	79.63	79.53	78.83	80.32	80.26	80.24	79.96
20138	Manhole	2D	75.68	77.98	79.28	79.12	79.04	78.09	79.76	79.72	79.72	79.50
20138	Manhole	2D	75.68	77.98	79.28	79.12	79.04	78.09	79.76	79.72	79.72	79.50
20139	Manhole	2D	75.81	78.16	79.23	79.01	78.91	78.14	79.70	79.58	79.54	79.39
20139	Manhole	2D	75.81	78.16	79.23	79.01	78.91	78.14	79.70	79.58	79.54	79.39
20140	Manhole	2D	75.69	77.49	79.23	79.05	78.89	78.06	79.66	79.61	79.54	79.33
20140	Manhole	2D	75.69	77.49	79.23	79.05	78.89	78.06	79.66	79.61	79.54	79.33
20141	Manhole	2D	75.42	77.71	79.53	79.34	79.28	78.39	80.00	79.94	79.97	79.69
20141	Manhole	2D	75.42	77.71	79.53	79.34	79.28	78.39	80.00	79.94	79.97	79.69
20142	Manhole	2D	75.32	77.88	79.53	79.33	79.21	76.76	80.00	79.94	79.90	79.50
20142	Manhole	2D	75.32	77.88	79.53	79.33	79.21	76.76	80.00	79.94	79.90	79.50
30000	Manhole	Sealed	64.99	82.20	80.72	80.57	80.70	80.74	81.87	81.64	81.77	81.80
30001	Manhole	Sealed	64.82	80.59	79.62	79.39	79.59	79.65	80.93	80.56	80.77	80.82
30002	Manhole	Sealed	65.27	81.75	81.49	81.38	81.48	81.51	82.64	82.47	82.57	82.59
30003	Manhole	Sealed	64.31	75.29	77.64	77.23	77.60	77.70	79.29	78.61	79.01	79.10
30004	Manhole	Sealed	64.29	74.65	77.45	77.01	77.40	77.51	79.13	78.42	78.83	78.93
30005	Manhole	Sealed	64.14	74.01	76.15	75.63	76.09	76.23	77.79	76.84	77.40	77.51
30006	Manhole	Sealed	64.07	74.01	75.68	75.13	75.62	75.76	77.26	76.23	76.83	76.95
30007	Manhole	Sealed	64.88	82.15	80.54	80.38	80.52	80.56	81.69	81.44	81.58	81.61
30008	Manhole	Sealed	66.80	79.17	78.84	78.56	78.81	78.88	80.24	79.80	80.05	80.10
30009	Manhole	Sealed	64.27	74.59	77.10	76.64	77.05	77.17	78.81	78.04	78.49	78.59
30010	Manhole	Sealed	66.90	80.91	80.55	80.40	80.52	80.56	81.58	81.37	81.49	81.51
30011	Manhole	Sealed	67.13	79.75	80.89	80.77	80.85	80.88	81.76	81.62	81.69	81.70
30012	Manhole	Sealed	64.92	80.98	80.03	79.83	80.00	80.05	81.25	80.94	81.11	81.15
30013	Manhole	Sealed	64.54	78.41	78.30	77.94	78.26	78.35	79.86	79.29	79.62	79.70
30014	Manhole	Sealed	65.06	74.80	76.83	76.36	76.79	76.91	78.49	77.67	78.16	78.26
30015	Manhole	Sealed	63.97	76.14	74.83	74.22	74.73	74.89	76.11	75.45	75.69	75.85
30016	Manhole	Sealed	64.00	74.60	75.22	74.65	75.16	75.31	76.74	75.69	76.28	76.41
30017	Manhole	Sealed	65.58	75.04	77.04	76.58	76.99	77.11	78.74	77.96	78.41	78.52
30018	Manhole	Sealed	64.96	81.00	80.19	80.01	80.16	80.21	81.37	81.09	81.25	81.28
30019	Manhole	Sealed	65.26	82.78	81.37	81.25	81.36	81.39	82.52	82.34	82.45	82.47
30020	Manhole	Sealed	64.70	79.36	79.17	78.89	79.13	79.20	80.58	80.14	80.39	80.44
30021	Manhole	Sealed	64.28	73.92	77.29	76.84	77.24	77.35	79.00	78.26	78.69	78.79
30022	Manhole	Sealed	64.21	74.47	76.64	76.15	76.59	76.72	78.32	77.46	77.97	78.07
30023	Manhole	Sealed	64.54	79.60	78.81	78.51	78.78	78.86	80.32	79.83	80.11	80.17
30027	Manhole	Sealed	64.82	80.99	80.31	80.13	80.28	80.33	81.46	81.19	81.34	81.37
30028	Outfall	Sealed	65.36	81.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30029	Manhole	Sealed	65.40	81.55	72.06	72.06	72.06	72.06	73.37	73.37	73.36	73.36
30030	Manhole	2D	73.43	73.43	75.41	75.07	75.27	75.26	77.46	77.10	77.08	76.65
30032	Manhole	2D	77.40	82.29	82.66	82.09	82.08	82.09	82.94	82.92	82.90	82.90
30033	Manhole	2D	74.46	83.60	82.96	82.24	82.24	82.25	83.30	83.28	83.27	83.27
30034	Manhole	2D	78.00	82.47	83.74	82.84	82.84	82.85	83.76	83.53	83.52	83.51
30035	Manhole	2D	78.00	82.99	83.83	83.15	83.19	83.19	83.79	83.86	83.88	83.87
30036	Manhole	2D	77.75	82.57	80.95	80.64	80.66	80.68	81.59	81.57	81.57	81.57
30037	Manhole	2D	77.33	83.04	81.66	81.30	81.31	81.35	82.88	82.86	82.85	82.86
3143189	Manhole	2D	75.37	86.61	87.05	87.04	87.01	86.94	87.79	87.78	87.78	87.75
3143195	Manhole	2D	83.89	88.04	88.08	88.08	88.09	88.07	88.50	88.50	88.50	88.49
3143196	Manhole	2D	75.11	86.38	86.86	86.84	86.82	86.74	87.68	87.67	87.67	87.63
3143197	Manhole	2D	83.59	87.70	87.09	87.06	87.14	86.98	88.52	88.51	88.63	88.59
3143201	Manhole	2D	74.87	86.09	86.61	86.59	86.57	86.48	87.47	87.47	87.46	87.41

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
3143205	Manhole	2D	74.35	86.88	85.99	85.96	85.94	85.75	87.08	87.07	87.06	86.94
3143206	Manhole	2D	74.65	88.45	86.36	86.33	86.32	86.16	87.48	87.47	87.48	87.42
3143209	Manhole	2D	69.55	86.31	86.41	86.40	86.40	86.40	86.64	86.64	86.63	86.63
3143214	Manhole	2D	79.00	86.50	87.27	87.26	87.26	87.22	87.75	87.75	87.76	87.74
3143215	Manhole	2D	80.56	86.67	87.30	87.29	87.28	87.26	87.64	87.64	87.63	87.62
3143216	Manhole	2D	82.26	86.98	87.45	87.44	87.42	87.41	87.72	87.72	87.70	87.69
3143228	Manhole	2D	79.87	86.65	87.20	87.20	87.22	87.22	87.60	87.60	87.60	87.60
3143498	Manhole	Sealed	84.59	86.73	87.05	87.04	87.01	86.94	87.79	87.78	87.78	87.75
3143499	Manhole	Sealed	83.58	86.11	86.86	86.84	86.82	86.74	87.68	87.67	87.67	87.63
3143507	Manhole	2D	82.51	86.35	86.67	86.60	86.54	86.36	87.65	87.64	87.64	87.60
3144582	Manhole	2D	79.45	85.47	86.63	86.61	86.57	86.55	87.26	87.25	87.22	87.21
3144583	Manhole	2D	73.76	87.72	86.02	85.99	85.96	85.91	87.06	87.04	87.04	87.00
3144584	Manhole	2D	76.68	87.43	87.00	86.96	87.09	87.05	87.81	87.83	87.84	87.83
3144586	Manhole	2D	70.70	83.61	84.23	84.22	84.22	84.22	84.86	84.91	84.92	84.92
3144587	Manhole	2D	77.19	86.76	85.40	85.28	85.21	85.13	86.70	86.71	86.69	86.62
3144591	Manhole	2D	76.54	86.97	86.25	86.44	86.43	86.39	86.93	87.10	87.10	87.09
3144598	Manhole	2D	76.64	85.91	86.67	87.03	87.05	87.03	86.97	87.50	87.58	87.58
3144599	Manhole	2D	76.53	86.76	85.12	84.98	84.90	84.81	86.54	86.56	86.53	86.45
3144600	Manhole	2D	78.62	86.59	85.44	85.43	85.46	85.46	86.24	86.23	86.23	86.23
3144602	Manhole	2D	68.83	82.28	83.51	82.97	82.97	82.98	83.66	83.64	83.63	83.62
3144603	Manhole	2D	69.28	81.99	86.46	83.61	83.70	83.83	84.96	84.65	84.80	84.78
3144605	Manhole	2D	69.30	82.42	86.69	83.10	83.13	83.15	84.61	83.90	83.93	83.89
3144606	Manhole	2D	69.96	82.05	85.28	83.07	83.07	83.06	84.02	83.79	83.82	83.81
3144607	Manhole	2D	69.54	82.59	83.69	83.26	83.21	83.21	83.93	83.88	83.80	83.79
3144608	Manhole	2D	70.06	82.11	83.46	82.71	82.71	82.72	83.47	83.43	83.43	83.42
3144609	Manhole	2D	75.91	86.27	84.84	84.67	84.59	84.49	86.27	86.21	86.17	86.07
3144610	Manhole	2D	72.83	86.77	84.70	84.53	84.44	84.33	86.03	85.95	85.91	85.80
3144612	Manhole	2D	70.54	82.19	83.68	83.62	83.63	83.62	84.13	84.19	84.20	84.20
3144613	Manhole	2D	70.97	82.60	83.73	83.65	83.64	83.64	84.25	84.30	84.29	84.29
3144614	Manhole	2D	72.41	82.47	83.63	83.57	83.60	83.60	84.08	84.14	84.17	84.16
3144615	Manhole	2D	71.67	82.63	83.86	83.66	83.68	83.68	84.31	84.27	84.28	84.27
3144616	Manhole	2D	69.64	82.24	82.90	82.22	82.22	82.22	83.23	83.21	83.20	83.20
3144617	Manhole	2D	82.48	85.77	84.03	83.77	83.65	83.53	85.49	85.43	85.36	85.29
3144618	Manhole	2D	71.98	82.53	83.78	83.63	83.66	83.65	84.25	84.23	84.26	84.25
3144619	Manhole	2D	77.98	82.94	83.86	83.81	83.80	83.79	84.40	84.36	84.29	84.26
3144623	Manhole	2D	72.17	83.67	83.78	83.69	83.70	83.69	84.26	84.23	84.32	84.31
3144624	Manhole	2D	77.08	84.90	85.35	85.32	85.32	85.31	85.80	85.80	85.80	85.79
3144627	Manhole	2D	75.85	82.54	84.10	84.00	84.00	83.97	84.78	84.73	84.69	84.65
3144628	Manhole	2D	75.73	82.35	84.03	83.94	83.94	83.91	84.77	84.73	84.69	84.65
3144629	Manhole	2D	74.66	84.46	83.62	83.37	83.28	83.17	84.85	84.79	84.73	84.66
3144631	Manhole	2D	72.69	83.78	84.12	84.02	83.97	83.92	84.74	84.71	84.67	84.64
3144632	Manhole	2D	75.30	85.00	83.60	83.56	83.59	83.59	83.99	84.02	84.03	84.03
3144633	Manhole	2D	75.23	85.44	83.61	83.56	83.59	83.59	84.02	84.06	84.08	84.07
3144637	Manhole	2D	69.49	84.00	84.00	83.86	83.83	83.79	84.79	84.75	84.73	84.70
3144638	Manhole	2D	75.53	84.72	83.66	83.63	83.58	83.58	84.02	84.01	84.01	84.01
3144640	Manhole	2D	74.26	82.25	83.44	83.39	83.45	83.45	83.74	83.75	83.80	83.80
3144641	Manhole	2D	75.64	82.92	83.58	83.57	83.58	83.58	83.93	83.94	83.94	83.94
3144642	Manhole	2D	75.86	81.53	83.00	83.00	83.03	83.03	83.37	83.38	83.39	83.39
3144643	Manhole	2D	76.08	82.50	83.58	83.57	83.49	83.48	83.84	83.84	83.77	83.77
3144646	Manhole	2D	76.23	82.60	83.15	83.15	83.20	83.20	83.49	83.50	83.53	83.53
3144647	Manhole	2D	76.38	83.21	83.22	83.22	83.26	83.26	83.63	83.63	83.67	83.67
3144648	Manhole	2D	70.28	82.63	83.35	83.34	83.34	83.34	83.66	83.64	83.64	83.64
3144911	Manhole	2D	77.42	84.45	84.86	84.71	84.63	84.53	85.88	85.81	85.80	85.76
3144912	Manhole	2D	76.92	84.56	85.06	84.93	84.85	84.78	86.37	86.35	86.35	86.31
3144913	Manhole	2D	82.48	85.73	85.54	85.51	85.50	85.49	86.03	86.02	86.02	86.02
3144914	Manhole	2D	81.48	84.40	85.45	85.42	85.42	85.40	85.97	85.96	85.94	85.93
3144915	Manhole	2D	83.38	85.87	85.09	84.95	84.89	84.84	85.97	85.97	85.95	85.94
3144916	Manhole	2D	82.38	84.70	85.27	85.07	85.02	84.96	85.91	85.89	85.88	85.87
3144917	Manhole	2D	81.28	85.06	84.03	83.77	83.65	83.52	85.38	85.34	85.29	85.23
3144928	Manhole	2D	82.85	85.00	85.44	85.43	85.46	85.46	86.12	86.10	86.11	86.11
3144930	Manhole	2D	79.18	84.01	85.03	85.02	85.07	85.07	85.40	85.40	85.41	85.41
3144931	Manhole	2D	78.52	82.77	84.12	84.02	84.03	84.00	84.77	84.73	84.70	84.66
3144932	Manhole	2D	80.85	84.57	84.08	83.86	83.78	83.68	84.90	84.87	84.86	84.84
3144935	Manhole	2D	79.46	83.88	84.26	84.17	84.07	84.01	84.89	84.86	84.79	84.76
3144936	Manhole	2D	79.46	83.42	84.11	84.01	83.98	83.92	84.73	84.69	84.67	84.63
3144937	Manhole	2D	74.53	82.57	83.28	83.27	83.27	83.27	83.59	83.56	83.56	83.56

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
3144938	Manhole	2D	74.53	82.46	83.13	83.13	83.14	83.13	83.35	83.32	83.33	83.33
3144944	Manhole	2D	74.91	81.43	82.50	82.49	82.53	82.53	83.05	83.10	83.15	83.15
3144951	Manhole	2D	78.71	82.44	83.12	83.12	83.14	83.14	83.45	83.45	83.46	83.46
3144952	Manhole	2D	79.01	81.95	82.59	82.59	82.61	82.61	82.88	82.88	82.89	82.89
3144955	Manhole	2D	78.64	81.64	82.98	82.97	82.98	82.98	83.32	83.32	83.31	83.31
3144956	Manhole	2D	78.31	82.03	83.41	83.38	83.42	83.42	83.74	83.74	83.77	83.77
3144962	Manhole	2D	67.36	80.79	82.61	82.45	82.46	82.46	83.11	83.02	83.02	83.02
3144967	Manhole	2D	78.74	84.57	85.38	85.38	85.42	85.42	85.59	85.59	85.61	85.61
3146601	Manhole	2D	76.17	78.85	80.32	79.96	80.10	79.87	80.87	80.81	80.72	80.58
3146604	Manhole	2D	75.94	79.56	80.12	79.71	79.80	79.51	80.68	80.60	80.49	80.45
3146605	Manhole	2D	75.88	79.80	80.10	79.53	79.40	79.40	80.69	80.61	80.47	80.46
3146608	Manhole	2D	74.50	78.98	79.49	78.89	79.07	79.11	80.24	80.11	80.10	80.06
3146737	Manhole	2D	74.40	80.36	79.51	78.71	78.94	79.03	80.56	80.20	80.14	80.15
3146738	Manhole	2D	74.59	79.66	79.63	78.69	78.83	78.98	80.25	80.01	80.15	80.18
3146742	Manhole	2D	76.21	79.26	79.91	79.11	79.84	79.69	80.55	80.48	80.53	80.46
3146748	Manhole	2D	75.45	79.49	79.94	79.01	79.54	79.41	80.55	80.48	80.43	80.38
3146749	Manhole	2D	75.69	79.69	79.72	78.94	79.27	79.24	80.54	80.45	80.43	80.40
3146752	Manhole	2D	76.35	79.52	79.82	79.52	79.63	79.59	80.38	80.32	80.21	80.12
3146756	Manhole	2D	74.86	79.48	80.10	79.24	79.97	79.80	80.72	80.65	80.64	80.57
3146767	Manhole	2D	76.18	78.78	80.18	79.85	79.89	79.74	80.73	80.67	80.48	80.45
3146769	Manhole	2D	75.98	77.92	80.25	79.91	80.09	79.42	80.80	80.74	80.69	80.58
3175098	Manhole	2D	77.66	88.05	89.03	89.03	89.05	89.05	89.35	89.35	89.38	89.37
3175100	Manhole	2D	77.41	88.55	89.00	89.00	89.04	89.04	89.36	89.36	89.39	89.39
3175102	Manhole	2D	75.04	88.17	88.86	88.85	88.85	88.85	89.30	89.30	89.29	89.29
3175104	Manhole	2D	77.18	88.96	88.81	88.81	88.83	88.82	89.38	89.38	89.40	89.40
3175107	Manhole	2D	73.62	87.33	88.33	88.32	88.35	88.35	88.87	88.87	88.88	88.88
3175109	Manhole	2D	82.11	88.49	87.83	87.82	87.83	87.82	88.47	88.47	88.44	88.44
3175111	Manhole	2D	73.32	88.70	87.83	87.82	87.83	87.82	88.47	88.46	88.44	88.44
3175112	Manhole	2D	73.51	88.05	88.12	88.08	88.12	88.12	88.77	88.77	88.77	88.76
3175113	Manhole	2D	79.36	86.58	88.01	88.00	88.01	88.01	88.49	88.49	88.49	88.48
3175114	Manhole	Sealed	83.99	87.78	88.21	88.20	88.49	90.99	88.69	88.69	88.70	88.70
3175115	Manhole	2D	80.08	87.35	88.21	88.20	88.22	88.22	88.69	88.69	88.70	88.70
3175121	Manhole	2D	79.85	87.28	88.10	88.09	88.11	88.11	88.55	88.55	88.56	88.56
3175122	Manhole	Sealed	84.20	88.05	88.10	88.09	88.11	88.11	88.55	88.55	88.56	88.56
3175261	Manhole	Sealed	83.33	87.69	88.01	88.00	88.01	88.01	88.49	88.49	88.49	88.48
3175272	Manhole	2D	75.99	84.81	86.63	86.63	87.00	87.00	86.69	86.69	87.08	87.08
3175279	Manhole	2D	77.14	88.40	88.67	88.67	88.69	88.68	89.06	89.06	89.08	89.08
3176092	Manhole	2D	80.95	87.29	86.20	86.15	86.01	86.01	87.25	87.24	87.19	87.19
3176094	Manhole	2D	82.43	87.12	88.29	88.29	88.30	88.30	88.87	88.87	88.88	88.88
3176096	Manhole	2D	75.84	86.35	86.07	86.02	85.88	85.88	86.63	86.61	86.59	86.59
3176098	Manhole	2D	74.00	87.47	85.94	85.88	85.73	85.73	86.54	86.51	86.31	86.31
3176100	Manhole	Sealed	72.54	86.58	86.28	86.24	86.12	86.12	86.89	86.86	86.66	86.66
3176102	Manhole	Sealed	72.64	84.19	86.82	86.79	86.72	86.72	87.35	87.34	87.23	87.23
3176104	Manhole	2D	72.89	87.64	87.35	87.32	87.29	87.29	87.88	87.87	87.83	87.82
3176105	Manhole	2D	77.26	84.67	86.27	86.26	86.26	86.26	86.51	86.49	86.54	86.54
3176107	Manhole	2D	74.27	83.51	83.59	83.58	83.62	83.63	84.27	84.27	84.24	84.24
3176108	Manhole	2D	76.98	84.09	86.11	86.10	86.10	86.10	86.34	86.33	86.34	86.33
3176109	Manhole	2D	73.92	82.14	83.24	83.24	83.25	83.25	83.50	83.49	83.50	83.50
3176110	Manhole	2D	71.14	84.39	84.22	84.21	84.25	84.25	85.00	85.00	85.06	85.06
3176112	Manhole	2D	76.55	86.97	86.79	86.76	86.79	86.79	87.40	87.39	87.39	87.38
3176113	Manhole	2D	71.06	82.95	84.13	84.13	84.16	84.16	84.58	84.58	84.61	84.61
3176115	Manhole	Sealed	76.35	84.45	86.76	86.73	86.77	86.76	87.44	87.43	87.42	87.41
3176245	Manhole	2D	67.32	83.89	83.63	83.61	83.58	83.57	84.58	84.57	84.47	84.47
3176246	Manhole	2D	67.71	84.54	83.90	83.88	83.84	83.84	84.60	84.59	84.48	84.48
3176247	Manhole	2D	68.07	82.52	84.31	84.27	84.19	84.19	84.76	84.74	84.62	84.62
3176248	Manhole	2D	68.27	82.77	84.44	84.40	84.32	84.31	84.81	84.79	84.66	84.66
3176249	Manhole	2D	68.49	83.92	84.91	84.85	84.74	84.74	85.31	85.26	85.08	85.08
3176251	Manhole	2D	68.69	84.75	85.39	85.33	85.15	85.14	85.88	85.84	85.49	85.49
3176254	Manhole	2D	81.84	86.03	86.90	86.88	86.53	86.53	87.26	87.25	86.85	86.85
3176255	Manhole	2D	72.20	86.00	85.82	85.77	85.61	85.61	86.40	86.37	86.08	86.08
3176274	Manhole	2D	80.43	84.61	85.34	85.33	85.37	85.36	85.50	85.50	85.52	85.52
3176275	Manhole	2D	80.30	85.87	86.40	86.39	86.37	86.36	86.62	86.62	86.58	86.58
3177634	Manhole	2D	79.71	87.65	88.08	88.07	88.09	88.09	88.55	88.55	88.56	88.56
3177638	Manhole	2D	79.68	87.33	88.06	88.06	88.08	88.07	88.55	88.55	88.56	88.56
3177642	Manhole	2D	78.84	86.89	87.89	87.89	87.90	87.89	88.31	88.31	88.33	88.32
3177643	Manhole	2D	83.57	88.12	88.23	88.22	88.24	88.23	88.72	88.72	88.74	88.74

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
3177646	Manhole	2D	86.11	88.46	88.65	88.65	88.70	88.70	88.91	88.91	89.00	89.00
3177647	Outfall	Stored	85.84	87.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3177653	Manhole	2D	78.58	86.83	87.90	87.89	87.89	87.88	88.31	88.31	88.32	88.32
3177657	Manhole	2D	86.26	89.10	88.66	88.66	88.70	88.70	88.91	88.91	89.00	89.00
3177664	Manhole	2D	78.15	86.60	87.89	87.89	87.89	87.88	88.29	88.29	88.30	88.30
3177674	Manhole	2D	76.68	86.18	87.17	87.16	87.16	87.13	87.67	87.66	87.66	87.65
3177675	Manhole	2D	83.41	87.41	87.54	87.54	87.54	87.53	87.89	87.89	87.86	87.85
3177677	Manhole	2D	76.61	86.37	87.25	87.24	87.23	87.18	87.90	87.90	87.89	87.88
3177678	Manhole	2D	83.13	87.15	87.62	87.61	87.62	87.58	88.17	88.17	88.17	88.16
3177683	Manhole	2D	75.55	85.83	87.16	87.15	87.11	87.06	87.83	87.83	87.80	87.78
3177966	Manhole	Sealed	86.38	88.03	88.66	88.66	88.70	88.70	88.91	88.91	89.00	89.00
3177985	Manhole	Sealed	83.13	86.53	87.16	87.15	87.11	87.06	87.83	87.83	87.80	87.78
3177990	Manhole	2D	84.10	86.57	87.87	87.86	87.86	87.85	88.22	88.21	88.23	88.22
3178003	Manhole	Sealed	83.64	87.40	87.90	87.89	87.89	87.88	88.31	88.31	88.32	88.32
3178015	Manhole	2D	84.25	87.45	87.96	87.95	87.97	87.96	88.32	88.32	88.33	88.33
3178751	Manhole	2D	81.27	85.84	86.52	86.51	86.49	86.48	86.84	86.83	86.81	86.80
3178752	Manhole	2D	81.01	86.71	87.23	87.22	87.22	87.21	87.57	87.57	87.58	87.57
3178753	Manhole	2D	74.12	86.85	86.76	86.73	86.77	86.76	87.35	87.33	87.34	87.33
3178754	Manhole	2D	70.82	83.86	84.34	84.33	84.36	84.36	84.99	84.99	84.99	84.99
3178755	Manhole	2D	80.07	85.89	86.50	86.49	86.45	86.44	86.85	86.85	86.81	86.81
3178756	Manhole	2D	70.71	83.61	84.33	84.32	84.35	84.35	84.95	84.95	84.95	84.95
3178758	Manhole	2D	75.82	85.86	86.64	86.45	86.64	86.63	86.88	86.67	86.87	86.87
3178759	Manhole	2D	75.97	85.42	86.25	86.23	86.21	86.20	86.42	86.39	86.36	86.36
3178760	Manhole	2D	76.09	86.02	86.61	86.61	86.60	86.59	86.83	86.80	86.80	86.80
3178761	Manhole	2D	76.25	85.68	86.42	86.42	86.54	86.53	86.63	86.61	86.77	86.77
3178762	Manhole	2D	75.67	87.54	86.72	86.68	86.72	86.71	87.28	87.27	87.28	87.27
3178763	Manhole	2D	79.54	86.93	86.74	86.74	86.80	86.80	87.18	87.17	87.22	87.22
3178765	Manhole	2D	77.44	86.00	86.51	86.51	86.61	86.60	86.75	86.74	87.04	87.04
3178767	Manhole	2D	69.73	83.51	84.36	84.35	84.38	84.38	85.08	85.08	85.09	85.09
3178768	Manhole	Sealed	69.76	83.37	84.38	84.37	84.42	84.42	85.11	85.10	85.13	85.13
3178769	Manhole	2D	69.81	84.18	84.44	84.43	84.50	84.50	85.17	85.17	85.23	85.23
3178770	Manhole	2D	69.85	84.36	84.48	84.47	84.54	84.54	85.26	85.26	85.32	85.32
3178771	Manhole	2D	69.98	85.15	84.57	84.57	84.64	84.64	85.37	85.37	85.42	85.42
3178772	Manhole	2D	70.16	85.53	84.75	84.75	84.83	84.83	85.68	85.68	85.76	85.76
3178773	Manhole	2D	70.18	84.71	84.67	84.67	84.73	84.73	85.25	85.25	85.28	85.28
3178775	Manhole	2D	77.97	87.23	86.74	86.71	86.72	86.71	88.04	88.04	88.03	88.02
3178778	Manhole	2D	77.00	86.36	86.74	86.73	86.72	86.71	87.06	87.06	87.05	87.04
3178779	Manhole	2D	76.99	86.52	86.96	86.87	87.01	87.00	87.34	87.27	87.37	87.37
3178781	Manhole	2D	70.33	83.50	84.49	84.49	84.53	84.53	85.09	85.09	85.12	85.12
3178783	Manhole	2D	70.35	83.66	84.51	84.51	84.54	84.54	85.22	85.23	85.25	85.25
3178785	Manhole	2D	74.07	87.55	86.83	86.80	86.80	86.79	87.68	87.67	87.67	87.66
3178787	Manhole	2D	74.91	87.97	86.53	86.51	86.51	86.49	87.33	87.31	87.32	87.30
3178788	Manhole	2D	77.82	87.46	86.49	86.47	86.49	86.47	87.10	87.08	87.08	87.07
3178790	Manhole	2D	70.52	85.89	84.42	84.41	84.44	84.44	85.15	85.17	85.19	85.19
3178791	Manhole	2D	70.70	85.77	84.39	84.38	84.40	84.40	85.14	85.16	85.18	85.18
3178792	Manhole	2D	77.89	87.28	85.84	85.75	85.69	85.64	86.95	86.94	86.93	86.88
3178793	Manhole	2D	78.67	87.00	86.18	86.11	86.07	86.03	87.15	87.12	87.11	87.09
3178794	Manhole	2D	77.10	87.25	87.65	88.65	87.63	87.63	88.03	89.11	88.04	88.04
3178797	Manhole	2D	78.91	86.64	86.48	86.43	86.40	86.37	87.07	87.05	87.05	87.04
3178987	Manhole	2D	75.10	82.12	83.61	83.61	83.59	83.59	83.71	83.72	83.70	83.70
3178988	Manhole	2D	75.30	81.77	83.86	83.85	83.87	83.87	84.05	84.04	84.04	84.04
3178989	Manhole	2D	75.30	81.97	84.03	84.02	84.04	84.04	84.72	84.73	84.73	84.73
3178992	Manhole	2D	74.16	84.47	85.36	85.35	85.49	85.49	85.58	85.57	85.70	85.70
3179002	Manhole	2D	80.15	85.69	86.34	86.34	86.35	86.34	86.63	86.62	86.64	86.64
3179010	Manhole	2D	79.92	84.31	84.97	84.96	84.96	84.95	85.16	85.16	85.15	85.15
3179011	Manhole	2D	79.72	85.28	86.74	86.72	86.69	86.68	86.98	86.98	86.94	86.94
3179012	Manhole	2D	79.42	84.33	85.23	85.23	85.24	85.23	85.44	85.44	85.45	85.45
3179013	Manhole	2D	79.42	84.93	85.30	85.30	85.29	85.29	85.49	85.49	85.48	85.48
3179018	Manhole	2D	79.92	84.78	85.33	85.41	85.36	85.35	85.53	85.59	85.56	85.56
3179019	Manhole	2D	79.92	84.52	85.27	84.82	85.24	85.24	85.43	84.97	85.41	85.40
3179020	Manhole	2D	77.00	85.29	86.51	86.50	86.46	86.46	86.74	86.74	86.68	86.68
3179021	Manhole	2D	77.00	85.20	86.20	86.19	86.14	86.14	86.38	86.39	86.32	86.31
3179024	Manhole	2D	78.62	86.51	86.49	86.47	86.52	86.49	87.10	87.07	87.07	87.07
3179025	Manhole	2D	80.52	86.17	86.35	86.35	86.31	86.31	86.43	86.43	86.38	86.38
3179029	Manhole	2D	80.62	85.93	86.47	86.19	86.39	86.38	86.67	86.47	86.57	86.57
3179030	Manhole	2D	77.52	85.37	86.08	86.08	86.07	86.06	86.26	86.23	86.27	86.26

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
3218806	Manhole	2D	74.90	82.11	82.88	82.87	82.94	82.94	83.82	83.80	83.76	83.76
3218808	Manhole	2D	66.42	80.01	81.56	81.39	81.40	81.41	81.97	81.92	81.94	81.94
3218814	Manhole	2D	67.03	81.14	82.02	81.80	81.80	81.80	82.33	82.30	82.29	82.29
3218819	Manhole	2D	67.38	81.76	82.56	82.26	82.25	82.25	82.91	82.88	82.86	82.86
3218824	Manhole	2D	67.97	81.52	82.93	82.58	82.57	82.58	83.20	83.16	83.15	83.15
3218829	Manhole	2D	68.48	81.82	83.34	82.96	82.96	82.97	83.69	83.67	83.66	83.66
3218832	Manhole	2D	71.01	81.83	81.90	81.91	81.91	81.91	82.42	82.42	82.40	82.40
3218866	Manhole	2D	68.68	82.82	80.37	80.13	80.16	80.17	80.92	80.90	80.90	80.90
3218873	Manhole	2D	68.03	78.12	78.73	78.62	78.67	78.69	78.98	78.95	78.96	78.96
3219151	Manhole	2D	77.96	81.42	82.00	81.79	81.75	81.76	82.26	82.24	82.19	82.19
3219152	Manhole	2D	77.46	81.10	82.12	81.92	81.92	81.93	82.43	82.40	82.40	82.40
3219153	Manhole	2D	76.51	79.55	81.64	81.49	81.50	81.51	82.05	82.02	82.04	82.04
3219183	Manhole	2D	71.37	79.07	80.32	80.21	80.20	80.20	80.67	80.67	80.66	80.66
3219184	Manhole	2D	71.01	78.89	80.41	80.30	80.32	80.32	80.78	80.79	80.80	80.81
3219186	Manhole	2D	71.09	77.91	77.05	76.90	76.94	76.36	78.02	77.99	77.98	77.83
3219196	Manhole	2D	73.18	78.02	78.07	78.06	78.10	78.10	78.43	78.40	78.43	78.43
3219197	Manhole	2D	73.00	77.14	77.87	77.86	77.87	77.88	78.31	78.27	78.29	78.30
3219198	Manhole	2D	74.31	78.20	78.63	78.62	78.64	78.64	78.75	78.74	78.75	78.75
3219200	Manhole	2D	69.47	73.94	74.86	74.83	74.89	74.90	75.53	75.37	75.43	75.40
3219201	Manhole	2D	68.99	73.72	75.70	75.66	75.67	75.68	76.40	76.24	76.23	76.21
3221259	Manhole	2D	67.45	77.67	77.74	77.48	77.69	77.74	78.39	78.22	78.19	78.19
3221268	Manhole	2D	66.97	76.97	77.12	76.81	77.07	77.14	78.09	77.85	77.84	77.67
3221268	Manhole	2D	66.97	76.97	77.12	76.81	77.07	77.14	78.09	77.85	77.84	77.67
3221271	Manhole	2D	66.69	77.55	76.18	75.76	76.12	76.23	77.49	77.11	77.15	76.93
3221271	Manhole	2D	66.69	77.55	76.18	75.76	76.12	76.23	77.49	77.11	77.15	76.93
3221280	Manhole	Sealed	66.76	78.13	75.61	75.11	75.52	75.66	76.90	76.53	76.61	76.49
3234001	Manhole	Stored	68.06	83.95	87.11	87.11	87.11	87.10	88.63	88.63	88.63	88.62
3234041	Manhole	2D	73.73	84.44	83.77	83.76	83.75	83.75	84.66	84.66	84.65	84.65
3234043	Manhole	2D	70.93	85.69	83.32	83.30	83.30	83.30	84.89	84.88	84.82	84.82
3234049	Manhole	Sealed	71.87	85.05	83.81	83.79	83.83	83.83	85.46	85.45	85.45	85.45
3234050	Manhole	2D	80.33	84.19	83.53	83.50	83.60	83.60	84.75	84.75	84.78	84.78
3234051	Manhole	Sealed	74.97	83.42	84.23	84.22	84.24	84.24	85.29	85.28	85.28	85.28
3234052	Manhole	Sealed	74.51	84.14	84.08	84.08	84.09	84.09	84.84	84.84	84.84	84.84
3234054	Manhole	Sealed	75.48	83.87	84.23	84.22	84.25	84.25	85.26	85.26	85.26	85.26
3234057	Manhole	2D	72.25	84.99	83.81	83.80	83.83	83.84	85.46	85.45	85.45	85.45
3234058	Manhole	Sealed	70.15	85.12	70.25	70.25	70.25	70.25	79.58	78.95	79.10	83.01
3234059	Manhole	Sealed	72.67	85.43	83.82	83.80	83.84	83.84	85.45	85.44	85.44	85.44
3234307	Manhole	2D	67.04	83.32	83.38	83.08	83.07	83.07	84.52	84.51	84.39	84.39
3234312	Manhole	2D	67.60	83.31	84.66	84.66	84.65	84.65	85.16	85.15	85.14	85.14
3234315	Manhole	Sealed	66.85	83.59	82.62	82.59	82.57	82.57	84.39	84.38	84.27	84.26
3236559	Manhole	2D	73.27	84.24	84.27	84.27	84.27	84.28	84.94	84.94	84.92	84.92
3236568	Manhole	Sealed	73.15	85.01	83.73	83.71	83.74	83.74	84.80	84.77	84.77	84.77
3236569	Manhole	Sealed	73.23	85.23	83.74	83.71	83.74	83.74	84.84	84.80	84.81	84.82
3236576	Manhole	2D	72.23	84.13	84.09	84.07	84.09	84.09	84.95	84.95	84.95	84.95
3236582	Manhole	2D	72.70	85.11	83.72	83.69	83.72	83.73	84.80	84.76	84.78	84.78
3236584	Manhole	2D	66.58	84.75	83.72	83.69	83.72	83.72	84.80	84.76	84.78	84.78
3236585	Manhole	Sealed	69.35	85.24	83.81	83.79	83.81	83.82	84.88	84.85	84.86	84.86
3236588	Manhole	Sealed	73.98	85.30	83.66	83.62	83.63	83.63	84.51	84.34	84.32	84.32
3236589	Manhole	Sealed	74.01	85.00	83.41	83.32	83.28	83.28	84.38	83.97	83.87	83.87
3236590	Manhole	Sealed	71.95	83.86	84.04	84.02	84.04	84.05	84.90	84.89	84.89	84.89
3236593	Manhole	Sealed	69.54	83.91	84.03	84.01	84.03	84.03	84.94	84.91	84.92	84.92
3236596	Manhole	Sealed	69.91	83.99	83.80	83.77	83.78	83.78	84.64	84.56	84.53	84.53
3236615	Manhole	Sealed	66.38	84.77	83.35	83.31	83.36	83.36	84.51	84.46	84.49	84.49
3236631	Manhole	Sealed	65.27	82.69	81.87	81.78	81.86	81.89	83.03	82.89	82.97	82.99
3236632	Manhole	Sealed	65.43	82.61	82.36	82.29	82.35	82.37	83.52	83.42	83.48	83.50
3236633	Manhole	Sealed	65.63	84.05	82.92	82.88	82.92	82.93	83.90	83.83	83.88	83.89
3236634	Manhole	Sealed	65.62	83.63	82.67	82.62	82.67	82.68	83.71	83.63	83.67	83.69
3236636	Manhole	2D	74.13	82.53	82.76	82.75	82.77	82.77	83.09	83.07	83.11	83.11
4161810	Manhole	2D	80.88	84.03	83.74	83.50	83.41	83.30	84.86	84.81	84.72	84.67
4161810	Manhole	2D	80.88	84.03	83.74	83.50	83.41	83.30	84.86	84.81	84.72	84.67
4161811	Manhole	2D	82.15	82.81	83.67	83.59	83.55	83.52	84.33	84.28	84.21	84.17
4161811	Manhole	2D	82.15	82.81	83.67	83.59	83.55	83.52	84.33	84.28	84.21	84.17
4161812	Manhole	2D	78.52	83.26	83.61	83.58	83.55	83.54	84.15	84.11	83.95	83.92
4161812	Manhole	2D	78.52	83.26	83.61	83.58	83.55	83.54	84.15	84.11	83.95	83.92
4165577	Manhole	Sealed	70.86	77.95	75.71	75.40	75.20	75.42	77.59	77.03	76.54	76.91
4165577	Manhole	Sealed	70.86	77.95	75.71	75.40	75.20	75.42	77.59	77.03	76.54	76.91

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
4165579	Manhole	Sealed	72.04	78.61	76.43	76.46	76.01	76.20	78.43	78.16	77.96	78.02
4165579	Manhole	Sealed	72.04	78.61	76.43	76.46	76.01	76.20	78.43	78.16	77.96	78.02
4165581	Manhole	Sealed	72.60	77.91	76.60	76.73	76.23	76.41	78.53	78.41	78.31	78.34
4165581	Manhole	Sealed	72.60	77.91	76.60	76.73	76.23	76.41	78.53	78.41	78.31	78.34
4165583	Manhole	Sealed	73.46	78.72	76.62	76.78	76.26	76.44	78.73	78.64	78.60	78.61
4165583	Manhole	Sealed	73.46	78.72	76.62	76.78	76.26	76.44	78.73	78.64	78.60	78.61
4165585	Manhole	Sealed	71.93	78.30	73.54	73.54	73.54	73.54	78.59	78.53	78.52	78.53
4165585	Manhole	Sealed	71.93	78.30	73.54	73.54	73.54	73.54	78.59	78.53	78.52	78.53
4165604	Manhole	Sealed	72.50	78.78	75.71	75.40	75.20	75.42	77.59	77.03	76.54	76.91
4165604	Manhole	Sealed	72.50	78.78	75.71	75.40	75.20	75.42	77.59	77.03	76.54	76.91
4165605	Manhole	Sealed	72.50	79.39	75.71	75.41	75.21	75.43	77.68	77.08	76.55	76.94
4165605	Manhole	Sealed	72.50	79.39	75.71	75.41	75.21	75.43	77.68	77.08	76.55	76.94
4165607	Manhole	Sealed	73.10	78.81	76.60	76.73	76.23	76.41	78.48	78.38	78.30	78.32
4165607	Manhole	Sealed	73.10	78.81	76.60	76.73	76.23	76.41	78.48	78.38	78.30	78.32
4165610	Manhole	Sealed	73.96	78.83	76.62	76.78	76.26	76.45	78.73	78.64	78.60	78.61
4165610	Manhole	Sealed	73.96	78.83	76.62	76.78	76.26	76.45	78.73	78.64	78.60	78.61
4165614	Manhole	2D	72.13	79.44	73.60	73.60	73.60	73.60	78.60	78.41	78.42	78.43
4165614	Manhole	2D	72.13	79.44	73.60	73.60	73.60	73.60	78.60	78.41	78.42	78.43
4165616	Manhole	2D	72.19	78.71	73.69	73.69	73.69	73.69	78.72	78.50	78.47	78.48
4165616	Manhole	2D	72.19	78.71	73.69	73.69	73.69	73.69	78.72	78.50	78.47	78.48
5708649	Manhole	2D	71.13	75.87	76.64	76.42	76.54	75.46	77.59	77.42	77.42	76.89
5708649	Manhole	2D	71.13	75.87	76.64	76.42	76.54	75.46	77.59	77.42	77.42	76.89
5708650	Manhole	2D	70.60	75.43	76.61	76.35	76.48	75.46	77.90	77.69	77.67	76.84
5708650	Manhole	2D	70.60	75.43	76.61	76.35	76.48	75.46	77.90	77.69	77.67	76.84
5708651	Manhole	2D	70.70	75.40	76.86	76.59	76.75	75.46	78.19	77.97	77.98	77.15
5708651	Manhole	2D	70.70	75.40	76.86	76.59	76.75	75.46	78.19	77.97	77.98	77.15
5708685	Manhole	2D	70.87	75.64	76.92	76.78	76.82	75.86	77.66	77.50	77.49	77.13
5708685	Manhole	2D	70.87	75.64	76.92	76.78	76.82	75.86	77.66	77.50	77.49	77.13
5708686	Manhole	2D	70.70	75.51	77.04	76.82	76.86	76.16	78.50	78.25	78.18	77.20
5708686	Manhole	2D	70.70	75.51	77.04	76.82	76.86	76.16	78.50	78.25	78.18	77.20
5708689	Manhole	2D	70.70	75.01	77.22	77.06	77.10	76.58	78.32	78.10	78.04	77.52
5708689	Manhole	2D	70.70	75.01	77.22	77.06	77.10	76.58	78.32	78.10	78.04	77.52
5906134	Manhole	2D	74.65	86.99	84.76	84.76	84.73	84.72	87.27	87.26	87.25	87.25
5906135	Manhole	2D	74.78	87.05	85.21	85.21	85.18	85.17	87.45	87.44	87.43	87.43
5906136	Manhole	2D	74.82	86.77	85.38	85.38	85.35	85.34	87.53	87.53	87.51	87.51
5906137	Manhole	2D	74.87	86.81	85.56	85.55	85.53	85.52	87.62	87.62	87.60	87.60
5906138	Manhole	2D	75.02	87.13	85.90	85.90	85.88	85.87	87.81	87.80	87.79	87.79
5906139	Manhole	2D	75.25	87.15	86.29	86.29	86.26	86.26	87.99	87.99	87.97	87.97
5906140	Manhole	2D	75.32	86.66	86.40	86.40	86.38	86.37	88.01	88.00	87.99	87.99
5906141	Manhole	2D	75.36	87.10	87.00	87.00	86.97	86.96	88.22	88.21	88.20	88.20
5906142	Manhole	2D	75.41	86.97	87.08	87.07	87.05	87.04	88.22	88.21	88.20	88.20
5906143	Manhole	2D	75.62	87.63	87.30	87.30	87.27	87.26	88.40	88.40	88.39	88.39
5906172	Manhole	2D	77.57	87.59	87.01	87.01	86.98	86.97	88.32	88.32	88.27	88.27
5906175	Manhole	2D	76.31	86.46	86.35	86.35	86.32	86.31	87.99	87.99	87.96	87.95
5906176	Manhole	2D	77.96	88.14	86.77	86.78	86.75	86.74	88.01	88.01	87.98	87.97
5906177	Manhole	2D	78.65	86.57	87.22	87.23	87.20	87.19	88.05	88.05	88.01	88.00
5906183	Manhole	2D	76.20	86.56	85.99	85.98	85.94	85.91	87.44	87.44	87.37	87.37
5906184	Manhole	2D	76.81	86.29	86.71	86.68	86.69	86.55	87.77	87.76	87.75	87.73
5906227	Manhole	2D	76.76	86.16	86.40	86.37	86.36	86.20	87.53	87.53	87.54	87.50
5906228	Manhole	2D	76.78	86.38	86.45	86.42	86.42	86.26	87.55	87.55	87.56	87.53
5906232	Manhole	2D	82.44	86.53	88.08	88.08	88.09	88.09	88.52	88.52	88.53	88.53
5906233	Manhole	2D	82.09	88.12	87.82	87.83	87.83	87.83	88.49	88.49	88.49	88.49
5906234	Manhole	2D	81.50	86.83	87.53	87.54	87.55	87.55	88.33	88.33	88.34	88.34
5906250	Manhole	2D	79.63	86.92	87.67	87.67	87.66	87.63	88.27	88.26	88.27	88.27
5906258	Manhole	2D	77.06	85.84	86.56	86.54	86.48	86.41	87.24	87.24	87.17	87.16
5906312	Manhole	2D	75.76	86.85	87.44	87.44	87.41	87.40	88.43	88.43	88.42	88.42
5906313	Manhole	2D	75.81	87.27	87.54	87.53	87.51	87.51	88.55	88.55	88.53	88.53
5906314	Manhole	2D	76.86	89.04	87.91	87.91	87.87	87.87	89.32	89.31	89.25	89.25
5906316	Manhole	2D	78.23	87.67	87.95	87.94	87.91	87.90	88.66	88.65	88.63	88.63
5906317	Manhole	2D	78.33	87.08	87.95	87.95	87.91	87.91	88.61	88.60	88.58	88.58
5906318	Manhole	Sealed	76.94	87.23	87.90	87.90	87.87	87.86	89.12	89.11	89.08	89.07
5906319	Manhole	2D	78.02	86.76	87.67	87.67	87.70	87.70	88.08	88.08	88.12	88.12
5906321	Manhole	2D	78.36	88.03	87.95	87.95	87.96	87.96	88.47	88.47	88.48	88.48
5906330	Manhole	2D	80.19	87.05	88.12	88.12	88.11	88.11	88.51	88.51	88.51	88.51
5906331	Manhole	2D	78.84	86.74	87.98	87.98	87.99	87.99	88.52	88.52	88.53	88.53
5906359	Manhole	2D	78.45	86.87	88.03	88.03	88.02	88.01	88.66	88.65	88.65	88.65

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
5906361	Manhole	2D	79.07	86.97	88.16	88.16	88.16	88.15	88.67	88.67	88.66	88.66
5906388	Manhole	2D	75.90	87.17	87.55	87.55	87.52	87.52	88.54	88.54	88.53	88.53
5906390	Manhole	2D	78.06	87.55	87.54	87.53	87.51	87.51	88.39	88.38	88.35	88.35
5906410	Manhole	2D	80.37	86.45	88.19	88.20	88.15	88.14	88.78	88.78	88.71	88.71
5906476	Manhole	2D	79.70	86.77	88.20	88.19	88.21	88.20	88.70	88.70	88.70	88.70
5906479	Manhole	2D	79.77	86.89	88.23	88.23	88.24	88.24	88.74	88.74	88.74	88.74
5906481	Manhole	2D	80.92	88.24	88.44	88.44	88.43	88.43	89.28	89.27	89.26	89.26
6029677	Manhole	2D	73.53	78.22	80.16	80.02	79.89	79.74	80.68	80.62	80.55	80.44
6029685	Manhole	2D	73.55	78.33	80.15	80.01	79.87	79.73	80.66	80.60	80.50	80.40
6029687	Manhole	2D	73.57	78.17	80.10	79.97	79.80	79.66	80.61	80.55	80.43	80.33
6029695	Manhole	2D	73.62	78.20	79.85	79.73	79.58	79.45	80.34	80.29	80.17	80.07
6029697	Manhole	2D	73.79	78.78	80.12	80.00	79.93	79.91	80.59	80.53	80.46	80.39
6029708	Manhole	2D	74.20	79.05	80.08	79.98	79.93	79.91	80.51	80.45	80.39	80.34
6029724	Manhole	2D	72.49	77.88	79.87	79.78	79.77	79.77	80.45	80.39	80.37	80.35
6029730	Manhole	2D	68.65	81.00	80.12	79.95	79.98	80.01	81.01	80.97	80.97	80.97
6029738	Manhole	2D	74.54	79.43	80.22	80.06	80.04	80.02	80.81	80.69	80.68	80.64
6029740	Manhole	2D	74.64	78.76	79.91	79.72	79.78	79.77	80.45	80.29	80.35	80.31
6029741	Manhole	2D	74.85	78.54	79.76	79.57	79.66	79.65	80.31	80.15	80.22	80.19
6029751	Manhole	2D	68.13	81.86	80.15	79.95	79.98	80.00	81.00	80.96	80.96	80.96
6029753	Manhole	2D	68.13	82.18	80.12	79.91	79.94	79.96	80.65	80.62	80.62	80.63
6029755	Manhole	2D	74.21	81.76	80.15	79.95	79.98	80.00	81.00	80.96	80.96	80.96
6029762	Manhole	2D	68.46	81.62	80.68	80.53	80.54	80.56	81.35	81.33	81.32	81.32
6029770	Manhole	2D	70.78	81.17	81.31	81.25	81.24	81.24	81.75	81.74	81.71	81.71
6029772	Manhole	Sealed	71.24	80.59	82.44	82.42	82.41	82.41	84.81	84.81	84.79	84.79
6029773	Manhole	2D	72.64	80.81	81.72	81.72	81.72	81.72	82.09	82.08	82.09	82.09
6029774	Manhole	2D	72.64	80.56	81.20	81.20	81.15	81.15	81.55	81.54	81.49	81.49
6029809	Manhole	2D	70.66	75.39	76.95	76.85	76.89	76.33	77.69	77.56	77.57	77.32
6029814	Manhole	2D	71.12	75.68	77.11	77.01	77.06	76.57	77.84	77.70	77.73	77.49
6029820	Manhole	2D	71.10	75.90	76.82	76.73	76.69	76.27	77.54	77.40	77.32	77.09
6029823	Manhole	2D	66.51	74.72	75.54	75.52	75.55	75.56	76.23	76.07	76.09	76.06
6052589	Manhole	2D	76.25	83.59	83.81	83.75	83.78	83.44	84.45	84.44	84.45	84.36
6052590	Manhole	2D	78.17	83.14	83.54	83.53	83.53	83.43	83.83	83.82	83.81	83.78
6052591	Manhole	2D	78.17	83.27	83.82	83.77	83.81	83.57	84.35	84.35	84.38	84.31
6052597	Manhole	2D	77.06	84.54	84.08	84.02	84.06	83.78	84.88	84.88	84.86	84.83
6052599	Manhole	2D	77.43	85.01	84.39	84.33	84.38	84.15	85.63	85.62	85.61	85.59
6052601	Manhole	2D	78.28	84.90	84.45	84.43	84.42	84.34	85.40	85.40	85.37	85.36
6052608	Manhole	2D	78.73	83.62	84.45	84.43	84.40	84.36	84.94	84.94	84.87	84.85
6052609	Manhole	2D	78.73	84.01	84.45	84.43	84.43	84.35	84.91	84.91	84.93	84.91
6052620	Manhole	2D	78.63	84.87	85.02	85.02	85.00	85.00	85.37	85.37	85.34	85.34
6052621	Manhole	2D	78.31	85.05	82.30	82.30	82.29	82.29	83.42	83.42	83.28	83.28
6052633	Outfall	Sealed	78.04	78.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6061092	Manhole	2D	78.36	88.31	87.06	87.08	87.04	87.04	87.90	87.90	87.88	87.88
6061094	Manhole	2D	85.04	87.27	87.06	87.08	87.04	87.04	87.62	87.62	87.61	87.61
6061230	Manhole	2D	74.55	88.11	89.03	89.03	88.96	88.96	89.16	89.16	89.09	89.09
6061231	Outfall	Sealed	88.76	88.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6061276	Manhole	2D	76.10	88.08	87.80	87.80	87.77	87.77	88.64	88.64	88.63	88.63
6061278	Manhole	2D	83.55	87.85	87.80	87.80	87.78	87.78	88.54	88.54	88.54	88.54
6061287	Manhole	2D	76.26	86.82	87.94	87.93	87.91	87.91	88.71	88.71	88.71	88.71
6061295	Manhole	2D	76.33	87.04	87.97	87.97	87.95	87.95	88.72	88.72	88.71	88.71
6061297	Manhole	2D	83.45	87.48	87.93	87.93	87.84	87.84	88.40	88.40	88.31	88.31
6061307	Manhole	2D	77.70	88.49	88.15	88.15	88.14	88.13	88.72	88.72	88.71	88.71
6061308	Manhole	2D	76.64	87.53	88.10	88.10	88.09	88.08	88.74	88.73	88.73	88.73
6061320	Manhole	2D	78.22	88.09	88.32	88.32	88.31	88.31	88.74	88.74	88.74	88.74
6061322	Manhole	2D	80.60	88.19	88.83	88.83	88.82	88.82	89.10	89.10	89.09	89.09
6061332	Manhole	2D	78.62	87.74	88.31	88.31	88.29	88.29	88.69	88.69	88.67	88.66
6061338	Manhole	2D	80.69	87.86	88.46	88.46	88.44	88.44	88.80	88.79	88.78	88.78
6061347	Manhole	2D	82.02	88.32	88.65	88.65	88.65	88.65	88.91	88.91	88.91	88.91
6061355	Manhole	2D	79.50	87.86	88.32	88.32	88.32	88.32	88.74	88.74	88.75	88.75
6061365	Manhole	2D	79.82	87.90	88.40	88.41	88.40	88.40	88.84	88.84	88.84	88.84
6061368	Manhole	2D	80.72	87.46	88.42	88.42	88.43	88.43	88.86	88.86	88.87	88.87
6061377	Manhole	2D	81.11	87.68	88.42	88.42	88.43	88.42	88.86	88.86	88.87	88.86
6061387	Manhole	2D	81.22	87.49	88.29	88.36	88.29	88.29	88.70	88.78	88.70	88.70
6061395	Manhole	2D	76.61	87.54	88.10	88.10	88.09	88.08	88.73	88.73	88.72	88.72
6061397	Manhole	2D	76.70	87.71	88.12	88.12	88.10	88.10	88.73	88.73	88.72	88.72
6061405	Manhole	2D	76.80	88.29	88.17	88.17	88.16	88.16	88.84	88.84	88.84	88.84
6061415	Manhole	2D	76.90	87.46	88.19	88.19	88.18	88.18	88.82	88.82	88.82	88.82

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
6061423	Manhole	2D	77.21	87.43	88.28	88.28	88.27	88.27	88.84	88.84	88.84	88.84
6061431	Manhole	2D	77.27	87.94	88.38	88.38	88.37	88.37	89.00	89.00	89.00	89.00
6061433	Manhole	2D	78.27	88.69	88.46	88.46	88.46	88.45	89.14	89.13	89.10	89.10
6061441	Manhole	2D	79.43	88.37	88.81	88.80	88.80	88.80	89.30	89.30	89.29	89.29
6061443	Manhole	2D	81.27	88.16	88.74	88.74	88.75	88.75	89.16	89.16	89.19	89.19
6061451	Manhole	2D	80.35	87.89	88.53	88.53	88.67	88.67	88.91	88.91	89.08	89.08
6061459	Manhole	2D	78.26	89.01	88.43	88.43	88.43	88.42	89.00	89.00	89.00	88.99
6061461	Manhole	2D	78.40	89.10	88.46	88.46	88.45	88.45	89.00	89.00	88.99	88.99
6061463	Manhole	Sealed	78.52	88.31	88.49	88.49	88.48	88.48	89.00	88.99	88.98	88.98
6061466	Manhole	2D	79.11	87.89	88.49	88.49	88.48	88.48	88.93	88.93	88.90	88.90
6061468	Manhole	Sealed	79.14	87.99	88.52	88.52	88.52	88.51	88.97	88.97	88.95	88.95
6061471	Manhole	2D	79.28	88.42	88.56	88.55	88.56	88.56	89.04	89.04	89.04	89.04
6061479	Manhole	2D	81.17	88.53	88.97	88.97	88.93	88.93	89.38	89.38	89.35	89.35
6061481	Manhole	2D	81.66	88.18	88.98	88.98	88.93	88.93	89.35	89.35	89.38	89.38
6061489	Manhole	2D	82.40	87.96	88.95	88.95	89.03	89.03	89.27	89.27	89.35	89.35
6061497	Manhole	2D	82.60	88.09	89.17	89.17	89.13	89.13	89.55	89.54	89.50	89.50
6061499	Manhole	2D	83.21	88.24	89.20	89.20	89.17	89.17	89.50	89.50	89.48	89.48
6062507	Manhole	2D	80.74	88.00	88.85	88.85	88.88	88.88	89.29	89.29	89.30	89.30
6062515	Manhole	2D	82.50	88.51	89.14	89.14	89.16	89.15	89.59	89.59	89.58	89.58
6062523	Manhole	2D	83.31	89.45	89.14	89.14	89.16	89.15	89.61	89.60	89.60	89.60
6062528	Manhole	2D	81.64	87.93	88.69	88.69	88.71	88.71	89.17	89.16	89.19	89.19
6062536	Manhole	2D	80.59	88.63	88.62	88.62	88.63	88.63	89.06	89.06	89.06	89.06
6062544	Manhole	2D	82.34	88.40	88.98	88.98	88.98	88.98	89.37	89.37	89.35	89.35
6062552	Manhole	2D	79.43	87.81	88.55	88.55	88.55	88.55	88.96	88.95	88.94	88.94
6062554	Manhole	2D	81.50	87.59	88.57	88.57	88.58	88.58	88.97	88.97	89.00	89.00
6062562	Manhole	2D	79.48	87.78	88.50	88.50	88.49	88.49	88.86	88.85	88.82	88.82
6062570	Manhole	2D	78.07	88.03	88.54	88.54	88.58	88.58	89.00	88.99	89.02	89.02
6062572	Manhole	2D	83.89	88.39	88.54	88.54	88.57	88.57	88.91	88.91	88.91	88.91
6062580	Manhole	2D	84.67	88.44	88.83	88.83	88.85	88.85	89.24	89.23	89.24	89.24
6062588	Manhole	2D	80.79	87.89	88.29	88.29	88.34	88.34	88.73	88.72	88.75	88.75
6062598	Manhole	2D	80.98	87.57	87.94	87.93	88.31	88.31	88.33	88.33	88.75	88.75
6073349	Manhole	2D	87.87	88.84	89.42	89.41	89.47	89.47	89.77	89.77	89.79	89.79
6073352	Manhole	2D	78.53	88.93	89.47	89.47	89.55	89.55	89.69	89.69	89.76	89.76
6073404	Outfall	Sealed	87.87	87.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6073416	Outfall	Sealed	87.53	87.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6073420	Manhole	2D	81.81	88.85	89.43	89.43	89.43	89.43	89.74	89.74	89.74	89.74
6073424	Manhole	2D	84.39	89.05	89.55	89.55	89.61	89.61	89.74	89.74	89.80	89.80
6073426	Manhole	2D	83.58	89.18	89.45	89.45	89.50	89.50	89.61	89.61	89.69	89.69
6073433	Manhole	2D	80.88	88.70	89.65	89.65	89.64	89.64	89.91	89.91	89.91	89.91
6073436	Manhole	2D	80.86	90.30	90.39	90.38	90.37	90.37	90.81	90.81	90.81	90.81
6073438	Manhole	2D	79.68	88.84	89.89	89.88	89.91	89.91	90.10	90.10	90.14	90.14
6073447	Manhole	2D	79.50	89.33	89.89	89.89	89.91	89.91	90.15	90.15	90.18	90.18
6073451	Manhole	2D	78.79	89.32	89.81	89.81	89.82	89.82	90.07	90.07	90.09	90.09
6073459	Manhole	2D	77.60	90.25	90.06	89.78	89.78	89.78	90.18	90.18	90.18	90.18
6073463	Manhole	2D	79.98	88.67	89.75	89.75	89.73	89.73	90.03	90.03	90.02	90.02
6073469	Manhole	2D	80.51	88.78	89.70	89.70	89.71	89.71	89.95	89.95	89.97	89.97
6073473	Manhole	2D	80.69	89.42	89.68	89.68	89.68	89.68	89.93	89.93	89.94	89.94
6073491	Manhole	2D	76.96	89.35	89.78	89.78	89.78	89.78	90.17	90.17	90.17	90.17
6075001	Manhole	2D	76.85	88.74	89.79	89.78	89.78	89.78	90.16	90.16	90.16	90.16
6075003	Manhole	2D	79.48	88.71	89.64	89.64	89.62	89.62	89.92	89.92	89.91	89.91
6075006	Manhole	Sealed	75.40	88.12	88.91	88.90	88.89	88.88	89.35	89.35	89.33	89.33
6075008	Manhole	2D	81.64	88.04	88.83	88.83	88.83	88.82	89.24	89.24	89.24	89.24
6075011	Manhole	2D	78.41	88.87	89.21	89.21	89.19	89.19	89.68	89.68	89.68	89.68
6075013	Manhole	2D	80.43	88.86	89.21	89.20	89.20	89.19	89.65	89.65	89.67	89.67
6075016	Manhole	2D	78.57	87.42	88.94	88.93	88.84	88.84	89.35	89.35	89.26	89.26
6075019	Manhole	2D	78.27	88.32	88.94	88.94	88.89	88.89	89.39	89.39	89.35	89.35
6075021	Manhole	2D	81.78	88.29	88.91	88.90	88.87	88.86	89.46	89.46	89.43	89.43
6075024	Manhole	2D	80.94	88.34	88.92	88.91	88.79	88.79	89.36	89.36	89.31	89.31
6075027	Manhole	Sealed	75.17	88.52	88.87	88.86	88.86	88.85	89.31	89.31	89.30	89.30
6075033	Manhole	Sealed	75.27	88.90	88.88	88.87	88.87	88.86	89.32	89.32	89.31	89.31
6075039	Manhole	2D	81.28	87.61	88.84	88.83	88.83	88.83	89.26	89.25	89.25	89.25
6075045	Manhole	2D	77.18	88.08	89.01	89.00	88.99	88.98	89.48	89.48	89.48	89.48
6075065	Manhole	2D	79.48	88.42	89.20	89.19	89.18	89.17	89.62	89.62	89.63	89.62
6075083	Manhole	2D	78.08	88.34	88.94	88.94	88.90	88.90	89.40	89.39	89.37	89.36
6075085	Manhole	2D	78.34	87.48	88.90	88.89	88.86	88.85	89.35	89.35	89.32	89.32
6075095	Manhole	Sealed	79.11	87.64	88.90	88.90	88.77	88.76	89.30	89.30	89.16	89.16

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6075097	Manhole	2D	78.58	87.41	88.91	88.90	88.77	88.77	89.31	89.31	89.17	89.17
6075103	Manhole	2D	79.93	88.35	88.88	88.87	88.75	88.74	89.25	89.25	89.13	89.13
6075107	Manhole	2D	79.85	88.14	88.88	88.88	88.75	88.75	89.27	89.27	89.14	89.13
6075111	Manhole	2D	80.01	88.46	88.90	88.90	88.78	88.78	89.32	89.31	89.23	89.23
6075121	Manhole	2D	80.41	88.56	88.92	88.91	88.79	88.79	89.36	89.36	89.31	89.31
6075123	Manhole	2D	80.55	88.56	88.92	88.91	88.79	88.79	89.36	89.36	89.31	89.31
6075125	Manhole	2D	80.40	88.58	88.91	88.90	88.78	88.78	89.34	89.34	89.28	89.28
6075451	Manhole	2D	76.79	88.44	89.79	89.79	89.79	89.78	90.17	90.17	90.17	90.17
6075459	Manhole	2D	76.62	88.28	89.78	89.78	89.78	89.78	90.19	90.19	90.19	90.19
6075463	Manhole	2D	76.53	88.35	90.06	90.05	90.05	90.05	90.79	90.79	90.79	90.79
6075465	Manhole	2D	76.56	87.77	89.78	89.78	89.79	89.79	90.21	90.21	90.22	90.22
6076543	Manhole	2D	78.53	88.74	89.34	89.34	89.30	89.30	89.56	89.56	89.52	89.52
6076557	Manhole	2D	77.48	87.76	88.91	88.90	88.89	88.88	89.35	89.35	89.33	89.33
6076597	Manhole	2D	78.43	87.85	88.95	88.94	88.88	88.88	89.38	89.37	89.32	89.32
6076632	Manhole	2D	73.18	87.94	88.68	88.68	88.66	88.66	88.79	88.79	88.76	88.76
6076635	Outfall	Sealed	88.18	88.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6198704	Manhole	2D	74.06	87.38	84.39	84.39	84.36	84.35	87.08	87.08	87.06	87.06
6198706	Manhole	2D	73.74	87.85	84.08	84.08	84.05	84.04	86.94	86.94	86.92	86.92
6198708	Manhole	2D	72.84	87.32	83.37	83.37	83.34	83.33	86.61	86.61	86.59	86.59
6198711	Manhole	2D	72.54	87.31	83.02	83.02	82.99	82.98	86.46	86.46	86.44	86.44
6198730	Manhole	2D	71.54	85.59	82.01	82.01	81.97	81.96	85.77	85.76	85.74	85.75
6198761	Manhole	2D	70.56	84.90	80.96	80.96	80.92	80.91	85.04	85.03	85.00	85.01
6198771	Manhole	2D	70.14	85.00	80.43	80.43	80.39	80.38	84.67	84.65	84.62	84.62
6198780	Manhole	2D	69.83	85.27	79.94	79.94	79.90	79.89	84.31	84.29	84.26	84.26
6198784	Manhole	2D	69.66	85.11	79.64	79.64	79.60	79.59	84.12	84.10	84.06	84.06
6198788	Manhole	2D	69.34	84.18	79.20	79.20	79.16	79.15	83.81	83.78	83.74	83.75
6198792	Manhole	2D	68.69	82.41	78.34	78.34	78.30	78.29	83.15	83.12	83.06	83.07
6198793	Manhole	2D	77.44	82.60	78.55	78.55	78.55	78.55	82.99	82.97	83.08	83.09
6198800	Manhole	2D	67.20	80.75	78.14	77.26	77.22	77.32	81.76	81.74	81.72	81.73
6198804	Manhole	Sealed	66.92	80.44	78.12	77.24	77.21	77.30	81.63	81.62	81.59	81.61
6198806	Manhole	Sealed	75.21	79.88	78.13	77.24	77.21	77.31	81.48	81.46	81.42	81.43
6198808	Manhole	2D	75.30	80.39	78.12	77.24	77.21	77.30	81.33	81.32	81.31	81.32
6198813	Manhole	Sealed	75.24	80.50	78.13	77.24	77.21	77.31	81.37	81.35	81.31	81.32
6198814	Manhole	Sealed	75.24	80.37	78.13	77.24	77.21	77.31	81.47	81.45	81.41	81.42
6198824	Manhole	2D	66.64	80.47	78.11	77.23	77.19	77.29	81.56	81.55	81.53	81.54
6198825	Manhole	Sealed	75.60	80.62	78.12	77.24	77.21	77.30	81.34	81.32	81.32	81.33
6198826	Manhole	Sealed	75.60	81.04	78.12	77.24	77.21	77.30	81.36	81.34	81.33	81.34
6198834	Manhole	2D	66.31	80.77	78.09	77.21	77.17	77.26	81.49	81.47	81.44	81.46
6198836	Manhole	Sealed	66.21	80.33	78.08	77.19	77.16	77.25	81.42	81.40	81.38	81.39
6198837	Manhole	Sealed	74.94	81.41	78.09	77.21	77.17	77.26	81.46	81.43	81.40	81.41
6198838	Manhole	Sealed	75.50	80.80	78.08	77.19	77.16	77.25	81.42	81.40	81.37	81.39
6198839	Manhole	Sealed	75.50	80.87	78.08	77.19	77.16	77.25	81.42	81.40	81.38	81.40
6198853	Manhole	2D	65.93	80.91	78.06	77.18	77.15	77.23	81.33	81.31	81.28	81.30
6198854	Manhole	Sealed	76.84	81.21	78.06	77.18	77.15	77.23	81.33	81.31	81.28	81.30
6198858	Manhole	2D	64.42	81.22	78.02	77.13	77.10	77.18	80.97	80.96	80.93	80.95
6198859	Manhole	Sealed	76.64	81.22	78.02	77.14	77.10	77.19	80.97	80.96	80.93	80.95
6198860	Manhole	Sealed	76.64	81.92	78.02	77.17	77.18	77.19	80.98	80.97	80.94	80.96
6198869	Manhole	2D	74.18	80.52	80.16	80.16	79.68	79.68	81.64	81.63	81.59	81.61
6198872	Manhole	2D	75.73	80.60	80.81	80.81	80.75	80.75	81.68	81.67	81.60	81.61
6198873	Manhole	Sealed	75.46	80.61	80.16	80.16	79.68	79.68	81.60	81.59	81.56	81.57
6198874	Manhole	Sealed	75.46	81.13	80.16	80.16	79.68	79.68	81.57	81.56	81.52	81.54
6198884	Manhole	2D	75.88	80.89	81.04	81.04	81.05	81.05	81.76	81.75	81.72	81.74
6198885	Manhole	Sealed	75.76	80.92	80.98	80.98	80.98	80.98	81.62	81.61	81.56	81.57
6198886	Manhole	Sealed	75.84	81.53	81.05	81.05	81.05	81.05	81.78	81.76	81.74	81.76
6198892	Manhole	2D	76.15	81.09	81.18	81.18	81.17	81.17	81.76	81.75	81.72	81.74
6198894	Manhole	Sealed	76.22	80.74	81.03	81.03	81.03	81.03	81.65	81.65	81.60	81.61
7204174	Manhole	2D	67.04	81.98	83.46	83.39	83.35	83.34	84.52	84.51	84.39	84.39
31467671	Manhole	2D	76.37	78.03	79.83	79.50	79.65	79.49	80.35	80.30	80.22	80.18
31467671	Manhole	2D	76.37	78.03	79.83	79.50	79.65	79.49	80.35	80.30	80.22	80.18
31467672	Manhole	2D	76.37	78.02	79.91	79.60	79.76	79.67	80.45	80.39	80.30	80.25
31467672	Manhole	2D	76.37	78.02	79.91	79.60	79.76	79.67	80.45	80.39	80.30	80.25
31467673	Manhole	2D	76.40	77.94	79.79	79.49	79.58	79.53	80.34	80.28	80.11	80.09
31467673	Manhole	2D	76.40	77.94	79.79	79.49	79.58	79.53	80.34	80.28	80.11	80.09
10008!_2D	Manhole	2D	78.14	78.17	78.55	78.59	78.54	78.54	78.82	78.74	78.69	78.69
10008!_2D	Manhole	2D	78.14	78.17	78.55	78.59	78.54	78.54	78.82	78.74	78.69	78.69
10009!_2D	Manhole	2D	76.94	76.97	77.86	77.83	77.89	77.91	78.65	78.56	78.66	78.50

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
10010!_2D	Manhole	2D	77.00	77.04	77.48	77.45	77.28	77.29	78.31	78.21	77.60	77.59
10032!_2D	Manhole	2D	80.62	80.65	80.83	80.83	80.81	80.81	81.68	81.67	81.62	81.63
10055!_2D	Manhole	2D	77.15	77.18	77.22	77.22	77.22	77.22	77.48	77.40	77.43	77.34
10055!_2D	Manhole	2D	77.15	77.18	77.22	77.22	77.22	77.22	77.48	77.40	77.43	77.34
10056!_2D	Manhole	2D	77.10	77.13	77.27	77.27	77.27	77.27	78.03	77.78	77.74	77.60
10056!_2D	Manhole	2D	77.10	77.13	77.27	77.27	77.27	77.27	78.03	77.78	77.74	77.60
10059!_2D	Manhole	2D	77.86	77.89	78.18	78.22	78.19	78.19	78.60	78.53	78.49	78.50
-1018_Outfall	Outfall	Stored	66.99	67.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-1018_Outfall	Outfall	Stored	66.99	67.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-1027_Outfall	Outfall	Stored	80.99	81.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20053!_2D	Manhole	2D	78.45	78.48	78.48	78.48	78.48	78.48	78.48	78.48	78.48	78.48
20103!_2D	Manhole	2D	79.36	79.39	79.65	79.39	79.39	79.39	80.58	80.40	80.26	80.51
20104!_2D	Manhole	2D	79.33	79.36	79.36	79.36	79.36	79.36	79.57	79.51	79.36	79.41
20105!_2D	Manhole	2D	79.59	79.62	79.77	79.73	79.71	79.72	80.00	79.98	79.93	79.95
20106!_2D	Manhole	2D	79.19	79.23	79.30	79.26	79.25	79.26	79.62	79.58	79.50	79.53
20107!_2D	Manhole	2D	78.81	78.84	79.68	79.64	79.64	79.64	80.13	80.12	80.10	80.11
20108!_2D	Manhole	2D	78.91	78.94	79.47	79.41	79.38	79.39	79.82	79.79	79.73	79.75
20109!_2D	Manhole	2D	79.25	79.28	79.65	79.61	79.59	79.60	79.95	79.93	79.89	79.90
20110!_2D	Manhole	2D	79.16	79.19	79.46	79.42	79.39	79.40	79.78	79.76	79.71	79.73
20111!_2D	Manhole	2D	78.69	78.72	79.30	79.23	79.18	79.20	79.63	79.61	79.56	79.58
20112!_2D	Manhole	2D	79.09	79.13	79.41	79.36	79.32	79.34	79.73	79.71	79.67	79.68
20112!_2D	Manhole	2D	79.09	79.13	79.41	79.36	79.32	79.34	79.73	79.71	79.67	79.68
20113!_2D	Manhole	2D	78.94	78.98	79.84	79.82	79.81	79.81	80.27	80.25	80.22	80.23
20114!_2D	Manhole	2D	79.15	79.18	79.66	79.62	79.59	79.60	79.94	79.92	79.89	79.90
20115!_2D	Manhole	2D	78.80	78.83	79.35	79.31	79.29	79.30	79.63	79.61	79.58	79.59
20119!_2D	Manhole	2D	77.90	77.93	77.93	77.93	77.93	77.93	77.93	77.93	77.93	77.93
20120!_2D	Manhole	2D	78.16	78.20	78.20	78.20	78.20	78.20	78.20	78.20	78.20	78.20
20121!_2D	Manhole	2D	77.93	77.96	78.50	78.50	78.50	78.50	78.73	78.73	78.72	78.72
20122!_2D	Manhole	2D	78.40	78.44	78.44	78.44	78.44	78.44	78.44	78.44	78.44	78.44
20123!_2D	Manhole	2D	78.75	78.78	78.78	78.78	78.78	78.78	78.78	78.78	78.78	78.78
20124!_2D	Manhole	2D	77.06	77.09	77.09	77.09	77.09	77.09	77.13	77.09	77.09	77.09
20125!_2D	Manhole	2D	79.08	79.12	79.12	79.12	79.12	79.12	79.12	79.12	79.12	79.12
20126!_2D	Manhole	2D	79.28	79.31	79.31	79.31	79.31	79.31	79.58	79.55	79.44	79.50
20127!_2D	Manhole	2D	78.88	78.91	79.14	79.16	79.14	79.14	79.21	79.22	79.21	79.21
20128!_2D	Manhole	2D	78.60	78.63	79.46	79.35	79.46	79.46	79.68	79.55	79.66	79.66
20129!_2D	Manhole	2D	78.61	78.64	78.64	78.64	78.64	78.64	79.47	79.43	79.31	79.35
20142-1	Manhole	2D	75.54	77.70	79.41	79.23	79.10	76.99	79.88	79.82	79.78	79.50
4165583!_2D	Manhole	2D	77.86	77.89	78.11	78.07	78.03	78.03	78.76	78.71	78.67	78.68
4165604!_2D	Manhole	2D	77.91	77.95	78.05	78.05	78.05	78.05	78.09	78.09	78.09	78.09
4165605!_2D	Manhole	2D	78.52	78.56	78.75	78.75	78.75	78.75	79.06	78.96	78.88	78.92
4165607!_2D	Manhole	2D	77.94	77.98	78.03	78.03	78.03	78.03	78.31	78.24	78.20	78.22
4165610!_2D	Manhole	2D	77.96	78.00	78.10	78.08	78.07	78.07	78.71	78.64	78.62	78.63
5000!_2D	Manhole	2D	77.28	77.32	77.40	77.38	77.38	77.39	78.07	77.90	77.82	77.66
5788-1	Manhole	2D	73.70	78.85	79.67	78.69	78.67	78.75	79.84	79.72	80.13	80.14
5788-1	Manhole	2D	73.70	78.85	79.67	78.69	78.67	78.75	79.84	79.72	80.13	80.14
5788-2	Manhole	2D	73.70	78.49	79.41	78.69	N.M.*	N.M.*	79.73	79.64	N.M.*	N.M.*
5788-3	Manhole	2D	73.70	78.96	79.81	78.69	N.M.*	N.M.*	79.84	79.73	N.M.*	N.M.*
5897-1	Outfall	Stored	73.01	71.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5897-1	Outfall	Stored	73.01	71.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6198813!_2D	Manhole	2D	80.04	80.08	80.18	80.18	80.18	80.18	80.93	80.92	80.86	80.87
6198814!_2D	Manhole	2D	79.92	79.95	80.51	80.51	80.48	80.48	81.43	81.41	81.36	81.37
6198825!_2D	Manhole	2D	80.17	80.20	80.49	80.49	80.50	80.50	81.39	81.38	81.37	81.38
6198826!_2D	Manhole	2D	80.59	80.62	80.69	80.69	80.69	80.69	81.55	81.54	81.52	81.53
6198837!_2D	Manhole	2D	80.55	80.58	80.70	80.70	80.70	80.70	81.25	81.24	81.23	81.24
6198838!_2D	Manhole	2D	80.34	80.38	80.63	80.63	80.57	80.57	81.40	81.39	81.31	81.33
6198839!_2D	Manhole	2D	80.42	80.45	80.63	80.63	80.69	80.69	81.40	81.38	81.41	81.43
6198854!_2D	Manhole	2D	81.17	81.21	81.26	81.26	81.26	81.26	81.29	81.29	81.29	81.29
6198859!_2D	Manhole	2D	81.19	81.22	81.43	81.43	81.43	81.43	81.53	81.53	81.53	81.53
6198860!_2D	Manhole	2D	81.89	81.92	82.26	82.26	82.27	82.27	82.35	82.35	82.36	82.36
6198873!_2D	Manhole	2D	80.16	80.19	80.45	80.45	80.41	80.41	81.43	81.42	81.39	81.40
6198874!_2D	Manhole	2D	80.68	80.71	80.83	80.83	80.83	80.83	81.32	81.31	81.27	81.28
6198885!_2D	Manhole	2D	80.47	80.50	80.75	80.75	80.71	80.71	81.08	81.07	80.94	80.96
6198886!_2D	Manhole	2D	81.08	81.11	81.31	81.31	81.29	81.29	81.90	81.89	81.89	81.91
6198894!_2D	Manhole	2D	80.71	80.74	80.85	80.85	80.85	80.85	81.51	81.50	81.45	81.46
A10	Manhole	2D	70.47	73.82	74.22	74.20	74.22	74.23	74.71	74.68	74.69	74.69
A11	Manhole	2D	70.21	74.23	74.35	74.34	74.35	74.36	74.86	74.84	74.84	74.85

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
A13	Manhole	2D	65.50	74.07	74.49	74.48	74.51	74.51	74.92	74.90	74.93	74.94
A15	Manhole	2D	65.50	74.84	74.84	74.83	74.85	74.85	75.21	75.20	75.18	75.18
A17	Manhole	2D	66.10	73.29	73.86	73.85	73.80	73.81	74.27	74.26	74.21	74.21
A18	Manhole	2D	66.10	72.18	73.30	73.29	73.33	73.34	73.70	73.66	73.70	73.71
A2	Manhole	2D	69.63	73.80	74.78	74.74	74.83	74.84	75.44	75.41	75.48	75.48
A20	Manhole	2D	70.73	74.23	74.55	74.55	74.57	74.57	75.26	75.24	75.23	75.23
A21	Manhole	2D	71.03	73.87	74.85	74.86	74.88	74.88	75.36	75.35	75.36	75.36
A22	Manhole	2D	71.24	74.54	75.21	75.20	75.19	75.19	75.49	75.49	75.48	75.48
A25	Manhole	2D	73.35	74.60	75.35	75.35	75.31	75.31	75.62	75.62	75.58	75.58
A26	Manhole	2D	74.28	75.05	75.30	75.30	75.28	75.28	75.38	75.38	75.38	75.38
A28	Manhole	2D	76.03	77.17	78.19	78.19	78.17	78.17	78.34	78.34	78.31	78.31
A29	Manhole	2D	75.73	77.91	78.30	78.30	78.31	78.31	78.51	78.51	78.50	78.50
A3	Manhole	2D	69.53	72.58	73.38	73.35	73.36	73.36	73.57	73.54	73.53	73.53
A31	Manhole	2D	73.75	79.12	79.18	79.18	79.18	79.18	79.40	79.40	79.40	79.40
A32	Manhole	2D	72.36	78.34	79.13	79.13	79.13	79.13	79.37	79.37	79.38	79.38
A34	Manhole	2D	73.86	78.80	78.97	78.97	78.98	78.98	79.03	79.03	79.03	79.03
A35	Manhole	2D	73.77	78.78	79.17	79.17	79.18	79.18	79.47	79.47	79.46	79.46
A41	Manhole	2D	68.29	72.08	73.91	73.91	73.81	73.81	74.35	74.34	74.25	74.25
A42	Manhole	2D	72.14	75.61	75.75	75.75	75.74	75.74	76.05	76.05	75.99	75.99
A43	Manhole	2D	70.06	74.32	75.57	75.57	75.57	75.57	75.81	75.81	75.77	75.77
A46	Manhole	2D	71.50	77.32	77.68	77.68	77.71	77.71	78.07	78.07	78.09	78.09
A47	Manhole	2D	71.48	76.89	78.01	78.01	77.97	77.97	78.50	78.50	78.43	78.43
A48	Manhole	2D	73.30	75.67	76.81	76.81	76.79	76.79	76.87	76.87	76.85	76.85
A5	Manhole	2D	70.09	73.79	74.01	74.00	74.05	74.05	74.51	74.47	74.55	74.55
A6	Manhole	2D	70.40	73.29	73.87	73.85	73.90	73.90	74.40	74.37	74.38	74.39
A8	Manhole	2D	68.60	72.94	73.60	73.59	73.60	73.60	73.87	73.86	73.87	73.87
A9	Manhole	2D	70.24	72.54	73.08	73.08	73.06	73.06	73.26	73.26	73.23	73.24
AM1	Manhole	Sealed	61.18	74.15	73.45	73.38	73.44	73.46	73.95	73.77	73.85	73.87
AM12	Manhole	Sealed	63.30	73.04	74.20	74.18	74.20	74.21	74.63	74.60	74.61	74.62
AM14	Manhole	Sealed	65.34	73.49	74.51	74.50	74.52	74.53	74.93	74.91	74.93	74.94
AM16	Manhole	Sealed	65.95	72.15	73.78	73.77	73.74	73.75	74.19	74.17	74.14	74.15
AM19	Manhole	2D	64.21	74.18	74.55	74.55	74.56	74.57	74.97	74.94	74.98	74.98
AM23	Manhole	2D	66.96	74.93	75.17	75.17	75.16	75.16	75.46	75.46	75.46	75.46
AM24	Manhole	2D	66.96	76.38	75.35	75.35	75.32	75.32	75.63	75.63	75.60	75.60
AM27	Manhole	2D	70.10	78.76	78.22	78.22	78.22	78.22	78.49	78.49	78.49	78.49
AM30	Manhole	2D	70.10	79.67	79.10	79.10	79.10	79.10	79.43	79.43	79.43	79.43
AM33	Manhole	Sealed	70.16	77.36	79.13	79.13	79.13	79.13	79.39	79.39	79.39	79.39
AM36	Manhole	Sealed	71.10	78.88	79.12	79.12	79.13	79.13	79.36	79.36	79.36	79.36
AM37	Manhole	2D	66.95	73.61	74.67	74.66	74.58	74.59	75.11	75.10	75.01	75.02
AM38	Manhole	2D	64.82	73.22	74.73	74.73	74.73	74.74	75.19	75.18	75.19	75.19
AM39	Manhole	2D	65.73	73.86	74.95	74.94	74.98	74.99	75.40	75.39	75.45	75.45
AM4	Manhole	Sealed	61.62	73.25	73.65	73.60	73.65	73.66	74.11	74.00	74.05	74.07
AM40	Manhole	2D	67.73	73.59	74.86	74.85	74.85	74.86	75.31	75.30	75.31	75.31
AM44	Manhole	2D	65.73	76.84	75.73	75.73	75.72	75.72	76.07	76.07	75.99	75.99
AM45	Manhole	2D	66.85	76.95	77.32	77.32	77.31	77.31	77.62	77.62	77.58	77.58
AM49	Manhole	2D	67.11	76.76	77.08	77.08	77.08	77.08	77.24	77.24	77.23	77.23
AM50	Manhole	2D	67.95	77.06	77.08	77.08	77.08	77.08	77.14	77.14	77.13	77.13
AM7	Manhole	Sealed	61.99	74.19	73.70	73.66	73.70	73.71	74.14	74.05	74.09	74.10
B01	Manhole	Sealed	70.51	79.83	79.51	78.62	78.57	78.64	80.26	80.11	80.11	80.12
B03	Manhole	Sealed	73.82	77.53	79.53	78.63	78.57	78.64	80.51	80.32	80.11	80.12
B03_2D	Manhole	2D	80.56	80.66	80.96	80.96	80.76	80.76	82.99	82.66	80.80	80.80
B04	Manhole	Sealed	71.00	81.13	79.52	78.67	78.59	78.69	80.25	80.11	80.11	80.12
B05	Manhole	Sealed	74.00	78.57	79.57	78.71	78.62	78.72	80.39	80.25	80.17	80.19
B05_2D	Manhole	2D	80.54	80.91	81.00	81.00	80.96	80.96	81.28	81.28	81.01	81.01
B06	Manhole	Sealed	74.13	79.02	79.57	78.75	78.65	78.74	80.34	80.21	80.16	80.17
B06_2D	Manhole	2D	79.78	79.88	80.52	80.52	80.37	80.37	82.04	81.61	80.66	80.66
B07	Manhole	Sealed	71.09	80.33	79.51	78.70	78.61	78.70	80.25	80.11	80.12	80.13
B08	Manhole	Sealed	73.69	78.47	79.55	78.73	78.65	78.74	80.29	80.15	80.16	80.17
B08_2D	Manhole	2D	79.78	80.54	80.75	80.75	80.84	80.84	81.00	80.98	81.06	81.07
B10	Manhole	Sealed	71.67	80.35	79.50	78.72	78.64	78.72	80.24	80.10	80.12	80.13
B12	Manhole	Sealed	74.55	77.56	79.13	78.53	78.40	78.43	79.86	79.65	79.59	79.59
B12_2D	Manhole	2D	76.52	77.56	79.07	78.47	78.28	78.31	79.82	79.59	79.38	79.37
B13	Manhole	Sealed	71.95	80.71	79.52	78.81	N.M.*	N.M.*	80.21	80.07	N.M.*	N.M.*
B14	Manhole	Sealed	71.93	80.74	79.50	78.80	78.68	78.75	80.21	80.08	80.13	80.15
B15	Manhole	Sealed	73.19	79.28	79.70	78.95	78.99	79.08	80.53	80.45	81.10	81.10
B15_2D	Manhole	2D	75.16	80.32	79.81	79.06	79.16	79.27	80.71	80.66	81.66	81.66

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
B18	Manhole	Sealed	72.00	80.10	79.87	79.26	N.M.*	N.M.*	80.61	80.48	N.M.*	N.M.*
B19	Manhole	Sealed	73.14	77.42	79.98	79.49	79.12	79.15	80.48	80.51	80.54	80.51
B19_2D	Manhole	2D	75.11	79.64	79.95	79.49	79.13	79.16	80.39	80.46	80.48	80.46
B20	Manhole	Sealed	72.06	79.27	79.99	79.38	78.98	79.07	80.73	80.60	80.64	80.67
B20_2D	Manhole	2D	78.57	79.94	80.00	79.46	79.34	79.32	80.69	80.59	81.28	81.25
B22	Manhole	Sealed	72.09	80.07	80.08	79.49	79.11	79.15	80.86	80.74	80.78	80.78
B24	Manhole	Sealed	72.16	80.26	80.27	79.65	79.32	79.28	81.14	81.02	81.06	81.00
B26	Manhole	Sealed	76.01	79.43	80.41	79.87	79.59	79.46	81.30	81.18	81.22	81.11
B26_2D	Manhole	2D	79.24	79.46	79.67	79.62	79.55	79.55	79.84	79.80	79.79	79.75
B27	Manhole	Sealed	72.18	79.62	80.49	79.90	79.59	79.46	81.46	81.33	81.38	81.25
B29	Manhole	Sealed	72.25	79.19	80.67	80.10	79.82	79.60	81.74	81.59	81.64	81.46
B30	Manhole	Sealed	74.25	80.16	80.87	80.32	80.12	79.78	82.04	81.88	81.98	81.68
B30_2D	Manhole	2D	78.63	79.56	80.31	80.13	80.58	80.42	80.87	80.83	81.30	81.18
B31	Manhole	Sealed	73.14	78.98	80.88	80.32	80.07	79.73	82.06	81.90	81.95	81.65
B31_2D	Manhole	2D	78.63	79.23	80.24	80.09	79.95	79.77	80.76	80.69	80.63	80.51
B32	Manhole	Sealed	72.04	80.18	80.92	80.34	80.08	79.73	82.15	81.98	82.04	81.73
B35	Manhole	Sealed	76.99	80.23	82.07	81.83	80.67	80.37	83.27	83.12	82.46	82.26
B35_2D	Manhole	2D	81.18	81.53	82.57	82.45	82.17	82.17	83.60	83.54	82.68	82.63
B36	Manhole	Sealed	72.44	84.28	81.47	80.81	80.53	79.93	83.05	82.82	82.90	82.29
B38	Manhole	Sealed	72.60	85.44	81.83	81.23	80.98	80.62	83.59	83.37	83.39	82.85
B39	Manhole	Sealed	74.00	84.49	81.88	81.34	81.10	80.87	83.77	83.56	83.51	82.95
B39_2D	Manhole	2D	82.97	84.51	84.98	84.98	84.81	84.81	85.35	85.34	85.11	85.12
B41	Manhole	Sealed	72.62	85.52	81.91	81.33	81.13	80.91	83.69	83.48	83.49	82.97
B45	Manhole	Sealed	72.64	84.74	82.83	82.44	82.28	82.11	84.36	84.16	84.04	83.79
B46	Manhole	Sealed	75.58	85.07	82.83	82.44	82.28	82.11	84.41	84.20	84.07	83.81
B46_2D	Manhole	2D	84.77	84.87	85.00	85.00	84.92	84.92	85.60	85.59	85.31	85.29
B47	Manhole	Sealed	72.69	84.98	83.08	82.72	82.57	82.41	84.56	84.37	84.27	84.04
B48	Manhole	Sealed	72.70	85.08	83.54	83.25	83.11	82.97	84.93	84.78	84.70	84.52
B49	Manhole	Sealed	76.03	85.22	83.98	83.73	83.61	83.49	85.31	85.23	85.17	85.08
B50	Manhole	Sealed	79.94	84.21	84.11	83.86	83.70	83.58	85.54	85.48	85.38	85.32
B50_2D	Manhole	2D	84.57	84.67	85.02	85.02	85.02	85.02	85.85	85.83	85.67	85.64
BB-END	Outfall	Sealed	0.00	72.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BM10	Manhole	Sealed	63.03	74.81	73.97	73.67	73.80	73.87	74.72	74.34	74.39	74.52
BM13	Manhole	Sealed	62.69	75.31	73.91	73.55	73.73	73.82	74.72	74.35	74.41	74.53
BM14	Manhole	Sealed	62.65	75.47	74.51	74.27	74.42	74.47	75.23	75.06	75.09	75.17
BM2	Manhole	Sealed	65.64	75.20	74.35	74.33	74.31	74.32	74.67	74.62	74.61	74.62
BM20	Manhole	Sealed	62.92	74.94	75.01	74.93	74.99	75.01	75.57	75.50	75.51	75.54
BM24	Manhole	Sealed	63.17	74.33	75.11	75.04	75.08	75.10	75.63	75.58	75.60	75.61
BM25	Manhole	Sealed	64.63	74.35	75.27	75.22	75.25	75.26	75.82	75.78	75.81	75.81
BM29	Manhole	Sealed	67.85	74.20	75.41	75.35	75.40	75.42	76.48	76.45	76.47	76.48
BM30	Manhole	Sealed	64.99	74.50	75.33	75.28	75.31	75.33	76.19	76.16	76.18	76.18
BM33	Manhole	Sealed	66.24	76.06	75.53	75.49	75.52	75.54	76.26	76.23	76.25	76.26
BM34	Manhole	Sealed	66.62	75.84	75.94	75.94	75.95	75.95	76.39	76.38	76.40	76.40
BM38	Manhole	Sealed	67.45	76.74	76.11	76.11	76.12	76.12	76.48	76.47	76.48	76.48
BM4	Manhole	Sealed	65.39	73.56	74.30	74.28	74.26	74.27	74.68	74.61	74.60	74.61
BM40	Manhole	Sealed	66.13	74.29	75.46	75.40	75.45	75.47	76.64	76.61	76.63	76.64
BM7	Manhole	2D	64.82	73.70	74.29	74.24	74.22	74.24	74.69	74.61	74.60	74.61
C003	Manhole	Sealed	71.05	81.05	79.87	79.20	79.20	79.40	80.50	80.40	80.38	80.46
C004	Manhole	Sealed	71.06	81.62	80.32	79.91	79.91	80.27	80.90	80.78	80.72	80.91
C005	Manhole	Sealed	71.42	80.37	80.33	79.92	79.92	80.27	80.93	80.80	80.75	80.93
C006	Manhole	Sealed	72.39	80.13	80.24	79.85	79.87	80.15	80.89	80.67	80.74	80.80
C006_2D	Manhole	2D	74.51	80.21	80.29	79.86	79.88	80.16	80.91	80.67	80.78	80.81
C007	Manhole	Sealed	71.07	81.19	80.38	79.99	79.98	80.30	80.94	80.83	80.77	80.94
C008	Manhole	Sealed	72.50	80.29	80.23	79.48	79.53	79.80	80.61	80.69	80.51	80.55
C008_2D	Manhole	2D	74.66	80.21	80.23	79.49	79.53	79.80	80.58	80.69	80.48	80.50
C009	Manhole	Sealed	72.76	79.58	80.14	79.76	79.77	79.89	80.68	80.55	80.53	80.56
C009_2D	Manhole	2D	74.73	79.23	80.10	79.77	79.77	79.87	80.61	80.50	80.46	80.47
C010	Manhole	Sealed	71.08	80.33	80.43	80.07	80.05	80.33	80.98	80.88	80.83	80.97
C011	Manhole	Sealed	72.57	78.89	80.98	80.67	80.62	80.70	81.47	81.42	81.32	81.33
C011_2D	Manhole	2D	79.92	80.02	81.21	80.94	80.90	80.97	81.71	81.65	81.58	81.58
C012	Manhole	Sealed	71.08	79.86	80.47	80.11	80.09	80.35	81.00	80.92	80.86	80.99
C013	Manhole	Sealed	76.49	79.33	80.98	80.69	80.64	80.71	81.47	81.42	81.32	81.33
C013_2D	Manhole	2D	79.54	79.64	81.00	80.73	80.67	80.74	81.50	81.44	81.34	81.34
C014	Manhole	Sealed	77.22	80.46	80.72	80.64	80.62	80.65	80.94	80.89	80.83	80.83
C014_2D	Manhole	2D	80.29	80.56	80.65	80.62	80.60	80.62	80.88	80.82	80.74	80.74
C019	Manhole	Sealed	75.35	79.09	79.49	79.53	79.46	79.47	79.93	80.20	79.84	79.86

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
C019_2D	Manhole	2D	77.32	79.09	79.47	79.52	79.44	79.45	79.92	80.18	79.82	79.84
C020	Manhole	Sealed	75.33	79.11	80.48	80.16	80.14	80.35	81.02	80.96	80.88	80.98
C021	Manhole	Sealed	71.09	80.00	80.53	80.19	80.17	80.38	81.07	81.00	80.92	81.03
C022	Manhole	Sealed	75.78	79.24	80.51	80.18	80.17	80.38	81.07	81.00	80.93	81.03
C023	Manhole	Sealed	77.13	79.35	80.81	80.54	80.54	80.61	81.33	81.27	81.22	81.23
C023_2D	Manhole	2D	79.71	79.81	80.84	80.60	80.60	80.66	81.35	81.29	81.24	81.24
C024	Manhole	Sealed	75.81	79.59	80.08	79.84	79.80	79.86	80.58	80.52	80.44	80.44
C024_2D	Manhole	2D	77.78	79.27	80.07	79.83	79.79	79.85	80.57	80.51	80.43	80.43
C028	Manhole	Sealed	75.05	79.39	80.52	80.23	80.21	80.36	81.09	81.01	80.93	80.99
C028_2D	Manhole	2D	77.02	79.52	80.17	79.94	79.93	79.96	80.66	80.60	80.52	80.52
C029	Manhole	Sealed	71.09	78.28	80.60	80.28	80.25	80.42	81.16	81.09	81.00	81.07
C030	Manhole	Sealed	76.14	78.64	80.52	80.21	80.17	80.33	81.09	81.01	80.91	80.97
C030_2D	Manhole	2D	78.11	78.64	80.20	79.96	79.77	79.82	80.70	80.64	80.40	80.40
C033	Manhole	Sealed	71.10	79.06	80.68	80.38	80.34	80.46	81.25	81.18	81.08	81.11
C035	Manhole	Sealed	71.14	78.72	80.78	80.50	80.46	80.51	81.37	81.30	81.18	81.16
C036	Manhole	Sealed	73.33	77.69	80.85	80.57	80.42	80.46	81.45	81.38	81.13	81.12
C036_2D	Manhole	2D	78.90	79.00	81.42	81.19	79.84	79.86	81.92	81.87	80.43	80.43
C036A	Manhole	Sealed	75.73	78.28	81.08	80.84	80.82	80.83	81.59	81.53	81.43	81.43
C036A_2D	Manhole	2D	79.12	79.22	81.10	80.87	80.85	80.86	81.60	81.54	81.45	81.44
C037	Manhole	Sealed	71.21	78.78	80.81	80.55	80.52	80.53	81.41	81.35	81.22	81.18
C038	Manhole	Sealed	73.31	78.50	81.09	80.79	80.62	80.62	81.65	81.58	81.33	81.34
C038_2D	Manhole	2D	79.14	79.24	81.50	81.27	80.63	80.65	82.00	81.94	81.23	81.23
C038A	Manhole	Sealed	73.93	79.17	81.14	80.84	80.73	80.74	81.70	81.64	81.47	81.47
C038A_2D	Manhole	2D	79.85	79.95	81.25	81.02	81.04	81.06	81.75	81.70	81.64	81.64
C038B	Manhole	Sealed	76.70	78.61	81.17	80.94	80.93	80.95	81.67	81.62	81.54	81.53
C038B_2D	Manhole	2D	79.47	79.57	81.18	80.95	80.95	80.97	81.68	81.62	81.55	81.54
C040	Manhole	Sealed	71.27	79.14	80.92	80.69	80.67	80.60	81.54	81.48	81.36	81.25
C041	Manhole	Sealed	75.88	80.33	80.80	80.59	80.59	80.53	81.41	81.35	81.25	81.16
C041_2D	Manhole	2D	79.67	79.72	80.35	80.14	80.15	80.14	80.84	80.78	80.71	80.71
C044	Manhole	Sealed	76.32	80.07	80.96	80.77	80.77	80.65	81.46	81.41	81.36	81.27
C044_2D	Manhole	2D	80.57	80.67	80.81	80.75	80.83	80.79	81.26	81.20	81.27	81.25
C045	Manhole	Sealed	71.28	79.56	80.98	80.77	80.77	80.65	81.59	81.52	81.41	81.29
C046	Manhole	Sealed	75.92	79.40	81.00	80.81	80.82	80.68	81.59	81.53	81.42	81.30
C046_2D	Manhole	2D	79.75	79.85	80.83	80.73	80.83	80.77	81.31	81.25	81.23	81.19
C047	Manhole	Sealed	71.29	79.59	81.01	80.82	80.82	80.68	81.62	81.55	81.44	81.31
C048	Manhole	Sealed	76.20	79.09	80.90	80.76	80.58	80.41	81.44	81.38	81.07	80.92
C048_2D	Manhole	2D	77.67	79.09	80.47	80.39	79.94	79.90	80.98	80.92	80.24	80.20
C049	Manhole	Sealed	71.35	80.07	81.09	80.90	80.90	80.70	81.69	81.63	81.51	81.34
C051	Manhole	Sealed	71.39	79.58	81.18	81.00	80.99	80.74	81.78	81.72	81.60	81.38
C051B	Manhole	2D	75.89	78.56	79.89	79.81	79.47	79.43	80.40	80.34	79.79	79.74
C051B_2D	Manhole	2D	77.36	78.43	80.06	79.96	79.12	79.08	80.58	80.52	79.42	79.38
C053	Manhole	Sealed	71.53	79.18	81.38	81.21	81.18	80.81	81.98	81.92	81.80	81.46
C054	Manhole	Sealed	76.39	78.54	80.71	80.59	80.28	80.06	81.23	81.17	80.73	80.53
C054_2D	Manhole	2D	77.86	78.54	80.04	79.97	79.34	79.30	80.55	80.51	79.66	79.61
C055	Manhole	Sealed	71.60	79.26	81.59	81.44	81.40	80.88	82.19	82.14	82.02	81.54
C057	Manhole	Sealed	75.12	78.42	81.25	81.12	80.88	80.49	81.81	81.76	81.43	81.05
C057_2D	Manhole	2D	77.07	78.42	80.30	80.23	79.34	79.29	80.82	80.76	79.67	79.61
C060	Manhole	Sealed	73.47	78.20	81.14	81.02	80.65	80.31	81.69	81.64	81.17	80.84
C060_2D	Manhole	2D	78.25	78.38	80.36	80.29	79.35	79.30	80.87	80.81	79.68	79.63
C061	Manhole	Sealed	71.85	79.72	81.80	81.65	81.62	80.96	82.40	82.36	82.25	81.62
C062	Manhole	Sealed	76.16	78.69	80.57	80.47	79.93	79.75	81.10	81.03	80.32	80.15
C062_2D	Manhole	2D	77.63	78.74	80.19	80.12	79.37	79.32	80.71	80.64	79.70	79.64
C063	Manhole	Sealed	73.42	81.45	82.14	82.00	81.97	81.07	82.75	82.71	82.62	81.76
C064	Manhole	Sealed	75.46	81.79	82.14	82.00	81.98	81.07	82.66	82.66	82.60	81.76
C064_2D	Manhole	2D	82.18	82.28	82.30	82.30	82.31	82.30	82.46	82.45	82.45	82.38
C065	Manhole	Sealed	73.45	82.34	82.38	82.26	82.24	81.43	83.01	82.98	82.90	82.14
C066	Manhole	Sealed	73.26	82.53	82.59	82.47	82.45	81.69	83.23	83.20	83.12	82.44
C067	Manhole	Sealed	73.86	82.33	82.36	82.24	82.22	81.42	82.96	82.93	82.86	82.14
C068	Manhole	Sealed	79.06	81.89	82.36	82.24	82.22	81.42	82.92	82.89	82.86	82.16
C068_2D	Manhole	2D	82.30	82.40	82.46	82.46	82.59	82.57	82.80	82.80	82.86	82.75
C069	Manhole	Sealed	73.46	82.51	83.09	82.99	82.97	82.32	83.75	83.73	83.65	83.09
C070	Manhole	Sealed	77.85	82.31	82.36	82.24	82.22	81.42	82.96	82.93	82.86	82.14
C070_2D	Manhole	2D	82.93	83.03	83.12	83.12	83.13	83.13	83.13	83.13	83.14	83.14
C071	Manhole	Sealed	73.13	82.97	83.47	83.38	83.35	82.76	84.16	84.14	84.06	83.58
C072	Manhole	Sealed	77.79	83.85	83.47	83.38	83.35	82.76	84.16	84.14	84.06	83.58
C072_2D	Manhole	2D	83.28	83.31	83.81	83.81	83.83	83.81	84.12	84.12	84.15	84.13

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
C073	Manhole	Sealed	78.50	82.67	83.56	83.47	83.42	82.82	84.33	84.31	84.24	83.70
C073_2D	Manhole	2D	84.01	84.11	84.67	84.67	84.54	84.52	85.08	85.08	84.82	84.81
C080	Manhole	Sealed	83.96	84.06	84.70	84.69	84.65	84.54	85.11	85.10	84.99	84.82
C080_2D	Manhole	2D	84.53	84.63	85.38	85.38	85.21	85.19	85.76	85.75	85.52	85.48
C081	Manhole	Sealed	73.63	84.00	84.17	84.10	84.08	83.60	84.94	84.92	84.83	84.49
C082	Manhole	Sealed	81.12	84.57	84.19	84.12	84.10	83.62	84.98	84.96	84.87	84.54
C082_2D	Manhole	2D	84.53	84.53	85.05	85.05	85.14	85.12	85.56	85.55	85.46	85.43
C083	Manhole	Sealed	73.71	84.32	84.49	84.43	84.40	83.99	85.28	85.27	85.17	84.89
C083_2D	Manhole	2D	78.68	84.45	84.98	84.97	84.72	84.64	85.47	85.47	85.10	85.01
C084	Manhole	Sealed	79.55	84.32	85.19	85.18	85.39	85.33	85.54	85.54	85.66	85.61
C084_2D	Manhole	2D	81.57	84.32	85.01	85.01	85.26	85.24	85.28	85.28	85.45	85.43
C085	Manhole	Sealed	79.47	85.86	85.42	85.40	85.55	85.43	85.86	85.85	85.91	85.83
C086	Manhole	Sealed	79.37	85.26	85.81	85.80	85.98	85.92	86.16	86.16	86.25	86.22
C086_2D	Manhole	2D	81.57	85.35	85.81	85.81	86.03	86.01	86.11	86.11	86.24	86.22
C088	Manhole	Sealed	79.48	85.35	84.98	84.92	84.93	84.55	85.62	85.61	85.56	85.43
C088_2D	Manhole	2D	80.95	85.21	85.16	85.10	85.14	84.76	85.66	85.65	85.63	85.59
C089	Manhole	Sealed	73.90	84.71	84.74	84.68	84.66	84.28	85.57	85.56	85.48	85.23
C090	Manhole	Sealed	82.59	86.06	84.75	84.69	84.68	84.30	85.60	85.59	85.54	85.28
C090_2D	Manhole	2D	86.31	86.41	86.55	86.55	86.57	86.57	86.61	86.61	86.66	86.66
C092	Manhole	Sealed	74.05	86.71	85.29	85.24	85.22	84.92	86.27	86.25	86.22	86.02
C092A	Manhole	Sealed	74.01	85.94	85.05	85.00	84.98	84.64	85.96	85.95	85.90	85.67
C092B	Manhole	Sealed	76.70	86.67	85.05	85.00	84.98	84.64	85.96	85.95	85.90	85.67
C092B_2D	Manhole	2D	86.97	87.07	87.14	87.14	87.14	87.14	87.17	87.17	87.23	87.21
C093	Manhole	Sealed	85.01	86.41	85.37	85.34	85.34	85.25	86.58	86.57	86.65	86.40
C093_2D	Manhole	2D	87.32	87.42	87.62	87.62	87.62	87.62	87.83	87.83	87.87	87.84
C094	Manhole	Sealed	77.02	86.52	85.32	85.27	85.26	84.96	86.53	86.51	86.58	86.35
C095	Manhole	Sealed	83.90	86.62	85.34	85.30	85.29	84.99	86.77	86.75	86.92	86.67
C095_2D	Manhole	2D	87.42	87.52	87.71	87.71	87.74	87.74	87.97	87.97	88.12	88.09
C096	Manhole	Sealed	83.46	86.11	86.36	86.32	86.31	86.12	87.58	87.57	87.61	87.54
C096_2D	Manhole	2D	87.05	87.15	87.59	87.59	87.60	87.60	88.12	88.12	88.20	88.17
C097	Manhole	Sealed	77.24	86.64	86.24	86.21	86.20	85.99	87.40	87.39	87.42	87.34
C098	Manhole	Sealed	83.54	86.52	86.25	86.22	86.21	86.00	87.61	87.60	87.66	87.60
C098_2D	Manhole	2D	87.27	87.37	87.51	87.51	87.50	87.50	87.94	87.94	88.05	88.02
C099	Manhole	Sealed	84.10	87.23	86.26	86.22	86.21	86.01	87.42	87.42	87.44	87.35
C103	Manhole	Sealed	84.36	87.76	86.26	86.23	86.21	86.01	87.43	87.42	87.44	87.35
C103_2D	Manhole	2D	87.94	88.04	88.13	88.13	88.13	88.13	88.18	88.18	88.18	88.18
Chase	Manhole	2D	70.84	70.90	78.53	77.98	77.18	77.44	79.58	79.38	78.94	79.23
CP03	Manhole	2D	67.39	74.41	74.70	74.66	74.69	74.70	75.09	75.00	75.03	75.04
CP04	Manhole	2D	67.44	73.50	74.62	74.56	74.61	74.63	75.10	74.97	75.00	75.01
CP06	Manhole	2D	67.43	73.72	74.70	74.67	74.69	74.70	75.12	75.05	75.07	75.07
CP07	Manhole	2D	67.43	74.23	74.81	74.78	74.81	74.82	75.26	75.19	75.20	75.21
CP10	Manhole	2D	66.24	74.17	74.58	74.55	74.58	74.59	74.97	74.90	74.91	74.92
CP114	Manhole	2D	66.45	73.91	74.37	74.36	74.38	74.39	74.74	74.71	74.73	74.74
CP16	Manhole	2D	66.76	73.27	74.47	74.44	74.46	74.47	74.84	74.79	74.80	74.81
CP17	Manhole	2D	67.00	73.99	75.37	75.24	75.32	75.34	75.92	75.85	75.87	75.88
CP18	Manhole	2D	67.00	74.18	75.05	74.87	74.90	74.92	75.61	75.48	75.42	75.44
CP20	Manhole	2D	67.77	75.03	75.54	75.53	75.54	75.54	75.80	75.79	75.81	75.81
CP22	Manhole	2D	68.78	73.94	75.29	75.24	75.24	75.25	75.80	75.73	75.73	75.73
CP24	Manhole	2D	69.00	75.30	75.52	75.52	75.50	75.50	75.91	75.87	75.84	75.85
CP25	Manhole	2D	69.00	73.63	74.70	74.67	74.68	74.69	75.11	75.06	75.07	75.07
CP27	Manhole	2D	69.20	74.36	74.87	74.83	74.87	74.88	75.30	75.24	75.28	75.28
CP28	Manhole	2D	69.20	74.19	75.21	75.17	75.20	75.20	75.65	75.58	75.61	75.61
CP33	Manhole	2D	67.88	75.24	75.34	75.32	75.33	75.33	75.61	75.55	75.55	75.55
CP35	Manhole	2D	67.05	76.13	75.42	75.36	75.42	75.43	76.05	75.87	75.93	75.91
CPM1	Manhole	Sealed	63.17	74.13	75.05	74.87	74.93	74.95	75.68	75.54	75.53	75.58
CPM11	Manhole	Sealed	65.15	74.76	74.70	74.66	74.69	74.70	75.10	75.05	75.06	75.07
CPM12	Manhole	2D	66.37	75.09	74.79	74.77	74.80	74.81	75.20	75.18	75.19	75.19
CPM13	Manhole	Sealed	65.53	73.80	74.49	74.46	74.49	74.50	74.87	74.83	74.85	74.86
CPM15	Manhole	Sealed	66.56	73.42	74.48	74.45	74.47	74.48	74.85	74.81	74.82	74.83
CPM19	Manhole	2D	64.36	74.60	75.36	75.26	75.31	75.33	75.90	75.82	75.84	75.85
CPM2	Manhole	Sealed	64.04	73.45	74.62	74.56	74.61	74.63	75.09	74.96	75.00	75.01
CPM21	Manhole	2D	64.54	74.61	75.37	75.29	75.35	75.36	75.90	75.84	75.87	75.88
CPM23	Manhole	Sealed	65.05	74.65	75.33	75.27	75.31	75.32	75.81	75.76	75.77	75.78
CPM26	Manhole	Sealed	65.41	74.79	75.33	75.27	75.30	75.31	75.80	75.76	75.77	75.77
CPM29	Manhole	Sealed	65.57	75.59	75.46	75.46	75.48	75.49	75.85	75.83	75.83	75.83
CPM30	Manhole	2D	66.31	75.01	75.38	75.35	75.38	75.38	75.87	75.84	75.83	75.83

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CPM31	Manhole	2D	65.68	74.20	76.00	76.00	76.04	76.04	76.28	76.27	76.33	76.33
CPM32	Manhole	2D	65.93	75.15	75.37	75.33	75.34	75.35	75.78	75.72	75.70	75.70
CPM34	Manhole	2D	66.58	74.84	75.42	75.36	75.42	75.43	75.95	75.85	75.90	75.88
CPM5	Manhole	Sealed	64.46	73.78	74.70	74.67	74.70	74.71	75.13	75.05	75.07	75.08
CPM8	Manhole	Sealed	64.63	74.23	74.70	74.67	74.70	74.71	75.12	75.05	75.07	75.07
CPM9	Manhole	2D	64.94	74.07	74.71	74.68	74.71	74.72	75.12	75.05	75.06	75.07
D02	Manhole	Sealed	76.68	83.64	82.94	82.84	82.84	82.26	83.61	83.59	83.58	83.19
D02_2D	Manhole	2D	79.27	83.64	83.29	83.20	83.20	82.61	83.86	83.86	83.86	83.79
D03	Manhole	Sealed	73.41	82.80	82.89	82.79	82.79	82.20	83.58	83.56	83.54	83.11
D04	Manhole	Sealed	76.68	82.34	82.84	82.76	82.77	82.21	83.43	83.41	83.47	83.11
D04_2D	Manhole	2D	79.27	82.34	82.71	82.67	82.71	82.25	82.95	82.94	83.25	83.10
D05	Manhole	Sealed	76.62	80.86	82.00	81.91	81.89	81.28	82.50	82.47	82.41	81.85
D05_2D	Manhole	2D	78.59	80.63	80.98	80.98	80.97	80.92	81.12	81.11	81.07	81.03
D06	Manhole	Sealed	73.97	79.35	82.24	82.13	82.12	81.37	82.82	82.79	82.73	82.05
D07	Manhole	Sealed	76.62	79.95	81.89	81.80	81.81	81.21	82.42	82.39	82.36	81.81
D07_2D	Manhole	2D	77.68	79.95	80.66	80.65	80.74	80.66	81.10	81.04	81.05	80.97
D08	Manhole	Sealed	75.49	79.64	80.47	80.25	80.23	80.12	81.03	80.97	80.89	80.81
D08_2D	Manhole	2D	78.97	79.64	80.44	80.27	80.24	80.13	80.97	80.91	80.80	80.72
D09	Manhole	Sealed	73.76	78.98	80.47	80.25	80.23	80.12	81.05	80.98	80.92	80.83
D10	Manhole	Sealed	75.49	79.32	80.48	80.27	80.26	80.15	81.06	80.99	80.93	80.85
D10_2D	Manhole	2D	78.97	79.49	80.58	80.42	80.50	80.39	81.12	81.06	81.04	80.97
D11	Manhole	Sealed	73.99	79.13	80.41	80.12	80.04	79.92	80.99	80.92	80.85	80.76
D11_2D	Manhole	2D	76.46	79.16	80.26	80.10	80.06	79.95	80.79	80.73	80.61	80.54
D12	Manhole	Sealed	73.68	78.31	80.46	80.13	80.04	79.92	81.05	80.98	80.92	80.83
D13	Manhole	Sealed	74.68	79.36	80.33	80.01	79.86	79.73	80.92	80.86	80.78	80.69
D13_2D	Manhole	2D	78.97	78.98	79.81	79.66	79.59	79.50	80.32	80.27	80.13	80.05
D14	Manhole	Sealed	73.57	78.12	80.48	80.11	79.94	79.79	81.09	81.02	80.96	80.87
D15	Manhole	Sealed	73.99	78.26	80.48	80.13	79.98	79.84	81.09	81.02	80.96	80.87
D15_2D	Manhole	2D	78.97	79.07	80.53	80.37	80.39	80.29	81.06	81.00	80.93	80.86
D16	Manhole	Sealed	73.46	78.97	80.59	80.11	79.87	79.68	81.46	81.35	81.35	81.20
D17	Manhole	Sealed	73.40	78.41	80.48	80.05	79.81	79.61	81.35	81.24	81.25	81.09
D18	Manhole	Sealed	73.43	77.61	80.17	79.96	79.78	79.60	80.74	80.67	80.61	80.50
E0	Manhole	Sealed	70.51	81.20	75.40	75.40	75.40	75.40	76.00	75.99	76.01	76.01
E04	Manhole	Sealed	84.00	86.66	87.23	87.21	87.21	87.15	87.94	87.94	87.97	87.93
E04_2D	Manhole	2D	87.64	87.74	88.21	88.18	88.20	88.13	88.68	88.68	88.70	88.69
E05	Manhole	Sealed	77.84	86.40	87.16	87.15	87.14	87.09	87.78	87.77	87.80	87.77
E06	Manhole	Sealed	84.00	86.24	87.17	87.15	87.15	87.09	87.82	87.82	87.97	87.82
E06_2D	Manhole	2D	87.64	87.74	87.84	87.84	87.84	87.84	88.06	88.06	88.09	88.09
E08	Manhole	Sealed	76.41	85.16	85.01	84.88	84.82	84.77	85.79	85.77	85.76	85.73
E1	Manhole	2D	77.58	80.64	77.87	77.86	77.83	77.83	78.36	78.36	78.28	78.28
E13	Manhole	2D	78.19	81.32	81.67	81.67	81.67	81.67	82.09	82.09	82.10	82.10
E14	Manhole	2D	78.19	81.23	81.91	81.91	81.91	81.91	82.37	82.37	82.37	82.37
E16	Manhole	2D	77.69	81.48	81.73	81.73	81.73	81.73	81.99	81.99	81.99	81.99
E17	Manhole	2D	79.12	81.54	81.98	81.98	81.97	81.97	82.39	82.39	82.39	82.39
E2	Manhole	2D	77.15	80.74	77.23	77.23	77.23	77.23	77.23	77.23	77.23	77.23
E21	Manhole	2D	77.35	80.87	81.64	81.64	81.63	81.63	82.06	82.07	82.06	82.06
E22	Manhole	2D	77.35	80.13	81.34	81.34	81.34	81.34	81.76	81.76	81.76	81.76
E25	Manhole	2D	78.23	80.75	81.16	81.16	81.14	81.14	81.51	81.51	81.49	81.49
E26	Manhole	2D	78.21	79.95	81.28	81.28	81.28	81.28	81.66	81.66	81.66	81.66
E4	Manhole	2D	76.60	81.17	77.89	77.89	77.89	77.89	78.94	78.93	78.96	78.96
E5	Manhole	2D	78.22	81.12	79.04	79.04	79.04	79.04	79.40	79.40	79.40	79.40
E8	Manhole	2D	77.96	81.07	81.18	81.21	81.18	81.18	81.87	81.77	81.97	81.97
E9	Manhole	2D	77.96	80.85	80.72	80.73	80.72	80.72	81.76	81.76	81.75	81.75
EM10	Manhole	Sealed	71.76	82.45	80.15	80.16	80.15	80.15	80.93	80.91	80.96	80.96
EM11	Manhole	Sealed	73.15	82.49	81.34	81.35	81.34	81.34	81.83	81.83	81.84	81.84
EM12	Manhole	Sealed	72.27	82.85	81.24	81.25	81.24	81.24	81.78	81.77	81.79	81.79
EM15	Manhole	Sealed	73.43	81.94	81.45	81.46	81.45	81.45	81.89	81.89	81.89	81.89
EM18	Manhole	Sealed	73.60	82.80	81.46	81.46	81.45	81.45	81.89	81.89	81.89	81.89
EM20	Manhole	Sealed	73.92	81.34	81.46	81.46	81.46	81.46	81.89	81.89	81.89	81.89
EM23	Manhole	Sealed	75.45	81.26	81.37	81.37	81.36	81.36	81.78	81.77	81.77	81.77
EM24	Manhole	Sealed	76.97	80.58	81.28	81.28	81.27	81.27	81.66	81.65	81.65	81.65
EM3	Manhole	Sealed	71.11	81.69	77.22	77.22	77.22	77.22	78.28	78.26	78.29	78.29
EM6	Manhole	Sealed	71.30	82.71	78.05	78.06	78.05	78.05	79.04	79.02	79.06	79.06
EM7	Manhole	Sealed	71.67	82.50	79.99	80.01	79.99	79.99	80.82	80.79	80.84	80.84
F1	Manhole	2D	66.79	72.26	73.54	73.32	73.28	73.30	73.89	73.60	73.58	73.59
F2	Manhole	2D	65.50	75.04	68.39	68.39	68.39	68.39	71.35	71.34	71.34	71.34

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F3	Manhole	2D	65.40	75.14	68.15	68.15	68.15	68.15	70.62	70.62	70.62	70.62
F4OUT	Outfall	Sealed	65.30	73.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G2	Manhole	2D	65.20	72.08	68.93	68.93	68.93	68.93	72.15	72.15	72.14	72.14
GM01	Manhole	Sealed	63.80	71.19	68.32	68.32	68.32	68.32	70.53	70.53	70.53	70.53
GM1	Manhole	2D	63.85	74.40	74.81	74.40	74.68	74.79	75.67	75.25	75.37	75.41
GM3	Manhole	2D	63.85	72.04	68.78	68.78	68.78	68.78	71.40	71.40	71.39	71.39
GM4	Manhole	2D	64.00	73.18	69.81	69.81	69.81	69.81	72.65	72.65	72.64	72.64
GM5	Manhole	2D	64.30	72.17	70.51	70.51	70.51	70.51	73.17	73.17	73.16	73.16
GM6	Manhole	2D	64.40	72.38	70.56	70.56	70.56	70.56	73.17	73.17	73.16	73.16
GM7	Manhole	2D	64.60	73.16	70.59	70.59	70.59	70.59	73.24	73.24	73.23	73.23
GOUT	Outfall	Sealed	63.50	72.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
H1	Manhole	2D	63.52	72.40	73.15	73.07	73.14	73.16	74.00	73.93	73.97	73.98
H2	Manhole	Sealed	63.52	72.05	73.21	73.15	73.20	73.23	74.07	74.02	74.05	74.06
H3	Manhole	2D	63.60	73.99	73.36	73.29	73.35	73.37	74.21	74.19	74.21	74.22
IH-10_JUNCTION_E01	Manhole	Sealed	70.24	77.50	79.51	78.54	78.51	78.57	80.26	80.11	80.11	80.12
IH-10_JUNCTION_E116	Manhole	2D	70.61	80.56	79.51	78.69	78.65	78.71	80.19	80.06	80.08	80.09
IH-10_MH_C1	Manhole	2D	70.60	79.68	79.60	78.71	78.69	78.78	80.32	80.18	80.18	80.20
IH-10_MH_C105A	Manhole	2D	70.82	78.76	79.74	79.00	78.98	79.13	80.42	80.30	80.29	80.34
IH-10_MH_C107	Manhole	2D	70.92	79.27	79.79	79.09	79.08	79.26	80.44	80.33	80.32	80.37
IH-10_MH_C121	Manhole	2D	70.69	79.54	79.66	78.84	78.82	78.94	80.36	80.23	80.23	80.26
IH-10_MH_C2A	Manhole	Sealed	71.07	79.60	79.75	78.98	78.97	79.11	80.48	80.36	80.35	80.39
IH-10_MH_C7	Manhole	2D	70.78	79.30	79.71	78.94	78.93	79.07	80.39	80.28	80.27	80.31
IH-10_MH_WD13	Manhole	Sealed	70.92	79.81	79.75	78.98	78.97	79.11	80.48	80.36	80.35	80.39
IH-10_MH_WD19	Manhole	Sealed	71.04	81.03	79.51	78.58	78.55	78.61	80.25	80.10	80.10	80.12
IH-10_MH_WD20A	Manhole	Sealed	71.88	79.24	79.75	78.99	78.98	79.12	80.48	80.36	80.35	80.40
IH-10_MH_WD3	Manhole	Sealed	72.07	81.05	79.75	78.99	78.98	79.12	80.48	80.36	80.35	80.40
IH-10_MH_WD35	Manhole	Sealed	70.89	77.62	79.51	78.58	78.55	78.61	80.25	80.10	80.10	80.12
IH-10_MH_WD4	Manhole	Sealed	71.60	78.92	79.75	78.98	78.97	79.11	80.48	80.36	80.35	80.40
IH-10_MH_WD6	Manhole	Sealed	71.51	79.40	79.75	78.98	78.97	79.11	80.48	80.36	80.35	80.40
IH-10_MH_WD7	Manhole	Sealed	71.31	78.31	79.75	78.98	78.97	79.11	80.48	80.36	80.35	80.40
J1	Manhole	2D	62.75	71.65	72.69	72.67	72.59	72.60	73.58	73.40	73.42	73.45
J2	Manhole	Sealed	62.75	72.99	73.35	73.35	73.30	73.30	73.79	73.79	73.74	73.75
J3	Manhole	2D	62.87	73.60	73.81	73.82	73.79	73.79	74.15	74.22	74.15	74.15
L01	Manhole	2D	70.29	75.00	74.37	74.36	74.34	74.34	74.75	74.70	74.68	74.69
L03	Manhole	2D	70.29	74.05	74.35	74.33	74.31	74.32	74.62	74.54	74.52	74.52
L06	Manhole	2D	67.81	73.15	74.13	74.10	74.12	74.13	74.50	74.45	74.46	74.47
L08	Manhole	2D	70.45	73.51	74.03	73.75	73.83	73.89	74.58	74.35	74.39	74.42
L09	Manhole	2D	70.45	73.29	74.22	73.68	73.80	73.88	74.80	74.34	74.48	74.56
L11	Manhole	2D	70.65	74.13	73.91	73.55	73.74	73.82	74.78	74.35	74.41	74.55
L12	Manhole	2D	70.65	74.40	73.97	73.59	73.77	73.86	74.86	74.45	74.71	74.76
L15	Manhole	2D	71.93	74.53	75.22	75.20	75.17	75.18	75.70	75.66	75.68	75.69
L16	Manhole	2D	71.05	74.06	75.14	75.08	75.28	75.29	75.67	75.62	75.80	75.81
L19	Manhole	2D	70.54	74.67	75.11	75.13	75.17	75.18	75.63	75.66	75.68	75.69
L21	Manhole	2D	70.54	73.62	75.06	75.00	75.04	75.05	75.58	75.53	75.54	75.55
L22	Manhole	2D	70.34	73.31	75.31	75.26	75.30	75.31	75.82	75.78	75.80	75.81
L23	Manhole	2D	70.00	73.51	75.11	75.06	75.10	75.11	75.63	75.58	75.60	75.61
L26	Manhole	2D	71.66	75.21	75.46	75.39	75.42	75.44	76.00	75.95	75.96	75.97
L27	Manhole	2D	71.66	74.11	75.24	75.19	75.21	75.22	75.75	75.70	75.71	75.71
L35	Manhole	2D	71.22	74.70	75.56	75.57	75.57	75.57	75.90	75.90	75.90	75.90
L36	Manhole	2D	71.22	76.29	76.55	76.55	76.57	76.57	76.88	76.88	76.89	76.89
L37	Manhole	2D	73.84	75.49	75.88	75.88	75.87	75.87	76.24	76.23	76.22	76.22
L39	Manhole	2D	73.98	76.02	76.38	76.39	76.40	76.40	76.74	76.73	76.76	76.76
LB001	Manhole	2D	75.21	75.93	76.57	76.43	76.49	75.25	77.67	77.48	77.49	76.88
M01	Manhole	Sealed	59.09	71.79	67.50	67.50	67.50	67.50	70.47	70.20	70.31	70.35
M03	Manhole	2D	67.00	71.26	67.66	67.66	67.66	67.66	70.55	70.29	70.40	70.43
M04	Manhole	2D	67.00	71.83	68.95	68.95	68.95	68.95	71.98	71.87	71.92	71.93
M06	Manhole	2D	66.60	71.69	68.43	68.43	68.43	68.43	71.63	71.38	71.48	71.52
M07	Manhole	2D	66.60	71.53	67.58	67.58	67.58	67.58	70.65	70.39	70.49	70.53
M09	Manhole	2D	64.60	72.04	67.66	67.66	67.66	67.66	71.02	70.75	70.86	70.90
M10	Manhole	2D	64.60	72.68	67.50	67.50	67.50	67.50	70.52	70.26	70.36	70.40
M12	Manhole	2D	64.70	72.42	67.79	67.79	67.79	67.79	71.35	71.09	71.20	71.24
M13	Manhole	2D	64.70	72.45	67.50	67.50	67.50	67.50	70.53	70.27	70.37	70.41
M16	Manhole	2D	65.70	72.91	67.47	67.47	67.47	67.47	70.44	70.18	70.28	70.32
M18	Manhole	2D	65.70	72.74	67.48	67.48	67.48	67.48	70.47	70.21	70.32	70.36
M20	Manhole	2D	64.00	71.81	67.46	67.46	67.46	67.46	70.41	70.15	70.25	70.29
M21	Manhole	2D	64.00	72.07	67.47	67.47	67.47	67.47	70.41	70.15	70.26	70.29

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
M23	Manhole	2D	65.00	71.25	67.47	67.47	67.47	67.47	70.41	70.16	70.26	70.30
M24	Manhole	2D	65.00	72.22	67.46	67.46	67.46	67.46	70.39	70.13	70.24	70.28
Math_01	Manhole	2D	80.57	80.60	81.15	80.82	80.83	80.92	82.08	82.07	82.10	82.11
Math_02	Manhole	2D	80.57	80.60	81.04	80.76	80.76	80.84	81.90	81.90	81.91	81.93
Math_03	Manhole	2D	80.57	80.60	80.97	80.72	80.72	80.78	81.69	81.68	81.68	81.69
Math_04	Manhole	2D	80.57	80.60	80.95	80.69	80.69	80.73	81.70	81.70	81.69	81.70
Math_05	Manhole	2D	80.57	80.60	80.90	80.73	80.72	80.73	81.66	81.65	81.65	81.66
Math_06	Manhole	2D	80.57	80.60	80.83	80.73	80.72	80.72	81.62	81.61	81.60	81.62
Math_07	Manhole	2D	80.57	80.60	80.79	80.69	80.69	80.69	81.61	81.61	81.59	81.61
Math_08	Manhole	2D	80.57	80.60	80.74	80.66	80.65	80.65	81.44	81.44	81.42	81.44
Math_09	Manhole	2D	80.57	80.60	80.73	80.64	80.63	80.63	81.45	81.44	81.41	81.43
Math_10	Manhole	2D	80.57	80.60	80.74	80.61	80.61	80.63	81.50	81.49	81.46	81.48
Math_11	Manhole	2D	80.57	80.60	80.74	80.61	80.61	80.63	81.49	81.48	81.45	81.47
Math_12	Manhole	2D	80.57	80.60	80.79	80.62	80.62	80.66	81.48	81.47	81.45	81.46
Math_13	Manhole	2D	80.57	80.60	80.83	80.63	80.63	80.69	81.45	81.45	81.42	81.44
Math_14	Manhole	2D	80.57	80.60	80.97	80.66	80.66	80.75	81.65	81.63	81.60	81.61
Math_15	Manhole	2D	80.57	80.60	81.09	80.72	80.71	80.83	81.90	81.90	81.85	81.87
Math_16	Manhole	2D	80.57	80.60	81.00	80.62	80.62	80.74	81.90	81.90	81.90	81.91
Math_17	Manhole	2D	80.57	80.60	81.31	80.91	80.91	81.04	82.26	82.26	82.23	82.24
Math_18	Manhole	2D	76.72	76.75	77.72	77.01	76.99	77.09	79.60	79.59	79.56	79.58
Mathewson_Pond	Pond	Sealed	53.60	80.60	77.99	77.11	77.07	77.15	80.74	80.73	80.70	80.72
MM11	Manhole	Sealed	57.50	72.73	67.48	67.48	67.48	67.48	70.44	70.18	70.29	70.33
MM14	Manhole	Sealed	57.08	72.69	67.47	67.47	67.47	67.47	70.41	70.16	70.26	70.30
MM15	Manhole	2D	60.78	72.19	67.47	67.47	67.47	67.47	70.44	70.18	70.28	70.32
MM17	Manhole	2D	62.87	72.95	67.48	67.48	67.48	67.48	70.47	70.21	70.31	70.35
MM19	Manhole	Sealed	56.90	72.35	67.46	67.46	67.46	67.46	70.39	70.14	70.24	70.28
MM2	Manhole	Sealed	58.81	71.89	67.50	67.50	67.50	67.50	70.47	70.20	70.31	70.35
MM22	Manhole	Sealed	56.81	72.03	67.46	67.46	67.46	67.46	70.38	70.12	70.22	70.26
MM25	Manhole	Sealed	56.51	72.42	67.45	67.45	67.45	67.45	70.34	70.09	70.19	70.23
MM5	Manhole	Sealed	58.05	72.20	67.49	67.49	67.49	67.49	70.47	70.20	70.31	70.35
MM8	Manhole	Sealed	57.85	72.67	67.48	67.48	67.48	67.48	70.46	70.20	70.30	70.34
MOUT	Outfall	Sealed	63.89	72.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MX1	Manhole	Sealed	60.35	71.97	69.59	69.48	69.56	69.58	70.25	69.95	70.01	70.08
MX2	Manhole	Sealed	61.83	71.97	67.50	67.50	67.50	67.50	70.46	70.18	70.29	70.33
N02	Manhole	2D	66.25	71.42	70.54	70.37	70.50	70.55	71.66	71.62	71.64	71.64
N03	Manhole	2D	65.90	70.03	70.07	69.89	70.03	70.08	70.83	70.65	70.72	70.75
N06	Manhole	2D	66.40	71.51	71.51	71.34	71.47	71.52	72.15	72.13	72.14	72.14
N07	Manhole	2D	65.60	70.70	70.41	70.23	70.37	70.42	71.65	71.58	71.62	71.64
N09	Manhole	2D	66.50	72.40	70.69	70.53	70.66	70.71	72.07	71.90	71.97	71.99
N10	Manhole	2D	67.50	72.63	70.73	70.57	70.69	70.75	72.13	71.97	72.03	72.06
N13	Manhole	2D	73.60	73.70	74.34	74.34	74.31	74.31	74.41	74.41	74.38	74.38
N14	Manhole	2D	68.30	73.05	71.09	70.94	71.06	71.10	72.58	72.45	72.49	72.51
N16	Manhole	2D	68.60	73.39	71.39	71.26	71.37	71.41	72.91	72.79	72.84	72.86
N17	Manhole	2D	68.60	73.59	71.39	71.26	71.37	71.41	72.84	72.72	72.77	72.79
N19	Manhole	2D	67.00	73.45	73.02	72.91	73.02	73.04	73.74	73.73	73.73	73.73
N20	Manhole	2D	66.90	72.90	73.01	72.89	73.01	73.03	73.68	73.66	73.66	73.67
N21	Manhole	2D	67.22	73.51	71.55	71.43	71.53	71.57	73.27	73.13	73.19	73.21
N22	Manhole	2D	67.12	73.22	71.55	71.43	71.53	71.57	73.16	73.04	73.09	73.11
N24	Manhole	2D	66.10	73.83	72.59	72.53	72.62	72.64	73.66	73.63	73.70	73.71
N25	Manhole	2D	66.50	72.52	73.21	73.21	73.29	73.30	73.57	73.56	73.64	73.64
N26	Manhole	2D	66.10	73.51	72.27	72.20	72.26	72.28	73.12	73.09	73.09	73.10
N27	Manhole	2D	66.40	71.75	72.50	72.46	72.49	72.50	73.13	73.08	73.13	73.15
NM1	Manhole	Sealed	60.30	71.36	70.04	69.86	70.00	70.05	70.88	70.65	70.74	70.77
NM11	Manhole	Sealed	61.68	73.77	70.68	70.52	70.64	70.70	71.89	71.73	71.79	71.82
NM12	Manhole	Sealed	60.98	73.80	71.04	70.90	71.01	71.05	72.38	72.24	72.29	72.31
NM15	Manhole	Sealed	60.98	73.77	71.38	71.25	71.36	71.40	72.78	72.67	72.71	72.73
NM18	Manhole	Sealed	60.98	73.75	71.53	71.41	71.51	71.55	72.90	72.80	72.84	72.86
NM23	Manhole	Sealed	62.21	73.72	71.92	71.83	71.91	71.94	73.08	73.01	73.04	73.06
NM4	Manhole	Sealed	60.40	71.88	70.21	70.03	70.17	70.23	71.15	70.95	71.03	71.06
NM5	Manhole	Sealed	60.45	71.88	70.38	70.20	70.33	70.39	71.40	71.22	71.29	71.32
NM8	Manhole	Sealed	60.98	72.95	70.58	70.41	70.54	70.59	71.75	71.58	71.65	71.67
OM0	Manhole	2D	67.79	83.19	83.78	83.78	83.79	83.79	84.03	84.03	84.05	84.05
OM1	Manhole	2D	68.15	83.21	83.78	83.78	83.79	83.79	84.02	84.02	84.05	84.05
OM10	Manhole	2D	70.12	84.16	84.55	84.55	84.55	84.55	84.75	84.74	84.76	84.76
OM11	Manhole	2D	71.28	84.48	84.78	84.78	84.78	84.78	84.96	84.96	84.95	84.95
OM2	Manhole	2D	67.33	83.22	83.73	83.73	83.73	83.73	83.93	83.93	83.92	83.92

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
OM3	Manhole	2D	68.19	83.97	84.19	84.20	84.21	84.21	84.38	84.38	84.42	84.42
OM4	Manhole	2D	69.12	83.87	84.08	84.08	84.07	84.07	84.20	84.20	84.19	84.19
OM5	Manhole	2D	69.82	83.72	84.04	84.04	84.03	84.03	84.20	84.20	84.18	84.18
OM6	Manhole	2D	69.23	83.72	84.03	84.03	84.04	84.04	84.33	84.33	84.34	84.34
OM7	Manhole	2D	68.22	84.19	84.13	84.13	84.13	84.13	84.46	84.46	84.46	84.46
OM8	Manhole	2D	69.20	83.06	84.03	84.03	84.03	84.03	84.22	84.22	84.21	84.21
OM9	Manhole	2D	69.20	84.22	84.39	84.39	84.39	84.39	84.56	84.56	84.56	84.56
OOUT	Manhole	Sealed	67.26	82.65	83.78	83.78	83.79	83.79	84.03	84.03	84.05	84.05
P04	Manhole	2D	67.36	73.99	73.71	73.44	73.62	73.70	75.17	74.97	75.05	75.10
P05	Manhole	2D	69.80	73.90	74.05	73.93	74.02	74.05	74.53	74.42	74.50	74.52
P06	Manhole	2D	69.80	74.54	74.18	74.03	74.14	74.19	75.11	75.00	75.02	75.06
P08	Manhole	2D	69.80	74.07	74.47	74.40	74.48	74.51	75.12	75.01	75.08	75.10
P09	Manhole	2D	69.80	74.58	74.84	74.74	74.85	74.88	75.58	75.48	75.54	75.56
P12	Manhole	2D	72.40	73.81	74.64	74.58	74.64	74.66	75.27	75.17	75.21	75.23
P13	Manhole	2D	72.40	74.14	74.54	74.50	74.53	74.54	75.09	74.99	75.04	75.06
P17	Manhole	2D	73.40	75.89	75.91	75.87	75.91	75.92	76.35	76.32	76.33	76.33
P18	Manhole	2D	73.40	75.35	75.70	75.68	75.70	75.70	75.99	75.99	75.99	75.99
P23	Manhole	2D	71.72	79.54	79.56	79.56	79.57	79.57	79.88	79.87	79.87	79.87
P24	Manhole	2D	79.68	79.78	79.95	79.95	79.95	79.95	80.36	80.36	80.39	80.39
P27	Manhole	2D	73.43	79.24	79.69	79.68	79.73	79.73	80.20	80.20	80.25	80.25
P28	Manhole	2D	76.43	79.82	80.01	80.00	80.00	80.01	80.60	80.60	80.60	80.60
P30	Manhole	2D	74.94	79.81	80.11	80.11	80.11	80.11	80.40	80.40	80.40	80.40
P31	Manhole	2D	71.94	79.27	80.07	80.07	80.09	80.09	80.50	80.49	80.51	80.51
P33	Manhole	2D	77.32	80.11	81.32	81.31	81.35	81.35	81.67	81.67	81.70	81.70
P34	Manhole	2D	77.12	80.12	80.72	80.72	80.72	80.72	81.11	81.11	81.10	81.10
P36	Manhole	2D	75.78	80.79	81.25	81.20	81.18	81.19	81.57	81.55	81.53	81.53
P38	Manhole	2D	75.37	80.44	81.57	81.52	81.39	81.39	81.87	81.86	81.73	81.73
P40	Manhole	2D	75.35	81.41	82.20	82.11	82.12	82.12	82.54	82.51	82.52	82.52
P41	Manhole	2D	75.05	81.23	81.86	81.78	81.78	81.79	82.19	82.17	82.16	82.17
P43	Manhole	2D	74.81	79.96	80.44	80.44	80.45	80.45	80.82	80.82	80.83	80.83
P44	Manhole	2D	74.81	81.70	80.53	80.53	80.54	80.54	81.18	81.18	81.18	81.19
P46	Manhole	2D	74.76	79.05	79.79	79.79	79.79	79.79	80.15	80.15	80.15	80.15
P47	Manhole	2D	74.76	78.71	79.56	79.56	79.55	79.55	79.92	79.91	79.92	79.92
P49	Manhole	2D	80.43	80.53	81.08	81.08	81.08	81.08	81.29	81.29	81.29	81.29
P50	Manhole	2D	80.11	80.21	80.54	80.54	80.53	80.53	80.74	80.74	80.71	80.71
PM1	Manhole	Sealed	62.10	75.35	73.23	72.88	73.09	73.19	74.06	73.75	73.81	73.92
PM10	Manhole	Sealed	62.77	73.91	74.48	74.40	74.48	74.51	75.10	74.98	75.04	75.05
PM11	Manhole	Sealed	63.67	74.05	74.55	74.47	74.54	74.57	75.14	75.04	75.10	75.11
PM14	Manhole	Sealed	63.70	73.90	74.63	74.56	74.63	74.65	75.21	75.13	75.17	75.19
PM15	Manhole	Sealed	63.97	75.90	75.04	74.98	75.03	75.05	75.61	75.55	75.58	75.59
PM16	Manhole	Sealed	64.05	75.71	75.35	75.30	75.35	75.37	75.92	75.88	75.90	75.90
PM19	Manhole	Sealed	65.22	76.45	75.77	75.73	75.77	75.78	76.35	76.32	76.33	76.33
PM2	Manhole	2D	67.66	74.91	73.83	73.57	73.75	73.83	75.04	74.82	74.96	74.98
PM20	Manhole	2D	69.80	78.35	76.79	76.76	76.79	76.80	77.96	77.94	77.95	77.95
PM21	Manhole	2D	65.60	79.89	76.72	76.69	76.72	76.73	77.75	77.73	77.73	77.74
PM22	Manhole	Sealed	66.93	80.13	77.14	77.11	77.14	77.15	78.11	78.09	78.10	78.10
PM25	Manhole	Sealed	67.88	78.89	78.94	78.93	78.95	78.95	79.65	79.64	79.65	79.65
PM26	Manhole	2D	71.25	78.60	79.13	79.12	79.13	79.13	79.71	79.71	79.70	79.70
PM29	Manhole	Sealed	68.37	79.61	79.74	79.74	79.76	79.76	80.30	80.29	80.32	80.32
PM3	Manhole	Sealed	62.21	75.42	73.54	73.28	73.46	73.54	74.35	74.08	74.13	74.23
PM32	Manhole	Sealed	68.69	79.85	80.02	80.01	80.03	80.03	80.43	80.43	80.44	80.44
PM35	Manhole	Sealed	71.13	81.24	80.72	80.72	80.72	80.72	81.11	81.10	81.10	81.10
PM37	Manhole	Sealed	71.97	80.96	81.24	81.19	81.17	81.17	81.56	81.55	81.52	81.52
PM39	Manhole	Sealed	74.72	80.17	81.56	81.51	81.39	81.39	81.87	81.86	81.73	81.73
PM42	Manhole	Sealed	74.83	80.97	81.99	81.91	81.90	81.90	82.32	82.30	82.29	82.29
PM45	Manhole	Sealed	71.86	80.17	80.44	80.44	80.45	80.45	80.90	80.89	80.90	80.90
PM48	Manhole	Sealed	72.44	79.27	79.93	79.93	79.93	79.93	80.34	80.34	80.34	80.34
PM51	Manhole	Sealed	79.69	79.72	80.48	80.48	80.47	80.47	80.79	80.79	80.78	80.78
PM7	Manhole	Sealed	62.50	75.63	74.02	73.86	73.98	74.02	74.68	74.49	74.53	74.61
W14001_CL_16691	Break	Stored	0.00	78.40	78.28	78.28	N.M.*	N.M.*	78.28	78.28	N.M.*	N.M.*
W14001_CL_16746	Break	Stored	0.00	0.00	78.20	78.20	N.M.*	N.M.*	78.20	78.20	N.M.*	N.M.*
W14001_CL_16756	Manhole	Sealed	66.39	78.90	N.M.*	N.M.*	74.70	74.94	N.M.*	N.M.*	75.97	76.24
W14001_CL_19681	Break	Stored	0.00	78.83	N.M.*	N.M.*	79.02	79.11	N.M.*	N.M.*	80.46	80.47
W14001_CL_19710	Break	Stored	75.85	72.87	N.M.*	N.M.*	79.02	79.11	N.M.*	N.M.*	80.45	80.45
W14001_CL_19981	Break	Stored	76.32	73.86	N.M.*	N.M.*	79.17	79.24	N.M.*	N.M.*	80.44	80.43
W14001_CL_20471	Break	Stored	76.77	76.80	N.M.*	N.M.*	79.27	79.32	N.M.*	N.M.*	80.50	80.48

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
W14001_CL_20997	Break	Stored	77.42	79.40	N.M.*	N.M.*	79.53	79.48	N.M.*	N.M.*	80.59	80.57
W14001_CL_21120	Break	Stored	73.55	78.67	N.M.*	N.M.*	80.32	80.29	N.M.*	N.M.*	80.61	80.59
W14001_ML_16734	Manhole	Sealed	66.29	78.41	75.24	74.69	74.62	74.83	76.57	76.13	75.83	76.05
W14001_ML_16756	Manhole	Sealed	66.38	70.57	75.28	74.71	74.67	74.90	76.68	76.22	75.91	76.16
W14001_MR_16744	Manhole	Sealed	66.30	78.27	75.27	74.71	74.66	74.88	76.65	76.21	75.90	76.13
W14001_sta10765	Break	Sealed	0.00	60.03	69.26	69.06	69.19	69.24	69.82	69.56	69.61	69.67
W14001_sta10923	Break	Sealed	60.30	72.57	69.59	69.43	69.51	69.58	70.25	69.95	70.01	70.08
W14001_sta11029	Break	Stored	0.00	0.00	70.11	69.83	70.01	70.08	70.92	70.57	70.63	70.73
W14001_sta12065	Break	Sealed	60.51	60.54	72.13	71.78	71.99	72.08	72.89	72.59	72.65	72.75
W14001_sta12528	Break	Sealed	62.80	65.72	72.13	71.82	72.00	72.08	72.85	72.56	72.62	72.72
W14001_sta13031	Break	Sealed	62.08	63.08	73.00	72.58	72.82	72.93	73.83	73.50	73.56	73.68
W14001_sta13092	Break	Stored	0.00	0.00	73.15	72.70	72.96	73.07	74.03	73.68	73.75	73.87
W14001_sta13491	Break	Stored	0.00	0.00	73.28	72.82	73.09	73.20	74.17	73.82	73.89	74.02
W14001_sta13602	Break	Stored	62.52	0.00	73.80	73.31	73.60	73.72	74.69	74.34	74.41	74.54
W14001_sta13756	Break	Stored	0.00	0.00	73.46	72.99	73.26	73.38	74.38	74.00	74.09	74.21
W14001_sta14232	Break	Sealed	62.88	74.56	73.91	73.38	73.68	73.82	74.98	74.55	74.65	74.79
W14001_sta14781	Break	Sealed	63.70	68.10	74.37	73.75	74.10	74.25	75.59	75.12	75.19	75.34
W14001_sta14945	Break	Sealed	63.97	65.97	74.62	73.92	74.43	74.59	75.70	75.28	75.53	75.67
W14001_sta14971	Break	Sealed	63.81	65.47	74.63	73.92	74.50	74.66	75.70	75.29	75.62	75.75
W14001_sta15025	Break	Sealed	0.00	66.66	74.70	73.93	74.49	74.66	75.76	75.30	75.61	75.75
W14001_sta15081	Break	Sealed	64.32	66.18	74.61	73.95	N.M.*	N.M.*	75.75	75.37	N.M.*	N.M.*
W14001_sta15336	Break	Stored	73.97	0.00	N.M.*	N.M.*	74.50	74.66	N.M.*	N.M.*	75.60	75.74
W14001_sta15381	Break	Stored	0.00	0.00	74.66	73.98	N.M.*	N.M.*	75.86	75.38	N.M.*	N.M.*
W14001_sta15465	Break	Sealed	65.28	64.68	N.M.*	N.M.*	74.51	74.68	N.M.*	N.M.*	75.61	75.76
W14001_sta15481	Break	Sealed	65.28	64.68	74.68	74.01	N.M.*	N.M.*	76.06	75.45	N.M.*	N.M.*
W14001_sta15671	Break	Sealed	65.16	66.56	74.76	74.12	74.52	74.69	76.12	75.57	75.63	75.79
W14001_sta15863	Break	Stored	67.50	67.06	74.80	74.16	74.53	74.71	76.18	75.62	75.64	75.80
W14001_sta16016	Break	Sealed	74.94	67.17	74.87	74.25	74.54	74.71	76.22	75.70	75.65	75.80
W14001_sta16535	Break	Stored	66.32	78.39	N.M.*	N.M.*	74.51	74.69	N.M.*	N.M.*	75.63	75.79
W14001_sta16640	Break	Stored	64.61	78.00	N.M.*	N.M.*	74.48	74.65	N.M.*	N.M.*	75.60	75.74
W14001_sta16681	Break	Sealed	66.02	70.06	75.20	74.66	74.56	74.76	76.47	76.04	75.73	75.91
W14001_sta16756	Break	2D	66.40	70.77	75.31	74.73	N.M.*	N.M.*	76.77	76.30	N.M.*	N.M.*
W14001_sta16771	Break	Stored	74.82	78.41	N.M.*	N.M.*	74.92	75.00	N.M.*	N.M.*	76.02	76.33
W14001_sta16771_L	Manhole	Sealed	66.43	78.15	N.M.*	N.M.*	74.72	74.97	N.M.*	N.M.*	76.00	76.29
W14001_sta16771_R	Manhole	Sealed	66.43	78.15	N.M.*	N.M.*	74.72	74.97	N.M.*	N.M.*	76.00	76.29
W14001_sta16821	Break	Sealed	71.12	72.79	75.29	74.72	N.M.*	N.M.*	76.78	76.26	N.M.*	N.M.*
W14001_sta16821_R	Manhole	Sealed	66.46	78.39	N.M.*	N.M.*	74.75	75.01	N.M.*	N.M.*	76.05	76.35
W14001_sta16981	Break	Stored	74.93	0.00	N.M.*	N.M.*	75.56	75.58	N.M.*	N.M.*	76.10	76.41
W14001_sta16981_L	Manhole	Sealed	66.53	78.37	N.M.*	N.M.*	74.77	75.04	N.M.*	N.M.*	76.09	76.41
W14001_sta16981_R	Manhole	Sealed	66.54	78.37	N.M.*	N.M.*	74.78	75.06	N.M.*	N.M.*	76.11	76.43
W14001_sta17469	Break	Stored	75.77	0.00	N.M.*	N.M.*	75.81	75.82	N.M.*	N.M.*	76.52	76.73
W14001_sta17469_L	Manhole	Sealed	66.79	79.38	N.M.*	N.M.*	74.86	75.18	N.M.*	N.M.*	76.25	76.64
W14001_sta17469_R	Manhole	Sealed	66.80	79.38	N.M.*	N.M.*	74.86	75.17	N.M.*	N.M.*	76.25	76.63
W14001_sta18066	Break	Sealed	75.14	75.86	77.47	76.99	76.20	76.29	78.45	78.19	77.67	77.72
W14001_sta18066_L	Manhole	Sealed	67.06	78.76	N.M.*	N.M.*	74.99	75.40	N.M.*	N.M.*	76.46	77.01
W14001_sta18066_R	Manhole	Sealed	67.07	78.76	N.M.*	N.M.*	74.95	75.25	N.M.*	N.M.*	76.40	76.77
W14001_sta18076_L	Manhole	Sealed	67.06	78.76	N.M.*	N.M.*	76.92	77.20	N.M.*	N.M.*	78.69	79.00
W14001_sta18076_R	Manhole	Sealed	67.07	78.76	N.M.*	N.M.*	76.92	77.20	N.M.*	N.M.*	78.69	79.00
W14001_sta18481	Break	Sealed	73.50	75.36	78.28	77.76	76.99	77.26	79.10	78.84	78.76	79.05
W14001_sta18481_L	Manhole	Sealed	67.31	80.11	N.M.*	N.M.*	76.99	77.27	N.M.*	N.M.*	78.77	79.07
W14001_sta18481_R	Manhole	Sealed	67.31	80.11	N.M.*	N.M.*	76.99	77.27	N.M.*	N.M.*	78.77	79.07
W14001_sta19161	Break	Sealed	74.87	75.88	79.12	78.55	N.M.*	N.M.*	79.70	79.56	N.M.*	N.M.*
W14001_sta19161_L	Manhole	Sealed	67.65	80.54	N.M.*	N.M.*	77.07	77.37	N.M.*	N.M.*	78.87	79.20
W14001_sta19161_R	Manhole	Sealed	67.66	80.54	N.M.*	N.M.*	77.05	77.31	N.M.*	N.M.*	78.85	79.13
W14001_sta19321	Break	Stored	76.47	80.24	N.M.*	N.M.*	77.08	77.36	N.M.*	N.M.*	79.20	79.39
W14001_sta19321_L	Manhole	Stored	67.73	80.24	N.M.*	N.M.*	77.10	77.39	N.M.*	N.M.*	78.90	79.22
W14001_sta19321_R	Manhole	Stored	67.74	80.24	N.M.*	N.M.*	77.07	77.33	N.M.*	N.M.*	78.88	79.15
W14001_sta19330_L	Manhole	Stored	67.73	80.24	N.M.*	N.M.*	78.80	78.95	N.M.*	N.M.*	80.34	80.45
W14001_sta19330_R	Manhole	Stored	67.74	80.24	N.M.*	N.M.*	78.65	78.73	N.M.*	N.M.*	80.11	80.13
W14001_sta19481	Break	Sealed	73.70	76.20	79.29	78.69	N.M.*	N.M.*	79.84	79.72	N.M.*	N.M.*
W14001_sta19481_L	Manhole	Sealed	67.81	79.51	N.M.*	N.M.*	78.82	78.96	N.M.*	N.M.*	80.35	80.46
W14001_sta19481_R	Manhole	Sealed	67.82	79.51	N.M.*	N.M.*	78.67	78.75	N.M.*	N.M.*	80.12	80.14
W14001_sta19501	Break	Stored	0.00	78.52	N.M.*	N.M.*	78.92	78.92	N.M.*	N.M.*	79.51	79.61
W14001_sta19510_L	Manhole	Sealed	67.83	78.95	N.M.*	N.M.*	78.83	78.97	N.M.*	N.M.*	80.36	80.47
W14001_sta19510_R	Manhole	Sealed	67.84	78.95	N.M.*	N.M.*	78.68	78.75	N.M.*	N.M.*	80.13	80.15
W14001_sta19511_R	Manhole	Sealed	67.86	78.95	N.M.*	N.M.*	78.69	78.77	N.M.*	N.M.*	80.14	80.16

Node ID	Node Type	Flood Type	Flowline Elevation	Ground Elevation	Exist 10-Year WSEL	Phase 1 10-Year WSEL	Future Phase 2 10-Year WSEL	Future Phase 3 10-Year WSEL	Exist 100-Year WSEL	Prop Phase 1 100-Year WSEL	Future Phase 2 100-Year WSEL	Future Phase 3 100-Year WSEL
W14001_sta19663_L	Manhole	Sealed	67.86	78.96	N.M.*	N.M.*	78.85	78.99	N.M.*	N.M.*	80.40	80.50
W14001_sta19663_R	Manhole	Sealed	67.95	79.15	N.M.*	N.M.*	78.74	78.82	N.M.*	N.M.*	80.20	80.23
W14001_sta19700_L	Manhole	Sealed	67.91	79.09	N.M.*	N.M.*	78.86	78.99	N.M.*	N.M.*	80.43	80.52
W14001_sta19700_R	Manhole	Sealed	67.94	79.09	N.M.*	N.M.*	78.75	78.83	N.M.*	N.M.*	80.22	80.25
W14001_sta19701	Break	2D	72.44	73.60	80.09	79.53	N.M.*	N.M.*	80.98	80.80	N.M.*	N.M.*
W14001_sta19710_L	Manhole	Sealed	67.91	79.09	N.M.*	N.M.*	79.21	79.29	N.M.*	N.M.*	80.47	80.49
W14001_sta19710_R	Manhole	Sealed	67.94	79.09	N.M.*	N.M.*	79.21	79.29	N.M.*	N.M.*	80.46	80.48
W14001_sta19981	Break	Sealed	75.72	75.40	80.08	79.47	N.M.*	N.M.*	80.86	80.69	N.M.*	N.M.*
W14001_sta19981_L	Manhole	Sealed	68.10	79.14	N.M.*	N.M.*	79.22	79.30	N.M.*	N.M.*	80.48	80.47
W14001_sta19981_R	Manhole	Sealed	68.09	79.14	N.M.*	N.M.*	79.22	79.30	N.M.*	N.M.*	80.48	80.49
W14001_sta20471_L	Manhole	Sealed	68.35	79.77	N.M.*	N.M.*	79.22	79.30	N.M.*	N.M.*	80.49	80.48
W14001_sta20471_R	Manhole	Sealed	68.34	79.77	N.M.*	N.M.*	79.22	79.30	N.M.*	N.M.*	80.49	80.49
W14001_sta20481	Break	Sealed	75.61	75.66	80.08	79.52	N.M.*	N.M.*	80.89	80.70	N.M.*	N.M.*
W14001_sta20881	Break	Stored	0.00	0.00	80.20	79.63	N.M.*	N.M.*	80.92	80.91	N.M.*	N.M.*
W14001_sta21000_L	Manhole	Sealed	68.53	79.87	N.M.*	N.M.*	79.23	79.30	N.M.*	N.M.*	80.48	80.49
W14001_sta21000_R	Manhole	Sealed	68.63	79.87	N.M.*	N.M.*	79.23	79.30	N.M.*	N.M.*	80.48	80.49
W14001_sta21026	Break	Sealed	73.55	78.67	80.38	80.07	N.M.*	N.M.*	80.84	80.76	N.M.*	N.M.*
W1400105_sta0010	Break	2D	67.56	75.95	74.85	74.23	74.59	74.80	76.40	75.95	75.98	75.91
W1400105_sta0157	Break	2D	67.77	74.96	74.96	74.37	74.73	74.95	76.69	76.27	76.30	76.06
W1400105_sta0213	Break	2D	70.65	72.31	74.96	74.38	74.74	74.96	76.73	76.29	76.32	76.06
W1400105_sta1458	Break	2D	73.41	73.66	75.41	75.06	75.27	75.26	77.60	77.18	77.17	76.66
W54001	Manhole	2D	68.19	79.43	77.58	70.05	70.00	70.67	80.22	75.38	75.59	75.74
W5400101-OUT	Manhole	Sealed	64.24	77.85	N.M.*	70.05	70.00	70.67	N.M.*	75.30	75.61	75.75
W54001-US	Manhole	2D	69.54	75.60	N.M.*	72.70	72.70	72.70	N.M.*	75.48	75.68	75.88
WittePond	Manhole	2D	72.46	76.17	81.47	80.82	80.53	79.93	83.07	82.83	82.92	82.36
*N.M. = Not Modeled. This node is either Proposed or Existing to Be Demolished												

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
-1027	-1027_Outfall	1	Conduit	CIRC	3.3	1	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-1018	-1018_Outfall	1	Conduit	CIRC	10	1	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5000	5031	1	Conduit	CIRC	19	42	42	39.97	41.24	40.58	39.63	44.32	42.80	40.52	39.08
5001	3178797	1	Conduit	CIRC	95.4	30	30	25.77	30.47	32.71	34.85	24.27	25.39	26.33	27.04
5005	10049	1	Conduit	RECT	158.6	60	72	202.71	207.76	199.81	199.18	189.38	194.73	186.04	184.86
5007	5059	1	Conduit	CIRC	145.1	66	66	109.49	115.18	114.04	114.18	110.57	111.27	109.73	112.98
5010	D03	1	Conduit	CIRC	179.6	42	42	41.80	42.41	42.94	46.95	50.70	51.18	52.43	59.83
5013	3143205	1	Conduit	CIRC	322.4	66	66	134.60	135.07	135.06	139.56	151.73	152.23	153.84	158.92
5022	3144608	1	Conduit	CIRC	25.5	72	72	203.45	158.54	157.20	156.88	149.02	150.08	146.66	148.18
5023	3144616	1	Conduit	RECT	65.6	60	72	157.56	159.14	158.95	158.15	147.81	146.43	147.64	149.54
5025	5026	1	Conduit	RECT	72.7	60	72	221.02	182.02	180.97	180.66	198.96	200.81	200.44	200.79
5026	5027	1	Conduit	RECT	161.5	60	72	205.78	182.18	181.16	180.72	203.08	203.51	203.44	203.28
5027	10046	1	Conduit	RECT	112.6	60	72	210.92	189.54	188.64	188.33	214.29	214.94	214.71	214.49
5028	3221259	1	Conduit	RECT	130.8	72	84	203.59	208.74	200.58	199.94	191.89	196.20	193.99	192.19
5029	5030	1	Conduit	CIRC	132.6	24	24	15.04	15.54	14.85	14.68	14.20	14.50	14.05	13.93
5030	3221259	1	Conduit	CIRC	49.9	24	24	23.01	23.93	22.58	22.19	21.08	21.86	20.89	20.60
5031	5032	1	Conduit	CIRC	118.7	42	42	40.87	41.87	41.09	40.14	47.53	46.44	46.88	45.30
5032	5034	1	Conduit	CIRC	274.9	42	42	41.59	43.79	42.99	42.08	59.66	58.61	62.36	57.79
5033	3221280	1	Conduit	RECT	65.8	72	84	233.56	243.10	228.44	224.73	240.76	239.01	230.05	224.40
5034	W14001_MR_16744	1	Conduit	CIRC	107.4	42	42	42.08	44.33	43.49	42.58	59.76	59.56	62.55	58.68
5057	5000	1	Conduit	CIRC	196	42	42	39.49	40.98	40.39	39.44	43.49	42.11	40.13	38.82
5058	5005	1	Conduit	CIRC	70.8	24	24	14.14	15.32	13.70	13.38	12.32	13.37	12.04	11.79
5059	3144607	1	Conduit	CIRC	33.5	72	72	109.61	115.40	114.26	114.40	110.59	111.34	109.76	113.00
5225	5817	1	Conduit	CIRC	263.1	36	36	39.14	38.52	37.61	109.15	43.36	43.20	41.17	136.33
5361	10263	1	Conduit	CIRC	74.4	24	24	11.61	11.61	11.61	11.61	33.15	33.12	33.13	33.15
5361	4165585	2	Conduit	CIRC	107.6	36	36	-2.05	-2.05	-2.05	-2.05	-21.27	-20.58	-20.01	-20.10
5654	5659	1	Conduit	RECT	59	48	60	-46.44	-40.87	-43.15	-49.02	-58.84	-57.32	-59.24	-61.69
5659	5665	1	Conduit	RECT	99	48	60	102.69	78.18	77.66	86.14	114.84	136.33	139.42	141.09
5665	5669	1	Conduit	RECT	148	48	60	104.03	80.91	80.39	89.20	116.32	138.05	141.15	142.83
5669	10251	1	Conduit	RECT	150	48	60	104.07	80.99	80.42	89.26	116.35	138.07	141.18	142.86
5671	C005	1	Conduit	RECT	125.3	48	72	105.14	83.21	82.56	91.68	117.54	139.48	145.08	144.28
5744	5659	1	Conduit	CIRC	92.8	48	48	65.39	66.56	66.77	66.78	65.59	66.32	66.47	66.47
5750	IH-10_JUNCTION_E116	1	Conduit	RECT	225	48	72	49.11	97.50	102.53	99.46	-67.55	-56.72	60.16	59.71
5763	10285	1	Conduit	RECT	512	48	72	36.87	71.23	76.72	73.93	35.13	45.17	46.79	46.43
5765	5763	1	Conduit	RECT	214	48	72	27.80	50.86	52.30	49.85	30.53	37.74	38.88	39.68
5770	5765	1	Conduit	CIRC	232	48	48	42.98	50.94	49.57	48.81	47.13	50.33	45.81	45.58
5771	5770	1	Conduit	CIRC	212	48	48	22.14	31.30	30.10	29.24	21.64	26.78	26.45	26.30
5774	10262	1	Conduit	CIRC	127.8	36	36	12.42	12.42	12.42	12.42	33.75	33.54	33.55	33.57
5776	10264	1	Conduit	RECT	323.3	48	48	40.33	40.33	40.35	40.32	79.36	78.47	78.13	78.25
5779	10265	1	Conduit	CIRC	332.1	48	48	22.77	22.77	22.79	22.77	47.76	47.25	47.15	47.20
5804	3146608	1	Conduit	CIRC	77	24	24	11.41	5.68	14.03	10.57	12.55	12.95	13.74	10.41
5809	5804	1	Conduit	CIRC	87.4	24	24	10.69	5.68	14.01	10.55	10.71	11.01	13.72	10.36
5816	W1400105_sta0157	1	Conduit	CIRC	62.3	36	36	48.42	50.87	47.87	133.41	61.46	57.06	60.40	191.37
5817	5816	1	Conduit	CIRC	50.4	36	36	48.46	50.92	47.90	133.42	56.67	53.77	52.47	189.91
5819	5809	1	Conduit	CIRC	160.5	24	24	8.09	5.67	13.96	10.54	8.31	8.85	13.66	10.33
5822	5819	1	Conduit	CIRC	98.9	24	24	5.31	5.67	5.43	4.27	-6.68	-6.55	-6.92	-7.26
5825	5826	1	Conduit	CIRC	317.4	30	30	20.76	20.39	20.00	20.77	21.26	21.79	20.31	21.29
5826	5827	1	Conduit	CIRC	180.6	36	36	27.26	29.65	26.38	25.05	28.41	33.57	29.92	27.80
5827	W14001_sta15671	1	Conduit	CIRC	21.2	36	36	27.21	29.69	26.35	25.01	28.42	33.56	29.90	27.78
5830	5822	1	Conduit	CIRC	168.3	24	24	-7.36	3.86	-5.38	-2.07	-9.34	-9.26	-10.32	-10.33
5837	D18	1	Conduit	CIRC	19.3	24	24	-10.28	9.43	13.69	14.60	-11.88	-11.66	14.14	14.40

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
5839	D18	1	Conduit	CIRC	22.5	24	24	-12.12	-10.58	-10.76	-10.27	-13.22	-13.06	-14.27	-14.05
5849	5850	1	Conduit	CIRC	323.8	36	36	27.25	28.17	26.52	81.40	30.46	30.95	28.52	64.01
5850	5225	1	Conduit	CIRC	346.9	36	36	32.81	33.24	32.01	97.42	35.59	36.06	34.18	93.66
5854	5825	1	Conduit	CIRC	317.6	30	30	18.81	18.50	18.12	18.80	19.33	19.95	18.65	19.51
5860	5854	1	Conduit	CIRC	315.3	24	24	17.37	18.06	16.99	16.89	16.91	17.34	15.68	15.61
5861	5860	1	Conduit	CIRC	323.9	24	24	7.09	7.19	6.64	6.67	7.02	7.13	6.46	6.50
5868	6029809	1	Conduit	CIRC	71.5	30	30	5.25	-4.33	2.66	3.01	10.77	11.22	10.88	12.32
5870	5868	1	Conduit	CIRC	43.2	24	24	5.25	2.99	2.66	2.79	10.77	11.22	10.88	12.32
5874	5876	1	Conduit	CIRC	422.2	24	24	-9.91	-9.85	-9.83	-9.87	-10.75	-10.48	-10.50	-10.51
5876	5887	1	Conduit	CIRC	36.8	30	30	22.18	22.96	20.96	20.78	16.29	16.84	15.56	15.53
5879	5025	1	Conduit	CIRC	101.3	24	24	19.99	17.63	17.26	17.21	21.74	25.07	25.81	26.13
5881	6198704	1	Conduit	RECT	78.9	60	120	325.83	326.01	326.02	326.02	302.43	305.93	307.16	306.95
5887	5888	1	Conduit	CIRC	119.1	30	30	22.06	22.82	20.96	20.81	16.25	16.80	15.53	15.50
5888	5895	1	Conduit	CIRC	171.3	30	30	22.05	22.69	21.01	20.86	16.20	16.76	15.49	15.46
5890	3144610	1	Conduit	CIRC	11.4	66	66	155.57	164.75	166.64	168.81	145.82	153.77	157.71	161.29
5891	5890	1	Conduit	CIRC	411.7	66	66	140.88	149.26	150.99	153.14	133.90	141.13	143.68	147.06
5895	5896	1	Conduit	CIRC	183.7	30	30	21.99	22.66	20.99	20.81	16.17	16.72	15.45	15.42
5896	30008	1	Conduit	CIRC	267.9	30	30	21.82	22.57	20.84	20.65	16.12	16.67	15.40	15.37
5897	5897-1	1	Conduit	CIRC	100	1	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5902	5906172	1	Conduit	CIRC	17.3	24	24	-2.47	-2.59	-2.49	-2.47	-23.36	-23.35	-23.23	-23.23
5905	3144583	1	Conduit	CIRC	256.6	66	66	102.98	111.26	115.94	122.08	97.31	104.71	110.37	113.89
5916	5906388	1	Conduit	RECT	31.3	60	72	129.57	129.71	129.22	129.23	123.25	123.31	123.56	123.86
5921	3178787	1	Conduit	CIRC	240.5	60	60	78.23	84.05	87.50	95.74	75.46	83.65	89.12	91.28
5923	5921	1	Conduit	CIRC	93.9	60	60	71.66	77.53	79.66	89.30	68.05	75.81	81.18	83.19
5926	5923	1	Conduit	CIRC	289.7	60	60	65.82	70.73	73.78	78.63	60.65	63.29	68.51	70.28
5928	3177674	1	Conduit	CIRC	464.2	54	54	90.41	91.99	92.42	94.62	82.99	83.52	84.93	86.64
5929	5928	1	Conduit	CIRC	39.9	54	54	125.45	125.72	126.20	127.06	129.92	129.88	130.62	130.73
5940	6061295	1	Conduit	RECT	275.4	60	72	113.39	113.48	113.54	113.96	99.65	99.71	100.64	100.85
5942	3178768	1	Conduit	CIRC	5.7	24	24	-26.26	-26.24	-27.56	-27.56	-27.46	-27.44	-28.77	-28.77
5952	3178762	1	Conduit	CIRC	294	54	54	41.82	43.74	45.14	48.58	43.70	50.62	44.56	46.03
5960	3176115	1	Conduit	CIRC	130.7	48	48	34.84	36.56	38.03	42.20	34.88	35.36	35.99	36.22
5963	3176112	1	Conduit	CIRC	39.3	42	42	-42.24	-40.94	-42.29	-42.02	-80.04	-79.71	-78.52	-78.23
5967	5968	1	Conduit	CIRC	193.5	96	96	245.96	246.59	249.38	249.10	246.98	247.83	256.08	256.14
5968	3176104	1	Conduit	CIRC	282.2	96	96	230.52	231.98	234.49	234.47	222.54	224.36	231.99	232.06
5974	3176102	1	Conduit	CIRC	51	96	96	242.06	243.45	247.16	247.05	250.87	253.04	260.48	260.48
5979	3176249	1	Conduit	RECT	95	96	96	359.39	356.24	317.09	317.03	407.87	408.32	340.37	340.33
5982	3176248	1	Conduit	RECT	107.7	96	96	399.45	358.62	379.77	379.50	438.59	398.13	407.79	407.65
5985	3176247	1	Conduit	RECT	103.6	96	96	294.89	294.92	292.97	290.31	275.07	274.19	271.34	267.73
5988	5990	1	Conduit	RECT	199.7	96	96	301.59	305.54	305.06	303.10	297.07	297.59	296.05	292.73
5990	5993	1	Conduit	RECT	89.3	96	96	297.91	302.11	301.78	300.46	301.59	302.94	300.48	296.75
5993	3176246	1	Conduit	RECT	89.5	96	96	292.52	295.29	295.11	294.22	305.92	309.14	304.22	300.49
5997	5999	1	Conduit	RECT	91.6	96	96	291.37	290.66	289.95	287.78	304.49	322.19	303.58	301.18
5999	6003	1	Conduit	RECT	178.9	96	96	292.98	292.44	291.74	289.60	295.35	298.98	294.16	291.58
6003	3176245	1	Conduit	RECT	88.8	96	96	297.75	294.93	293.53	290.99	298.15	300.16	296.79	293.93
6006	7204174	1	Conduit	RECT	211.9	96	96	320.29	316.37	315.15	312.09	319.18	323.89	316.93	313.15
6013	3234315	1	Conduit	RECT	305.5	96	84	319.19	317.68	318.15	318.16	328.40	328.13	328.37	328.30
6013	3234315	2	Conduit	RECT	305.5	96	84	319.19	317.68	318.15	318.16	328.40	328.13	328.37	328.30
6016	30029	1	Conduit	RECT	1458	96	96	802.38	801.82	801.57	801.52	843.43	843.18	838.62	838.56
6018	7204174	1	Conduit	RECT	59.9	60	96	386.04	387.96	388.60	391.18	404.90	405.47	404.64	407.09
6021	3175107	1	Conduit	CIRC	356.4	96	96	219.59	223.30	219.34	223.39	216.63	215.45	212.94	213.26
6023	6021	1	Conduit	CIRC	95.8	96	96	257.82	258.27	251.35	251.17	268.77	269.13	263.57	263.78

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6028	3175102	1	Conduit	CIRC	120.3	84	84	183.89	187.68	187.88	207.89	179.54	183.24	184.20	185.97
6031	6028	1	Conduit	CIRC	267.3	84	84	189.71	193.39	193.46	210.13	178.72	182.46	183.49	184.96
6037	6073459	1	Conduit	CIRC	45.2	66	66	-120.51	-120.18	-115.98	-115.84	-179.04	-178.55	-174.92	-174.91
6040	6073491	1	Conduit	CIRC	142.1	78	78	-97.83	-88.32	-82.39	-81.11	49.75	50.58	51.63	53.41
6046	5654	1	Conduit	CIRC	198.9	36	36	-5.66	-5.70	-5.68	-5.59	-13.98	-13.92	-13.66	-13.78
6049	W14001_sta15481	1	Conduit	CIRC	65.5	24	24	31.80	33.23	32.15	32.90	31.92	33.65	31.24	32.03
10002	3234050	1	Conduit	CIRC	17.1	24	24	-13.97	-13.63	-15.76	-15.79	-26.98	-26.94	-28.08	-28.08
10003	3234050	1	Conduit	CIRC	22.4	24	24	-16.58	-16.33	-17.70	-17.72	-27.60	-27.57	-28.37	-28.37
10008	4165579	1	Conduit	CIRC	16.8	24	24	5.67	6.46	5.36	5.36	9.86	10.37	9.04	9.05
10009	5057	1	Conduit	CIRC	10.7	24	24	33.67	31.39	35.29	35.04	36.64	33.74	40.10	33.20
10010	5057	1	Conduit	CIRC	27.8	24	24	10.93	10.22	6.00	5.81	11.72	11.02	-11.37	-8.85
10011	10048	1	Conduit	CIRC	48.2	24	24	-13.57	-12.14	-13.06	-13.17	-14.89	-14.57	-14.94	-14.93
10032	6198894	1	Conduit	CIRC	37.2	24	24	-3.32	-3.32	-3.36	-3.36	6.73	6.76	6.64	6.65
10033	6198892	1	Conduit	CIRC	32.3	24	24	13.21	13.21	13.21	13.21	16.35	16.39	16.60	16.60
10034	6198872	1	Conduit	CIRC	18.9	24	24	4.52	4.51	4.22	4.22	5.87	5.86	11.39	11.40
10035	6198872	1	Conduit	CIRC	37.6	24	24	6.01	6.01	6.64	6.64	5.68	6.07	7.53	7.52
10036	6198824	1	Conduit	CIRC	25.3	24	24	3.32	3.32	3.32	3.32	6.72	5.75	7.08	8.02
10037	6198800	1	Conduit	CIRC	21.7	24	24	-0.96	-1.00	-0.92	-0.92	-15.79	-14.38	-13.53	-13.93
10044	5025	1	Conduit	RECT	133	60	72	186.59	168.37	167.09	167.14	164.99	163.31	163.41	164.68
10046	3218866	1	Conduit	RECT	150.9	60	72	211.79	191.08	189.95	189.66	216.70	217.36	216.98	216.79
10048	3218873	1	Conduit	RECT	21.7	60	72	191.40	196.30	188.77	188.14	179.21	182.34	175.95	174.83
10049	5028	1	Conduit	RECT	54.9	60	72	203.79	209.18	200.84	200.21	190.33	196.31	187.02	185.83
10051	3221268	1	Conduit	RECT	64.8	72	84	225.61	234.91	220.17	216.83	215.42	223.52	216.90	212.69
10052	10051	1	Conduit	CIRC	49.6	30	30	2.91	2.87	2.78	2.76	-15.03	-12.25	-14.23	-10.31
10053	10054	1	Conduit	RECT	212.5	72	84	228.56	237.95	223.26	219.74	218.72	229.15	220.06	214.37
10054	3221271	1	Conduit	RECT	35.7	72	84	233.04	242.52	227.82	224.20	229.10	237.49	228.50	222.81
10055	5031	1	Conduit	CIRC	6.3	24	24	0.23	0.22	0.25	0.23	-9.69	-7.34	-6.19	-3.50
10056	5032	1	Conduit	CIRC	6.1	24	24	1.44	1.15	1.16	1.15	20.39	7.72	6.95	6.42
10057	5033	1	Conduit	CIRC	6.6	24	24	0.98	1.14	0.98	0.98	1.72	1.72	1.71	1.72
10058	5034	1	Conduit	CIRC	6.2	24	24	0.60	0.55	0.62	0.58	1.25	0.96	0.94	0.94
10059	4165581	1	Conduit	CIRC	7.7	24	24	3.85	4.47	4.03	4.02	4.58	5.10	5.82	5.64
10095	3234049	1	Conduit	CIRC	30	18	18	-4.56	-4.34	-4.43	-4.45	-14.38	-14.36	-14.26	-14.26
10096	3234059	1	Conduit	CIRC	19.6	18	18	-11.66	-11.55	-11.49	-11.51	-18.95	-18.94	-18.74	-18.74
10097	3234058	1	Conduit	CIRC	20.2	18	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10098	3236569	1	Conduit	CIRC	24.8	18	18	-8.30	-8.12	-8.45	-8.48	-13.11	-12.94	-13.10	-13.10
10099	3236568	1	Conduit	CIRC	22.2	18	18	-0.31	-0.34	-0.44	-0.34	-8.50	-8.23	-8.30	-8.32
10100	3236589	1	Conduit	CIRC	30.6	30	30	-5.06	-6.32	-3.89	-3.78	31.66	10.95	8.61	8.61
10101	3236589	1	Conduit	CIRC	12.9	30	30	-23.00	-19.19	-22.08	-22.10	-39.41	-26.98	-28.75	-28.76
10102	3236588	1	Conduit	CIRC	30.3	24	24	-5.27	-6.70	-4.58	-4.47	-14.29	-11.93	-11.11	-11.12
10103	3236596	1	Conduit	CIRC	7.4	18	18	-5.82	-5.62	-5.71	-5.73	-8.60	-7.60	-7.54	-7.54
10106	3234051	1	Conduit	CIRC	10.4	18	18	19.59	20.08	19.96	20.66	19.52	19.68	20.02	20.83
10107	3234052	1	Conduit	CIRC	11.6	18	18	-11.90	-11.87	-11.98	-11.99	-15.64	-15.63	-15.64	-15.64
10108	3234054	1	Conduit	CIRC	21.9	18	18	15.83	15.81	16.03	16.04	16.40	16.40	16.56	16.54
10109	3234054	1	Conduit	CIRC	8.5	18	18	-16.71	-16.69	-16.82	-16.82	-21.19	-21.18	-21.18	-21.19
10110	3144586	1	Conduit	CIRC	20.8	24	24	-9.76	-13.55	-4.27	-2.71	0.52	0.62	0.63	0.69
10111	3178791	1	Conduit	CIRC	22.3	24	24	-6.71	-11.14	-3.97	-4.00	0.54	0.66	0.61	0.71
10112	3178790	1	Conduit	CIRC	21.7	24	24	-11.08	-8.88	-10.91	-10.33	-19.25	-19.50	-19.84	-19.83
10113	3178781	1	Conduit	CIRC	11.1	24	24	-29.54	-29.53	-30.01	-30.01	-31.19	-31.21	-31.61	-31.61
10114	3178783	1	Conduit	CIRC	12.5	24	24	-24.48	-24.45	-24.95	-24.96	-28.45	-28.50	-29.06	-29.05
10115	3178772	1	Conduit	CIRC	18.1	48	48	-43.10	-42.83	-53.88	-53.92	-67.40	-67.48	-73.09	-73.09
10118	3178768	1	Conduit	CIRC	31.4	24	24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
10119	3236615	1	Conduit	CIRC	17.3	24	24	14.77	11.87	16.29	16.50	24.67	25.18	27.88	27.83
10120	3236615	1	Conduit	CIRC	30	24	24	-21.12	-20.72	-21.07	-21.15	-29.33	-28.99	-29.31	-29.34
10121	3236633	1	Conduit	CIRC	28.9	24	24	22.43	23.11	22.81	22.70	21.19	21.55	22.27	22.12
10123	3236634	1	Conduit	CIRC	16	24	24	-11.37	-10.44	-12.27	-12.48	-23.94	-23.04	-24.28	-24.41
10124	3218806	1	Conduit	CIRC	10.1	24	24	-37.65	-37.57	-38.53	-38.55	-40.69	-40.66	-41.12	-41.12
10128	3176113	1	Conduit	CIRC	36.8	24	24	-23.28	-23.27	-23.42	-23.42	-24.60	-24.59	-24.73	-24.73
10135	3236590	1	Conduit	CIRC	8.9	24	24	30.25	30.50	31.21	31.23	30.36	30.82	31.19	31.11
10136	3236590	1	Conduit	CIRC	25.3	24	24	-17.35	-17.29	-18.00	-18.00	-20.01	-19.73	-20.70	-20.71
10138	3144584	1	Conduit	CIRC	7.6	18	18	-11.45	-11.13	-11.95	-11.67	-17.01	-17.00	-17.00	-16.99
10245	5750	1	Conduit	RECT	223	48	72	64.06	97.71	102.77	99.69	65.60	70.37	61.18	60.01
10247	5771	1	Conduit	CIRC	210	48	48	34.41	21.05	21.04	20.55	39.40	39.08	38.62	38.64
10251	5671	1	Conduit	RECT	190	48	72	104.12	81.09	80.47	89.34	116.39	138.11	141.22	142.90
10260	5361	1	Conduit	CIRC	45.8	24	24	2.38	0.89	0.90	0.89	13.61	12.09	13.23	13.48
10261	4165585	1	Conduit	CIRC	44.9	24	24	0.55	0.56	0.55	0.55	8.52	8.80	8.65	8.64
10262	10266	1	Conduit	CIRC	40.6	36	36	15.87	15.87	15.87	15.87	41.44	37.80	35.97	36.23
10263	5774	1	Conduit	CIRC	59.5	24	24	12.24	12.24	12.24	12.24	33.52	33.49	33.50	33.52
10264	6050	1	Conduit	RECT	28	48	48	54.24	54.24	54.24	54.24	103.53	102.46	102.01	102.15
10265	5776	1	Conduit	CIRC	277	48	48	39.76	39.77	39.77	39.76	78.35	77.58	77.34	77.43
10266	5779	1	Conduit	CIRC	171.8	48	48	21.85	21.86	21.86	21.85	46.93	46.31	46.22	46.26
10285	10245	1	Conduit	RECT	223	48	72	36.80	70.98	76.41	73.63	35.15	45.19	46.71	46.37
10289	5360	1	Conduit	CIRC	36.6	24	24	0.49	0.49	0.50	0.49	23.94	21.96	21.23	21.85
10290	5360	1	Conduit	CIRC	45.2	24	24	0.46	0.46	0.46	0.46	-15.21	-13.69	-13.42	-13.69
10297	3218866	1	Conduit	CIRC	17.9	24	24	-3.20	-1.59	-1.55	-1.45	0.21	-0.23	-0.19	-0.19
10302	5861	1	Conduit	CIRC	70.6	24	24	11.10	11.04	12.03	12.04	11.30	11.29	12.30	12.19
10304	5854	1	Conduit	CIRC	30	24	24	10.11	9.60	9.04	9.52	10.39	10.89	10.55	10.19
10306	5854	1	Conduit	CIRC	19	24	24	-15.26	-14.47	-15.17	-15.41	-20.29	-19.99	-19.91	-19.87
10308	5825	1	Conduit	CIRC	34.1	24	24	-13.48	-11.85	-12.41	-12.81	-16.82	-16.38	-15.30	-15.37
10309	5825	1	Conduit	CIRC	18	24	24	-8.63	-6.55	-8.41	-9.08	-14.72	-14.00	-14.19	-14.30
10311	5826	1	Conduit	CIRC	31.1	24	24	3.02	1.24	1.90	2.08	14.82	14.72	13.05	13.02
10313	5826	1	Conduit	CIRC	51.2	24	24	-0.71	-0.27	-0.17	-0.45	-9.62	-9.43	-7.43	-8.46
20053	20119	1	Conduit	CIRC	21.5	30	30	-0.31	-0.24	-0.27	-0.26	0.36	0.39	0.33	0.37
20102	W14001_sta18481	1	Conduit	CIRC	38.2	48	48	41.44	43.95	N.M.*	N.M.*	60.40	57.67	N.M.*	N.M.*
20103	20102	1	Conduit	CIRC	13.6	48	48	46.77	55.17	59.24	57.52	53.39	54.57	60.81	59.62
20104	20103	1	Conduit	CIRC	44.4	42	42	46.83	55.28	59.35	57.65	45.17	50.92	60.88	57.53
20105	20104	1	Conduit	CIRC	119.8	42	42	34.57	41.71	44.49	43.28	29.38	34.63	40.57	39.53
20106	20105	1	Conduit	CIRC	120.3	42	42	34.62	42.11	45.02	43.73	29.41	34.69	40.86	39.85
20107	20106	1	Conduit	CIRC	120.6	42	42	34.68	42.45	45.46	44.21	29.44	34.76	41.15	40.15
20108	20107	1	Conduit	CIRC	114.5	36	36	21.89	28.07	30.66	29.57	19.67	22.64	27.79	27.02
20109	20108	1	Conduit	CIRC	80.5	36	36	18.06	23.49	25.38	25.01	15.96	18.72	23.27	22.55
20110	20111	1	Conduit	CIRC	125.3	36	36	13.60	18.29	19.44	19.32	11.70	14.16	17.92	17.45
20111	20109	1	Conduit	CIRC	123.1	36	36	16.62	21.66	23.24	22.99	14.52	17.20	21.38	20.74
20112	20110	1	Conduit	CIRC	123.6	30	30	13.66	18.80	19.43	19.43	11.70	14.28	18.30	18.01
20113	20112	1	Conduit	CIRC	124.4	30	30	13.62	18.39	19.00	19.00	11.86	14.27	17.95	17.75
20114	20113	1	Conduit	CIRC	123.7	21	21	5.11	6.25	7.52	7.32	4.86	5.43	6.45	6.89
20115	20114	1	Conduit	CIRC	124.4	15	15	2.65	3.28	3.96	3.85	-3.07	-3.06	3.41	3.64
20116	W14001_sta19161	1	Conduit	CIRC	164.1	24	24	12.04	14.43	15.80	38.61	11.84	13.83	15.96	52.21
20117	20116	1	Conduit	CIRC	46.6	24	24	-13.99	11.32	-17.91	20.33	-14.56	9.97	-20.50	19.68
20118	20117	1	Conduit	CIRC	25.2	18	18	8.95	-6.85	-8.69	-7.23	9.18	-7.47	-10.11	-10.46
20119	20120	1	Conduit	CIRC	132.6	30	30	-1.58	-1.17	-1.24	-1.31	0.80	0.85	0.72	0.82
20120	20121	1	Conduit	CIRC	126	36	36	-2.73	-2.02	-2.24	-2.36	1.09	-1.18	-0.96	1.11
20121	20122	1	Conduit	CIRC	100	36	36	8.59	8.58	8.52	8.55	14.68	14.77	14.49	14.56

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
20122	20123	1	Conduit	CIRC	101	36	36	8.56	8.56	8.51	8.53	14.64	14.75	14.47	14.55
20123	20124	1	Conduit	CIRC	84.1	48	48	27.06	23.52	26.65	26.81	43.84	40.78	42.19	42.42
20124	W14001_sta16821	2	Conduit	CIRC	29.2	48	48	27.02	23.46	26.63	26.76	43.90	40.83	42.15	42.41
20125	20123	1	Conduit	CIRC	132.4	36	36	18.85	15.74	18.70	18.71	30.41	26.97	27.81	28.12
20126	20125	1	Conduit	CIRC	127.4	36	36	18.74	15.44	18.39	18.50	30.38	26.91	27.80	27.93
20127	20126	1	Conduit	CIRC	171.6	36	36	18.79	15.52	18.46	18.56	29.38	26.29	27.84	27.94
20128	20127	1	Conduit	CIRC	109.1	36	36	16.52	13.13	16.27	16.34	26.66	24.20	24.34	24.41
20129	20128	1	Conduit	CIRC	125.8	30	30	-0.90	0.69	-0.78	-0.86	15.38	15.11	11.92	13.02
20131	20132	1	Conduit	CIRC	27	24	24	-6.33	-6.14	-6.17	5.47	-8.81	-9.12	-9.17	-11.48
20132	20139	1	Conduit	CIRC	273.9	24	24	8.15	8.22	8.24	23.94	8.12	8.77	9.00	22.72
20132	20139	2	Conduit	CIRC	273.9	24	24	8.15	8.22	8.24	N.M.*	8.13	8.77	9.00	N.M.*
20133	20132	1	Conduit	CIRC	56.7	18	18	4.62	4.66	4.65	9.06	4.64	4.68	4.68	7.88
20134	20133	1	Conduit	CIRC	27.1	18	18	-4.95	-4.76	-4.63	1.40	-5.48	-5.45	-5.50	-9.17
20135	20131	1	Conduit	CIRC	27	24	24	14.46	7.38	3.21	1.90	17.24	17.07	17.45	17.29
20136	20137	1	Conduit	CIRC	26.9	12	12	-4.96	-4.95	-4.97	-14.28	-5.29	-5.29	-5.33	-21.77
20137	20138	1	Conduit	CIRC	57.6	18	18	7.35	7.20	7.17	18.74	7.97	7.82	7.79	17.70
20138	20142-1	1	Conduit	CIRC	271.7	24	24	6.91	7.05	6.96	41.96	6.24	6.27	6.27	45.29
20138	20142-1	2	Conduit	CIRC	271.7	24	24	6.91	7.05	6.96	N.M.*	6.24	6.27	6.27	N.M.*
20139	20138	1	Conduit	CIRC	27.1	24	24	-7.21	-11.13	-11.81	23.90	-8.01	-12.72	-14.18	-33.04
20139	20138	2	Conduit	CIRC	27.1	24	24	-7.22	-11.14	-11.82	N.M.*	-8.02	-12.74	-14.19	N.M.*
20140	20141	1	Conduit	CIRC	27.4	12	12	-2.92	-2.91	-3.35	-13.05	-3.25	-3.25	-3.63	-15.84
20141	20142	1	Conduit	CIRC	57.4	18	18	7.65	7.72	7.40	26.90	7.66	7.68	7.47	26.03
20142	W14001_sta18066	1	Conduit	CIRC	166.4	24	24	14.93	15.45	15.17	81.30	15.00	15.51	16.95	121.31
20142	W14001_sta18066	2	Conduit	CIRC	166.4	24	24	14.93	15.45	15.17	N.M.*	15.00	15.51	16.95	N.M.*
30000	30007	1	Conduit	CIRC	98.7	78	78	170.21	172.77	169.21	167.91	171.89	175.55	173.62	172.82
30001	30020	1	Conduit	CIRC	318.1	96	96	280.97	289.51	281.33	279.48	267.27	282.35	274.79	270.20
30002	30019	1	Conduit	CIRC	24.6	78	78	170.50	173.04	169.47	168.17	172.15	175.74	173.79	173.02
30003	30004	1	Conduit	CIRC	35.4	96	96	307.30	315.28	303.80	300.41	300.34	312.47	300.69	297.36
30004	30021	1	Conduit	CIRC	37.4	102	102	307.25	315.33	303.85	300.45	300.32	312.49	300.65	297.32
30005	30006	1	Conduit	CIRC	323.6	102	102	343.94	355.83	344.57	341.31	364.86	387.08	373.95	370.47
30006	30016	1	Conduit	CIRC	314.3	102	102	343.85	355.87	344.63	341.36	364.81	387.21	373.90	370.61
30007	30027	1	Conduit	CIRC	114.4	78	78	170.08	172.65	169.09	167.78	171.77	175.46	173.53	172.72
30008	30023	1	Conduit	CIRC	30	30	30	21.66	22.39	20.67	20.48	16.08	16.64	15.37	15.34
30009	30017	1	Conduit	CIRC	37.9	24	24	5.58	5.71	5.50	5.46	6.23	6.49	6.36	6.28
30009	30022	2	Conduit	CIRC	296.8	102	102	344.12	355.58	344.35	341.11	364.99	386.75	374.06	370.60
30010	30027	1	Conduit	CIRC	59.8	60	60	132.36	135.50	129.48	128.29	112.35	121.15	116.86	114.01
30011	30010	1	Conduit	CIRC	193.5	60	60	132.34	135.48	129.46	128.28	112.45	121.15	116.85	114.01
30012	30001	1	Conduit	CIRC	239.2	96	96	280.93	289.45	281.23	279.39	267.22	282.32	274.78	270.21
30013	30003	1	Conduit	CIRC	478.5	96	96	307.34	315.24	303.76	300.38	300.36	312.44	300.72	297.39
30014	W14001_sta14971	1	Conduit	CIRC	1150	24	24	5.51	5.64	5.47	5.43	6.17	6.46	6.28	6.22
30015	W14001_sta14945	2	Conduit	CIRC	14.8	102	102	416.02	428.26	416.99	413.80	493.72	516.78	503.29	500.44
30016	30015	1	Conduit	CIRC	151.5	102	102	416.03	428.28	417.04	413.79	492.84	516.56	502.62	499.87
30017	30014	1	Conduit	CIRC	298.2	24	24	5.56	5.66	5.49	5.45	6.19	6.47	6.30	6.24
30018	30012	1	Conduit	CIRC	63.4	96	96	280.90	289.41	281.15	279.32	267.17	282.29	274.76	270.19
30019	30000	1	Conduit	CIRC	238.7	78	78	170.35	172.89	169.32	168.03	172.01	175.64	173.69	172.91
30020	30023	1	Conduit	CIRC	24.2	96	96	281.03	289.54	281.38	279.54	267.30	282.36	274.80	270.26
30021	30009	1	Conduit	CIRC	29.8	102	102	349.74	361.29	349.87	346.60	371.27	393.26	380.32	376.85
30022	30005	1	Conduit	CIRC	329.7	102	102	344.02	355.63	344.37	341.12	364.91	386.71	373.98	370.52
30023	30013	1	Conduit	CIRC	362.4	96	96	307.81	314.73	303.66	299.89	300.54	312.32	300.89	297.55
30027	30018	1	Conduit	CIRC	11.6	96	96	280.87	289.37	281.09	279.26	267.35	282.27	274.74	270.17
30029	30028	1	Conduit	RECT	46	96	96	703.78	703.53	703.47	703.45	943.83	943.56	941.48	941.47

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
30029	30028	2	Conduit	RECT	46	96	96	703.78	703.53	703.47	703.45	943.83	943.56	941.48	941.47
30030	W1400105_sta1458	1	Conduit	RECT	48	36	72	10.01	10.27	10.45	10.75	22.50	22.40	23.69	23.99
30030	W1400105_sta1458	2	Conduit	RECT	48	36	72	10.01	10.27	10.45	10.75	22.50	22.40	23.69	23.99
30032	10044	1	Conduit	CIRC	32	24	24	-10.60	5.19	5.29	5.29	-14.72	-14.63	-14.99	-14.99
30033	3144616	1	Conduit	CIRC	55.4	24	24	5.76	4.59	4.93	5.13	7.73	7.76	7.74	7.74
30034	5022	1	Conduit	CIRC	21	24	24	31.29	15.52	15.71	15.92	23.39	21.58	20.64	20.64
30035	5022	1	Conduit	CIRC	55	24	24	25.73	18.11	18.95	19.15	17.86	22.35	22.24	21.79
30036	10046	1	Conduit	CIRC	52.3	24	24	2.47	2.07	2.14	2.12	3.58	3.58	3.58	3.58
30037	5027	1	Conduit	CIRC	72.4	24	24	13.24	12.73	12.88	12.85	22.04	22.04	22.04	22.04
3143189	3143196	1	Conduit	CIRC	256.4	66	66	115.84	117.15	117.12	118.73	121.24	122.11	122.81	127.26
3143195	3143197	1	Conduit	CIRC	352.2	24	24	12.56	12.59	12.63	12.73	12.24	12.29	12.34	12.71
3143196	3143201	1	Conduit	CIRC	217.1	66	66	121.80	123.37	123.24	125.71	125.75	126.66	127.52	132.25
3143197	3143196	1	Conduit	CIRC	25.7	24	24	12.55	12.58	14.57	12.72	26.71	26.68	28.67	28.53
3143201	5013	1	Conduit	CIRC	73.8	66	66	121.88	123.49	123.34	125.83	125.94	126.87	127.58	132.31
3143205	C092	1	Conduit	CIRC	307.9	66	66	148.31	151.07	150.31	161.47	171.69	172.20	173.70	182.58
3143206	3143205	1	Conduit	CIRC	96.9	30	30	23.89	32.50	33.96	35.58	30.20	30.31	31.22	33.27
3143206	5906227	2	Conduit	CIRC	28.8	30	30	-22.18	-27.36	-28.50	-29.82	-22.43	-23.95	-24.27	-25.06
3143209	3144624	1	Conduit	CIRC	556.4	24	24	10.70	10.81	10.86	10.91	10.37	10.46	10.45	10.51
3143214	E05	1	Conduit	CIRC	266.6	30	30	19.25	19.51	19.52	20.08	16.00	16.12	16.40	16.90
3143215	3143214	1	Conduit	CIRC	260.3	24	24	12.66	12.92	13.07	13.20	9.81	9.90	10.44	10.76
3143216	3143215	1	Conduit	CIRC	283.4	24	24	10.36	10.61	10.38	10.90	7.17	7.22	7.21	7.66
3143228	C086	1	Conduit	CIRC	144.3	24	24	22.00	22.31	22.36	23.19	21.99	22.01	22.01	22.63
3143498	3143189	1	Conduit	CIRC	73.9	18	18	-1.22	-4.54	-4.03	-2.87	-1.09	-1.22	-1.20	-1.46
3143499	3143196	1	Conduit	CIRC	75	18	18	-3.06	-3.36	-2.49	-3.72	-1.04	-1.39	-1.94	-1.37
3143507	5013	1	Conduit	CIRC	72.8	18	18	6.09	5.87	4.83	-3.67	8.24	8.30	9.05	9.44
3144582	5001	1	Conduit	CIRC	107.9	30	30	26.68	30.94	33.11	35.17	24.30	25.48	26.53	27.24
3144583	5891	1	Conduit	CIRC	248	66	66	123.29	127.82	128.82	135.29	119.19	121.82	123.58	126.88
3144584	3144583	1	Conduit	CIRC	40.3	24	24	20.34	20.14	21.79	21.84	22.06	22.20	22.93	23.26
3144586	3144612	1	Conduit	CIRC	735.2	66	66	82.04	89.32	87.96	88.05	93.21	91.87	92.24	92.80
3144586	3178791	2	Conduit	CIRC	380.5	66	66	-77.08	-84.29	-82.98	-83.07	-85.91	-86.13	-85.74	-88.98
3144587	3144599	1	Conduit	CIRC	299.2	36	36	25.49	26.97	27.47	28.66	24.12	24.89	25.52	26.20
3144591	5891	1	Conduit	CIRC	24.4	24	24	21.06	23.90	24.60	24.95	18.73	21.03	21.84	22.21
3144598	3144591	1	Conduit	CIRC	47	24	24	21.04	23.87	24.57	24.93	18.76	21.04	21.85	22.22
3144599	3144609	1	Conduit	CIRC	288.1	36	36	25.65	27.01	27.52	28.69	24.09	24.68	25.34	26.10
3144600	3144619	1	Conduit	CIRC	478.3	30	30	21.71	22.12	22.22	22.37	23.56	23.74	23.93	24.07
3144602	3218829	1	Conduit	CIRC	176.7	48	48	33.85	29.93	30.27	30.43	35.54	33.02	32.08	27.34
3144603	3144605	1	Conduit	CIRC	26.6	72	72	-748.48	192.91	209.68	236.92	-493.30	276.14	-310.16	283.24
3144605	3144602	1	Conduit	CIRC	129	48	48	71.56	-30.53	-23.11	-21.60	34.53	22.48	-26.49	-24.79
3144605	3144606	2	Conduit	CIRC	20.2	72	72	878.55	302.83	294.42	314.45	570.87	447.46	418.96	426.54
3144606	5022	1	Conduit	CIRC	36.7	72	72	201.00	156.42	154.71	153.63	138.39	143.52	142.89	142.92
3144607	3144603	1	Conduit	CIRC	294.3	72	72	110.84	115.73	114.64	114.78	113.02	114.19	111.60	113.05
3144608	5023	1	Conduit	RECT	131.8	60	72	169.02	157.64	156.25	155.78	145.82	144.65	145.27	147.01
3144609	3144610	1	Conduit	CIRC	30.1	36	36	25.53	27.04	27.56	28.74	26.79	28.59	28.68	28.41
3144610	B48	1	Conduit	CIRC	290.5	66	66	192.54	202.50	204.94	207.47	193.61	200.78	203.99	209.69
3144612	3144613	1	Conduit	CIRC	43.7	66	66	82.18	89.54	88.20	88.28	89.50	90.33	90.07	92.86
3144613	5007	1	Conduit	CIRC	298.8	66	66	108.20	114.71	113.02	113.16	109.74	109.71	109.57	112.89
3144614	3144615	1	Conduit	CIRC	20.4	24	24	11.43	11.59	11.40	11.53	-11.13	-8.23	-7.85	-7.85
3144615	3144613	1	Conduit	CIRC	39.2	24	24	25.16	26.84	22.29	21.83	21.15	20.98	20.92	20.91
3144616	10044	1	Conduit	RECT	53.6	60	72	163.89	163.53	162.61	161.91	152.75	151.27	152.28	153.39
3144617	3144917	1	Conduit	CIRC	75	24	24	-1.40	0.66	0.70	0.79	7.67	6.99	6.55	5.62
3144618	3144615	1	Conduit	CIRC	180	24	24	20.35	21.14	18.02	17.65	14.86	15.08	14.59	14.58

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
3144619	3144627	1	Conduit	CIRC	23.3	30	30	-16.78	17.33	17.54	18.20	-21.57	-21.37	-22.12	-21.93
3144623	3144618	1	Conduit	CIRC	199.4	24	24	20.82	21.40	18.47	18.07	14.91	15.21	14.65	14.64
3144624	E08	1	Conduit	CIRC	279.1	30	30	19.80	21.64	22.17	23.07	17.28	18.77	19.74	20.62
3144627	3144628	1	Conduit	CIRC	53.6	36	36	22.80	24.25	24.87	25.41	18.17	20.30	21.18	22.65
3144628	3144629	1	Conduit	CIRC	458.7	36	36	31.32	34.03	35.44	36.64	24.30	28.60	30.41	31.44
3144629	B47	1	Conduit	CIRC	150.4	36	36	39.18	42.34	43.75	45.11	32.46	36.14	38.54	41.19
3144631	3144623	1	Conduit	CIRC	136.9	24	24	12.13	12.34	10.89	10.42	11.57	11.69	11.14	10.48
3144632	3144633	1	Conduit	CIRC	36.1	24	24	11.31	11.46	11.28	11.40	6.95	7.03	6.95	7.36
3144633	3144614	1	Conduit	CIRC	191	24	24	11.38	11.53	11.35	11.47	6.87	6.95	7.03	7.43
3144637	3144631	1	Conduit	CIRC	61.9	24	24	8.72	8.83	8.40	8.31	-8.92	-8.88	-8.88	-8.83
3144638	3144623	1	Conduit	CIRC	182	24	24	9.54	9.86	8.52	8.40	-8.50	-8.18	-9.20	-9.12
3144640	3144641	1	Conduit	CIRC	98.7	24	24	11.28	11.33	11.16	11.27	-7.19	-7.20	6.98	7.23
3144641	3144632	1	Conduit	CIRC	191.9	24	24	11.26	11.40	11.23	11.35	7.01	7.09	6.92	7.30
3144642	3144640	1	Conduit	CIRC	23.2	24	24	-19.23	-18.82	-19.60	-19.60	-19.14	-19.15	-19.91	-19.90
3144643	3144638	1	Conduit	CIRC	152.6	24	24	9.92	10.11	9.00	8.89	-8.51	-8.19	-9.21	-9.13
3144646	3144642	1	Conduit	CIRC	197.9	24	24	6.02	6.04	6.35	6.36	6.23	6.23	6.59	6.60
3144647	3144646	1	Conduit	CIRC	85.2	24	24	4.83	4.89	4.65	4.66	6.69	6.64	6.50	6.50
3144648	3144637	1	Conduit	CIRC	441.4	24	24	-9.35	9.19	8.77	8.69	-12.13	-12.03	-11.94	-11.82
3144911	5890	1	Conduit	CIRC	15.1	24	24	-1.67	1.55	-1.72	-1.61	-13.03	-12.94	-12.60	-10.87
3144912	5890	1	Conduit	CIRC	30.3	24	24	16.71	16.18	16.23	16.31	20.04	21.08	21.58	22.66
3144913	3144624	1	Conduit	CIRC	10.6	24	24	15.73	15.73	15.73	15.73	21.27	21.70	21.67	21.98
3144914	3144624	1	Conduit	CIRC	35.4	24	24	13.33	14.63	15.15	15.78	12.80	12.87	12.42	12.56
3144915	E08	1	Conduit	CIRC	9.2	18	18	6.17	6.17	6.17	6.17	10.63	10.65	10.67	10.69
3144916	E08	1	Conduit	CIRC	38.6	18	18	10.03	9.01	9.71	8.80	8.74	9.10	8.90	9.62
3144917	B49	1	Conduit	CIRC	14.5	24	24	7.71	7.68	7.63	7.61	13.18	14.17	14.71	15.63
3144928	3144600	1	Conduit	CIRC	47.7	18	18	-2.32	-2.90	-2.65	-2.21	5.99	5.73	5.95	5.96
3144930	3144600	1	Conduit	CIRC	281.4	24	24	-7.58	-7.52	-7.40	-7.37	-11.53	-11.54	-11.50	-11.49
3144931	3144627	1	Conduit	CIRC	38	24	24	9.41	6.82	6.27	5.65	6.32	-7.94	6.59	7.26
3144932	3144629	1	Conduit	CIRC	24.7	18	18	11.42	11.42	11.42	11.42	13.38	14.51	15.10	15.81
3144935	3144631	1	Conduit	CIRC	37.6	24	24	14.56	13.09	10.52	9.37	13.71	14.36	12.69	12.83
3144936	3144631	1	Conduit	CIRC	26.7	24	24	8.30	5.25	4.86	4.27	5.84	6.96	7.26	7.10
3144937	3144648	1	Conduit	CIRC	5.6	24	24	-7.08	-7.06	-7.06	-7.05	-7.47	-7.47	-7.48	-7.48
3144938	3144648	1	Conduit	CIRC	19	24	24	-11.56	-11.49	-11.24	-11.20	-13.96	-13.92	-13.70	-13.69
3144944	3144586	1	Conduit	CIRC	13.6	24	24	-30.94	-30.89	-30.56	-30.57	-31.81	-31.82	-31.46	-31.46
3144951	3144647	1	Conduit	CIRC	4.6	24	24	-7.71	-7.70	-8.48	-8.49	-10.13	-10.13	-10.80	-10.80
3144952	3144951	1	Conduit	CIRC	27.8	24	24	-25.88	-25.91	-25.98	-25.98	-27.19	-27.19	-27.07	-27.07
3144955	3144956	1	Conduit	CIRC	28.4	24	24	-23.89	-22.78	-23.71	-23.71	-23.14	-23.14	-24.05	-24.05
3144956	3144640	1	Conduit	CIRC	5	24	24	21.14	13.06	11.54	11.51	11.56	11.71	9.74	9.86
3144962	3144602	1	Conduit	CIRC	60.1	30	30	39.97	40.83	38.40	38.18	-34.86	-33.97	-33.78	-33.66
3144967	3144600	1	Conduit	CIRC	44.6	24	24	-8.46	-8.41	-8.68	-8.71	-24.23	-24.03	-23.83	-23.75
3146601	3146604	1	Conduit	CIRC	233.5	36	36	23.90	26.36	31.48	39.38	26.43	28.75	31.64	40.74
3146604	3146605	1	Conduit	CIRC	57.7	30	30	24.21	26.94	35.24	39.99	26.80	29.22	34.45	41.12
3146605	W14001_sta19981	1	Conduit	CIRC	158.8	36	36	24.80	27.90	36.06	40.58	27.92	30.02	35.03	41.49
3146608	3146737	1	Conduit	CIRC	68.3	24	24	10.91	10.71	14.39	10.85	-12.56	14.47	14.14	10.55
3146737	3146738	1	Conduit	CIRC	53.7	24	24	11.01	10.86	14.49	10.97	15.26	14.54	14.21	10.63
3146738	W14001_sta19481	1	Conduit	CIRC	38	24	24	11.66	11.03	14.62	11.12	21.05	19.73	-23.44	-27.61
3146742	5819	1	Conduit	CIRC	16.8	12	12	-2.38	-0.09	7.55	6.29	-2.54	-2.64	7.41	6.25
3146748	5809	1	Conduit	CIRC	17.6	12	12	1.68	-0.04	1.55	-0.19	2.16	1.75	1.86	-0.79
3146749	5804	1	Conduit	CIRC	17.2	12	12	0.82	-0.05	-0.09	-0.14	3.02	3.33	2.80	2.85
3146752	5830	1	Conduit	CIRC	16.2	12	12	2.87	3.86	-1.96	-1.63	2.62	2.75	2.04	-1.99
3146756	5822	1	Conduit	CIRC	17.8	12	12	2.77	1.70	5.36	4.21	2.92	3.88	5.26	4.21

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
3146767	3146601	1	Conduit	CIRC	8.3	18	18	9.71	13.35	13.92	-29.51	6.85	9.86	9.90	-28.63
3146769	W14001_sta20481	1	Conduit	CIRC	143.5	15	15	7.60	7.85	9.22	37.03	7.65	8.06	9.01	48.69
3175098	6031	1	Conduit	CIRC	104.2	24	24	11.22	11.14	12.74	12.85	-8.68	-8.67	-8.28	-8.27
3175100	6028	1	Conduit	CIRC	95.9	24	24	3.72	3.74	4.96	5.01	-4.60	-4.59	5.42	5.43
3175102	6023	1	Conduit	CIRC	147.4	96	96	237.49	237.68	231.89	231.67	250.45	250.66	362.97	244.98
3175104	3175279	1	Conduit	CIRC	14.7	24	24	16.86	16.76	16.90	16.79	26.48	26.47	26.28	26.28
3175107	3175112	1	Conduit	CIRC	89.2	96	96	220.37	223.97	221.30	225.81	216.50	215.36	212.17	213.08
3175109	3175111	1	Conduit	CIRC	48.9	60	60	4.56	-6.82	-5.64	-5.08	7.89	7.89	7.89	7.89
3175111	5967	1	Conduit	CIRC	296.5	96	96	234.34	236.18	239.10	239.16	235.36	235.76	245.25	245.27
3175112	3175111	1	Conduit	CIRC	166.2	96	96	237.15	235.20	238.07	238.13	231.74	232.22	239.94	240.01
3175112	3175113	2	Conduit	CIRC	326.4	36	36	-43.52	-36.07	-33.39	35.32	20.68	21.09	22.36	23.36
3175113	3175115	1	Conduit	CIRC	177.9	36	36	43.29	44.90	45.82	48.33	34.94	35.32	36.08	37.62
3175114	3175115	1	Conduit	CIRC	90.8	30	30	-4.46	-26.47	-30.65	-33.34	-4.36	-4.24	-4.28	-5.18
3175115	3175121	1	Conduit	CIRC	263.2	48	48	46.39	48.07	49.03	51.63	38.54	38.96	39.76	41.33
3175121	3177634	1	Conduit	CIRC	153.1	48	48	48.52	50.07	51.02	53.66	40.84	41.27	42.07	43.67
3175122	3175121	1	Conduit	CIRC	72.2	18	18	-3.72	-7.05	-6.50	-10.30	-1.66	-1.70	-1.82	-2.00
3175261	3175113	1	Conduit	CIRC	76.6	18	18	-2.83	-14.24	-12.90	-4.87	-1.98	-1.73	-1.77	-2.50
3175272	5968	1	Conduit	CIRC	35.8	30	30	-34.40	-35.18	-27.01	-25.88	-42.44	-42.36	-34.85	-34.83
3175279	6023	1	Conduit	CIRC	81.8	24	24	10.96	11.05	11.06	11.13	9.95	10.02	9.97	10.00
3176092	3176096	1	Conduit	CIRC	508.6	42	42	-19.43	-20.12	-21.64	-19.35	33.54	33.54	32.77	32.77
3176094	3176254	1	Conduit	CIRC	492	30	30	34.99	35.04	35.14	35.15	34.09	34.12	34.16	34.47
3176096	3176098	1	Conduit	CIRC	27.2	54	54	55.77	56.30	58.77	58.75	59.77	61.19	80.85	80.87
3176098	3176255	1	Conduit	CIRC	15.4	54	54	57.26	57.68	58.83	58.80	65.08	66.46	80.88	80.89
3176100	3176255	1	Conduit	RECT	179.1	96	96	261.79	264.19	273.17	273.05	281.73	284.39	297.09	297.05
3176102	3176100	1	Conduit	CIRC	151.5	96	96	236.23	238.05	241.27	241.16	241.73	244.49	256.11	256.09
3176102	3176105	2	Conduit	CIRC	15	24	24	-35.24	-35.24	-35.06	-32.27	-27.07	-26.26	-27.24	-26.10
3176104	5974	1	Conduit	CIRC	532.7	96	96	242.04	243.43	247.14	247.04	238.67	240.39	257.83	257.84
3176105	3176108	1	Conduit	CIRC	282.7	36	36	-35.29	-34.92	-34.39	-32.45	-26.41	-25.75	-26.80	-25.60
3176107	3176109	1	Conduit	CIRC	277.2	30	30	14.14	14.01	14.66	14.67	21.23	21.21	20.90	20.90
3176108	5963	1	Conduit	CIRC	240.6	42	42	-46.47	-46.18	-46.81	-46.74	-50.64	-50.64	-50.61	-50.59
3176109	3176110	1	Conduit	CIRC	32.7	30	30	-56.36	-56.25	-56.90	-56.92	-69.77	-69.75	-70.90	-70.90
3176110	3176113	1	Conduit	CIRC	387.3	54	54	26.89	28.92	29.58	29.97	62.21	62.17	63.93	63.92
3176112	5960	1	Conduit	CIRC	187.7	48	48	24.59	26.70	28.46	30.38	-35.42	-32.30	-33.58	-32.20
3176113	3178754	1	Conduit	CIRC	353.5	54	54	-45.38	-45.07	-44.12	-44.18	-63.63	-63.59	-61.12	-61.13
3176115	3178753	1	Conduit	CIRC	298.7	48	48	34.85	36.57	38.04	42.25	34.88	35.37	35.99	36.23
3176245	6006	1	Conduit	RECT	171.7	96	96	304.27	301.95	300.70	297.72	298.40	301.90	297.29	294.68
3176246	5997	1	Conduit	RECT	107.4	96	96	289.79	289.27	288.55	286.33	307.39	314.91	305.96	302.74
3176247	5988	1	Conduit	RECT	136.4	96	96	300.68	302.70	300.91	298.60	282.00	284.40	278.44	275.29
3176248	5985	1	Conduit	RECT	190.5	96	96	294.87	293.29	291.22	288.30	273.34	271.85	269.41	265.42
3176249	5982	1	Conduit	RECT	215	96	96	292.25	289.00	288.00	287.46	275.91	279.05	278.22	278.07
3176251	5979	1	Conduit	RECT	199.3	96	96	316.01	316.47	310.60	310.95	337.12	339.41	303.88	303.88
3176254	3176096	1	Conduit	CIRC	10.4	36	36	43.02	43.48	38.11	38.57	40.87	41.22	40.39	40.57
3176255	3176251	1	Conduit	RECT	318.2	96	96	318.23	321.09	331.43	331.30	354.19	356.57	377.50	377.48
3176274	3176275	1	Conduit	CIRC	49.4	24	24	-21.34	-21.33	-20.77	-20.77	-21.95	-21.95	-21.36	-21.36
3176275	5960	1	Conduit	CIRC	42	24	24	16.44	16.98	17.20	16.60	-20.25	-20.05	-20.24	-20.15
3177634	3177638	1	Conduit	CIRC	34.6	48	48	48.63	50.12	51.07	53.72	40.92	41.35	42.18	43.75
3177638	3177642	1	Conduit	CIRC	283.8	48	48	55.18	56.38	57.27	59.96	47.08	47.55	48.41	50.06
3177642	3177653	1	Conduit	CIRC	253.6	54	54	65.54	66.55	67.00	70.09	53.65	54.16	54.00	56.34
3177643	3177642	1	Conduit	CIRC	93.7	24	24	12.36	12.31	12.45	-16.10	14.40	14.39	14.41	14.41
3177646	3177647	1	Conduit	CIRC	267.1	21	21	9.82	9.82	9.93	9.93	10.56	10.56	10.85	10.85
3177653	3177664	1	Conduit	CIRC	363.7	54	54	73.33	74.54	75.36	78.37	64.26	64.78	65.62	67.74

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
3177657	3177646	1	Conduit	CIRC	154.5	18	18	-0.76	-0.76	-0.76	-0.76	-1.01	-1.03	-1.02	-1.01
3177664	5929	1	Conduit	CIRC	64.7	54	54	86.52	87.98	88.32	90.89	79.18	79.76	80.91	82.87
3177674	3177677	1	Conduit	CIRC	48.6	60	60	94.51	96.13	96.62	98.99	-133.27	-132.98	-131.81	-130.45
3177675	3177674	1	Conduit	CIRC	42	24	24	21.11	21.25	21.33	21.67	20.32	20.36	20.49	20.67
3177677	3177683	1	Conduit	CIRC	402.8	60	60	96.99	98.70	99.23	101.91	94.17	95.01	96.62	99.95
3177678	3177677	1	Conduit	CIRC	71.7	24	24	15.74	15.70	16.02	15.98	16.66	16.70	16.88	17.01
3177683	3143189	1	Conduit	CIRC	185.3	66	66	110.01	111.11	110.98	111.99	115.59	116.43	117.20	121.51
3177966	3177657	1	Conduit	CIRC	110.6	18	18	-0.35	-0.35	-0.35	-0.35	-0.59	-0.59	-0.59	-0.59
3177985	3177683	1	Conduit	CIRC	67.6	18	18	-1.37	-3.68	-3.32	-2.63	-1.41	-1.26	-1.62	-1.70
3177990	3177664	1	Conduit	CIRC	70.5	18	18	6.29	6.42	6.39	6.63	8.94	8.94	9.84	8.67
3178003	3177653	1	Conduit	CIRC	94	18	18	-3.90	-5.51	-4.95	-8.12	-1.79	-1.94	-2.01	-2.11
3178015	3177638	1	Conduit	CIRC	72.7	18	18	6.74	6.94	7.94	8.69	-5.39	-5.38	-5.38	-5.37
3178751	3178752	1	Conduit	CIRC	127	24	24	-15.92	-15.88	-16.20	-16.14	-16.70	-16.70	-17.00	-17.00
3178752	3179002	1	Conduit	CIRC	118.8	24	24	18.33	18.30	18.25	18.21	18.93	18.92	18.85	18.85
3178753	5952	1	Conduit	CIRC	45.8	54	54	41.81	43.72	45.12	48.50	62.47	62.07	62.33	62.00
3178754	3178756	1	Conduit	CIRC	220.5	54	54	39.90	43.03	41.36	41.86	32.53	34.51	35.13	38.79
3178755	3178763	1	Conduit	CIRC	270.6	24	24	17.48	18.23	18.74	19.52	16.77	17.21	17.51	18.53
3178756	3178767	1	Conduit	CIRC	267	54	54	47.33	49.93	46.57	47.00	43.73	46.16	45.23	48.88
3178758	3178762	1	Conduit	CIRC	32.2	30	30	23.43	26.61	29.15	29.88	-24.16	-29.26	-24.19	24.37
3178759	3178758	1	Conduit	CIRC	86	30	30	-23.50	21.71	-24.69	-24.63	-25.49	-20.08	-26.90	-26.89
3178760	3178759	1	Conduit	CIRC	70.4	30	30	26.63	27.23	27.56	27.52	28.12	28.44	29.49	29.47
3178761	3178760	1	Conduit	CIRC	136.1	30	30	19.32	22.55	23.82	24.30	18.22	18.67	18.94	20.05
3178762	5926	1	Conduit	CIRC	320.4	60	60	58.62	61.56	62.78	66.84	60.86	59.07	62.18	66.53
3178763	3178765	1	Conduit	CIRC	48.5	24	24	19.26	23.09	23.93	24.40	18.05	18.49	19.01	19.86
3178765	3178761	1	Conduit	CIRC	89.1	30	30	19.12	22.84	23.86	24.30	18.06	18.50	20.95	20.91
3178767	3236593	1	Conduit	CIRC	326	54	54	81.42	85.37	82.09	82.14	87.97	88.16	84.83	83.35
3178768	3178767	1	Conduit	CIRC	42	54	54	45.57	39.75	45.07	45.07	47.77	48.08	61.20	61.19
3178769	3178768	1	Conduit	CIRC	121.7	66	66	60.92	61.09	72.19	72.19	74.45	74.74	89.28	89.27
3178770	3178769	1	Conduit	CIRC	95.8	66	66	57.03	57.13	58.92	58.88	84.90	84.92	82.59	82.58
3178771	3178770	1	Conduit	CIRC	282.2	66	66	57.81	57.89	59.43	59.39	75.71	75.95	76.47	76.43
3178772	3178771	1	Conduit	CIRC	405.4	66	66	57.85	57.93	59.46	59.43	76.06	76.25	79.87	79.85
3178773	3178772	1	Conduit	CIRC	26.3	66	66	-61.52	-61.51	-67.32	-67.35	-138.90	-138.70	-147.72	-147.74
3178775	5926	1	Conduit	CIRC	24.5	24	24	14.87	15.79	16.52	17.00	18.79	19.16	18.65	18.73
3178778	3179011	1	Conduit	CIRC	4.8	18	18	-13.50	-13.94	-12.41	-12.53	-13.51	-14.12	-12.51	-13.00
3178778	5926	2	Conduit	CIRC	48.4	24	24	13.57	14.98	14.21	14.45	12.34	13.51	12.51	13.18
3178779	5923	1	Conduit	CIRC	24.8	24	24	15.96	17.23	17.85	18.74	14.67	14.01	16.19	16.43
3178781	3178773	1	Conduit	CIRC	344.2	66	66	-61.50	-61.50	-66.76	-66.77	-70.42	-70.46	-72.79	-72.79
3178783	3178781	1	Conduit	CIRC	40.6	66	66	47.18	-47.27	42.95	43.04	132.98	134.88	131.05	130.97
3178785	5921	1	Conduit	CIRC	35.2	24	24	13.66	14.73	14.66	15.10	14.35	14.62	14.33	14.45
3178787	5905	1	Conduit	CIRC	564.6	66	66	84.90	93.21	96.94	102.21	82.06	90.37	95.89	98.38
3178788	3178787	1	Conduit	CIRC	44.8	24	24	-4.27	-6.78	-7.39	-8.43	-10.99	-10.91	-11.33	-11.19
3178790	3178783	1	Conduit	CIRC	364.8	66	66	-68.84	-72.65	-64.94	-65.32	-82.61	-83.02	-84.87	-85.40
3178791	3178790	1	Conduit	CIRC	394.7	66	66	-65.58	-69.81	-68.41	-68.76	-80.62	-81.73	-81.57	-82.16
3178792	3144587	1	Conduit	CIRC	351.2	36	36	25.48	26.94	27.43	29.64	24.16	25.09	25.75	26.40
3178793	3178792	1	Conduit	CIRC	104.2	30	30	25.47	28.92	32.57	34.84	24.21	25.23	26.00	26.69
3178794	5905	1	Conduit	CIRC	41.8	24	24	25.69	32.50	26.68	27.02	24.42	31.52	25.25	25.65
3178797	3178793	1	Conduit	CIRC	99.7	30	30	25.47	30.97	32.57	34.58	24.24	25.31	26.16	26.86
3178987	3178791	1	Conduit	CIRC	9.7	24	24	-21.33	-21.22	-21.63	-21.64	-28.82	-29.01	-29.43	-29.42
3178988	3178790	1	Conduit	CIRC	12.9	24	24	-18.26	-18.19	-18.37	-18.37	-25.20	-25.43	-25.61	-25.60
3178989	3178783	1	Conduit	CIRC	17.4	24	24	22.15	23.02	23.08	23.11	23.71	22.72	22.12	22.00
3178992	3178753	1	Conduit	CIRC	17.4	24	24	-28.06	-27.81	-26.78	-26.72	-31.56	-31.51	-30.45	-30.43

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
3179002	3178755	1	Conduit	CIRC	40.4	24	24	14.73	15.33	15.37	16.08	-16.25	-16.24	14.66	15.44
3179010	3178778	1	Conduit	CIRC	35.6	18	18	-14.76	-14.74	-14.72	-14.71	-15.33	-15.33	-15.31	-15.30
3179012	3178775	1	Conduit	CIRC	29.4	24	24	-28.28	-28.05	-28.04	-27.98	-37.21	-37.21	-37.09	-37.08
3179013	3178775	1	Conduit	CIRC	16.2	24	24	-27.28	-26.99	-27.15	-27.06	-36.35	-36.34	-36.36	-36.35
3179018	3178779	1	Conduit	CIRC	6.1	18	18	-18.83	-17.84	-18.95	-18.94	-19.91	-19.18	-19.92	-19.91
3179019	3178779	1	Conduit	CIRC	43.4	18	18	-13.80	-15.13	-14.09	-14.09	-14.66	-16.04	-14.89	-14.89
3179020	3178785	1	Conduit	CIRC	8.7	18	18	-8.21	-7.94	-8.39	-8.31	-13.55	-13.55	-13.86	-13.86
3179021	3178785	1	Conduit	CIRC	30.6	18	18	-9.91	-9.79	-10.10	-10.03	-14.32	-14.27	-14.56	-14.56
3179024	3178788	1	Conduit	CIRC	32	18	18	0.70	-1.67	2.55	2.40	8.31	8.01	8.84	9.05
3179025	3178788	1	Conduit	CIRC	9.2	18	18	-4.95	-4.68	-5.62	-5.36	-10.87	-10.69	-11.03	-10.95
3179029	3178794	1	Conduit	CIRC	35.3	18	18	-12.18	-17.59	-12.48	-12.46	-13.04	-18.25	-13.56	-13.56
3179030	5905	1	Conduit	CIRC	27.3	18	18	-5.87	-5.82	-5.18	-4.65	-14.05	-14.18	-13.93	-13.71
3218806	3236636	1	Conduit	CIRC	460.9	24	24	-8.04	-8.01	-10.53	-7.21	19.65	19.70	20.30	20.32
3218808	30011	1	Conduit	CIRC	255.2	60	60	132.33	135.47	129.45	128.27	112.65	121.14	116.85	114.01
3218814	3218808	1	Conduit	CIRC	509.3	60	60	83.70	83.86	83.26	82.87	80.75	80.72	80.03	79.76
3218819	3218814	1	Conduit	CIRC	318.6	60	60	104.84	97.44	96.18	96.10	105.39	105.62	103.55	103.39
3218824	3218819	1	Conduit	CIRC	394.1	54	54	64.79	64.84	62.60	62.23	61.07	60.33	59.70	59.56
3218829	3218824	1	Conduit	CIRC	254.1	48	48	66.12	65.92	64.89	64.81	64.41	62.83	62.68	62.62
3218832	5897	1	Conduit	CIRC	29.8	24	24	29.46	29.47	29.35	29.35	30.69	30.69	30.54	30.54
3218866	6029753	1	Conduit	RECT	43.8	60	72	211.62	191.26	190.07	189.72	216.85	217.47	217.06	216.89
3218873	5005	1	Conduit	RECT	42.3	60	72	191.95	196.85	189.28	188.66	179.77	182.87	176.51	175.39
3219151	3218814	1	Conduit	CIRC	28.5	24	24	6.35	-3.47	-5.16	-5.24	-5.90	-5.73	-7.45	-7.47
3219152	3218814	1	Conduit	CIRC	13.6	24	24	15.18	14.40	14.61	14.61	14.71	14.91	14.89	14.85
3219153	3218808	1	Conduit	CIRC	13.2	24	24	40.33	37.96	35.52	35.84	33.70	34.41	31.68	31.64
3219183	3219184	1	Conduit	CIRC	39.6	24	24	-11.54	-11.97	-13.14	-13.14	-11.68	-12.15	-13.32	-13.31
3219184	3218832	1	Conduit	CIRC	191	24	24	-21.10	-21.00	-20.91	-20.91	-22.34	-22.27	-22.10	-22.10
3219186	5870	1	Conduit	CIRC	15.8	24	24	-1.05	-1.39	0.45	0.36	-2.67	-1.70	-1.41	-0.23
3219196	5874	1	Conduit	CIRC	16.9	24	24	-1.00	-0.93	-1.59	-1.60	-7.22	-7.04	-7.61	-7.64
3219197	5874	1	Conduit	CIRC	6.2	24	24	-11.18	-11.18	-11.73	-11.73	-11.59	-11.64	-12.09	-12.07
3219198	5876	1	Conduit	CIRC	16.2	24	24	-24.82	-23.89	-24.72	-25.05	-36.02	-35.25	-35.66	-35.76
3219200	5860	1	Conduit	CIRC	18.3	24	24	-22.13	-22.09	-21.43	-21.44	-24.75	-24.72	-24.12	-24.13
3219201	5860	1	Conduit	CIRC	37.2	24	24	20.94	21.10	20.60	20.71	20.78	21.03	20.23	20.39
3221259	10051	1	Conduit	RECT	243.6	72	84	220.52	229.74	215.04	212.93	210.82	217.89	214.77	212.17
3221268	10053	1	Conduit	RECT	12.3	72	84	226.45	235.67	220.95	217.54	216.53	224.76	215.64	212.04
3221271	5033	1	Conduit	RECT	135.3	72	84	232.85	242.35	227.67	224.02	240.44	237.40	228.40	222.75
3221280	W14001_sta16681	1	Conduit	CIRC	39.8	84	84	233.37	242.86	228.11	224.41	241.06	238.96	230.00	224.34
3234001	3234312	1	Conduit	RECT	456.3	60	96	384.32	386.31	387.07	389.93	451.89	451.89	452.30	452.25
3234041	6006	1	Conduit	CIRC	228.1	24	24	14.13	14.28	14.27	14.27	12.68	12.71	12.45	12.51
3234043	6013	1	Conduit	CIRC	286	36	36	28.54	28.70	30.46	30.26	34.26	34.08	34.11	34.13
3234049	3234043	1	Conduit	CIRC	410.6	36	36	29.51	29.61	31.78	32.56	34.25	34.07	34.10	34.12
3234050	3234049	1	Conduit	CIRC	25.2	24	24	16.22	16.35	16.35	16.35	-18.73	-18.70	-18.25	-18.25
3234051	3234041	1	Conduit	CIRC	456.5	24	24	14.33	14.44	14.44	14.44	12.66	12.69	12.43	12.49
3234051	3234052	2	Conduit	CIRC	16.1	24	24	14.08	14.61	14.53	14.63	15.83	15.85	15.88	15.87
3234052	3236559	1	Conduit	CIRC	506.4	24	24	17.44	17.99	17.45	17.63	14.38	14.68	14.51	15.23
3234054	3234051	1	Conduit	CIRC	44.4	24	24	8.41	8.40	8.50	8.54	8.98	9.03	9.09	9.19
3234057	3234049	1	Conduit	CIRC	166.1	36	36	-21.27	-23.78	-21.74	-21.60	15.47	15.20	15.82	15.82
3234058	3234059	1	Conduit	CIRC	17.2	30	30	0.00	0.00	0.00	0.00	-5.25	-5.05	18.31	-111.22
3234058	3236568	2	Conduit	CIRC	341.7	36	36	0.00	0.00	0.00	0.00	-0.89	0.65	0.28	-1.31
3234059	3234057	1	Conduit	CIRC	182.5	36	36	-21.34	-23.85	-21.82	-21.66	-13.95	-14.16	-13.95	-13.94
3234307	6013	1	Conduit	RECT	124.4	96	84	315.49	316.26	315.73	315.20	312.20	311.94	312.20	312.16
3234307	6013	2	Conduit	RECT	124.4	96	84	315.49	316.26	315.73	315.20	312.20	311.94	312.20	312.16

			Existing Conditions												
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
3234312	6018	1	Conduit	RECT	446	60	96	385.92	387.86	388.51	391.09	403.15	403.71	403.31	405.86
3234315	6016	1	Conduit	RECT	338.3	96	84	320.57	319.06	319.58	319.60	329.99	329.72	329.91	329.86
3234315	6016	2	Conduit	RECT	338.3	96	84	320.57	319.06	319.58	319.60	329.99	329.72	329.91	329.86
3236559	3236576	1	Conduit	CIRC	424.5	30	30	19.19	19.81	19.19	19.38	16.32	16.63	16.43	17.20
3236568	3236569	1	Conduit	CIRC	11	30	30	-13.64	-14.89	-14.05	-14.01	-8.80	-9.22	-8.28	-8.72
3236568	3236582	2	Conduit	CIRC	420.6	36	36	13.77	15.00	14.17	14.14	9.33	9.54	9.46	10.23
3236569	3234059	1	Conduit	CIRC	342	30	30	-24.16	-26.89	-25.02	-24.79	-17.32	-17.70	-17.60	-17.58
3236576	3236590	1	Conduit	CIRC	279.5	36	36	19.27	19.89	19.27	19.46	24.94	25.60	25.57	25.55
3236582	3236584	1	Conduit	CIRC	32.5	36	36	13.84	15.06	14.24	14.22	9.51	9.72	9.61	10.41
3236584	3236615	1	Conduit	CIRC	504.3	72	72	111.74	117.25	113.48	113.86	107.81	108.62	106.59	107.70
3236585	3236584	1	Conduit	CIRC	14.3	60	60	108.17	110.39	103.46	103.78	102.52	103.11	101.18	101.94
3236585	3236569	2	Conduit	CIRC	453.2	30	30	-10.92	-12.20	-11.22	-11.21	5.93	6.12	6.21	-6.29
3236588	3236585	1	Conduit	CIRC	20.2	30	30	-14.76	-15.37	-16.31	-16.36	-26.32	-27.15	-28.04	-28.05
3236589	3236588	1	Conduit	CIRC	15.3	24	24	-12.48	-13.60	-14.76	-14.80	-15.97	-17.70	-19.13	-19.13
3236590	3236593	1	Conduit	CIRC	7.8	36	36	19.32	19.93	19.32	19.51	34.83	36.41	35.88	35.83
3236593	3236585	1	Conduit	CIRC	377.3	60	60	89.05	93.41	90.27	90.38	94.63	94.86	92.15	91.63
3236596	3236589	1	Conduit	CIRC	361.2	24	24	7.43	7.59	8.21	8.21	8.23	8.97	9.56	9.56
3236596	3236593	2	Conduit	CIRC	18	24	24	-12.43	-12.61	-13.16	-13.18	-15.86	-16.15	-16.78	-16.79
3236615	3236633	1	Conduit	CIRC	631.9	78	78	133.36	136.39	133.18	133.43	151.97	153.93	152.24	151.89
3236631	30002	1	Conduit	CIRC	324	78	78	170.61	173.15	169.57	168.27	172.17	175.76	173.81	173.03
3236632	3236631	1	Conduit	CIRC	426.1	78	78	170.79	173.32	169.73	168.44	172.31	175.90	173.93	173.14
3236633	3236634	1	Conduit	CIRC	29.8	78	78	145.52	149.55	144.51	144.06	148.04	149.61	148.03	148.99
3236634	3236632	1	Conduit	CIRC	471.9	78	78	145.10	148.45	144.18	143.69	151.55	153.49	151.47	152.46
3236636	3236633	1	Conduit	CIRC	30	24	24	-9.87	-8.88	-9.70	-9.82	-22.05	-21.41	-21.49	-21.57
4161810	3144629	1	Conduit	CIRC	28	18	18	5.41	5.41	5.41	5.41	6.32	7.29	7.35	8.10
4161811	3144628	1	Conduit	CIRC	19.1	18	18	-8.35	-8.26	-8.65	-8.61	-9.17	-9.15	-9.46	-9.42
4161812	3144627	1	Conduit	CIRC	38.2	18	18	-10.18	-9.48	-9.75	-9.49	-11.61	-11.54	-12.51	-12.45
4165577	W14001_ML_16756	1	Conduit	CIRC	294.8	30	30	13.50	15.74	13.74	13.74	20.49	20.37	20.43	19.89
4165579	4165577	1	Conduit	CIRC	220.4	24	24	10.88	13.19	11.09	11.09	15.05	16.45	16.39	15.88
4165581	4165579	1	Conduit	CIRC	184.7	24	24	5.35	7.10	5.99	5.98	10.84	10.30	11.00	10.55
4165583	4165581	1	Conduit	CIRC	309.1	24	24	3.33	2.70	2.14	-2.06	7.78	6.79	7.15	7.01
4165585	5360	1	Conduit	CIRC	68.3	36	36	-1.95	-1.02	-1.02	-1.02	-15.56	-16.95	-15.56	-15.48
4165604	4165577	1	Conduit	CIRC	7.6	24	24	0.73	0.73	0.73	0.73	1.23	1.24	1.26	1.26
4165605	4165577	1	Conduit	CIRC	51.3	24	24	1.96	1.96	1.99	1.99	8.49	6.26	4.45	5.16
4165607	4165581	1	Conduit	CIRC	50.1	24	24	0.27	0.26	0.27	0.27	-4.91	-3.62	-2.40	-2.75
4165610	4165583	1	Conduit	CIRC	56.5	24	24	0.83	0.70	0.70	0.66	2.35	1.98	2.28	2.22
4165614	5361	1	Conduit	CIRC	85.1	36	36	9.44	9.45	9.45	9.44	16.90	16.71	16.68	16.71
4165616	4165614	1	Conduit	CIRC	62.9	30	30	9.44	9.45	9.44	9.45	16.65	16.56	16.55	16.56
5708649	5225	1	Conduit	CIRC	32.2	24	24	7.04	8.43	6.71	-0.15	-14.44	-12.52	-13.27	12.36
5708650	5225	1	Conduit	CIRC	25.9	24	24	-11.74	-10.82	-11.56	-0.41	-13.07	-13.49	-13.29	15.62
5708651	5708650	1	Conduit	CIRC	21.2	24	24	19.75	19.18	20.66	0.34	20.58	20.42	21.33	22.05
5708685	5850	1	Conduit	CIRC	29.2	24	24	-21.63	13.05	11.11	5.46	-21.72	-20.00	-20.27	14.23
5708686	5850	1	Conduit	CIRC	16.3	24	24	27.03	16.96	13.47	27.21	13.08	13.51	25.21	24.53
5708689	5849	1	Conduit	CIRC	28.6	24	24	16.83	16.77	15.37	24.61	18.40	18.39	17.01	19.44
5906134	5881	1	Conduit	RECT	13.6	60	120	328.75	328.76	328.26	328.22	307.89	310.63	310.27	310.58
5906135	5906134	1	Conduit	RECT	200.9	60	120	319.61	319.62	319.12	319.07	300.17	302.79	302.41	302.71
5906136	5906135	1	Conduit	RECT	48.2	60	120	319.71	319.73	319.23	319.17	300.37	303.00	302.60	302.91
5906137	5906136	1	Conduit	RECT	71.5	60	120	280.17	280.30	280.01	280.28	263.86	266.33	265.92	266.43
5906138	5906137	1	Conduit	RECT	204.6	60	120	280.28	280.41	280.13	280.40	264.07	266.53	266.12	266.62
5906139	5906138	1	Conduit	RECT	300.6	60	120	259.80	259.92	259.62	259.88	247.20	249.29	248.87	249.28
5906140	5906139	1	Conduit	RECT	97.5	60	120	216.52	217.89	216.99	216.86	204.82	206.55	206.26	206.57

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
5906141	5906140	1	Conduit	CIRC	71.6	60	60	216.36	217.54	216.54	216.47	205.11	206.73	206.46	206.73
5906142	5906141	1	Conduit	RECT	66.7	60	120	211.88	212.47	211.30	211.29	198.36	199.74	199.47	199.75
5906143	5906142	1	Conduit	RECT	259.9	60	120	211.72	212.22	211.22	211.22	198.59	199.89	199.63	199.91
5906172	5906141	1	Conduit	CIRC	52.7	24	24	-2.52	-2.64	-2.55	-2.53	9.04	9.01	7.45	7.43
5906175	5906139	1	Conduit	CIRC	40.7	36	36	28.73	28.79	28.64	28.70	23.94	23.94	23.68	24.01
5906176	5906175	1	Conduit	CIRC	481.5	36	36	28.70	28.76	28.61	28.68	23.96	23.97	23.70	24.00
5906177	5906176	1	Conduit	CIRC	510.6	36	36	28.64	28.70	28.57	28.63	24.01	24.01	23.74	23.98
5906183	5906136	1	Conduit	CIRC	349.4	36	36	31.23	31.11	30.91	30.57	29.43	29.50	29.51	29.28
5906184	5906258	1	Conduit	CIRC	130.5	30	30	-19.36	-21.03	-21.52	-22.15	26.07	26.02	27.50	27.30
5906227	5906228	1	Conduit	CIRC	16.3	30	30	-22.21	-27.40	-28.61	-29.89	-22.44	-23.95	-24.27	-24.85
5906228	5906184	1	Conduit	CIRC	251.5	30	30	-22.27	-27.59	-28.76	-29.99	-22.50	-23.99	-24.29	-24.88
5906232	5906233	1	Conduit	CIRC	200.4	24	24	14.67	14.73	14.75	14.82	13.16	13.20	13.27	13.28
5906233	5906234	1	Conduit	CIRC	298.1	24	24	14.70	14.76	14.78	14.85	13.17	13.21	13.28	13.30
5906234	5906177	1	Conduit	CIRC	39	30	30	23.88	23.90	24.35	24.45	23.64	23.65	23.60	23.64
5906250	5906184	1	Conduit	CIRC	276.7	24	24	16.96	17.19	17.34	18.37	14.71	14.86	15.36	16.01
5906258	5906183	1	Conduit	CIRC	601.7	30	30	20.82	20.78	20.46	19.98	17.57	17.50	-17.45	-17.50
5906312	5906143	1	Conduit	RECT	189.6	60	120	199.34	199.73	198.60	198.57	180.21	181.07	180.81	180.99
5906313	5906312	1	Conduit	RECT	130.9	60	120	199.04	199.41	198.32	198.30	180.48	181.24	180.99	181.14
5906314	5906313	1	Conduit	CIRC	263.3	48	48	62.89	62.98	61.63	61.85	73.21	72.98	70.77	70.72
5906316	5906318	1	Conduit	CIRC	186.3	36	36	27.45	27.37	26.89	26.97	25.81	25.77	26.00	26.08
5906317	5906316	1	Conduit	CIRC	81.4	36	36	27.44	27.34	26.87	26.95	25.80	25.75	25.97	26.07
5906318	5906314	1	Conduit	CIRC	56.7	48	48	62.84	62.93	61.59	61.82	-70.39	-70.22	-66.46	-66.41
5906319	5906318	1	Conduit	CIRC	55.2	36	36	36.62	36.90	36.83	36.99	-76.48	-76.31	-73.40	-73.36
5906321	5906319	1	Conduit	CIRC	231.8	36	36	36.58	36.88	36.79	36.95	34.20	34.48	34.64	34.65
5906330	5906331	1	Conduit	CIRC	260.4	24	24	12.39	12.47	12.50	12.56	11.44	11.45	11.68	11.67
5906331	5906321	1	Conduit	CIRC	323.3	36	36	34.06	34.34	34.28	34.42	31.66	31.92	32.09	32.09
5906359	5906317	1	Conduit	CIRC	95.2	36	36	27.37	27.29	26.57	26.68	25.45	25.41	25.53	25.65
5906361	5906359	1	Conduit	CIRC	605.2	36	36	23.24	23.15	22.55	22.62	20.97	20.95	21.39	21.43
5906388	5906313	1	Conduit	RECT	48.4	60	120	129.70	129.89	129.43	129.47	122.90	122.97	123.19	123.48
5906390	5906313	1	Conduit	CIRC	34.4	24	24	-0.17	-0.17	-0.17	-0.17	-14.67	-14.67	-15.37	-15.37
5906410	5906331	1	Conduit	CIRC	301.1	24	24	19.36	19.40	19.64	19.65	18.96	19.05	18.98	18.98
5906476	5906361	1	Conduit	CIRC	134.3	30	30	17.61	17.45	18.03	18.02	15.50	15.40	16.72	16.65
5906479	5906476	1	Conduit	CIRC	35.7	30	30	11.13	11.05	12.12	12.11	11.32	11.32	12.28	12.27
5906481	5906479	1	Conduit	CIRC	403.3	24	24	10.28	10.33	10.33	10.37	10.84	10.84	10.82	10.84
6029677	D18	1	Conduit	CIRC	209.5	30	30	13.51	15.35	18.35	19.93	13.37	13.84	14.22	14.33
6029685	6029677	1	Conduit	CIRC	41	30	30	9.87	14.21	17.04	18.57	7.93	10.29	11.85	12.44
6029687	6029685	1	Conduit	CIRC	37.8	30	30	-9.68	12.10	14.69	16.05	-10.30	-10.21	-12.54	-12.47
6029695	6029687	1	Conduit	CIRC	99.3	30	30	-17.29	-16.98	-16.44	16.07	-17.67	-17.65	-17.51	-17.41
6029697	6029695	1	Conduit	CIRC	348.1	30	30	12.54	15.15	17.36	17.96	12.25	12.49	14.64	15.65
6029708	6029697	1	Conduit	CIRC	286.6	30	30	6.51	6.60	7.44	7.62	-6.78	-6.87	-6.59	6.59
6029724	6029730	1	Conduit	CIRC	372.1	24	24	20.38	19.93	18.18	17.99	20.21	20.07	18.44	18.13
6029730	6029751	1	Conduit	CIRC	201.1	24	24	20.70	20.47	18.76	18.59	20.59	20.45	18.85	18.56
6029738	6029708	1	Conduit	CIRC	221.1	30	30	10.27	7.94	9.53	9.92	15.05	13.61	14.64	14.64
6029740	6029738	1	Conduit	CIRC	67.4	30	30	-24.48	-25.32	-22.75	-22.65	-26.88	-28.23	-25.74	-25.67
6029741	6029740	1	Conduit	CIRC	22.2	24	24	-9.25	-9.33	-8.66	-8.65	-9.32	-9.59	-8.80	-8.80
6029751	6029753	1	Conduit	CIRC	115.2	24	24	20.94	20.88	19.21	19.07	20.87	20.74	19.17	18.91
6029753	10048	1	Conduit	RECT	287.7	60	72	228.23	218.70	216.53	216.51	252.29	252.95	251.92	251.94
6029755	6029751	1	Conduit	CIRC	9.7	24	24	-0.42	-0.48	-0.44	-0.44	0.26	0.27	0.27	0.26
6029762	6029753	1	Conduit	CIRC	36.4	24	24	28.16	28.96	26.86	26.41	27.13	27.39	27.06	27.05
6029770	6029762	1	Conduit	CIRC	117.4	24	24	24.69	25.45	23.62	23.27	19.56	19.95	19.33	19.30
6029772	6029770	1	Conduit	CIRC	172.8	24	24	24.89	25.62	23.90	23.68	25.87	25.88	25.92	25.91

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
6029773	6029772	1	Conduit	CIRC	5	24	24	-23.46	-23.29	-22.98	-23.00	-46.18	-46.18	-45.94	-45.94
6029774	6029772	1	Conduit	CIRC	20.8	24	24	-27.85	-27.72	-28.10	-28.10	-45.59	-45.59	-45.79	-45.79
6029809	5849	2	Conduit	CIRC	331.4	36	36	17.38	18.05	17.09	45.44	-26.33	-24.09	-24.15	34.64
6029814	6029809	1	Conduit	CIRC	49.5	24	24	12.52	12.53	12.82	18.41	12.64	12.65	12.93	14.58
6029820	6029809	1	Conduit	CIRC	40.7	24	24	-9.79	-9.23	-12.29	-6.90	-11.43	-11.27	-14.07	-13.53
6029823	5861	1	Conduit	CIRC	20.7	24	24	-8.07	-8.05	-6.05	-6.06	-9.23	-9.23	-7.31	-7.31
6052589	5010	1	Conduit	CIRC	318.1	42	42	41.78	42.39	42.92	46.92	40.12	40.56	41.36	48.47
6052590	6052589	1	Conduit	CIRC	31.9	24	24	15.12	16.32	16.30	19.43	-18.99	-18.97	-19.48	-18.85
6052591	6052589	1	Conduit	CIRC	31.9	24	24	11.92	12.06	12.26	12.84	10.78	10.90	11.59	12.63
6052597	6052589	1	Conduit	CIRC	217.5	36	36	22.77	22.85	23.15	26.42	29.33	29.48	28.75	30.50
6052599	6052597	1	Conduit	CIRC	246	36	36	22.75	22.83	23.12	26.31	35.12	35.12	35.23	35.49
6052601	6052599	1	Conduit	CIRC	58.1	24	24	18.15	18.61	18.11	20.32	15.89	16.41	16.33	18.56
6052608	6052601	1	Conduit	CIRC	33.2	24	24	16.39	16.80	16.37	18.31	-14.82	-14.82	-15.42	15.68
6052609	6052601	1	Conduit	CIRC	31.8	24	24	5.18	5.45	5.24	5.98	-16.15	-16.15	-15.46	-15.42
6052620	6052621	1	Conduit	CIRC	160.5	24	24	28.13	28.13	28.08	28.08	28.82	28.82	28.72	28.72
6052621	6052633	1	Conduit	CIRC	139	24	24	28.13	28.13	28.08	28.08	34.36	34.36	33.67	33.67
6061092	5902	1	Conduit	CIRC	229	24	24	-2.42	-2.54	-2.44	-2.41	-5.81	-5.77	-5.23	-5.23
6061094	6061092	1	Conduit	CIRC	228.7	24	24	-2.30	-2.41	-2.31	-2.29	-9.04	-9.03	-9.02	-9.02
6061230	6061231	1	Conduit	CIRC	390.8	30	30	0.47	0.47	0.20	0.20	1.20	1.20	0.78	0.78
6061276	5916	1	Conduit	RECT	235.1	60	72	129.47	129.56	129.07	129.09	123.41	123.47	123.74	124.03
6061278	6061276	1	Conduit	CIRC	323.7	24	24	-6.90	-7.03	-6.97	-6.97	-6.55	-6.54	-6.24	-6.23
6061287	6061276	1	Conduit	RECT	212.1	60	72	119.35	119.38	119.10	119.33	110.20	110.27	110.68	110.92
6061295	6061287	1	Conduit	RECT	96	60	72	118.87	118.97	118.88	119.19	111.09	111.13	111.50	111.70
6061297	6061295	1	Conduit	CIRC	250.3	24	24	-3.04	-3.17	-4.66	-4.61	-9.17	-9.18	-9.82	-9.82
6061307	6061308	1	Conduit	CIRC	59.4	36	36	33.37	33.63	33.41	33.44	30.50	30.77	30.65	30.79
6061308	5940	1	Conduit	RECT	13.7	60	120	113.29	113.39	113.49	113.88	100.24	100.33	100.94	101.19
6061320	6061307	1	Conduit	CIRC	246.2	36	36	33.32	33.64	33.67	33.70	30.61	30.72	30.77	30.91
6061322	6061320	1	Conduit	CIRC	172	24	24	12.14	12.12	12.09	12.10	11.91	11.90	11.88	11.89
6061332	6061320	1	Conduit	CIRC	195.4	36	36	26.53	26.81	26.28	26.36	23.27	23.64	23.11	23.17
6061338	6061320	1	Conduit	CIRC	183.4	24	24	10.32	10.34	10.37	10.42	9.08	9.10	9.41	9.46
6061347	6061338	1	Conduit	CIRC	344.3	24	24	5.32	5.31	5.64	5.65	5.65	5.66	5.64	5.64
6061355	6061332	1	Conduit	CIRC	191.1	30	30	26.47	26.76	26.19	26.28	23.20	23.57	23.03	23.09
6061365	6061355	1	Conduit	CIRC	160.4	30	30	24.66	24.94	24.63	24.72	21.36	21.72	21.34	21.41
6061368	6061365	1	Conduit	CIRC	28.7	24	24	14.43	14.29	14.68	14.75	11.94	11.91	12.53	12.52
6061377	6061368	1	Conduit	CIRC	140.6	24	24	12.76	12.27	12.81	12.86	10.25	10.27	10.49	10.51
6061387	6061365	1	Conduit	CIRC	158	24	24	10.34	10.72	10.25	10.28	9.05	9.31	8.91	8.95
6061395	6061308	1	Conduit	RECT	29.4	60	72	78.83	78.81	78.77	78.88	65.45	65.56	66.06	66.51
6061397	6061395	1	Conduit	RECT	137.1	60	72	78.74	78.72	78.66	78.80	65.34	65.47	65.88	66.34
6061405	6061397	1	Conduit	CIRC	139.6	60	60	78.66	78.65	78.57	78.74	68.95	68.93	70.68	70.65
6061415	6061405	1	Conduit	CIRC	129.8	60	60	76.44	76.46	76.80	77.03	62.68	62.87	63.66	64.14
6061423	6061415	1	Conduit	CIRC	409.4	60	60	68.07	68.09	69.12	69.38	55.03	55.07	54.96	55.22
6061431	6061423	1	Conduit	CIRC	80	60	60	74.23	74.21	74.31	74.30	99.00	99.02	98.20	98.19
6061433	6061431	1	Conduit	CIRC	35.4	36	36	31.07	31.12	31.84	31.98	31.15	31.21	29.00	29.01
6061441	6061433	1	Conduit	CIRC	162.2	36	36	30.99	31.03	31.79	31.93	24.51	24.54	22.36	22.37
6061443	6061441	1	Conduit	CIRC	147.6	24	24	-5.88	-5.87	-5.38	-5.38	-6.97	-6.97	-6.24	-6.24
6061451	6061441	1	Conduit	CIRC	102.3	30	30	25.07	25.14	24.83	24.97	-17.95	-17.95	17.77	17.83
6061459	6061431	1	Conduit	CIRC	129.1	48	48	31.15	31.64	31.89	32.04	31.56	31.59	31.60	31.77
6061461	6061459	1	Conduit	CIRC	33.2	48	48	31.51	32.04	32.27	32.25	31.62	31.65	31.66	31.82
6061463	6061461	1	Conduit	CIRC	142	48	48	31.85	32.41	32.63	32.60	31.67	31.70	31.71	31.88
6061466	6061463	1	Conduit	CIRC	100.1	42	42	25.64	26.15	28.58	28.71	25.23	25.27	-26.24	-26.23
6061468	6061466	1	Conduit	CIRC	29.6	42	42	26.07	26.58	27.81	27.92	26.79	26.82	29.14	29.13

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
6061471	6061468	1	Conduit	CIRC	164.9	42	42	21.71	22.27	25.45	25.55	20.72	20.76	21.19	21.18
6061479	6061451	1	Conduit	CIRC	210.4	30	30	24.91	24.98	20.97	21.09	16.77	16.81	16.91	16.93
6061481	6061479	1	Conduit	CIRC	241.1	24	24	5.71	5.71	4.40	4.45	-5.14	-5.13	-5.11	-5.12
6061489	6061479	1	Conduit	CIRC	245.4	24	24	19.49	19.39	18.66	18.71	14.33	14.34	14.54	14.56
6061497	6061489	1	Conduit	CIRC	68.6	24	24	16.77	16.73	16.32	16.35	12.19	12.20	12.20	12.22
6061499	6061497	1	Conduit	CIRC	305.1	24	24	11.73	11.70	12.01	12.03	-5.97	-5.97	-5.90	-5.91
6062507	6061463	1	Conduit	CIRC	41.2	24	24	17.89	17.89	18.79	18.79	17.98	17.98	18.83	18.83
6062515	6062507	1	Conduit	CIRC	349.4	24	24	7.55	7.55	7.40	7.41	7.47	7.47	7.36	7.36
6062523	6062515	1	Conduit	CIRC	167.2	24	24	-1.74	-1.96	-1.95	-1.96	4.04	4.02	4.04	4.03
6062528	6061468	1	Conduit	CIRC	214.4	24	24	7.58	7.59	7.49	7.49	7.37	7.38	7.46	7.46
6062536	6061471	1	Conduit	CIRC	34.8	24	24	8.65	8.65	8.70	8.70	8.63	8.64	8.45	8.46
6062544	6062536	1	Conduit	CIRC	260.8	24	24	8.65	8.66	8.70	8.71	9.00	9.02	8.92	8.92
6062552	6061471	1	Conduit	CIRC	151.7	42	42	18.51	18.22	22.70	22.78	-23.59	-23.60	-24.45	-24.46
6062554	6062552	1	Conduit	CIRC	132.1	24	24	7.47	7.43	5.45	5.45	5.13	5.13	5.25	5.25
6062562	6062552	1	Conduit	CIRC	56.4	42	42	-23.14	-23.12	-25.60	-25.58	-34.90	-34.91	-37.74	-37.74
6062570	6062562	1	Conduit	CIRC	87.6	36	36	14.58	14.43	19.55	19.57	24.05	23.99	28.20	28.18
6062572	6062570	1	Conduit	CIRC	36.6	24	24	6.63	6.61	6.29	6.29	6.71	6.71	-6.74	-6.74
6062580	6062572	1	Conduit	CIRC	386.3	24	24	6.62	6.62	6.24	6.23	7.22	7.24	7.26	7.26
6062588	6062570	1	Conduit	CIRC	163.5	30	30	-15.35	-15.35	16.95	16.94	-16.21	-16.23	-16.14	-16.15
6062598	6062588	1	Conduit	CIRC	152.6	30	30	-18.36	-18.37	14.69	14.67	-20.19	-20.19	10.58	10.57
6073349	6073404	1	Conduit	CIRC	305.2	24	24	6.92	6.90	7.33	7.31	9.45	9.45	9.61	9.61
6073352	6076543	1	Conduit	CIRC	46.5	24	24	8.11	8.11	10.97	10.97	8.27	8.27	11.08	11.08
6073420	6073416	1	Conduit	CIRC	308.7	24	24	8.15	8.15	8.12	8.12	10.94	10.94	10.93	10.92
6073424	6073426	1	Conduit	CIRC	63.3	24	24	7.91	7.91	8.08	8.08	9.12	9.12	8.66	8.66
6073426	6073352	1	Conduit	CIRC	126	24	24	-2.59	-2.59	-3.58	-3.58	-4.66	-4.66	-4.76	-4.76
6073433	6073473	1	Conduit	CIRC	256.7	48	48	-36.94	-31.44	-32.13	-31.86	-14.08	-14.12	-17.40	-17.40
6073436	6073438	1	Conduit	CIRC	246	48	48	60.99	60.92	58.73	58.70	73.23	73.23	71.15	71.15
6073438	6073447	1	Conduit	CIRC	236.9	60	60	-66.05	-50.29	-54.68	-65.05	-37.45	-37.43	-31.23	-31.23
6073447	6073451	1	Conduit	CIRC	261.3	60	60	46.25	46.15	47.09	47.05	49.96	50.00	50.56	50.57
6073451	6037	1	Conduit	CIRC	185.2	66	66	86.09	85.95	88.13	88.04	90.98	91.00	93.47	93.47
6073459	6040	1	Conduit	CIRC	43.5	78	78	-95.00	-83.69	-80.70	-78.87	49.19	50.37	51.74	53.54
6073463	6073459	1	Conduit	CIRC	172.3	54	54	-56.00	-56.48	-52.02	-51.21	-38.34	-38.05	-39.39	-39.39
6073469	6073463	1	Conduit	CIRC	45.6	48	48	-58.62	-56.40	-56.88	-57.38	-27.57	-27.53	-22.01	-22.01
6073473	6073469	1	Conduit	CIRC	279.3	48	48	-64.04	-49.47	-51.36	-54.84	-14.57	-14.57	-16.04	-16.06
6073491	6075001	1	Conduit	CIRC	185	84	84	-98.38	-90.10	-82.24	-81.23	52.03	52.81	53.63	55.51
6075001	6075451	1	Conduit	CIRC	101	84	84	-102.00	-94.34	-85.10	-84.22	52.19	52.91	53.40	55.06
6075003	6075011	1	Conduit	CIRC	307.8	24	24	12.13	12.47	12.64	12.84	9.33	9.34	9.35	9.35
6075006	6075033	1	Conduit	CIRC	154.1	78	78	-113.90	-98.61	-100.02	-100.18	52.88	52.93	50.45	48.89
6075008	6075039	1	Conduit	CIRC	215.8	48	48	-42.68	-35.51	-36.24	-35.15	-15.45	-15.43	-14.26	-14.26
6075011	6075045	1	Conduit	CIRC	581.5	54	54	-54.76	-49.41	-49.97	-49.16	34.48	34.53	34.15	34.15
6075013	6075065	1	Conduit	CIRC	264.1	48	48	-38.91	-36.90	-40.62	-37.73	17.05	17.06	18.38	18.38
6075016	6076597	1	Conduit	CIRC	118.9	60	60	-55.51	-49.88	-49.91	-50.53	-30.29	-30.27	-49.72	-49.70
6075019	6075083	1	Conduit	CIRC	134.5	60	60	-88.51	-80.47	-77.66	-77.75	27.11	27.35	-26.70	28.03
6075021	6075085	1	Conduit	CIRC	385.3	48	48	-47.33	-47.56	-43.12	-41.01	23.37	-23.51	-23.53	23.28
6075024	6075123	1	Conduit	CIRC	212.6	48	48	-27.93	-26.66	-27.39	-26.42	9.18	9.19	9.03	9.04
6075027	3175102	1	Conduit	CIRC	33.4	78	78	-110.89	-95.60	-96.99	-97.01	55.99	56.03	52.06	52.05
6075033	6075027	1	Conduit	CIRC	106.2	78	78	-114.49	-99.16	-100.60	-100.66	52.89	52.93	50.23	48.89
6075039	6075006	1	Conduit	CIRC	33.3	48	48	-44.01	-38.16	-40.40	-42.28	-26.01	-25.99	-24.91	-24.90
6075045	6075006	1	Conduit	CIRC	278.8	60	60	56.82	55.37	56.73	56.58	54.41	54.39	55.35	55.35
6075065	6075011	1	Conduit	CIRC	33.9	48	48	-45.54	-42.81	-44.81	-41.48	-26.49	-26.46	-25.40	-25.39
6075083	6076557	1	Conduit	CIRC	118.3	60	60	-88.32	-81.00	-77.62	-77.64	51.49	51.50	44.20	44.18

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
6075085	6075019	1	Conduit	CIRC	37.4	48	48	-49.60	-49.48	-44.90	-42.91	-30.62	-30.64	-28.60	-28.61
6075095	6075097	1	Conduit	CIRC	20.7	54	54	-54.51	-46.46	-47.90	-48.46	-19.92	-19.91	-17.79	-17.79
6075097	6075016	1	Conduit	CIRC	8.1	60	60	-53.19	-45.46	-48.63	-48.54	-38.59	-38.58	-55.24	-55.23
6075103	6075107	1	Conduit	CIRC	40.9	48	48	-45.69	-40.92	-40.89	-42.84	-19.90	-19.88	18.27	18.54
6075107	6075095	1	Conduit	CIRC	196.4	54	54	-52.74	-45.31	-46.83	-46.97	-19.92	-19.91	-17.79	-17.78
6075111	6075103	1	Conduit	CIRC	38.7	48	48	-47.66	-41.77	-41.94	-42.14	42.96	42.94	56.29	56.25
6075121	6075125	1	Conduit	CIRC	41.1	48	48	-28.05	-24.14	-26.04	-25.76	26.19	26.20	29.26	29.27
6075123	6075121	1	Conduit	CIRC	44.9	48	48	-30.48	-27.29	-28.19	-27.64	9.18	9.06	9.08	8.62
6075125	6075111	1	Conduit	CIRC	218.5	48	48	-45.72	-40.69	-41.64	-43.08	17.45	17.46	21.84	21.83
6075451	6075459	1	Conduit	CIRC	287.2	84	84	-100.42	-93.46	-82.87	-81.77	55.29	55.90	54.26	55.26
6075459	6075465	1	Conduit	CIRC	81.7	84	84	-101.60	-94.46	-83.46	-82.40	55.66	55.87	-67.25	-67.26
6075463	6031	1	Conduit	CIRC	148.8	84	84	208.17	208.31	207.87	211.73	253.88	253.92	253.37	253.39
6075465	6075463	1	Conduit	CIRC	41.7	84	84	-125.82	-125.86	-123.92	-123.90	-190.72	-190.72	-188.58	-188.58
6076543	6073420	1	Conduit	CIRC	265.8	24	24	-4.04	-4.04	-4.85	-4.82	-5.97	-5.97	-6.65	-6.65
6076557	6075006	1	Conduit	CIRC	30.6	66	66	-87.83	-81.21	-77.44	-77.54	38.56	38.86	-28.73	28.41
6076597	6075019	1	Conduit	CIRC	160.4	60	60	-64.88	-58.24	-57.90	-55.90	-32.64	-32.66	-38.10	-38.10
6076632	6076635	1	Conduit	CIRC	374.1	24	24	1.73	1.73	1.60	1.60	2.44	2.44	2.28	2.28
6198704	6198706	1	Conduit	RECT	111.8	60	120	322.72	322.84	322.72	322.17	296.03	299.67	301.10	300.78
6198706	6198708	1	Conduit	RECT	317	60	120	318.15	318.64	318.62	317.53	291.16	294.15	294.27	294.05
6198708	6198711	1	Conduit	RECT	85.1	60	120	313.23	313.53	313.34	312.71	288.24	291.07	291.09	291.02
6198711	6198730	1	Conduit	RECT	338	60	120	354.65	354.65	354.41	354.51	323.08	326.92	326.81	327.07
6198730	6198761	1	Conduit	RECT	325.8	60	120	371.07	371.20	371.06	371.01	335.22	337.91	337.91	337.82
6198761	6198771	1	Conduit	RECT	136.8	60	120	368.24	368.28	368.19	368.25	334.61	337.30	337.32	337.22
6198771	6198780	1	Conduit	RECT	119.2	60	120	365.72	365.76	365.80	365.81	333.96	336.75	336.76	336.66
6198780	6198784	1	Conduit	RECT	44.2	60	120	366.08	366.68	366.59	366.39	333.37	336.18	336.21	336.10
6198784	6198788	1	Conduit	RECT	98	60	120	366.67	367.84	367.75	367.55	332.80	335.66	335.68	335.56
6198788	6198792	1	Conduit	RECT	224.3	60	120	378.47	379.43	379.35	379.18	346.89	348.41	350.43	350.15
6198792	6198800	1	Conduit	RECT	496.6	60	120	418.18	418.16	418.09	417.88	394.02	399.07	399.53	398.98
6198793	6198792	1	Conduit	CIRC	39.4	24	24	9.46	9.46	9.46	9.46	14.77	15.18	15.22	15.19
6198800	6198804	1	Conduit	RECT	97.3	60	120	453.82	453.78	453.15	452.94	447.61	454.52	454.20	453.45
6198804	6198824	1	Conduit	RECT	74.7	60	120	463.83	463.77	463.12	462.90	457.34	465.39	465.47	464.59
6198806	6198804	1	Conduit	CIRC	64.2	24	24	7.39	7.39	7.12	7.12	-9.99	-9.96	-10.40	-10.44
6198808	6198804	1	Conduit	CIRC	9.9	24	24	2.70	2.80	3.00	3.00	-23.56	-23.45	-22.87	-23.00
6198813	6198806	1	Conduit	CIRC	13.3	24	24	0.53	0.53	0.53	0.53	-7.67	-7.66	-7.79	-7.80
6198814	6198806	1	Conduit	CIRC	7.7	24	24	6.86	6.86	6.59	6.59	8.42	8.47	8.26	8.23
6198824	6198834	1	Conduit	RECT	120.7	60	120	470.82	470.78	470.72	470.50	468.18	476.55	477.24	476.29
6198825	6198808	1	Conduit	CIRC	18.1	24	24	2.33	2.33	2.45	2.45	3.91	4.04	4.23	4.18
6198826	6198808	1	Conduit	CIRC	28.9	24	24	0.29	0.33	0.29	0.29	5.15	5.17	5.10	5.12
6198834	6198836	1	Conduit	RECT	53.9	60	120	503.74	503.81	502.22	502.00	493.53	502.80	503.43	502.37
6198836	6198853	1	Conduit	RECT	92.9	60	120	506.86	507.10	505.52	505.28	496.79	506.21	506.85	505.75
6198837	6198834	1	Conduit	CIRC	27.6	24	24	1.00	1.00	1.00	1.00	-10.24	-9.57	-8.04	-8.16
6198838	6198836	1	Conduit	CIRC	6.2	24	24	1.95	1.95	1.36	1.36	8.61	8.23	7.76	7.86
6198839	6198836	1	Conduit	CIRC	20.5	24	24	1.24	1.24	1.83	1.83	7.71	5.72	7.73	7.92
6198853	6198858	1	Conduit	RECT	321.7	60	120	520.77	520.24	518.65	518.43	516.77	526.67	527.35	526.19
6198854	6198853	1	Conduit	CIRC	15.7	24	24	0.31	0.31	0.31	0.31	-0.70	-0.56	0.48	0.48
6198858	Mathewson_Pond	1	Conduit	RECT	186.1	60	120	536.30	536.61	535.38	535.15	540.64	551.38	551.85	550.58
6198859	6198858	1	Conduit	CIRC	17.8	24	24	2.12	2.12	2.11	2.11	3.62	3.65	3.69	3.68
6198860	6198858	1	Conduit	CIRC	12.3	24	24	4.26	4.26	4.51	4.51	6.12	6.15	6.28	6.28
6198869	6198834	1	Conduit	CIRC	202.2	24	24	28.60	28.60	27.08	27.08	24.90	25.08	24.80	24.81
6198872	6198869	1	Conduit	CIRC	116.4	24	24	19.46	19.46	19.82	19.82	19.45	19.49	19.86	19.87
6198873	6198869	1	Conduit	CIRC	11.8	24	24	2.08	2.08	1.61	1.61	-4.87	-4.86	-4.78	-4.79

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6198874	6198869	1	Conduit	CIRC	23.3	24	24	0.66	0.66	0.62	0.62	-5.81	-5.81	-5.85	-5.86
6198884	6198872	1	Conduit	CIRC	106	24	24	12.42	12.41	12.43	12.43	12.31	12.30	12.23	12.22
6198885	6198884	1	Conduit	CIRC	16.9	24	24	-5.60	-5.60	-6.00	-6.00	-8.52	-8.52	-9.11	-9.12
6198886	6198884	1	Conduit	CIRC	28.5	24	24	1.32	1.32	1.18	1.18	4.41	4.43	4.63	4.65
6198892	6198884	1	Conduit	CIRC	101.6	24	24	8.48	8.46	8.44	8.44	9.00	9.01	8.81	8.82
6198894	6198892	1	Conduit	CIRC	182.8	24	24	-6.05	-6.05	-6.01	-6.01	-9.24	-9.17	-9.36	-9.37
7204174	3234307	1	Conduit	RECT	38.8	96	84	315.45	316.22	315.69	315.16	310.94	310.73	308.75	308.68
7204174	3234307	2	Conduit	RECT	38.8	96	84	315.45	316.22	315.69	315.16	310.94	310.73	308.75	308.68
31467671	3146601	1	Conduit	CIRC	65.7	18	18	-8.91	-8.60	-8.50	-18.25	-9.09	-9.14	-8.98	-17.62
31467672	3146601	1	Conduit	CIRC	354.6	18	18	5.95	5.83	6.23	22.41	6.08	6.27	6.36	23.92
31467673	31467672	1	Conduit	CIRC	23.3	15	15	-4.00	-3.96	-5.05	-14.45	-3.98	-3.98	-5.09	-15.25
10008!_2D	10008	1	Weir	78.171	0	9.96	96	5.69	6.49	5.38	5.38	9.88	10.38	9.05	9.06
10009!_2D	10009	1	Weir	76.974	0	9.96	156	44.17	42.13	47.88	46.54	48.55	47.15	49.82	45.01
10010!_2D	10010	1	Weir	77.035	0	9.96	156	9.81	9.36	4.75	4.71	12.92	11.44	-11.37	-8.84
10032!_2D	10032	1	Weir	80.65	0	0	87	-3.32	-3.32	-3.36	-3.36	6.72	6.75	6.63	6.65
10055!_2D	10055	1	Weir	77.183	0	9.96	96	0.18	0.18	0.19	0.19	-9.68	-7.34	-6.19	-3.50
10056!_2D	10056	1	Weir	77.134	0	9.96	96	1.15	1.15	1.14	1.15	11.57	6.76	6.95	6.42
10059!_2D	10059	1	Weir	77.889	0	9.96	96	3.83	4.49	4.02	4.02	4.72	5.10	5.82	5.64
20053!_2D	20053	1	Weir	78.478	0	0	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20103!_2D	20103	1	Weir	79.39	0	0	87	2.96	0.00	0.00	0.00	25.77	21.43	17.68	25.74
20104!_2D	20104	1	Weir	79.362	0	0	87	0.00	0.00	0.00	0.00	-4.58	-2.80	0.00	-0.65
20105!_2D	20105	1	Weir	79.619	0	0	87	1.25	0.81	0.62	0.68	4.42	4.56	3.78	4.06
20106!_2D	20106	1	Weir	79.225	0	0	87	0.47	0.17	0.10	0.13	-5.42	-3.93	2.01	-1.62
20107!_2D	20107	1	Weir	78.837	0	0	87	14.77	15.35	15.52	15.52	17.49	18.51	21.38	20.53
20108!_2D	20108	1	Weir	78.938	0	0	87	5.57	6.51	6.42	6.53	5.24	5.42	5.99	5.70
20109!_2D	20109	1	Weir	79.279	0	0	87	4.91	4.22	3.81	3.92	6.19	6.28	6.37	6.22
20110!_2D	20110	1	Weir	79.192	0	0	87	1.89	2.08	1.98	2.07	-2.69	-2.18	2.11	2.06
20111!_2D	20111	1	Weir	78.723	0	0	87	-3.43	4.16	5.38	4.72	-10.42	-9.81	-8.35	-8.88
20112!_2D	20112	1	Weir	79.125	0	0	87	-1.56	1.25	1.54	1.55	-5.56	-5.24	-4.60	-4.83
20113!_2D	20113	1	Weir	78.976	0	0	87	10.85	13.72	14.02	14.02	15.00	15.16	15.51	15.39
20114!_2D	20114	1	Weir	79.183	0	0	87	4.43	4.59	5.08	4.94	4.92	4.93	4.91	4.87
20115!_2D	20115	1	Weir	78.829	0	0	87	2.64	3.27	3.95	3.84	-3.06	-3.05	3.40	3.62
20119!_2D	20119	1	Weir	77.931	0	0	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20120!_2D	20120	1	Weir	78.196	0	0	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20121!_2D	20121	1	Weir	77.96	0	0	87	8.69	8.69	8.59	8.59	14.79	14.79	14.54	14.54
20122!_2D	20122	1	Weir	78.435	0	0	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20123!_2D	20123	1	Weir	78.78	0	0	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20124!_2D	20124	1	Weir	77.094	0	0	87	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00
20125!_2D	20125	1	Weir	79.116	0	0	87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
20126!_2D	20126	1	Weir	79.314	0	0	87	0.00	0.00	0.00	0.00	2.98	2.45	1.00	1.70
20127!_2D	20127	1	Weir	78.914	0	0	87	2.32	2.60	2.30	2.30	3.58	3.73	3.53	3.53
20128!_2D	20128	1	Weir	78.628	0	0	87	16.59	13.47	16.43	16.43	23.25	19.41	22.94	22.94
20129!_2D	20129	1	Weir	78.644	0	0	87	0.00	0.00	0.00	0.00	15.37	15.11	11.92	13.03
20142-1	20142	1	Conduit	CIRC	28.1	24	24	-11.33	-10.71	-10.92	42.32	-12.58	-12.32	-12.18	49.02
20142-1	20142	2	Conduit	CIRC	28.1	24	24	-11.33	-10.71	-10.92	N.M.*	-12.58	-12.32	-12.18	N.M.*
4165583!_2D	4165583	1	Weir	77.887	0	9.96	96	2.49	1.91	1.29	1.29	8.43	5.45	5.23	5.16
4165604!_2D	4165604	1	Weir	77.947	0	9.96	96	0.74	0.74	0.74	0.74	1.25	1.25	1.26	1.26
4165605!_2D	4165605	1	Weir	78.557	0	9.96	96	1.98	1.98	2.00	2.00	8.48	6.26	4.45	5.16
4165607!_2D	4165607	1	Weir	77.976	0	9.96	96	0.30	0.30	0.30	0.30	-4.91	-3.62	-2.40	-2.75
4165610!_2D	4165610	1	Weir	77.997	0	9.96	96	0.81	0.61	0.51	0.51	2.35	1.98	2.28	2.22
5000!_2D	5000	1	Weir	77.317	0	9.96	96	0.55	0.34	0.40	0.46	3.58	3.24	3.99	3.08

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
5788-1	W14001_sta19481	1	Conduit	RECT	5	36	36	23.24	2.33	N.M.*	N.M.*	10.19	9.16	N.M.*	N.M.*
5788-2	W14001_sta19481	1	Conduit	RECT	5	36	36	-29.62	-2.31	N.M.*	N.M.*	-43.71	-39.24	N.M.*	N.M.*
5788-3	W14001_sta19481	1	Conduit	RECT	5	36	36	34.29	1.29	N.M.*	N.M.*	24.07	21.87	N.M.*	N.M.*
6198813!_2D	6198813	1	Weir	80.077	0	5.04	61.5	0.53	0.53	0.53	0.53	-7.67	-7.66	-7.79	-7.80
6198814!_2D	6198814	1	Weir	79.951	0	5.04	61.5	6.86	6.86	6.59	6.59	8.88	8.77	8.62	8.62
6198825!_2D	6198825	1	Weir	80.202	0	5.04	61.5	2.33	2.33	2.45	2.45	4.19	4.34	4.49	4.47
6198826!_2D	6198826	1	Weir	80.621	0	5.04	61.5	0.28	0.28	0.27	0.27	5.35	5.40	5.33	5.33
6198837!_2D	6198837	1	Weir	80.582	0	9.96	96	1.00	1.00	1.00	1.00	-15.11	-13.31	-8.04	-8.16
6198838!_2D	6198838	1	Weir	80.376	0	5.04	61.5	1.95	1.95	1.36	1.36	8.54	8.09	7.64	7.72
6198839!_2D	6198839	1	Weir	80.447	0	5.04	61.5	1.24	1.24	1.83	1.83	7.60	7.20	7.60	7.83
6198854!_2D	6198854	1	Weir	81.205	0	0	87	0.31	0.31	0.31	0.31	-0.70	-0.56	0.51	0.51
6198859!_2D	6198859	1	Weir	81.22	0	0	87	2.12	2.12	2.11	2.11	3.67	3.68	3.72	3.72
6198860!_2D	6198860	1	Weir	81.92	0	0	87	4.26	4.26	4.51	4.51	6.16	6.16	6.30	6.30
6198873!_2D	6198873	1	Weir	80.191	0	5.04	61.5	2.08	2.08	1.61	1.61	-4.86	-4.86	-4.78	-4.78
6198874!_2D	6198874	1	Weir	80.709	0	5.04	61.5	0.66	0.66	0.63	0.63	-5.81	-5.81	-5.85	-5.86
6198885!_2D	6198885	1	Weir	80.498	0	5.04	61.5	-5.60	-5.60	-6.01	-6.01	-8.52	-8.52	-9.11	-9.12
6198886!_2D	6198886	1	Weir	81.111	0	5.04	61.5	1.32	1.32	1.18	1.18	4.57	4.63	4.90	4.85
6198894!_2D	6198894	1	Weir	80.741	0	0	87	-2.73	-2.73	-2.65	-2.65	-7.58	-7.53	-7.39	-7.47
A10	AM12	1	Conduit	CIRC	47.1	24	24	8.38	8.64	8.00	7.92	9.65	10.28	9.94	9.66
A11	AM12	1	Conduit	CIRC	73.8	24	24	10.11	10.17	10.03	9.99	12.24	12.21	12.13	12.02
A13	AM14	1	Conduit	CIRC	24.1	24	24	9.92	10.03	9.80	9.78	8.94	10.18	10.04	9.57
A15	AM14	1	Conduit	CIRC	21.6	24	24	20.86	20.86	20.74	20.71	21.79	22.10	21.48	21.38
A17	AM16	1	Conduit	CIRC	17.7	24	24	18.46	18.66	16.18	16.31	20.12	19.97	17.73	18.06
A18	AM16	1	Conduit	CIRC	23.7	24	24	-17.30	-17.29	-16.28	-16.28	-17.46	-17.45	-16.29	-16.30
A2	AM1	1	Conduit	CIRC	24.9	24	24	39.42	40.10	40.52	40.38	42.03	43.96	43.80	43.55
A20	AM19	1	Conduit	CIRC	61.7	24	24	1.88	1.90	1.82	1.81	13.67	13.75	12.55	12.60
A21	AM19	1	Conduit	CIRC	51.5	24	24	14.24	14.38	14.60	14.64	17.04	17.37	16.87	16.86
A22	AM23	1	Conduit	CIRC	66.3	24	24	6.61	6.80	6.55	6.60	4.87	4.44	4.35	4.48
A25	AM24	1	Conduit	CIRC	57.3	24	24	4.79	5.08	-5.30	-5.31	3.80	3.90	-4.31	-4.31
A26	AM24	1	Conduit	CIRC	41.5	24	24	-7.53	-7.54	-6.46	-6.48	-11.27	-11.23	-10.88	-10.89
A28	AM27	1	Conduit	CIRC	35.8	24	24	4.69	4.70	-4.65	-4.65	-8.10	-8.10	-8.75	-8.76
A29	AM27	1	Conduit	CIRC	33.3	24	24	8.87	8.87	9.66	9.66	8.70	8.72	9.34	9.34
A3	AM1	1	Conduit	CIRC	22.8	24	24	8.65	8.93	8.50	8.45	-15.83	-12.70	-14.30	-14.78
A31	AM33	1	Conduit	CIRC	43.4	24	24	6.42	6.42	6.45	6.45	6.25	6.24	6.28	6.28
A32	AM33	1	Conduit	CIRC	40.1	24	24	5.66	5.67	5.66	5.66	5.30	5.30	5.26	5.28
A34	AM36	1	Conduit	CIRC	38	24	24	-8.09	-8.09	-8.15	-8.15	-12.13	-12.12	-12.09	-12.09
A35	AM36	1	Conduit	CIRC	36.5	24	24	7.78	7.77	7.92	7.92	12.59	12.56	12.36	12.37
A41	AM39	1	Conduit	CIRC	17.1	24	24	-28.00	-28.00	-29.83	-29.83	-28.30	-28.30	-30.16	-30.16
A42	AM44	1	Conduit	CIRC	26.5	24	24	5.93	5.94	6.03	6.03	5.68	5.70	5.82	5.82
A43	AM44	1	Conduit	CIRC	31.6	24	24	-14.08	-14.08	-13.80	-13.80	-17.86	-17.84	-16.19	-16.19
A46	AM45	1	Conduit	CIRC	42.2	24	24	18.63	18.63	19.63	19.63	20.71	20.71	21.84	21.84
A47	AM45	1	Conduit	CIRC	23.1	24	24	29.97	29.97	29.35	29.35	33.60	33.60	32.98	32.98
A48	AM49	1	Conduit	CIRC	48	24	24	-11.17	-11.17	-11.53	-11.53	-12.91	-12.91	-13.15	-13.15
A5	AM4	1	Conduit	CIRC	30.5	24	24	19.92	20.23	20.80	20.63	24.77	23.06	24.17	24.89
A6	AM4	1	Conduit	CIRC	40	24	24	14.68	15.01	15.06	14.94	16.16	18.77	17.43	17.14
A8	AM7	1	Conduit	CIRC	40.6	24	24	17.63	18.03	16.93	16.85	-17.82	-16.17	-16.42	-17.18
A9	AM7	1	Conduit	CIRC	34	24	24	-16.72	-16.06	-16.82	-17.01	-21.20	-19.93	-20.55	-20.81
AM1	W14001_sta12065	1	Conduit	CIRC	398.8	66	66	125.98	128.79	120.98	120.50	110.85	114.75	109.77	108.50
AM12	AM7	1	Conduit	CIRC	738.4	60	60	71.73	72.98	71.25	71.09	73.51	76.12	76.20	74.99
AM14	AM12	1	Conduit	CIRC	309.7	36	36	19.80	20.03	19.60	19.56	17.95	18.19	18.11	18.04
AM16	AM12	1	Conduit	CIRC	492.2	24	24	13.58	14.32	13.58	13.86	14.96	15.24	14.41	14.93

			Existing Conditions												
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
AM19	AM12	1	Conduit	CIRC	513.6	54	54	49.56	50.42	49.40	49.43	48.86	49.59	47.61	47.57
AM23	AM19	1	Conduit	CIRC	612.9	36	36	27.14	27.45	26.37	26.28	26.12	26.37	25.56	25.54
AM23	AM24	2	Conduit	CIRC	300	36	36	-21.87	-22.02	-21.55	-21.53	-21.52	-21.82	-21.07	-21.05
AM27	AM24	1	Conduit	CIRC	297	24	24	19.75	19.75	19.84	19.84	19.87	19.87	19.95	19.94
AM30	AM27	1	Conduit	CIRC	347.1	24	24	12.25	12.31	12.12	12.10	11.98	12.08	11.89	11.89
AM33	AM30	1	Conduit	CIRC	169.5	24	24	10.43	10.49	10.31	10.29	10.16	10.24	10.08	10.08
AM36	AM33	1	Conduit	CIRC	372.1	24	24	4.84	4.84	4.82	4.82	4.38	4.38	4.41	4.41
AM37	AM38	1	Conduit	CIRC	20.2	24	24	-5.99	-5.99	-9.03	-9.04	-6.69	-6.80	-9.78	-9.78
AM38	AM19	1	Conduit	CIRC	383.1	36	36	26.36	27.26	26.65	27.00	24.30	24.33	24.05	25.15
AM39	AM44	1	Conduit	CIRC	295.2	24	24	-16.40	-16.55	-15.69	-15.50	-15.14	-15.32	-14.57	-14.50
AM39	AM38	2	Conduit	CIRC	300.1	30	30	23.81	24.70	23.80	24.13	22.31	22.31	21.91	22.78
AM4	AM1	1	Conduit	CIRC	366.5	66	66	102.25	104.45	97.92	97.45	90.49	93.46	87.37	87.29
AM40	AM39	1	Conduit	CIRC	46.7	24	24	7.52	7.80	-7.62	-7.62	7.89	7.82	-7.80	-7.80
AM45	AM44	1	Conduit	CIRC	292	24	24	15.11	15.11	14.94	14.94	15.06	15.07	15.16	15.16
AM49	AM45	1	Conduit	CIRC	152.3	24	24	-7.44	-7.44	-7.40	-7.40	-9.53	-9.53	-9.24	-9.24
AM50	AM49	1	Conduit	CIRC	495.3	24	24	-0.86	-0.85	-0.86	-0.87	-3.15	-3.15	-3.02	-3.02
AM7	AM4	1	Conduit	CIRC	306.5	66	66	93.22	95.10	89.32	88.86	83.91	86.22	81.08	81.01
B01	IH-10_JUNCTION_E01	1	Conduit	RECT	55	60	96	129.34	238.57	185.10	222.59	130.67	189.74	202.16	235.45
B03	B01	1	Conduit	CIRC	39.1	24	24	3.50	3.45	1.01	1.01	17.18	15.82	1.50	1.51
B03_2D	B03	1	Weir	80.59	0	5.04	61.5	3.45	3.45	1.03	1.03	17.18	15.81	1.49	1.50
B04	B01	1	Conduit	RECT	177.9	60	96	122.40	191.69	143.65	187.23	124.73	176.63	159.72	193.67
B05	B04	1	Conduit	CIRC	92.3	24	24	5.22	5.12	3.72	3.73	8.19	8.20	5.51	5.51
B05_2D	B05	1	Weir	80.57	0	5.04	61.5	5.33	5.33	3.75	3.75	8.18	8.18	5.51	5.51
B06	B07	1	Conduit	CIRC	28.8	24	24	8.24	8.20	6.85	6.86	16.37	14.61	10.63	10.44
B06_2D	B06	1	Weir	79.81	0	5.04	61.5	8.22	8.22	6.88	6.88	16.37	14.60	10.62	10.43
B07	B04	1	Conduit	RECT	167.4	60	96	122.10	190.93	142.89	120.31	124.44	176.05	159.24	123.85
B08	B07	1	Conduit	CIRC	7	24	24	9.91	9.88	10.47	10.48	11.82	12.04	12.82	12.69
B08_2D	B08	1	Weir	79.81	0	5.04	61.5	9.90	9.90	10.49	10.49	11.85	12.21	12.82	12.69
B10	B07	1	Conduit	RECT	263.9	60	96	120.89	188.33	139.26	118.37	123.11	174.15	154.22	121.71
B12	B13	1	Conduit	CIRC	36.3	24	24	-23.56	-18.73	N.M.*	N.M.*	-23.88	-25.31	N.M.*	N.M.*
B12_2D	B12	1	Weir	76.55	0	12	144	-23.48	-18.73	-21.66	-22.97	-23.87	-25.30	-33.08	-33.42
B13	W14001_sta19481	1	Conduit	CIRC	22.8	48	48	103.24	76.09	N.M.*	N.M.*	115.79	115.23	N.M.*	N.M.*
B13	W14001_sta19481	2	Conduit	CIRC	22.8	48	48	103.24	76.09	N.M.*	N.M.*	115.79	115.23	N.M.*	N.M.*
B13	B14	3	Conduit	RECT	61.7	60	96	118.69	185.11	N.M.*	N.M.*	121.50	171.63	N.M.*	N.M.*
B14	B10	1	Conduit	RECT	473.9	60	96	120.45	187.87	138.83	118.49	122.97	173.65	154.13	121.88
B15	B14	1	Conduit	CIRC	10.6	24	24	22.18	22.01	27.87	28.93	30.59	33.02	50.69	50.66
B15_2D	B15	1	Weir	75.19	0	12	144	22.11	22.03	27.89	28.94	30.60	33.03	50.69	50.65
B18	B13	1	Conduit	RECT	152.9	60	96	254.04	274.57	N.M.*	N.M.*	267.79	300.18	N.M.*	N.M.*
B19	B22	1	Conduit	CIRC	42.7	24	24	-9.94	6.16	6.06	6.22	-18.26	-15.10	-15.30	-16.14
B19_2D	B19	1	Weir	75.14	0	12	144	-9.93	6.12	6.07	6.14	-18.26	-15.10	-15.30	-16.15
B20	B18	1	Conduit	RECT	100.4	60	96	143.09	191.22	232.26	170.56	153.95	171.72	216.46	173.99
B20_2D	B20	1	Weir	78.6	0	12	144	16.63	15.53	18.49	15.52	16.73	21.32	62.15	61.31
B22	B20	1	Conduit	RECT	101.8	60	96	142.13	189.50	229.52	175.62	159.47	170.50	212.81	154.31
B24	B22	1	Conduit	RECT	187.2	60	96	145.41	188.78	228.63	173.75	177.66	172.21	212.11	153.76
B26	B27	1	Conduit	CIRC	116.3	30	30	-9.99	-5.85	2.20	2.28	-13.98	-13.67	-13.91	-13.58
B26_2D	B26	1	Weir	79.27	0	5.04	61.5	-9.96	-5.83	2.23	2.23	-13.97	-13.66	-13.90	-13.57
B27	B24	1	Conduit	RECT	242.1	60	96	145.40	188.70	228.36	172.63	177.67	172.19	211.84	155.18
B29	B27	1	Conduit	RECT	157.4	60	96	154.90	188.19	227.78	171.75	191.63	185.68	211.39	163.10
B30	B32	1	Conduit	CIRC	21.4	24	24	-9.01	10.96	13.44	13.84	-12.98	-12.46	11.29	11.96
B30_2D	B30	1	Weir	78.66	0	5.04	61.5	-9.01	11.09	13.48	13.86	-12.98	-12.46	11.24	12.02
B31	B32	1	Conduit	CIRC	15.7	24	24	-9.32	-5.63	7.65	8.56	-13.25	-12.79	-13.35	-12.45

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
B31_2D	B31	1	Weir	78.66	0	5.04	61.5	-9.32	5.85	7.67	8.90	-13.25	-12.78	-13.35	-12.45
B32	B29	1	Conduit	RECT	146.2	60	96	185.44	185.51	198.22	149.86	239.17	230.50	235.34	192.57
B35	B36	1	Conduit	CIRC	26.7	24	24	48.08	53.20	34.08	34.09	39.56	44.82	40.79	45.21
B35_2D	B35	1	Weir	81.21	0	12	144	58.85	60.61	34.10	34.10	50.51	58.03	52.89	57.58
B36	B32	1	Conduit	RECT	309.7	60	96	203.65	195.07	192.53	144.28	265.37	255.46	258.17	207.92
B38	B36	1	Conduit	RECT	324.1	60	96	281.77	296.71	299.70	304.11	280.30	293.78	296.88	308.33
B39	B38	1	Conduit	CIRC	48	24	24	15.43	15.44	14.64	14.65	16.88	17.26	16.61	15.99
B39_2D	B39	1	Weir	83	0	5.04	61.5	15.41	15.41	14.66	14.66	17.04	17.41	16.82	16.01
B41	B38	1	Conduit	RECT	29.7	60	96	265.95	281.68	284.43	288.83	262.02	275.37	279.19	290.59
B45	B41	1	Conduit	RECT	344.6	60	96	266.04	281.07	284.53	288.94	262.13	275.50	279.28	290.69
B46	B45	1	Conduit	CIRC	16.4	24	24	1.38	1.38	0.64	0.64	8.95	8.80	6.40	6.17
B46_2D	B46	1	Weir	84.8	0	5.04	61.5	1.37	1.37	0.63	0.63	8.94	8.79	6.39	6.16
B47	B45	1	Conduit	RECT	45.5	60	96	264.89	279.95	284.09	288.51	258.67	271.87	278.23	289.38
B48	B47	1	Conduit	CIRC	36	66	66	228.68	240.23	242.69	245.79	230.62	240.31	244.09	251.21
B49	B48	1	Conduit	CIRC	20.4	30	30	36.78	38.23	38.45	39.16	37.82	39.69	40.93	42.80
B50	B49	1	Conduit	CIRC	47.2	18	18	5.09	4.91	4.18	4.18	8.12	8.59	8.11	9.17
B50_2D	B50	1	Weir	84.6	0	5.04	61.5	5.32	5.31	4.18	4.18	8.12	8.58	8.11	9.17
BM10	BM13	1	Conduit	CIRC	198.2	48	48	31.06	34.17	30.58	29.15	27.12	31.26	26.19	24.96
BM13	W14001_sta13602	1	Conduit	CIRC	97.2	48	48	37.79	41.19	37.47	35.67	33.16	45.67	36.43	33.71
BM14	W14001_sta13602	1	Conduit	CIRC	224.2	54	54	81.87	84.72	81.80	83.74	80.82	81.21	78.95	81.99
BM2	BM4	1	Conduit	CIRC	178.3	36	36	12.00	12.23	12.29	12.19	10.69	10.95	10.68	10.59
BM20	BM14	1	Conduit	CIRC	674.4	54	54	68.66	71.34	67.01	68.72	67.60	69.14	65.02	67.47
BM24	BM20	1	Conduit	CIRC	187.2	54	54	55.35	58.74	53.95	55.55	53.31	55.15	51.20	53.22
BM25	BM24	1	Conduit	CIRC	284.4	42	42	38.08	39.30	37.70	37.33	34.29	36.63	33.43	33.03
BM29	BM30	1	Conduit	CIRC	65.1	24	24	7.80	7.80	7.80	7.80	13.60	13.60	13.60	13.60
BM30	BM25	1	Conduit	CIRC	222	42	42	32.08	32.36	32.04	31.90	38.52	38.91	38.73	38.64
BM33	BM30	1	Conduit	CIRC	180.6	30	30	22.61	23.22	21.59	21.51	22.01	22.77	20.94	20.90
BM34	BM33	1	Conduit	CIRC	272	30	30	22.70	23.28	21.73	21.64	22.02	22.78	20.96	20.92
BM38	BM34	1	Conduit	CIRC	177.9	24	24	11.92	12.02	11.68	11.66	10.95	11.26	10.64	10.63
BM4	BM7	1	Conduit	CIRC	404.9	36	36	11.95	12.19	12.25	12.15	10.67	10.92	10.66	10.57
BM40	BM30	1	Conduit	CIRC	67.6	24	24	9.50	9.50	9.50	9.50	16.77	16.77	16.77	16.77
BM7	BM10	1	Conduit	CIRC	567	36	36	19.88	23.24	19.32	19.03	16.61	19.67	17.02	16.00
C003	IH-10_MH_C107	1	Conduit	RECT	299	60	96	95.29	129.53	130.08	139.66	102.64	131.20	125.61	126.37
C003	IH-10_MH_WD3	2	Conduit	CIRC	37	24	24	15.20	20.02	20.69	22.47	16.54	20.65	19.79	20.14
C003	IH-10_MH_C107	3	Conduit	RECT	299	60	96	95.29	129.53	130.08	139.66	102.64	131.20	125.61	126.37
C004	C003	1	Conduit	RECT	84.4	60	96	204.29	270.69	282.25	299.63	218.32	262.19	250.78	252.56
C005	C004	1	Conduit	RECT	86	60	96	105.50	88.08	88.49	92.44	118.35	142.94	152.71	145.96
C006	C005	1	Conduit	CIRC	66	24	24	-9.00	10.73	10.65	-9.14	-7.40	-10.42	7.99	-11.52
C006_2D	C006	1	Weir	74.54	0	9.96	96	9.79	2.05	2.04	2.05	11.14	7.55	13.10	11.54
C007	C004	1	Conduit	RECT	60.4	60	120	125.56	191.34	202.95	122.05	140.94	159.43	163.20	96.97
C008	C003	1	Conduit	CIRC	62.1	24	24	20.14	25.73	25.23	25.03	20.84	26.96	24.24	23.84
C008_2D	C008	1	Weir	74.69	0	9.96	96	1.33	1.31	1.30	1.31	-9.67	7.93	-7.97	-9.20
C009	C006	1	Conduit	CIRC	102.6	24	24	-11.01	10.45	10.35	-10.99	-9.98	-10.77	-10.42	-11.42
C009_2D	C009	1	Weir	74.76	0	9.96	96	-11.00	10.44	10.34	-10.99	-9.97	-10.76	-10.41	-11.41
C010	C007	1	Conduit	RECT	105.8	60	120	125.55	191.78	203.23	122.15	140.80	159.53	163.31	97.03
C011	C008	1	Conduit	CIRC	99.6	24	24	19.99	25.50	24.98	24.82	20.76	24.95	24.14	23.73
C011_2D	C011	1	Weir	79.95	0	9.96	96	18.88	24.68	24.83	24.61	21.16	24.24	24.19	23.72
C012	C010	1	Conduit	RECT	33.8	60	120	125.55	192.24	203.57	122.26	140.78	159.63	163.43	97.09
C013	C011	1	Conduit	CIRC	38.2	24	24	8.24	11.84	11.20	10.98	8.98	11.36	10.43	10.23
C013_2D	C013	1	Weir	79.57	0	0	87	8.12	11.67	11.01	10.79	8.86	11.22	10.29	10.08
C014	C013	1	Conduit	CIRC	53	12	12	-2.34	-1.12	1.13	1.16	-3.38	-3.36	-3.25	-3.26

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
C014_2D	C014	1	Weir	80.32	0	0	87	-2.34	-1.00	0.65	-1.13	-3.38	-3.36	-3.25	-3.26
C019	C020	1	Conduit	CIRC	35.4	12	12	-5.62	6.92	7.32	7.60	-5.90	-5.23	-5.70	-5.92
C019_2D	C019	1	Weir	77.35	0	0	87	-5.62	6.99	7.38	7.68	-5.90	-5.23	-5.71	-5.93
C020	C021	1	Conduit	CIRC	62.8	24	24	-5.62	6.85	7.21	7.45	-5.90	-5.24	-5.70	-5.92
C021	C012	1	Conduit	RECT	118.9	60	120	125.55	192.66	204.10	122.36	140.77	159.73	163.53	97.14
C022	C021	1	Conduit	CIRC	66.6	18	18	2.95	5.95	5.52	5.39	3.69	5.26	5.13	5.26
C023	C022	1	Conduit	CIRC	29.6	12	12	4.56	4.86	4.95	4.89	4.61	4.89	5.01	5.00
C023_2D	C023	1	Weir	79.74	0	0	87	4.56	4.86	4.95	4.89	4.61	4.89	5.00	5.00
C024	C022	1	Conduit	CIRC	25.6	12	12	-4.70	-4.36	-3.99	-4.52	-4.49	-4.65	-4.48	-4.77
C024_2D	C024	1	Weir	77.81	0	0	87	-4.69	-4.35	-3.99	-4.52	-4.48	-4.64	-4.47	-4.76
C028	C029	1	Conduit	CIRC	49	24	24	-7.98	8.26	8.25	8.27	-7.97	-8.10	-7.75	-8.19
C028_2D	C028	1	Weir	77.05	0	5.04	61.5	-7.98	8.29	8.38	8.85	-7.96	-8.10	-7.74	-8.18
C029	C021	1	Conduit	RECT	137.1	60	120	131.49	186.93	198.88	123.44	146.17	154.90	162.22	98.50
C030	C029	1	Conduit	CIRC	45.5	24	24	-9.30	-8.70	-8.48	-9.21	-8.31	-8.69	-9.25	-9.64
C030_2D	C030	1	Weir	78.14	0	5.04	61.5	-9.28	-8.68	-8.48	-9.21	-8.31	-8.68	-9.24	-9.63
C033	C029	1	Conduit	RECT	112.6	60	120	147.97	182.91	192.32	125.16	162.21	163.72	161.86	107.02
C035	C033	1	Conduit	RECT	156.2	60	120	147.97	182.95	192.36	125.19	162.19	163.70	161.88	107.01
C036	C035	1	Conduit	CIRC	41.6	24	24	16.65	18.88	10.86	11.61	17.42	18.47	10.54	11.33
C036_2D	C036	1	Weir	78.93	0	5.04	61.5	11.24	12.74	-9.95	-10.28	11.70	12.36	-10.54	-10.47
C036A	C036	1	Conduit	CIRC	20.7	12	12	5.41	6.23	7.87	8.10	5.73	6.13	7.38	7.50
C036A_2D	C036A	1	Weir	79.15	0	0	87	5.41	6.23	7.86	8.19	5.72	6.13	7.37	7.49
C037	C035	1	Conduit	RECT	45.6	60	120	130.53	174.73	183.94	123.93	140.53	143.32	158.06	104.65
C038	C035	1	Conduit	CIRC	36.9	24	24	22.67	23.43	22.46	23.51	23.44	24.54	23.25	23.88
C038_2D	C038	1	Weir	79.17	0	5.04	61.5	11.24	12.46	8.66	8.45	11.35	12.23	7.92	8.11
C038A	C038	1	Conduit	CIRC	16.1	24	24	11.67	11.43	14.65	14.96	12.51	12.85	16.96	17.03
C038A_2D	C038A	1	Weir	79.88	0	0	87	11.67	11.42	14.65	14.96	12.51	12.85	16.96	17.03
C038B	C038	1	Conduit	CIRC	40.6	12	12	3.61	4.56	4.97	5.00	3.73	4.38	4.61	4.69
C038B_2D	C038B	1	Weir	79.5	0	0	87	3.60	4.54	4.94	5.09	3.72	4.36	4.56	4.64
C040	C037	1	Conduit	RECT	248.2	60	120	130.55	174.76	184.05	123.94	140.53	143.34	158.07	104.65
C041	C040	1	Conduit	CIRC	67.4	24	24	-8.73	-7.97	-7.62	-7.18	-9.15	-9.27	-8.83	-8.09
C041_2D	C041	1	Weir	79.7	0	5.04	61.5	-8.72	-7.96	-7.62	-7.17	-9.14	-9.26	-8.82	-8.08
C044	C045	1	Conduit	CIRC	55.5	24	24	-3.15	0.77	1.72	1.66	-9.86	-9.53	6.66	6.95
C044_2D	C044	1	Weir	80.6	0	0	87	-3.15	0.79	1.72	1.65	-9.85	-9.53	6.66	6.94
C045	C040	1	Conduit	RECT	202.5	60	120	119.40	153.45	167.92	112.69	106.17	131.28	146.11	92.86
C046	C047	1	Conduit	CIRC	66.6	48	48	-11.30	7.08	11.98	11.91	-20.86	-20.15	-15.91	12.20
C046_2D	C046	1	Weir	79.78	0	0	87	-11.30	7.05	11.91	11.87	-20.86	-20.15	-15.92	12.19
C047	C045	1	Conduit	RECT	112.8	60	120	114.90	148.87	163.33	109.29	107.34	129.28	142.63	91.00
C047	W14001_sta21026	2	Conduit	CIRC	50.5	36	36	72.98	69.15	55.99	49.16	78.34	79.66	76.32	71.47
C048	C051	1	Conduit	CIRC	44.8	18	18	-7.69	-7.12	-9.26	-8.31	-8.45	-8.48	-10.55	-9.84
C048_2D	C048	1	Weir	77.7	0	5.04	61.5	-7.69	-7.12	-9.26	-8.31	-8.44	-8.48	-10.55	-9.84
C049	C047	1	Conduit	RECT	48.2	60	120	184.75	193.77	180.13	111.03	193.65	195.55	187.13	118.77
C051	C049	1	Conduit	RECT	72.9	60	120	184.74	193.78	180.14	111.05	193.64	195.55	187.13	118.76
C051B	C051	1	Conduit	CIRC	33.1	18	18	-19.04	-18.27	-20.32	-18.91	-20.34	-20.39	-22.56	-21.46
C051B_2D	C051B	1	Weir	77.39	0	5.04	61.5	4.99	5.22	-6.93	-6.87	5.19	5.14	-7.01	-6.95
C053	C051	1	Conduit	RECT	148.4	60	120	211.22	217.91	209.46	123.41	220.45	222.49	218.88	133.85
C054	C053	1	Conduit	CIRC	71.7	18	18	-9.71	-9.35	-11.24	-10.20	-10.32	-10.32	-12.25	-11.39
C054_2D	C054	1	Weir	77.89	0	5.04	61.5	-9.70	-9.34	-11.24	-10.20	-10.31	-10.31	-12.25	-11.39
C055	C053	1	Conduit	RECT	152.7	60	120	220.85	226.96	220.65	128.48	230.20	232.24	230.75	139.37
C057	C055	1	Conduit	CIRC	31.5	24	24	-18.83	-18.26	-23.10	-20.31	-20.02	-20.15	-24.88	-22.55
C057_2D	C057	1	Weir	77.1	0	5.04	61.5	-11.46	-11.10	-14.43	-12.71	-12.19	-12.26	-15.52	-14.09
C060	C055	1	Conduit	CIRC	40.5	18	18	-10.31	-9.93	-13.22	-11.62	-10.89	-10.93	-14.14	-12.79

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
C060_2D	C060	1	Weir	78.28	0	5.04	61.5	-10.31	-9.92	-13.23	-11.63	-10.87	-10.91	-14.14	-12.79
C061	C055	1	Conduit	RECT	101.7	60	120	249.84	254.54	256.91	144.41	259.65	261.98	269.01	156.68
C062	C057	1	Conduit	CIRC	82.3	18	18	-7.36	-7.16	-8.67	-7.60	-7.81	-7.86	-9.35	-8.46
C062_2D	C062	1	Weir	77.66	0	5.04	61.5	-7.36	-7.16	-8.67	-7.60	-7.80	-7.86	-9.35	-8.46
C063	C061	1	Conduit	RECT	183.4	60	120	249.82	254.53	256.89	144.40	259.70	261.97	269.00	156.67
C064	C063	1	Conduit	CIRC	36.6	18	18	0.42	0.42	0.46	0.44	-5.00	-4.70	-2.31	1.09
C064_2D	C064	1	Weir	82.21	0	5.04	61.5	0.43	0.43	0.47	0.44	-5.30	-5.15	-2.31	1.09
C065	C063	1	Conduit	RECT	49.7	60	96	249.39	254.10	256.41	288.25	263.75	265.00	270.79	312.34
C066	C065	1	Conduit	RECT	16.5	60	96	271.97	275.77	276.40	301.02	293.48	294.49	295.86	327.98
C067	C065	1	Conduit	CIRC	70.2	48	48	-22.64	-21.75	-20.27	-12.89	-29.88	-29.59	-25.60	-16.83
C068	C067	1	Conduit	CIRC	23.6	24	24	0.69	0.70	2.02	1.82	-3.99	-3.67	2.46	5.07
C068_2D	C068	1	Weir	82.33	0	5.04	61.5	0.70	0.71	2.01	1.79	-4.21	-3.97	2.98	5.31
C069	C066	1	Conduit	RECT	50.8	60	96	229.21	231.53	230.69	245.48	245.70	246.15	244.11	261.76
C070	C067	1	Conduit	CIRC	34.8	24	24	0.96	0.96	1.08	1.06	1.34	1.35	1.47	1.26
C070_2D	C070	1	Weir	82.96	0	5.04	61.5	0.96	0.96	1.08	1.06	1.07	1.07	1.20	1.19
C071	C069	1	Conduit	RECT	127.7	60	96	229.20	231.52	230.67	245.40	245.70	246.15	244.10	261.75
C072	C071	1	Conduit	CIRC	6.6	24	24	0.14	-0.35	-0.41	-0.63	0.31	0.30	0.25	-0.18
C072_2D	C072	1	Weir	84.31	0	5.04	61.5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C073	C071	1	Conduit	CIRC	73.5	24	24	7.55	7.47	6.29	6.04	10.56	10.69	9.61	8.65
C073_2D	C073	1	Weir	84.04	0	5.04	61.5	7.55	7.48	6.27	6.03	10.61	10.93	9.83	8.66
C080	C081	1	Conduit	CIRC	70.3	24	24	9.73	9.78	8.74	7.61	9.79	9.84	8.99	9.77
C080_2D	C080	1	Weir	84.56	0	5.04	61.5	9.61	9.66	8.77	7.55	9.83	9.89	9.01	9.78
C081	C071	1	Conduit	RECT	350.8	60	96	221.62	224.81	224.37	239.27	235.87	236.19	236.64	253.99
C082	C081	1	Conduit	CIRC	8.5	24	24	6.17	6.08	7.09	6.84	9.92	10.03	10.13	9.41
C082_2D	C082	1	Weir	84.56	0	5.04	61.5	6.17	6.09	7.08	6.82	10.10	10.22	10.31	9.42
C083	C081	1	Conduit	RECT	164.7	60	96	208.30	212.35	211.91	227.90	219.11	219.28	224.74	241.00
C083_2D	C083	1	Weir	78.71	0	5.04	61.5	9.60	10.16	9.56	11.25	9.39	9.61	9.19	10.59
C084	C085	1	Conduit	CIRC	46.8	18	18	-4.98	-4.88	4.73	5.13	-5.91	-5.88	-5.33	-4.89
C084_2D	C084	1	Weir	81.6	0	5.04	61.5	-4.98	-4.88	4.69	5.08	-5.91	-5.88	-5.33	-4.90
C085	C083	1	Conduit	CIRC	140.7	24	24	21.04	21.85	21.84	24.09	20.75	21.05	20.90	22.44
C086	C085	1	Conduit	CIRC	24.8	24	24	23.63	23.98	24.02	25.15	23.36	23.54	23.64	24.52
C086_2D	C086	1	Weir	81.6	0	5.04	61.5	2.36	2.42	5.63	5.21	-2.63	-2.57	4.65	4.61
C088	C089	1	Conduit	CIRC	98.7	18	18	4.99	4.99	5.32	5.31	5.48	5.60	6.18	7.17
C088_2D	C088	1	Weir	80.98	0	5.04	61.5	5.00	5.00	5.32	5.32	5.50	5.62	6.20	7.18
C089	C083	1	Conduit	RECT	163.9	60	96	181.51	184.44	184.06	195.49	204.51	204.25	212.77	222.42
C090	C089	1	Conduit	CIRC	72	18	18	1.44	1.45	1.70	1.70	2.15	2.16	2.84	2.77
C090_2D	C090	1	Weir	86.34	0	5.04	61.5	1.43	1.43	1.71	1.71	2.15	2.15	2.85	2.79
C092	C092A	1	Conduit	RECT	174.9	60	96	174.41	177.32	176.78	188.15	200.12	199.65	205.69	215.92
C092A	C089	1	Conduit	RECT	238.7	60	96	175.35	178.28	177.74	189.13	200.91	200.43	207.76	216.65
C092B	C092A	1	Conduit	CIRC	19.3	24	24	1.09	1.09	1.14	1.14	1.56	1.56	2.36	2.09
C092B_2D	C092B	1	Weir	87	0	0	87	1.10	1.10	1.15	1.15	1.56	1.56	2.36	2.09
C093	C094	1	Conduit	CIRC	6.5	18	18	2.17	2.17	2.12	2.12	6.00	6.00	6.42	6.18
C093_2D	C093	1	Weir	87.35	0	5.04	61.5	2.18	2.18	2.13	2.13	6.01	6.01	6.42	6.18
C094	C092	1	Conduit	CIRC	21.2	24	24	4.23	4.23	4.45	4.44	12.13	12.12	14.28	13.79
C095	C094	1	Conduit	CIRC	46.4	18	18	2.07	2.07	2.34	2.35	6.44	6.44	7.87	7.61
C095_2D	C095	1	Weir	87.45	0	5.04	61.5	2.08	2.08	2.35	2.35	6.44	6.44	7.87	7.61
C096	C097	1	Conduit	CIRC	15.4	18	18	6.40	6.40	6.44	6.44	10.04	10.10	10.28	10.51
C096_2D	C096	1	Weir	87.08	0	5.04	61.5	6.39	6.39	6.43	6.43	10.04	10.09	10.24	10.50
C097	C092	1	Conduit	CIRC	73.3	24	24	24.60	24.90	24.69	25.63	26.25	26.31	27.30	28.45
C098	C097	1	Conduit	CIRC	39.9	18	18	1.46	1.46	1.40	1.40	7.33	7.40	7.87	8.19
C098_2D	C098	1	Weir	87.3	0	5.04	61.5	1.46	1.46	1.41	1.41	7.39	7.41	7.87	8.18

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
C099	C097	1	Conduit	CIRC	95.8	18	18	1.12	1.07	1.05	1.03	1.44	1.43	1.41	1.44
C103	C099	1	Conduit	CIRC	14.8	18	18	1.03	1.00	0.99	0.98	1.44	1.44	1.42	1.42
C103_2D	C103	1	Weir	87.97	0	5.04	61.5	0.99	0.99	0.99	0.99	1.45	1.45	1.43	1.43
Chase	20102	1	Conduit	CIRC	45	36	36	-28.17	-28.73	-28.86	-35.35	17.32	18.94	31.78	39.16
CP03	CPM2	1	Conduit	CIRC	19	24	24	14.65	14.92	14.63	14.48	13.17	13.85	13.09	12.97
CP04	CPM2	1	Conduit	CIRC	16.3	24	24	7.89	9.04	8.05	8.49	7.79	6.94	7.59	8.28
CP06	CPM5	1	Conduit	CIRC	23.6	24	24	4.88	5.05	4.74	4.69	3.94	4.28	3.72	3.69
CP07	CPM5	1	Conduit	CIRC	20.8	24	24	12.09	12.23	12.24	12.22	13.54	13.66	13.46	13.42
CP10	CPM9	1	Conduit	CIRC	56.7	24	24	-6.93	-6.81	-6.87	-6.91	-7.64	-7.61	-7.57	-7.57
CP114	CPM13	1	Conduit	CIRC	102.3	24	24	-6.21	-6.07	-5.99	-6.02	-6.92	-6.51	-6.41	-6.61
CP16	CPM15	1	Conduit	CIRC	59.6	24	24	-7.03	-6.92	-7.13	-7.15	-5.90	-6.00	-5.75	-5.74
CP17	CPM1	1	Conduit	CIRC	11	24	24	26.46	26.69	27.86	28.13	25.91	27.40	27.90	28.34
CP18	CPM1	1	Conduit	CIRC	27.4	24	24	7.21	7.77	7.07	-6.93	-6.19	6.40	-7.91	-8.46
CP20	CPM19	1	Conduit	CIRC	305.2	18	18	6.32	6.45	6.10	6.08	5.30	5.52	5.22	5.21
CP22	CPM21	1	Conduit	CIRC	310.3	18	18	4.53	4.68	4.66	4.72	4.50	4.69	4.51	4.60
CP24	CPM23	1	Conduit	CIRC	39.7	18	18	9.33	9.42	9.15	9.12	8.56	8.74	8.27	8.24
CP25	CPM23	1	Conduit	CIRC	27.8	18	18	-10.19	-9.86	-10.07	-10.13	-10.86	-10.75	-10.79	-10.81
CP27	CPM26	1	Conduit	CIRC	21	18	18	-9.53	-9.20	-9.24	-9.31	-10.05	-9.96	-9.76	-9.77
CP28	CPM26	1	Conduit	CIRC	26.6	18	18	12.24	12.11	11.09	11.37	11.64	12.07	10.16	10.26
CP33	CPM32	1	Conduit	CIRC	47.6	24	24	-3.59	2.43	-2.60	-2.77	-9.08	-8.94	-8.40	-8.41
CP35	CPM34	1	Conduit	CIRC	44.7	30	30	5.75	5.75	5.75	5.75	12.83	10.09	10.09	10.09
CPM1	W14001_sta14232	1	Conduit	CIRC	95	36	36	52.56	53.14	50.85	52.13	52.90	53.36	50.38	52.23
CPM11	CPM9	1	Conduit	CIRC	137.2	36	36	7.99	8.42	7.11	7.10	-7.14	6.89	-6.70	-7.15
CPM12	CPM11	1	Conduit	CIRC	114.1	24	24	6.54	6.54	6.54	6.54	10.06	10.29	10.08	10.02
CPM13	CPM11	1	Conduit	CIRC	191.3	27	27	-8.69	-8.65	-8.65	-8.67	-9.22	-9.01	-9.02	-9.02
CPM15	CPM13	1	Conduit	CIRC	177.1	24	24	-7.04	-6.93	-7.15	-7.16	-5.90	-6.00	-5.76	-5.74
CPM19	CPM1	1	Conduit	CIRC	396.2	36	36	38.20	38.95	37.42	38.28	38.02	38.71	36.81	37.82
CPM2	W14001_sta14232	1	Conduit	CIRC	221.6	36	36	32.93	34.10	31.05	30.84	24.53	26.47	23.50	23.03
CPM21	CPM19	1	Conduit	CIRC	130.5	36	36	34.59	35.70	33.92	34.51	34.30	35.48	33.20	33.99
CPM23	CPM21	1	Conduit	CIRC	425	36	36	29.66	30.47	28.88	29.29	29.09	29.87	27.61	28.09
CPM26	CPM23	1	Conduit	CIRC	300.1	36	36	22.79	23.48	21.85	22.31	22.65	23.34	20.85	21.36
CPM29	CPM26	1	Conduit	CIRC	137.3	36	36	24.60	24.99	24.49	24.42	21.92	22.55	21.90	21.85
CPM30	CPM29	1	Conduit	CIRC	124.4	24	24	-5.34	-5.28	-5.07	-5.08	-6.32	-6.14	-6.69	-6.72
CPM31	CPM29	1	Conduit	CIRC	125.6	36	36	40.16	40.30	41.01	40.99	41.25	41.67	42.38	42.32
CPM32	CPM29	1	Conduit	CIRC	68.7	30	30	-12.90	-12.76	-13.53	-13.56	-16.05	-15.86	-16.57	-16.60
CPM34	CPM32	1	Conduit	CIRC	331.8	30	30	-8.99	-8.97	8.89	9.00	9.70	9.70	9.74	9.82
CPM5	CPM2	1	Conduit	CIRC	280.9	36	36	20.35	21.21	18.68	18.50	16.71	17.44	15.52	15.47
CPM8	CPM5	1	Conduit	CIRC	111.6	36	36	12.75	13.37	11.54	11.40	10.74	11.10	9.93	9.89
CPM9	CPM8	1	Conduit	CIRC	205.3	36	36	12.92	13.55	11.70	11.57	10.77	11.14	9.95	9.91
D02	D03	1	Conduit	CIRC	39.8	24	24	6.90	6.90	6.90	6.90	8.70	8.85	8.98	10.84
D02_2D	D02	1	Weir	79.3	0	5.04	61.5	6.91	6.91	6.91	6.91	8.71	8.87	9.00	10.85
D03	C066	1	Conduit	CIRC	139	42	42	42.87	44.57	45.93	55.86	47.70	48.34	52.22	66.23
D04	D03	1	Conduit	CIRC	36.3	24	24	-4.29	-3.53	3.51	2.44	-8.05	-7.96	-6.18	2.77
D04_2D	D04	1	Weir	79.3	0	5.04	61.5	-4.29	-3.53	3.43	2.45	-8.05	-7.96	-6.19	2.79
D05	D06	1	Conduit	CIRC	22.6	24	24	-11.73	-11.23	-11.18	-7.02	-13.72	-13.66	-13.56	-10.58
D05_2D	D05	1	Weir	78.62	0	5.04	61.5	-11.73	-11.24	-11.18	-7.02	-13.72	-13.66	-13.56	-10.59
D06	C067	1	Conduit	CIRC	310.4	48	48	-24.61	-23.70	-23.19	-15.60	-27.47	-27.48	-26.82	-21.21
D07	D06	1	Conduit	CIRC	25.1	24	24	-12.89	-12.48	-12.01	-8.60	-13.84	-13.91	-13.33	-10.65
D07_2D	D07	1	Weir	77.71	0	5.04	61.5	-12.89	-12.48	-12.01	-8.59	-13.83	-13.91	-13.33	-10.64
D08	D09	1	Conduit	CIRC	24.1	24	24	2.79	3.40	3.57	4.30	-2.95	-2.84	-3.68	-3.59
D08_2D	D08	1	Weir	79	0	5.04	61.5	3.21	3.42	4.10	5.39	-2.95	-2.84	-3.68	-3.59

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
D09	D12	1	Conduit	CIRC	172.3	24	24	6.27	7.31	8.37	8.00	6.08	6.27	7.10	7.48
D10	D09	1	Conduit	CIRC	22.4	24	24	5.14	5.18	5.90	6.37	5.12	5.30	6.33	6.94
D10_2D	D10	1	Weir	79	0	5.04	61.5	5.40	5.22	7.05	7.11	5.11	5.32	7.00	7.30
D11	D12	1	Conduit	CIRC	38.8	24	24	-4.55	2.95	2.99	3.50	-5.19	-5.13	-5.62	-5.54
D11_2D	D11	1	Weir	76.49	0	5.04	61.5	-4.55	2.94	3.05	3.60	-5.19	-5.13	-5.62	-5.54
D12	D14	1	Conduit	CIRC	217	30	30	7.95	9.11	11.19	11.12	8.25	8.73	9.18	10.32
D13	D14	1	Conduit	CIRC	25	24	24	-8.37	-6.94	-6.37	-5.93	-8.99	-8.92	-9.39	-9.31
D13_2D	D13	1	Weir	79	0	5.04	61.5	-8.37	-6.94	-6.37	-5.93	-8.99	-8.92	-9.39	-9.31
D14	D16	1	Conduit	CIRC	218	30	30	13.91	16.64	18.83	18.45	-16.11	15.38	17.51	18.69
D15	D14	1	Conduit	CIRC	22.9	24	24	8.29	8.40	8.67	8.82	8.22	8.50	8.87	9.12
D15_2D	D15	1	Weir	79	0	5.04	61.5	8.27	8.39	8.65	8.81	8.20	8.48	8.86	9.11
D16	B29	1	Conduit	CIRC	162.5	30	30	13.92	16.63	18.88	18.52	-16.11	15.39	17.53	18.71
D17	B29	1	Conduit	CIRC	49.1	30	30	-22.40	19.84	23.92	27.00	-31.51	-30.52	-31.99	-31.02
D18	D17	1	Conduit	CIRC	85.2	30	30	-22.40	19.84	23.91	26.99	-31.51	-30.52	-31.99	-31.03
E0	30029	1	Conduit	CIRC	339.5	54	54	130.82	130.93	130.82	130.82	145.43	145.20	145.65	145.65
E04	E05	1	Conduit	CIRC	5.4	18	18	6.63	6.39	6.55	5.78	10.26	10.28	10.44	10.46
E04_2D	E04	1	Weir	87.67	0	5.04	61.5	6.62	6.39	6.54	5.79	10.26	10.27	10.43	10.46
E05	C097	1	Conduit	CIRC	230.6	24	24	21.11	21.48	21.46	21.84	17.79	18.02	18.06	18.81
E06	E05	1	Conduit	CIRC	38.4	18	18	1.61	1.63	1.54	1.59	3.02	3.01	4.48	3.40
E06_2D	E06	1	Weir	87.67	0	5.04	61.5	1.09	1.09	1.09	1.09	3.01	3.01	6.42	3.40
E08	B49	1	Conduit	CIRC	270.1	30	30	27.57	29.13	29.91	30.00	23.41	25.25	26.52	27.56
E1	E0	1	Conduit	CIRC	66.6	24	24	1.27	1.24	0.93	0.93	9.79	9.80	7.99	7.99
E13	EM12	1	Conduit	CIRC	38.4	24	24	23.00	23.00	23.07	23.07	23.20	23.19	23.27	23.28
E14	EM12	1	Conduit	CIRC	34.9	24	24	28.05	28.03	28.00	28.00	26.88	26.87	27.72	27.72
E16	EM15	1	Conduit	CIRC	40.6	18	18	11.06	11.06	11.00	11.00	10.73	10.73	10.73	10.73
E17	EM15	1	Conduit	CIRC	44.4	15	15	13.01	12.66	12.80	13.83	13.96	13.01	13.41	12.66
E2	E0	1	Conduit	CIRC	60.8	24	24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E21	EM20	1	Conduit	CIRC	43.5	24	24	15.33	15.45	15.21	15.21	14.83	14.90	14.81	14.81
E22	EM20	1	Conduit	CIRC	38	24	24	12.46	12.16	12.21	12.23	9.62	9.58	9.83	9.84
E25	EM24	1	Conduit	CIRC	30.9	24	24	-6.15	-6.15	-6.51	-6.51	-7.27	-7.26	-7.68	-7.68
E26	EM24	1	Conduit	CIRC	51.3	24	24	12.14	11.88	11.66	11.67	9.88	9.81	9.59	9.59
E4	EM3	1	Conduit	CIRC	64.5	24	24	11.28	11.28	11.28	11.28	19.99	19.99	19.99	19.99
E5	EM3	1	Conduit	CIRC	44.5	24	24	12.68	12.68	12.68	12.68	22.21	22.25	22.23	22.21
E8	EM7	1	Conduit	CIRC	38.6	24	24	30.52	30.51	30.52	30.52	30.68	30.30	32.27	32.27
E9	EM7	1	Conduit	CIRC	39.8	24	24	22.94	22.94	22.94	22.94	29.09	30.85	28.78	28.78
EM10	EM7	1	Conduit	CIRC	71.5	48	48	70.93	70.94	70.65	70.65	67.31	67.22	69.36	69.36
EM11	EM12	1	Conduit	CIRC	224.9	36	36	37.82	37.64	37.38	37.39	35.42	35.43	35.33	35.33
EM12	EM10	1	Conduit	CIRC	343.2	42	42	70.84	70.84	70.56	70.56	67.28	67.19	69.33	69.33
EM15	EM11	1	Conduit	CIRC	258.5	36	36	37.78	37.59	37.33	37.35	35.50	35.50	35.40	35.40
EM18	EM15	1	Conduit	CIRC	157.4	36	36	23.74	23.40	23.27	23.28	20.27	20.22	20.18	20.20
EM20	EM18	1	Conduit	CIRC	187.4	30	30	23.70	23.36	23.23	23.25	20.25	20.20	20.15	20.17
EM23	EM20	1	Conduit	CIRC	213.6	24	24	13.64	13.40	13.15	13.16	11.62	11.56	11.29	11.29
EM24	EM23	1	Conduit	CIRC	209.2	24	24	13.62	13.37	13.12	13.13	11.60	11.54	11.27	11.28
EM3	E0	1	Conduit	CIRC	344.6	54	54	130.86	130.97	130.86	130.86	145.45	145.22	145.67	145.66
EM6	EM3	1	Conduit	CIRC	215.3	54	54	107.45	107.47	107.41	107.41	113.17	112.14	113.97	113.97
EM7	EM6	1	Conduit	CIRC	308.7	48	48	107.26	107.28	107.22	107.22	113.12	112.09	113.94	113.94
F1	W14001_sta13031	1	Conduit	CIRC	366.5	30	30	13.26	13.18	11.79	11.74	11.63	11.40	9.18	9.03
F2	F3	1	Conduit	CIRC	316	30	30	10.97	10.97	10.97	10.97	19.22	19.22	19.22	19.22
F3	F4OUT	1	Conduit	CIRC	217.6	30	30	26.37	26.37	26.37	26.37	46.35	46.35	46.35	46.35
G2	GM01	1	Conduit	CIRC	31.3	18	18	12.46	12.46	12.46	12.46	26.02	21.46	21.47	21.47
GM01	GOUT	1	Conduit	CIRC	413.9	48	48	86.17	86.17	86.17	86.16	119.32	119.32	119.27	119.27

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Existing Conditions Link Shape	Existing Conditions Length (feet)	Existing Conditions Height (Inches)	Existing Conditions Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
GM1	W14001_sta14781	1	Conduit	CIRC	104.6	36	36	25.25	28.01	26.88	26.01	24.68	34.46	30.22	28.08
GM3	GM01	1	Conduit	CIRC	88.6	48	48	73.88	73.88	73.88	73.88	98.73	98.73	98.66	98.66
GM4	GM3	1	Conduit	CIRC	399.2	48	48	55.39	55.40	55.40	55.39	70.23	70.23	70.23	70.23
GM5	GM4	1	Conduit	CIRC	499.1	48	48	39.91	39.92	39.92	39.91	53.52	53.52	53.71	53.71
GM6	GM5	1	Conduit	CIRC	157.7	48	48	20.60	20.60	20.60	20.59	33.49	33.49	34.16	34.16
GM7	GM6	1	Conduit	CIRC	191.1	48	48	14.45	14.45	14.46	14.45	25.63	25.63	25.63	25.63
H1	W14001_sta12528	1	Conduit	CIRC	143.2	24	24	11.51	12.15	11.30	11.13	11.17	12.89	12.21	11.97
H2	H1	1	Conduit	CIRC	29.6	24	24	7.03	7.04	7.04	7.03	10.55	10.78	10.60	10.53
H3	H2	1	Conduit	CIRC	139.9	24	24	7.04	7.04	7.04	7.04	10.57	10.79	10.61	10.55
IH-10_JUNCTION_E01	5251	1	Conduit	RECT	377	96	60	114.15	170.13	154.34	174.39	124.82	162.76	157.10	170.22
IH-10_JUNCTION_E01	5218	2	Conduit	RECT	377	96	60	134.15	179.73	172.17	189.69	154.86	176.60	171.49	183.29
IH-10_JUNCTION_E01	5632	3	Conduit	RECT	377	96	60	114.15	173.12	163.38	182.17	125.04	162.76	157.10	170.21
IH-10_JUNCTION_E116	B01	1	Conduit	RECT	170	48	72	46.05	87.53	93.14	89.68	-47.30	49.79	55.49	54.70
IH-10_JUNCTION_E116	IH-10_MH_WD19	2	Conduit	CIRC	40	24	24	8.56	17.90	17.09	17.33	8.60	11.78	12.45	13.81
IH-10_MH_C1	IH-10_JUNCTION_E01	1	Conduit	RECT	234	60	96	101.10	137.25	136.97	149.50	142.88	145.81	129.52	133.70
IH-10_MH_C1	IH-10_MH_C2A	2	Conduit	CIRC	36	24	24	-14.34	-18.14	-18.37	-20.19	-15.35	-18.39	-16.63	-17.63
IH-10_MH_C1	IH-10_JUNCTION_E01	3	Conduit	RECT	234	60	96	101.10	137.25	136.97	149.50	142.88	145.81	129.52	133.70
IH-10_MH_C105A	IH-10_MH_C7	1	Conduit	RECT	94	60	96	87.06	119.51	119.39	129.08	98.65	125.33	114.79	115.43
IH-10_MH_C105A	IH-10_MH_WD4	2	Conduit	CIRC	37	24	24	6.91	11.27	12.32	14.04	-8.85	10.59	9.08	9.26
IH-10_MH_C105A	IH-10_MH_C7	3	Conduit	RECT	94	60	96	87.06	119.51	119.39	129.08	98.65	125.33	114.79	115.43
IH-10_MH_C107	IH-10_MH_WD20A	1	Conduit	CIRC	37	24	24	11.77	17.19	18.06	20.06	12.87	16.23	15.50	15.78
IH-10_MH_C107	IH-10_MH_C105A	2	Conduit	RECT	248	60	96	89.89	122.92	123.85	133.23	96.69	123.73	118.49	119.18
IH-10_MH_C107	IH-10_MH_C105A	5	Conduit	RECT	248	60	96	89.89	122.92	123.85	133.23	96.69	123.73	118.49	119.18
IH-10_MH_C121	IH-10_MH_C1	1	Conduit	RECT	232	60	96	91.96	127.76	127.45	135.91	116.16	134.23	120.89	122.22
IH-10_MH_C121	IH-10_MH_WD7	2	Conduit	CIRC	40	24	24	-10.19	-12.44	-12.59	-13.71	-11.69	-12.28	-12.18	-12.81
IH-10_MH_C121	IH-10_MH_C1	3	Conduit	RECT	232	60	96	91.96	127.76	127.45	135.91	116.16	134.23	120.89	122.22
IH-10_MH_C2A	IH-10_MH_WD13	1	Conduit	RECT	149	72	144	17.06	23.31	23.24	24.73	21.34	24.28	22.43	22.57
IH-10_MH_C7	IH-10_MH_C121	3	Conduit	RECT	208	60	96	87.76	121.64	121.19	129.45	102.10	127.51	115.27	115.80
IH-10_MH_C7	IH-10_MH_WD6	4	Conduit	CIRC	40	24	24	-6.71	7.83	9.25	11.05	-9.72	-10.06	-9.97	-10.43
IH-10_MH_C7	IH-10_MH_C121	6	Conduit	RECT	208	60	96	87.76	121.64	121.19	129.45	102.10	127.51	115.27	115.80
IH-10_MH_WD13	IH-10_JUNCTION_E01	1	Conduit	CIRC	32	24	24	18.65	24.06	24.35	26.78	21.99	24.88	22.75	23.19
IH-10_MH_WD19	IH-10_MH_WD35	1	Conduit	RECT	150	72	144	4.30	6.71	6.34	6.91	4.33	5.92	6.26	6.93
IH-10_MH_WD19	IH-10_MH_WD35	2	Conduit	RECT	150	72	144	4.30	6.71	6.34	6.91	4.33	5.92	6.26	6.93
IH-10_MH_WD20A	IH-10_MH_WD4	1	Conduit	RECT	275	72	144	29.04	41.14	41.95	43.70	31.35	39.48	38.06	38.49
IH-10_MH_WD3	IH-10_MH_WD20A	1	Conduit	RECT	190	72	144	10.78	12.37	12.62	13.73	12.61	13.34	13.19	13.87
IH-10_MH_WD3	IH-10_MH_WD20A	2	Conduit	RECT	190	72	144	10.78	12.37	12.62	13.73	12.61	13.34	13.19	13.87
IH-10_MH_WD35	IH-10_JUNCTION_E01	1	Conduit	CIRC	11	24	24	8.61	13.58	12.84	13.98	8.66	11.85	12.52	13.87
IH-10_MH_WD4	IH-10_MH_WD6	1	Conduit	RECT	94	72	144	35.84	50.51	51.01	53.75	39.01	49.05	47.05	47.84
IH-10_MH_WD6	IH-10_MH_WD7	1	Conduit	RECT	203	72	144	36.67	48.16	48.17	51.55	42.42	51.82	48.21	49.07
IH-10_MH_WD7	IH-10_MH_C2A	1	Conduit	RECT	237	72	144	29.10	38.87	38.87	41.49	35.18	41.67	38.21	38.86
J1	W14001_sta12065	1	Conduit	CIRC	146.8	24	24	11.77	12.08	11.27	11.21	9.64	10.99	10.11	10.15
J2	J1	1	Conduit	CIRC	117.8	24	24	13.68	13.88	13.83	13.77	13.47	14.03	14.04	14.01
J3	J2	1	Conduit	CIRC	118.3	24	24	13.70	13.90	13.84	13.79	13.47	14.04	14.05	14.01
L01	BM2	1	Conduit	CIRC	52.8	30	30	6.92	6.92	6.92	6.92	12.06	12.06	12.06	12.06
L03	BM2	1	Conduit	CIRC	88.6	30	30	5.65	5.83	5.71	5.64	-10.18	-7.81	-8.03	-8.32
L06	BM7	1	Conduit	CIRC	60.7	24	24	10.76	11.36	10.81	11.60	-9.25	-9.01	8.86	10.03
L08	BM10	1	Conduit	CIRC	36.4	24	24	12.84	11.51	10.49	10.03	11.49	9.92	10.48	11.15
L09	BM10	1	Conduit	CIRC	41.4	24	24	13.65	4.25	6.42	6.83	10.50	7.83	9.77	9.92
L11	BM13	1	Conduit	CIRC	35.5	24	24	1.90	1.95	1.89	1.90	8.18	3.34	7.82	9.03
L12	BM13	1	Conduit	CIRC	42.7	24	24	5.35	5.43	5.35	5.33	13.84	14.33	16.11	15.89
L15	BM14	1	Conduit	CIRC	50.7	15	15	10.53	10.80	10.29	10.24	9.38	9.70	9.05	8.99

Upstream Node ID	Downstream Node ID	Link Suffix	Existing Conditions Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Phase 1 Interim 10-Year Flow (CFS)	Phase 2 Proposed 10-Year Flow (CFS)	Phase 3 Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Phase 1 Interim 100-Year Flow (CFS)	Phase 2 Proposed 100-Year Flow (CFS)	Phase 3 Future 100-Year Flow (CFS)
L16	BM14	1	Conduit	CIRC	72.1	15	15	11.13	10.83	10.36	10.64	10.77	10.66	10.29	10.59
L19	BM20	1	Conduit	CIRC	40.8	24	24	10.81	13.72	13.52	13.80	10.91	13.43	13.25	13.74
L21	BM20	1	Conduit	CIRC	37.2	24	24	15.36	15.93	14.50	15.05	15.43	15.75	14.31	15.03
L22	BM24	1	Conduit	CIRC	46.7	24	24	22.25	22.99	21.43	22.08	23.26	24.08	22.24	23.07
L23	BM24	1	Conduit	CIRC	52.8	24	24	18.43	19.26	17.47	18.22	19.53	20.39	18.39	19.32
L26	BM25	1	Conduit	CIRC	44.2	24	24	12.29	11.80	11.77	11.88	13.72	13.58	13.42	13.39
L27	BM25	1	Conduit	CIRC	37.4	24	24	9.14	9.10	-8.49	-8.62	-10.03	10.32	-10.02	-10.06
L35	BM34	1	Conduit	CIRC	45.4	24	24	-13.03	-12.83	-13.05	-13.11	-15.07	-14.95	-15.12	-15.15
L36	BM34	1	Conduit	CIRC	52.1	24	24	22.36	22.45	22.31	22.29	21.94	22.04	21.84	21.82
L37	BM38	1	Conduit	CIRC	72.4	24	24	-8.55	-8.47	-8.82	-8.84	-10.01	-9.98	-10.38	-10.39
L39	BM38	1	Conduit	CIRC	42	24	24	15.19	15.30	15.08	15.07	14.61	14.77	14.93	14.91
LB001	W14001_sta16016	1	Conduit	CIRC	180.8	24	24	5.19	4.24	4.66	0.00	10.79	9.88	9.94	7.22
LB001	W14001_sta16016	2	Conduit	CIRC	180.8	24	24	5.19	4.24	4.66	0.00	10.79	9.88	9.94	7.22
M01	MM2	1	Conduit	RECT	156.4	120	120	-7.18	-6.41	-5.37	-4.88	-25.06	-32.93	-29.78	-28.74
M01	MX2	2	Conduit	CIRC	18.6	48	48	7.53	6.67	5.55	5.01	24.97	32.87	29.70	28.68
M03	MM2	1	Conduit	CIRC	16.4	24	24	6.40	6.40	6.40	6.40	11.10	11.10	11.10	11.10
M04	MM2	1	Conduit	CIRC	30.7	24	24	24.86	24.86	24.86	24.86	42.70	44.51	43.76	43.47
M06	MM5	1	Conduit	CIRC	27.8	24	24	22.03	22.03	22.03	22.03	38.76	38.76	38.76	38.76
M07	MM5	1	Conduit	CIRC	20.6	24	24	9.02	9.02	9.02	9.02	15.96	15.96	15.96	15.96
M09	MM8	1	Conduit	CIRC	26.3	24	24	15.46	15.47	15.46	15.46	27.46	27.47	27.47	27.47
M10	MM8	1	Conduit	CIRC	13.9	24	24	6.42	6.42	6.42	6.42	11.24	11.24	11.24	11.25
M12	MM11	1	Conduit	CIRC	24.6	24	24	20.23	20.23	20.23	20.23	36.02	36.02	36.02	36.02
M13	MM11	1	Conduit	CIRC	14.5	24	24	7.27	7.27	7.27	7.27	12.86	12.87	12.86	12.87
M16	MM15	1	Conduit	CIRC	32.8	24	24	0.72	0.72	0.72	0.72	1.35	1.36	1.36	1.36
M18	MM17	1	Conduit	CIRC	27.8	24	24	1.52	1.52	1.52	1.52	2.78	2.79	2.79	2.79
M20	MM19	1	Conduit	CIRC	38.5	24	24	2.32	2.32	2.32	2.32	4.08	4.07	4.08	4.07
M21	MM19	1	Conduit	CIRC	18.4	24	24	3.05	3.05	3.05	3.05	5.37	5.37	5.37	5.37
M23	MM22	1	Conduit	CIRC	19.9	24	24	4.37	4.37	4.37	4.37	7.64	7.65	7.64	7.65
M24	MM22	1	Conduit	CIRC	40.5	24	24	2.22	2.22	2.22	2.22	3.90	3.91	3.90	3.91
Math_01	Mathewson_Pond	1	Weir	80.6	0	0	48	7.89	2.01	2.06	3.51	33.23	33.17	34.39	34.55
Math_02	Mathewson_Pond	1	Weir	80.6	0	0	48	5.62	1.26	1.27	2.32	26.85	26.95	27.83	28.00
Math_03	Mathewson_Pond	1	Weir	80.6	0	0	48	4.41	0.76	0.76	1.43	20.37	20.36	20.62	20.74
Math_04	Mathewson_Pond	1	Weir	80.6	0	0	48	4.04	0.51	0.49	0.93	20.75	20.73	20.95	21.09
Math_05	Mathewson_Pond	1	Weir	80.6	0	0	48	3.18	0.85	0.78	0.92	19.60	19.52	19.60	19.80
Math_06	Mathewson_Pond	1	Weir	80.6	0	0	48	2.15	0.91	0.83	0.84	18.44	18.32	18.28	18.54
Math_07	Mathewson_Pond	1	Weir	80.6	0	0	48	1.61	0.55	0.50	0.51	18.27	18.12	17.99	18.31
Math_08	Mathewson_Pond	1	Weir	80.6	0	0	48	0.97	0.26	0.24	0.24	13.60	13.68	13.30	13.60
Math_09	Mathewson_Pond	1	Weir	80.6	0	0	48	0.86	0.12	0.11	0.11	13.73	13.65	13.17	13.44
Math_10	Mathewson_Pond	1	Weir	80.6	0	0	48	0.95	0.03	0.02	0.09	15.00	14.89	14.44	14.73
Math_11	Mathewson_Pond	1	Weir	80.6	0	0	48	0.98	0.02	0.02	0.10	14.80	14.67	14.27	14.57
Math_12	Mathewson_Pond	1	Weir	80.6	0	0	48	1.60	0.04	0.04	0.26	14.44	14.49	14.04	14.29
Math_13	Mathewson_Pond	1	Weir	80.6	0	0	48	2.10	0.11	0.11	0.54	13.83	13.88	13.46	13.69
Math_14	Mathewson_Pond	1	Weir	80.6	0	0	48	4.31	0.26	0.25	1.09	19.21	18.70	18.12	18.24
Math_15	Mathewson_Pond	1	Weir	80.6	0	0	48	6.55	0.77	0.73	2.15	27.11	27.11	25.89	26.07
Math_16	Mathewson_Pond	1	Weir	80.6	0	0	48	4.96	0.05	0.07	1.00	26.92	27.02	27.34	27.47
Math_17	Mathewson_Pond	1	Weir	80.6	0	0	48	11.59	3.35	3.38	5.56	39.68	39.79	38.84	39.02
Math_18	Mathewson_Pond	1	Weir	76.75	0	0	300	-78.26	14.25	13.84	23.99	-514.98	-512.92	-509.34	-513.20
Mathewson_Pond	5744	1	Pump	ATHEWSON_SUI	NA	NA	NA	3.94	4.02	4.03	4.03	3.96	4.01	4.02	4.02
Mathewson_Pond	5744	2	Pump	EWSON_SUBMEI	NA	NA	NA	20.48	20.83	20.89	20.89	20.54	20.77	20.81	20.81
Mathewson_Pond	5744	3	Pump	EWSON_SUBMEI	NA	NA	NA	20.48	20.83	20.89	20.89	20.54	20.77	20.81	20.81
Mathewson_Pond	5744	4	Pump	EWSON_SUBMEI	NA	NA	NA	20.48	20.83	20.89	20.89	20.54	20.77	20.81	20.81

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
MM11	MM14	1	Conduit	RECT	234	120	120	94.71	94.72	94.71	94.71	172.44	166.56	169.48	170.67
MM14	MM19	1	Conduit	RECT	97.4	120	120	98.16	98.17	98.17	98.16	178.07	172.33	174.66	175.42
MM15	MM14	1	Conduit	CIRC	157.4	36	36	4.01	4.01	4.01	4.01	7.66	7.69	7.67	7.69
MM17	MM15	1	Conduit	CIRC	417.2	36	36	2.65	2.65	2.65	2.65	5.03	5.05	5.03	5.04
MM19	MM22	1	Conduit	RECT	49	120	120	101.90	101.90	101.90	101.90	187.38	181.67	183.97	184.78
MM2	MM5	1	Conduit	RECT	420.7	120	120	29.27	29.29	29.29	29.29	54.39	53.57	54.05	54.13
MM22	MM25	1	Conduit	RECT	163.6	120	120	106.70	106.69	106.70	106.70	198.75	193.09	195.36	196.21
MM25	MOUT	1	Conduit	RECT	23.5	24	48	106.70	106.69	106.70	106.70	198.71	193.07	195.33	196.18
MM5	MM8	1	Conduit	RECT	305	120	120	54.59	54.62	54.61	54.61	95.26	92.43	93.68	94.01
MM8	MM11	1	Conduit	RECT	196.3	120	120	72.21	72.24	72.22	72.22	128.85	122.99	125.86	127.04
MX1	W14001_sta10923	1	Conduit	RECT	27.9	48	60	7.57	6.70	9.39	7.44	24.92	32.85	29.66	28.65
MX2	MX1	2	Flapvalve	CIRC	0	48	48	7.53	6.67	5.55	5.01	24.95	32.86	29.68	28.66
N02	NM1	1	Conduit	CIRC	29.3	24	24	24.26	24.26	24.26	24.26	35.43	37.18	36.29	35.92
N03	NM1	1	Conduit	CIRC	12	24	24	7.90	8.03	7.92	7.89	-11.03	11.11	9.33	8.71
N06	NM5	1	Conduit	CIRC	23.9	24	24	39.99	39.99	39.99	39.93	39.17	41.05	39.77	39.27
N07	NM5	1	Conduit	CIRC	24.8	24	24	6.93	7.07	6.94	6.94	20.73	24.57	23.41	22.95
N09	NM8	1	Conduit	CIRC	17.5	24	24	13.58	13.58	13.59	13.59	23.70	23.70	23.70	23.70
N10	NM8	1	Conduit	CIRC	19.9	24	24	13.95	13.95	13.95	13.95	24.86	24.86	24.86	24.86
N13	NM12	1	Conduit	CIRC	21.2	24	24	4.53	4.53	4.19	4.19	5.26	5.26	5.00	5.00
N14	NM12	1	Conduit	CIRC	18.6	24	24	7.17	7.16	7.12	7.12	15.84	15.76	15.47	15.49
N16	NM15	1	Conduit	CIRC	16	24	24	2.79	2.79	2.79	2.79	13.23	12.86	13.05	13.12
N17	NM15	1	Conduit	CIRC	17.6	24	24	2.94	2.94	2.94	2.94	8.38	7.90	8.01	8.11
N19	N20	1	Conduit	CIRC	46.9	24	24	3.35	3.29	3.34	3.35	9.10	9.09	8.92	8.90
N20	NM18	1	Conduit	CIRC	52.6	24	24	25.87	24.90	24.95	25.28	31.91	31.54	31.27	31.47
N21	N22	1	Conduit	CIRC	47.3	30	30	2.21	2.29	2.21	2.21	18.12	14.90	15.13	16.04
N22	NM18	1	Conduit	CIRC	50.7	36	36	5.15	5.29	5.15	5.15	20.70	19.73	20.27	20.46
N24	NM23	1	Conduit	CIRC	24.7	30	30	33.04	33.50	33.25	33.10	31.77	32.28	32.63	32.51
N25	N24	1	Conduit	CIRC	415	30	30	22.40	22.74	22.61	22.50	21.66	22.06	21.76	21.72
N26	NM23	1	Conduit	CIRC	20.4	30	30	25.39	26.68	25.69	25.35	28.45	28.88	27.79	27.90
N27	N26	1	Conduit	CIRC	77.2	30	30	23.70	24.93	24.08	23.76	25.43	26.04	24.81	24.95
NM1	W14001_sta10923	1	Conduit	RECT	198.9	84	84	203.00	205.55	204.48	203.12	237.14	258.50	249.18	246.31
NM11	NM8	1	Conduit	RECT	257.1	72	84	98.77	100.85	99.68	98.78	120.41	119.55	121.77	120.76
NM12	NM11	1	Conduit	CIRC	193.3	60	60	98.42	100.37	99.31	98.40	120.40	119.18	121.79	120.78
NM15	NM12	1	Conduit	CIRC	256.5	60	60	86.97	88.74	88.19	87.36	108.40	107.00	110.26	109.06
NM18	NM15	1	Conduit	CIRC	98.6	60	60	81.72	83.16	82.93	82.26	90.76	92.49	94.83	92.98
NM23	NM18	1	Conduit	CIRC	117	48	48	56.21	56.95	56.43	56.06	53.77	54.59	56.19	54.49
NM4	NM1	1	Conduit	RECT	206.1	84	84	171.73	173.69	172.55	171.81	216.08	225.62	222.18	220.90
NM5	NM4	1	Conduit	RECT	110.2	72	84	171.70	173.43	172.37	171.74	216.10	225.57	222.19	220.88
NM8	NM5	1	Conduit	RECT	352.4	72	84	125.08	127.21	125.95	125.16	164.39	166.85	165.70	165.39
OM0	OOUT	1	Conduit	CIRC	381.6	54	54	0.95	1.03	1.08	1.08	1.93	1.93	1.93	1.93
OM1	OM0	1	Conduit	CIRC	256.6	54	54	7.50	7.51	10.87	10.87	10.17	10.02	12.66	12.67
OM10	OM9	1	Conduit	CIRC	770.4	36	36	10.14	10.14	10.18	10.18	10.54	10.43	10.84	10.84
OM11	OM10	1	Conduit	CIRC	504.5	30	30	8.69	8.68	8.55	8.55	8.73	8.73	8.59	8.59
OM2	OM1	1	Conduit	CIRC	558.9	36	36	-5.65	-5.63	-7.10	-7.10	-8.54	-8.56	-9.74	-9.74
OM3	OM2	1	Conduit	CIRC	659.3	30	30	10.79	10.82	10.96	10.96	10.80	10.85	11.15	11.15
OM4	OM3	1	Conduit	CIRC	246.4	24	24	-4.63	-4.70	-5.12	-5.12	-5.87	-5.90	-6.79	-6.79
OM5	OM4	1	Conduit	CIRC	413.7	24	24	2.65	2.65	-2.80	-2.80	-2.74	-2.71	-2.87	-2.87
OM6	OM1	1	Conduit	CIRC	648.1	48	48	25.27	25.28	24.70	24.70	32.30	32.15	31.29	31.31
OM7	OM6	1	Conduit	CIRC	423.7	42	42	14.34	14.35	14.02	14.02	17.78	17.78	17.51	17.51
OM8	OM7	1	Conduit	CIRC	397.5	36	36	10.00	10.00	-10.20	-10.20	-16.14	-16.14	-16.27	-16.27
OM8	OM9	2	Conduit	CIRC	770.4	36	36	-14.69	-14.69	-14.76	-14.76	-14.59	-14.59	-14.64	-14.64

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
P04	PM3	1	Conduit	CIRC	22.9	24	24	14.22	14.23	14.23	14.23	33.29	35.90	36.35	35.14
P05	PM7	1	Conduit	CIRC	14.2	24	24	9.86	10.56	9.89	9.59	-12.25	10.10	9.05	-9.76
P06	PM7	1	Conduit	CIRC	23	24	24	13.94	13.94	13.94	13.94	25.09	25.16	24.44	23.65
P08	PM10	1	Conduit	CIRC	32.5	24	24	9.01	9.90	10.14	10.10	10.93	10.79	10.79	11.08
P09	PM10	1	Conduit	CIRC	23.7	24	24	21.15	20.54	21.85	21.91	25.55	26.29	25.93	25.34
P12	PM14	1	Conduit	CIRC	19.8	24	24	18.37	18.45	16.20	16.70	20.35	20.09	17.58	18.06
P13	PM14	1	Conduit	CIRC	17.8	24	24	10.34	11.04	10.11	9.96	9.07	9.80	8.77	8.65
P17	PM19	1	Conduit	CIRC	21.5	24	24	12.41	12.45	12.40	12.37	12.74	13.22	12.77	12.66
P18	PM19	1	Conduit	CIRC	21.4	24	24	6.69	6.92	6.53	6.42	-11.23	-10.93	-11.02	-11.06
P23	PM25	1	Conduit	CIRC	73.5	24	24	19.52	19.55	19.50	19.49	19.86	19.93	19.79	19.77
P24	PM25	1	Conduit	CIRC	51.2	24	24	2.26	2.24	2.27	2.24	11.40	11.37	12.30	12.31
P27	PM29	1	Conduit	CIRC	12	24	24	7.30	7.69	8.88	8.76	-8.52	-8.50	-7.18	-7.18
P28	PM29	1	Conduit	CIRC	17.2	24	24	19.40	19.43	18.41	18.41	20.92	21.00	19.98	19.97
P30	PM32	1	Conduit	CIRC	62.8	24	24	13.71	13.80	13.66	13.63	13.42	13.49	13.39	13.37
P31	PM32	1	Conduit	CIRC	83.3	24	24	16.16	16.87	16.79	16.74	12.69	12.86	13.05	13.01
P33	PM35	1	Conduit	CIRC	119.2	24	24	15.71	15.76	16.18	16.15	14.75	14.76	15.18	15.18
P34	PM35	1	Conduit	CIRC	64.7	24	24	-4.43	-4.43	-4.80	-4.80	-4.33	-4.32	-4.73	-4.73
P36	PM37	1	Conduit	CIRC	50.7	24	24	9.08	9.10	9.67	9.68	8.46	8.44	9.08	9.08
P38	PM39	1	Conduit	CIRC	49.5	24	24	10.56	10.92	9.69	9.81	10.28	10.34	9.43	9.70
P40	PM42	1	Conduit	CIRC	31.4	24	24	16.26	16.33	16.76	16.79	16.53	16.57	16.80	16.78
P41	PM42	1	Conduit	CIRC	25.9	24	24	-7.95	-7.85	-7.57	-7.58	-8.06	-8.05	-7.79	-7.79
P43	PM45	1	Conduit	CIRC	40.9	24	24	6.45	6.50	6.45	6.43	6.24	6.33	6.23	6.21
P44	PM45	1	Conduit	CIRC	58.1	24	24	7.82	7.82	7.81	7.81	13.82	13.82	13.82	13.82
P46	PM48	1	Conduit	CIRC	32.7	24	24	-9.26	-9.26	-9.20	-9.20	-10.39	-10.39	-10.26	-10.26
P47	PM48	1	Conduit	CIRC	33.4	24	24	-13.42	-13.42	-13.44	-13.44	-14.09	-14.09	-14.08	-14.08
P49	PM51	1	Conduit	CIRC	37.9	24	24	5.86	5.85	5.86	5.86	9.87	9.85	9.89	9.90
P50	PM51	1	Conduit	CIRC	92.3	24	24	0.95	0.95	0.82	0.82	-1.94	-1.92	-2.09	-2.09
PM1	W14001_sta13031	1	Conduit	CIRC	56.5	78	78	165.12	172.80	166.35	163.23	166.30	188.37	179.16	174.63
PM10	PM7	1	Conduit	CIRC	668.9	72	72	119.69	124.37	119.38	117.46	112.48	124.94	117.84	115.76
PM11	PM10	1	Conduit	CIRC	32.7	66	66	106.70	111.00	106.24	104.48	100.34	104.49	100.02	98.90
PM14	PM11	1	Conduit	CIRC	47.2	66	66	106.77	111.08	106.26	104.50	100.35	104.54	100.03	98.91
PM15	PM14	1	Conduit	CIRC	457.8	66	66	93.35	94.57	93.07	92.60	94.83	96.07	94.90	94.62
PM16	PM15	1	Conduit	CIRC	97.7	54	54	93.42	94.67	93.13	92.67	94.90	96.14	94.96	94.68
PM19	PM16	1	Conduit	CIRC	146.2	54	54	93.45	94.72	93.16	92.70	94.93	96.17	94.99	94.70
PM2	PM3	1	Conduit	CIRC	19.8	24	24	20.02	20.02	20.02	20.02	33.67	36.00	35.38	34.92
PM20	PM21	1	Conduit	CIRC	35.8	36	36	21.78	21.78	21.78	21.78	38.66	38.66	38.66	38.66
PM21	PM19	1	Conduit	CIRC	471.1	54	54	84.78	85.09	84.87	84.79	103.06	103.26	103.29	103.26
PM22	PM21	1	Conduit	CIRC	249.2	48	48	58.55	60.76	59.58	59.14	59.10	59.60	59.59	59.53
PM25	PM22	1	Conduit	CIRC	406.5	42	42	58.52	60.72	59.53	59.10	59.09	59.58	59.57	59.51
PM26	PM25	1	Conduit	CIRC	238.4	24	24	13.76	14.51	13.84	13.72	12.82	12.95	12.62	12.56
PM29	PM25	1	Conduit	CIRC	406.8	36	36	42.45	43.83	43.28	43.05	37.70	37.89	38.17	38.08
PM3	PM1	1	Conduit	CIRC	279.1	78	78	164.60	172.47	166.40	163.28	166.38	188.40	179.19	174.67
PM32	PM29	1	Conduit	CIRC	269.4	36	36	38.43	39.52	39.05	38.98	33.44	33.68	33.71	33.65
PM35	PM32	1	Conduit	CIRC	596	30	30	27.52	28.07	27.35	27.51	27.21	27.48	26.37	26.36
PM37	PM35	1	Conduit	CIRC	190.3	24	24	21.52	22.03	21.16	21.34	20.84	21.06	20.56	20.86
PM39	PM37	1	Conduit	CIRC	175.3	24	24	20.23	20.69	19.84	20.00	19.76	19.97	19.47	19.77
PM42	PM39	1	Conduit	CIRC	387.5	24	24	17.10	17.24	17.57	17.63	16.51	16.52	16.71	16.85
PM45	PM35	1	Conduit	CIRC	407.3	30	30	-10.20	-10.18	-10.10	-10.10	-11.18	-11.16	-11.02	-11.03
PM48	PM45	1	Conduit	CIRC	322.7	30	30	-15.91	-15.92	-16.00	-16.00	-16.57	-16.57	-16.64	-16.64
PM51	PM48	1	Conduit	CIRC	251.2	24	24	6.77	6.77	6.63	6.63	7.94	7.94	7.79	7.79
PM7	PM3	1	Conduit	CIRC	736	78	78	137.72	142.92	137.62	135.29	129.53	136.43	129.60	127.57

			Existing Conditions						Phase 1	Phase 2	Phase 3		Phase 1	Phase 2	Phase 3
Upstream Node ID	Downstream Node ID	Link Suffix	Link Type	Link Shape	Length (feet)	Height (Inches)	Width (Inches)	Exist 10-Year Flow (CFS)	Interim 10-Year Flow (CFS)	Proposed 10-Year Flow (CFS)	Future 10-Year Flow (CFS)	Exist 100-Year Flow (CFS)	Interim 100-Year Flow (CFS)	Proposed 100-Year Flow (CFS)	Future 100-Year Flow (CFS)
W14001_CL_16691	W14001_sta16681	1	River	NA	23.5	NA	NA	-1.65	-3.15	N.M.*	N.M.*	7.64	-4.53	N.M.*	N.M.*
W14001_ML_16734	W14001_sta16681	1	Conduit	RECT	43.5	84	84	142.38	117.03	169.93	192.51	206.02	197.30	223.34	250.04
W14001_ML_16756	W14001_ML_16734	1	Conduit	RECT	21.7	84	84	142.46	117.03	169.94	192.52	205.47	197.50	223.34	250.01
W14001_MR_16744	W14001_sta16681	1	Conduit	RECT	55.1	84	84	174.73	144.24	205.12	231.32	252.18	243.48	273.91	298.30
W14001_sta10765	BB-END	1	River	NA	144.1	NA	NA	1649.91	1546.24	1612.28	1642.27	1983.20	1819.66	1848.46	1886.11
W14001_sta10923	W14001_sta10765	1	River	NA	158.9	NA	NA	1649.95	1546.35	1612.36	1642.34	1979.63	1819.73	1849.12	1885.51
W14001_sta11029	W14001_sta10923	1	Bridge	Campbell	104.9	NA	NA	1489.35	1374.87	1436.93	1467.84	1769.62	1659.29	1682.30	1722.14
W14001_sta12065	W14001_sta11029	1	River	NA	1034	NA	NA	1489.11	1376.78	1436.65	1467.57	1769.57	1659.45	1682.35	1722.21
W14001_sta12528	W14001_sta12065	1	River	NA	462.4	NA	NA	1380.29	1245.89	1323.24	1356.93	1673.77	1545.93	1566.04	1608.16
W14001_sta13031	W14001_sta12528	1	River	NA	493.7	NA	NA	1377.23	1239.98	1318.55	1351.79	1673.91	1538.29	1559.17	1600.38
W14001_sta13092	W14001_sta13031	1	Bridge	Adkins	60.8	NA	NA	1223.21	1066.37	1154.65	1192.72	1529.83	1390.62	1413.79	1458.55
W14001_sta13491	W14001_sta13092	1	River	NA	239.2	NA	NA	1223.34	1066.45	1154.79	1192.79	1530.05	1391.01	1414.19	1458.97
W14001_sta13602	W14001_sta13491	1	River	NA	110.8	NA	NA	1225.88	1068.58	1156.78	1194.45	1536.38	1388.07	1412.43	1455.50
W14001_sta13756	W14001_sta13602	1	Bridge	Blalock	154.2	NA	NA	1149.94	970.35	1071.59	1114.64	1477.99	1322.75	1356.59	1401.96
W14001_sta14232	W14001_sta13756	1	River	NA	477.3	NA	NA	1150.79	970.50	1072.04	1115.72	1481.40	1332.41	1384.36	1427.58
W14001_sta14781	W14001_sta14232	1	River	NA	549	NA	NA	1103.11	909.19	1017.04	1063.82	1446.04	1277.93	1327.68	1374.68
W14001_sta14945	W14001_sta14781	1	River	NA	164	NA	NA	1089.69	888.26	996.22	1045.44	1438.90	1268.96	1334.23	1386.68
W14001_sta14971	W14001_sta14945	1	River	NA	26	NA	NA	689.05	531.29	625.37	643.23	1011.61	958.99	1048.64	1085.52
W14001_sta15025	W14001_sta14971	1	River	NA	54	NA	NA	683.87	527.32	620.68	631.30	1006.28	952.24	996.77	1014.96
W14001_sta15081	W14001_sta15025	2	River	NA	56	NA	NA	684.42	526.82	N.M.*	N.M.*	1004.92	941.06	N.M.*	N.M.*
W14001_sta15381	W14001_sta15081	1	River	NA	300	NA	NA	652.92	526.28	N.M.*	N.M.*	960.43	947.73	N.M.*	N.M.*
W14001_sta15481	W14001_sta15381	1	River	NA	100	NA	NA	650.66	628.32	N.M.*	N.M.*	957.30	1019.32	N.M.*	N.M.*
W14001_sta15671	W14001_sta15481	1	River	NA	190	NA	NA	622.22	603.67	705.53	835.23	895.39	888.05	1010.85	1158.62
W14001_sta15863	W14001_sta15671	1	River	NA	192.2	NA	NA	604.44	577.31	681.85	813.11	875.54	862.70	932.11	1071.33
W14001_sta16016	W14001_sta15863	1	River	NA	152.8	NA	NA	530.38	497.10	602.88	647.68	713.48	688.28	744.81	778.98
W14001_sta16681	W14001_sta16016	1	River	NA	664.9	NA	NA	533.48	497.35	N.M.*	N.M.*	692.80	668.22	N.M.*	N.M.*
W14001_sta16756	W14001_MR_16744	1	Conduit	RECT	22.8	84	84	141.10	114.37	N.M.*	N.M.*	199.45	187.02	N.M.*	N.M.*
W14001_sta16756	W14001_ML_16756	2	Conduit	RECT	12	84	84	132.29	107.84	N.M.*	N.M.*	186.40	178.72	N.M.*	N.M.*
W14001_sta16756	W14001_CL_16746	3	River	NA	13.6	NA	NA	0.00	0.00	N.M.*	N.M.*	-0.29	-0.10	N.M.*	N.M.*
W14001_sta16821	W14001_sta16756	1	River	NA	66.5	NA	NA	274.79	221.42	N.M.*	N.M.*	406.10	394.84	N.M.*	N.M.*
W14001_sta18066	W14001_sta16821	1	River	NA	1244	NA	NA	257.01	209.37	0.22	0.22	353.83	334.81	12.12	13.09
W14001_sta18481	W14001_sta18066	1	River	NA	415	NA	NA	227.60	178.64	N.M.*	N.M.*	289.14	283.97	N.M.*	N.M.*
W14001_sta19161	W14001_sta18481	1	River	NA	680	NA	NA	199.53	150.95	N.M.*	N.M.*	235.43	231.44	N.M.*	N.M.*
W14001_sta19481	W14001_sta19161	1	River	NA	319.8	NA	NA	204.57	149.26	N.M.*	N.M.*	235.82	229.93	N.M.*	N.M.*
W14001_sta19701	B18	1	Conduit	CIRC	52.3	48	48	59.58	60.88	N.M.*	N.M.*	68.51	75.37	N.M.*	N.M.*
W14001_sta19701	B18	2	Conduit	CIRC	52.3	48	48	59.58	60.88	N.M.*	N.M.*	68.51	75.37	N.M.*	N.M.*
W14001_sta19981	W14001_sta19701	1	River	NA	278	NA	NA	120.50	123.15	N.M.*	N.M.*	139.40	152.59	N.M.*	N.M.*
W14001_sta20481	W14001_sta19981	1	River	NA	499.8	NA	NA	90.23	119.00	N.M.*	N.M.*	144.34	175.50	N.M.*	N.M.*
W14001_sta20881	W14001_sta20481	1	River	NA	400.2	NA	NA	87.14	87.96	N.M.*	N.M.*	111.04	143.90	N.M.*	N.M.*
W14001_sta21026	W14001_sta20881	1	River	NA	145	NA	NA	70.72	76.35	N.M.*	N.M.*	71.31	109.03	N.M.*	N.M.*
W1400105_sta0010	W14001_sta15863	1	Conduit	CIRC	35.4	72	72	85.18	81.86	83.63	167.25	166.67	173.15	185.70	289.19
W1400105_sta0157	W1400105_sta0010	1	Conduit	CIRC	143.5	72	72	78.01	82.30	79.67	156.86	101.24	116.75	121.13	233.19
W1400105_sta0157	W1400105_sta0010	2	River	NA	149.5	NA	NA	9.81	-0.83	5.66	10.60	80.05	73.06	74.00	58.75
W1400105_sta0213	W1400105_sta0157	1	Channel	-1030_1	NA	NA	NA	31.70	24.66	28.80	24.19	100.62	113.43	115.22	81.59
W1400105_sta1458	W1400105_sta0213	1	River	NA	1246	NA	NA	31.53	24.55	28.65	23.94	101.06	114.35	118.82	82.35
W54001	W14001_sta15081	1	Conduit	CIRC	100	36	36	61.16	24.48	21.11	22.56	77.15	32.86	29.68	27.85
WittePond	B36	1	Conduit	RECT	54.8	60	96	-243.31	-267.63	-257.49	-251.84	-159.23	-202.61	-221.31	-227.83

*N.M. = Not Modeled. This link is either Proposed or Existing to Be Demolished

Appendix D: HEC-HMS Model Results

Hydraulic Element	Exist 10-Year Peak Flow (CFS)	Time	Phase 1 Interim (Basin) 10-Year Peak Flow (CFS)	Time	Phase 2 Proposed (Channel Impvs) 10-Year Peak Flow (CFS)	Time	Phase 3 Future (Storm Sew Impvs) 10-Year Peak Flow (CFS)	Time	Exist 100-Year Peak Flow (CFS)	Time	Phase 1 Interim (Basin) 100-Year Peak Flow (CFS)	Time	Phase 2 Proposed (Channel Impvs) 100-Year Peak Flow (CFS)	Time	Phase 3 Future (Storm Sew Impvs) 100-Year Peak Flow (CFS)	Time
W1000000_0007_R	986.7	20:15	986.7	20:15	986.7	20:15	986.7	20:15	2208.1	20:30	2208.1	20:30	2208.1	20:30	2208.1	20:30
W1000000_0809_J	39605.9	23:45	39589.6	23:45	39600.2	23:45	39605.1	23:45	61636	01:45	61576.9	01:45	61587.8	01:45	61601	01:45
W1000000_0809_R	37866.3	00:00	37849.5	00:00	37860.5	00:00	37865.4	00:00	59034	02:15	58973.8	02:15	58985	02:15	58998.4	02:15
W1000000_1072_J	38441.5	23:00	38425	23:00	38435.8	23:00	38440.7	23:00	59250.4	01:30	59189.4	01:30	59200.7	01:30	59214.4	01:30
W1000000_1102_R	8512.2	07:30	8502.8	07:30	8509.1	07:30	8511.8	07:30	17277.8	05:45	17245.6	05:45	17251.9	05:45	17259.3	05:45
W1000000_1237_J	8535.1	06:45	8525.9	06:45	8532.1	06:45	8534.7	06:45	17393.3	04:45	17360.9	04:45	17367.2	04:45	17374.7	04:45
W1000000_1237_R	8035	07:30	8027.3	07:30	8032.5	07:30	8034.7	07:30	16189.6	05:15	16161.6	05:15	16167.2	05:15	16173.6	05:15
W1000000_1488_J	8840.4	21:00	8808.6	21:00	8829.4	21:00	8838.8	21:00	17496.7	02:30	17475.2	02:45	17479.4	02:45	17484.2	02:45
W1000000_1488_R	8366	04:45	8362.1	04:45	8364.8	04:45	8365.8	04:45	16590.1	02:45	16569.8	02:45	16574	02:45	16578.8	02:45
W1000000_1559_J	8431	03:15	8426.9	03:15	8429.8	03:15	8430.8	03:15	16676.3	01:45	16656.3	01:45	16660.5	01:45	16665.2	01:45
W1000000_1559_R	8129.8	03:30	8126.5	03:30	8128.8	03:30	8129.7	03:30	15875.4	02:00	15857.6	02:00	15861.4	02:00	15865.6	02:00
W1000000_1606_J	8152.4	03:00	8149.2	03:00	8151.5	03:00	8152.3	03:00	15902.8	01:30	15884.4	01:30	15888.2	01:30	15892.6	01:30
W1000000_1606_R	8152.4	03:00	8149.2	03:00	8151.5	03:00	8152.3	03:00	15902.8	01:30	15884.4	01:30	15888.2	01:30	15892.6	01:30
W1000000_1628_J	8155.3	02:45	8152.2	02:45	8154.5	02:45	8155.2	02:45	15905.1	01:30	15888.2	01:30	15891.8	01:30	15895.9	01:30
W1000000_1628_R	7936.6	02:45	7933.4	02:45	7935.7	02:45	7936.4	02:45	15409.2	01:30	15392.4	01:30	15396	01:30	15400	01:30
W1000000_1646_J	7953.4	02:30	7950.5	02:30	7952.6	02:30	7953.3	02:30	15422.7	01:15	15405.6	01:15	15409.2	01:15	15413.3	01:15
W1000000_1655_R	6993.3	03:15	6993.3	03:15	6993.3	03:15	6993.3	03:15	13225.5	02:15	13225.5	02:15	13225.5	02:15	13225.5	02:15
W1000000_1663_J	6995.4	03:00	6995.4	03:00	6995.4	03:00	6995.4	03:00	13225.1	02:15	13225.1	02:15	13225.1	02:15	13225.1	02:15
W1000000_1666_R	6840.4	03:00	6840.4	03:00	6840.4	03:00	6840.4	03:00	12914.5	02:15	12914.5	02:15	12914.5	02:15	12914.5	02:15
W1000000_1757_J	6893.2	01:15	6893.2	01:15	6893.2	01:15	6893.2	01:15	12966.6	00:30	12966.6	00:30	12966.6	00:30	12966.6	00:30
W1000000_1766_J	6699.8	01:00	6699.8	01:00	6699.8	01:00	6699.8	01:00	12544.3	00:30	12544.3	00:30	12544.3	00:30	12544.3	00:30
W1000000_1766_R	6684.5	01:30	6684.5	01:30	6684.5	01:30	6684.5	01:30	12526.7	00:45	12526.7	00:45	12526.7	00:45	12526.7	00:45
W1000000_1777_R	6352.4	01:30	6352.4	01:30	6352.4	01:30	6352.4	01:30	11830.1	01:15	11830.1	01:15	11830.1	01:15	11830.1	01:15
W1000000_1865_J	6385.9	00:00	6385.9	00:00	6385.9	00:00	6385.9	00:00	11850	00:00	11850	00:00	11850	00:00	11850	00:00
W1000000_1865_R	6385.9	00:00	6385.9	00:00	6385.9	00:00	6385.9	00:00	11850	00:00	11850	00:00	11850	00:00	11850	00:00
W1000000_1879_J	6387.5	23:45	6387.5	23:45	6387.5	23:45	6387.5	23:45	11851.7	00:00	11851.7	00:00	11851.7	00:00	11851.7	00:00
W1000000_1879_R	5877.1	00:30	5877.1	00:30	5877.1	00:30	5877.1	00:30	10939.8	01:00	10939.8	01:00	10939.8	01:00	10939.8	01:00
W1000000_1985_J	5894.2	21:45	5894.2	21:45	5894.2	21:45	5894.2	21:45	10964.8	23:15	10964.8	23:15	10964.8	23:15	10964.8	23:15
W1000000_2037_J	5287.7	23:15	5287.7	23:15	5287.7	23:15	5287.7	23:15	9913.7	23:45	9913.7	23:45	9913.7	23:45	9913.7	23:45
W1000000_2046_R	5090.2	23:45	5090.2	23:45	5090.2	23:45	5090.2	23:45	9560.1	00:15	9560.1	00:15	9560.1	00:15	9560.1	00:15
W1000000_2116_J	5098.3	22:30	5098.3	22:30	5098.3	22:30	5098.3	22:30	9568	23:00	9568	23:00	9568	23:00	9568	23:00
W1000000_2116_R	4915.1	23:00	4915.1	23:00	4915.1	23:00	4915.1	23:00	9259.6	00:00	9259.6	00:00	9259.6	00:00	9259.6	00:00
W1000000_2147_J	4921.8	22:45	4921.8	22:45	4921.8	22:45	4921.8	22:45	9263.8	23:45	9263.8	23:45	9263.8	23:45	9263.8	23:45
W1000000_2150_R	3922.6	00:15	3922.6	00:15	3922.6	00:15	3922.6	00:15	7724.8	01:15	7724.8	01:15	7724.8	01:15	7724.8	01:15
W1000000_2168_R	3959.9	23:00	3959.9	23:00	3959.9	23:00	3959.9	23:00	7756.5	00:30	7756.5	00:30	7756.5	00:30	7756.5	00:30
W1000000_2250_J	4446.4	20:00	4446.4	20:00	4446.4	20:00	4446.4	20:00	8349.8	20:45	8349.8	20:45	8349.8	20:45	8349.8	20:45
W1000000_2250_R	4102.9	20:15	4102.9	20:15	4102.9	20:15	4102.9	20:15	7837	22:45	7837	22:45	7837	22:45	7837	22:45
W1000000_2271_J	4121.6	19:45	4121.6	19:45	4121.6	19:45	4121.6	19:45	7843.8	22:15	7843.8	22:15	7843.8	22:15	7843.8	22:15
W1000000_2271_R	2946.4	23:00	2946.4	23:00	2946.4	23:00	2946.4	23:00	6331.5	23:30	6331.5	23:30	6331.5	23:30	6331.5	23:30
W1000000_2340_J	2980	21:00	2980	21:00	2980	21:00	2980	21:00	6462.2	20:30	6462.2	20:30	6462.2	20:30	6462.2	20:30
W1000000_2400_R	1654.2	22:15	1654.2	22:15	1654.2	22:15	1654.2	22:15	3753.2	22:00	3753.2	22:00	3753.2	22:00	3753.2	22:00
W1000000_2403_R	1468.3	22:30	1468.3	22:30	1468.3	22:30	1468.3	22:30	3353.7	22:15	3353.7	22:15	3353.7	22:15	3353.7	22:15
W1000000_2411_J	1654.3	22:15	1654.3	22:15	1654.3	22:15	1654.3	22:15	3752.6	22:00	3752.6	22:00	3752.6	22:00	3752.6	22:00
W1000000_2486_J	1765.6	20:15	1765.6	20:15	1765.6	20:15	1765.6	20:15	3803.3	20:00	3803.3	20:00	3803.3	20:00	3803.3	20:00
W100A	421.8	16:45	421.8	16:45	421.8	16:45	421.8	16:45	791.5	17:00	791.5	17:00	791.5	17:00	791.5	17:00
W100B	1250	16:45	1250	16:45	1250	16:45	1250	16:45	2315.9	16:45	2315.9	16:45	2315.9	16:45	2315.9	16:45
W100C	2158.2	16:45	2158.2	16:45	2158.2	16:45	2158.2	16:45	3862.4	17:00	3862.4	17:00	3862.4	17:00	3862.4	17:00
W100D	554.4	17:00	554.4	17:00	554.4	17:00	554.4	17:00	999.5	17:00	999.5	17:00	999.5	17:00	999.5	17:00
W100E	634.3	17:30	634.3	17:30	634.3	17:30	634.3	17:30	1170.5	17:30	1170.5	17:30	1170.5	17:30	1170.5	17:30
W100F	380.9	16:45	380.9	16:45	380.9	16:45	380.9	16:45	687.1	16:45	687.1	16:45	687.1	16:45	687.1	16:45
W100G	377.8	17:00	377.8	17:00	377.8	17:00	377.8	17:00	700.2	17:00	700.2	17:00	700.2	17:00	700.2	17:00
W100H	667.3	17:00	667.3	17:00	667.3	17:00	667.3	17:00	1226	17:15	1226	17:15	1226	17:15	1226	17:15
W100I	687.2	17:15	687.2	17:15	687.2	17:15	687.2	17:15	1265.6	17:15	1265.6	17:15	1265.6	17:15	1265.6	17:15

Hydraulic Element	Exist 10-Year Peak Flow (CFS)	Time	Phase 1 Interim (Basin) 10-Year Peak Flow (CFS)	Time	Phase 2 Proposed (Channel Impvs) 10-Year Peak Flow (CFS)	Time	Phase 3 Future (Storm Sew Impvs) 10-Year Peak Flow (CFS)	Time	Exist 100-Year Peak Flow (CFS)	Time	Phase 1 Interim (Basin) 100-Year Peak Flow (CFS)	Time	Phase 2 Proposed (Channel Impvs) 100-Year Peak Flow (CFS)	Time	Phase 3 Future (Storm Sew Impvs) 100-Year Peak Flow (CFS)	Time
W100J	525.3	17:30	525.3	17:30	525.3	17:30	525.3	17:30	982	17:30	982	17:30	982	17:30	982	17:30
W100K	1477.4	17:45	1477.4	17:45	1477.4	17:45	1477.4	17:45	2735.9	17:45	2735.9	17:45	2735.9	17:45	2735.9	17:45
W100L	1099.7	17:15	1099.7	17:15	1099.7	17:15	1099.7	17:15	2003	17:15	2003	17:15	2003	17:15	2003	17:15
W100M	1415.4	19:00	1415.4	19:00	1415.4	19:00	1415.4	19:00	2697	19:15	2697	19:15	2697	19:15	2697	19:15
W100N	1689.1	17:30	1689.1	17:30	1689.1	17:30	1689.1	17:30	3053.7	18:00	3053.7	18:00	3053.7	18:00	3053.7	18:00
W100O	2820.3	18:30	2820.3	18:30	2820.3	18:30	2820.3	18:30	5230.2	18:30	5230.2	18:30	5230.2	18:30	5230.2	18:30
W1290000_0001_J	402.7	18:15	402.7	18:15	402.7	18:15	402.7	18:15	742.2	19:00	742.2	19:00	742.2	19:00	742.2	19:00
W129A	402.7	18:15	402.7	18:15	402.7	18:15	402.7	18:15	742.2	19:00	742.2	19:00	742.2	19:00	742.2	19:00
W138A	599	17:00	599	17:00	599	17:00	599	17:00	1095.3	17:30	1095.3	17:30	1095.3	17:30	1095.3	17:30
W1390000_0001_J	249.2	18:00	249.2	18:00	249.2	18:00	249.2	18:00	466.9	18:30	466.9	18:30	466.9	18:30	466.9	18:30
W139A	249.2	18:00	249.2	18:00	249.2	18:00	249.2	18:00	466.9	18:30	466.9	18:30	466.9	18:30	466.9	18:30
W1400000_0001_J	1157.7	17:30	1118.5	17:30	1144	17:30	1155.7	17:30	2141.5	17:45	2047.4	17:45	2064.6	17:45	2086.2	17:45
W1400000_0007_R	3852.8	17:30	3808	17:30	3837.2	17:30	3850.5	17:30	7104.3	17:30	7009	17:30	7025.6	17:30	7046.3	17:30
W1400000_0008_J	3852.8	17:30	3808	17:30	3837.2	17:30	3850.5	17:30	7104.3	17:30	7009	17:30	7025.6	17:30	7046.3	17:30
W1400000_0008_R	586.9	17:45	550.6	18:00	574.1	17:45	585	17:45	1087.1	18:15	998.5	18:30	1014.5	18:15	1034.1	18:15
W1400000_0033_J	3846.2	17:15	3801.7	17:30	3828.7	17:15	3843.6	17:15	7125.4	17:15	7032	17:15	7048.4	17:15	7068.4	17:15
W1400000_0033_R	1580.1	17:30	1580.1	17:30	1580.1	17:30	1580.1	17:30	2869.8	17:30	2869.8	17:30	2869.8	17:30	2869.8	17:30
W1400000_0134_J	1618.8	17:00	1618.8	17:00	1618.8	17:00	1618.8	17:00	2888.4	17:00	2888.4	17:00	2888.4	17:00	2888.4	17:00
W1400100_0106_J	588.5	17:15	552	17:30	575.8	17:30	586.6	17:15	1088	18:00	999.5	18:00	1015.6	18:00	1035.2	18:00
W140A	359.2	17:30	359.2	17:30	359.2	17:30	359.2	17:30	682.8	17:45	682.8	17:45	682.8	17:45	682.8	17:45
W140B	1273.7	17:00	1273.7	17:00	1273.7	17:00	1273.7	17:00	2254.4	17:00	2254.4	17:00	2254.4	17:00	2254.4	17:00
W140C	588.5	17:15	552	17:30	575.8	17:30	586.6	17:15	1088	18:00	999.5	18:00	1015.6	18:00	1035.2	18:00
W140D	590.1	17:00	590.1	17:00	590.1	17:00	590.1	17:00	1075.6	17:15	1075.6	17:15	1075.6	17:15	1075.6	17:15
W140E	1308.4	16:45	1308.4	16:45	1308.4	16:45	1308.4	16:45	2300.1	16:45	2300.1	16:45	2300.1	16:45	2300.1	16:45
W141A	495.7	16:45	495.7	16:45	495.7	16:45	495.7	16:45	930.9	17:15	930.9	17:15	930.9	17:15	930.9	17:15
W142A	437.2	17:00	437.2	17:00	437.2	17:00	437.2	17:00	779.2	17:15	779.2	17:15	779.2	17:15	779.2	17:15
W145A	578.8	17:00	578.8	17:00	578.8	17:00	578.8	17:00	1049.3	17:30	1049.3	17:30	1049.3	17:30	1049.3	17:30
W147A	559.6	17:00	559.6	17:00	559.6	17:00	559.6	17:00	1013.9	17:00	1013.9	17:00	1013.9	17:00	1013.9	17:00
W1510000_1994_R	5283.5	00:00	5283.5	00:00	5283.5	00:00	5283.5	00:00	9906	00:30	9906	00:30	9906	00:30	9906	00:30
W151A	582.5	17:45	582.5	17:45	582.5	17:45	582.5	17:45	1084.8	17:45	1084.8	17:45	1084.8	17:45	1084.8	17:45
W1560000_0000_R	1345	18:00	1345	18:00	1345	18:00	1345	18:00	2494.8	17:45	2494.8	17:45	2494.8	17:45	2494.8	17:45
W1560000_0001_J	2144	17:45	2144	17:45	2144	17:45	2144	17:45	4047.7	17:30	4047.7	17:30	4047.7	17:30	4047.7	17:30
W1560000_0122_J	1508.8	16:45	1508.8	16:45	1508.8	16:45	1508.8	16:45	2661.1	16:45	2661.1	16:45	2661.1	16:45	2661.1	16:45
W156A	1508.8	16:45	1508.8	16:45	1508.8	16:45	1508.8	16:45	2661.1	16:45	2661.1	16:45	2661.1	16:45	2661.1	16:45
W156B	1042.4	16:45	1042.4	16:45	1042.4	16:45	1042.4	16:45	1851.8	16:45	1851.8	16:45	1851.8	16:45	1851.8	16:45
W1570000_0001_J	3959.9	23:00	3959.9	23:00	3959.9	23:00	3959.9	23:00	7756.5	00:30	7756.5	00:30	7756.5	00:30	7756.5	00:30
W1670000_0020_J	1227.4	19:00	1227.4	19:00	1227.4	19:00	1227.4	19:00	2268.8	18:45	2268.8	18:45	2268.8	18:45	2268.8	18:45
W1670000_0020_R	805.7	19:45	805.7	19:45	805.7	19:45	805.7	19:45	1539.7	20:45	1539.7	20:45	1539.7	20:45	1539.7	20:45
W1670000_0105_J	811.6	18:45	811.6	18:45	811.6	18:45	811.6	18:45	1557.7	19:15	1557.7	19:15	1557.7	19:15	1557.7	19:15
W167A	713.1	17:15	713.1	17:15	713.1	17:15	713.1	17:15	1285.3	17:15	1285.3	17:15	1285.3	17:15	1285.3	17:15
W167B	811.6	18:45	811.6	18:45	811.6	18:45	811.6	18:45	1557.7	19:15	1557.7	19:15	1557.7	19:15	1557.7	19:15
W170A	698.9	17:45	698.9	17:45	698.9	17:45	698.9	17:45	1313.2	18:00	1313.2	18:00	1313.2	18:00	1313.2	18:00
W1900000_0017_J	1214.6	20:15	1214.6	20:15	1214.6	20:15	1214.6	20:15	2695.6	20:30	2695.6	20:30	2695.6	20:30	2695.6	20:30
W1900000_0327_J	1021.8	17:45	1021.8	17:45	1021.8	17:45	1021.8	17:45	2230.4	18:15	2230.4	18:15	2230.4	18:15	2230.4	18:15
W1900000_0348_J	545.2	17:00	545.2	17:00	545.2	17:00	545.2	17:00	1148.4	17:45	1148.4	17:45	1148.4	17:45	1148.4	17:45
W190A	545.2	17:00	545.2	17:00	545.2	17:00	545.2	17:00	1148.4	17:45	1148.4	17:45	1148.4	17:45	1148.4	17:45
W190B	500.6	18:00	500.6	18:00	500.6	18:00	500.6	18:00	1093.5	18:30	1093.5	18:30	1093.5	18:30	1093.5	18:30
W190C	228.7	20:30	228.7	20:30	228.7	20:30	228.7	20:30	487.5	20:30	487.5	20:30	487.5	20:30	487.5	20:30

Appendix E: HEC-RAS Model Results

Profile	River Sta	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
10PCT_10yr	13322	Existing[1]	589	62.35	73.08		73.29	0.001449	3.6	163.39	30.54	0.27
	13322	InterimPh1[2]	552	62.35	72.85		73.04	0.001431	3.53	156.3	29.78	0.27
	13322	PropPh2[3]	576	62.35	73		73.2	0.001444	3.58	160.87	30.27	0.27
	13322	FuturePh3[4]	587	62.35	73.07		73.27	0.00145	3.6	162.94	30.49	0.27
	13075.6	Existing[1]	589	62.15	72.69	68.44	72.91	0.001593	3.74	157.64	29.93	0.29
	13075.6	InterimPh1[2]	552	62.15	72.46	68.28	72.67	0.001574	3.66	150.74	29.18	0.28
	13075.6	PropPh2[3]	576	62.15	72.61	68.39	72.82	0.00159	3.71	155.09	29.65	0.29
	13075.6	FuturePh3[4]	587	62.15	72.67	68.44	72.89	0.001598	3.74	157.06	29.86	0.29
	13053.2		Bridge									
	13030.8	Existing[1]	589	62.08	72.52	68.37	72.74	0.001678	3.81	154.56	29.59	0.29
	13030.8	InterimPh1[2]	552	62.08	72.3	68.21	72.51	0.001649	3.73	148.1	28.89	0.29
	13030.8	PropPh2[3]	576	62.08	72.44	68.32	72.67	0.001668	3.78	152.32	29.35	0.29
	13030.8	FuturePh3[4]	587	62.08	72.51	68.36	72.73	0.001676	3.81	154.23	29.56	0.29
	12896.2	Existing[1]	589	61.87	72.31	67.87	72.51	0.001616	3.66	160.73	31.95	0.29
	12896.2	InterimPh1[2]	552	61.87	72.09	67.67	72.29	0.001595	3.59	153.86	31.15	0.28
	12896.2	PropPh2[3]	576	61.87	72.23	67.81	72.44	0.001609	3.64	158.35	31.67	0.29
	12896.2	FuturePh3[4]	587	61.87	72.3	67.87	72.5	0.001615	3.66	160.39	31.91	0.29
	12527.9	Existing[1]	589	61.3	72	67.34	72.09	0.000748	2.46	239.61	54.58	0.21
	12527.9	InterimPh1[2]	552	61.3	71.78	67.2	71.87	0.000744	2.42	227.88	52.64	0.21
	12527.9	PropPh2[3]	576	61.3	71.92	67.3	72.01	0.000747	2.45	235.54	53.91	0.21
	12527.9	FuturePh3[4]	587	61.3	71.99	67.35	72.08	0.000747	2.46	239.02	54.48	0.21
	12065.3	Existing[1]	589	60.51	71.48	66.5	71.65	0.001228	3.31	178.18	33.89	0.25
	12065.3	InterimPh1[2]	552	60.51	71.27	66.31	71.43	0.001199	3.22	171.25	33.13	0.25
	12065.3	PropPh2[3]	576	60.51	71.41	66.45	71.57	0.001218	3.28	175.79	33.63	0.25
	12065.3	FuturePh3[4]	587	60.51	71.47	66.51	71.64	0.001226	3.3	177.84	33.86	0.25
	11519.3	Existing[1]	589	60.46	70.75	66.73	70.9	0.001512	3.12	188.82	53.88	0.29
	11519.3	InterimPh1[2]	552	60.46	70.54	66.56	70.69	0.00152	3.09	178.54	49.49	0.29
	11519.3	PropPh2[3]	576	60.46	70.68	66.68	70.83	0.001514	3.11	185.27	50.96	0.29
	11519.3	FuturePh3[4]	587	60.46	70.74	66.72	70.89	0.001511	3.12	188.35	53.48	0.29
	11029.3	Existing[1]	589	60.41	70.13	66.68	70.36	0.00081	3.86	152.61	36.4	0.33
	11029.3	InterimPh1[2]	552	60.41	69.94	66.52	70.16	0.000798	3.79	145.79	35.23	0.33
	11029.3	PropPh2[3]	576	60.41	70.06	66.62	70.29	0.000804	3.83	150.37	36.02	0.33
	11029.3	FuturePh3[4]	587	60.41	70.12	66.68	70.35	0.000807	3.85	152.47	36.38	0.33
	11002.1	Existing[1]	589	60.41	70.11	66.55	70.34	0.001542	3.84	153.54	36.29	0.33
	11002.1	InterimPh1[2]	552	60.41	69.91	66.4	70.13	0.001525	3.77	146.42	35.06	0.33
	11002.1	PropPh2[3]	576	60.41	70.04	66.52	70.26	0.001538	3.82	150.97	35.85	0.33
	11002.1	FuturePh3[4]	587	60.41	70.09	66.57	70.32	0.001544	3.84	153.05	36.21	0.33
	10962.7		Bridge									
	10923.3	Existing[1]	589	60.3	69.87	66.44	70.12	0.001659	3.95	149.11	35.53	0.34
	10923.3	InterimPh1[2]	552	60.3	69.68	66.29	69.91	0.001635	3.88	142.36	34.33	0.34
	10923.3	PropPh2[3]	576	60.3	69.81	66.4	70.05	0.001651	3.92	146.76	35.12	0.34
	10923.3	FuturePh3[4]	587	60.3	69.86	66.46	70.11	0.001657	3.95	148.78	35.47	0.34

	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Profile			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	10764.8	Existing[1]	589	59.93	69.8	66.26	69.93	0.000508	2.97	198.47	51.69	0.27
	10764.8	InterimPh1[2]	552	59.93	69.6	66.08	69.73	0.000515	2.93	188.28	50.36	0.27
	10764.8	PropPh2[3]	576	59.93	69.73	66.19	69.86	0.000511	2.96	194.82	51.22	0.27
	10764.8	FuturePh3[4]	587	59.93	69.78	66.25	69.92	0.000509	2.97	197.8	51.6	0.27
	10641.7	Existing[1]	589	59.65	69.72	65.71	69.87	0.000441	3.1	190.58	42.38	0.25
	10641.7	InterimPh1[2]	552	59.65	69.53	65.55	69.67	0.000438	3.02	182.75	40.14	0.25
	10641.7	PropPh2[3]	576	59.65	69.66	65.66	69.8	0.000439	3.07	187.91	41.63	0.25
	10641.7	FuturePh3[4]	587	59.65	69.71	65.7	69.86	0.00044	3.09	190.3	42.31	0.25
	10599.6	Existing[1]	682	59.55	69.63	65.97	69.84	0.000621	3.66	189.73	158.05	0.3
	10599.6	InterimPh1[2]	644	59.55	69.43	65.84	69.63	0.000633	3.61	179.78	152.59	0.3
	10599.6	PropPh2[3]	669	59.55	69.56	65.93	69.76	0.000627	3.64	186.04	156.03	0.3
	10599.6	FuturePh3[4]	680	59.55	69.61	65.98	69.82	0.000624	3.66	188.89	157.59	0.3
	10581.7		Bridge									
	10563.8	Existing[1]	682	59.46	69.53	65.88	69.74	0.000624	3.66	189.31	157.82	0.3
	10563.8	InterimPh1[2]	644	59.46	69.33	65.74	69.54	0.000635	3.61	179.53	152.45	0.3
	10563.8	PropPh2[3]	669	59.46	69.46	65.84	69.67	0.000629	3.65	185.79	155.89	0.3
	10563.8	FuturePh3[4]	680	59.46	69.52	65.89	69.73	0.000626	3.66	188.64	157.45	0.3
	10404.9	Existing[1]	682	59.39	69.21	65.67	69.57	0.00107	4.81	141.8	26.97	0.37
	10404.9	InterimPh1[2]	644	59.39	69.02	65.52	69.37	0.00105	4.7	136.89	26.49	0.36
	10404.9	PropPh2[3]	669	59.39	69.14	65.65	69.49	0.001065	4.78	140.04	26.8	0.37
	10404.9	FuturePh3[4]	680	59.39	69.19	65.69	69.55	0.00107	4.81	141.5	26.94	0.37
	9889.4	Existing[1]	709	59.19	68.38		68.88	0.001606	5.65	125.56	25.32	0.45
	9889.4	InterimPh1[2]	670	59.19	68.22		68.7	0.001566	5.51	121.52	24.9	0.44
	9889.4	PropPh2[3]	695	59.19	68.33		68.81	0.001592	5.6	124.11	25.17	0.44
	9889.4	FuturePh3[4]	707	59.19	68.37		68.87	0.001606	5.64	125.27	25.29	0.45
	9202.8	Existing[1]	709	58.42	67.8	64.76	68.04	0.000807	3.94	179.86	42.84	0.34
	9202.8	InterimPh1[2]	670	58.42	67.65	64.65	67.88	0.000798	3.87	173.26	42.04	0.34
	9202.8	PropPh2[3]	695	58.42	67.75	64.74	67.99	0.000803	3.91	177.55	42.56	0.34
	9202.8	FuturePh3[4]	707	58.42	67.79	64.78	68.03	0.000808	3.94	179.42	42.79	0.34
	9132	Existing[1]	738	58.34	67.72	64.77	67.98	0.000875	4.11	179.68	42.74	0.35
	9132	InterimPh1[2]	699	58.34	67.56	64.67	67.81	0.000869	4.04	173.14	41.95	0.35
	9132	PropPh2[3]	725	58.34	67.66	64.76	67.92	0.000875	4.09	177.38	42.46	0.35
	9132	FuturePh3[4]	736	58.34	67.71	64.79	67.97	0.000876	4.11	179.28	42.69	0.35
	9104.1		Bridge									
	9076.2	Existing[1]	738	58.21	67.55	64.64	67.82	0.000896	4.14	178.15	42.56	0.36
	9076.2	InterimPh1[2]	699	58.21	67.4	64.54	67.66	0.000887	4.07	171.8	41.79	0.35
	9076.2	PropPh2[3]	725	58.21	67.5	64.63	67.76	0.000894	4.12	176	42.3	0.36
	9076.2	FuturePh3[4]	736	58.21	67.54	64.66	67.81	0.000895	4.14	177.88	42.53	0.36
	8911.9	Existing[1]	738	58.05	67.34		67.61	0.001797	4.17	183.53	43.73	0.32
	8911.9	InterimPh1[2]	699	58.05	67.2		67.45	0.001777	4.07	177.28	42.47	0.32
	8911.9	PropPh2[3]	725	58.05	67.3		67.56	0.00179	4.14	181.44	43.18	0.32
	8911.9	FuturePh3[4]	736	58.05	67.34		67.61	0.001793	4.16	183.29	43.66	0.32

	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Profile			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	8753.8	Existing[1]	738	57.9	67.04		67.32	0.001943	4.25	188	49.16	0.34
	8753.8	InterimPh1[2]	699	57.9	66.9		67.16	0.001932	4.15	180.91	48.31	0.33
	8753.8	PropPh2[3]	725	57.9	66.99		67.26	0.001942	4.22	185.56	48.87	0.34
	8753.8	FuturePh3[4]	736	57.9	67.04		67.31	0.001941	4.24	187.67	49.12	0.34
	8320.8	Existing[1]	771	57.59	65.17		65.83	0.006823	6.51	118.41	32.66	0.6
	8320.8	InterimPh1[2]	732	57.59	65.05		65.69	0.006761	6.39	114.6	31.73	0.59
	8320.8	PropPh2[3]	758	57.59	65.13		65.78	0.006808	6.47	117.15	32.31	0.6
	8320.8	FuturePh3[4]	769	57.59	65.17		65.82	0.006822	6.51	118.21	32.6	0.6
	7945.8	Existing[1]	771	55.6	63.88		64.19	0.002725	4.57	200.6	72.69	0.39
	7945.8	InterimPh1[2]	732	55.6	63.75		64.05	0.002749	4.49	191.18	70.41	0.39
	7945.8	PropPh2[3]	758	55.6	63.84		64.15	0.002731	4.54	197.53	71.95	0.39
	7945.8	FuturePh3[4]	769	55.6	63.88		64.19	0.002722	4.56	200.27	72.61	0.39
	7482.7	Existing[1]	771	53.23	62.12		62.51	0.005074	5.08	163.44	51.64	0.42
	7482.7	InterimPh1[2]	732	53.23	61.96		62.35	0.005156	5.01	155.67	48.82	0.42
	7482.7	PropPh2[3]	758	53.23	62.06		62.45	0.005132	5.07	160.42	50.56	0.42
	7482.7	FuturePh3[4]	769	53.23	62.1		62.5	0.005105	5.09	162.68	51.37	0.42
	7444.9	Existing[1]	809	53.04	61.96	59.47	62.32	0.004341	4.9	176.01	44.21	0.39
	7444.9	InterimPh1[2]	769	53.04	61.8	59.39	62.15	0.004377	4.81	169.17	43.32	0.38
	7444.9	PropPh2[3]	795	53.04	61.9	59.46	62.26	0.004371	4.87	173.37	43.87	0.39
	7444.9	FuturePh3[4]	807	53.04	61.94	59.49	62.31	0.004367	4.9	175.31	44.12	0.39
	7418.6		Bridge									
	7392.3	Existing[1]	809	53.07	61.22	59.5	61.75	0.007659	5.83	143.93	39.84	0.5
	7392.3	InterimPh1[2]	769	53.07	61.1	59.41	61.6	0.007618	5.72	138.94	39.11	0.49
	7392.3	PropPh2[3]	795	53.07	61.18	59.49	61.69	0.007656	5.8	142.11	39.57	0.5
	7392.3	FuturePh3[4]	807	53.07	61.21	59.52	61.74	0.007671	5.83	143.58	39.79	0.5
	7223.2	Existing[1]	809	51.31	58.78	58.13	59.72	0.018153	7.78	106.42	36.36	0.75
	7223.2	InterimPh1[2]	769	51.31	58.65		59.57	0.018496	7.7	101.81	35.35	0.75
	7223.2	PropPh2[3]	795	51.31	58.73		59.66	0.018263	7.75	104.82	36.01	0.75
	7223.2	FuturePh3[4]	807	51.31	58.77		59.71	0.018161	7.78	106.21	36.31	0.75
	6508.1	Existing[1]	851	42.18	51.15		51.79	0.00747	6.42	132.55	26.38	0.5
	6508.1	InterimPh1[2]	811	42.18	50.99		51.61	0.007441	6.32	128.29	26.14	0.5
	6508.1	PropPh2[3]	837	42.18	51.09		51.73	0.007461	6.39	131.06	26.3	0.5
	6508.1	FuturePh3[4]	849	42.18	51.14		51.78	0.007469	6.42	132.33	26.37	0.5
	5707.3	Existing[1]	851	41.84	48.67		48.86	0.002015	3.42	249.09	48.99	0.27
	5707.3	InterimPh1[2]	811	41.84	48.49		48.67	0.00203	3.38	240.21	48.42	0.27
	5707.3	PropPh2[3]	837	41.84	48.61		48.79	0.002018	3.4	246.1	48.8	0.27
	5707.3	FuturePh3[4]	849	41.84	48.67		48.85	0.002012	3.41	248.81	48.97	0.27
	5602.5	Existing[1]	894	41.79	48.39	45.16	48.61	0.002548	3.76	237.52	48.25	0.3
	5602.5	InterimPh1[2]	854	41.79	48.2	45.08	48.42	0.002595	3.74	228.56	47.67	0.3
	5602.5	PropPh2[3]	880	41.79	48.32	45.14	48.54	0.00256	3.75	234.52	48.05	0.3
	5602.5	FuturePh3[4]	892	41.79	48.38	45.16	48.6	0.002544	3.76	237.25	48.23	0.3
	5375.3		Culvert									

	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Profile			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	5148.1	Existing[1]	894	38.37	47.42	41.74	47.51	0.000712	2.46	362.77	55.89	0.17
	5148.1	InterimPh1[2]	854	38.37	47.25	41.66	47.34	0.000703	2.42	353.61	55.35	0.16
	5148.1	PropPh2[3]	880	38.37	47.36	41.71	47.46	0.000708	2.45	359.82	55.72	0.16
	5148.1	FuturePh3[4]	892	38.37	47.42	41.74	47.51	0.00071	2.46	362.65	55.89	0.17
	4988.3	Existing[1]	894	37.97	47.02		47.28	0.002648	4.05	220.47	38.96	0.3
	4988.3	InterimPh1[2]	854	37.97	46.85		47.09	0.002624	4	213.76	38.37	0.3
	4988.3	PropPh2[3]	880	37.97	46.96		47.21	0.00264	4.03	218.14	38.75	0.3
	4988.3	FuturePh3[4]	892	37.97	47.01		47.27	0.002647	4.05	220.15	38.93	0.3
	4200.8	Existing[1]	964	36	43.56		44.08	0.006518	5.8	166.29	33.9	0.46
	4200.8	InterimPh1[2]	924	36	43.44		43.94	0.006412	5.7	162.06	33.48	0.46
	4200.8	PropPh2[3]	950	36	43.52		44.04	0.006478	5.76	164.85	33.76	0.46
	4200.8	FuturePh3[4]	962	36	43.56		44.08	0.006512	5.79	166.08	33.88	0.46
	3767.1	Existing[1]	964	34.6	41.71		41.94	0.003615	3.84	251.12	66.53	0.35
	3767.1	InterimPh1[2]	924	34.6	41.59		41.81	0.003619	3.8	243.15	65.26	0.35
	3767.1	PropPh2[3]	950	34.6	41.67		41.89	0.00362	3.83	248.32	66.03	0.35
	3767.1	FuturePh3[4]	962	34.6	41.7		41.93	0.003617	3.84	250.67	66.45	0.35
	3368.2	Existing[1]	1009	33.01	40.31		40.55	0.003369	3.91	258.83	59.46	0.32
	3368.2	InterimPh1[2]	969	33.01	40.19		40.42	0.003375	3.85	251.74	58.13	0.32
	3368.2	PropPh2[3]	995	33.01	40.26		40.5	0.003375	3.89	256.25	59.32	0.32
	3368.2	FuturePh3[4]	1007	33.01	40.3		40.54	0.003374	3.91	258.36	59.44	0.32
	2735.8	Existing[1]	1009	31.73	39.52		39.58	0.000799	1.95	516.36	108.67	0.16
	2735.8	InterimPh1[2]	969	31.73	39.4		39.45	0.000798	1.93	503.03	107.52	0.16
	2735.8	PropPh2[3]	995	31.73	39.47		39.53	0.0008	1.95	511.32	108.24	0.16
	2735.8	FuturePh3[4]	1007	31.73	39.51		39.57	0.000801	1.95	515.27	108.57	0.16
	2065.5	Existing[1]	1082	30.37	37.72		38.25	0.007789	5.87	184.44	37.46	0.47
	2065.5	InterimPh1[2]	1043	30.37	37.62		38.14	0.007639	5.77	180.92	37.21	0.46
	2065.5	PropPh2[3]	1068	30.37	37.68		38.21	0.007741	5.83	183.14	37.37	0.46
	2065.5	FuturePh3[4]	1080	30.37	37.71		38.25	0.007788	5.86	184.21	37.44	0.47
	1689.7	Existing[1]	1082	28.45	36.49	33.85	36.61	0.00246	2.86	378.56	101.45	0.26
	1689.7	InterimPh1[2]	1043	28.45	36.37		36.5	0.00251	2.84	367.02	100.72	0.26
	1689.7	PropPh2[3]	1068	28.45	36.44		36.57	0.002487	2.86	373.96	101.16	0.26
	1689.7	FuturePh3[4]	1080	28.45	36.48		36.6	0.002471	2.86	377.53	101.38	0.26
	821.4	Existing[1]	1158	24.03	32.76	29.53	33.28	0.006302	5.79	199.87	33.84	0.42
	821.4	InterimPh1[2]	1119	24.03	32.62	29.43	33.13	0.006303	5.74	194.89	33.5	0.42
	821.4	PropPh2[3]	1144	24.03	32.71	29.49	33.23	0.006302	5.78	198.09	33.72	0.42
	821.4	FuturePh3[4]	1156	24.03	32.76	29.52	33.28	0.006302	5.79	199.62	33.82	0.42
1PCT_100yr	13322	Existing[1]	1088	62.35	75.34		75.66	0.001766	4.51	264.01	297.08	0.31
	13322	InterimPh1[2]	1000	62.35	75.17		75.45	0.001616	4.27	233.93	37.21	0.3
	13322	PropPh2[3]	1016	62.35	75.18		75.47	0.00166	4.34	234.35	37.25	0.3
	13322	FuturePh3[4]	1035	62.35	75.23		75.53	0.001683	4.38	238.62	155.31	0.31
	13075.6	Existing[1]	1088	62.15	75	70.22	75.22	0.001438	4.04	717.1	1340.56	0.28
	13075.6	InterimPh1[2]	1000	62.15	74.72	69.98	75.02	0.001798	4.45	224.69	615.07	0.32
	13075.6	PropPh2[3]	1016	62.15	74.81	70.04	75.05	0.001541	4.14	484.96	678.64	0.29
	13075.6	FuturePh3[4]	1035	62.15	74.87	70.09	75.11	0.00151	4.11	543	1291.59	0.29

	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Profile			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	13053.2		Bridge									
	13030.8	Existing[1]	1088	62.08	74.67	70.15	75.03	0.002105	4.82	225.64	633.3	0.34
	13030.8	InterimPh1[2]	1000	62.08	74.44	69.91	74.77	0.001967	4.6	217.21	385.95	0.33
	13030.8	PropPh2[3]	1016	62.08	74.49	69.96	74.83	0.001983	4.64	219.16	447.1	0.33
	13030.8	FuturePh3[4]	1035	62.08	74.53	70.02	74.87	0.002021	4.69	220.65	493.21	0.33
	12896.2	Existing[1]	1088	61.87	74.43	69.9	74.74	0.001754	4.52	283.54	793.36	0.32
	12896.2	InterimPh1[2]	1000	61.87	74.21	69.63	74.5	0.001698	4.34	258.04	380.48	0.31
	12896.2	PropPh2[3]	1016	61.87	74.27	69.67	74.56	0.001695	4.36	264.03	470.99	0.31
	12896.2	FuturePh3[4]	1035	61.87	74.3	69.74	74.6	0.001719	4.41	268.33	535.02	0.31
	12527.9	Existing[1]	1088	61.3	74.2	68.79	74.32	0.000639	2.87	522.36	1423.22	0.2
	12527.9	InterimPh1[2]	1000	61.3	73.97	68.58	74.09	0.000636	2.79	401.78	867.59	0.2
	12527.9	PropPh2[3]	1016	61.3	74.03	68.61	74.15	0.00063	2.8	429.72	969.1	0.2
	12527.9	FuturePh3[4]	1035	61.3	74.06	68.67	74.19	0.000638	2.83	447.72	1040.4	0.2
	12065.3	Existing[1]	1088	60.51	73.62	68.54	73.89	0.001349	4.19	333.99	1300.02	0.28
	12065.3	InterimPh1[2]	1000	60.51	73.43	68.27	73.67	0.001278	4	265.39	600.76	0.27
	12065.3	PropPh2[3]	1016	60.51	73.48	68.31	73.73	0.001279	4.02	274.85	742.32	0.27
	12065.3	FuturePh3[4]	1035	60.51	73.51	68.38	73.76	0.001311	4.08	279.68	803.7	0.28
	11519.3	Existing[1]	1088	60.46	73.1	68.52	73.26	0.000911	3.26	513.87	630.28	0.24
	11519.3	InterimPh1[2]	1000	60.46	72.89	68.22	73.05	0.000935	3.22	335.39	344.61	0.24
	11519.3	PropPh2[3]	1016	60.46	72.96	68.28	73.12	0.000928	3.23	341.29	393.01	0.24
	11519.3	FuturePh3[4]	1035	60.46	72.96	68.35	73.13	0.000958	3.28	342.11	399.69	0.25
	11029.3	Existing[1]	1088	60.41	72.82	68.41	72.98	0.000404	3.47	1390.75	2118.19	0.25
	11029.3	InterimPh1[2]	1000	60.41	72.52	68.18	72.72	0.000501	3.73	501.88	1562.45	0.28
	11029.3	PropPh2[3]	1016	60.41	72.58	68.23	72.79	0.000491	3.72	533.11	1771.45	0.28
	11029.3	FuturePh3[4]	1035	60.41	72.58	68.28	72.79	0.000513	3.8	529.41	1747.38	0.28
	11002.1	Existing[1]	1088	60.41	72.82	68.37	72.95	0.000636	3.19	1592.71	2470.19	0.23
	11002.1	InterimPh1[2]	1000	60.41	72.45	68.1	72.69	0.00106	3.95	268.01	1428.4	0.29
	11002.1	PropPh2[3]	1016	60.41	72.51	68.15	72.76	0.001054	3.97	272.08	1556.31	0.29
	11002.1	FuturePh3[4]	1035	60.41	72.5	68.2	72.76	0.001101	4.05	271.39	1534.12	0.3
	10962.7		Bridge									
	10923.3	Existing[1]	1088	60.3	72.27	68.21	72.51	0.001154	4.09	611.4	1306.97	0.3
	10923.3	InterimPh1[2]	1000	60.3	72.12	67.99	72.39	0.001211	4.11	253.9	1039.28	0.31
	10923.3	PropPh2[3]	1016	60.3	72.17	68.03	72.44	0.001214	4.14	257.02	1151.51	0.31
	10923.3	FuturePh3[4]	1035	60.3	72.15	68.09	72.43	0.001278	4.24	255.47	1118.01	0.32
	10764.8	Existing[1]	1088	59.93	72.25	67.82	72.37	0.000291	3.01	940.33	1003.04	0.22
	10764.8	InterimPh1[2]	1000	59.93	72.11	67.61	72.24	0.000283	2.92	659.93	695.94	0.21
	10764.8	PropPh2[3]	1016	59.93	72.16	67.65	72.29	0.000281	2.93	686.45	881.93	0.21
	10764.8	FuturePh3[4]	1035	59.93	72.14	67.7	72.27	0.000297	3.01	671.92	719.04	0.22
	10641.7	Existing[1]	1088	59.65	72.14	67.34	72.33	0.000363	3.57	615.3	1574.24	0.24
	10641.7	InterimPh1[2]	1000	59.65	72.03	67.12	72.19	0.000331	3.37	560.95	1314.54	0.23
	10641.7	PropPh2[3]	1016	59.65	72.08	67.16	72.24	0.000331	3.38	584.1	1441.31	0.23
	10641.7	FuturePh3[4]	1035	59.65	72.04	67.21	72.22	0.00035	3.47	569.75	1362.85	0.23

	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Profile			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	10599.6	Existing[1]	1261	59.55	72.09	67.65	72.29	0.000439	3.93	903.43	971.83	0.26
	10599.6	InterimPh1[2]	1168	59.55	71.89	67.43	72.15	0.000508	4.14	309.18	696.09	0.28
	10599.6	PropPh2[3]	1185	59.55	71.93	67.47	72.2	0.000511	4.17	311.89	764.63	0.28
	10599.6	FuturePh3[4]	1206	59.55	71.89	67.52	72.18	0.000539	4.27	309.74	709.91	0.29
	10581.7		Bridge									
	10563.8	Existing[1]	1261	59.46	72.08	67.55	72.28	0.000412	3.84	987.3	1049.97	0.26
	10563.8	InterimPh1[2]	1168	59.46	71.76	67.34	72.03	0.000516	4.16	307.21	647.52	0.29
	10563.8	PropPh2[3]	1185	59.46	71.88	67.38	72.07	0.000413	3.77	795.26	821.68	0.26
	10563.8	FuturePh3[4]	1206	59.46	71.8	67.43	72.08	0.000541	4.28	309.24	697.76	0.29
	10404.9	Existing[1]	1261	59.39	71.55	67.7	72.08	0.001181	5.88	273.41	494.98	0.41
	10404.9	InterimPh1[2]	1168	59.39	71.35	67.43	71.84	0.00113	5.66	231.69	340.42	0.4
	10404.9	PropPh2[3]	1185	59.39	71.39	67.49	71.89	0.001141	5.7	237.93	364.58	0.4
	10404.9	FuturePh3[4]	1206	59.39	71.35	67.54	71.88	0.001202	5.83	232.58	344	0.41
	9889.4	Existing[1]	1310	59.19	70.51		71.29	0.001919	7.07	185.37	30.96	0.51
	9889.4	InterimPh1[2]	1217	59.19	70.42		71.11	0.001726	6.67	182.56	30.72	0.48
	9889.4	PropPh2[3]	1234	59.19	70.44		71.14	0.001759	6.74	183.14	30.77	0.49
	9889.4	FuturePh3[4]	1255	59.19	70.33		71.08	0.001915	6.98	179.69	30.47	0.51
	9202.8	Existing[1]	1310	58.42	70.08	66.35	70.39	0.000708	4.52	293.22	179.54	0.34
	9202.8	InterimPh1[2]	1217	58.42	70.04	66.16	70.32	0.000625	4.23	290.44	160.47	0.32
	9202.8	PropPh2[3]	1234	58.42	70.05	66.19	70.33	0.000639	4.28	291.18	165.7	0.32
	9202.8	FuturePh3[4]	1255	58.42	69.86	66.25	70.18	0.000741	4.51	279.46	110.42	0.34
	9132	Existing[1]	1365	58.34	69.99	66.38	70.33	0.00077	4.72	296.75	389.64	0.35
	9132	InterimPh1[2]	1271	58.34	69.96	66.19	70.26	0.000679	4.41	294.97	365.99	0.33
	9132	PropPh2[3]	1288	58.34	69.97	66.23	70.28	0.000694	4.47	295.55	373.68	0.33
	9132	FuturePh3[4]	1309	58.34	69.77	66.27	70.11	0.000809	4.71	283.03	240.42	0.36
	9104.1		Bridge									
	9076.2	Existing[1]	1365	58.21	69.6	66.25	69.98	0.000899	4.95	280.62	202.47	0.38
	9076.2	InterimPh1[2]	1271	58.21	69.34	66.07	69.7	0.000909	4.84	264.43	100.25	0.38
	9076.2	PropPh2[3]	1288	58.21	69.38	66.1	69.75	0.000908	4.86	267.27	105.83	0.38
	9076.2	FuturePh3[4]	1309	58.21	69.44	66.14	69.81	0.000907	4.89	270.75	122.37	0.38
	8911.9	Existing[1]	1365	58.05	69.3		69.74	0.001976	5.42	305.64	123.43	0.36
	8911.9	InterimPh1[2]	1271	58.05	69.06		69.48	0.001947	5.26	280.98	80.54	0.35
	8911.9	PropPh2[3]	1288	58.05	69.1		69.52	0.001953	5.29	284.72	88.02	0.36
	8911.9	FuturePh3[4]	1309	58.05	69.16		69.58	0.00196	5.33	289.77	97.19	0.36
	8753.8	Existing[1]	1365	57.9	68.98		69.42	0.002066	5.46	310.93	82.47	0.37
	8753.8	InterimPh1[2]	1271	57.9	68.74		69.16	0.002036	5.29	291.97	76.59	0.36
	8753.8	PropPh2[3]	1288	57.9	68.79		69.21	0.002042	5.32	295.32	77.67	0.36
	8753.8	FuturePh3[4]	1309	57.9	68.84		69.27	0.002049	5.36	299.5	78.98	0.36
	8320.8	Existing[1]	1427	57.59	66.86		67.86	0.006792	8.08	186.9	50.07	0.63
	8320.8	InterimPh1[2]	1332	57.59	66.67		67.62	0.006759	7.85	177.49	47.58	0.63
	8320.8	PropPh2[3]	1349	57.59	66.7		67.66	0.006772	7.9	179.09	48.01	0.63
	8320.8	FuturePh3[4]	1370	57.59	66.74		67.71	0.006789	7.95	181.07	48.54	0.63

	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Profile			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	7945.8	Existing[1]	1427	55.6	66		66.37	0.002072	5.21	394.18	111.01	0.36
	7945.8	InterimPh1[2]	1332	55.6	65.82		66.17	0.002017	5.04	374.38	107.44	0.36
	7945.8	PropPh2[3]	1349	55.6	65.85		66.21	0.002027	5.07	377.95	108.09	0.36
	7945.8	FuturePh3[4]	1370	55.6	65.89		66.25	0.002039	5.11	382.34	108.89	0.36
	7482.7	Existing[1]	1427	53.23	64.87		65.25	0.002933	5.28	379.72	108.32	0.34
	7482.7	InterimPh1[2]	1332	53.23	64.73		65.09	0.002756	5.06	365.64	105.45	0.33
	7482.7	PropPh2[3]	1349	53.23	64.76		65.12	0.002791	5.1	367.99	105.93	0.33
	7482.7	FuturePh3[4]	1370	53.23	64.78		65.15	0.002835	5.15	370.81	106.51	0.34
	7444.9	Existing[1]	1496	53.04	64.66	61.02	65.11	0.00315	5.56	312.44	228.15	0.35
	7444.9	InterimPh1[2]	1400	53.04	64.56	60.83	64.97	0.002904	5.29	306.5	215.46	0.34
	7444.9	PropPh2[3]	1418	53.04	64.57	60.87	64.99	0.002954	5.35	307.46	217.49	0.34
	7444.9	FuturePh3[4]	1439	53.04	64.6	60.91	65.02	0.003011	5.41	308.67	220.06	0.34
	7418.6		Bridge									
	7392.3	Existing[1]	1496	53.07	62.77	61.05	63.67	0.008895	7.73	212.68	48.74	0.57
	7392.3	InterimPh1[2]	1400	53.07	62.6	60.86	63.45	0.008658	7.47	204.42	47.75	0.55
	7392.3	PropPh2[3]	1418	53.07	62.64	60.91	63.49	0.008693	7.52	206.07	47.95	0.56
	7392.3	FuturePh3[4]	1439	53.07	62.68	60.94	63.54	0.008746	7.57	207.88	48.17	0.56
	7223.2	Existing[1]	1496	51.31	60.58	59.69	61.74	0.013799	8.84	201.77	81.3	0.7
	7223.2	InterimPh1[2]	1400	51.31	60.38	59.51	61.52	0.014114	8.7	186.22	74.29	0.7
	7223.2	PropPh2[3]	1418	51.31	60.42	59.54	61.56	0.014091	8.74	188.83	75.55	0.7
	7223.2	FuturePh3[4]	1439	51.31	60.47	59.58	61.61	0.014004	8.77	192.33	77.21	0.7
	6508.1	Existing[1]	1574	42.18	53.68		54.61	0.007536	7.71	204.61	32.89	0.52
	6508.1	InterimPh1[2]	1478	42.18	53.39		54.28	0.007578	7.56	195.41	30.22	0.52
	6508.1	PropPh2[3]	1495	42.18	53.44		54.34	0.007568	7.59	197.02	30.71	0.52
	6508.1	FuturePh3[4]	1517	42.18	53.51		54.41	0.007559	7.62	199.1	31.32	0.52
	5707.3	Existing[1]	1574	41.84	51.67		51.9	0.001694	3.84	409.96	58.33	0.26
	5707.3	InterimPh1[2]	1478	41.84	51.35		51.57	0.001699	3.78	391.44	57.33	0.25
	5707.3	PropPh2[3]	1495	41.84	51.41		51.64	0.001696	3.79	394.96	57.52	0.25
	5707.3	FuturePh3[4]	1517	41.84	51.49		51.71	0.001695	3.8	399.17	57.75	0.25
	5602.5	Existing[1]	1653	41.79	51.43	46.53	51.7	0.00187	4.2	393.84	57.72	0.27
	5602.5	InterimPh1[2]	1556	41.79	51.11	46.37	51.37	0.001918	4.13	376.83	56.72	0.27
	5602.5	PropPh2[3]	1574	41.79	51.17	46.4	51.43	0.001909	4.14	380.08	56.91	0.27
	5602.5	FuturePh3[4]	1596	41.79	51.24	46.43	51.51	0.001897	4.16	383.97	57.14	0.27
	5375.3		Culvert									
	5148.1	Existing[1]	1653	38.37	50.12	43.11	50.29	0.000811	3.27	505.97	64.31	0.19
	5148.1	InterimPh1[2]	1556	38.37	49.86	42.96	50.02	0.000788	3.16	492.24	63.51	0.18
	5148.1	PropPh2[3]	1574	38.37	49.91	42.99	50.07	0.000792	3.18	494.91	63.67	0.18
	5148.1	FuturePh3[4]	1596	38.37	49.97	43.02	50.13	0.000797	3.2	498.06	63.85	0.18
	4988.3	Existing[1]	1653	37.97	49.62		50.01	0.002763	4.99	341.14	52.61	0.32
	4988.3	InterimPh1[2]	1556	37.97	49.38		49.74	0.002734	4.86	328.53	51.4	0.32
	4988.3	PropPh2[3]	1574	37.97	49.43		49.79	0.00274	4.89	330.98	51.63	0.32
	4988.3	FuturePh3[4]	1596	37.97	49.48		49.85	0.002745	4.92	333.86	51.91	0.32

	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
Profile			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	4200.8	Existing[1]	1783	36	45.56		46.41	0.00818	7.41	241.21	42.56	0.53
	4200.8	InterimPh1[2]	1687	36	45.37		46.18	0.008059	7.24	233.13	41.01	0.53
	4200.8	PropPh2[3]	1704	36	45.4		46.22	0.00808	7.27	234.57	41.29	0.53
	4200.8	FuturePh3[4]	1726	36	45.45		46.28	0.008108	7.31	236.42	41.65	0.53
	3767.1	Existing[1]	1783	34.6	43.92		44.2	0.003063	4.26	426.95	92.74	0.34
	3767.1	InterimPh1[2]	1687	34.6	43.69		43.97	0.003105	4.22	406.73	90.12	0.34
	3767.1	PropPh2[3]	1704	34.6	43.74		44.01	0.003094	4.23	410.47	90.61	0.34
	3767.1	FuturePh3[4]	1726	34.6	43.79		44.06	0.003085	4.23	415.07	91.21	0.34
	3368.2	Existing[1]	1866	33.01	42.58		42.94	0.003204	4.82	402.68	67.03	0.32
	3368.2	InterimPh1[2]	1769	33.01	42.36		42.71	0.0032	4.73	387.96	66.29	0.32
	3368.2	PropPh2[3]	1787	33.01	42.4		42.75	0.003201	4.74	390.71	66.43	0.32
	3368.2	FuturePh3[4]	1809	33.01	42.45		42.8	0.003202	4.77	394.05	66.6	0.32
	2735.8	Existing[1]	1866	31.73	41.9		41.99	0.000759	2.37	801.69	130.72	0.16
	2735.8	InterimPh1[2]	1769	31.73	41.68		41.76	0.000758	2.32	772.42	128.63	0.16
	2735.8	PropPh2[3]	1787	31.73	41.72		41.8	0.000758	2.33	777.9	129.03	0.16
	2735.8	FuturePh3[4]	1809	31.73	41.77		41.86	0.000758	2.34	784.55	129.5	0.16
	2065.5	Existing[1]	2002	30.37	39.73		40.61	0.009765	7.55	264.99	42.69	0.53
	2065.5	InterimPh1[2]	1906	30.37	39.54		40.39	0.009648	7.42	256.82	42.19	0.53
	2065.5	PropPh2[3]	1924	30.37	39.57		40.43	0.009673	7.45	258.33	42.28	0.53
	2065.5	FuturePh3[4]	1946	30.37	39.61		40.48	0.009705	7.48	260.17	42.4	0.53
	1689.7	Existing[1]	2002	28.45	39.01		39.15	0.001635	3.07	652.12	115.4	0.23
	1689.7	InterimPh1[2]	1906	28.45	38.78		38.92	0.001677	3.05	625.58	114.17	0.23
	1689.7	PropPh2[3]	1924	28.45	38.82		38.96	0.001669	3.05	630.54	114.4	0.23
	1689.7	FuturePh3[4]	1946	28.45	38.87		39.02	0.001661	3.06	636.39	114.67	0.23
	821.4	Existing[1]	2142	24.03	35.82	31.68	36.54	0.006312	6.83	313.41	40.29	0.43
	821.4	InterimPh1[2]	2047	24.03	35.56	31.49	36.27	0.006307	6.75	303.27	39.79	0.43
	821.4	PropPh2[3]	2065	24.03	35.61	31.53	36.32	0.006308	6.77	305.2	39.89	0.43
	821.4	FuturePh3[4]	2086	24.03	35.67	31.57	36.38	0.006309	6.78	307.44	40	0.43

Existing Conditions[1]: Model includes FEMA Effective geometry data with the Existing Conditions HMS model flows.

InterimPh1[2]: Model includes FEMA Effective geometry data with the Phase 1 Interim (Basin) HMS model flows.

PropPh2[3]: Model includes FEMA Effective geometry data with the Phase 2 Proposed (Channel Impvs) HMS model flows.

FuturePh3[4]: Model includes FEMA Effective geometry data with the Phase 3 Future (Storm Sew Impvs) HMS model flows.

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	19209.6	Existing[1]	994	67.34	74.45		75.37	0.001032	7.67	129.66	29.52	0.64
	19209.6	InterimPh1[2]	994	67.34	74.45		75.37	0.001032	7.67	129.66	29.52	0.64
	19209.6	PropPh2[3]	994	67.34	74.45		75.37	0.001032	7.67	129.66	29.52	0.64
	19209.6	FuturePh3[4]	994	67.34	74.45		75.37	0.001032	7.67	129.66	29.52	0.64
	18393.7	Existing[1]	994	65.96	72.98		74.28	0.001648	9.13	108.82	23.69	0.75
	18393.7	InterimPh1[2]	994	65.96	72.99		74.28	0.001644	9.12	108.94	23.7	0.75
	18393.7	PropPh2[3]	994	65.96	72.99		74.28	0.001644	9.12	108.94	23.7	0.75
	18393.7	FuturePh3[4]	994	65.96	72.99		74.28	0.001644	9.12	108.94	23.7	0.75
	17507.7	Existing[1]	994	64.97	72.74	70.2	73.32	0.000506	6.08	163.48	31.07	0.47
	17507.7	InterimPh1[2]	994	64.97	72.75	70.2	73.32	0.000505	6.07	163.69	31.08	0.47
	17507.7	PropPh2[3]	994	64.97	72.75	70.2	73.32	0.000505	6.07	163.69	31.08	0.47
	17507.7	FuturePh3[4]	994	64.97	72.75	70.2	73.32	0.000505	6.07	163.69	31.08	0.47
	17444.3	Existing[1]	994	64.9	71.9	71.12	73.08	0.001704	8.74	113.79	29.65	0.79
	17444.3	InterimPh1[2]	994	64.9	71.91	71.14	73.09	0.001682	8.7	114.28	29.68	0.78
	17444.3	PropPh2[3]	994	64.9	71.91	71.14	73.09	0.001682	8.7	114.28	29.68	0.78
	17444.3	FuturePh3[4]	994	64.9	71.91	71.14	73.09	0.001682	8.7	114.28	29.68	0.78
	17433.3		Bridge									
	17431.8	Existing[1]	994	64.89	71.99	70.55	72.97	0.001604	7.94	125.13	29.84	0.68
	17431.8	InterimPh1[2]	994	64.89	71.99	70.56	72.97	0.001605	7.95	125.1	29.84	0.68
	17431.8	PropPh2[3]	994	64.89	71.99	70.56	72.97	0.001605	7.95	125.1	29.84	0.68
	17431.8	FuturePh3[4]	994	64.89	71.99	70.56	72.97	0.001605	7.95	125.1	29.84	0.68
	17383.8		Bridge									
	17335.8	Existing[1]	994	64.71	70.38	70.38	72.39	0.003679	11.38	87.37	21.7	1
	17335.8	InterimPh1[2]	994	64.71	70.38	70.38	72.39	0.003678	11.38	87.37	21.71	1
	17335.8	PropPh2[3]	994	64.71	70.38	70.38	72.39	0.003678	11.38	87.37	21.71	1
	17335.8	FuturePh3[4]	994	64.71	70.38	70.38	72.39	0.003678	11.38	87.37	21.71	1
	17139	Existing[1]	994	63.93	69.34	69.34	71.45	0.00305	11.67	85.21	20.31	1
	17139	InterimPh1[2]	994	63.93	69.34	69.34	71.45	0.003051	11.67	85.2	20.3	1
	17139	PropPh2[3]	994	63.93	69.34	69.34	71.45	0.003051	11.67	85.2	20.3	1
	17139	FuturePh3[4]	994	63.93	69.34	69.34	71.45	0.003051	11.67	85.2	20.3	1
	16368.5	Existing[1]	994	60.87	68.83		69.53	0.000667	6.7	149.17	29.42	0.5
	16368.5	InterimPh1[2]	994	60.87	68.83		69.53	0.000668	6.71	149.14	29.41	0.5
	16368.5	PropPh2[3]	994	60.87	68.83		69.53	0.000668	6.71	149.14	29.41	0.5
	16368.5	FuturePh3[4]	994	60.87	68.83		69.53	0.000668	6.71	149.14	29.41	0.5
	15380.2	Existing[1]	1190	59.59	67.25		68.44	0.001692	8.75	136.02	27.54	0.69
	15380.2	InterimPh1[2]	1190	59.59	67.25	65.78	68.44	0.001696	8.76	135.91	27.52	0.69
	15380.2	PropPh2[3]	1190	59.59	67.25	65.78	68.44	0.001696	8.76	135.91	27.52	0.69
	15380.2	FuturePh3[4]	1190	59.59	67.25	65.78	68.44	0.001696	8.76	135.91	27.52	0.69
	15029.4	Existing[1]	1190	59.02	65.23	65.23	67.49	0.00373	12.07	98.6	22	1
	15029.4	InterimPh1[2]	1190	59.02	65.24	65.24	67.49	0.003701	12.03	98.9	22.04	1
	15029.4	PropPh2[3]	1190	59.02	65.24	65.24	67.49	0.003701	12.03	98.9	22.04	1
	15029.4	FuturePh3[4]	1190	59.02	65.24	65.24	67.49	0.003701	12.03	98.9	22.04	1
	14479.9	Existing[1]	1190	58.14	64.53	63.52	65.73	0.001226	8.79	135.42	29.51	0.72
	14479.9	InterimPh1[2]	1190	58.14	64.54	63.54	65.73	0.001224	8.78	135.5	29.51	0.72
	14479.9	PropPh2[3]	1190	58.14	64.54	63.54	65.73	0.001224	8.78	135.5	29.51	0.72
	14479.9	FuturePh3[4]	1190	58.14	64.54	63.54	65.73	0.001224	8.78	135.5	29.51	0.72

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	14449.4		Bridge									
	14418.9	Existing[1]	1190	57.97	64.26	63.35	65.51	0.001311	9	132.27	29.32	0.75
	14418.9	InterimPh1[2]	1190	57.97	64.26	63.37	65.52	0.001309	8.99	132.33	29.33	0.75
	14418.9	PropPh2[3]	1190	57.97	64.26	63.37	65.52	0.001309	8.99	132.33	29.33	0.75
	14418.9	FuturePh3[4]	1190	57.97	64.26	63.37	65.52	0.001309	8.99	132.33	29.33	0.75
	13972.2	Existing[1]	1190	56.53	64.16		64.79	0.000669	6.35	187.32	39.85	0.52
	13972.2	InterimPh1[2]	1190	56.53	64.17		64.79	0.000668	6.35	187.46	39.86	0.52
	13972.2	PropPh2[3]	1190	56.53	64.17		64.79	0.000668	6.35	187.46	39.86	0.52
	13972.2	FuturePh3[4]	1190	56.53	64.17		64.79	0.000668	6.35	187.46	39.86	0.52
	13404.1	Existing[1]	1619	54.71	62.92		64.17	0.001443	8.95	180.9	32.14	0.66
	13404.1	InterimPh1[2]	1619	54.71	62.91		64.16	0.001454	8.97	180.4	32.08	0.67
	13404.1	PropPh2[3]	1619	54.71	62.91		64.16	0.001454	8.97	180.4	32.08	0.67
	13404.1	FuturePh3[4]	1619	54.71	62.91		64.16	0.001454	8.97	180.4	32.08	0.67
	12959.9	Existing[1]	1619	53.36	63.32		63.66	0.000274	4.63	349.46	56.35	0.33
	12959.9	InterimPh1[2]	1619	53.36	63.31		63.65	0.000275	4.64	348.77	56.3	0.33
	12959.9	PropPh2[3]	1619	53.36	63.31		63.65	0.000275	4.64	348.77	56.3	0.33
	12959.9	FuturePh3[4]	1619	53.36	63.31		63.65	0.000275	4.64	348.77	56.3	0.33
	12859.9	Existing[1]	1757	53.06	62.35	60.26	63.38	0.002738	8.12	216.28	40.99	0.62
	12859.9	InterimPh1[2]	1757	53.06	62.34	60.26	63.37	0.002752	8.14	215.84	40.93	0.62
	12859.9	PropPh2[3]	1757	53.06	62.34	60.26	63.37	0.002752	8.14	215.84	40.93	0.62
	12859.9	FuturePh3[4]	1757	53.06	62.34	60.26	63.37	0.002752	8.14	215.84	40.93	0.62
	12817.9		Bridge									
	12775.9	Existing[1]	1757	52.87	61.47	60.07	62.81	0.003831	9.28	189.37	37.29	0.73
	12775.9	InterimPh1[2]	1757	52.87	61.47	60.07	62.81	0.003848	9.29	189.05	37.24	0.73
	12775.9	PropPh2[3]	1757	52.87	61.47	60.07	62.81	0.003848	9.29	189.05	37.24	0.73
	12775.9	FuturePh3[4]	1757	52.87	61.47	60.07	62.81	0.003848	9.29	189.05	37.24	0.73
	12490	Existing[1]	1757	52.01	61.04	58.82	61.85	0.001671	7.25	242.39	48.92	0.57
	12490	InterimPh1[2]	1757	52.01	61.03	58.82	61.85	0.001678	7.26	242	48.87	0.57
	12490	PropPh2[3]	1757	52.01	61.03	58.82	61.85	0.001678	7.26	242	48.87	0.57
	12490	FuturePh3[4]	1757	52.01	61.03	58.82	61.85	0.001678	7.26	242	48.87	0.57
	12193.4	Existing[1]	1885	51.11	58.09	58.09	60.67	0.009215	12.87	146.43	28.73	1
	12193.4	InterimPh1[2]	1885	51.11	58.1	58.1	60.67	0.009213	12.87	146.44	28.74	1
	12193.4	PropPh2[3]	1885	51.11	58.1	58.1	60.67	0.009213	12.87	146.44	28.74	1
	12193.4	FuturePh3[4]	1885	51.11	58.1	58.1	60.67	0.009213	12.87	146.44	28.74	1
	11598.5	Existing[1]	1885	49.79	58.23		58.59	0.000794	4.78	393.99	65.37	0.34
	11598.5	InterimPh1[2]	1885	49.79	58.23		58.58	0.000796	4.79	393.76	65.35	0.34
	11598.5	PropPh2[3]	1885	49.79	58.23		58.58	0.000796	4.79	393.76	65.35	0.34
	11598.5	FuturePh3[4]	1885	49.79	58.23		58.58	0.000796	4.79	393.76	65.35	0.34
	11492.6	Existing[1]	1885	49.55	58.15	54.14	58.49	0.000738	4.66	404.62	66.07	0.33
	11492.6	InterimPh1[2]	1885	49.55	58.16	54.16	58.49	0.000737	4.66	404.86	66.08	0.33
	11492.6	PropPh2[3]	1885	49.55	58.16	54.16	58.49	0.000737	4.66	404.86	66.08	0.33
	11492.6	FuturePh3[4]	1885	49.55	58.16	54.16	58.49	0.000737	4.66	404.86	66.08	0.33
	11443.6		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	11394.6	Existing[1]	1885	49.2	57.66	53.79	58.01	0.000789	4.77	394.9	65.43	0.34
	11394.6	InterimPh1[2]	1885	49.2	57.66	53.81	58.01	0.000788	4.77	395.06	65.44	0.34
	11394.6	PropPh2[3]	1885	49.2	57.66	53.81	58.01	0.000788	4.77	395.06	65.44	0.34
	11394.6	FuturePh3[4]	1885	49.2	57.66	53.81	58.01	0.000788	4.77	395.06	65.44	0.34
	11197.6	Existing[1]	1885	48.43	57.68		57.88	0.000135	3.58	559.38	89.63	0.23
	11197.6	InterimPh1[2]	1885	48.43	57.68		57.88	0.000135	3.58	559.6	89.65	0.23
	11197.6	PropPh2[3]	1885	48.43	57.68		57.88	0.000135	3.58	559.6	89.65	0.23
	11197.6	FuturePh3[4]	1885	48.43	57.68		57.88	0.000135	3.58	559.6	89.65	0.23
	11108	Existing[1]	1885	48.08	57.62	52.76	57.85	0.000149	3.89	517.54	79.39	0.25
	11108	InterimPh1[2]	1885	48.08	57.62	52.77	57.86	0.000149	3.89	517.73	79.4	0.24
	11108	PropPh2[3]	1885	48.08	57.62	52.77	57.86	0.000149	3.89	517.73	79.4	0.24
	11108	FuturePh3[4]	1885	48.08	57.62	52.77	57.86	0.000149	3.89	517.73	79.4	0.24
	11097		Bridge									
	11095.7	Existing[1]	1885	48.04	57.61	52.85	57.85	0.000302	3.94	511.63	79.52	0.25
	11095.7	InterimPh1[2]	1885	48.04	57.61	52.86	57.85	0.000302	3.94	511.79	79.53	0.25
	11095.7	PropPh2[3]	1885	48.04	57.61	52.86	57.85	0.000302	3.94	511.79	79.53	0.25
	11095.7	FuturePh3[4]	1885	48.04	57.61	52.86	57.85	0.000302	3.94	511.79	79.53	0.25
	11073		Bridge									
	11050.3	Existing[1]	1885	47.71	57.23	52.52	57.47	0.000308	3.96	508.14	79.31	0.25
	11050.3	InterimPh1[2]	1885	47.71	57.23	52.53	57.47	0.000308	3.96	507.92	79.3	0.25
	11050.3	PropPh2[3]	1885	47.71	57.23	52.53	57.47	0.000308	3.96	507.92	79.3	0.25
	11050.3	FuturePh3[4]	1885	47.71	57.23	52.53	57.47	0.000308	3.96	507.92	79.3	0.25
	11007.9	Existing[1]	2149	47.75	57.2	52.41	57.45	0.001461	3.97	558.07	79.12	0.25
	11007.9	InterimPh1[2]	2149	47.75	57.2	52.43	57.45	0.001463	3.97	557.84	79.11	0.25
	11007.9	PropPh2[3]	2149	47.75	57.2	52.43	57.45	0.001463	3.97	557.84	79.11	0.25
	11007.9	FuturePh3[4]	2149	47.75	57.2	52.43	57.45	0.001463	3.97	557.84	79.11	0.25
	10997.4		Bridge									
	10986.9	Existing[1]	2149	47.72	57.12	52.37	57.37	0.001497	4	553.73	78.95	0.25
	10986.9	InterimPh1[2]	2149	47.72	57.12	52.4	57.37	0.001496	4	553.75	78.95	0.25
	10986.9	PropPh2[3]	2149	47.72	57.12	52.4	57.37	0.001496	4	553.75	78.95	0.25
	10986.9	FuturePh3[4]	2149	47.72	57.12	52.4	57.37	0.001496	4	553.75	78.95	0.25
	10363.6	Existing[1]	2286	44.94	54.76		55.5	0.006185	7	364.52	96.72	0.49
	10363.6	InterimPh1[2]	2286	44.94	54.76		55.5	0.006186	7	364.49	96.72	0.49
	10363.6	PropPh2[3]	2286	44.94	54.76		55.5	0.006186	7	364.49	96.71	0.49
	10363.6	FuturePh3[4]	2286	44.94	54.76		55.5	0.006186	7	364.49	96.71	0.49
	9604.7	Existing[1]	2453	41.43	52		52.37	0.002846	5.2	641.43	132.54	0.34
	9604.7	InterimPh1[2]	2453	41.43	52.01		52.37	0.002841	5.2	641.82	132.57	0.34
	9604.7	PropPh2[3]	2453	41.43	52.01		52.37	0.00284	5.2	641.9	132.58	0.34
	9604.7	FuturePh3[4]	2453	41.43	52.01		52.37	0.00284	5.2	641.94	132.58	0.34
	9178.3	Existing[1]	2453	38.89	50.68		51.14	0.002913	5.46	470.97	72.98	0.35
	9178.3	InterimPh1[2]	2453	38.89	50.68		51.14	0.002913	5.46	470.92	72.97	0.35
	9178.3	PropPh2[3]	2453	38.89	50.68		51.14	0.002912	5.46	471.01	72.98	0.35
	9178.3	FuturePh3[4]	2453	38.89	50.69		51.14	0.002911	5.46	471.06	72.98	0.35
	8486.4	Existing[1]	2698	34.77	48.94		49.34	0.002341	5.39	648.92	94.89	0.31
	8486.4	InterimPh1[2]	2698	34.77	48.93		49.33	0.002346	5.4	648.41	94.87	0.31
	8486.4	PropPh2[3]	2698	34.77	48.94		49.33	0.002344	5.39	648.69	94.88	0.31
	8486.4	FuturePh3[4]	2698	34.77	48.94		49.34	0.002342	5.39	648.84	94.89	0.31

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	8058.8	Existing[1]	2698	34.42	48.37		48.61	0.001149	3.95	719.59	88.52	0.23
	8058.8	InterimPh1[2]	2698	34.42	48.36		48.6	0.001152	3.95	719	88.41	0.23
	8058.8	PropPh2[3]	2698	34.42	48.37		48.6	0.00115	3.95	719.32	88.47	0.23
	8058.8	FuturePh3[4]	2698	34.42	48.37		48.61	0.00115	3.95	719.5	88.5	0.23
	7626	Existing[1]	2887	34.07	47.92		48.13	0.001065	3.92	926.61	103.26	0.22
	7626	InterimPh1[2]	2887	34.07	47.91		48.12	0.001068	3.93	925.81	103.25	0.22
	7626	PropPh2[3]	2887	34.07	47.92		48.12	0.001066	3.93	926.24	103.25	0.22
	7626	FuturePh3[4]	2887	34.07	47.92		48.13	0.001065	3.92	926.48	103.25	0.22
	6629.4	Existing[1]	3106	31.18	46.12		46.58	0.00228	5.45	580.83	71.96	0.3
	6629.4	InterimPh1[2]	3106	31.18	46.1		46.57	0.002297	5.46	579.3	71.75	0.31
	6629.4	PropPh2[3]	3106	31.18	46.11		46.57	0.002291	5.46	579.85	71.83	0.31
	6629.4	FuturePh3[4]	3106	31.18	46.11		46.58	0.002287	5.46	580.16	71.87	0.3
	5764.3	Existing[1]	3106	29.94	44.75		45.09	0.001302	4.85	841.84	116.14	0.25
	5764.3	InterimPh1[2]	3106	29.94	44.71		45.05	0.001317	4.87	837.54	115.86	0.25
	5764.3	PropPh2[3]	3106	29.94	44.73		45.06	0.001312	4.87	839.05	115.96	0.25
	5764.3	FuturePh3[4]	3106	29.94	44.74		45.07	0.001309	4.86	839.89	116.01	0.25
	5522.1	Existing[1]	3106	29.59	44.34	37.56	44.74	0.001469	5.14	701.59	81.56	0.26
	5522.1	InterimPh1[2]	3106	29.59	44.3	37.6	44.7	0.001487	5.16	698.19	81.38	0.27
	5522.1	PropPh2[3]	3106	29.59	44.32	37.6	44.71	0.001481	5.15	699.39	81.44	0.27
	5522.1	FuturePh3[4]	3106	29.59	44.32	37.6	44.72	0.001477	5.15	700.05	81.48	0.27
	5499.1		Bridge									
	5485.3	Existing[1]	3106	29.57	44.24	36.71	44.53	0.001054	4.35	790.83	86.84	0.22
	5485.3	InterimPh1[2]	3106	29.57	44.2	36.74	44.49	0.001067	4.37	787.24	86.68	0.23
	5485.3	PropPh2[3]	3106	29.57	44.21	36.74	44.5	0.001063	4.36	788.52	86.73	0.23
	5485.3	FuturePh3[4]	3106	29.57	44.22	36.74	44.51	0.00106	4.36	789.24	86.77	0.22
	5417.8		Bridge									
	5350.3	Existing[1]	3106	30.24	43.63	37.38	44	0.001579	4.93	682.52	81.76	0.27
	5350.3	InterimPh1[2]	3106	30.24	43.58	37.42	43.95	0.001604	4.95	678.72	81.58	0.27
	5350.3	PropPh2[3]	3106	30.24	43.6	37.42	43.97	0.001595	4.94	680.05	81.64	0.27
	5350.3	FuturePh3[4]	3106	30.24	43.6	37.42	43.98	0.00159	4.94	680.8	81.68	0.27
	5343.7	Existing[1]	3106	30.34	43.56	36.95	43.96	0.001531	5.22	681	79.27	0.27
	5343.7	InterimPh1[2]	3106	30.34	43.52	36.97	43.93	0.001549	5.24	678.11	79.12	0.27
	5343.7	PropPh2[3]	3106	30.34	43.54	36.97	43.95	0.001541	5.23	679.41	79.19	0.27
	5343.7	FuturePh3[4]	3106	30.34	43.55	36.97	43.95	0.001536	5.23	680.14	79.22	0.27
	5314.7		Bridge									
	5285.7	Existing[1]	3106	30.19	43.12	36.8	43.55	0.001673	5.37	658.43	78.09	0.28
	5285.7	InterimPh1[2]	3106	30.19	43.09	36.82	43.52	0.00169	5.38	655.98	77.96	0.28
	5285.7	PropPh2[3]	3106	30.19	43.11	36.82	43.54	0.001681	5.37	657.33	78.03	0.28
	5285.7	FuturePh3[4]	3106	30.19	43.12	36.82	43.55	0.001675	5.37	658.08	78.07	0.28
	4805.3	Existing[1]	3106	28.79	42.16		42.65	0.002048	5.66	610.75	76.44	0.31
	4805.3	InterimPh1[2]	3106	28.79	42.12		42.61	0.002078	5.69	607.36	76.24	0.31
	4805.3	PropPh2[3]	3106	28.79	42.14		42.63	0.002061	5.68	609.24	76.35	0.31
	4805.3	FuturePh3[4]	3106	28.79	42.16		42.64	0.002052	5.67	610.3	76.41	0.31

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	4470.3	Existing[1]	3106	27.81	41.69		42.01	0.001603	5.28	916.06	103.63	0.27
	4470.3	InterimPh1[2]	3106	27.81	41.64		41.96	0.001631	5.31	910.54	103.49	0.27
	4470.3	PropPh2[3]	3106	27.81	41.67		41.99	0.001615	5.3	913.62	103.57	0.27
	4470.3	FuturePh3[4]	3106	27.81	41.68		42	0.001607	5.29	915.33	103.61	0.27
	4332	Existing[1]	3106	27.41	41.04	35.58	41.65	0.002544	6.34	548.63	67.49	0.34
	4332	InterimPh1[2]	3106	27.41	40.98	35.61	41.59	0.002596	6.38	544.39	67.25	0.34
	4332	PropPh2[3]	3106	27.41	41.01	35.61	41.63	0.002566	6.36	546.8	67.39	0.34
	4332	FuturePh3[4]	3106	27.41	41.03	35.61	41.64	0.00255	6.35	548.14	67.46	0.34
	4321.5		Bridge									
	4320.7	Existing[1]	3106	27.38	40.92	35.55	41.54	0.002623	6.4	542.33	67.13	0.34
	4320.7	InterimPh1[2]	3106	27.38	40.86	35.58	41.48	0.002676	6.44	538.23	66.9	0.35
	4320.7	PropPh2[3]	3106	27.38	40.89	35.58	41.52	0.002644	6.42	540.69	67.04	0.35
	4320.7	FuturePh3[4]	3106	27.38	40.91	35.58	41.53	0.002626	6.41	542.06	67.12	0.34
	4273.2		Bridge									
	4225.7	Existing[1]	3106	26.96	40.05	35.13	40.73	0.003042	6.7	512.82	65.42	0.37
	4225.7	InterimPh1[2]	3106	26.96	39.98	35.16	40.67	0.003119	6.76	508.02	65.14	0.37
	4225.7	PropPh2[3]	3106	26.96	40.02	35.16	40.71	0.003073	6.72	510.84	65.31	0.37
	4225.7	FuturePh3[4]	3106	26.96	40.05	35.16	40.73	0.003048	6.71	512.4	65.4	0.37
	3807.1	Existing[1]	3106	25.2	39.99		40.09	0.00039	2.8	1646.39	185.66	0.14
	3807.1	InterimPh1[2]	3106	25.2	39.91		40.01	0.000399	2.82	1632.02	185.17	0.14
	3807.1	PropPh2[3]	3106	25.2	39.96		40.06	0.000393	2.81	1640.46	185.46	0.14
	3807.1	FuturePh3[4]	3106	25.2	39.98		40.08	0.00039	2.8	1645.13	185.62	0.14
	3403.8	Existing[1]	3846	23.47	39.62	30.61	39.83	0.000738	3.74	1066.7	104.57	0.19
	3403.8	InterimPh1[2]	3802	23.47	39.54	30.58	39.76	0.000736	3.72	1058.91	104.06	0.19
	3403.8	PropPh2[3]	3829	23.47	39.59	30.6	39.8	0.000738	3.73	1063.46	104.36	0.19
	3403.8	FuturePh3[4]	3844	23.47	39.61	30.62	39.83	0.000739	3.74	1065.97	104.53	0.19
	3306.3		Bridge									
	3208.8	Existing[1]	3846	22.18	38.03	29.33	38.26	0.000801	3.83	1036.07	102.57	0.19
	3208.8	InterimPh1[2]	3802	22.18	37.96	29.29	38.19	0.000799	3.81	1028.82	102.13	0.19
	3208.8	PropPh2[3]	3829	22.18	38	29.31	38.23	0.000801	3.82	1033.15	102.39	0.19
	3208.8	FuturePh3[4]	3844	22.18	38.03	29.33	38.25	0.000802	3.83	1035.54	102.53	0.19
	2790.6	Existing[1]	3847	22	35.09		36.9	0.015376	10.79	360.66	58.13	0.73
	2790.6	InterimPh1[2]	3803	22	35.02		36.82	0.015533	10.77	356.77	57.83	0.73
	2790.6	PropPh2[3]	3830	22	35.06		36.87	0.01549	10.8	358.75	57.98	0.73
	2790.6	FuturePh3[4]	3845	22	35.08		36.89	0.015471	10.81	359.81	58.07	0.73
	2557.7	Existing[1]	3847	21.48	34.03		34.88	0.004343	7.45	543.81	74.22	0.44
	2557.7	InterimPh1[2]	3803	21.48	33.96		34.81	0.004354	7.42	538.86	73.89	0.44
	2557.7	PropPh2[3]	3830	21.48	34		34.85	0.004352	7.44	541.67	74.08	0.44
	2557.7	FuturePh3[4]	3845	21.48	34.02		34.87	0.004354	7.45	543.14	74.18	0.44
	2427.7	Existing[1]	3847	21.18	32.88	29.79	34.07	0.007046	8.77	446.6	57.67	0.53
	2427.7	InterimPh1[2]	3803	21.18	32.81	29.78	34	0.007054	8.74	442.83	57.5	0.53
	2427.7	PropPh2[3]	3830	21.18	32.85	29.81	34.04	0.007063	8.77	444.82	57.59	0.53
	2427.7	FuturePh3[4]	3845	21.18	32.86	29.83	34.06	0.007074	8.78	445.8	57.63	0.53
	2416.7		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	2405.7	Existing[1]	3847	20.97	32.57	29.58	33.79	0.007297	8.87	441.16	57.42	0.54
	2405.7	InterimPh1[2]	3803	20.97	32.52	29.58	33.73	0.007264	8.83	438.31	57.29	0.54
	2405.7	PropPh2[3]	3830	20.97	32.56	29.6	33.77	0.007278	8.85	440.2	57.37	0.54
	2405.7	FuturePh3[4]	3845	20.97	32.57	29.62	33.79	0.007292	8.87	441.1	57.42	0.54
	2340.9	Existing[1]	3849	19.76	32.66	27.74	33.16	0.002742	5.63	693.4	91.46	0.34
	2340.9	InterimPh1[2]	3804	19.76	32.61	27.71	33.1	0.002736	5.6	688.6	91.24	0.34
	2340.9	PropPh2[3]	3832	19.76	32.65	27.74	33.14	0.002737	5.62	691.79	91.38	0.34
	2340.9	FuturePh3[4]	3846	19.76	32.66	27.75	33.15	0.002738	5.63	693.34	91.45	0.34
	2279.4		Bridge									
	2217.9	Existing[1]	3849	18.97	31.2	26.95	31.78	0.003648	6.14	632.3	88.71	0.39
	2217.9	InterimPh1[2]	3804	18.97	31.15	26.93	31.72	0.003641	6.1	627.93	88.51	0.39
	2217.9	PropPh2[3]	3832	18.97	31.18	26.95	31.76	0.003642	6.12	630.82	88.64	0.39
	2217.9	FuturePh3[4]	3846	18.97	31.2	26.97	31.78	0.003643	6.13	632.22	88.71	0.39
	1752.3	Existing[1]	3850	17.74	29.12		29.86	0.004467	7.11	674.09	144.09	0.44
	1752.3	InterimPh1[2]	3805	17.74	29.07		29.8	0.004465	7.08	667.02	140.99	0.44
	1752.3	PropPh2[3]	3834	17.74	29.1		29.84	0.004464	7.1	671.73	143.06	0.44
	1752.3	FuturePh3[4]	3848	17.74	29.12		29.86	0.004463	7.11	674.02	144.06	0.44
	781.2	Existing[1]	3853	16.28	26.11	22.1	26.51	0.002601	5.1	775.71	115.27	0.33
	781.2	InterimPh1[2]	3808	16.28	26.06	22.07	26.46	0.002601	5.08	769.58	115.02	0.33
	781.2	PropPh2[3]	3837	16.28	26.09	22.09	26.49	0.002601	5.1	773.53	115.18	0.33
	781.2	FuturePh3[4]	3851	16.28	26.11	22.1	26.51	0.002601	5.1	775.43	115.26	0.33
1PCT_100yr	19209.6	Existing[1]	1760	67.34	76.76		77.88	0.000882	8.51	225.05	86.15	0.62
	19209.6	InterimPh1[2]	1760	67.34	76.76	74.92	77.88	0.00088	8.5	225.38	86.35	0.62
	19209.6	PropPh2[3]	1760	67.34	76.76	74.92	77.88	0.00088	8.5	225.38	86.35	0.62
	19209.6	FuturePh3[4]	1760	67.34	76.76	74.92	77.88	0.00088	8.5	225.38	86.35	0.62
	18393.7	Existing[1]	1760	65.96	75.27		76.89	0.001574	10.23	172.07	31.66	0.77
	18393.7	InterimPh1[2]	1760	65.96	75.27		76.89	0.001568	10.21	172.3	31.68	0.77
	18393.7	PropPh2[3]	1760	65.96	75.27		76.89	0.001568	10.21	172.3	31.68	0.77
	18393.7	FuturePh3[4]	1760	65.96	75.27		76.89	0.001568	10.21	172.3	31.68	0.77
	17507.7	Existing[1]	1760	64.97	74.99	72.02	75.84	0.000603	7.38	238.38	37.63	0.52
	17507.7	InterimPh1[2]	1760	64.97	75.01	72.04	75.85	0.000602	7.37	238.88	37.83	0.52
	17507.7	PropPh2[3]	1760	64.97	75.01	72.04	75.85	0.000602	7.37	238.88	37.83	0.52
	17507.7	FuturePh3[4]	1760	64.97	75.01	72.04	75.85	0.000602	7.37	238.88	37.83	0.52
	17444.3	Existing[1]	1760	64.9	74.34	72.9	75.65	0.00119	9.19	191.53	34.12	0.68
	17444.3	InterimPh1[2]	1760	64.9	74.35	72.91	75.65	0.001182	9.17	192.01	34.15	0.68
	17444.3	PropPh2[3]	1760	64.9	74.35	72.91	75.65	0.001182	9.17	192.01	34.15	0.68
	17444.3	FuturePh3[4]	1760	64.9	74.35	72.91	75.65	0.001182	9.17	192.01	34.15	0.68
	17433.3		Bridge									
	17431.8	Existing[1]	1760	64.89	74.4	72.59	75.57	0.001274	8.69	202.48	34.34	0.63
	17431.8	InterimPh1[2]	1760	64.89	74.4	72.6	75.57	0.001273	8.69	202.52	34.34	0.63
	17431.8	PropPh2[3]	1760	64.89	74.4	72.6	75.57	0.001273	8.69	202.52	34.34	0.63
	17431.8	FuturePh3[4]	1760	64.89	74.4	72.6	75.57	0.001273	8.69	202.52	34.34	0.63
	17383.8		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	17335.8	Existing[1]	1760	64.71	72.62	72.43	74.76	0.002989	11.74	149.9	31.35	0.95
	17335.8	InterimPh1[2]	1760	64.71	72.42	72.42	74.75	0.003364	12.23	143.85	30.99	1
	17335.8	PropPh2[3]	1760	64.71	72.42	72.42	74.75	0.003364	12.23	143.85	30.99	1
	17335.8	FuturePh3[4]	1760	64.71	72.42	72.42	74.75	0.003364	12.23	143.85	30.99	1
	17139	Existing[1]	1760	63.93	71.49	71.49	74.04	0.002694	12.81	138.59	33.28	1
	17139	InterimPh1[2]	1760	63.93	71.49	71.49	74.04	0.002694	12.81	138.59	33.28	1
	17139	PropPh2[3]	1760	63.93	71.49	71.49	74.04	0.002694	12.81	138.59	33.28	1
	17139	FuturePh3[4]	1760	63.93	71.49	71.49	74.04	0.002694	12.81	138.59	33.28	1
	16368.5	Existing[1]	1760	60.87	71.16		72.23	0.000639	8.31	227.45	42.56	0.52
	16368.5	InterimPh1[2]	1760	60.87	71.16		72.23	0.000639	8.31	227.44	42.56	0.52
	16368.5	PropPh2[3]	1760	60.87	71.16		72.23	0.000639	8.31	227.44	42.56	0.52
	16368.5	FuturePh3[4]	1760	60.87	71.16		72.23	0.000639	8.31	227.44	42.56	0.52
	15380.2	Existing[1]	2106	59.59	69.66	68.1	71.19	0.001638	9.91	212.48	37.44	0.72
	15380.2	InterimPh1[2]	2106	59.59	69.66	68.1	71.19	0.001638	9.91	212.49	37.45	0.72
	15380.2	PropPh2[3]	2106	59.59	69.66	68.1	71.19	0.001638	9.91	212.49	37.45	0.72
	15380.2	FuturePh3[4]	2106	59.59	69.66	68.1	71.19	0.001638	9.91	212.49	37.45	0.72
	15029.4	Existing[1]	2106	59.02	67.6	67.6	70.28	0.003353	13.14	160.31	30.03	1
	15029.4	InterimPh1[2]	2106	59.02	67.62	67.61	70.28	0.003324	13.09	160.85	30.09	1
	15029.4	PropPh2[3]	2106	59.02	67.62	67.61	70.28	0.003324	13.09	160.85	30.09	1
	15029.4	FuturePh3[4]	2106	59.02	67.62	67.61	70.28	0.003324	13.09	160.85	30.09	1
	14479.9	Existing[1]	2106	58.14	67.43	65.42	68.75	0.000887	9.23	228.22	34.56	0.63
	14479.9	InterimPh1[2]	2106	58.14	67.43	65.42	68.75	0.000887	9.23	228.2	34.56	0.63
	14479.9	PropPh2[3]	2106	58.14	67.43	65.42	68.75	0.000887	9.23	228.2	34.56	0.63
	14479.9	FuturePh3[4]	2106	58.14	67.43	65.42	68.75	0.000887	9.23	228.2	34.56	0.63
	14449.4		Bridge									
	14418.9	Existing[1]	2106	57.97	67.22	65.25	68.56	0.000903	9.29	226.73	34.48	0.64
	14418.9	InterimPh1[2]	2106	57.97	67.22	65.25	68.56	0.000903	9.29	226.76	34.48	0.64
	14418.9	PropPh2[3]	2106	57.97	67.22	65.25	68.56	0.000903	9.29	226.76	34.48	0.64
	14418.9	FuturePh3[4]	2106	57.97	67.22	65.25	68.56	0.000903	9.29	226.76	34.48	0.64
	13972.2	Existing[1]	2106	56.53	67.31		67.92	0.00044	6.3	334.31	53.71	0.44
	13972.2	InterimPh1[2]	2106	56.53	67.31		67.92	0.000439	6.3	334.38	53.72	0.44
	13972.2	PropPh2[3]	2106	56.53	67.31		67.92	0.000439	6.3	334.38	53.72	0.44
	13972.2	FuturePh3[4]	2106	56.53	67.31		67.92	0.000439	6.3	334.38	53.72	0.44
	13404.1	Existing[1]	2888	54.71	65.83		67.39	0.001341	10.03	287.84	41.46	0.67
	13404.1	InterimPh1[2]	2888	54.71	65.82		67.39	0.001346	10.05	287.45	41.44	0.67
	13404.1	PropPh2[3]	2888	54.71	65.82		67.39	0.001346	10.05	287.45	41.44	0.67
	13404.1	FuturePh3[4]	2888	54.71	65.82		67.39	0.001346	10.05	287.45	41.44	0.67
	12959.9	Existing[1]	2888	53.36	66.38		66.82	0.000283	5.3	544.53	73.63	0.34
	12959.9	InterimPh1[2]	2888	53.36	66.37		66.81	0.000283	5.31	544.14	73.58	0.34
	12959.9	PropPh2[3]	2888	53.36	66.37		66.81	0.000283	5.31	544.14	73.58	0.34
	12959.9	FuturePh3[4]	2888	53.36	66.37		66.81	0.000283	5.31	544.14	73.58	0.34
	12859.9	Existing[1]	3151	53.06	65.37	62.86	66.53	0.002281	8.65	364.4	57.21	0.6
	12859.9	InterimPh1[2]	3151	53.06	65.37	62.86	66.53	0.002284	8.65	364.27	57.2	0.6
	12859.9	PropPh2[3]	3151	53.06	65.37	62.86	66.53	0.002284	8.65	364.27	57.2	0.6
	12859.9	FuturePh3[4]	3151	53.06	65.37	62.86	66.53	0.002284	8.65	364.27	57.2	0.6
	12817.9		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	12775.9	Existing[1]	3151	52.87	64.48	62.67	65.93	0.003066	9.68	325.49	53.43	0.69
	12775.9	InterimPh1[2]	3151	52.87	64.48	62.68	65.93	0.003063	9.68	325.59	53.44	0.69
	12775.9	PropPh2[3]	3151	52.87	64.48	62.68	65.93	0.003063	9.68	325.59	53.44	0.69
	12775.9	FuturePh3[4]	3151	52.87	64.48	62.68	65.93	0.003063	9.68	325.59	53.44	0.69
	12490	Existing[1]	3151	52.01	64.24	61.16	65.06	0.001302	7.27	433.32	74.81	0.53
	12490	InterimPh1[2]	3151	52.01	64.25		65.07	0.001298	7.26	433.95	74.93	0.53
	12490	PropPh2[3]	3151	52.01	64.25		65.07	0.001298	7.26	433.95	74.93	0.53
	12490	FuturePh3[4]	3151	52.01	64.25		65.07	0.001298	7.26	433.95	74.93	0.53
	12193.4	Existing[1]	3394	51.11	60.83	60.83	64.01	0.008358	14.3	237.26	37.59	1
	12193.4	InterimPh1[2]	3394	51.11	60.82	60.82	64.01	0.008411	14.34	236.7	37.54	1.01
	12193.4	PropPh2[3]	3394	51.11	60.82	60.82	64.01	0.008411	14.34	236.7	37.54	1.01
	12193.4	FuturePh3[4]	3394	51.11	60.82	60.82	64.01	0.008411	14.34	236.7	37.54	1.01
	11598.5	Existing[1]	3394	49.79	61.25		61.73	0.000768	5.55	611.22	78.44	0.35
	11598.5	InterimPh1[2]	3394	49.79	61.24		61.72	0.00077	5.56	610.55	78.4	0.35
	11598.5	PropPh2[3]	3394	49.79	61.24		61.72	0.00077	5.56	610.56	78.4	0.35
	11598.5	FuturePh3[4]	3394	49.79	61.24		61.72	0.00077	5.56	610.58	78.4	0.35
	11492.6	Existing[1]	3394	49.55	61.17	55.99	61.63	0.000726	5.44	623.93	79.14	0.34
	11492.6	InterimPh1[2]	3394	49.55	61.18	56	61.63	0.000725	5.44	624.08	79.15	0.34
	11492.6	PropPh2[3]	3394	49.55	61.18	56	61.63	0.000725	5.44	624.09	79.15	0.34
	11492.6	FuturePh3[4]	3394	49.55	61.18	56	61.64	0.000725	5.44	624.11	79.15	0.34
	11443.6	InterimPh1[2]	Bridge									
	11394.6	Existing[1]	3394	49.2	60.67	55.64	61.14	0.000766	5.55	611.55	78.46	0.35
	11394.6	InterimPh1[2]	3394	49.2	60.66	55.66	61.14	0.000767	5.55	611.26	78.45	0.35
	11394.6	PropPh2[3]	3394	49.2	60.66	55.66	61.14	0.000767	5.55	611.27	78.45	0.35
	11394.6	FuturePh3[4]	3394	49.2	60.66	55.66	61.14	0.000767	5.55	611.29	78.45	0.35
	11197.6	Existing[1]	3394	48.43	60.69		61.01	0.000139	4.55	854.9	106.52	0.25
	11197.6	InterimPh1[2]	3394	48.43	60.69		61.01	0.000139	4.55	854.52	106.5	0.25
	11197.6	PropPh2[3]	3394	48.43	60.69		61.01	0.000139	4.55	854.53	106.5	0.25
	11197.6	FuturePh3[4]	3394	48.43	60.69		61.01	0.000139	4.55	854.55	106.5	0.25
	11108	Existing[1]	3394	48.08	60.58	54.32	60.98	0.000163	5.05	774.26	93.84	0.27
	11108	InterimPh1[2]	3394	48.08	60.58	54.34	60.97	0.000163	5.05	773.91	93.82	0.27
	11108	PropPh2[3]	3394	48.08	60.58	54.34	60.97	0.000163	5.05	773.92	93.82	0.27
	11108	FuturePh3[4]	3394	48.08	60.58	54.34	60.97	0.000163	5.05	773.94	93.82	0.27
	11097		Bridge									
	11095.7	Existing[1]	3394	48.04	60.57	54.41	60.96	0.000325	5.07	768.48	93.95	0.27
	11095.7	InterimPh1[2]	3394	48.04	60.56	54.44	60.96	0.000326	5.07	768.02	93.93	0.27
	11095.7	PropPh2[3]	3394	48.04	60.56	54.44	60.96	0.000326	5.07	768.03	93.93	0.27
	11095.7	FuturePh3[4]	3394	48.04	60.56	54.44	60.96	0.000326	5.07	768.05	93.93	0.27
	11073		Bridge									
	11050.3	Existing[1]	3394	47.71	60.17	54.08	60.57	0.000333	5.11	761.93	93.61	0.28
	11050.3	InterimPh1[2]	3394	47.71	60.16	54.11	60.56	0.000333	5.11	761.53	93.59	0.28
	11050.3	PropPh2[3]	3394	47.71	60.16	54.11	60.56	0.000333	5.11	761.55	93.59	0.28
	11050.3	FuturePh3[4]	3394	47.71	60.16	54.11	60.56	0.000333	5.11	761.56	93.59	0.28

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	11007.9	Existing[1]	3898	47.75	60.12	54.03	60.53	0.001637	5.19	801.72	87.97	0.28
	11007.9	InterimPh1[2]	3898	47.75	60.12	54.03	60.53	0.001639	5.19	801.34	87.95	0.28
	11007.9	PropPh2[3]	3898	47.75	60.12	54.03	60.53	0.001639	5.19	801.35	87.96	0.28
	11007.9	FuturePh3[4]	3898	47.75	60.12	54.03	60.53	0.001639	5.19	801.37	87.96	0.28
	10997.4		Bridge									
	10986.9	Existing[1]	3898	47.72	60.01	54	60.43	0.00168	5.23	794.54	87.72	0.28
	10986.9	InterimPh1[2]	3898	47.72	60.01	54.01	60.43	0.001681	5.23	794.42	87.72	0.28
	10986.9	PropPh2[3]	3898	47.72	60.01	54.01	60.43	0.001681	5.23	794.43	87.72	0.28
	10986.9	FuturePh3[4]	3898	47.72	60.01	54.01	60.43	0.00168	5.23	794.45	87.72	0.28
	10363.6	Existing[1]	4158	44.94	57.59		58.54	0.005161	8.17	655.65	108.64	0.47
	10363.6	InterimPh1[2]	4158	44.94	57.59		58.54	0.005174	8.17	655.02	108.61	0.47
	10363.6	PropPh2[3]	4158	44.94	57.59		58.54	0.005173	8.17	655.07	108.61	0.47
	10363.6	FuturePh3[4]	4158	44.94	57.59		58.54	0.005171	8.17	655.14	108.62	0.47
	9604.7	Existing[1]	4475	41.43	55.79		56.19	0.001895	5.64	1208.41	167.05	0.3
	9604.7	InterimPh1[2]	4475	41.43	55.79		56.18	0.001897	5.64	1207.9	167.01	0.3
	9604.7	PropPh2[3]	4475	41.43	55.79		56.19	0.001896	5.64	1208.11	167.03	0.3
	9604.7	FuturePh3[4]	4475	41.43	55.79		56.19	0.001895	5.64	1208.37	167.04	0.3
	9178.3	Existing[1]	4475	38.89	54.69		55.29	0.002238	6.36	794.43	88.62	0.33
	9178.3	InterimPh1[2]	4475	38.89	54.68		55.29	0.00224	6.36	794.08	88.61	0.33
	9178.3	PropPh2[3]	4475	38.89	54.69		55.29	0.002239	6.36	794.24	88.61	0.33
	9178.3	FuturePh3[4]	4475	38.89	54.69		55.29	0.002238	6.36	794.44	88.62	0.33
	8486.4	Existing[1]	4942	34.77	53.35		53.85	0.001887	6.26	1101.75	109.5	0.3
	8486.4	InterimPh1[2]	4942	34.77	53.34		53.85	0.001891	6.26	1101.06	109.49	0.3
	8486.4	PropPh2[3]	4942	34.77	53.34		53.85	0.001889	6.26	1101.35	109.49	0.3
	8486.4	FuturePh3[4]	4942	34.77	53.35		53.85	0.001887	6.26	1101.73	109.5	0.3
	8058.8	Existing[1]	4942	34.42	52.91		53.22	0.001004	4.63	1289.37	143.93	0.22
	8058.8	InterimPh1[2]	4942	34.42	52.9		53.21	0.001007	4.63	1287.76	143.87	0.22
	8058.8	PropPh2[3]	4942	34.42	52.9		53.22	0.001006	4.63	1288.22	143.89	0.22
	8058.8	FuturePh3[4]	4942	34.42	52.91		53.22	0.001005	4.63	1288.78	143.91	0.22
	7626	Existing[1]	5301	34.07	52.48		52.79	0.001028	4.82	1410.86	110.88	0.22
	7626	InterimPh1[2]	5301	34.07	52.47		52.78	0.001031	4.82	1409.49	110.84	0.22
	7626	PropPh2[3]	5301	34.07	52.47		52.78	0.001031	4.82	1409.88	110.85	0.22
	7626	FuturePh3[4]	5301	34.07	52.48		52.79	0.00103	4.82	1410.36	110.87	0.22
	6629.4	Existing[1]	5717	31.18	50.75		51.37	0.001943	6.49	1090.43	133.36	0.3
	6629.4	InterimPh1[2]	5717	31.18	50.73		51.35	0.001955	6.5	1087.31	133.15	0.3
	6629.4	PropPh2[3]	5717	31.18	50.73		51.35	0.001953	6.5	1088.05	133.2	0.3
	6629.4	FuturePh3[4]	5717	31.18	50.74		51.36	0.001949	6.5	1088.99	133.26	0.3
	5764.3	Existing[1]	5717	29.94	49.59		50.03	0.00117	5.79	1509.53	160.55	0.25
	5764.3	InterimPh1[2]	5717	29.94	49.56		50	0.001179	5.8	1504.41	160.25	0.25
	5764.3	PropPh2[3]	5717	29.94	49.57		50.01	0.001176	5.8	1505.64	160.33	0.25
	5764.3	FuturePh3[4]	5717	29.94	49.58		50.02	0.001174	5.79	1507.19	160.42	0.25
	5522.1	Existing[1]	5717	29.59	49.08	40.15	49.67	0.001472	6.45	1135.38	101.73	0.28
	5522.1	InterimPh1[2]	5717	29.59	49.04	40.16	49.64	0.001484	6.47	1131.88	101.59	0.28
	5522.1	PropPh2[3]	5717	29.59	49.05	40.16	49.65	0.001481	6.46	1132.74	101.62	0.28
	5522.1	FuturePh3[4]	5717	29.59	49.06	40.16	49.66	0.001477	6.46	1133.82	101.67	0.28
	5499.1		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	5485.3	Existing[1]	5717	29.57	48.98	39.18	49.43	0.001075	5.51	1246.88	105.57	0.24
	5485.3	InterimPh1[2]	5717	29.57	48.95	39.19	49.39	0.001083	5.53	1243.25	105.44	0.24
	5485.3	PropPh2[3]	5717	29.57	48.96	39.19	49.4	0.001081	5.52	1244.14	105.47	0.24
	5485.3	FuturePh3[4]	5717	29.57	48.97	39.19	49.41	0.001079	5.52	1245.27	105.51	0.24
	5417.8		Bridge									
	5350.3	Existing[1]	5717	30.24	48.32	39.85	48.86	0.001452	6.06	1109.89	100.32	0.27
	5350.3	InterimPh1[2]	5717	30.24	48.28	39.86	48.83	0.001465	6.07	1106.32	100.17	0.28
	5350.3	PropPh2[3]	5717	30.24	48.29	39.86	48.84	0.001461	6.07	1107.25	100.21	0.28
	5350.3	FuturePh3[4]	5717	30.24	48.31	39.86	48.85	0.001457	6.06	1108.41	100.26	0.28
	5343.7	Existing[1]	5717	30.34	48.22	39.53	48.84	0.001543	6.57	1095.14	98.45	0.29
	5343.7	InterimPh1[2]	5717	30.34	48.17	39.53	48.8	0.001559	6.59	1090.52	98.26	0.29
	5343.7	PropPh2[3]	5717	30.34	48.18	39.53	48.81	0.001556	6.59	1091.44	98.3	0.29
	5343.7	FuturePh3[4]	5717	30.34	48.19	39.53	48.82	0.001552	6.58	1092.6	98.35	0.29
	5314.7		Bridge									
	5285.7	Existing[1]	5717	30.19	47.76	39.38	48.41	0.001654	6.72	1065.12	97.19	0.3
	5285.7	InterimPh1[2]	5717	30.19	47.71	39.38	48.36	0.001674	6.74	1059.89	96.97	0.3
	5285.7	PropPh2[3]	5717	30.19	47.72	39.38	48.37	0.001671	6.74	1060.85	97.01	0.3
	5285.7	FuturePh3[4]	5717	30.19	47.73	39.38	48.38	0.001666	6.73	1062.05	97.06	0.3
	4805.3	Existing[1]	5717	28.79	46.86		47.56	0.001876	6.93	1018.18	97.17	0.31
	4805.3	InterimPh1[2]	5717	28.79	46.79		47.49	0.001909	6.96	1011.16	96.85	0.31
	4805.3	PropPh2[3]	5717	28.79	46.8		47.5	0.001903	6.96	1012.38	96.9	0.31
	4805.3	FuturePh3[4]	5717	28.79	46.81		47.52	0.001896	6.95	1013.92	96.97	0.31
	4470.3	Existing[1]	5717	27.81	46.48		46.93	0.001525	6.47	1448.87	123.17	0.28
	4470.3	InterimPh1[2]	5717	27.81	46.4		46.86	0.001553	6.51	1439	122.67	0.28
	4470.3	PropPh2[3]	5717	27.81	46.41		46.87	0.001548	6.5	1440.73	122.76	0.28
	4470.3	FuturePh3[4]	5717	27.81	46.43		46.89	0.001542	6.49	1442.9	122.87	0.28
	4332	Existing[1]	5717	27.41	45.64	38.36	46.54	0.002443	7.87	899.44	85.15	0.35
	4332	InterimPh1[2]	5717	27.41	45.54	38.38	46.46	0.002498	7.93	891.42	84.79	0.36
	4332	PropPh2[3]	5717	27.41	45.56	38.38	46.47	0.002488	7.92	892.85	84.85	0.36
	4332	FuturePh3[4]	5717	27.41	45.58	38.38	46.49	0.002475	7.9	894.64	84.94	0.36
	4321.5		Bridge									
	4320.7	Existing[1]	5717	27.38	45.5	38.33	46.42	0.002506	7.93	890.27	84.74	0.36
	4320.7	InterimPh1[2]	5717	27.38	45.4	38.35	46.33	0.002566	7.99	881.81	84.35	0.36
	4320.7	PropPh2[3]	5717	27.38	45.42	38.35	46.34	0.002555	7.98	883.27	84.42	0.36
	4320.7	FuturePh3[4]	5717	27.38	45.44	38.35	46.36	0.002542	7.97	885.11	84.5	0.36
	4273.2		Bridge									
	4225.7	Existing[1]	5717	26.96	44.56	37.91	45.55	0.002842	8.26	846.34	82.72	0.38
	4225.7	InterimPh1[2]	5717	26.96	44.44	37.93	45.45	0.002925	8.33	836.61	82.27	0.38
	4225.7	PropPh2[3]	5717	26.96	44.46	37.93	45.47	0.002911	8.32	838.25	82.34	0.38
	4225.7	FuturePh3[4]	5717	26.96	44.48	37.93	45.49	0.002893	8.3	840.31	82.44	0.38
	3807.1	Existing[1]	5717	25.2	44.63		44.77	0.000398	3.51	2576.14	215.37	0.15
	3807.1	InterimPh1[2]	5717	25.2	44.51		44.66	0.000408	3.54	2550.61	214.61	0.15
	3807.1	PropPh2[3]	5717	25.2	44.53		44.68	0.000407	3.53	2554.95	214.74	0.15
	3807.1	FuturePh3[4]	5717	25.2	44.55		44.7	0.000404	3.53	2560.37	214.9	0.15

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	3403.8	Existing[1]	7125	23.47	44.09	33	44.46	0.000869	4.98	1600.48	133.33	0.21
	3403.8	InterimPh1[2]	7032	23.47	43.97	32.96	44.35	0.000867	4.95	1585.49	132.65	0.21
	3403.8	PropPh2[3]	7048	23.47	43.99	32.97	44.37	0.000868	4.96	1588.03	132.77	0.21
	3403.8	FuturePh3[4]	7068	23.47	44.02	32.98	44.39	0.000868	4.96	1591.21	132.91	0.21
	3306.3		Bridge									
	3208.8	Existing[1]	7125	22.18	42.4	31.71	42.79	0.000946	5.11	1547.6	130.92	0.22
	3208.8	InterimPh1[2]	7032	22.18	42.29	31.66	42.68	0.000944	5.08	1533.38	130.26	0.22
	3208.8	PropPh2[3]	7048	22.18	42.31	31.68	42.7	0.000944	5.09	1535.82	130.37	0.22
	3208.8	FuturePh3[4]	7068	22.18	42.33	31.69	42.72	0.000945	5.1	1538.88	130.51	0.22
	2790.6	Existing[1]	7121	22	38.57		41.16	0.012955	13.03	589.29	73.51	0.72
	2790.6	InterimPh1[2]	7028	22	38.47		41.05	0.013013	12.98	582.63	73.11	0.72
	2790.6	PropPh2[3]	7044	22	38.49		41.07	0.013004	12.99	583.76	73.18	0.72
	2790.6	FuturePh3[4]	7064	22	38.51		41.09	0.012994	13	585.15	73.26	0.72
	2557.7	Existing[1]	7121	21.48	37.79		39.14	0.004435	9.49	858.25	92.35	0.47
	2557.7	InterimPh1[2]	7028	21.48	37.69		39.03	0.00444	9.44	849.14	91.95	0.47
	2557.7	PropPh2[3]	7044	21.48	37.71		39.05	0.00444	9.45	850.69	92.02	0.47
	2557.7	FuturePh3[4]	7064	21.48	37.73		39.07	0.004439	9.46	852.59	92.1	0.47
	2427.7	Existing[1]	7121	21.18	36.11	32.84	38.17	0.008097	11.6	654.04	71.5	0.6
	2427.7	InterimPh1[2]	7028	21.18	36.02	32.78	38.06	0.008099	11.54	647.68	71.09	0.6
	2427.7	PropPh2[3]	7044	21.18	36.04	32.79	38.08	0.0081	11.55	648.71	71.16	0.6
	2427.7	FuturePh3[4]	7064	21.18	36.05	32.8	38.1	0.008104	11.57	649.96	71.24	0.6
	2416.7		Bridge									
	2405.7	Existing[1]	7121	20.97	35.56	32.63	37.76	0.008972	11.97	629.87	69.93	0.63
	2405.7	InterimPh1[2]	7028	20.97	35.48	32.57	37.65	0.008954	11.9	624.33	69.57	0.63
	2405.7	PropPh2[3]	7044	20.97	35.49	32.58	37.67	0.008958	11.91	625.27	69.63	0.63
	2405.7	FuturePh3[4]	7064	20.97	35.51	32.59	37.69	0.008964	11.93	626.4	69.71	0.63
	2340.9	Existing[1]	7117	19.76	35.92	30.48	36.76	0.003063	7.42	1012.23	104.62	0.38
	2340.9	InterimPh1[2]	7023	19.76	35.83	30.45	36.67	0.003057	7.37	1003.53	104.28	0.38
	2340.9	PropPh2[3]	7040	19.76	35.85	30.46	36.68	0.003059	7.38	1005.06	104.34	0.38
	2340.9	FuturePh3[4]	7060	19.76	35.87	30.48	36.7	0.00306	7.39	1006.92	104.41	0.38
	2279.4		Bridge									
	2217.9	Existing[1]	7117	18.97	34.15	29.69	35.16	0.004143	8.13	911.62	100.65	0.44
	2217.9	InterimPh1[2]	7023	18.97	34.07	29.66	35.08	0.004133	8.08	904.11	100.35	0.44
	2217.9	PropPh2[3]	7040	18.97	34.08	29.67	35.09	0.004135	8.09	905.43	100.4	0.44
	2217.9	FuturePh3[4]	7060	18.97	34.1	29.69	35.11	0.004137	8.1	907.07	100.47	0.44
	1752.3	Existing[1]	7113	17.74	32.25		33.21	0.004129	8.5	1300.07	241.55	0.45
	1752.3	InterimPh1[2]	7019	17.74	32.17		33.13	0.004143	8.47	1280.6	239.47	0.45
	1752.3	PropPh2[3]	7035	17.74	32.18		33.14	0.00414	8.48	1283.99	239.84	0.45
	1752.3	FuturePh3[4]	7056	17.74	32.2		33.16	0.004139	8.48	1288.08	240.27	0.45
	781.2	Existing[1]	7104	16.28	29.35	24.01	29.99	0.002603	6.46	1206.85	156.4	0.35
	781.2	InterimPh1[2]	7009	16.28	29.27	23.95	29.9	0.002603	6.43	1194	155.02	0.35
	781.2	PropPh2[3]	7026	16.28	29.28	23.96	29.91	0.002603	6.44	1196.3	155.27	0.35
	781.2	FuturePh3[4]	7046	16.28	29.3	23.97	29.93	0.002603	6.44	1199	155.56	0.35

Existing Conditions[1]: Model includes FEMA Effective geometry data with the Existing Conditions HMS model flows.
InterimPh1[2]: Model includes FEMA Effective geometry data with the Phase 1 Interim (Basin) HMS model flows.
PropPh2[3]: Model includes FEMA Effective geometry data with the Phase 2 Proposed (Channel Impvs) HMS model flows.
FuturePh3[4]: Model includes FEMA Effective geometry data with the Phase 3 Future (Storm Sew Impvs) HMS model flows.

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	248647.7	Existing[1]	1765	56.61	70.91		70.97	0.000045	2.01	878.61	104.4	0.12
	248647.7	InterimPh1[2]	1765	56.61	70.91		70.97	0.000045	2.01	878.61	104.4	0.12
	248647.7	Proposed Ph2[3]	1765	56.61	70.91		70.97	0.000045	2.01	878.61	104.4	0.12
	248647.7	FuturePh3[4]	1765	56.61	70.91		70.97	0.000045	2.01	878.61	104.4	0.12
	248547.8	Existing[1]	1765	56.16	70.9	61.12	70.96	0.000158	1.91	925.63	107.11	0.11
	248547.8	InterimPh1[2]	1765	56.16	70.9	61.12	70.96	0.000158	1.91	925.63	107.11	0.11
	248547.8	Proposed Ph2[3]	1765	56.16	70.9	61.12	70.96	0.000158	1.91	925.63	107.11	0.11
	248547.8	FuturePh3[4]	1765	56.16	70.9	61.12	70.96	0.000158	1.91	925.63	107.11	0.11
	248481.1		Bridge									
	248414.4	Existing[1]	1765	55.9	70.65	60.86	70.71	0.000157	1.9	927.05	107.19	0.11
	248414.4	InterimPh1[2]	1765	55.9	70.65	60.86	70.71	0.000157	1.9	927.05	107.19	0.11
	248414.4	Proposed Ph2[3]	1765	55.9	70.65	60.86	70.71	0.000157	1.9	927.05	107.19	0.11
	248414.4	FuturePh3[4]	1765	55.9	70.65	60.86	70.71	0.000157	1.9	927.05	107.19	0.11
	247502	Existing[1]	1752	50.81	70.5		70.53	0.000214	1.43	1223.99	119.15	0.08
	247502	InterimPh1[2]	1752	50.81	70.5		70.53	0.000214	1.43	1223.99	119.15	0.08
	247502	Proposed Ph2[3]	1752	50.81	70.5		70.53	0.000214	1.43	1223.99	119.15	0.08
	247502	FuturePh3[4]	1752	50.81	70.5		70.53	0.000214	1.43	1223.99	119.15	0.08
	246449.8	Existing[1]	1752	52.3	70.31		70.34	0.000151	1.46	1203.53	123.34	0.08
	246449.8	InterimPh1[2]	1752	52.3	70.31		70.34	0.000151	1.46	1203.53	123.34	0.08
	246449.8	Proposed Ph2[3]	1752	52.3	70.31		70.34	0.000151	1.46	1203.53	123.34	0.08
	246449.8	FuturePh3[4]	1752	52.3	70.31		70.34	0.000151	1.46	1203.53	123.34	0.08
	245413.7	Existing[1]	1724	51.09	70.13		70.16	0.000214	1.37	1258.9	123.15	0.08
	245413.7	InterimPh1[2]	1724	51.09	70.13		70.16	0.000214	1.37	1258.89	123.15	0.08
	245413.7	Proposed Ph2[3]	1724	51.09	70.13		70.16	0.000214	1.37	1258.9	123.15	0.08
	245413.7	FuturePh3[4]	1724	51.09	70.13		70.16	0.000214	1.37	1258.9	123.15	0.08
	244345.5	Existing[1]	1724	49	69.98		70	0.000105	1.22	1412.54	136.72	0.07
	244345.5	InterimPh1[2]	1724	49	69.98		70	0.000105	1.22	1412.54	136.72	0.07
	244345.5	Proposed Ph2[3]	1724	49	69.98		70	0.000105	1.22	1412.54	136.72	0.07
	244345.5	FuturePh3[4]	1724	49	69.98		70	0.000105	1.22	1412.54	136.72	0.07
	243452.9	Existing[1]	1698	49	69.89		69.91	0.000095	1.07	1586.87	167.61	0.06
	243452.9	InterimPh1[2]	1698	49	69.89		69.91	0.000095	1.07	1586.86	167.61	0.06
	243452.9	Proposed Ph2[3]	1698	49	69.89		69.91	0.000095	1.07	1586.87	167.61	0.06
	243452.9	FuturePh3[4]	1698	49	69.89		69.91	0.000095	1.07	1586.87	167.61	0.06
	242655.3	Existing[1]	1698	49.31	69.76		69.79	0.000271	1.3	1303.6	127.56	0.07
	242655.3	InterimPh1[2]	1698	49.31	69.76		69.79	0.000271	1.3	1303.6	127.56	0.07
	242655.3	Proposed Ph2[3]	1698	49.31	69.76		69.79	0.000271	1.3	1303.6	127.56	0.07
	242655.3	FuturePh3[4]	1698	49.31	69.76		69.79	0.000271	1.3	1303.6	127.56	0.07
	241917.5	Existing[1]	1698	48.64	69.61	54.22	69.63	0.000184	1.12	1522.31	152.26	0.06
	241917.5	InterimPh1[2]	1698	48.64	69.61	54.22	69.63	0.000184	1.12	1522.31	152.26	0.06
	241917.5	Proposed Ph2[3]	1698	48.64	69.61	54.22	69.63	0.000184	1.12	1522.31	152.26	0.06
	241917.5	FuturePh3[4]	1698	48.64	69.61	54.22	69.63	0.000184	1.12	1522.31	152.26	0.06
	241646.1	Existing[1]	1698	48.4	69.57	53.98	69.58	0.000134	1.08	1577.59	140.56	0.06
	241646.1	InterimPh1[2]	1698	48.4	69.57	53.98	69.58	0.000134	1.08	1577.59	140.56	0.06
	241646.1	Proposed Ph2[3]	1698	48.4	69.57	53.98	69.58	0.000134	1.08	1577.59	140.56	0.06
	241646.1	FuturePh3[4]	1698	48.4	69.57	53.98	69.58	0.000134	1.08	1577.59	140.56	0.06
	241632.7		Bridge									
	241619.3	Existing[1]	1698	48.33	69.49	53.91	69.51	0.000134	1.08	1576.84	140.53	0.06
	241619.3	InterimPh1[2]	1698	48.33	69.49	53.91	69.51	0.000134	1.08	1576.84	140.53	0.06
	241619.3	Proposed Ph2[3]	1698	48.33	69.49	53.91	69.51	0.000134	1.08	1576.84	140.53	0.06
	241619.3	FuturePh3[4]	1698	48.33	69.49	53.91	69.51	0.000134	1.08	1576.84	140.53	0.06
	241079	Existing[1]	1665	49.13	69.46		69.46	0.000042	0.62	2667.84	210.17	0.03
	241079	InterimPh1[2]	1665	49.13	69.46		69.46	0.000042	0.62	2667.84	210.17	0.03

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	241079	Proposed Ph2[3]	1665	49.13	69.46		69.46	0.000042	0.62	2667.84	210.17	0.03
	241079	FuturePh3[4]	1665	49.13	69.46		69.46	0.000042	0.62	2667.84	210.17	0.03
	240579	Existing[1]	1665	48.94	69.43		69.44	0.000069	0.8	2081.13	198.23	0.04
	240579	InterimPh1[2]	1665	48.94	69.43		69.44	0.000069	0.8	2081.12	198.23	0.04
	240579	Proposed Ph2[3]	1665	48.94	69.43		69.44	0.000069	0.8	2081.13	198.23	0.04
	240579	FuturePh3[4]	1665	48.94	69.43		69.44	0.000069	0.8	2081.13	198.23	0.04
	240376.3	Existing[1]	1665	48.86	69.41	53.01	69.42	0.000099	0.8	2093.73	198.62	0.04
	240376.3	InterimPh1[2]	1665	48.86	69.41	53.01	69.42	0.000099	0.8	2093.73	198.62	0.04
	240376.3	Proposed Ph2[3]	1665	48.86	69.41	53.01	69.42	0.000099	0.8	2093.73	198.62	0.04
	240376.3	FuturePh3[4]	1665	48.86	69.41	53.01	69.42	0.000099	0.8	2093.73	198.62	0.04
	240315.3		Bridge									
	240254.3	Existing[1]	1665	48.68	69.28	52.83	69.29	0.000098	0.79	2102.97	198.9	0.04
	240254.3	InterimPh1[2]	1665	48.68	69.28	52.83	69.29	0.000098	0.79	2102.96	198.9	0.04
	240254.3	Proposed Ph2[3]	1665	48.68	69.28	52.83	69.29	0.000098	0.79	2102.97	198.9	0.04
	240254.3	FuturePh3[4]	1665	48.68	69.28	52.83	69.29	0.000098	0.79	2102.97	198.9	0.04
	239993.6	Existing[1]	3152	47	69.17		69.21	0.000502	1.69	1862.12	161.6	0.09
	239993.6	InterimPh1[2]	3152	47	69.17		69.21	0.000502	1.69	1862.12	161.6	0.09
	239993.6	Proposed Ph2[3]	3152	47	69.17		69.21	0.000502	1.69	1862.12	161.6	0.09
	239993.6	FuturePh3[4]	3152	47	69.17		69.21	0.000502	1.69	1862.12	161.6	0.09
	239036.8	Existing[1]	3152	47.67	68.71		68.76	0.000447	1.74	1814.42	153.94	0.09
	239036.8	InterimPh1[2]	3152	47.67	68.71		68.76	0.000447	1.74	1814.41	153.94	0.09
	239036.8	Proposed Ph2[3]	3152	47.67	68.71		68.76	0.000447	1.74	1814.42	153.94	0.09
	239036.8	FuturePh3[4]	3152	47.67	68.71		68.76	0.000447	1.74	1814.42	153.94	0.09
	238060.4	Existing[1]	3152	45.2	68.27		68.31	0.000468	1.77	1777.53	158.47	0.09
	238060.4	InterimPh1[2]	3152	45.2	68.27		68.31	0.000468	1.77	1777.53	158.47	0.09
	238060.4	Proposed Ph2[3]	3152	45.2	68.27		68.31	0.000468	1.77	1777.53	158.47	0.09
	238060.4	FuturePh3[4]	3152	45.2	68.27		68.31	0.000468	1.77	1777.53	158.47	0.09
	237276.3	Existing[1]	3152	44.89	67.84		67.88	0.000654	1.73	1823.99	160.3	0.09
	237276.3	InterimPh1[2]	3152	44.89	67.84		67.88	0.000654	1.73	1823.98	160.3	0.09
	237276.3	Proposed Ph2[3]	3152	44.89	67.84		67.88	0.000654	1.73	1823.99	160.3	0.09
	237276.3	FuturePh3[4]	3152	44.89	67.84		67.88	0.000654	1.73	1823.99	160.3	0.09
	236611	Existing[1]	3361	44.63	67.41		67.46	0.000607	1.87	1797.24	159.56	0.1
	236611	InterimPh1[2]	3361	44.63	67.41		67.46	0.000607	1.87	1797.23	159.56	0.1
	236611	Proposed Ph2[3]	3361	44.63	67.41		67.46	0.000607	1.87	1797.24	159.56	0.1
	236611	FuturePh3[4]	3361	44.63	67.41		67.46	0.000607	1.87	1797.24	159.56	0.1
	235706.9	Existing[1]	3361	44.41	66.86		66.92	0.000585	1.98	1700.04	163.07	0.11
	235706.9	InterimPh1[2]	3361	44.41	66.86		66.92	0.000585	1.98	1700.04	163.07	0.11
	235706.9	Proposed Ph2[3]	3361	44.41	66.86		66.92	0.000585	1.98	1700.04	163.07	0.11
	235706.9	FuturePh3[4]	3361	44.41	66.86		66.92	0.000585	1.98	1700.04	163.07	0.11
	234807.9	Existing[1]	3539	44.91	66.62		66.66	0.000177	1.61	2851.48	366.41	0.08
	234807.9	InterimPh1[2]	3539	44.91	66.62		66.66	0.000177	1.61	2851.46	366.41	0.08
	234807.9	Proposed Ph2[3]	3539	44.91	66.62		66.66	0.000177	1.61	2851.48	366.41	0.08
	234807.9	FuturePh3[4]	3539	44.91	66.62		66.66	0.000177	1.61	2851.48	366.41	0.08
	233698.4	Existing[1]	3539	45.45	66.35	51.63	66.39	0.000343	1.64	2153.11	640.94	0.08
	233698.4	InterimPh1[2]	3539	45.45	66.35	51.63	66.39	0.000343	1.64	2153.11	640.94	0.08
	233698.4	Proposed Ph2[3]	3539	45.45	66.35	51.63	66.39	0.000343	1.64	2153.11	640.94	0.08
	233698.4	FuturePh3[4]	3539	45.45	66.35	51.63	66.39	0.000343	1.64	2153.11	640.94	0.08
	233029.3	Existing[1]	3539	43.15	66.06		66.13	0.000443	2.05	1728.46	149.9	0.11
	233029.3	InterimPh1[2]	3539	43.15	66.06		66.13	0.000443	2.05	1728.46	149.9	0.11
	233029.3	Proposed Ph2[3]	3539	43.15	66.06		66.13	0.000443	2.05	1728.46	149.9	0.11
	233029.3	FuturePh3[4]	3539	43.15	66.06		66.13	0.000443	2.05	1728.46	149.9	0.11

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	232816.9	Existing[1]	3634	42.42	65.97	50.54	66.03	0.000418	1.94	1873.58	278.54	0.1
	232816.9	InterimPh1[2]	3634	42.42	65.97	50.54	66.03	0.000418	1.94	1873.57	278.54	0.1
	232816.9	Proposed Ph2[3]	3634	42.42	65.97	50.54	66.03	0.000418	1.94	1873.58	278.54	0.1
	232816.9	FuturePh3[4]	3634	42.42	65.97	50.54	66.03	0.000418	1.94	1873.58	278.54	0.1
	232805.9		Bridge									
	232794.9	Existing[1]	3634	42.38	65.96	50.51	66.02	0.000415	1.94	1877.55	279.01	0.1
	232794.9	InterimPh1[2]	3634	42.38	65.96	50.51	66.02	0.000415	1.94	1877.54	279.01	0.1
	232794.9	Proposed Ph2[3]	3634	42.38	65.96	50.51	66.02	0.000415	1.94	1877.55	279.01	0.1
	232794.9	FuturePh3[4]	3634	42.38	65.96	50.51	66.02	0.000415	1.94	1877.55	279.01	0.1
	232790.8	Existing[1]	3634	42.38	65.95	50.46	66.01	0.000341	1.99	1828.18	272.09	0.1
	232790.8	InterimPh1[2]	3634	42.38	65.95	50.46	66.01	0.000341	1.99	1828.18	272.09	0.1
	232790.8	Proposed Ph2[3]	3634	42.38	65.95	50.46	66.01	0.000341	1.99	1828.18	272.09	0.1
	232790.8	FuturePh3[4]	3634	42.38	65.95	50.46	66.01	0.000341	1.99	1828.18	272.09	0.1
	232732.9		Bridge									
	232681.7	Existing[1]	3634	43.64	65.82	51.23	65.88	0.000183	1.99	1828.44	146.83	0.1
	232681.7	InterimPh1[2]	3634	43.64	65.82	51.23	65.88	0.000183	1.99	1828.43	146.83	0.1
	232681.7	Proposed Ph2[3]	3634	43.64	65.82	51.23	65.88	0.000183	1.99	1828.44	146.83	0.1
	232681.7	FuturePh3[4]	3634	43.64	65.82	51.23	65.88	0.000183	1.99	1828.44	146.83	0.1
	232669.7		Bridge									
	232657.7	Existing[1]	3634	44.33	65.8	51.92	65.87	0.000199	2.11	1725.21	142.49	0.11
	232657.7	InterimPh1[2]	3634	44.33	65.8	51.92	65.87	0.000199	2.11	1725.2	142.49	0.11
	232657.7	Proposed Ph2[3]	3634	44.33	65.8	51.92	65.87	0.000199	2.11	1725.21	142.49	0.11
	232657.7	FuturePh3[4]	3634	44.33	65.8	51.92	65.87	0.000199	2.11	1725.21	142.49	0.11
	232645.3		Bridge									
	232632.3	Existing[1]	3634	44.3	65.79	51.89	65.86	0.000199	2.1	1728.89	142.81	0.11
	232632.3	InterimPh1[2]	3634	44.3	65.79	51.89	65.86	0.000199	2.1	1728.88	142.81	0.11
	232632.3	Proposed Ph2[3]	3634	44.3	65.79	51.89	65.86	0.000199	2.1	1728.89	142.81	0.11
	232632.3	FuturePh3[4]	3634	44.3	65.79	51.89	65.86	0.000199	2.1	1728.89	142.81	0.11
	231798	Existing[1]	3708	41.92	65.48		65.55	0.000882	2.11	1756.23	177.59	0.12
	231798	InterimPh1[2]	3708	41.92	65.48		65.55	0.000882	2.11	1756.21	177.59	0.12
	231798	Proposed Ph2[3]	3708	41.92	65.48		65.55	0.000882	2.11	1756.22	177.59	0.12
	231798	FuturePh3[4]	3708	41.92	65.48		65.55	0.000882	2.11	1756.23	177.59	0.12
	230908	Existing[1]	3878	42.68	64.98		65.02	0.000425	1.63	2929.23	394.93	0.08
	230908	InterimPh1[2]	3878	42.68	64.98		65.02	0.000425	1.63	2929.2	394.92	0.08
	230908	Proposed Ph2[3]	3878	42.68	64.98		65.02	0.000425	1.63	2929.22	394.93	0.08
	230908	FuturePh3[4]	3878	42.68	64.98		65.02	0.000425	1.63	2929.23	394.93	0.08
	229882.5	Existing[1]	3878	41.58	64.71		64.75	0.000175	1.73	2663.33	456.19	0.09
	229882.5	InterimPh1[2]	3878	41.58	64.71		64.75	0.000175	1.73	2663.29	456.18	0.09
	229882.5	Proposed Ph2[3]	3878	41.58	64.71		64.75	0.000175	1.73	2663.32	456.18	0.09
	229882.5	FuturePh3[4]	3878	41.58	64.71		64.75	0.000175	1.73	2663.33	456.19	0.09
	228917.1	Existing[1]	4040	41.61	64.56		64.59	0.000155	1.46	4319.12	599.87	0.07
	228917.1	InterimPh1[2]	4040	41.61	64.56		64.59	0.000155	1.46	4319.07	599.87	0.07
	228917.1	Proposed Ph2[3]	4040	41.61	64.56		64.59	0.000155	1.46	4319.1	599.87	0.07
	228917.1	FuturePh3[4]	4040	41.61	64.56		64.59	0.000155	1.46	4319.12	599.87	0.07
	228060.7	Existing[1]	4040	40.89	64.4		64.42	0.000251	1.47	4818.67	940.83	0.07
	228060.7	InterimPh1[2]	4040	40.89	64.4		64.42	0.000251	1.47	4818.59	940.82	0.07
	228060.7	Proposed Ph2[3]	4040	40.89	64.4		64.42	0.000251	1.47	4818.64	940.83	0.07
	228060.7	FuturePh3[4]	4040	40.89	64.4		64.42	0.000251	1.47	4818.67	940.83	0.07

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	227524.1	Existing[1]	4040	40.54	64.29	48.63	64.32	0.000141	1.47	2751.6	264.21	0.07
	227524.1	InterimPh1[2]	4040	40.54	64.29	48.63	64.32	0.000141	1.47	2751.59	264.2	0.07
	227524.1	Proposed Ph2[3]	4040	40.54	64.29	48.63	64.32	0.000141	1.47	2751.6	264.21	0.07
	227524.1	FuturePh3[4]	4040	40.54	64.29	48.63	64.32	0.000141	1.47	2751.6	264.21	0.07
	227144.7	Existing[1]	4139	40.3	64.24	48.47	64.27	0.000125	1.34	3379.7	397.43	0.06
	227144.7	InterimPh1[2]	4139	40.3	64.24	48.47	64.27	0.000125	1.34	3379.67	397.43	0.06
	227144.7	Proposed Ph2[3]	4139	40.3	64.24	48.47	64.27	0.000125	1.34	3379.69	397.43	0.06
	227144.7	FuturePh3[4]	4139	40.3	64.24	48.47	64.27	0.000125	1.34	3379.7	397.43	0.06
	227088.2		Bridge									
	227031.7	Existing[1]	4139	40.22	64.22	48.4	64.25	0.000123	1.33	3403.45	398.58	0.06
	227031.7	InterimPh1[2]	4139	40.22	64.22	48.4	64.25	0.000123	1.33	3403.41	398.57	0.06
	227031.7	Proposed Ph2[3]	4139	40.22	64.22	48.4	64.25	0.000123	1.33	3403.44	398.58	0.06
	227031.7	FuturePh3[4]	4139	40.22	64.22	48.4	64.25	0.000123	1.33	3403.45	398.58	0.06
	225979.2	Existing[1]	4297	40.46	64.03		64.07	0.000259	1.58	3202.31	309.57	0.08
	225979.2	InterimPh1[2]	4297	40.46	64.03		64.07	0.000259	1.58	3202.28	309.56	0.08
	225979.2	Proposed Ph2[3]	4297	40.46	64.03		64.07	0.000259	1.58	3202.3	309.56	0.08
	225979.2	FuturePh3[4]	4297	40.46	64.03		64.07	0.000259	1.58	3202.31	309.57	0.08
	224981.6	Existing[1]	4484	40.72	63.61		63.66	0.000693	1.97	3083.79	398.56	0.1
	224981.6	InterimPh1[2]	4484	40.72	63.61		63.66	0.000693	1.97	3083.74	398.56	0.1
	224981.6	Proposed Ph2[3]	4484	40.72	63.61		63.66	0.000693	1.97	3083.77	398.56	0.1
	224981.6	FuturePh3[4]	4484	40.72	63.61		63.66	0.000693	1.97	3083.79	398.56	0.1
	224198	Existing[1]	4484	39.2	63.2		63.24	0.000419	1.8	2909.93	384.01	0.09
	224198	InterimPh1[2]	4484	39.2	63.19		63.24	0.000419	1.8	2909.88	384	0.09
	224198	Proposed Ph2[3]	4484	39.2	63.2		63.24	0.000419	1.8	2909.92	384.01	0.09
	224198	FuturePh3[4]	4484	39.2	63.2		63.24	0.000419	1.8	2909.93	384.01	0.09
	223061.1	Existing[1]	4580	37.26	62.83	46.45	62.89	0.00024	1.87	2451.14	473.34	0.09
	223061.1	InterimPh1[2]	4580	37.26	62.83	46.45	62.89	0.00024	1.87	2451.11	473.33	0.09
	223061.1	Proposed Ph2[3]	4580	37.26	62.83	46.45	62.89	0.00024	1.87	2451.13	473.34	0.09
	223061.1	FuturePh3[4]	4580	37.26	62.83	46.45	62.89	0.00024	1.87	2451.14	473.34	0.09
	222172.8	Existing[1]	4580	38.92	62.5	48.2	62.55	0.000659	1.82	2733.25	702.18	0.09
	222172.8	InterimPh1[2]	4580	38.92	62.5	48.2	62.55	0.000659	1.82	2733.2	702.15	0.09
	222172.8	Proposed Ph2[3]	4580	38.92	62.5	48.2	62.55	0.000659	1.82	2733.23	702.17	0.09
	222172.8	FuturePh3[4]	4580	38.92	62.5	48.2	62.55	0.000659	1.82	2733.25	702.18	0.09
	221721.3	Existing[1]	4580	38.24	62.39		62.45	0.0001	2.12	2469.5	187.42	0.08
	221721.3	InterimPh1[2]	4580	38.24	62.39		62.45	0.0001	2.12	2469.47	187.42	0.08
	221721.3	Proposed Ph2[3]	4580	38.24	62.39		62.45	0.0001	2.12	2469.49	187.42	0.08
	221721.3	FuturePh3[4]	4580	38.24	62.39		62.45	0.0001	2.12	2469.5	187.42	0.08
	221523.4	Existing[1]	4616	37.95	62.37	44.29	62.43	0.000081	1.92	3225.82	254.6	0.07
	221523.4	InterimPh1[2]	4616	37.95	62.37	44.29	62.43	0.000081	1.92	3225.78	254.6	0.07
	221523.4	Proposed Ph2[3]	4616	37.95	62.37	44.29	62.43	0.000081	1.92	3225.8	254.6	0.07
	221523.4	FuturePh3[4]	4616	37.95	62.37	44.29	62.43	0.000081	1.92	3225.82	254.6	0.07
	221469.5		Bridge									
	221415.6	Existing[1]	4616	37.86	62.27	44.2	62.32	0.000081	1.92	3222.86	254.5	0.07
	221415.6	InterimPh1[2]	4616	37.86	62.27	44.2	62.32	0.000081	1.92	3222.82	254.5	0.07
	221415.6	Proposed Ph2[3]	4616	37.86	62.27	44.2	62.32	0.000081	1.92	3222.84	254.5	0.07
	221415.6	FuturePh3[4]	4616	37.86	62.27	44.2	62.32	0.000081	1.92	3222.86	254.5	0.07
	220426.4	Existing[1]	4748	36.86	62.1		62.15	0.000615	1.82	3090.33	438.16	0.09
	220426.4	InterimPh1[2]	4748	36.86	62.1		62.15	0.000615	1.82	3090.26	438.16	0.09
	220426.4	Proposed Ph2[3]	4748	36.86	62.1		62.15	0.000615	1.82	3090.31	438.16	0.09
	220426.4	FuturePh3[4]	4748	36.86	62.1		62.15	0.000615	1.82	3090.33	438.16	0.09

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	219577.1	Existing[1]	4748	35.81	61.36		61.43	0.001221	2.2	3237.97	328.17	0.11
	219577.1	InterimPh1[2]	4748	35.81	61.36		61.43	0.001221	2.2	3237.91	328.16	0.11
	219577.1	Proposed Ph2[3]	4748	35.81	61.36		61.43	0.001221	2.2	3237.96	328.17	0.11
	219577.1	FuturePh3[4]	4748	35.81	61.36		61.43	0.001221	2.2	3237.97	328.17	0.11
	218625.5	Existing[1]	4748	33.78	61.05		61.06	0.000171	1.15	7225.16	765.97	0.05
	218625.5	InterimPh1[2]	4748	33.78	61.05		61.06	0.000171	1.15	7225	765.97	0.05
	218625.5	Proposed Ph2[3]	4748	33.78	61.05		61.06	0.000171	1.15	7225.12	765.97	0.05
	218625.5	FuturePh3[4]	4748	33.78	61.05		61.06	0.000171	1.15	7225.16	765.97	0.05
	217899.8	Existing[1]	4835	35.59	60.68	44.3	60.76	0.001943	2.18	2215.34	181.16	0.11
	217899.8	InterimPh1[2]	4835	35.59	60.68	44.3	60.76	0.001943	2.18	2215.3	181.16	0.11
	217899.8	Proposed Ph2[3]	4835	35.59	60.68	44.3	60.76	0.001943	2.18	2215.33	181.16	0.11
	217899.8	FuturePh3[4]	4835	35.59	60.68	44.3	60.76	0.001943	2.18	2215.34	181.16	0.11
	216802.9	Existing[1]	4835	33.28	60.21	42.5	60.22	0.000209	0.83	8701.23	868.28	0.04
	216802.9	InterimPh1[2]	4835	33.28	60.21	42.5	60.22	0.000209	0.83	8701.01	868.28	0.04
	216802.9	Proposed Ph2[3]	4835	33.28	60.21	42.5	60.22	0.000209	0.83	8701.17	868.28	0.04
	216802.9	FuturePh3[4]	4835	33.28	60.21	42.5	60.22	0.000209	0.83	8701.23	868.28	0.04
	216040.3	Existing[1]	4835	33.72	59.92	42.94	59.94	0.000653	1.17	4649.62	422.98	0.06
	216040.3	InterimPh1[2]	4835	33.72	59.92	42.94	59.94	0.000653	1.17	4649.5	422.97	0.06
	216040.3	Proposed Ph2[3]	4835	33.72	59.92	42.94	59.94	0.000653	1.17	4649.59	422.97	0.06
	216040.3	FuturePh3[4]	4835	33.72	59.92	42.94	59.94	0.000653	1.17	4649.62	422.98	0.06
	214968	Existing[1]	4922	34.34	59.9	40.69	59.91	0.000009	0.85	9081.22	944.47	0.03
	214968	InterimPh1[2]	4922	34.34	59.9	40.69	59.91	0.000009	0.85	9080.99	944.46	0.03
	214968	Proposed Ph2[3]	4922	34.34	59.9	40.69	59.91	0.000009	0.85	9081.15	944.47	0.03
	214968	FuturePh3[4]	4922	34.34	59.9	40.69	59.91	0.000009	0.85	9081.22	944.47	0.03
	214945		Bridge									
	214922	Existing[1]	4922	33.55	59	39.9	59.01	0.00001	0.86	8992.62	942.22	0.03
	214922	InterimPh1[2]	4922	33.55	59	39.9	59.01	0.00001	0.86	8992.4	942.22	0.03
	214922	Proposed Ph2[3]	4922	33.55	59	39.9	59.01	0.00001	0.86	8992.56	942.22	0.03
	214922	FuturePh3[4]	4922	33.55	59	39.9	59.01	0.00001	0.86	8992.62	942.22	0.03
	214866.8	Existing[1]	4922	34.09	58.9	42.6	58.98	0.000091	2.4	2688.2	222.54	0.1
	214866.8	InterimPh1[2]	4922	34.09	58.9	42.6	58.98	0.000091	2.4	2688.13	222.54	0.1
	214866.8	Proposed Ph2[3]	4922	34.09	58.9	42.6	58.98	0.000091	2.4	2688.18	222.54	0.1
	214866.8	FuturePh3[4]	4922	34.09	58.9	42.6	58.98	0.000091	2.4	2688.2	222.54	0.1
	214821.3		Bridge									
	214775.8	Existing[1]	4922	34.17	58.86	42.67	58.95	0.000093	2.42	2663.23	221.6	0.1
	214775.8	InterimPh1[2]	4922	34.17	58.86	42.67	58.95	0.000093	2.42	2663.17	221.6	0.1
	214775.8	Proposed Ph2[3]	4922	34.17	58.86	42.67	58.95	0.000093	2.42	2663.21	221.6	0.1
	214775.8	FuturePh3[4]	4922	34.17	58.86	42.67	58.95	0.000093	2.42	2663.23	221.6	0.1
	214672.8	Existing[1]	4942	34.45	58.85	41.97	58.94	0.000089	2.48	2487.2	178.64	0.1
	214672.8	InterimPh1[2]	4942	34.45	58.85	41.97	58.94	0.000089	2.48	2487.15	178.64	0.1
	214672.8	Proposed Ph2[3]	4942	34.45	58.85	41.97	58.94	0.000089	2.48	2487.19	178.64	0.1
	214672.8	FuturePh3[4]	4942	34.45	58.85	41.97	58.94	0.000089	2.48	2487.2	178.64	0.1
	214628.5		Bridge									
	214584.2	Existing[1]	4942	34.14	58.51	41.66	58.6	0.000089	2.48	2481.75	178.46	0.1
	214584.2	InterimPh1[2]	4942	34.14	58.51	41.66	58.6	0.000089	2.48	2481.69	178.45	0.1
	214584.2	Proposed Ph2[3]	4942	34.14	58.51	41.66	58.6	0.000089	2.48	2481.73	178.46	0.1
	214584.2	FuturePh3[4]	4942	34.14	58.51	41.66	58.6	0.000089	2.48	2481.75	178.46	0.1
	213687.7	Existing[1]	5040	32.8	58.37		58.44	0.000401	2.24	3001.43	237.31	0.09
	213687.7	InterimPh1[2]	5040	32.8	58.37		58.44	0.000401	2.24	3001.36	237.31	0.09
	213687.7	Proposed Ph2[3]	5040	32.8	58.37		58.44	0.000401	2.24	3001.41	237.31	0.09
	213687.7	FuturePh3[4]	5040	32.8	58.37		58.44	0.000401	2.24	3001.43	237.31	0.09

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	212742.1	Existing[1]	5040	32.47	58.22		58.28	0.000094	2.07	3931.46	294.3	0.08
	212742.1	InterimPh1[2]	5040	32.47	58.22		58.28	0.000094	2.07	3931.37	294.3	0.08
	212742.1	Proposed Ph2[3]	5040	32.47	58.22		58.28	0.000094	2.07	3931.43	294.3	0.08
	212742.1	FuturePh3[4]	5040	32.47	58.22		58.28	0.000094	2.07	3931.46	294.3	0.08
	211631.3	Existing[1]	5116	32.47	58.14		58.18	0.00008	1.94	7007.98	670.38	0.07
	211631.3	InterimPh1[2]	5116	32.47	58.14		58.18	0.00008	1.94	7007.77	670.37	0.07
	211631.3	Proposed Ph2[3]	5116	32.47	58.14		58.18	0.00008	1.94	7007.92	670.38	0.07
	211631.3	FuturePh3[4]	5116	32.47	58.14		58.18	0.00008	1.94	7007.98	670.38	0.07
	210975.8	Existing[1]	5116	30.49	57.99		58.1	0.000197	2.71	2739.03	188.21	0.11
	210975.8	InterimPh1[2]	5116	30.49	57.99		58.1	0.000197	2.71	2738.97	188.21	0.11
	210975.8	Proposed Ph2[3]	5116	30.49	57.99		58.1	0.000197	2.71	2739.01	188.21	0.11
	210975.8	FuturePh3[4]	5116	30.49	57.99		58.1	0.000197	2.71	2739.03	188.21	0.11
	209864.1	Existing[1]	5230	28.37	57.8		57.84	0.000262	1.9	4327.8	404.34	0.08
	209864.1	InterimPh1[2]	5230	28.37	57.8		57.84	0.000262	1.9	4327.67	404.34	0.08
	209864.1	Proposed Ph2[3]	5230	28.37	57.8		57.84	0.000262	1.9	4327.76	404.34	0.08
	209864.1	FuturePh3[4]	5230	28.37	57.8		57.84	0.000262	1.9	4327.8	404.34	0.08
	208924.8	Existing[1]	5230	31.48	57.41		57.48	0.000618	2.03	2611.3	226.06	0.1
	208924.8	InterimPh1[2]	5230	31.48	57.41		57.48	0.000618	2.03	2611.22	226.05	0.1
	208924.8	Proposed Ph2[3]	5230	31.48	57.41		57.48	0.000618	2.03	2611.28	226.06	0.1
	208924.8	FuturePh3[4]	5230	31.48	57.41		57.48	0.000618	2.03	2611.3	226.06	0.1
	207774.7	Existing[1]	5230	26.21	56.87		56.91	0.000406	1.88	4164.29	510.5	0.08
	207774.7	InterimPh1[2]	5230	26.21	56.87		56.91	0.000406	1.88	4164.09	510.48	0.08
	207774.7	Proposed Ph2[3]	5230	26.21	56.87		56.91	0.000406	1.88	4164.23	510.49	0.08
	207774.7	FuturePh3[4]	5230	26.21	56.87		56.91	0.000406	1.88	4164.29	510.5	0.08
	206741.3	Existing[1]	5230	31.91	56.5		56.55	0.000321	1.89	3216.88	308.24	0.08
	206741.3	InterimPh1[2]	5230	31.91	56.5		56.55	0.000321	1.89	3216.75	308.24	0.08
	206741.3	Proposed Ph2[3]	5230	31.91	56.5		56.55	0.000321	1.89	3216.84	308.24	0.08
	206741.3	FuturePh3[4]	5230	31.91	56.5		56.55	0.000321	1.89	3216.88	308.24	0.08
	205679.6	Existing[1]	5288	28.19	56.31		56.38	0.000101	2.24	4279.21	397.61	0.08
	205679.6	InterimPh1[2]	5288	28.19	56.31		56.38	0.000101	2.24	4279.03	397.6	0.08
	205679.6	Proposed Ph2[3]	5288	28.19	56.31		56.38	0.000101	2.24	4279.15	397.6	0.08
	205679.6	FuturePh3[4]	5288	28.19	56.31		56.38	0.000101	2.24	4279.2	397.61	0.08
	205102.2	Existing[1]	5288	28.33	56.26		56.32	0.000094	2.21	3937.47	305.45	0.08
	205102.2	InterimPh1[2]	5288	28.33	56.26		56.32	0.000094	2.21	3937.33	305.44	0.08
	205102.2	Proposed Ph2[3]	5288	28.33	56.26		56.32	0.000094	2.21	3937.43	305.45	0.08
	205102.2	FuturePh3[4]	5288	28.33	56.26		56.32	0.000094	2.21	3937.47	305.45	0.08
	204727.6	Existing[1]	5288	28.33	56.2	37.02	56.28	0.000109	2.37	3282.33	258.22	0.09
	204727.6	InterimPh1[2]	5288	28.33	56.2	37.02	56.28	0.000109	2.37	3282.21	258.21	0.09
	204727.6	Proposed Ph2[3]	5288	28.33	56.2	37.02	56.28	0.000109	2.37	3282.3	258.22	0.09
	204727.6	FuturePh3[4]	5288	28.33	56.2	37.02	56.28	0.000109	2.37	3282.33	258.22	0.09
	204673.8		Bridge									
	204620	Existing[1]	5288	28.15	55.98	36.84	56.06	0.00011	2.38	3271.56	257.27	0.09
	204620	InterimPh1[2]	5288	28.15	55.98	36.84	56.05	0.00011	2.38	3271.44	257.25	0.09
	204620	Proposed Ph2[3]	5288	28.15	55.98	36.84	56.06	0.00011	2.38	3271.52	257.26	0.09
	204620	FuturePh3[4]	5288	28.15	55.98	36.84	56.06	0.00011	2.38	3271.56	257.27	0.09
	203658.9	Existing[1]	5497	28.97	55.79		55.83	0.000575	1.44	3824.8	305.77	0.07
	203658.9	InterimPh1[2]	5497	28.97	55.79		55.83	0.000575	1.44	3824.65	305.76	0.07
	203658.9	Proposed Ph2[3]	5497	28.97	55.79		55.83	0.000575	1.44	3824.75	305.77	0.07
	203658.9	FuturePh3[4]	5497	28.97	55.79		55.83	0.000575	1.44	3824.79	305.77	0.07

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	202834.1	Existing[1]	5497	27.57	55.39		55.44	0.000392	1.79	3288.23	306.75	0.08
	202834.1	InterimPh1[2]	5497	27.57	55.39		55.44	0.000392	1.79	3288.06	306.75	0.08
	202834.1	Proposed Ph2[3]	5497	27.57	55.39		55.44	0.000392	1.79	3288.18	306.75	0.08
	202834.1	FuturePh3[4]	5497	27.57	55.39		55.44	0.000392	1.79	3288.22	306.75	0.08
	201783.6	Existing[1]	5620	27.98	54.87		54.93	0.000595	1.98	2854.9	278.47	0.1
	201783.6	InterimPh1[2]	5620	27.98	54.87		54.93	0.000595	1.98	2854.73	278.34	0.1
	201783.6	Proposed Ph2[3]	5620	27.98	54.87		54.93	0.000595	1.98	2854.84	278.43	0.1
	201783.6	FuturePh3[4]	5620	27.98	54.87		54.93	0.000595	1.98	2854.89	278.47	0.1
	201212.1	Existing[1]	5620	27.61	54.54	36.36	54.59	0.000593	1.74	3229.96	368.55	0.09
	201212.1	InterimPh1[2]	5620	27.61	54.54	36.36	54.59	0.000593	1.74	3229.77	368.53	0.09
	201212.1	Proposed Ph2[3]	5620	27.61	54.54	36.36	54.59	0.000593	1.74	3229.9	368.54	0.09
	201212.1	FuturePh3[4]	5620	27.61	54.54	36.36	54.59	0.000593	1.74	3229.95	368.55	0.09
	200299.3	Existing[1]	5620	27.02	54.1		54.17	0.000356	2.19	2643.56	214.16	0.09
	200299.3	InterimPh1[2]	5620	27.02	54.1		54.17	0.000357	2.19	2643.41	214.15	0.09
	200299.3	Proposed Ph2[3]	5620	27.02	54.1		54.17	0.000356	2.19	2643.51	214.15	0.09
	200299.3	FuturePh3[4]	5620	27.02	54.1		54.17	0.000356	2.19	2643.55	214.16	0.09
	200076.4	Existing[1]	5833	27.02	54.03	36.46	54.1	0.000305	2.1	2771.67	199.59	0.1
	200076.4	InterimPh1[2]	5833	27.02	54.03	36.46	54.1	0.000305	2.1	2771.53	199.58	0.1
	200076.4	Proposed Ph2[3]	5833	27.02	54.03	36.46	54.1	0.000305	2.1	2771.63	199.59	0.1
	200076.4	FuturePh3[4]	5833	27.02	54.03	36.46	54.1	0.000305	2.1	2771.67	199.59	0.1
	200020.5		Bridge									
	199964.6	Existing[1]	5833	26.77	53.7	36.2	53.77	0.000309	2.12	2756.81	199.19	0.1
	199964.6	InterimPh1[2]	5833	26.77	53.7	36.2	53.77	0.000309	2.12	2756.67	199.19	0.1
	199964.6	Proposed Ph2[3]	5833	26.77	53.7	36.2	53.77	0.000309	2.12	2756.77	199.19	0.1
	199964.6	FuturePh3[4]	5833	26.77	53.7	36.2	53.77	0.000309	2.12	2756.81	199.19	0.1
	199440.6	Existing[1]	5977	27.48	53.52		53.58	0.000424	1.98	4106.38	450.15	0.09
	199440.6	InterimPh1[2]	5977	27.48	53.52		53.58	0.000425	1.98	4106.05	450.15	0.09
	199440.6	Proposed Ph2[3]	5977	27.48	53.52		53.58	0.000424	1.98	4106.28	450.15	0.09
	199440.6	FuturePh3[4]	5977	27.48	53.52		53.58	0.000424	1.98	4106.37	450.15	0.09
	198496.4	Existing[1]	5977	27.21	53.05		53.13	0.000523	2.13	2805.12	213.24	0.1
	198496.4	InterimPh1[2]	5977	27.21	53.05		53.12	0.000523	2.13	2804.95	213.23	0.1
	198496.4	Proposed Ph2[3]	5977	27.21	53.05		53.12	0.000523	2.13	2805.07	213.23	0.1
	198496.4	FuturePh3[4]	5977	27.21	53.05		53.13	0.000523	2.13	2805.11	213.24	0.1
	197506.8	Existing[1]	5977	26.73	52.62		52.71	0.000342	2.58	3442.47	371.34	0.1
	197506.8	InterimPh1[2]	5977	26.73	52.62		52.71	0.000342	2.58	3442.15	371.33	0.1
	197506.8	Proposed Ph2[3]	5977	26.73	52.62		52.71	0.000342	2.58	3442.38	371.34	0.1
	197506.8	FuturePh3[4]	5977	26.73	52.62		52.71	0.000342	2.58	3442.46	371.34	0.1
	196463.1	Existing[1]	5977	26.19	52.08		52.2	0.000805	2.78	2205.63	242.9	0.13
	196463.1	InterimPh1[2]	5977	26.19	52.08		52.19	0.000806	2.78	2205.39	242.86	0.13
	196463.1	Proposed Ph2[3]	5977	26.19	52.08		52.2	0.000805	2.78	2205.56	242.89	0.13
	196463.1	FuturePh3[4]	5977	26.19	52.08		52.2	0.000805	2.78	2205.62	242.9	0.13
	196182.3	Existing[1]	6059	25.3	51.87	36.33	52.03	0.000423	3.38	2563.05	392.51	0.14
	196182.3	InterimPh1[2]	6059	25.3	51.86	36.33	52.03	0.000423	3.38	2562.81	392.5	0.14
	196182.3	Proposed Ph2[3]	6059	25.3	51.87	36.33	52.03	0.000423	3.38	2562.98	392.51	0.14
	196182.3	FuturePh3[4]	6059	25.3	51.87	36.33	52.03	0.000423	3.38	2563.04	392.51	0.14
	196149		Bridge									
	196115.7	Existing[1]	6059	25.16	51.74	36.19	51.91	0.000421	3.38	2566.97	392.77	0.14
	196115.7	InterimPh1[2]	6059	25.16	51.74	36.19	51.9	0.000421	3.38	2566.73	392.75	0.14
	196115.7	Proposed Ph2[3]	6059	25.16	51.74	36.19	51.9	0.000421	3.38	2566.9	392.77	0.14
	196115.7	FuturePh3[4]	6059	25.16	51.74	36.19	51.91	0.000421	3.38	2566.97	392.77	0.14

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	195567.4	Existing[1]	6140	23.51	51.66		51.68	0.000205	1.29	7617.53	656.97	0.05
	195567.4	InterimPh1[2]	6140	23.51	51.66		51.68	0.000205	1.29	7616.84	656.95	0.05
	195567.4	Proposed Ph2[3]	6140	23.51	51.66		51.68	0.000205	1.29	7617.33	656.96	0.05
	195567.4	FuturePh3[4]	6140	23.51	51.66		51.68	0.000205	1.29	7617.52	656.97	0.05
	194614.1	Existing[1]	6140	26.15	51.41		51.46	0.000301	2.16	5320.86	475.03	0.09
	194614.1	InterimPh1[2]	6140	26.15	51.41		51.46	0.000301	2.16	5320.33	475.02	0.09
	194614.1	Proposed Ph2[3]	6140	26.15	51.41		51.46	0.000301	2.16	5320.7	475.03	0.09
	194614.1	FuturePh3[4]	6140	26.15	51.41		51.46	0.000301	2.16	5320.84	475.03	0.09
	193675.6	Existing[1]	6140	23.35	51.42		51.42	0.000009	0.57	14418.37	933.55	0.02
	193675.6	InterimPh1[2]	6140	23.35	51.42		51.42	0.000009	0.57	14417.32	933.55	0.02
	193675.6	Proposed Ph2[3]	6140	23.35	51.42		51.42	0.000009	0.57	14418.05	933.55	0.02
	193675.6	FuturePh3[4]	6140	23.35	51.42		51.42	0.000009	0.57	14418.34	933.55	0.02
	192820.3	Existing[1]	6303	24.17	51.33		51.39	0.000584	2.13	3333.52	278.37	0.09
	192820.3	InterimPh1[2]	6303	24.17	51.33		51.39	0.000584	2.13	3333.2	278.33	0.09
	192820.3	Proposed Ph2[3]	6303	24.17	51.33		51.39	0.000584	2.13	3333.42	278.36	0.09
	192820.3	FuturePh3[4]	6303	24.17	51.33		51.39	0.000584	2.13	3333.51	278.37	0.09
	191722.7	Existing[1]	6303	20.85	50.52		50.58	0.000994	2.02	3269.5	418.37	0.1
	191722.7	InterimPh1[2]	6303	20.85	50.52		50.58	0.000994	2.02	3268.92	418.35	0.1
	191722.7	Proposed Ph2[3]	6303	20.85	50.52		50.58	0.000994	2.02	3269.33	418.36	0.1
	191722.7	FuturePh3[4]	6303	20.85	50.52		50.58	0.000994	2.02	3269.49	418.37	0.1
	190794	Existing[1]	6303	20.58	49.91		50	0.000441	2.6	3698.72	339.37	0.11
	190794	InterimPh1[2]	6303	20.58	49.91		49.99	0.000441	2.6	3698.17	339.35	0.11
	190794	Proposed Ph2[3]	6303	20.58	49.91		50	0.000441	2.6	3698.55	339.36	0.11
	190794	FuturePh3[4]	6303	20.58	49.91		50	0.000441	2.6	3698.7	339.37	0.11
	189869.8	Existing[1]	6303	17.5	49.63		49.72	0.000227	2.61	3991.4	430.78	0.1
	189869.8	InterimPh1[2]	6303	17.5	49.63		49.72	0.000227	2.61	3990.67	430.76	0.1
	189869.8	Proposed Ph2[3]	6303	17.5	49.63		49.72	0.000227	2.61	3991.18	430.78	0.1
	189869.8	FuturePh3[4]	6303	17.5	49.63		49.72	0.000227	2.61	3991.39	430.78	0.1
	188903.7	Existing[1]	6388	21.71	49.43		49.48	0.000273	2.02	5088.78	570.65	0.08
	188903.7	InterimPh1[2]	6388	21.71	49.42		49.47	0.000273	2.02	5087.75	570.63	0.08
	188903.7	Proposed Ph2[3]	6388	21.71	49.43		49.48	0.000273	2.02	5088.47	570.65	0.08
	188903.7	FuturePh3[4]	6388	21.71	49.43		49.48	0.000273	2.02	5088.75	570.65	0.08
	187878.1	Existing[1]	6388	23.78	48.96		49.06	0.000692	2.74	2842.92	202.06	0.11
	187878.1	InterimPh1[2]	6388	23.78	48.95		49.05	0.000692	2.74	2842.52	202.06	0.11
	187878.1	Proposed Ph2[3]	6388	23.78	48.96		49.05	0.000692	2.74	2842.8	202.06	0.11
	187878.1	FuturePh3[4]	6388	23.78	48.96		49.06	0.000692	2.74	2842.91	202.06	0.11
	186536.1	Existing[1]	6388	20.17	48.12		48.2	0.000629	2.47	3463.84	478.87	0.12
	186536.1	InterimPh1[2]	6388	20.17	48.11		48.2	0.000629	2.47	3462.67	478.31	0.12
	186536.1	Proposed Ph2[3]	6388	20.17	48.12		48.2	0.000629	2.47	3463.49	478.7	0.12
	186536.1	FuturePh3[4]	6388	20.17	48.12		48.2	0.000629	2.47	3463.82	478.85	0.12
	185293.8	Existing[1]	6388	20.84	47.8		47.83	0.000187	1.72	5798.52	423.25	0.07
	185293.8	InterimPh1[2]	6388	20.84	47.8		47.83	0.000187	1.72	5797.41	423.23	0.07
	185293.8	Proposed Ph2[3]	6388	20.84	47.8		47.83	0.000187	1.72	5798.19	423.24	0.07
	185293.8	FuturePh3[4]	6388	20.84	47.8		47.83	0.000187	1.72	5798.49	423.25	0.07
	184862.8	Existing[1]	6500	21.37	47.61	31.25	47.72	0.00025	2.89	3096.42	231.22	0.11
	184862.8	InterimPh1[2]	6500	21.37	47.61	31.25	47.71	0.00025	2.89	3095.79	231.2	0.11
	184862.8	Proposed Ph2[3]	6500	21.37	47.61	31.25	47.72	0.00025	2.89	3096.24	231.21	0.11
	184862.8	FuturePh3[4]	6500	21.37	47.61	31.25	47.72	0.00025	2.89	3096.41	231.22	0.11
	184807.6		Bridge									
	184752.4	Existing[1]	6500	21.24	47.47	31.13	47.58	0.00025	2.89	3094.59	231.17	0.11
	184752.4	InterimPh1[2]	6500	21.24	47.47	31.13	47.58	0.00025	2.89	3093.95	231.16	0.11
	184752.4	Proposed Ph2[3]	6500	21.24	47.47	31.13	47.58	0.00025	2.89	3094.4	231.17	0.11

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	184752.4	FuturePh3[4]	6500	21.24	47.47	31.13	47.58	0.00025	2.89	3094.57	231.17	0.11
10PCT_10yr	184295.8	Existing[1]	6500	18.27	47.31		47.4	0.000634	2.61	3232.32	261.78	0.11
	184295.8	InterimPh1[2]	6500	18.27	47.31		47.4	0.000634	2.61	3231.58	261.76	0.11
	184295.8	Proposed Ph2[3]	6500	18.27	47.31		47.4	0.000634	2.61	3232.1	261.77	0.11
	184295.8	FuturePh3[4]	6500	18.27	47.31		47.4	0.000634	2.61	3232.3	261.78	0.11
	183335.1	Existing[1]	6500	20.58	46.79	30.65	46.95	0.00036	3.45	2492.27	170.3	0.13
	183335.1	InterimPh1[2]	6500	20.58	46.79	30.65	46.95	0.00036	3.45	2491.74	170.29	0.13
	183335.1	Proposed Ph2[3]	6500	20.58	46.79	30.65	46.95	0.00036	3.45	2492.11	170.3	0.13
	183335.1	FuturePh3[4]	6500	20.58	46.79	30.65	46.95	0.00036	3.45	2492.25	170.3	0.13
	182381.6	Existing[1]	6625	18.93	46.43		46.49	0.00062	2.12	3492.32	286.19	0.1
	182381.6	InterimPh1[2]	6625	18.93	46.42		46.49	0.00062	2.12	3491.38	286.16	0.1
	182381.6	Proposed Ph2[3]	6625	18.93	46.43		46.49	0.00062	2.12	3492.04	286.18	0.1
	182381.6	FuturePh3[4]	6625	18.93	46.43		46.49	0.00062	2.12	3492.3	286.19	0.1
	181623	Existing[1]	6625	18.35	46.23		46.26	0.000183	1.58	8447.69	899.74	0.07
	181623	InterimPh1[2]	6625	18.35	46.23		46.25	0.000183	1.58	8444.57	899.69	0.07
	181623	Proposed Ph2[3]	6625	18.35	46.23		46.26	0.000183	1.58	8446.76	899.73	0.07
	181623	FuturePh3[4]	6625	18.35	46.23		46.26	0.000183	1.58	8447.61	899.74	0.07
	180731.2	Existing[1]	6625	19.12	45.94		46	0.000646	1.92	3510.3	295.84	0.09
	180731.2	InterimPh1[2]	6625	19.12	45.94		45.99	0.000646	1.92	3509.21	295.7	0.09
	180731.2	Proposed Ph2[3]	6625	19.12	45.94		46	0.000646	1.92	3509.98	295.8	0.09
	180731.2	FuturePh3[4]	6625	19.12	45.94		46	0.000646	1.92	3510.28	295.84	0.09
	179838.1	Existing[1]	6625	17.65	45.22		45.29	0.000998	2.06	3213.78	239.54	0.1
	179838.1	InterimPh1[2]	6625	17.65	45.22		45.29	0.000999	2.06	3212.78	239.5	0.1
	179838.1	Proposed Ph2[3]	6625	17.65	45.22		45.29	0.000998	2.06	3213.48	239.53	0.1
	179838.1	FuturePh3[4]	6625	17.65	45.22		45.29	0.000998	2.06	3213.75	239.53	0.1
	179305.6	Existing[1]	6625	17.48	44.8		44.97	0.000383	3.49	2612.28	221.21	0.13
	179305.6	InterimPh1[2]	6625	17.48	44.8		44.96	0.000383	3.49	2611.29	221.16	0.13
	179305.6	Proposed Ph2[3]	6625	17.48	44.8		44.96	0.000383	3.49	2611.99	221.19	0.13
	179305.6	FuturePh3[4]	6625	17.48	44.8		44.97	0.000383	3.49	2612.26	221.21	0.13
	178955.5	Existing[1]	6660	17.37	44.68	29.33	44.83	0.000357	3.37	3102.2	301.43	0.13
	178955.5	InterimPh1[2]	6660	17.37	44.68	29.33	44.82	0.000357	3.37	3100.81	301.33	0.13
	178955.5	Proposed Ph2[3]	6660	17.37	44.68	29.33	44.82	0.000357	3.37	3101.79	301.4	0.13
	178955.5	FuturePh3[4]	6660	17.37	44.68	29.33	44.83	0.000357	3.37	3102.17	301.43	0.13
	178899.3		Bridge									
	178843.1	Existing[1]	6660	17.13	44.38	29.08	44.53	0.000361	3.39	3084.57	300.05	0.13
	178843.1	InterimPh1[2]	6660	17.13	44.38	29.08	44.52	0.000362	3.39	3083.17	299.94	0.13
	178843.1	Proposed Ph2[3]	6660	17.13	44.38	29.08	44.53	0.000361	3.39	3084.16	300.02	0.13
	178843.1	FuturePh3[4]	6660	17.13	44.38	29.08	44.53	0.000361	3.39	3084.54	300.05	0.13
	177732.9	Existing[1]	6893	16.54	43.99		44.05	0.000419	2.1	3671.94	273.34	0.09
	177732.9	InterimPh1[2]	6893	16.54	43.99		44.05	0.000419	2.1	3670.56	273.3	0.09
	177732.9	Proposed Ph2[3]	6893	16.54	43.99		44.05	0.000419	2.1	3671.53	273.33	0.09
	177732.9	FuturePh3[4]	6893	16.54	43.99		44.05	0.000419	2.1	3671.91	273.34	0.09
	176644.1	Existing[1]	6893	17.41	43.69	27.24	43.75	0.000213	2.24	5324.96	568.28	0.1
	176644.1	InterimPh1[2]	6893	17.41	43.69	27.24	43.75	0.000213	2.24	5321.89	568.01	0.1
	176644.1	Proposed Ph2[3]	6893	17.41	43.69	27.24	43.75	0.000213	2.24	5324.05	568.2	0.1
	176644.1	FuturePh3[4]	6893	17.41	43.69	27.24	43.75	0.000213	2.24	5324.88	568.27	0.1
	175675.6	Existing[1]	6958	16.27	43.43	24.71	43.49	0.000373	1.95	3578.9	242.39	0.09
	175675.6	InterimPh1[2]	6958	16.27	43.42	24.71	43.48	0.000373	1.95	3577.53	242.34	0.09
	175675.6	Proposed Ph2[3]	6958	16.27	43.43	24.71	43.48	0.000373	1.95	3578.49	242.37	0.09
	175675.6	FuturePh3[4]	6958	16.27	43.43	24.71	43.49	0.000373	1.95	3578.87	242.39	0.09

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	173819.4	Existing[1]	6958	14.97	42.72		42.74	0.000416	1.33	6531.54	602.78	0.07
	173819.4	InterimPh1[2]	6958	14.97	42.72		42.74	0.000417	1.33	6527.61	602.64	0.07
	173819.4	Proposed Ph2[3]	6958	14.97	42.72		42.74	0.000417	1.33	6530.38	602.74	0.07
	173819.4	FuturePh3[4]	6958	14.97	42.72		42.74	0.000416	1.33	6531.44	602.78	0.07
	172846.5	Existing[1]	6958	11.61	42.36		42.4	0.000471	1.69	6003.69	641.88	0.07
	172846.5	InterimPh1[2]	6958	11.61	42.36		42.39	0.000472	1.69	5999.06	641.85	0.07
	172846.5	Proposed Ph2[3]	6958	11.61	42.36		42.4	0.000471	1.69	6002.33	641.87	0.07
	172846.5	FuturePh3[4]	6958	11.61	42.36		42.4	0.000471	1.69	6003.58	641.88	0.07
	171967.4	Existing[1]	6958	14.04	42.15		42.18	0.000201	1.66	7601.14	678.48	0.07
	171967.4	InterimPh1[2]	6958	14.04	42.14		42.17	0.000201	1.67	7595.96	678.44	0.07
	171967.4	Proposed Ph2[3]	6958	14.04	42.15		42.18	0.000201	1.66	7599.61	678.47	0.07
	171967.4	FuturePh3[4]	6958	14.04	42.15		42.18	0.000201	1.66	7601.01	678.48	0.07
	171168.9	Existing[1]	6958	6.86	42.04		42.07	0.000129	1.57	7041.92	502.48	0.06
	171168.9	InterimPh1[2]	6958	6.86	42.04		42.07	0.000129	1.58	7038	502.44	0.06
	171168.9	Proposed Ph2[3]	6958	6.86	42.04		42.07	0.000129	1.57	7040.77	502.47	0.06
	171168.9	FuturePh3[4]	6958	6.86	42.04		42.07	0.000129	1.57	7041.82	502.48	0.06
	170256	Existing[1]	6958	13.83	41.82		41.9	0.000319	2.31	3543.65	250.92	0.1
	170256	InterimPh1[2]	6958	13.83	41.82		41.89	0.00032	2.31	3541.62	250.87	0.1
	170256	Proposed Ph2[3]	6958	13.83	41.82		41.9	0.00032	2.31	3543.05	250.9	0.1
	170256	FuturePh3[4]	6958	13.83	41.82		41.9	0.000319	2.31	3543.6	250.91	0.1
	169087.1	Existing[1]	6979	11.36	41.6		41.61	0.000185	1.36	8534.26	674.71	0.05
	169087.1	InterimPh1[2]	6979	11.36	41.59		41.61	0.000185	1.36	8528.54	674.61	0.05
	169087.1	Proposed Ph2[3]	6979	11.36	41.59		41.61	0.000185	1.36	8532.57	674.68	0.05
	169087.1	FuturePh3[4]	6979	11.36	41.59		41.61	0.000185	1.36	8534.11	674.7	0.05
	168169.9	Existing[1]	6979	14.35	41.35		41.4	0.000362	1.93	4564.08	352.07	0.08
	168169.9	InterimPh1[2]	6979	14.35	41.35		41.39	0.000362	1.93	4560.95	352.02	0.08
	168169.9	Proposed Ph2[3]	6979	14.35	41.35		41.4	0.000362	1.93	4563.15	352.05	0.08
	168169.9	FuturePh3[4]	6979	14.35	41.35		41.4	0.000362	1.93	4564	352.07	0.08
	167249.9	Existing[1]	6989	11.5	40.93	21.91	41.01	0.000542	2.22	3151.12	203.77	0.1
	167249.9	InterimPh1[2]	6989	11.5	40.92	21.91	41	0.000543	2.22	3149.17	203.72	0.1
	167249.9	Proposed Ph2[3]	6989	11.5	40.93	21.91	41	0.000542	2.22	3150.54	203.75	0.1
	167249.9	FuturePh3[4]	6989	11.5	40.93	21.91	41.01	0.000542	2.22	3151.07	203.76	0.1
	166879.7	Existing[1]	6989	10.84	40.71		40.83	0.000373	3.44	4449.15	511.04	0.12
	166879.7	InterimPh1[2]	6989	10.84	40.7		40.82	0.000374	3.45	4443.96	510.96	0.12
	166879.7	Proposed Ph2[3]	6989	10.84	40.7		40.83	0.000373	3.44	4447.61	511.01	0.12
	166879.7	FuturePh3[4]	6989	10.84	40.71		40.83	0.000373	3.44	4449.02	511.04	0.12
	166613	Existing[1]	7041	10.36	40.61	23.39	40.73	0.00034	3.48	4098.78	305.3	0.12
	166613	InterimPh1[2]	7041	10.36	40.6	23.39	40.72	0.00034	3.48	4095.66	305.2	0.12
	166613	Proposed Ph2[3]	7041	10.36	40.6	23.39	40.73	0.00034	3.48	4097.86	305.27	0.12
	166613	FuturePh3[4]	7041	10.36	40.61	23.39	40.73	0.00034	3.48	4098.7	305.29	0.12
	166585.6		Bridge									
	166558.2	Existing[1]	7041	10.11	40.51	23.15	40.63	0.000331	3.45	4144.97	306.74	0.12
	166558.2	InterimPh1[2]	7041	10.11	40.5	23.15	40.62	0.000331	3.45	4141.79	306.64	0.12
	166558.2	Proposed Ph2[3]	7041	10.11	40.5	23.15	40.63	0.000331	3.45	4144.03	306.71	0.12
	166558.2	FuturePh3[4]	7041	10.11	40.51	23.15	40.63	0.000331	3.45	4144.89	306.74	0.12
	166297.3	Existing[1]	7261	8.4	40.46		40.52	0.000271	2.17	4244.56	264.09	0.08
	166297.3	InterimPh1[2]	7261	8.4	40.45		40.51	0.000271	2.17	4241.79	264.06	0.08
	166297.3	Proposed Ph2[3]	7261	8.4	40.46		40.52	0.000271	2.17	4243.74	264.09	0.08
	166297.3	FuturePh3[4]	7261	8.4	40.46		40.52	0.000271	2.17	4244.48	264.09	0.08

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	165903.2	Existing[1]	7261	10.27	40.34		40.4	0.000322	2.23	4534.47	354.27	0.08
	165903.2	InterimPh1[2]	7261	10.27	40.33		40.39	0.000323	2.23	4530.68	354.15	0.08
	165903.2	Proposed Ph2[3]	7261	10.27	40.34		40.4	0.000322	2.23	4533.35	354.23	0.08
	165903.2	FuturePh3[4]	7261	10.27	40.34		40.4	0.000322	2.23	4534.38	354.27	0.08
	165476.1	Existing[1]	7961	12.3	40.09	21.55	40.24	0.000301	3.41	3140.74	211.23	0.12
	165476.1	InterimPh1[2]	7961	12.3	40.07	21.55	40.23	0.000302	3.41	3138.4	211.16	0.12
	165476.1	Proposed Ph2[3]	7961	12.3	40.08	21.55	40.24	0.000301	3.41	3140.05	211.21	0.12
	165476.1	FuturePh3[4]	7961	12.3	40.09	21.55	40.24	0.000301	3.41	3140.68	211.23	0.12
	165428.1		Bridge									
	165380.1	Existing[1]	7961	11.69	39.44	20.94	39.6	0.000303	3.42	3133.23	210.98	0.12
	165380.1	InterimPh1[2]	7961	11.69	39.43	20.94	39.59	0.000303	3.42	3130.87	210.9	0.12
	165380.1	Proposed Ph2[3]	7961	11.69	39.44	20.94	39.6	0.000303	3.42	3132.53	210.96	0.12
	165380.1	FuturePh3[4]	7961	11.69	39.44	20.94	39.6	0.000303	3.42	3133.17	210.98	0.12
	164555.2	Existing[1]	7953	8.31	39.17		39.29	0.000415	2.85	3176.53	207.74	0.12
	164555.2	InterimPh1[2]	7951	8.31	39.16		39.27	0.000416	2.85	3174.13	207.69	0.12
	164555.2	Proposed Ph2[3]	7953	8.31	39.17		39.28	0.000415	2.85	3175.81	207.72	0.12
	164555.2	FuturePh3[4]	7953	8.31	39.17		39.29	0.000415	2.85	3176.47	207.74	0.12
	163635.5	Existing[1]	7953	11.2	38.93		39.01	0.000241	2.64	5375.88	551.67	0.1
	163635.5	InterimPh1[2]	7951	11.2	38.92		39	0.000242	2.64	5369.18	551.59	0.11
	163635.5	Proposed Ph2[3]	7953	11.2	38.93		39.01	0.000242	2.64	5373.86	551.65	0.1
	163635.5	FuturePh3[4]	7953	11.2	38.93		39.01	0.000241	2.64	5375.7	551.67	0.1
	162811.9	Existing[1]	8155	8.08	38.75		38.83	0.000195	2.51	4600.38	289.89	0.1
	162811.9	InterimPh1[2]	8152	8.08	38.74		38.82	0.000196	2.51	4596.79	289.81	0.1
	162811.9	Proposed Ph2[3]	8155	8.08	38.75		38.83	0.000195	2.51	4599.28	289.86	0.1
	162811.9	FuturePh3[4]	8155	8.08	38.75		38.83	0.000195	2.51	4600.28	289.89	0.1
	161822.3	Existing[1]	8155	6.55	38.44		38.55	0.000484	2.84	3692.14	272.52	0.11
	161822.3	InterimPh1[2]	8152	6.55	38.42		38.53	0.000485	2.84	3688.64	272.45	0.11
	161822.3	Proposed Ph2[3]	8155	6.55	38.43		38.54	0.000484	2.84	3691.06	272.5	0.11
	161822.3	FuturePh3[4]	8155	6.55	38.44		38.54	0.000484	2.84	3692.05	272.52	0.11
	160630.7	Existing[1]	8155	6.96	37.78		37.91	0.000581	2.97	3089.17	255.21	0.12
	160630.7	InterimPh1[2]	8152	6.96	37.76		37.89	0.000582	2.97	3085.62	255.11	0.12
	160630.7	Proposed Ph2[3]	8155	6.96	37.77		37.9	0.000581	2.97	3088.03	255.18	0.12
	160630.7	FuturePh3[4]	8155	6.96	37.78		37.91	0.000581	2.97	3089.07	255.2	0.12
	159757.4	Existing[1]	8155	9.2	37.14		37.24	0.001005	2.55	3195.31	180.66	0.11
	159757.4	InterimPh1[2]	8152	9.2	37.13		37.23	0.001007	2.55	3192.59	180.43	0.11
	159757.4	Proposed Ph2[3]	8155	9.2	37.14		37.24	0.001006	2.55	3194.41	180.58	0.11
	159757.4	FuturePh3[4]	8155	9.2	37.14		37.24	0.001005	2.55	3195.23	180.65	0.11
	158811.6	Existing[1]	8152	7.94	36.75		36.81	0.000252	2.01	4961.26	442.31	0.08
	158811.6	InterimPh1[2]	8149	7.94	36.74		36.8	0.000252	2.01	4954.17	442.12	0.08
	158811.6	Proposed Ph2[3]	8152	7.94	36.75		36.81	0.000252	2.01	4958.85	442.24	0.08
	158811.6	FuturePh3[4]	8152	7.94	36.75		36.81	0.000252	2.01	4961.04	442.3	0.08
	157933.4	Existing[1]	8152	5.48	36.44	17.49	36.57	0.000306	3.12	3992.88	401.33	0.12
	157933.4	InterimPh1[2]	8149	5.48	36.42	17.49	36.55	0.000307	3.12	3986.1	401.15	0.12
	157933.4	Proposed Ph2[3]	8152	5.48	36.43	17.49	36.56	0.000306	3.12	3990.54	401.26	0.12
	157933.4	FuturePh3[4]	8152	5.48	36.44	17.49	36.57	0.000306	3.12	3992.67	401.32	0.12
	156882.1	Existing[1]	8152	5.55	36.19		36.3	0.000204	2.71	3506.31	231.51	0.1
	156882.1	InterimPh1[2]	8149	5.55	36.18		36.28	0.000205	2.71	3502.28	231.34	0.1
	156882.1	Proposed Ph2[3]	8152	5.55	36.19		36.3	0.000204	2.71	3504.91	231.45	0.1
	156882.1	FuturePh3[4]	8152	5.55	36.19		36.3	0.000204	2.71	3506.18	231.51	0.1

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	156116.3	Existing[1]	8152	5.91	36.07		36.11	0.000241	1.76	4636.26	282.73	0.08
	156116.3	InterimPh1[2]	8149	5.91	36.05		36.1	0.000242	1.76	4631.24	282.69	0.08
	156116.3	Proposed Ph2[3]	8152	5.91	36.06		36.11	0.000241	1.76	4634.5	282.71	0.08
	156116.3	FuturePh3[4]	8152	5.91	36.07		36.11	0.000241	1.76	4636.1	282.73	0.08
	155861.6	Existing[1]	8431	6.03	35.99	16.31	36.04	0.000305	1.88	4486.38	293.06	0.08
	155861.6	InterimPh1[2]	8427	6.03	35.97	16.31	36.03	0.000306	1.88	4481.12	292.95	0.08
	155861.6	Proposed Ph2[3]	8430	6.03	35.98	16.31	36.04	0.000306	1.88	4484.54	293.02	0.08
	155861.6	FuturePh3[4]	8431	6.03	35.99	16.31	36.04	0.000305	1.88	4486.21	293.06	0.08
	155805.1		Bridge									
	155748.6	Existing[1]	8431	5.79	35.65	16.07	35.71	0.000311	1.89	4457.7	292.46	0.09
	155748.6	InterimPh1[2]	8427	5.79	35.63	16.07	35.69	0.000312	1.89	4452.4	292.35	0.09
	155748.6	Proposed Ph2[3]	8430	5.79	35.64	16.07	35.7	0.000311	1.89	4455.84	292.42	0.09
	155748.6	FuturePh3[4]	8431	5.79	35.65	16.07	35.71	0.000311	1.89	4457.53	292.46	0.09
	154890.7	Existing[1]	8587	5.42	35.29	15.79	35.42	0.000302	2.96	3304.9	472.89	0.12
	154890.7	InterimPh1[2]	8573	5.42	35.27	15.79	35.4	0.000302	2.96	3300.18	472.51	0.12
	154890.7	Proposed Ph2[3]	8582	5.42	35.28	15.79	35.41	0.000302	2.96	3303.25	472.76	0.12
	154890.7	FuturePh3[4]	8587	5.42	35.29	15.79	35.42	0.000302	2.96	3304.74	472.88	0.12
	153992.6	Existing[1]	8587	3.83	35.08	16.21	35.17	0.000245	2.49	4858.46	850.28	0.11
	153992.6	InterimPh1[2]	8573	3.83	35.06	16.2	35.15	0.000245	2.49	4847.79	849.56	0.11
	153992.6	Proposed Ph2[3]	8582	3.83	35.07	16.21	35.16	0.000245	2.49	4854.73	850.03	0.11
	153992.6	FuturePh3[4]	8587	3.83	35.08	16.21	35.17	0.000245	2.49	4858.09	850.26	0.11
	153119.9	Existing[1]	8587	4.13	34.81	14.47	34.89	0.000433	2.37	3992.62	687.89	0.09
	153119.9	InterimPh1[2]	8573	4.13	34.79	14.45	34.87	0.000433	2.37	3987.29	687.39	0.09
	153119.9	Proposed Ph2[3]	8582	4.13	34.8	14.47	34.88	0.000433	2.37	3990.76	687.72	0.09
	153119.9	FuturePh3[4]	8587	4.13	34.81	14.47	34.89	0.000433	2.37	3992.43	687.87	0.09
	153108.9		Bridge									
	153097.9	Existing[1]	8587	4.13	34.79	14.47	34.87	0.000434	2.37	3987.82	687.44	0.09
	153097.9	InterimPh1[2]	8573	4.13	34.77	14.45	34.85	0.000434	2.37	3982.49	686.94	0.09
	153097.9	Proposed Ph2[3]	8582	4.13	34.78	14.47	34.87	0.000434	2.37	3985.95	687.27	0.09
	153097.9	FuturePh3[4]	8587	4.13	34.79	14.47	34.87	0.000434	2.37	3987.62	687.42	0.09
	152376.3	Existing[1]	8587	3.84	34.56	15.82	34.64	0.000249	2.68	4608.7	987.28	0.1
	152376.3	InterimPh1[2]	8573	3.84	34.54	15.81	34.62	0.000249	2.68	4598.35	985.05	0.1
	152376.3	Proposed Ph2[3]	8582	3.84	34.55	15.81	34.63	0.000249	2.68	4605.08	986.5	0.1
	152376.3	FuturePh3[4]	8587	3.84	34.56	15.82	34.64	0.000249	2.68	4608.3	987.19	0.1
	151996.2	Existing[1]	8587	4.14	34.54	14.35	34.57	0.000075	1.46	6541.82	473.27	0.06
	151996.2	InterimPh1[2]	8573	4.14	34.52	14.33	34.55	0.000075	1.46	6533.65	473.14	0.06
	151996.2	Proposed Ph2[3]	8582	4.14	34.53	14.34	34.56	0.000075	1.46	6538.96	473.23	0.06
	151996.2	FuturePh3[4]	8587	4.14	34.54	14.35	34.57	0.000075	1.46	6541.5	473.27	0.06
	151963.3		Bridge									
	151930.4	Existing[1]	8587	3.37	34.51	13.57	34.54	0.000065	1.4	6870.1	478.58	0.06
	151930.4	InterimPh1[2]	8573	3.37	34.49	13.56	34.52	0.000065	1.4	6861.9	478.45	0.06
	151930.4	Proposed Ph2[3]	8582	3.37	34.5	13.57	34.53	0.000065	1.4	6867.24	478.53	0.06
	151930.4	FuturePh3[4]	8587	3.37	34.51	13.57	34.54	0.000065	1.4	6869.78	478.57	0.06
	151925.3	Existing[1]	8587	2.99	34.51	11.76	34.53	0.000033	1.15	7963.17	609.31	0.04
	151925.3	InterimPh1[2]	8573	2.99	34.49	11.75	34.51	0.000033	1.14	7955.94	609.14	0.04
	151925.3	Proposed Ph2[3]	8582	2.99	34.51	11.76	34.53	0.000033	1.14	7960.65	609.25	0.04
	151925.3	FuturePh3[4]	8587	2.99	34.51	11.76	34.53	0.000033	1.15	7962.89	609.31	0.04
	151846.3		Bridge									
	151767.3	Existing[1]	8587	1.3	33.74	10.07	33.76	0.000029	1.1	8323.82	618.06	0.04
	151767.3	InterimPh1[2]	8573	1.3	33.72	10.06	33.74	0.000029	1.1	8316.36	617.88	0.04
	151767.3	Proposed Ph2[3]	8582	1.3	33.73	10.07	33.75	0.000029	1.1	8321.21	617.99	0.04

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	151767.3	FuturePh3[4]	8587	1.3	33.74	10.07	33.76	0.000029	1.1	8323.53	618.05	0.04
10PCT_10yr	151736.6	Existing[1]	8587	3.46	33.68	12.83	33.74	0.000111	2.07	4708.15	308.54	0.08
	151736.6	InterimPh1[2]	8573	3.46	33.66	12.82	33.72	0.000111	2.07	4703.15	308.4	0.08
	151736.6	Proposed Ph2[3]	8582	3.46	33.67	12.83	33.74	0.000111	2.07	4706.4	308.49	0.08
	151736.6	FuturePh3[4]	8587	3.46	33.68	12.83	33.74	0.000111	2.07	4707.95	308.53	0.08
	151711.1		Bridge									
	151685.6	Existing[1]	8587	4.19	33.65	13.56	33.72	0.000124	2.15	4507.51	303.05	0.08
	151685.6	InterimPh1[2]	8573	4.19	33.63	13.55	33.7	0.000124	2.14	4502.55	302.91	0.08
	151685.6	Proposed Ph2[3]	8582	4.19	33.64	13.55	33.71	0.000124	2.14	4505.77	303	0.08
	151685.6	FuturePh3[4]	8587	4.19	33.65	13.56	33.72	0.000124	2.15	4507.31	303.04	0.08
	151353.8	Existing[1]	8690	4.9	33.63	15.52	33.66	0.000118	1.7	7925.85	869.92	0.07
	151353.8	InterimPh1[2]	8668	4.9	33.61	15.52	33.64	0.000118	1.7	7913.9	869.18	0.07
	151353.8	Proposed Ph2[3]	8682	4.9	33.62	15.52	33.66	0.000118	1.7	7921.67	869.66	0.07
	151353.8	FuturePh3[4]	8689	4.9	33.63	15.52	33.66	0.000118	1.7	7925.37	869.89	0.07
	150358.8	Existing[1]	8797	3.31	33.43		33.51	0.000189	2.42	4211.92	372.36	0.1
	150358.8	InterimPh1[2]	8768	3.31	33.41		33.49	0.000188	2.41	4205.18	372.22	0.1
	150358.8	Proposed Ph2[3]	8787	3.31	33.42		33.51	0.000188	2.42	4209.57	372.31	0.1
	150358.8	FuturePh3[4]	8796	3.31	33.42		33.51	0.000189	2.42	4211.66	372.35	0.1
	149526.4	Existing[1]	8797	3.15	33.31	14.02	33.37	0.000149	2.15	5946.31	465.34	0.08
	149526.4	InterimPh1[2]	8768	3.15	33.29	14.01	33.35	0.000148	2.15	5938.03	465.2	0.08
	149526.4	Proposed Ph2[3]	8787	3.15	33.3	14.02	33.36	0.000149	2.15	5943.42	465.29	0.08
	149526.4	FuturePh3[4]	8796	3.15	33.31	14.02	33.37	0.000149	2.15	5945.98	465.33	0.08
	149122.7	Existing[1]	8797	3.15	33.23		33.31	0.000131	2.31	4439.64	268.07	0.08
	149122.7	InterimPh1[2]	8768	3.15	33.21		33.29	0.000131	2.31	4434.97	267.88	0.08
	149122.7	Proposed Ph2[3]	8787	3.15	33.23		33.3	0.000131	2.31	4438.01	268	0.08
	149122.7	FuturePh3[4]	8796	3.15	33.23		33.31	0.000131	2.31	4439.45	268.06	0.08
	148795.4	Existing[1]	8840	3.15	33.18	13.6	33.25	0.000266	2.34	4817.09	1007.33	0.09
	148795.4	InterimPh1[2]	8809	3.15	33.16	13.58	33.23	0.000265	2.34	4811.59	1006.06	0.09
	148795.4	Proposed Ph2[3]	8829	3.15	33.17	13.59	33.24	0.000265	2.34	4815.17	1006.89	0.09
	148795.4	FuturePh3[4]	8839	3.15	33.17	13.61	33.25	0.000266	2.34	4816.87	1007.28	0.09
	148768.4		Bridge									
	148741.4	Existing[1]	8840	3.04	33.07	13.5	33.15	0.000265	2.34	4819.47	1007.88	0.09
	148741.4	InterimPh1[2]	8809	3.04	33.06	13.49	33.13	0.000264	2.33	4814.02	1006.62	0.09
	148741.4	Proposed Ph2[3]	8829	3.04	33.07	13.49	33.14	0.000265	2.34	4817.56	1007.44	0.09
	148741.4	FuturePh3[4]	8839	3.04	33.07	13.5	33.15	0.000265	2.34	4819.25	1007.83	0.09
	147632.4	Existing[1]	8840	-1.17	32.91	10.75	32.98	0.000097	2.16	4864.84	397.62	0.09
	147632.4	InterimPh1[2]	8809	-1.17	32.89	10.74	32.96	0.000097	2.15	4858.32	397.5	0.09
	147632.4	Proposed Ph2[3]	8829	-1.17	32.9	10.74	32.97	0.000097	2.15	4862.57	397.58	0.09
	147632.4	FuturePh3[4]	8839	-1.17	32.91	10.75	32.98	0.000097	2.16	4864.58	397.62	0.09
	146698	Existing[1]	8840	1.88	32.79	10.63	32.88	0.000116	2.5	4878.48	325.53	0.1
	146698	InterimPh1[2]	8809	1.88	32.77	10.61	32.86	0.000115	2.49	4873.31	325.42	0.1
	146698	Proposed Ph2[3]	8829	1.88	32.78	10.62	32.87	0.000115	2.49	4876.68	325.49	0.1
	146698	FuturePh3[4]	8839	1.88	32.79	10.63	32.88	0.000116	2.5	4878.26	325.52	0.1
	145723.9	Existing[1]	8840	1.61	32.6		32.74	0.000164	3.24	4533.45	380.64	0.12
	145723.9	InterimPh1[2]	8809	1.61	32.58		32.72	0.000163	3.23	4527.74	380.5	0.12
	145723.9	Proposed Ph2[3]	8829	1.61	32.59		32.73	0.000164	3.24	4531.47	380.59	0.12
	145723.9	FuturePh3[4]	8839	1.61	32.6		32.74	0.000164	3.24	4533.21	380.63	0.12
	144753.5	Existing[1]	8840	0.07	32.47	11.07	32.59	0.00014	2.82	3889.94	297.04	0.11
	144753.5	InterimPh1[2]	8809	0.07	32.45	11.05	32.57	0.00014	2.82	3885.68	296.79	0.11
	144753.5	Proposed Ph2[3]	8829	0.07	32.46	11.06	32.58	0.00014	2.82	3888.46	296.95	0.11
	144753.5	FuturePh3[4]	8839	0.07	32.47	11.07	32.59	0.00014	2.82	3889.76	297.03	0.11

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	143966.8	Existing[1]	8840	-7.47	32.33	11.16	32.46	0.000189	3.04	4125.82	437.22	0.12
	143966.8	InterimPh1[2]	8809	-7.47	32.32	11.13	32.45	0.000188	3.03	4120.56	436.75	0.12
	143966.8	Proposed Ph2[3]	8829	-7.47	32.32	11.15	32.46	0.000189	3.04	4124	437.06	0.12
	143966.8	FuturePh3[4]	8839	-7.47	32.33	11.16	32.46	0.000189	3.04	4125.59	437.2	0.12
	143078.2	Existing[1]	8840	-4.19	32.21		32.31	0.000139	2.58	5333.46	509.8	0.1
	143078.2	InterimPh1[2]	8809	-4.19	32.2		32.29	0.000138	2.57	5326.72	509.37	0.1
	143078.2	Proposed Ph2[3]	8829	-4.19	32.21		32.3	0.000138	2.58	5331.13	509.65	0.1
	143078.2	FuturePh3[4]	8839	-4.19	32.21		32.31	0.000139	2.58	5333.16	509.78	0.1
	142061.4	Existing[1]	8840	0.55	32.12		32.19	0.000082	2.29	5570.23	450.37	0.09
	142061.4	InterimPh1[2]	8809	0.55	32.11		32.18	0.000082	2.29	5564.46	450.25	0.09
	142061.4	Proposed Ph2[3]	8829	0.55	32.12		32.19	0.000082	2.29	5568.23	450.33	0.09
	142061.4	FuturePh3[4]	8839	0.55	32.12		32.19	0.000082	2.29	5569.97	450.37	0.09
	141320.1	Existing[1]	8840	-2.7	32.11	9.03	32.14	0.000046	1.58	10182.23	741.36	0.06
	141320.1	InterimPh1[2]	8809	-2.7	32.09	9.01	32.12	0.000046	1.57	10172.76	741.25	0.06
	141320.1	Proposed Ph2[3]	8829	-2.7	32.1	9.02	32.13	0.000046	1.58	10178.96	741.32	0.06
	141320.1	FuturePh3[4]	8839	-2.7	32.11	9.02	32.14	0.000046	1.58	10181.8	741.36	0.06
	140116.2	Existing[1]	8840	-1.31	31.96	9.76	32.05	0.000117	2.54	5376.27	589.09	0.09
	140116.2	InterimPh1[2]	8809	-1.31	31.94	9.75	32.04	0.000116	2.53	5369.2	588.77	0.09
	140116.2	Proposed Ph2[3]	8829	-1.31	31.95	9.76	32.04	0.000117	2.54	5373.83	588.98	0.09
	140116.2	FuturePh3[4]	8839	-1.31	31.96	9.76	32.05	0.000117	2.54	5375.94	589.07	0.09
	139320	Existing[1]	8840	-2.14	31.9	9.43	31.96	0.000086	2.06	6226.38	582.77	0.08
	139320	InterimPh1[2]	8809	-2.14	31.89	9.4	31.95	0.000086	2.06	6219.55	582.37	0.08
	139320	Proposed Ph2[3]	8829	-2.14	31.9	9.42	31.96	0.000086	2.06	6224.03	582.63	0.08
	139320	FuturePh3[4]	8839	-2.14	31.9	9.43	31.96	0.000086	2.06	6226.06	582.75	0.08
	138607.9	Existing[1]	8717	-2.08	31.91	10.3	31.92	0.000021	1.12	15802.59	1065.4	0.04
	138607.9	InterimPh1[2]	8694	-2.08	31.9	10.29	31.91	0.000021	1.12	15790.14	1064.5	0.04
	138607.9	Proposed Ph2[3]	8709	-2.08	31.91	10.3	31.92	0.000021	1.12	15798.31	1065.09	0.04
	138607.9	FuturePh3[4]	8716	-2.08	31.91	10.3	31.92	0.000021	1.12	15802.01	1065.36	0.04
	137732	Existing[1]	8717	-2.4	31.84	9.67	31.9	0.000063	2.15	9144.93	865.51	0.07
	137732	InterimPh1[2]	8694	-2.4	31.83	9.65	31.88	0.000063	2.15	9135.51	865.1	0.07
	137732	Proposed Ph2[3]	8709	-2.4	31.84	9.66	31.89	0.000063	2.15	9141.69	865.37	0.07
	137732	FuturePh3[4]	8716	-2.4	31.84	9.67	31.9	0.000063	2.15	9144.49	865.49	0.07
	137113	Existing[1]	8717	-2.62	31.76	9.45	31.85	0.000089	2.56	5899.55	439.4	0.09
	137113	InterimPh1[2]	8694	-2.62	31.75	9.43	31.84	0.000088	2.56	5895.24	439.12	0.09
	137113	Proposed Ph2[3]	8709	-2.62	31.75	9.44	31.84	0.000088	2.56	5898.07	439.3	0.09
	137113	FuturePh3[4]	8716	-2.62	31.76	9.45	31.85	0.000089	2.56	5899.35	439.38	0.09
	136331.2	Existing[1]	8717	-2.09	31.71	9.33	31.73	0.000167	1.41	8913.73	632.94	0.05
	136331.2	InterimPh1[2]	8694	-2.09	31.7	9.31	31.72	0.000166	1.41	8906.7	632.83	0.05
	136331.2	Proposed Ph2[3]	8709	-2.09	31.7	9.32	31.73	0.000167	1.41	8911.32	632.9	0.05
	136331.2	FuturePh3[4]	8716	-2.09	31.71	9.32	31.73	0.000167	1.41	8913.4	632.94	0.05
	135666.2	Existing[1]	8717	-1.47	31.59		31.65	0.00008	2.21	6574.73	543.93	0.08
	135666.2	InterimPh1[2]	8694	-1.47	31.58		31.64	0.000079	2.2	6568.93	543.72	0.08
	135666.2	Proposed Ph2[3]	8709	-1.47	31.58		31.65	0.00008	2.2	6572.74	543.86	0.08
	135666.2	FuturePh3[4]	8716	-1.47	31.59		31.65	0.00008	2.21	6574.46	543.92	0.08
	134706.7	Existing[1]	8717	-1.93	31.57		31.59	0.000037	1.54	12309.27	857.27	0.06
	134706.7	InterimPh1[2]	8694	-1.93	31.56		31.58	0.000037	1.54	12300.15	857.07	0.06
	134706.7	Proposed Ph2[3]	8709	-1.93	31.57		31.59	0.000037	1.54	12306.14	857.2	0.06
	134706.7	FuturePh3[4]	8716	-1.93	31.57		31.59	0.000037	1.54	12308.84	857.26	0.06
	134090.6	Existing[1]	8717	-1.59	31.53		31.57	0.000049	1.89	9717.94	714.95	0.07
	134090.6	InterimPh1[2]	8694	-1.59	31.52		31.56	0.000049	1.89	9710.45	714.78	0.07
	134090.6	Proposed Ph2[3]	8709	-1.59	31.52		31.57	0.000049	1.89	9715.37	714.89	0.07
	134090.6	FuturePh3[4]	8716	-1.59	31.53		31.57	0.000049	1.89	9717.58	714.94	0.07

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	133772.1	Existing[1]	8717	-0.79	31.47	8.82	31.55	0.000072	2.43	8124.09	801.93	0.08
	133772.1	InterimPh1[2]	8694	-0.79	31.46	8.81	31.53	0.000072	2.43	8115.84	801.53	0.08
	133772.1	Proposed Ph2[3]	8709	-0.79	31.47	8.82	31.54	0.000072	2.43	8121.26	801.8	0.08
	133772.1	FuturePh3[4]	8716	-0.79	31.47	8.82	31.54	0.000072	2.43	8123.7	801.91	0.08
	133760.1		Bridge									
	133748.1	Existing[1]	8717	-0.46	31.41	9.15	31.48	0.000078	2.5	7810.41	786.32	0.08
	133748.1	InterimPh1[2]	8694	-0.46	31.4	9.13	31.47	0.000077	2.49	7802.52	785.2	0.08
	133748.1	Proposed Ph2[3]	8709	-0.46	31.4	9.15	31.48	0.000077	2.49	7807.71	786.09	0.08
	133748.1	FuturePh3[4]	8716	-0.46	31.41	9.15	31.48	0.000078	2.5	7810.04	786.28	0.08
	132963.8	Existing[1]	8717	-1.98	31.33	8.67	31.41	0.0001	2.46	4849.22	440.8	0.09
	132963.8	InterimPh1[2]	8694	-1.98	31.32	8.66	31.4	0.000099	2.46	4844.95	438.71	0.09
	132963.8	Proposed Ph2[3]	8709	-1.98	31.32	8.67	31.41	0.0001	2.46	4847.76	440.08	0.09
	132963.8	FuturePh3[4]	8716	-1.98	31.33	8.68	31.41	0.0001	2.46	4849.01	440.7	0.09
	131789.8	Existing[1]	8717	-2.31	31.21	7.49	31.3	0.000096	2.58	5498.26	482.11	0.09
	131789.8	InterimPh1[2]	8694	-2.31	31.2	7.47	31.29	0.000096	2.57	5493.79	482.01	0.09
	131789.8	Proposed Ph2[3]	8709	-2.31	31.2	7.48	31.29	0.000096	2.58	5496.73	482.08	0.09
	131789.8	FuturePh3[4]	8716	-2.31	31.21	7.48	31.3	0.000096	2.58	5498.04	482.1	0.09
	130765.5	Existing[1]	8717	-3.81	31.18		31.22	0.000038	1.76	8161.14	487.01	0.06
	130765.5	InterimPh1[2]	8694	-3.81	31.17		31.21	0.000038	1.76	8156.67	486.94	0.06
	130765.5	Proposed Ph2[3]	8709	-3.81	31.18		31.22	0.000038	1.76	8159.61	486.99	0.06
	130765.5	FuturePh3[4]	8716	-3.81	31.18		31.22	0.000038	1.76	8160.92	487.01	0.06
	129725.3	Existing[1]	8717	-3.71	31.1		31.17	0.00007	2.38	7764.16	683.95	0.08
	129725.3	InterimPh1[2]	8694	-3.71	31.09		31.16	0.00007	2.37	7758.1	683.88	0.08
	129725.3	Proposed Ph2[3]	8709	-3.71	31.1		31.17	0.00007	2.38	7762.1	683.92	0.08
	129725.3	FuturePh3[4]	8716	-3.71	31.1		31.17	0.00007	2.38	7763.87	683.95	0.08
	129163.2	Existing[1]	8717	-3.13	31.06		31.13	0.000061	2.14	5875.01	477.42	0.07
	129163.2	InterimPh1[2]	8694	-3.13	31.05		31.12	0.000061	2.13	5870.86	477.21	0.07
	129163.2	Proposed Ph2[3]	8709	-3.13	31.06		31.13	0.000061	2.13	5873.59	477.35	0.07
	129163.2	FuturePh3[4]	8716	-3.13	31.06		31.13	0.000061	2.13	5874.81	477.41	0.07
	128326.9	Existing[1]	8717	-4.05	31.03	6.11	31.08	0.000042	1.88	8405.33	810.09	0.06
	128326.9	InterimPh1[2]	8694	-4.05	31.03	6.09	31.07	0.000042	1.88	8400.66	809.84	0.06
	128326.9	Proposed Ph2[3]	8709	-4.05	31.03	6.1	31.08	0.000042	1.88	8403.74	810.01	0.06
	128326.9	FuturePh3[4]	8716	-4.05	31.03	6.11	31.08	0.000042	1.88	8405.11	810.08	0.06
	128104.6	Existing[1]	8588	-4.29	31.02	5.79	31.07	0.000041	1.87	6693.57	384.84	0.06
	128104.6	InterimPh1[2]	8575	-4.29	31.02	5.78	31.06	0.000041	1.87	6690.53	384.75	0.06
	128104.6	Proposed Ph2[3]	8584	-4.29	31.02	5.78	31.07	0.000041	1.87	6692.53	384.81	0.06
	128104.6	FuturePh3[4]	8587	-4.29	31.02	5.79	31.07	0.000041	1.87	6693.43	384.83	0.06
	128066.7		Bridge									
	128028.8	Existing[1]	8588	-4.51	30.8	5.57	30.85	0.000041	1.87	6693.14	384.82	0.06
	128028.8	InterimPh1[2]	8575	-4.51	30.79	5.56	30.84	0.000041	1.87	6690.11	384.74	0.06
	128028.8	Proposed Ph2[3]	8584	-4.51	30.8	5.56	30.85	0.000041	1.87	6692.1	384.79	0.06
	128028.8	FuturePh3[4]	8587	-4.51	30.8	5.57	30.85	0.000041	1.87	6693	384.82	0.06
	126647	Existing[1]	8588	-3.93	30.77		30.79	0.00003	1.63	11091.84	738.67	0.05
	126647	InterimPh1[2]	8575	-3.93	30.76		30.78	0.00003	1.63	11085.48	737.92	0.05
	126647	Proposed Ph2[3]	8584	-3.93	30.76		30.79	0.00003	1.63	11089.66	738.41	0.05
	126647	FuturePh3[4]	8587	-3.93	30.77		30.79	0.00003	1.63	11091.55	738.63	0.05
	125376.9	Existing[1]	8588	-4.05	30.66		30.73	0.000056	2.28	5520.46	329.08	0.07
	125376.9	InterimPh1[2]	8575	-4.05	30.65		30.72	0.000056	2.28	5517.7	328.99	0.07
	125376.9	Proposed Ph2[3]	8584	-4.05	30.66		30.73	0.000056	2.28	5519.51	329.05	0.07
	125376.9	FuturePh3[4]	8587	-4.05	30.66		30.73	0.000056	2.28	5520.34	329.08	0.07

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	124983.5	Existing[1]	8588	-3.86	30.66	7.86	30.71	0.000054	2.2	5732.84	979.61	0.07
	124983.5	InterimPh1[2]	8575	-3.86	30.65	7.85	30.7	0.000054	2.2	5729.76	979.24	0.07
	124983.5	Proposed Ph2[3]	8584	-3.86	30.65	7.86	30.7	0.000054	2.2	5731.78	979.48	0.07
	124983.5	FuturePh3[4]	8587	-3.86	30.65	7.86	30.71	0.000054	2.2	5732.7	979.59	0.07
	124644.1	Existing[1]	8588	-3.69	30.63	8	30.69	0.000058	2.28	5511.71	484.21	0.07
	124644.1	InterimPh1[2]	8575	-3.69	30.62	7.99	30.68	0.000058	2.27	5509.09	484.12	0.07
	124644.1	Proposed Ph2[3]	8584	-3.69	30.63	8	30.68	0.000058	2.28	5510.81	484.18	0.07
	124644.1	FuturePh3[4]	8587	-3.69	30.63	8.01	30.69	0.000058	2.28	5511.59	484.21	0.07
	124591.8		Bridge									
	124539.5	Existing[1]	8588	-3.74	30.62	7.95	30.67	0.000058	2.27	5523.33	484.59	0.07
	124539.5	InterimPh1[2]	8575	-3.74	30.61	7.94	30.66	0.000058	2.27	5520.71	484.51	0.07
	124539.5	Proposed Ph2[3]	8584	-3.74	30.62	7.95	30.67	0.000058	2.27	5522.43	484.56	0.07
	124539.5	FuturePh3[4]	8587	-3.74	30.62	7.96	30.67	0.000058	2.27	5523.21	484.59	0.07
	123658.2	Existing[1]	8535	-2.04	30.59		30.62	0.000036	1.73	11049.68	1134.26	0.06
	123658.2	InterimPh1[2]	8526	-2.04	30.58		30.61	0.000036	1.72	11040.24	1132.81	0.06
	123658.2	Proposed Ph2[3]	8532	-2.04	30.59		30.62	0.000036	1.72	11046.43	1133.76	0.06
	123658.2	FuturePh3[4]	8535	-2.04	30.59		30.62	0.000036	1.73	11049.25	1134.19	0.06
	123138.8	Existing[1]	8535	-4.08	30.59		30.6	0.000016	1.11	14703.14	944.38	0.04
	123138.8	InterimPh1[2]	8526	-4.08	30.58		30.6	0.000016	1.11	14695.29	943.79	0.04
	123138.8	Proposed Ph2[3]	8532	-4.08	30.59		30.6	0.000016	1.11	14700.44	944.18	0.04
	123138.8	FuturePh3[4]	8535	-4.08	30.59		30.6	0.000016	1.11	14702.78	944.35	0.04
	122627.1	Existing[1]	8535	-6.08	30.56	3.67	30.59	0.000027	1.41	8228.05	628.18	0.05
	122627.1	InterimPh1[2]	8526	-6.08	30.56	3.66	30.58	0.000027	1.41	8222.84	627.71	0.05
	122627.1	Proposed Ph2[3]	8532	-6.08	30.56	3.66	30.59	0.000027	1.41	8226.25	628.02	0.05
	122627.1	FuturePh3[4]	8535	-6.08	30.56	3.67	30.59	0.000027	1.41	8227.81	628.16	0.05
	122572.1		Mult Open									
	122517.1	Existing[1]	8535	-5.38	30.55	4.37	30.57	0.00003	1.45	7792.68	583.85	0.05
	122517.1	InterimPh1[2]	8526	-5.38	30.54	4.36	30.57	0.00003	1.44	7787.98	583.06	0.05
	122517.1	Proposed Ph2[3]	8532	-5.38	30.54	4.37	30.57	0.00003	1.45	7791.02	583.58	0.05
	122517.1	FuturePh3[4]	8535	-5.38	30.55	4.37	30.57	0.00003	1.45	7792.46	583.81	0.05
	121229.5	Existing[1]	8535	-11.37	30.48		30.52	0.000043	1.94	8219.06	832.18	0.06
	121229.5	InterimPh1[2]	8526	-11.37	30.47		30.51	0.000043	1.94	8212.28	832.07	0.06
	121229.5	Proposed Ph2[3]	8532	-11.37	30.48		30.52	0.000043	1.94	8216.7	832.14	0.06
	121229.5	FuturePh3[4]	8535	-11.37	30.48		30.52	0.000043	1.94	8218.74	832.17	0.06
	120962.2	Existing[1]	8535	-10.59	30.44		30.51	0.000056	2.2	6243.25	651.68	0.07
	120962.2	InterimPh1[2]	8526	-10.59	30.44		30.5	0.000056	2.2	6237.97	651.54	0.07
	120962.2	Proposed Ph2[3]	8532	-10.59	30.44		30.5	0.000056	2.2	6241.41	651.63	0.07
	120962.2	FuturePh3[4]	8535	-10.59	30.44		30.51	0.000056	2.2	6243	651.67	0.07
	120005.2	Existing[1]	8535	-7.78	30.45	3.1	30.46	0.000015	1.14	13447.91	899.24	0.04
	120005.2	InterimPh1[2]	8526	-7.78	30.44	3.1	30.45	0.000015	1.14	13440.64	898.08	0.04
	120005.2	Proposed Ph2[3]	8532	-7.78	30.45	3.11	30.46	0.000015	1.14	13445.37	898.84	0.04
	120005.2	FuturePh3[4]	8535	-7.78	30.45	3.1	30.46	0.000015	1.14	13447.56	899.19	0.04
	119952.6		Bridge									
	119900	Existing[1]	8535	-7.64	30.43	3.25	30.44	0.000015	1.15	13306.37	891.53	0.04
	119900	InterimPh1[2]	8526	-7.64	30.42	3.24	30.43	0.000015	1.15	13299.18	891.31	0.04
	119900	Proposed Ph2[3]	8532	-7.64	30.43	3.25	30.44	0.000015	1.15	13303.86	891.46	0.04
	119900	FuturePh3[4]	8535	-7.64	30.43	3.25	30.44	0.000015	1.15	13306.02	891.52	0.04
	119495.9	Existing[1]	8535	-7.21	30.43		30.44	0.000009	0.97	20392.04	1226.71	0.03
	119495.9	InterimPh1[2]	8526	-7.21	30.42		30.43	0.000009	0.97	20382.15	1226.36	0.03
	119495.9	Proposed Ph2[3]	8532	-7.21	30.43		30.43	0.000009	0.97	20388.59	1226.59	0.03
	119495.9	FuturePh3[4]	8535	-7.21	30.43		30.44	0.000009	0.97	20391.57	1226.69	0.03

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	118667.7	Existing[1]	8535	-8.56	30.39		30.42	0.000022	1.56	10517.87	697.66	0.05
	118667.7	InterimPh1[2]	8526	-8.56	30.39		30.41	0.000022	1.56	10512.28	697.33	0.05
	118667.7	Proposed Ph2[3]	8532	-8.56	30.39		30.42	0.000022	1.56	10515.92	697.55	0.05
	118667.7	FuturePh3[4]	8535	-8.56	30.39		30.42	0.000022	1.56	10517.6	697.65	0.05
	118466.1	Existing[1]	8535	-8.89	30.37	1.23	30.41	0.000028	1.77	8184.43	789.42	0.05
	118466.1	InterimPh1[2]	8526	-8.89	30.36	1.22	30.4	0.000028	1.77	8178.11	789.28	0.05
	118466.1	Proposed Ph2[3]	8532	-8.89	30.37	1.23	30.41	0.000028	1.77	8182.22	789.37	0.05
	118466.1	FuturePh3[4]	8535	-8.89	30.37	1.23	30.41	0.000028	1.77	8184.12	789.42	0.05
	118418.1		Bridge									
	118370.1	Existing[1]	8535	-8.87	30.34	1.25	30.38	0.000029	1.77	8146.37	788.57	0.05
	118370.1	InterimPh1[2]	8526	-8.87	30.34	1.24	30.38	0.000029	1.77	8140.06	788.43	0.05
	118370.1	Proposed Ph2[3]	8532	-8.87	30.34	1.25	30.38	0.000029	1.77	8144.16	788.52	0.05
	118370.1	FuturePh3[4]	8535	-8.87	30.34	1.25	30.38	0.000029	1.77	8146.05	788.56	0.05
	117845.4	Existing[1]	8535	-7.26	30.34		30.36	0.000027	1.63	8945.07	567.21	0.05
	117845.4	InterimPh1[2]	8526	-7.26	30.33		30.36	0.000027	1.63	8940.53	567.13	0.05
	117845.4	Proposed Ph2[3]	8532	-7.26	30.33		30.36	0.000027	1.63	8943.48	567.18	0.05
	117845.4	FuturePh3[4]	8535	-7.26	30.34		30.36	0.000027	1.63	8944.84	567.2	0.05
	117204.3	Existing[1]	8535	-4.6	30.32		30.34	0.000026	1.54	10722.03	646.02	0.05
	117204.3	InterimPh1[2]	8526	-4.6	30.31		30.34	0.000026	1.54	10716.88	645.96	0.05
	117204.3	Proposed Ph2[3]	8532	-4.6	30.32		30.34	0.000026	1.54	10720.23	646	0.05
	117204.3	FuturePh3[4]	8535	-4.6	30.32		30.34	0.000026	1.54	10721.77	646.02	0.05
	116395.7	Existing[1]	8535	-3.88	30.3		30.32	0.000023	1.53	9635.14	499.24	0.05
	116395.7	InterimPh1[2]	8526	-3.88	30.29		30.32	0.000023	1.53	9631.17	499.2	0.05
	116395.7	Proposed Ph2[3]	8532	-3.88	30.29		30.32	0.000023	1.53	9633.75	499.23	0.05
	116395.7	FuturePh3[4]	8535	-3.88	30.3		30.32	0.000023	1.53	9634.93	499.24	0.05
	116167.6	Existing[1]	8535	-3.68	30.26	3.8	30.31	0.000037	1.92	5861.06	270.06	0.06
	116167.6	InterimPh1[2]	8526	-3.68	30.25	3.79	30.3	0.000037	1.92	5859.03	270.03	0.06
	116167.6	Proposed Ph2[3]	8532	-3.68	30.26	3.8	30.31	0.000037	1.92	5860.35	270.05	0.06
	116167.6	FuturePh3[4]	8535	-3.68	30.26	3.8	30.31	0.000037	1.92	5860.96	270.06	0.06
	116121.9		Bridge									
	116076.2	Existing[1]	8535	-3.86	30.08	3.62	30.13	0.000037	1.92	5861.87	270.07	0.06
	116076.2	InterimPh1[2]	8526	-3.86	30.07	3.61	30.13	0.000037	1.92	5859.84	270.04	0.06
	116076.2	Proposed Ph2[3]	8532	-3.86	30.08	3.62	30.13	0.000037	1.92	5861.16	270.06	0.06
	116076.2	FuturePh3[4]	8535	-3.86	30.08	3.62	30.13	0.000037	1.92	5861.77	270.07	0.06
	115655.5	Existing[1]	8535	-5.03	30.06	4.01	30.12	0.000033	2.06	6061.4	536.29	0.07
	115655.5	InterimPh1[2]	8526	-5.03	30.05	4.01	30.11	0.000033	2.06	6057.19	536.03	0.07
	115655.5	Proposed Ph2[3]	8532	-5.03	30.05	4.01	30.11	0.000033	2.06	6059.92	536.2	0.07
	115655.5	FuturePh3[4]	8535	-5.03	30.06	4.01	30.12	0.000033	2.06	6061.18	536.28	0.07
	115635.5		Bridge									
	115615.5	Existing[1]	8535	-5.27	30.05	3.77	30.11	0.000032	2.04	6189.97	544.06	0.06
	115615.5	InterimPh1[2]	8526	-5.27	30.05	3.77	30.1	0.000032	2.04	6185.69	543.8	0.06
	115615.5	Proposed Ph2[3]	8532	-5.27	30.05	3.77	30.11	0.000032	2.04	6188.46	543.97	0.06
	115615.5	FuturePh3[4]	8535	-5.27	30.05	3.77	30.11	0.000032	2.04	6189.74	544.04	0.06
	115573.5	Existing[1]	8535	-5.72	30.06	2.71	30.1	0.000024	1.73	7392.02	493.73	0.05
	115573.5	InterimPh1[2]	8526	-5.72	30.06	2.7	30.09	0.000024	1.73	7388.14	493.71	0.05
	115573.5	Proposed Ph2[3]	8532	-5.72	30.06	2.7	30.1	0.000024	1.73	7390.66	493.72	0.05
	115573.5	FuturePh3[4]	8535	-5.72	30.06	2.71	30.1	0.000024	1.73	7391.82	493.73	0.05
	115553.5		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	115533.5	Existing[1]	8535	-6.77	30.06	1.65	30.1	0.000021	1.65	7911.04	496.77	0.05
	115533.5	InterimPh1[2]	8526	-6.77	30.05	1.65	30.09	0.000021	1.64	7907.14	496.75	0.05
	115533.5	Proposed Ph2[3]	8532	-6.77	30.06	1.65	30.09	0.000021	1.64	7909.67	496.77	0.05
	115533.5	FuturePh3[4]	8535	-6.77	30.06	1.65	30.09	0.000021	1.65	7910.83	496.77	0.05
	115214	Existing[1]	8535	-7.96	30.05	0.66	30.09	0.00002	1.64	6506.09	326.94	0.05
	115214	InterimPh1[2]	8526	-7.96	30.04	0.66	30.08	0.00002	1.63	6503.78	326.89	0.05
	115214	Proposed Ph2[3]	8532	-7.96	30.04	0.66	30.08	0.00002	1.63	6505.28	326.93	0.05
	115214	FuturePh3[4]	8535	-7.96	30.05	0.66	30.09	0.00002	1.64	6505.97	326.94	0.05
	115168.5		Bridge									
	115123	Existing[1]	8535	-8.12	30.02	0.5	30.06	0.00002	1.63	6546.26	327.76	0.05
	115123	InterimPh1[2]	8526	-8.12	30.02	0.5	30.05	0.00002	1.63	6543.96	327.72	0.05
	115123	Proposed Ph2[3]	8532	-8.12	30.02	0.5	30.06	0.00002	1.63	6545.45	327.75	0.05
	115123	FuturePh3[4]	8535	-8.12	30.02	0.5	30.06	0.00002	1.63	6546.14	327.76	0.05
	114890.5	Existing[1]	8535	-8.56	30.01	1.24	30.06	0.000025	1.74	6827.43	416.87	0.06
	114890.5	InterimPh1[2]	8526	-8.56	30	1.23	30.05	0.000025	1.74	6824.37	416.77	0.06
	114890.5	Proposed Ph2[3]	8532	-8.56	30.01	1.24	30.05	0.000025	1.74	6826.35	416.83	0.06
	114890.5	FuturePh3[4]	8535	-8.56	30.01	1.24	30.06	0.000025	1.74	6827.26	416.86	0.06
	114864.5		Bridge									
	114838.5	Existing[1]	8535	-9.27	29.35	0.53	29.4	0.000025	1.74	6848.53	417.54	0.06
	114838.5	InterimPh1[2]	8526	-9.27	29.35	0.52	29.39	0.000025	1.74	6845.48	417.44	0.06
	114838.5	Proposed Ph2[3]	8532	-9.27	29.35	0.52	29.4	0.000025	1.74	6847.46	417.51	0.06
	114838.5	FuturePh3[4]	8535	-9.27	29.35	0.53	29.4	0.000025	1.74	6848.37	417.54	0.06
	114492	Existing[1]	8535	-10.48	29.34		29.39	0.00003	1.77	6379.22	347.88	0.06
	114492	InterimPh1[2]	8526	-10.48	29.34		29.38	0.00003	1.76	6376.52	347.79	0.06
	114492	Proposed Ph2[3]	8532	-10.48	29.34		29.39	0.00003	1.76	6378.27	347.85	0.06
	114492	FuturePh3[4]	8535	-10.48	29.34		29.39	0.00003	1.77	6379.08	347.88	0.06
	114195.9	Existing[1]	8535	-11.52	29.34	0.76	29.38	0.000027	1.71	5842.42	321.96	0.06
	114195.9	InterimPh1[2]	8526	-11.52	29.33	0.76	29.37	0.000027	1.71	5840.02	321.91	0.06
	114195.9	Proposed Ph2[3]	8532	-11.52	29.33	0.77	29.38	0.000027	1.71	5841.58	321.94	0.06
	114195.9	FuturePh3[4]	8535	-11.52	29.34	0.76	29.38	0.000027	1.71	5842.3	321.96	0.06
	114168.9		Bridge									
	114141.9	Existing[1]	8535	-10.83	29.32	1.46	29.37	0.00003	1.76	5624.84	317.54	0.06
	114141.9	InterimPh1[2]	8526	-10.83	29.32	1.45	29.36	0.00003	1.76	5622.45	317.5	0.06
	114141.9	Proposed Ph2[3]	8532	-10.83	29.32	1.46	29.37	0.00003	1.76	5624	317.53	0.06
	114141.9	FuturePh3[4]	8535	-10.83	29.32	1.46	29.37	0.00003	1.76	5624.71	317.54	0.06
	114097.4	Existing[1]	8535	-7.46	29.33	2.81	29.36	0.000025	1.59	6480.21	379.42	0.05
	114097.4	InterimPh1[2]	8526	-7.46	29.32	2.8	29.36	0.000025	1.59	6477.27	379.4	0.05
	114097.4	Proposed Ph2[3]	8532	-7.46	29.32	2.81	29.36	0.000025	1.59	6479.17	379.41	0.05
	114097.4	FuturePh3[4]	8535	-7.46	29.33	2.81	29.36	0.000025	1.59	6480.05	379.42	0.05
	114070.4		Bridge									
	114043.4	Existing[1]	8535	-7.72	28.32	2.55	28.36	0.000028	1.65	6198.2	377.73	0.06
	114043.4	InterimPh1[2]	8526	-7.72	28.31	2.55	28.35	0.000028	1.65	6195.28	377.72	0.06
	114043.4	Proposed Ph2[3]	8532	-7.72	28.32	2.55	28.36	0.000028	1.65	6197.17	377.73	0.06
	114043.4	FuturePh3[4]	8535	-7.72	28.32	2.55	28.36	0.000028	1.65	6198.05	377.73	0.06
	113644	Existing[1]	8535	-8.91	28.29		28.34	0.000047	1.91	5129.31	360.01	0.07
	113644	InterimPh1[2]	8526	-8.91	28.28		28.34	0.000047	1.91	5126.55	359.59	0.07
	113644	Proposed Ph2[3]	8532	-8.91	28.28		28.34	0.000047	1.91	5128.34	359.86	0.07
	113644	FuturePh3[4]	8535	-8.91	28.29		28.34	0.000047	1.91	5129.17	359.99	0.07

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	113411.6	Existing[1]	8535	-9.61	28.29	-0.01	28.33	0.000025	1.75	5295.19	370.52	0.05
	113411.6	InterimPh1[2]	8526	-9.61	28.28	-0.01	28.32	0.000025	1.75	5293.77	370.5	0.05
	113411.6	Proposed Ph2[3]	8532	-9.61	28.28	-0.01	28.33	0.000025	1.75	5294.69	370.51	0.05
	113411.6	FuturePh3[4]	8535	-9.61	28.28	-0.01	28.33	0.000025	1.75	5295.11	370.52	0.05
	113374.3		Bridge									
	113337	Existing[1]	8535	-9.65	28.17	-0.05	28.21	0.000025	1.75	5280.88	370.31	0.05
	113337	InterimPh1[2]	8526	-9.65	28.16	-0.05	28.21	0.000025	1.75	5279.46	370.29	0.05
	113337	Proposed Ph2[3]	8532	-9.65	28.17	-0.05	28.21	0.000025	1.75	5280.38	370.3	0.05
	113337	FuturePh3[4]	8535	-9.65	28.17	-0.05	28.21	0.000025	1.75	5280.8	370.31	0.05
	113266.4	Existing[1]	8535	-9.11	28.12	2.43	28.2	0.000055	2.35	4305.19	237.87	0.08
	113266.4	InterimPh1[2]	8526	-9.11	28.11	2.43	28.19	0.000055	2.35	4303.39	237.84	0.08
	113266.4	Proposed Ph2[3]	8532	-9.11	28.11	2.43	28.2	0.000055	2.35	4304.55	237.86	0.08
	113266.4	FuturePh3[4]	8535	-9.11	28.12	2.43	28.2	0.000055	2.35	4305.09	237.87	0.08
	113238.6		Bridge									
	113210.8	Existing[1]	8535	-9.46	27.72	2.09	27.8	0.000056	2.36	4293.27	237.68	0.08
	113210.8	InterimPh1[2]	8526	-9.46	27.71	2.07	27.79	0.000056	2.35	4291.48	237.66	0.08
	113210.8	Proposed Ph2[3]	8532	-9.46	27.71	2.08	27.8	0.000056	2.35	4292.64	237.67	0.08
	113210.8	FuturePh3[4]	8535	-9.46	27.72	2.09	27.8	0.000056	2.36	4293.17	237.68	0.08
	112974	Existing[1]	8535	-10.69	27.7	0.51	27.78	0.000066	2.33	4105.15	199.71	0.08
	112974	InterimPh1[2]	8526	-10.69	27.69	0.5	27.78	0.000065	2.33	4103.65	199.69	0.08
	112974	Proposed Ph2[3]	8532	-10.69	27.7	0.51	27.78	0.000066	2.33	4104.62	199.71	0.08
	112974	FuturePh3[4]	8535	-10.69	27.7	0.51	27.78	0.000066	2.33	4105.07	199.71	0.08
	112944.9		Bridge									
	112915.8	Existing[1]	8535	-10.82	27.55	0.38	27.64	0.000066	2.33	4101.39	199.67	0.08
	112915.8	InterimPh1[2]	8526	-10.82	27.55	0.37	27.63	0.000066	2.33	4099.89	199.65	0.08
	112915.8	Proposed Ph2[3]	8532	-10.82	27.55	0.38	27.63	0.000066	2.33	4100.86	199.67	0.08
	112915.8	FuturePh3[4]	8535	-10.82	27.55	0.38	27.64	0.000066	2.33	4101.31	199.67	0.08
	112575.5	Existing[1]	8535	-9.2	27.54	1.97	27.61	0.000049	2.11	4867.01	239.48	0.07
	112575.5	InterimPh1[2]	8526	-9.2	27.54	1.97	27.6	0.000049	2.1	4865.41	239.47	0.07
	112575.5	Proposed Ph2[3]	8532	-9.2	27.54	1.97	27.6	0.000049	2.1	4866.44	239.48	0.07
	112575.5	FuturePh3[4]	8535	-9.2	27.54	1.97	27.61	0.000049	2.11	4866.92	239.48	0.07
	112534.5		Bridge									
	112493.5	Existing[1]	8535	-9.47	27.21	1.71	27.28	0.000049	2.11	4853.7	239.37	0.07
	112493.5	InterimPh1[2]	8526	-9.47	27.2	1.7	27.27	0.000049	2.11	4852.1	239.36	0.07
	112493.5	Proposed Ph2[3]	8532	-9.47	27.21	1.7	27.27	0.000049	2.11	4853.13	239.37	0.07
	112493.5	FuturePh3[4]	8535	-9.47	27.21	1.71	27.28	0.000049	2.11	4853.61	239.37	0.07
	112003.3	Existing[1]	8535	-9.69	27.21	1.61	27.25	0.000027	1.66	5817.41	284.57	0.06
	112003.3	InterimPh1[2]	8526	-9.69	27.2	1.6	27.24	0.000027	1.66	5815.35	284.54	0.06
	112003.3	Proposed Ph2[3]	8532	-9.69	27.2	1.6	27.24	0.000027	1.66	5816.68	284.56	0.06
	112003.3	FuturePh3[4]	8535	-9.69	27.2	1.61	27.25	0.000027	1.66	5817.29	284.57	0.06
	111953.3		Bridge									
	111903.3	Existing[1]	8535	-9.84	27.18	1.45	27.22	0.000027	1.65	5852.46	285.08	0.05
	111903.3	InterimPh1[2]	8526	-9.84	27.18	1.45	27.22	0.000027	1.65	5850.42	285.05	0.05
	111903.3	Proposed Ph2[3]	8532	-9.84	27.18	1.46	27.22	0.000027	1.65	5851.74	285.07	0.05
	111903.3	FuturePh3[4]	8535	-9.84	27.18	1.45	27.22	0.000027	1.65	5852.35	285.08	0.05
	111853.5	Existing[1]	8535	-9.86	27.18	1.11	27.22	0.000024	1.6	5516.06	225.93	0.05
	111853.5	InterimPh1[2]	8526	-9.86	27.17	1.12	27.21	0.000024	1.6	5514.38	225.91	0.05
	111853.5	Proposed Ph2[3]	8532	-9.86	27.18	1.12	27.22	0.000024	1.6	5515.46	225.92	0.05
	111853.5	FuturePh3[4]	8535	-9.86	27.18	1.11	27.22	0.000024	1.6	5515.96	225.93	0.05
	111818.6		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	111783.7	Existing[1]	8535	-8.67	27.17	2.3	27.21	0.000028	1.67	5245.71	222.29	0.06
	111783.7	InterimPh1[2]	8526	-8.67	27.16	2.31	27.2	0.000028	1.67	5244.07	222.27	0.06
	111783.7	Proposed Ph2[3]	8532	-8.67	27.16	2.31	27.21	0.000028	1.67	5245.13	222.28	0.06
	111783.7	FuturePh3[4]	8535	-8.67	27.17	2.3	27.21	0.000028	1.67	5245.62	222.29	0.06
	111626.7	Existing[1]	8535	-11.83	27.15	0.77	27.2	0.000034	1.84	5442.07	229.27	0.06
	111626.7	InterimPh1[2]	8526	-11.83	27.14	0.77	27.19	0.000034	1.84	5440.38	229.25	0.06
	111626.7	Proposed Ph2[3]	8532	-11.83	27.15	0.78	27.2	0.000034	1.84	5441.47	229.26	0.06
	111626.7	FuturePh3[4]	8535	-11.83	27.15	0.77	27.2	0.000034	1.84	5441.97	229.27	0.06
	111518.6		Bridge									
	111410.5	Existing[1]	8535	-11.23	27.12	1.38	27.17	0.000037	1.89	5297.61	228.21	0.06
	111410.5	InterimPh1[2]	8526	-11.23	27.11	1.37	27.17	0.000037	1.89	5295.95	228.19	0.06
	111410.5	Proposed Ph2[3]	8532	-11.23	27.12	1.38	27.17	0.000037	1.89	5297.02	228.2	0.06
	111410.5	FuturePh3[4]	8535	-11.23	27.12	1.38	27.17	0.000037	1.89	5297.51	228.2	0.06
	110876.6	Existing[1]	8535	-10.43	27.11	-0.98	27.15	0.000023	1.75	6847.1	331.2	0.05
	110876.6	InterimPh1[2]	8526	-10.43	27.1	-0.99	27.15	0.000023	1.75	6844.69	330.89	0.05
	110876.6	Proposed Ph2[3]	8532	-10.43	27.11	-0.98	27.15	0.000023	1.75	6846.24	331.09	0.05
	110876.6	FuturePh3[4]	8535	-10.43	27.11	-0.98	27.15	0.000023	1.75	6846.96	331.18	0.05
	110837.8		Bridge									
	110799	Existing[1]	8535	-10.72	27.08	-1.27	27.12	0.000023	1.73	6899.09	342.74	0.05
	110799	InterimPh1[2]	8526	-10.72	27.07	-1.27	27.12	0.000023	1.73	6896.86	342.36	0.05
	110799	Proposed Ph2[3]	8532	-10.72	27.08	-1.27	27.12	0.000023	1.73	6898.28	342.6	0.05
	110799	FuturePh3[4]	8535	-10.72	27.08	-1.27	27.12	0.000023	1.73	6898.96	342.71	0.05
	110672.7	Existing[1]	8535	-13.25	27.07	-1.88	27.12	0.000032	1.82	7111.9	659.11	0.06
	110672.7	InterimPh1[2]	8526	-13.25	27.06	-1.88	27.11	0.000032	1.82	7107.68	658.77	0.06
	110672.7	Proposed Ph2[3]	8532	-13.25	27.07	-1.88	27.12	0.000032	1.82	7110.35	658.98	0.06
	110672.7	FuturePh3[4]	8535	-13.25	27.07	-1.88	27.12	0.000032	1.82	7111.64	659.08	0.06
	110643.7		Bridge									
	110614.7	Existing[1]	8535	-12.75	27.06	-1.38	27.11	0.000034	1.86	6812.49	639.81	0.06
	110614.7	InterimPh1[2]	8526	-12.75	27.06	-1.38	27.11	0.000034	1.86	6808.32	639.57	0.06
	110614.7	Proposed Ph2[3]	8532	-12.75	27.06	-1.38	27.11	0.000034	1.86	6810.97	639.72	0.06
	110614.7	FuturePh3[4]	8535	-12.75	27.06	-1.38	27.11	0.000034	1.86	6812.24	639.8	0.06
	110200.2	Existing[1]	38442	-9.11	25.88	11.11	26.76	0.000661	8.12	6776.31	438.78	0.28
	110200.2	InterimPh1[2]	38425	-9.11	25.87	11.11	26.75	0.000661	8.12	6773.26	438.61	0.28
	110200.2	Proposed Ph2[3]	38436	-9.11	25.88	11.11	26.76	0.000661	8.12	6775.19	438.71	0.28
	110200.2	FuturePh3[4]	38441	-9.11	25.88	11.11	26.76	0.000661	8.12	6776.13	438.77	0.28
	110154.2		Bridge									
	110108.2	Existing[1]	38442	-9.31	25.47	10.91	26.37	0.000681	8.2	6685.15	433.8	0.28
	110108.2	InterimPh1[2]	38425	-9.31	25.46	10.9	26.36	0.000681	8.19	6682.12	433.63	0.28
	110108.2	Proposed Ph2[3]	38436	-9.31	25.47	10.91	26.37	0.000681	8.2	6684.03	433.74	0.28
	110108.2	FuturePh3[4]	38441	-9.31	25.47	10.91	26.37	0.000681	8.2	6684.97	433.79	0.28
	109551.7	Existing[1]	38442	-14.28	25.27	4.9	25.98	0.000424	6.95	6872.11	334.14	0.22
	109551.7	InterimPh1[2]	38425	-14.28	25.27	4.89	25.97	0.000424	6.95	6869.79	334.11	0.22
	109551.7	Proposed Ph2[3]	38436	-14.28	25.27	4.89	25.97	0.000424	6.95	6871.26	334.13	0.22
	109551.7	FuturePh3[4]	38441	-14.28	25.27	4.91	25.98	0.000424	6.95	6871.98	334.14	0.22
	109518.7		Bridge									
	109485.7	Existing[1]	38442	-15.31	24.45	3.87	25.14	0.000413	6.9	6940.45	334.91	0.22
	109485.7	InterimPh1[2]	38425	-15.31	24.44	3.86	25.13	0.000413	6.89	6938.13	334.89	0.22
	109485.7	Proposed Ph2[3]	38436	-15.31	24.44	3.87	25.14	0.000413	6.89	6939.6	334.9	0.22
	109485.7	FuturePh3[4]	38441	-15.31	24.45	3.87	25.14	0.000413	6.9	6940.31	334.91	0.22

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	109440.2	Existing[1]	38442	-16.48	24.22	4.29	25.07	0.000475	7.65	6468.53	320.55	0.24
	109440.2	InterimPh1[2]	38425	-16.48	24.22	4.29	25.06	0.000475	7.65	6466.33	320.54	0.24
	109440.2	Proposed Ph2[3]	38436	-16.48	24.22	4.29	25.07	0.000475	7.65	6467.72	320.55	0.24
	109440.2	FuturePh3[4]	38441	-16.48	24.22	4.3	25.07	0.000475	7.65	6468.4	320.55	0.24
	109395.2		Bridge									
	109350.2	Existing[1]	38442	-16.89	23.88	3.89	24.73	0.000471	7.63	6491.38	320.66	0.24
	109350.2	InterimPh1[2]	38425	-16.89	23.88	3.88	24.72	0.000471	7.63	6489.19	320.65	0.24
	109350.2	Proposed Ph2[3]	38436	-16.89	23.88	3.88	24.73	0.000471	7.63	6490.57	320.66	0.24
	109350.2	FuturePh3[4]	38441	-16.89	23.88	3.88	24.73	0.000471	7.63	6491.25	320.66	0.24
	109119	Existing[1]	38442	-17.14	23.53	5.52	24.55	0.000684	8.27	5166.5	340.53	0.27
	109119	InterimPh1[2]	38425	-17.14	23.52	5.52	24.54	0.000684	8.27	5164.4	340.44	0.27
	109119	Proposed Ph2[3]	38436	-17.14	23.53	5.51	24.54	0.000684	8.27	5165.72	340.5	0.27
	109119	FuturePh3[4]	38441	-17.14	23.53	5.52	24.55	0.000684	8.27	5166.38	340.53	0.27
	109103.1		Bridge									
	109087.2	Existing[1]	38442	-17.55	23.29	5.1	24.29	0.000669	8.21	5217.83	342.85	0.27
	109087.2	InterimPh1[2]	38425	-17.55	23.28	5.1	24.28	0.000669	8.2	5215.7	342.75	0.27
	109087.2	Proposed Ph2[3]	38436	-17.55	23.28	5.1	24.28	0.000669	8.2	5217.04	342.81	0.27
	109087.2	FuturePh3[4]	38441	-17.55	23.29	5.1	24.29	0.000669	8.21	5217.7	342.84	0.27
	108565.3	Existing[1]	38442	-12.77	23.2	4.31	23.82	0.00043	6.28	6121.16	248.08	0.22
	108565.3	InterimPh1[2]	38425	-12.77	23.2	4.31	23.81	0.00043	6.28	6119.44	248.06	0.22
	108565.3	Proposed Ph2[3]	38436	-12.77	23.2	4.32	23.81	0.00043	6.28	6120.52	248.07	0.22
	108565.3	FuturePh3[4]	38441	-12.77	23.2	4.31	23.82	0.00043	6.28	6121.06	248.08	0.22
	108334	Existing[1]	38442	-14.06	23.17		23.7	0.000357	5.88	6567.67	271.64	0.2
	108334	InterimPh1[2]	38425	-14.06	23.16		23.7	0.000357	5.88	6565.78	271.59	0.2
	108334	Proposed Ph2[3]	38436	-14.06	23.16		23.7	0.000357	5.88	6566.97	271.63	0.2
	108334	FuturePh3[4]	38441	-14.06	23.17		23.7	0.000357	5.88	6567.56	271.64	0.2
	107179.4	Existing[1]	38563	-20.52	22.33	1.36	23.09	0.000677	7	5794.67	336.06	0.24
	107179.4	InterimPh1[2]	38547	-20.52	22.32	1.36	23.08	0.000677	7	5792.34	335.86	0.24
	107179.4	Proposed Ph2[3]	38557	-20.52	22.32	1.36	23.08	0.000677	7	5793.81	335.98	0.24
	107179.4	FuturePh3[4]	38562	-20.52	22.33	1.36	23.08	0.000677	7	5794.53	336.05	0.24
	107158.9		Bridge									
	107138.4	Existing[1]	38563	-20.19	22.15	1.69	22.94	0.000723	7.14	5628.68	321.49	0.25
	107138.4	InterimPh1[2]	38547	-20.19	22.14	1.68	22.93	0.000723	7.14	5626.48	321.29	0.25
	107138.4	Proposed Ph2[3]	38557	-20.19	22.15	1.7	22.94	0.000723	7.14	5627.87	321.41	0.25
	107138.4	FuturePh3[4]	38562	-20.19	22.15	1.69	22.94	0.000723	7.14	5628.56	321.48	0.25
	106594	Existing[1]	38563	-16.7	21.99	0.72	22.58	0.000342	6.2	6402.16	247.38	0.2
	106594	InterimPh1[2]	38547	-16.7	21.98	0.72	22.58	0.000342	6.2	6400.47	247.35	0.2
	106594	Proposed Ph2[3]	38557	-16.7	21.99	0.72	22.58	0.000342	6.2	6401.54	247.37	0.2
	106594	FuturePh3[4]	38562	-16.7	21.99	0.72	22.58	0.000342	6.2	6402.07	247.38	0.2
	106151.4	Existing[1]	38563	-13.85	21.62	3.57	22.36	0.000486	6.94	5887.56	254.9	0.24
	106151.4	InterimPh1[2]	38547	-13.85	21.61	3.57	22.35	0.000486	6.94	5885.82	254.87	0.24
	106151.4	Proposed Ph2[3]	38557	-13.85	21.61	3.56	22.36	0.000486	6.94	5886.92	254.89	0.24
	106151.4	FuturePh3[4]	38562	-13.85	21.62	3.56	22.36	0.000486	6.94	5887.46	254.9	0.24
	106131.1		Bridge									
	106110.8	Existing[1]	38563	-12.53	21.39	4.89	22.23	0.000585	7.37	5499.63	248.35	0.26
	106110.8	InterimPh1[2]	38547	-12.53	21.39	4.89	22.23	0.000585	7.37	5497.94	248.32	0.26
	106110.8	Proposed Ph2[3]	38557	-12.53	21.39	4.89	22.23	0.000585	7.37	5499.01	248.34	0.26
	106110.8	FuturePh3[4]	38562	-12.53	21.39	4.89	22.23	0.000585	7.37	5499.53	248.34	0.26

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	105705.4	Existing[1]	38563	-18.22	21.25	2.18	21.97	0.000431	6.79	5677.64	253.98	0.25
	105705.4	InterimPh1[2]	38547	-18.22	21.25	2.17	21.96	0.000431	6.79	5675.9	253.9	0.25
	105705.4	Proposed Ph2[3]	38557	-18.22	21.25	2.17	21.97	0.000431	6.79	5677	253.95	0.25
	105705.4	FuturePh3[4]	38562	-18.22	21.25	2.17	21.97	0.000431	6.79	5677.54	253.98	0.25
	105667.4		Bridge									
	105629.4	Existing[1]	38563	-18.43	20.95	1.97	21.67	0.000437	6.82	5654.65	252.91	0.25
	105629.4	InterimPh1[2]	38547	-18.43	20.95	1.95	21.67	0.000437	6.82	5652.92	252.83	0.25
	105629.4	Proposed Ph2[3]	38557	-18.43	20.95	1.96	21.67	0.000437	6.82	5654.02	252.88	0.25
	105629.4	FuturePh3[4]	38562	-18.43	20.95	1.97	21.67	0.000437	6.82	5654.55	252.91	0.25
	105211	Existing[1]	38563	-16.14	20.6	2.32	21.44	0.000484	7.39	5215.02	217.48	0.27
	105211	InterimPh1[2]	38547	-16.14	20.59	2.31	21.44	0.000484	7.39	5213.55	217.46	0.27
	105211	Proposed Ph2[3]	38557	-16.14	20.59	2.31	21.44	0.000484	7.39	5214.48	217.47	0.27
	105211	FuturePh3[4]	38562	-16.14	20.6	2.31	21.44	0.000484	7.39	5214.94	217.48	0.27
	104608.2	Existing[1]	38563	-18.46	20.42		21.05	0.0006	6.37	6052.84	386.43	0.28
	104608.2	InterimPh1[2]	38547	-18.46	20.42		21.05	0.0006	6.37	6050.14	386.36	0.28
	104608.2	Proposed Ph2[3]	38557	-18.46	20.42		21.05	0.0006	6.37	6051.85	386.4	0.28
	104608.2	FuturePh3[4]	38562	-18.46	20.42		21.05	0.0006	6.37	6052.69	386.42	0.28
	104370.8	Existing[1]	38563	-19.99	19.8	3.75	20.81	0.00054	8.46	6376.55	436.13	0.28
	104370.8	InterimPh1[2]	38547	-19.99	19.8	3.74	20.8	0.00054	8.46	6373.53	436.1	0.28
	104370.8	Proposed Ph2[3]	38557	-19.99	19.8	3.75	20.8	0.00054	8.46	6375.45	436.12	0.28
	104370.8	FuturePh3[4]	38562	-19.99	19.8	3.75	20.81	0.00054	8.46	6376.38	436.13	0.28
	104350		Bridge									
	104329.2	Existing[1]	38563	-20.2	19.03	3.53	20.1	0.000587	8.7	6130.89	433.75	0.3
	104329.2	InterimPh1[2]	38547	-20.2	19.02	3.53	20.09	0.000587	8.7	6128.01	433.72	0.3
	104329.2	Proposed Ph2[3]	38557	-20.2	19.03	3.53	20.1	0.000587	8.7	6129.84	433.74	0.3
	104329.2	FuturePh3[4]	38562	-20.2	19.03	3.53	20.1	0.000587	8.7	6130.73	433.75	0.3
	103664	Existing[1]	38563	-23.03	16.66		19.11	0.001445	13.24	4062.06	258.55	0.42
	103664	InterimPh1[2]	38547	-23.03	16.66		19.1	0.001445	13.24	4060.45	258.52	0.42
	103664	Proposed Ph2[3]	38557	-23.03	16.66		19.1	0.001445	13.24	4061.48	258.54	0.42
	103664	FuturePh3[4]	38562	-23.03	16.66		19.1	0.001445	13.24	4061.98	258.55	0.42
	102875.3	Existing[1]	38563	-26.39	16.12	0.67	17.85	0.000959	11.43	4869.43	338.69	0.35
	102875.3	InterimPh1[2]	38547	-26.39	16.12	0.66	17.85	0.00096	11.43	4867.23	338.66	0.35
	102875.3	Proposed Ph2[3]	38557	-26.39	16.12	0.66	17.85	0.000959	11.43	4868.64	338.68	0.35
	102875.3	FuturePh3[4]	38562	-26.39	16.12	0.66	17.85	0.000959	11.43	4869.32	338.69	0.35
	102847.5		Bridge									
	102819.7	Existing[1]	38563	-26.43	15.59	0.62	17.44	0.00103	11.73	4705.06	335.2	0.36
	102819.7	InterimPh1[2]	38547	-26.43	15.59	0.63	17.43	0.00103	11.73	4703.08	335.15	0.36
	102819.7	Proposed Ph2[3]	38557	-26.43	15.59	0.62	17.43	0.00103	11.73	4704.36	335.18	0.36
	102819.7	FuturePh3[4]	38562	-26.43	15.59	0.62	17.44	0.00103	11.73	4704.97	335.2	0.36
	102309	Existing[1]	38563	-23.48	15.9		16.58	0.000329	6.59	5855.36	216.46	0.22
	102309	InterimPh1[2]	38547	-23.48	15.9		16.57	0.000329	6.59	5854.09	216.45	0.22
	102309	Proposed Ph2[3]	38557	-23.48	15.9		16.58	0.000329	6.59	5854.91	216.45	0.22
	102309	FuturePh3[4]	38562	-23.48	15.9		16.58	0.000329	6.59	5855.3	216.46	0.22
	101828	Existing[1]	38563	-20.7	15.46	-0.76	16.33	0.0005	7.47	5162.23	219.14	0.27
	101828	InterimPh1[2]	38547	-20.7	15.45	-0.77	16.32	0.0005	7.47	5160.96	219.03	0.27
	101828	Proposed Ph2[3]	38557	-20.7	15.46	-0.77	16.33	0.0005	7.47	5161.78	219.1	0.27
	101828	FuturePh3[4]	38562	-20.7	15.46	-0.76	16.33	0.0005	7.47	5162.17	219.14	0.27
	101790.1		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	101752.2	Existing[1]	38563	-20.69	15.28	-0.76	16.16	0.000513	7.53	5120.38	217.52	0.27
	101752.2	InterimPh1[2]	38547	-20.69	15.27	-0.76	16.15	0.000513	7.53	5119.12	217.5	0.27
	101752.2	Proposed Ph2[3]	38557	-20.69	15.28	-0.76	16.16	0.000513	7.53	5119.93	217.51	0.27
	101752.2	FuturePh3[4]	38562	-20.69	15.28	-0.76	16.16	0.000513	7.53	5120.32	217.52	0.27
	101007.3	Existing[1]	38563	-16.93	15.01		15.72	0.000435	6.76	5703.71	255.98	0.25
	101007.3	InterimPh1[2]	38547	-16.93	15.01		15.72	0.000435	6.76	5702.24	255.95	0.25
	101007.3	Proposed Ph2[3]	38557	-16.93	15.01		15.72	0.000435	6.76	5703.19	255.97	0.25
	101007.3	FuturePh3[4]	38562	-16.93	15.01		15.72	0.000435	6.76	5703.65	255.98	0.25
	99992.6	Existing[1]	38910	-18.9	14.45		15.24	0.000492	7.16	5432.33	238.48	0.26
	99992.6	InterimPh1[2]	38894	-18.9	14.44		15.24	0.000492	7.16	5430.97	238.48	0.26
	99992.6	Proposed Ph2[3]	38904	-18.9	14.45		15.24	0.000492	7.16	5431.86	238.48	0.26
	99992.6	FuturePh3[4]	38909	-18.9	14.45		15.24	0.000492	7.16	5432.27	238.48	0.26
	98399.4	Existing[1]	38910	-20.26	13.7		14.45	0.000482	6.95	5600.82	250.77	0.26
	98399.4	InterimPh1[2]	38894	-20.26	13.7		14.45	0.000482	6.95	5599.41	250.75	0.26
	98399.4	Proposed Ph2[3]	38904	-20.26	13.7		14.45	0.000482	6.95	5600.33	250.76	0.26
	98399.4	FuturePh3[4]	38909	-20.26	13.7		14.45	0.000482	6.95	5600.77	250.77	0.26
	97517.4	Existing[1]	38910	-19.35	13.64		14.07	0.000233	5.24	7437.36	311	0.19
	97517.4	InterimPh1[2]	38894	-19.35	13.64		14.07	0.000233	5.24	7435.59	311	0.19
	97517.4	Proposed Ph2[3]	38904	-19.35	13.64		14.07	0.000233	5.24	7436.75	311	0.19
	97517.4	FuturePh3[4]	38909	-19.35	13.64		14.07	0.000233	5.24	7437.29	311	0.19
	96028.6	Existing[1]	38910	-17.81	12.83	-3.25	13.52	0.000446	6.7	5819.99	277.03	0.25
	96028.6	InterimPh1[2]	38894	-17.81	12.82	-3.25	13.52	0.000446	6.7	5818.44	276.99	0.25
	96028.6	Proposed Ph2[3]	38904	-17.81	12.82	-3.25	13.52	0.000446	6.7	5819.46	277.01	0.25
	96028.6	FuturePh3[4]	38909	-17.81	12.82	-3.25	13.52	0.000446	6.7	5819.93	277.02	0.25
	95985.1		Bridge									
	95941.6	Existing[1]	38910	-17.87	12.67	-3.3	13.37	0.000453	6.73	5793.96	276.44	0.25
	95941.6	InterimPh1[2]	38894	-17.87	12.67	-3.3	13.37	0.000453	6.73	5792.42	276.41	0.25
	95941.6	Proposed Ph2[3]	38904	-17.87	12.67	-3.31	13.37	0.000453	6.73	5793.43	276.43	0.25
	95941.6	FuturePh3[4]	38909	-17.87	12.67	-3.3	13.37	0.000453	6.73	5793.9	276.44	0.25
	95362.9	Existing[1]	38910	-15.97	12.47		13.08	0.000419	6.26	6212.43	312.99	0.25
	95362.9	InterimPh1[2]	38894	-15.97	12.46		13.07	0.000419	6.26	6210.67	312.96	0.25
	95362.9	Proposed Ph2[3]	38904	-15.97	12.46		13.07	0.000419	6.26	6211.83	312.98	0.25
	95362.9	FuturePh3[4]	38909	-15.97	12.47		13.07	0.000419	6.26	6212.37	312.98	0.25
	94280.7	Existing[1]	39073	-19.82	11.41		12.47	0.000664	8.25	4733.33	202.44	0.3
	94280.7	InterimPh1[2]	39057	-19.82	11.4		12.46	0.000664	8.25	4732.25	202.42	0.3
	94280.7	Proposed Ph2[3]	39068	-19.82	11.41		12.46	0.000664	8.25	4732.95	202.43	0.3
	94280.7	FuturePh3[4]	39073	-19.82	11.41		12.47	0.000664	8.25	4733.27	202.43	0.3
	93495.6	Existing[1]	39073	-20.43	11.18		11.9	0.00053	6.8	5749.16	300.95	0.27
	93495.6	InterimPh1[2]	39057	-20.43	11.18		11.89	0.00053	6.8	5747.53	300.9	0.27
	93495.6	Proposed Ph2[3]	39068	-20.43	11.18		11.9	0.00053	6.8	5748.59	300.93	0.27
	93495.6	FuturePh3[4]	39073	-20.43	11.18		11.9	0.00053	6.8	5749.08	300.94	0.27
	92795.6	Existing[1]	39136	-20.98	10.81	-5.19	11.54	0.00049	6.84	5718.49	277.85	0.27
	92795.6	InterimPh1[2]	39120	-20.98	10.81	-5.2	11.53	0.00049	6.84	5717.01	277.81	0.27
	92795.6	Proposed Ph2[3]	39131	-20.98	10.81	-5.19	11.54	0.00049	6.84	5717.96	277.84	0.27
	92795.6	FuturePh3[4]	39136	-20.98	10.81	-5.19	11.54	0.00049	6.84	5718.41	277.84	0.27
	92741.1		Bridge									
	92686.6	Existing[1]	39136	-21.08	10.59	-5.29	11.33	0.000498	6.88	5684.38	277.09	0.27
	92686.6	InterimPh1[2]	39120	-21.08	10.58	-5.29	11.32	0.000498	6.88	5682.91	277.06	0.27
	92686.6	Proposed Ph2[3]	39131	-21.08	10.59	-5.3	11.32	0.000498	6.88	5683.86	277.08	0.27
	92686.6	FuturePh3[4]	39136	-21.08	10.59	-5.29	11.33	0.000498	6.88	5684.3	277.09	0.27

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	90936.7	Existing[1]	39136	-18.64	9.61		10.3	0.000667	6.68	5861.07	382.22	0.3
	90936.7	InterimPh1[2]	39120	-18.64	9.6		10.29	0.000668	6.68	5859	382.18	0.3
	90936.7	Proposed Ph2[3]	39131	-18.64	9.61		10.3	0.000667	6.68	5860.32	382.2	0.3
	90936.7	FuturePh3[4]	39136	-18.64	9.61		10.3	0.000667	6.68	5860.94	382.21	0.3
	89918.4	Existing[1]	39247	-17.23	8.44		9.46	0.00095	8.12	4831.61	305.25	0.36
	89918.4	InterimPh1[2]	39230	-17.23	8.43		9.46	0.00095	8.12	4829.94	305.23	0.36
	89918.4	Proposed Ph2[3]	39241	-17.23	8.44		9.46	0.00095	8.12	4831.01	305.25	0.36
	89918.4	FuturePh3[4]	39246	-17.23	8.44		9.46	0.00095	8.12	4831.51	305.25	0.36
	88579	Existing[1]	39247	-20.97	7.24		8.22	0.000883	7.94	4942.58	306.26	0.35
	88579	InterimPh1[2]	39230	-20.97	7.24		8.22	0.000883	7.94	4940.84	306.23	0.35
	88579	Proposed Ph2[3]	39241	-20.97	7.24		8.22	0.000883	7.94	4941.95	306.25	0.35
	88579	FuturePh3[4]	39246	-20.97	7.24		8.22	0.000883	7.94	4942.47	306.26	0.35
	87591.9	Existing[1]	39247	-23.72	6.69		7.46	0.000586	7.04	5573.03	298.66	0.29
	87591.9	InterimPh1[2]	39230	-23.72	6.68		7.45	0.000586	7.04	5571.32	298.65	0.29
	87591.9	Proposed Ph2[3]	39241	-23.72	6.68		7.45	0.000586	7.04	5572.41	298.65	0.29
	87591.9	FuturePh3[4]	39246	-23.72	6.69		7.46	0.000586	7.04	5572.93	298.66	0.29
	86660.2	Existing[1]	39247	-23.42	6.35	-10.08	6.95	0.000359	6.2	6334.13	286.28	0.23
	86660.2	InterimPh1[2]	39230	-23.42	6.35	-10.08	6.94	0.000359	6.2	6332.49	286.26	0.23
	86660.2	Proposed Ph2[3]	39241	-23.42	6.35	-10.08	6.95	0.000359	6.2	6333.53	286.27	0.23
	86660.2	FuturePh3[4]	39246	-23.42	6.35	-10.07	6.95	0.000359	6.2	6334.03	286.27	0.23
	86641.7		Bridge									
	86623.2	Existing[1]	39247	-23.61	5.99	-10.26	6.59	0.000368	6.25	6283.36	285.19	0.23
	86623.2	InterimPh1[2]	39230	-23.61	5.98	-10.27	6.59	0.000368	6.25	6281.75	285.15	0.23
	86623.2	Proposed Ph2[3]	39241	-23.61	5.98	-10.26	6.59	0.000368	6.25	6282.77	285.17	0.23
	86623.2	FuturePh3[4]	39246	-23.61	5.98	-10.27	6.59	0.000368	6.25	6283.26	285.19	0.23
	85855.2	Existing[1]	39247	-26.84	4.6		5.95	0.000907	9.31	4216.92	200.58	0.36
	85855.2	InterimPh1[2]	39230	-26.84	4.6		5.94	0.000906	9.31	4215.87	200.56	0.36
	85855.2	Proposed Ph2[3]	39241	-26.84	4.6		5.95	0.000906	9.31	4216.53	200.57	0.36
	85855.2	FuturePh3[4]	39246	-26.84	4.6		5.95	0.000906	9.31	4216.85	200.58	0.36
	85238.7	Existing[1]	39247	-29.43	4.3		5.39	0.000671	8.38	4685.47	215.48	0.31
	85238.7	InterimPh1[2]	39230	-29.43	4.3		5.39	0.000671	8.38	4684.35	215.36	0.31
	85238.7	Proposed Ph2[3]	39241	-29.43	4.3		5.39	0.000671	8.38	4685.06	215.44	0.31
	85238.7	FuturePh3[4]	39246	-29.43	4.3		5.39	0.000671	8.38	4685.4	215.47	0.31
	84561.7	Existing[1]	39247	-32.27	4.02	-13.14	4.9	0.000492	7.51	5223.35	214.36	0.27
	84561.7	InterimPh1[2]	39230	-32.27	4.02	-13.15	4.89	0.000492	7.51	5222.25	214.35	0.27
	84561.7	Proposed Ph2[3]	39241	-32.27	4.02	-13.14	4.9	0.000492	7.51	5222.94	214.36	0.27
	84561.7	FuturePh3[4]	39246	-32.27	4.02	-13.14	4.9	0.000492	7.51	5223.28	214.36	0.27
	84531.4		Bridge									
	84501.1	Existing[1]	39247	-28.97	3.54	-9.85	4.76	0.000785	8.85	4432.92	203.63	0.33
	84501.1	InterimPh1[2]	39230	-28.97	3.54	-9.85	4.75	0.000785	8.85	4431.9	203.61	0.33
	84501.1	Proposed Ph2[3]	39241	-28.97	3.54	-9.84	4.76	0.000785	8.85	4432.54	203.62	0.33
	84501.1	FuturePh3[4]	39246	-28.97	3.54	-9.85	4.76	0.000785	8.85	4432.85	203.63	0.33
	84252.6	Existing[1]	39247	-26.9	3.45	-9.61	4.48	0.000697	8.16	4808.9	232.72	0.32
	84252.6	InterimPh1[2]	39230	-26.9	3.44	-9.61	4.48	0.000697	8.16	4807.74	232.7	0.32
	84252.6	Proposed Ph2[3]	39241	-26.9	3.45	-9.62	4.48	0.000697	8.16	4808.46	232.71	0.32
	84252.6	FuturePh3[4]	39246	-26.9	3.45	-9.62	4.48	0.000697	8.16	4808.83	232.72	0.32
	84222.3		Bridge									
	84192	Existing[1]	39247	-24.1	2.82	-6.81	4.3	0.001168	9.74	4030.02	222.16	0.4
	84192	InterimPh1[2]	39230	-24.1	2.82	-6.82	4.29	0.001168	9.74	4028.94	222.15	0.4
	84192	Proposed Ph2[3]	39241	-24.1	2.82	-6.81	4.3	0.001168	9.74	4029.61	222.16	0.4
	84192	FuturePh3[4]	39246	-24.1	2.82	-6.81	4.3	0.001168	9.74	4029.95	222.16	0.4

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
10PCT_10yr	83635.7	Existing[1]	39496	-21.72	2.49		3.47	0.000938	7.91	4990.21	326.21	0.36
	83635.7	InterimPh1[2]	39480	-21.72	2.49		3.46	0.000938	7.91	4988.55	326.19	0.36
	83635.7	Proposed Ph2[3]	39490	-21.72	2.49		3.47	0.000938	7.91	4989.58	326.2	0.36
	83635.7	FuturePh3[4]	39495	-21.72	2.49		3.47	0.000938	7.91	4990.11	326.21	0.36
	81786.1	Existing[1]	39496	-31.97	1.01		1.87	0.000763	7.46	5291.02	322.19	0.32
	81786.1	InterimPh1[2]	39480	-31.97	1		1.87	0.000763	7.46	5289.31	322.14	0.32
	81786.1	Proposed Ph2[3]	39490	-31.97	1.01		1.87	0.000763	7.46	5290.38	322.17	0.32
	81786.1	FuturePh3[4]	39495	-31.97	1.01		1.87	0.000763	7.46	5290.91	322.19	0.32
	80903.1	Existing[1]	39606	-27.77	0.49	-12.43	1.18	0.000625	6.65	5953.38	365.2	0.29
	80903.1	InterimPh1[2]	39590	-27.77	0.48	-12.43	1.17	0.000625	6.65	5951.43	365.14	0.29
	80903.1	Proposed Ph2[3]	39600	-27.77	0.49	-12.43	1.18	0.000625	6.65	5952.65	365.18	0.29
	80903.1	FuturePh3[4]	39605	-27.77	0.49	-12.42	1.18	0.000625	6.65	5953.26	365.19	0.29
	80883.1		Bridge									
	80863.1	Existing[1]	39606	-28.1	-0.06	-12.75	0.64	0.000648	6.74	5872.49	362.82	0.3
	80863.1	InterimPh1[2]	39590	-28.1	-0.07	-12.76	0.64	0.000648	6.74	5870.56	362.77	0.3
	80863.1	Proposed Ph2[3]	39600	-28.1	-0.06	-12.76	0.64	0.000648	6.74	5871.77	362.8	0.3
	80863.1	FuturePh3[4]	39605	-28.1	-0.06	-12.75	0.64	0.000648	6.74	5872.37	362.82	0.3
	80538	Existing[1]	39606	-33.12	0.08	-20.17	0.32	0.00015	3.95	10017.38	472.21	0.15
	80538	InterimPh1[2]	39590	-33.12	0.08	-20.17	0.32	0.00015	3.95	10014.86	472.16	0.15
	80538	Proposed Ph2[3]	39600	-33.12	0.08	-20.17	0.32	0.00015	3.95	10016.43	472.19	0.15
	80538	FuturePh3[4]	39605	-33.12	0.08	-20.17	0.32	0.00015	3.95	10017.23	472.21	0.15
1PCT_100yr	248647.7	Existing[1]	3803	56.61	77.38		77.46	0.000037	2.26	1684.03	153.24	0.12
	248647.7	InterimPh1[2]	3803	56.61	77.38		77.46	0.000037	2.26	1684.02	153.24	0.12
	248647.7	Proposed Ph2[3]	3803	56.61	77.38		77.46	0.000037	2.26	1684.02	153.24	0.12
	248647.7	FuturePh3[4]	3803	56.61	77.38		77.46	0.000037	2.26	1684.02	153.24	0.12
	248547.8	Existing[1]	3803	56.16	77.37	63.57	77.45	0.000132	2.18	1752.6	158.29	0.11
	248547.8	InterimPh1[2]	3803	56.16	77.37	63.57	77.45	0.000132	2.18	1752.58	158.29	0.11
	248547.8	Proposed Ph2[3]	3803	56.16	77.37	63.57	77.45	0.000132	2.18	1752.59	158.29	0.11
	248547.8	FuturePh3[4]	3803	56.16	77.37	63.57	77.45	0.000132	2.18	1752.59	158.29	0.11
	248481.1		Bridge									
	248414.4	Existing[1]	3803	55.9	77.13	63.3	77.2	0.000132	2.17	1755.26	159.27	0.11
	248414.4	InterimPh1[2]	3803	55.9	77.13	63.3	77.2	0.000132	2.17	1755.24	159.26	0.11
	248414.4	Proposed Ph2[3]	3803	55.9	77.13	63.3	77.2	0.000132	2.17	1755.24	159.26	0.11
	248414.4	FuturePh3[4]	3803	55.9	77.13	63.3	77.2	0.000132	2.17	1755.25	159.26	0.11
	247502	Existing[1]	3797	50.81	76.97		77.02	0.000291	1.8	2113.5	156.43	0.09
	247502	InterimPh1[2]	3797	50.81	76.97		77.02	0.000291	1.8	2113.49	156.43	0.09
	247502	Proposed Ph2[3]	3797	50.81	76.97		77.02	0.000291	1.8	2113.49	156.43	0.09
	247502	FuturePh3[4]	3797	50.81	76.97		77.02	0.000291	1.8	2113.5	156.43	0.09
	246449.8	Existing[1]	3797	52.3	76.71		76.76	0.000213	1.79	2147.36	239.41	0.09
	246449.8	InterimPh1[2]	3797	52.3	76.71		76.76	0.000213	1.79	2147.33	239.4	0.09
	246449.8	Proposed Ph2[3]	3797	52.3	76.71		76.76	0.000213	1.79	2147.33	239.4	0.09
	246449.8	FuturePh3[4]	3797	52.3	76.71		76.76	0.000213	1.79	2147.34	239.4	0.09
	245413.7	Existing[1]	3784	51.09	76.47		76.52	0.000255	1.76	2147.14	157.35	0.08
	245413.7	InterimPh1[2]	3784	51.09	76.47		76.52	0.000255	1.76	2147.11	157.35	0.08
	245413.7	Proposed Ph2[3]	3784	51.09	76.47		76.52	0.000255	1.76	2147.12	157.35	0.08
	245413.7	FuturePh3[4]	3784	51.09	76.47		76.52	0.000255	1.76	2147.13	157.35	0.08

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	244345.5	Existing[1]	3784	49	76.24		76.27	0.000202	1.56	2430.24	195.27	0.08
	244345.5	InterimPh1[2]	3784	49	76.24		76.27	0.000202	1.56	2430.22	195.27	0.08
	244345.5	Proposed Ph2[3]	3784	49	76.24		76.27	0.000202	1.56	2430.22	195.27	0.08
	244345.5	FuturePh3[4]	3784	49	76.24		76.27	0.000202	1.56	2430.23	195.27	0.08
	243452.9	Existing[1]	3772	49	76.1		76.12	0.000135	1.37	3559.03	590.28	0.06
	243452.9	InterimPh1[2]	3772	49	76.1		76.12	0.000135	1.37	3558.94	590.26	0.06
	243452.9	Proposed Ph2[3]	3772	49	76.1		76.12	0.000135	1.37	3558.96	590.27	0.06
	243452.9	FuturePh3[4]	3772	49	76.1		76.12	0.000135	1.37	3558.98	590.27	0.06
	242655.3	Existing[1]	3772	49.31	75.92		75.96	0.000337	1.63	2920.57	705.15	0.08
	242655.3	InterimPh1[2]	3772	49.31	75.92		75.96	0.000337	1.63	2920.46	705.13	0.08
	242655.3	Proposed Ph2[3]	3772	49.31	75.92		75.96	0.000337	1.63	2920.49	705.13	0.08
	242655.3	FuturePh3[4]	3772	49.31	75.92		75.96	0.000337	1.63	2920.51	705.14	0.08
	241917.5	Existing[1]	3772	48.64	75.76	57.62	75.78	0.000174	1.31	3573.15	1293.15	0.06
	241917.5	InterimPh1[2]	3772	48.64	75.76	57.62	75.78	0.000174	1.31	3572.99	1292.99	0.06
	241917.5	Proposed Ph2[3]	3772	48.64	75.76	57.62	75.78	0.000174	1.31	3573.04	1293.04	0.06
	241917.5	FuturePh3[4]	3772	48.64	75.76	57.62	75.78	0.000174	1.31	3573.07	1293.07	0.06
	241646.1	Existing[1]	3772	48.4	75.7	57.39	75.74	0.000157	1.47	3538.42	1241.02	0.06
	241646.1	InterimPh1[2]	3772	48.4	75.7	57.39	75.74	0.000157	1.47	3538.21	1240.93	0.06
	241646.1	Proposed Ph2[3]	3772	48.4	75.7	57.39	75.74	0.000157	1.47	3538.27	1240.96	0.06
	241646.1	FuturePh3[4]	3772	48.4	75.7	57.39	75.74	0.000157	1.47	3538.3	1240.97	0.06
	241632.7		Bridge									
	241619.3	Existing[1]	3772	48.33	75.68	57.31	75.71	0.000155	1.46	3592.59	1262.38	0.06
	241619.3	InterimPh1[2]	3772	48.33	75.68	57.31	75.71	0.000155	1.46	3592.37	1262.3	0.06
	241619.3	Proposed Ph2[3]	3772	48.33	75.68	57.31	75.71	0.000155	1.46	3592.43	1262.32	0.06
	241619.3	FuturePh3[4]	3772	48.33	75.68	57.31	75.71	0.000155	1.46	3592.47	1262.33	0.06
	241079	Existing[1]	3758	49.13	75.64		75.65	0.000062	0.89	5543.84	952.18	0.04
	241079	InterimPh1[2]	3758	49.13	75.64		75.65	0.000062	0.89	5543.68	952.16	0.04
	241079	Proposed Ph2[3]	3758	49.13	75.64		75.65	0.000062	0.89	5543.72	952.17	0.04
	241079	FuturePh3[4]	3758	49.13	75.64		75.65	0.000062	0.89	5543.75	952.17	0.04
	240579	Existing[1]	3758	48.94	75.59		75.61	0.0001	1.07	3810.9	932.08	0.05
	240579	InterimPh1[2]	3758	48.94	75.59		75.61	0.0001	1.07	3810.74	932.03	0.05
	240579	Proposed Ph2[3]	3758	48.94	75.59		75.61	0.0001	1.07	3810.78	932.04	0.05
	240579	FuturePh3[4]	3758	48.94	75.59		75.61	0.0001	1.07	3810.81	932.05	0.05
	240376.3	Existing[1]	3758	48.86	75.57	55.58	75.58	0.000147	1.09	3659.06	806.27	0.05
	240376.3	InterimPh1[2]	3758	48.86	75.57	55.58	75.58	0.000147	1.09	3658.95	806.17	0.05
	240376.3	Proposed Ph2[3]	3758	48.86	75.57	55.58	75.58	0.000147	1.09	3658.98	806.2	0.05
	240376.3	FuturePh3[4]	3758	48.86	75.57	55.58	75.58	0.000147	1.09	3659	806.21	0.05
	240315.3		Bridge									
	240254.3	Existing[1]	3758	48.68	75.54	55.4	75.56	0.000143	1.08	3754.13	861.64	0.05
	240254.3	InterimPh1[2]	3758	48.68	75.54	55.4	75.56	0.000143	1.08	3754.02	861.55	0.05
	240254.3	Proposed Ph2[3]	3758	48.68	75.54	55.4	75.56	0.000143	1.08	3754.04	861.57	0.05
	240254.3	FuturePh3[4]	3758	48.68	75.54	55.4	75.56	0.000143	1.08	3754.06	861.59	0.05
	239993.6	Existing[1]	6670	47	75.42		75.47	0.000535	1.93	5026.85	1685.22	0.09
	239993.6	InterimPh1[2]	6670	47	75.42		75.47	0.000535	1.93	5026.54	1685.19	0.09
	239993.6	Proposed Ph2[3]	6670	47	75.42		75.47	0.000535	1.93	5026.62	1685.2	0.09
	239993.6	FuturePh3[4]	6670	47	75.42		75.47	0.000535	1.93	5026.68	1685.2	0.09
	239036.8	Existing[1]	6670	47.67	74.85		74.93	0.000587	2.29	3312.88	839.65	0.1
	239036.8	InterimPh1[2]	6670	47.67	74.85		74.93	0.000587	2.29	3312.69	839.52	0.1
	239036.8	Proposed Ph2[3]	6670	47.67	74.85		74.93	0.000587	2.29	3312.74	839.55	0.1
	239036.8	FuturePh3[4]	6670	47.67	74.85		74.93	0.000587	2.29	3312.77	839.58	0.1

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	238060.4	Existing[1]	6670	45.2	74.28		74.36	0.000581	2.25	3444.02	661.25	0.1
	238060.4	InterimPh1[2]	6670	45.2	74.28		74.36	0.000581	2.25	3443.85	661.2	0.1
	238060.4	Proposed Ph2[3]	6670	45.2	74.28		74.36	0.000581	2.25	3443.89	661.21	0.1
	238060.4	FuturePh3[4]	6670	45.2	74.28		74.36	0.000581	2.25	3443.92	661.22	0.1
	237276.3	Existing[1]	6670	44.89	73.84		73.9	0.00058	2.01	3943.22	789.35	0.09
	237276.3	InterimPh1[2]	6670	44.89	73.84		73.9	0.00058	2.01	3942.98	789.26	0.09
	237276.3	Proposed Ph2[3]	6670	44.89	73.84		73.9	0.00058	2.01	3943.04	789.28	0.09
	237276.3	FuturePh3[4]	6670	44.89	73.84		73.9	0.00058	2.01	3943.09	789.3	0.09
	236611	Existing[1]	6923	44.63	73.44		73.51	0.000589	2.25	3750.81	722	0.1
	236611	InterimPh1[2]	6923	44.63	73.44		73.51	0.000589	2.25	3750.57	721.94	0.1
	236611	Proposed Ph2[3]	6923	44.63	73.44		73.51	0.000589	2.25	3750.63	721.96	0.1
	236611	FuturePh3[4]	6923	44.63	73.44		73.51	0.000589	2.25	3750.68	721.97	0.1
	235706.9	Existing[1]	6923	44.41	72.87		72.97	0.000611	2.44	3300.66	738.4	0.11
	235706.9	InterimPh1[2]	6923	44.41	72.87		72.96	0.000611	2.44	3300.37	738.29	0.11
	235706.9	Proposed Ph2[3]	6923	44.41	72.87		72.96	0.000611	2.44	3300.45	738.32	0.11
	235706.9	FuturePh3[4]	6923	44.41	72.87		72.96	0.000611	2.44	3300.5	738.34	0.11
	234807.9	Existing[1]	7139	44.91	72.64		72.69	0.000174	1.85	5219.18	438.55	0.08
	234807.9	InterimPh1[2]	7139	44.91	72.64		72.69	0.000174	1.85	5219	438.53	0.08
	234807.9	Proposed Ph2[3]	7139	44.91	72.64		72.69	0.000174	1.85	5219.05	438.54	0.08
	234807.9	FuturePh3[4]	7139	44.91	72.64		72.69	0.000174	1.85	5219.08	438.54	0.08
	233698.4	Existing[1]	7139	45.45	72.48	54.64	72.49	0.000154	1.33	8496.97	875.58	0.06
	233698.4	InterimPh1[2]	7139	45.45	72.48	54.64	72.49	0.000154	1.33	8496.6	875.57	0.06
	233698.4	Proposed Ph2[3]	7139	45.45	72.48	54.64	72.49	0.000154	1.33	8496.69	875.57	0.06
	233698.4	FuturePh3[4]	7139	45.45	72.48	54.64	72.49	0.000154	1.33	8496.75	875.57	0.06
	233029.3	Existing[1]	7139	43.15	72.2		72.31	0.000556	2.64	2760.97	320.55	0.12
	233029.3	InterimPh1[2]	7139	43.15	72.2		72.31	0.000556	2.64	2760.83	319.89	0.12
	233029.3	Proposed Ph2[3]	7139	43.15	72.2		72.31	0.000556	2.64	2760.87	320.06	0.12
	233029.3	FuturePh3[4]	7139	43.15	72.2		72.31	0.000556	2.64	2760.89	320.16	0.12
	232816.9	Existing[1]	7254	42.42	72.09	53.76	72.19	0.00052	2.51	2889.25	542.86	0.11
	232816.9	InterimPh1[2]	7254	42.42	72.09	53.76	72.19	0.00052	2.51	2889.17	542.83	0.11
	232816.9	Proposed Ph2[3]	7254	42.42	72.09	53.76	72.19	0.00052	2.51	2889.19	542.84	0.11
	232816.9	FuturePh3[4]	7254	42.42	72.09	53.76	72.19	0.00052	2.51	2889.2	542.85	0.11
	232805.9		Bridge									
	232794.9	Existing[1]	7254	42.38	72.07	53.72	72.17	0.000518	2.51	2892.54	544.13	0.11
	232794.9	InterimPh1[2]	7254	42.38	72.07	53.72	72.17	0.000518	2.51	2892.46	544.1	0.11
	232794.9	Proposed Ph2[3]	7254	42.38	72.07	53.72	72.17	0.000518	2.51	2892.48	544.11	0.11
	232794.9	FuturePh3[4]	7254	42.38	72.07	53.72	72.17	0.000518	2.51	2892.5	544.12	0.11
	232790.8	Existing[1]	7254	42.38	72.06	53.6	72.17	0.000464	2.58	2813.92	539.51	0.11
	232790.8	InterimPh1[2]	7254	42.38	72.06	53.6	72.16	0.000464	2.58	2813.84	539.48	0.11
	232790.8	Proposed Ph2[3]	7254	42.38	72.06	53.6	72.16	0.000464	2.58	2813.86	539.49	0.11
	232790.8	FuturePh3[4]	7254	42.38	72.06	53.6	72.17	0.000464	2.58	2813.88	539.49	0.11
	232732.9		Bridge									
	232681.7	Existing[1]	7254	43.64	71.82	54.17	71.92	0.000335	2.57	2818.04	182.9	0.12
	232681.7	InterimPh1[2]	7254	43.64	71.82	54.17	71.92	0.000335	2.57	2817.96	182.89	0.12
	232681.7	Proposed Ph2[3]	7254	43.64	71.82	54.17	71.92	0.000335	2.57	2817.98	182.9	0.12
	232681.7	FuturePh3[4]	7254	43.64	71.82	54.17	71.92	0.000335	2.57	2818	182.9	0.12
	232669.7		Bridge									
	232657.7	Existing[1]	7254	44.33	71.76	54.86	71.87	0.00037	2.7	2682.34	178.51	0.12
	232657.7	InterimPh1[2]	7254	44.33	71.76	54.86	71.87	0.00037	2.7	2682.26	178.5	0.12

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	232657.7	Proposed Ph2[3]	7254	44.33	71.76	54.86	71.87	0.00037	2.7	2682.28	178.5	0.12
	232657.7	FuturePh3[4]	7254	44.33	71.76	54.86	71.87	0.00037	2.7	2682.29	178.51	0.12
	232645.3		Bridge									
	232632.3	Existing[1]	7254	44.3	71.74	54.83	71.85	0.000371	2.7	2685.93	179.04	0.12
	232632.3	InterimPh1[2]	7254	44.3	71.73	54.83	71.85	0.000371	2.7	2685.85	179.04	0.12
	232632.3	Proposed Ph2[3]	7254	44.3	71.74	54.83	71.85	0.000371	2.7	2685.87	179.04	0.12
	232632.3	FuturePh3[4]	7254	44.3	71.74	54.83	71.85	0.000371	2.7	2685.88	179.04	0.12
	231798	Existing[1]	7344	41.92	71.28		71.37	0.000935	2.52	3025.04	377.11	0.12
	231798	InterimPh1[2]	7344	41.92	71.28		71.37	0.000935	2.52	3024.85	377.05	0.12
	231798	Proposed Ph2[3]	7344	41.92	71.28		71.37	0.000935	2.52	3024.9	377.07	0.12
	231798	FuturePh3[4]	7344	41.92	71.28		71.37	0.000935	2.52	3024.94	377.08	0.12
	230908	Existing[1]	7549	42.68	70.85		70.89	0.000346	1.68	7279.17	1133.29	0.07
	230908	InterimPh1[2]	7549	42.68	70.85		70.89	0.000346	1.68	7278.55	1133.07	0.07
	230908	Proposed Ph2[3]	7549	42.68	70.85		70.89	0.000346	1.68	7278.7	1133.12	0.07
	230908	FuturePh3[4]	7549	42.68	70.85		70.89	0.000346	1.68	7278.82	1133.16	0.07
	229882.5	Existing[1]	7549	41.58	70.67		70.7	0.000112	1.68	8360.04	1872.17	0.07
	229882.5	InterimPh1[2]	7549	41.58	70.67		70.7	0.000112	1.68	8358.95	1871.84	0.07
	229882.5	Proposed Ph2[3]	7549	41.58	70.67		70.7	0.000112	1.68	8359.21	1871.92	0.07
	229882.5	FuturePh3[4]	7549	41.58	70.67		70.7	0.000112	1.68	8359.41	1871.98	0.07
	228917.1	Existing[1]	7745	41.61	70.56		70.59	0.000125	1.57	8767.05	1106.95	0.06
	228917.1	InterimPh1[2]	7745	41.61	70.56		70.59	0.000125	1.57	8766.38	1106.72	0.06
	228917.1	Proposed Ph2[3]	7745	41.61	70.56		70.59	0.000125	1.57	8766.55	1106.78	0.06
	228917.1	FuturePh3[4]	7745	41.61	70.56		70.59	0.000125	1.57	8766.67	1106.82	0.06
	228060.7	Existing[1]	7745	40.89	70.47		70.48	0.000115	1.28	13567.7	2312.83	0.05
	228060.7	InterimPh1[2]	7745	40.89	70.47		70.48	0.000115	1.28	13566.29	2312.71	0.05
	228060.7	Proposed Ph2[3]	7745	40.89	70.47		70.48	0.000115	1.28	13566.64	2312.74	0.05
	228060.7	FuturePh3[4]	7745	40.89	70.47		70.48	0.000115	1.28	13566.91	2312.76	0.05
	227524.1	Existing[1]	7745	40.54	70.36	50.85	70.41	0.000156	1.81	7599.14	2169.3	0.07
	227524.1	InterimPh1[2]	7745	40.54	70.36	50.85	70.41	0.000156	1.81	7597.79	2168.44	0.07
	227524.1	Proposed Ph2[3]	7745	40.54	70.36	50.85	70.41	0.000156	1.81	7598.12	2168.65	0.07
	227524.1	FuturePh3[4]	7745	40.54	70.36	50.85	70.41	0.000156	1.81	7598.37	2168.8	0.07
	227144.7	Existing[1]	7870	40.3	70.31	50.66	70.35	0.000126	1.68	7363.77	1483.99	0.06
	227144.7	InterimPh1[2]	7870	40.3	70.31	50.66	70.35	0.000126	1.68	7362.87	1483.49	0.06
	227144.7	Proposed Ph2[3]	7870	40.3	70.31	50.66	70.35	0.000126	1.68	7363.08	1483.61	0.06
	227144.7	FuturePh3[4]	7870	40.3	70.31	50.66	70.35	0.000126	1.68	7363.26	1483.71	0.06
	227088.2		Bridge									
	227031.7	Existing[1]	7870	40.22	70.29	50.58	70.33	0.000125	1.67	7446.4	1529.87	0.06
	227031.7	InterimPh1[2]	7870	40.22	70.29	50.58	70.33	0.000125	1.67	7445.45	1529.35	0.06
	227031.7	Proposed Ph2[3]	7870	40.22	70.29	50.58	70.33	0.000125	1.67	7445.67	1529.48	0.06
	227031.7	FuturePh3[4]	7870	40.22	70.29	50.58	70.33	0.000125	1.67	7445.86	1529.58	0.06
	225979.2	Existing[1]	8117	40.46	70.1		70.14	0.000256	1.84	5390.48	626.49	0.08
	225979.2	InterimPh1[2]	8117	40.46	70.1		70.14	0.000256	1.84	5390.06	626.16	0.08
	225979.2	Proposed Ph2[3]	8117	40.46	70.1		70.14	0.000256	1.84	5390.16	626.23	0.08
	225979.2	FuturePh3[4]	8117	40.46	70.1		70.14	0.000256	1.84	5390.24	626.3	0.08
	224981.6	Existing[1]	8422	40.72	69.79		69.83	0.000402	1.92	7438.12	1144.03	0.08
	224981.6	InterimPh1[2]	8422	40.72	69.79		69.82	0.000402	1.92	7437.31	1143.79	0.08
	224981.6	Proposed Ph2[3]	8422	40.72	69.79		69.82	0.000402	1.92	7437.49	1143.84	0.08
	224981.6	FuturePh3[4]	8422	40.72	69.79		69.82	0.000402	1.92	7437.66	1143.89	0.08

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	224198	Existing[1]	8422	39.2	69.49		69.54	0.000333	1.91	5706.32	555.98	0.08
	224198	InterimPh1[2]	8422	39.2	69.49		69.53	0.000333	1.91	5705.9	555.83	0.08
	224198	Proposed Ph2[3]	8422	39.2	69.49		69.53	0.000333	1.91	5706	555.86	0.08
	224198	FuturePh3[4]	8422	39.2	69.49		69.54	0.000333	1.91	5706.09	555.9	0.08
	223061.1	Existing[1]	8606	37.26	69.12	50.77	69.2	0.000263	2.24	4099.07	1261.29	0.1
	223061.1	InterimPh1[2]	8606	37.26	69.12	50.77	69.2	0.000263	2.24	4098.8	1260.9	0.1
	223061.1	Proposed Ph2[3]	8606	37.26	69.12	50.77	69.2	0.000263	2.24	4098.86	1260.99	0.1
	223061.1	FuturePh3[4]	8606	37.26	69.12	50.77	69.2	0.000263	2.24	4098.92	1261.08	0.1
	222172.8	Existing[1]	8606	38.92	68.8	53.18	68.86	0.000549	1.9	4628.88	1498.28	0.08
	222172.8	InterimPh1[2]	8606	38.92	68.8	53.18	68.86	0.000549	1.9	4628.6	1498.2	0.08
	222172.8	Proposed Ph2[3]	8606	38.92	68.8	53.18	68.86	0.000549	1.9	4628.67	1498.22	0.08
	222172.8	FuturePh3[4]	8606	38.92	68.8	53.18	68.86	0.000549	1.9	4628.73	1498.24	0.08
	221721.3	Existing[1]	8606	38.24	68.62		68.74	0.000131	2.89	4058.72	692.65	0.1
	221721.3	InterimPh1[2]	8606	38.24	68.62		68.74	0.000131	2.9	4058.11	691.98	0.1
	221721.3	Proposed Ph2[3]	8606	38.24	68.62		68.74	0.000131	2.9	4058.25	692.13	0.1
	221721.3	FuturePh3[4]	8606	38.24	68.62		68.74	0.000131	2.89	4058.38	692.28	0.1
	221523.4	Existing[1]	8675	37.95	68.63	47.07	68.69	0.000083	2.32	9592.69	2064.29	0.08
	221523.4	InterimPh1[2]	8675	37.95	68.63	47.07	68.69	0.000083	2.32	9590.85	2064.01	0.08
	221523.4	Proposed Ph2[3]	8675	37.95	68.63	47.07	68.69	0.000083	2.32	9591.27	2064.08	0.08
	221523.4	FuturePh3[4]	8675	37.95	68.63	47.07	68.69	0.000083	2.32	9591.67	2064.14	0.08
	221469.5		Bridge									
	221415.6	Existing[1]	8675	37.86	68.58	46.98	68.65	0.000082	2.31	9690.55	2079.4	0.08
	221415.6	InterimPh1[2]	8675	37.86	68.58	46.98	68.64	0.000082	2.31	9688.68	2079.12	0.08
	221415.6	Proposed Ph2[3]	8675	37.86	68.58	46.98	68.65	0.000082	2.31	9689.09	2079.18	0.08
	221415.6	FuturePh3[4]	8675	37.86	68.58	46.98	68.65	0.000082	2.31	9689.5	2079.24	0.08
	220426.4	Existing[1]	8930	36.86	68.44		68.48	0.000414	1.78	6860	1136.92	0.08
	220426.4	InterimPh1[2]	8930	36.86	68.44		68.48	0.000414	1.78	6858.94	1136.07	0.08
	220426.4	Proposed Ph2[3]	8930	36.86	68.44		68.48	0.000414	1.78	6859.18	1136.26	0.08
	220426.4	FuturePh3[4]	8930	36.86	68.44		68.48	0.000414	1.78	6859.41	1136.44	0.08
	219577.1	Existing[1]	8930	35.81	67.8		67.89	0.001312	2.55	7034.9	778.18	0.11
	219577.1	InterimPh1[2]	8930	35.81	67.8		67.89	0.001312	2.55	7034.06	778.14	0.11
	219577.1	Proposed Ph2[3]	8930	35.81	67.8		67.89	0.001312	2.55	7034.25	778.15	0.11
	219577.1	FuturePh3[4]	8930	35.81	67.8		67.89	0.001312	2.55	7034.43	778.15	0.11
	218625.5	Existing[1]	8930	33.78	67.51		67.52	0.000163	1.23	12760.5	1120.06	0.05
	218625.5	InterimPh1[2]	8930	33.78	67.51		67.52	0.000163	1.23	12759.22	1119.93	0.05
	218625.5	Proposed Ph2[3]	8930	33.78	67.51		67.52	0.000163	1.23	12759.51	1119.96	0.05
	218625.5	FuturePh3[4]	8930	33.78	67.51		67.52	0.000163	1.23	12759.79	1119.99	0.05
	217899.8	Existing[1]	9096	35.59	67.13	47.83	67.23	0.001873	2.56	3999.77	680.55	0.11
	217899.8	InterimPh1[2]	9096	35.59	67.13	47.83	67.23	0.001873	2.56	3999.07	680.4	0.11
	217899.8	Proposed Ph2[3]	9096	35.59	67.13	47.83	67.23	0.001873	2.56	3999.22	680.43	0.11
	217899.8	FuturePh3[4]	9096	35.59	67.13	47.83	67.23	0.001873	2.56	3999.37	680.47	0.11
	216802.9	Existing[1]	9096	33.28	66.78	46.05	66.79	0.000159	0.81	14575.52	970.26	0.03
	216802.9	InterimPh1[2]	9096	33.28	66.78	46.05	66.79	0.000159	0.81	14574.3	970.21	0.03
	216802.9	Proposed Ph2[3]	9096	33.28	66.78	46.05	66.79	0.000159	0.81	14574.57	970.22	0.03
	216802.9	FuturePh3[4]	9096	33.28	66.78	46.05	66.79	0.000159	0.81	14574.84	970.23	0.03
	216040.3	Existing[1]	9096	33.72	66.54	46.49	66.56	0.000539	1.3	7672.79	544.15	0.06
	216040.3	InterimPh1[2]	9096	33.72	66.54	46.49	66.56	0.000539	1.3	7672.12	544.04	0.06
	216040.3	Proposed Ph2[3]	9096	33.72	66.54	46.49	66.56	0.000539	1.3	7672.26	544.07	0.06
	216040.3	FuturePh3[4]	9096	33.72	66.54	46.49	66.56	0.000539	1.3	7672.41	544.09	0.06
	214968	Existing[1]	9264	34.34	66.53	42.72	66.53	0.000009	1	14707.95	1520.54	0.03
	214968	InterimPh1[2]	9264	34.34	66.52	42.72	66.53	0.000009	1	14706.75	1520.36	0.03

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	214968	Proposed Ph2[3]	9264	34.34	66.52	42.72	66.53	0.000009	1	14707	1520.4	0.03
	214968	FuturePh3[4]	9264	34.34	66.53	42.72	66.53	0.000009	1	14707.27	1520.44	0.03
	214945		Bridge									
	214922	Existing[1]	9264	33.55	65.63	41.93	65.63	0.000009	1.01	14609.89	1505.9	0.03
	214922	InterimPh1[2]	9264	33.55	65.62	41.93	65.63	0.000009	1.01	14608.7	1505.73	0.03
	214922	Proposed Ph2[3]	9264	33.55	65.62	41.93	65.63	0.000009	1.01	14608.95	1505.76	0.03
	214922	FuturePh3[4]	9264	33.55	65.62	41.93	65.63	0.000009	1.01	14609.23	1505.8	0.03
	214866.8	Existing[1]	9264	34.09	65.45	45.71	65.59	0.000107	3.19	4900.74	873.4	0.11
	214866.8	InterimPh1[2]	9264	34.09	65.45	45.71	65.59	0.000107	3.19	4899.99	873.31	0.11
	214866.8	Proposed Ph2[3]	9264	34.09	65.45	45.71	65.59	0.000107	3.19	4900.14	873.33	0.11
	214866.8	FuturePh3[4]	9264	34.09	65.45	45.71	65.59	0.000107	3.19	4900.32	873.35	0.11
	214821.3		Bridge									
	214775.8	Existing[1]	9264	34.17	65.38	45.79	65.53	0.00011	3.21	4821.35	863.44	0.11
	214775.8	InterimPh1[2]	9264	34.17	65.38	45.79	65.53	0.00011	3.21	4820.6	863.35	0.11
	214775.8	Proposed Ph2[3]	9264	34.17	65.38	45.79	65.53	0.00011	3.21	4820.76	863.36	0.11
	214775.8	FuturePh3[4]	9264	34.17	65.38	45.79	65.53	0.00011	3.21	4820.94	863.39	0.11
	214672.8	Existing[1]	9299	34.45	65.34	44.95	65.51	0.000118	3.44	3789.98	456.01	0.12
	214672.8	InterimPh1[2]	9299	34.45	65.33	44.95	65.51	0.000118	3.44	3789.65	455.76	0.12
	214672.8	Proposed Ph2[3]	9299	34.45	65.34	44.95	65.51	0.000118	3.44	3789.72	455.81	0.12
	214672.8	FuturePh3[4]	9299	34.45	65.34	44.95	65.51	0.000118	3.44	3789.8	455.87	0.12
	214628.5		Bridge									
	214584.2	Existing[1]	9299	34.14	65.31	44.64	65.48	0.000114	3.4	3859.21	504.75	0.12
	214584.2	InterimPh1[2]	9299	34.14	65.31	44.64	65.48	0.000114	3.4	3858.87	504.53	0.12
	214584.2	Proposed Ph2[3]	9299	34.14	65.31	44.64	65.48	0.000114	3.4	3858.94	504.58	0.12
	214584.2	FuturePh3[4]	9299	34.14	65.31	44.64	65.48	0.000114	3.4	3859.02	504.63	0.12
	213687.7	Existing[1]	9467	32.8	65.17		65.25	0.000459	2.7	4661.72	257.53	0.1
	213687.7	InterimPh1[2]	9467	32.8	65.16		65.25	0.000459	2.7	4661.36	257.52	0.1
	213687.7	Proposed Ph2[3]	9467	32.8	65.16		65.25	0.000459	2.7	4661.44	257.52	0.1
	213687.7	FuturePh3[4]	9467	32.8	65.16		65.25	0.000459	2.7	4661.52	257.53	0.1
	212742.1	Existing[1]	9467	32.47	64.96		65.06	0.000116	2.79	6032.05	333.98	0.09
	212742.1	InterimPh1[2]	9467	32.47	64.96		65.06	0.000116	2.79	6031.57	333.96	0.09
	212742.1	Proposed Ph2[3]	9467	32.47	64.96		65.06	0.000116	2.79	6031.67	333.96	0.09
	212742.1	FuturePh3[4]	9467	32.47	64.96		65.06	0.000116	2.79	6031.78	333.97	0.09
	211631.3	Existing[1]	9600	32.47	64.9		64.95	0.000079	2.31	11865.51	896.87	0.08
	211631.3	InterimPh1[2]	9600	32.47	64.9		64.94	0.000079	2.31	11864.21	896.7	0.08
	211631.3	Proposed Ph2[3]	9600	32.47	64.9		64.95	0.000079	2.31	11864.47	896.74	0.08
	211631.3	FuturePh3[4]	9600	32.47	64.9		64.95	0.000079	2.31	11864.78	896.78	0.08
	210975.8	Existing[1]	9600	30.49	64.66		64.85	0.000256	3.67	4552.22	561.93	0.13
	210975.8	InterimPh1[2]	9600	30.49	64.66		64.85	0.000256	3.67	4551.38	561.7	0.13
	210975.8	Proposed Ph2[3]	9600	30.49	64.66		64.85	0.000256	3.67	4551.55	561.75	0.13
	210975.8	FuturePh3[4]	9600	30.49	64.66		64.85	0.000256	3.67	4551.75	561.8	0.13
	209864.1	Existing[1]	9809	28.37	64.5		64.55	0.000236	2.23	7569.86	714.71	0.08
	209864.1	InterimPh1[2]	9809	28.37	64.5		64.55	0.000236	2.23	7568.77	714.54	0.08
	209864.1	Proposed Ph2[3]	9809	28.37	64.5		64.55	0.000236	2.23	7568.98	714.57	0.08
	209864.1	FuturePh3[4]	9809	28.37	64.5		64.55	0.000236	2.23	7569.25	714.61	0.08
	208924.8	Existing[1]	9809	31.48	64.13		64.22	0.000602	2.36	4944.21	685.47	0.1
	208924.8	InterimPh1[2]	9809	31.48	64.13		64.21	0.000602	2.36	4943.09	685.32	0.1
	208924.8	Proposed Ph2[3]	9809	31.48	64.13		64.21	0.000602	2.36	4943.31	685.35	0.1
	208924.8	FuturePh3[4]	9809	31.48	64.13		64.21	0.000602	2.36	4943.58	685.39	0.1

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	207774.7	Existing[1]	9809	26.21	63.7		63.73	0.000313	1.72	8654.05	921.3	0.07
	207774.7	InterimPh1[2]	9809	26.21	63.7		63.73	0.000313	1.72	8652.37	920.48	0.07
	207774.7	Proposed Ph2[3]	9809	26.21	63.7		63.73	0.000313	1.72	8652.71	920.64	0.07
	207774.7	FuturePh3[4]	9809	26.21	63.7		63.73	0.000313	1.72	8653.12	920.84	0.07
	206741.3	Existing[1]	9809	31.91	63.31		63.37	0.000432	2.19	5996.35	731.28	0.09
	206741.3	InterimPh1[2]	9809	31.91	63.31		63.37	0.000432	2.19	5994.9	731.08	0.09
	206741.3	Proposed Ph2[3]	9809	31.91	63.31		63.37	0.000432	2.19	5995.19	731.12	0.09
	206741.3	FuturePh3[4]	9809	31.91	63.31		63.37	0.000432	2.19	5995.54	731.17	0.09
	205679.6	Existing[1]	9914	28.19	63.08		63.17	0.000113	2.83	7677.09	793.03	0.09
	205679.6	InterimPh1[2]	9914	28.19	63.07		63.16	0.000113	2.83	7675.45	792.3	0.09
	205679.6	Proposed Ph2[3]	9914	28.19	63.07		63.17	0.000113	2.83	7675.78	792.44	0.09
	205679.6	FuturePh3[4]	9914	28.19	63.07		63.17	0.000113	2.83	7676.18	792.62	0.09
	205102.2	Existing[1]	9914	28.33	63.01		63.1	0.000111	2.85	6350.07	609.96	0.09
	205102.2	InterimPh1[2]	9914	28.33	63		63.1	0.000111	2.85	6348.81	609.58	0.09
	205102.2	Proposed Ph2[3]	9914	28.33	63.01		63.1	0.000111	2.85	6349.06	609.66	0.09
	205102.2	FuturePh3[4]	9914	28.33	63.01		63.1	0.000111	2.85	6349.36	609.75	0.09
	204727.6	Existing[1]	9914	28.33	62.93	40.42	63.05	0.000131	3.08	5435.22	441.9	0.1
	204727.6	InterimPh1[2]	9914	28.33	62.93	40.42	63.05	0.000131	3.08	5434.5	441.01	0.1
	204727.6	Proposed Ph2[3]	9914	28.33	62.93	40.42	63.05	0.000131	3.08	5434.64	441.19	0.1
	204727.6	FuturePh3[4]	9914	28.33	62.93	40.42	63.05	0.000131	3.08	5434.82	441.4	0.1
	204673.8		Bridge									
	204620	Existing[1]	9914	28.15	62.77	40.25	62.89	0.00013	3.08	5441.21	449.27	0.1
	204620	InterimPh1[2]	9914	28.15	62.77	40.25	62.88	0.00013	3.08	5440.49	448.39	0.1
	204620	Proposed Ph2[3]	9914	28.15	62.77	40.25	62.88	0.00013	3.08	5440.64	448.57	0.1
	204620	FuturePh3[4]	9914	28.15	62.77	40.25	62.88	0.00013	3.08	5440.81	448.78	0.1
	203658.9	Existing[1]	10276	28.97	62.57		62.61	0.000612	1.68	6132.29	378.01	0.07
	203658.9	InterimPh1[2]	10276	28.97	62.57		62.61	0.000612	1.68	6131.48	377.98	0.07
	203658.9	Proposed Ph2[3]	10276	28.97	62.57		62.61	0.000612	1.68	6131.64	377.99	0.07
	203658.9	FuturePh3[4]	10276	28.97	62.57		62.61	0.000612	1.68	6131.84	377.99	0.07
	202834.1	Existing[1]	10276	27.57	62.18		62.25	0.000333	2.15	5572.91	372.15	0.08
	202834.1	InterimPh1[2]	10276	27.57	62.18		62.24	0.000333	2.15	5572.05	372.12	0.08
	202834.1	Proposed Ph2[3]	10276	27.57	62.18		62.24	0.000333	2.15	5572.22	372.13	0.08
	202834.1	FuturePh3[4]	10276	27.57	62.18		62.25	0.000333	2.15	5572.43	372.13	0.08
	201783.6	Existing[1]	10489	27.98	61.74		61.81	0.000547	2.17	6175.92	610.3	0.09
	201783.6	InterimPh1[2]	10489	27.98	61.74		61.81	0.000547	2.18	6174.38	610.24	0.09
	201783.6	Proposed Ph2[3]	10489	27.98	61.74		61.81	0.000547	2.18	6174.7	610.25	0.09
	201783.6	FuturePh3[4]	10489	27.98	61.74		61.81	0.000547	2.17	6175.06	610.27	0.09
	201212.1	Existing[1]	10489	27.61	61.45	39.38	61.51	0.00047	1.92	5502.07	567.31	0.09
	201212.1	InterimPh1[2]	10489	27.61	61.45	39.38	61.51	0.00047	1.92	5501.11	567.17	0.09
	201212.1	Proposed Ph2[3]	10489	27.61	61.45	39.38	61.51	0.00047	1.92	5501.3	567.2	0.09
	201212.1	FuturePh3[4]	10489	27.61	61.45	39.38	61.51	0.00047	1.92	5501.53	567.24	0.09
	200299.3	Existing[1]	10489	27.02	60.99		61.1	0.000426	2.75	4783.71	493.23	0.1
	200299.3	InterimPh1[2]	10489	27.02	60.99		61.1	0.000427	2.75	4782.3	493.1	0.1
	200299.3	Proposed Ph2[3]	10489	27.02	60.99		61.1	0.000427	2.75	4782.58	493.13	0.1
	200299.3	FuturePh3[4]	10489	27.02	60.99		61.1	0.000427	2.75	4782.92	493.16	0.1
	200076.4	Existing[1]	10859	27.02	60.92	39.55	61.02	0.000313	2.55	4256.36	235.89	0.1
	200076.4	InterimPh1[2]	10859	27.02	60.91	39.55	61.01	0.000313	2.55	4255.7	235.88	0.1
	200076.4	Proposed Ph2[3]	10859	27.02	60.91	39.55	61.01	0.000313	2.55	4255.84	235.88	0.1
	200076.4	FuturePh3[4]	10859	27.02	60.91	39.55	61.01	0.000313	2.55	4255.99	235.89	0.1
	200020.5		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	199964.6	Existing[1]	10859	26.77	60.57	39.31	60.67	0.000318	2.56	4233.98	235.37	0.1
	199964.6	InterimPh1[2]	10859	26.77	60.56	39.31	60.67	0.000318	2.57	4233.33	235.36	0.1
	199964.6	Proposed Ph2[3]	10859	26.77	60.56	39.31	60.67	0.000318	2.57	4233.46	235.36	0.1
	199964.6	FuturePh3[4]	10859	26.77	60.57	39.31	60.67	0.000318	2.56	4233.62	235.37	0.1
	199440.6	Existing[1]	11113	27.48	60.41		60.47	0.000353	2.17	7809.87	842.21	0.08
	199440.6	InterimPh1[2]	11113	27.48	60.41		60.47	0.000353	2.17	7807.41	842.02	0.08
	199440.6	Proposed Ph2[3]	11113	27.48	60.41		60.47	0.000353	2.17	7807.91	842.06	0.08
	199440.6	FuturePh3[4]	11113	27.48	60.41		60.47	0.000353	2.17	7808.49	842.1	0.08
	198496.4	Existing[1]	11113	27.21	59.91		60.01	0.000664	2.52	4447.31	313.11	0.1
	198496.4	InterimPh1[2]	11113	27.21	59.91		60.01	0.000665	2.52	4446.31	312.91	0.1
	198496.4	Proposed Ph2[3]	11113	27.21	59.91		60.01	0.000664	2.52	4446.51	312.95	0.1
	198496.4	FuturePh3[4]	11113	27.21	59.91		60.01	0.000664	2.52	4446.75	313	0.1
	197506.8	Existing[1]	11113	26.73	59.46		59.57	0.000319	3.06	6463.07	541.65	0.11
	197506.8	InterimPh1[2]	11113	26.73	59.46		59.57	0.00032	3.07	6461.19	541.55	0.11
	197506.8	Proposed Ph2[3]	11113	26.73	59.46		59.57	0.00032	3.07	6461.57	541.57	0.11
	197506.8	FuturePh3[4]	11113	26.73	59.46		59.57	0.00032	3.07	6462.01	541.59	0.11
	196463.1	Existing[1]	11113	26.19	58.99		59.14	0.000621	3.2	4675.65	431.9	0.12
	196463.1	InterimPh1[2]	11113	26.19	58.99		59.14	0.000621	3.2	4674.01	431.86	0.12
	196463.1	Proposed Ph2[3]	11113	26.19	58.99		59.14	0.000621	3.2	4674.33	431.87	0.12
	196463.1	FuturePh3[4]	11113	26.19	58.99		59.14	0.000621	3.2	4674.72	431.88	0.12
	196182.3	Existing[1]	11262	25.3	58.73	40.08	58.97	0.000452	4.29	4255.47	670.3	0.15
	196182.3	InterimPh1[2]	11262	25.3	58.72	40.08	58.97	0.000453	4.29	4254.42	670.08	0.15
	196182.3	Proposed Ph2[3]	11262	25.3	58.72	40.08	58.97	0.000453	4.29	4254.63	670.12	0.15
	196182.3	FuturePh3[4]	11262	25.3	58.72	40.08	58.97	0.000453	4.29	4254.88	670.17	0.15
	196149		Bridge									
	196115.7	Existing[1]	11262	25.16	58.59	39.94	58.84	0.000452	4.29	4256.76	670.56	0.15
	196115.7	InterimPh1[2]	11262	25.16	58.59	39.94	58.83	0.000452	4.29	4255.7	670.35	0.15
	196115.7	Proposed Ph2[3]	11262	25.16	58.59	39.94	58.83	0.000452	4.29	4255.91	670.39	0.15
	196115.7	FuturePh3[4]	11262	25.16	58.59	39.94	58.83	0.000452	4.29	4256.16	670.44	0.15
	195567.4	Existing[1]	11407	23.51	58.55		58.58	0.000183	1.5	12503.54	798.37	0.05
	195567.4	InterimPh1[2]	11407	23.51	58.55		58.57	0.000183	1.5	12500.34	798.22	0.05
	195567.4	Proposed Ph2[3]	11407	23.51	58.55		58.57	0.000183	1.5	12500.99	798.25	0.05
	195567.4	FuturePh3[4]	11407	23.51	58.55		58.57	0.000183	1.5	12501.74	798.29	0.05
	194614.1	Existing[1]	11407	26.15	58.31		58.38	0.000293	2.62	8920.95	589.94	0.09
	194614.1	InterimPh1[2]	11407	26.15	58.3		58.37	0.000293	2.62	8918.5	589.82	0.09
	194614.1	Proposed Ph2[3]	11407	26.15	58.31		58.37	0.000293	2.62	8918.99	589.84	0.09
	194614.1	FuturePh3[4]	11407	26.15	58.31		58.37	0.000293	2.62	8919.57	589.87	0.09
	193675.6	Existing[1]	11407	23.35	58.33		58.33	0.00001	0.69	21059.28	991.89	0.02
	193675.6	InterimPh1[2]	11407	23.35	58.32		58.33	0.00001	0.69	21055.17	991.85	0.02
	193675.6	Proposed Ph2[3]	11407	23.35	58.33		58.33	0.00001	0.69	21055.99	991.86	0.02
	193675.6	FuturePh3[4]	11407	23.35	58.33		58.33	0.00001	0.69	21056.96	991.87	0.02
	192820.3	Existing[1]	11699	24.17	58.22		58.3	0.000519	2.52	6147.07	574.68	0.09
	192820.3	InterimPh1[2]	11699	24.17	58.21		58.3	0.000519	2.52	6144.66	574.49	0.09
	192820.3	Proposed Ph2[3]	11699	24.17	58.21		58.3	0.000519	2.52	6145.14	574.53	0.09
	192820.3	FuturePh3[4]	11699	24.17	58.22		58.3	0.000519	2.52	6145.71	574.57	0.09
	191722.7	Existing[1]	11699	20.85	57.63		57.69	0.000652	2.16	6769.72	632.75	0.09
	191722.7	InterimPh1[2]	11699	20.85	57.62		57.69	0.000652	2.16	6766.72	632.21	0.09
	191722.7	Proposed Ph2[3]	11699	20.85	57.62		57.69	0.000652	2.16	6767.32	632.32	0.09
	191722.7	FuturePh3[4]	11699	20.85	57.62		57.69	0.000652	2.16	6768.03	632.45	0.09

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	190794	Existing[1]	11699	20.58	57.13		57.23	0.000394	3.05	6464.9	461.5	0.11
	190794	InterimPh1[2]	11699	20.58	57.12		57.23	0.000395	3.05	6462.52	461.28	0.11
	190794	Proposed Ph2[3]	11699	20.58	57.12		57.23	0.000395	3.05	6462.99	461.33	0.11
	190794	FuturePh3[4]	11699	20.58	57.13		57.23	0.000394	3.05	6463.55	461.38	0.11
	189869.8	Existing[1]	11699	17.5	56.9		57	0.000204	3	7812.38	603.18	0.1
	189869.8	InterimPh1[2]	11699	17.5	56.89		56.99	0.000204	3.01	7809.14	603.09	0.1
	189869.8	Proposed Ph2[3]	11699	17.5	56.89		56.99	0.000204	3.01	7809.78	603.11	0.1
	189869.8	FuturePh3[4]	11699	17.5	56.89		57	0.000204	3.01	7810.55	603.13	0.1
	188903.7	Existing[1]	11852	21.71	56.74		56.79	0.00021	2.2	9653.27	716.71	0.08
	188903.7	InterimPh1[2]	11852	21.71	56.73		56.78	0.00021	2.2	9649.31	716.45	0.08
	188903.7	Proposed Ph2[3]	11852	21.71	56.74		56.79	0.00021	2.2	9650.1	716.5	0.08
	188903.7	FuturePh3[4]	11852	21.71	56.74		56.79	0.00021	2.2	9651.03	716.56	0.08
	187878.1	Existing[1]	11852	23.78	56.29		56.43	0.000672	3.39	4570.1	288.12	0.12
	187878.1	InterimPh1[2]	11852	23.78	56.28		56.43	0.000672	3.39	4568.4	288.03	0.12
	187878.1	Proposed Ph2[3]	11852	23.78	56.28		56.43	0.000672	3.39	4568.74	288.05	0.12
	187878.1	FuturePh3[4]	11852	23.78	56.28		56.43	0.000672	3.39	4569.14	288.07	0.12
	186536.1	Existing[1]	11852	20.17	55.74		55.82	0.000353	2.5	7987.37	650.47	0.1
	186536.1	InterimPh1[2]	11852	20.17	55.74		55.81	0.000353	2.5	7983.09	650.39	0.1
	186536.1	Proposed Ph2[3]	11852	20.17	55.74		55.81	0.000353	2.5	7983.94	650.41	0.1
	186536.1	FuturePh3[4]	11852	20.17	55.74		55.82	0.000353	2.5	7984.95	650.42	0.1
	185293.8	Existing[1]	11852	20.84	55.5		55.54	0.000175	2.07	9301.09	489.92	0.07
	185293.8	InterimPh1[2]	11852	20.84	55.5		55.54	0.000175	2.07	9297.73	489.85	0.07
	185293.8	Proposed Ph2[3]	11852	20.84	55.5		55.54	0.000175	2.07	9298.4	489.87	0.07
	185293.8	FuturePh3[4]	11852	20.84	55.5		55.54	0.000175	2.07	9299.2	489.88	0.07
	184862.8	Existing[1]	12103	21.37	55.28	34.79	55.43	0.000249	3.53	5031.51	487.5	0.11
	184862.8	InterimPh1[2]	12103	21.37	55.27	34.79	55.42	0.000249	3.53	5029.61	486.71	0.11
	184862.8	Proposed Ph2[3]	12103	21.37	55.28	34.79	55.42	0.000249	3.53	5029.99	486.87	0.11
	184862.8	FuturePh3[4]	12103	21.37	55.28	34.79	55.42	0.000249	3.53	5030.44	487.06	0.11
	184807.6		Bridge									
	184752.4	Existing[1]	12103	21.24	55.22	34.66	55.36	0.000247	3.52	5050.43	495.36	0.11
	184752.4	InterimPh1[2]	12103	21.24	55.21	34.66	55.36	0.000247	3.52	5048.56	494.58	0.11
	184752.4	Proposed Ph2[3]	12103	21.24	55.22	34.66	55.36	0.000247	3.52	5048.94	494.74	0.11
	184752.4	FuturePh3[4]	12103	21.24	55.22	34.66	55.36	0.000247	3.52	5049.38	494.92	0.11
	184295.8	Existing[1]	12103	18.27	55.07		55.16	0.000715	2.85	5545.4	463.08	0.1
	184295.8	InterimPh1[2]	12103	18.27	55.06		55.15	0.000716	2.85	5542.12	459.87	0.1
	184295.8	Proposed Ph2[3]	12103	18.27	55.06		55.16	0.000716	2.85	5542.78	460.52	0.1
	184295.8	FuturePh3[4]	12103	18.27	55.06		55.16	0.000716	2.85	5543.55	461.27	0.1
	183335.1	Existing[1]	12103	20.58	54.4	34.69	54.66	0.000407	4.48	4045.88	552.26	0.15
	183335.1	InterimPh1[2]	12103	20.58	54.39	34.69	54.65	0.000407	4.48	4043.72	551.82	0.15
	183335.1	Proposed Ph2[3]	12103	20.58	54.4	34.69	54.65	0.000407	4.48	4044.15	551.91	0.15
	183335.1	FuturePh3[4]	12103	20.58	54.4	34.69	54.65	0.000407	4.48	4044.66	552.01	0.15
	182381.6	Existing[1]	12379	18.93	54.08		54.16	0.000585	2.38	5931.16	364.11	0.09
	182381.6	InterimPh1[2]	12379	18.93	54.08		54.16	0.000586	2.39	5928.2	364	0.09
	182381.6	Proposed Ph2[3]	12379	18.93	54.08		54.16	0.000586	2.39	5928.79	364.02	0.09
	182381.6	FuturePh3[4]	12379	18.93	54.08		54.16	0.000586	2.39	5929.49	364.05	0.09
	181623	Existing[1]	12379	18.35	53.95		53.98	0.000127	1.67	15821.06	1012.48	0.06
	181623	InterimPh1[2]	12379	18.35	53.94		53.97	0.000127	1.67	15812.63	1012.33	0.06
	181623	Proposed Ph2[3]	12379	18.35	53.95		53.97	0.000127	1.67	15814.33	1012.36	0.06
	181623	FuturePh3[4]	12379	18.35	53.95		53.97	0.000127	1.67	15816.31	1012.4	0.06

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	180731.2	Existing[1]	12379	19.12	53.71		53.78	0.000618	2.2	6099.54	385.31	0.09
	180731.2	InterimPh1[2]	12379	19.12	53.7		53.77	0.000619	2.2	6096.21	385.06	0.09
	180731.2	Proposed Ph2[3]	12379	19.12	53.7		53.77	0.000619	2.2	6096.88	385.11	0.09
	180731.2	FuturePh3[4]	12379	19.12	53.7		53.78	0.000619	2.2	6097.67	385.17	0.09
	179838.1	Existing[1]	12379	17.65	52.95		53.03	0.00121	2.32	5334.74	329.12	0.1
	179838.1	InterimPh1[2]	12379	17.65	52.94		53.03	0.001212	2.33	5331.56	328.84	0.1
	179838.1	Proposed Ph2[3]	12379	17.65	52.94		53.03	0.001211	2.33	5332.2	328.89	0.1
	179838.1	FuturePh3[4]	12379	17.65	52.95		53.03	0.001211	2.32	5332.95	328.96	0.1
	179305.6	Existing[1]	12379	17.48	52.47		52.69	0.000373	4.25	4647.52	312.09	0.14
	179305.6	InterimPh1[2]	12379	17.48	52.46		52.68	0.000374	4.25	4644.3	311.89	0.14
	179305.6	Proposed Ph2[3]	12379	17.48	52.46		52.68	0.000374	4.25	4644.95	311.93	0.14
	179305.6	FuturePh3[4]	12379	17.48	52.47		52.69	0.000374	4.25	4645.71	311.98	0.14
	178955.5	Existing[1]	12457	17.37	52.38	33.01	52.55	0.000315	3.9	5701.16	864.8	0.13
	178955.5	InterimPh1[2]	12457	17.37	52.37	33.01	52.54	0.000315	3.9	5697.37	862.7	0.13
	178955.5	Proposed Ph2[3]	12457	17.37	52.37	33.01	52.54	0.000315	3.9	5698.14	863.12	0.13
	178955.5	FuturePh3[4]	12457	17.37	52.37	33.01	52.54	0.000315	3.9	5699.03	863.62	0.13
	178899.3		Bridge									
	178843.1	Existing[1]	12457	17.13	52.08	32.77	52.25	0.000317	3.91	5679.81	852.95	0.13
	178843.1	InterimPh1[2]	12457	17.13	52.07	32.77	52.24	0.000318	3.92	5675.99	850.82	0.13
	178843.1	Proposed Ph2[3]	12457	17.13	52.07	32.77	52.24	0.000318	3.92	5676.76	851.25	0.13
	178843.1	FuturePh3[4]	12457	17.13	52.07	32.77	52.24	0.000318	3.91	5677.66	851.75	0.13
	177732.9	Existing[1]	12967	16.54	51.7		51.79	0.000448	2.44	6104.48	375.95	0.09
	177732.9	InterimPh1[2]	12967	16.54	51.69		51.77	0.000449	2.44	6100.27	375.9	0.09
	177732.9	Proposed Ph2[3]	12967	16.54	51.7		51.78	0.000449	2.44	6101.13	375.91	0.09
	177732.9	FuturePh3[4]	12967	16.54	51.7		51.78	0.000449	2.44	6102.11	375.92	0.09
	176644.1	Existing[1]	12967	17.41	51.46	30.63	51.51	0.00017	2.35	10344.16	825.82	0.08
	176644.1	InterimPh1[2]	12967	17.41	51.44	30.63	51.5	0.00017	2.35	10336.05	825.39	0.08
	176644.1	Proposed Ph2[3]	12967	17.41	51.45	30.63	51.5	0.00017	2.35	10337.68	825.48	0.08
	176644.1	FuturePh3[4]	12967	17.41	51.45	30.63	51.51	0.00017	2.35	10339.59	825.58	0.08
	175675.6	Existing[1]	13131	16.27	51.19	28.53	51.27	0.000387	2.22	5788.56	322.23	0.09
	175675.6	InterimPh1[2]	13131	16.27	51.18	28.53	51.26	0.000388	2.22	5784.65	322.13	0.09
	175675.6	Proposed Ph2[3]	13131	16.27	51.18	28.53	51.26	0.000388	2.22	5785.44	322.15	0.09
	175675.6	FuturePh3[4]	13131	16.27	51.19	28.53	51.27	0.000388	2.22	5786.36	322.18	0.09
	173819.4	Existing[1]	13131	14.97	50.63		50.65	0.000278	1.37	12289.74	879.3	0.06
	173819.4	InterimPh1[2]	13131	14.97	50.62		50.64	0.000279	1.37	12277.98	878.8	0.06
	173819.4	Proposed Ph2[3]	13131	14.97	50.62		50.64	0.000279	1.37	12280.36	878.9	0.06
	173819.4	FuturePh3[4]	13131	14.97	50.62		50.64	0.000278	1.37	12283.11	879.02	0.06
	172846.5	Existing[1]	13131	11.61	50.42		50.45	0.000267	1.67	11324.51	682.9	0.06
	172846.5	InterimPh1[2]	13131	11.61	50.41		50.44	0.000268	1.67	11315.01	682.77	0.06
	172846.5	Proposed Ph2[3]	13131	11.61	50.41		50.44	0.000268	1.67	11316.93	682.8	0.06
	172846.5	FuturePh3[4]	13131	11.61	50.41		50.44	0.000267	1.67	11319.16	682.83	0.06
	171967.4	Existing[1]	13131	14.04	50.29		50.31	0.000153	1.71	13308.1	727.32	0.06
	171967.4	InterimPh1[2]	13131	14.04	50.27		50.3	0.000154	1.71	13297.75	727.22	0.06
	171967.4	Proposed Ph2[3]	13131	14.04	50.28		50.3	0.000153	1.71	13299.85	727.24	0.06
	171967.4	FuturePh3[4]	13131	14.04	50.28		50.31	0.000153	1.71	13302.27	727.26	0.06
	171168.9	Existing[1]	13131	6.86	50.18		50.22	0.000142	1.94	11469.97	655.85	0.07
	171168.9	InterimPh1[2]	13131	6.86	50.16		50.21	0.000142	1.94	11460.5	655.52	0.07
	171168.9	Proposed Ph2[3]	13131	6.86	50.17		50.21	0.000142	1.94	11462.42	655.59	0.07
	171168.9	FuturePh3[4]	13131	6.86	50.17		50.21	0.000142	1.94	11464.64	655.66	0.07

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	170256	Existing[1]	13131	13.83	49.93		50.04	0.000305	2.81	6255.09	448.35	0.1
	170256	InterimPh1[2]	13131	13.83	49.92		50.03	0.000305	2.81	6248.39	448.1	0.1
	170256	Proposed Ph2[3]	13131	13.83	49.92		50.03	0.000305	2.81	6249.75	448.15	0.1
	170256	FuturePh3[4]	13131	13.83	49.93		50.03	0.000305	2.81	6251.32	448.21	0.1
	169087.1	Existing[1]	13185	11.36	49.76		49.78	0.000153	1.54	14782.5	868.05	0.05
	169087.1	InterimPh1[2]	13185	11.36	49.74		49.77	0.000153	1.54	14769.14	867.84	0.05
	169087.1	Proposed Ph2[3]	13185	11.36	49.75		49.77	0.000153	1.54	14771.85	867.88	0.05
	169087.1	FuturePh3[4]	13185	11.36	49.75		49.77	0.000153	1.54	14774.98	867.93	0.05
	168169.9	Existing[1]	13185	14.35	49.56		49.61	0.000304	2.09	7847.52	454.32	0.07
	168169.9	InterimPh1[2]	13185	14.35	49.54		49.59	0.000305	2.09	7840.3	453.93	0.07
	168169.9	Proposed Ph2[3]	13185	14.35	49.54		49.6	0.000305	2.09	7841.76	454.01	0.07
	168169.9	FuturePh3[4]	13185	14.35	49.55		49.6	0.000304	2.09	7843.45	454.1	0.07
	167249.9	Existing[1]	13209	11.5	49.14	25.79	49.25	0.000544	2.65	5494.55	631.1	0.1
	167249.9	InterimPh1[2]	13209	11.5	49.13	25.79	49.23	0.000545	2.65	5483.85	630.45	0.1
	167249.9	Proposed Ph2[3]	13209	11.5	49.13	25.79	49.24	0.000545	2.65	5486.02	630.58	0.1
	167249.9	FuturePh3[4]	13209	11.5	49.13	25.79	49.24	0.000545	2.65	5488.53	630.73	0.1
	166879.7	Existing[1]	13209	10.84	49.02		49.11	0.000252	3.43	8996.56	641.51	0.11
	166879.7	InterimPh1[2]	13209	10.84	49		49.09	0.000253	3.44	8985.45	640.55	0.11
	166879.7	Proposed Ph2[3]	13209	10.84	49		49.1	0.000253	3.44	8987.7	640.74	0.11
	166879.7	FuturePh3[4]	13209	10.84	49.01		49.1	0.000252	3.44	8990.31	640.97	0.11
	166613	Existing[1]	13331	10.36	48.81	28.17	48.99	0.000389	4.48	7905.72	850.76	0.14
	166613	InterimPh1[2]	13331	10.36	48.79	28.17	48.98	0.00039	4.49	7891.44	847.54	0.14
	166613	Proposed Ph2[3]	13331	10.36	48.79	28.17	48.98	0.00039	4.49	7894.33	848.2	0.14
	166613	FuturePh3[4]	13331	10.36	48.8	28.17	48.98	0.00039	4.49	7897.68	848.95	0.14
	166585.6		Bridge									
	166558.2	Existing[1]	13331	10.11	48.66	27.93	48.84	0.000383	4.46	7987.16	868.87	0.14
	166558.2	InterimPh1[2]	13331	10.11	48.64	27.93	48.82	0.000384	4.46	7972.23	865.58	0.14
	166558.2	Proposed Ph2[3]	13331	10.11	48.64	27.93	48.83	0.000384	4.46	7975.25	866.25	0.14
	166558.2	FuturePh3[4]	13331	10.11	48.65	27.93	48.83	0.000383	4.46	7978.75	867.02	0.14
	166297.3	Existing[1]	13835	8.4	48.61		48.71	0.000308	2.81	6769.16	357.56	0.09
	166297.3	InterimPh1[2]	13835	8.4	48.59		48.69	0.000309	2.81	6762.58	357.35	0.09
	166297.3	Proposed Ph2[3]	13835	8.4	48.6		48.7	0.000308	2.81	6763.91	357.39	0.09
	166297.3	FuturePh3[4]	13835	8.4	48.6		48.7	0.000308	2.81	6765.46	357.44	0.09
	165903.2	Existing[1]	13835	10.27	48.5		48.58	0.000314	2.72	8200.84	589.42	0.09
	165903.2	InterimPh1[2]	13835	10.27	48.48		48.56	0.000314	2.72	8189.81	588.24	0.09
	165903.2	Proposed Ph2[3]	13835	10.27	48.48		48.57	0.000314	2.72	8192.04	588.48	0.09
	165903.2	FuturePh3[4]	13835	10.27	48.49		48.57	0.000314	2.72	8194.63	588.76	0.09
	165476.1	Existing[1]	15440	12.3	48.13	25.43	48.39	0.000366	4.53	5067.37	288.45	0.14
	165476.1	InterimPh1[2]	15440	12.3	48.11	25.43	48.37	0.000367	4.53	5062.15	287.66	0.14
	165476.1	Proposed Ph2[3]	15440	12.3	48.12	25.43	48.37	0.000367	4.53	5063.21	287.82	0.14
	165476.1	FuturePh3[4]	15440	12.3	48.12	25.43	48.38	0.000367	4.53	5064.43	288	0.14
	165428.1		Bridge									
	165380.1	Existing[1]	15440	11.69	47.46	24.82	47.72	0.000369	4.54	5052.03	286.12	0.14
	165380.1	InterimPh1[2]	15440	11.69	47.45	24.82	47.7	0.00037	4.54	5046.77	285.32	0.14
	165380.1	Proposed Ph2[3]	15440	11.69	47.45	24.82	47.71	0.00037	4.54	5047.83	285.48	0.14
	165380.1	FuturePh3[4]	15440	11.69	47.45	24.82	47.71	0.000369	4.54	5049.07	285.67	0.14
	164555.2	Existing[1]	15423	8.31	47.14		47.31	0.000541	3.56	4936.73	238.17	0.13
	164555.2	InterimPh1[2]	15406	8.31	47.12		47.29	0.000541	3.56	4932.02	238.02	0.13
	164555.2	Proposed Ph2[3]	15409	8.31	47.13		47.3	0.000541	3.56	4932.97	238.05	0.13
	164555.2	FuturePh3[4]	15413	8.31	47.13		47.3	0.000541	3.56	4934.08	238.08	0.13

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	163635.5	Existing[1]	15423	11.2	46.97		47.05	0.000179	2.86	10037.43	610.36	0.1
	163635.5	InterimPh1[2]	15406	11.2	46.95		47.03	0.000179	2.86	10025.24	610.2	0.1
	163635.5	Proposed Ph2[3]	15409	11.2	46.95		47.03	0.000179	2.86	10027.72	610.23	0.1
	163635.5	FuturePh3[4]	15413	11.2	46.96		47.04	0.000179	2.86	10030.58	610.27	0.1
	162811.9	Existing[1]	15905	8.08	46.75		46.88	0.000224	3.33	7106.97	340.38	0.11
	162811.9	InterimPh1[2]	15888	8.08	46.73		46.86	0.000225	3.33	7100.16	340.19	0.11
	162811.9	Proposed Ph2[3]	15892	8.08	46.73		46.86	0.000225	3.33	7101.55	340.23	0.11
	162811.9	FuturePh3[4]	15896	8.08	46.74		46.87	0.000225	3.33	7103.15	340.28	0.11
	161822.3	Existing[1]	15905	6.55	46.41		46.55	0.000593	3.38	6028.45	314.22	0.11
	161822.3	InterimPh1[2]	15888	6.55	46.39		46.53	0.000594	3.38	6022.08	313.94	0.11
	161822.3	Proposed Ph2[3]	15892	6.55	46.39		46.53	0.000593	3.38	6023.36	314	0.11
	161822.3	FuturePh3[4]	15896	6.55	46.39		46.53	0.000593	3.38	6024.86	314.06	0.11
	160630.7	Existing[1]	15905	6.96	45.61		45.79	0.000661	3.57	5343.93	406.63	0.13
	160630.7	InterimPh1[2]	15888	6.96	45.59		45.77	0.000661	3.57	5335.44	404.62	0.13
	160630.7	Proposed Ph2[3]	15892	6.96	45.6		45.77	0.000661	3.57	5337.12	405.02	0.13
	160630.7	FuturePh3[4]	15896	6.96	45.6		45.78	0.000661	3.57	5339.11	405.49	0.13
	159757.4	Existing[1]	15905	9.2	44.88		45.05	0.00112	3.32	5449.3	347.7	0.12
	159757.4	InterimPh1[2]	15888	9.2	44.86		45.03	0.001121	3.32	5441.82	347.52	0.12
	159757.4	Proposed Ph2[3]	15892	9.2	44.87		45.03	0.001121	3.32	5443.29	347.55	0.12
	159757.4	FuturePh3[4]	15896	9.2	44.87		45.04	0.00112	3.32	5445.04	347.6	0.12
	158811.6	Existing[1]	15903	7.94	44.52		44.59	0.000247	2.46	9191.69	690.94	0.08
	158811.6	InterimPh1[2]	15884	7.94	44.49		44.57	0.000247	2.46	9176.57	689.14	0.08
	158811.6	Proposed Ph2[3]	15888	7.94	44.5		44.57	0.000247	2.46	9179.53	689.23	0.08
	158811.6	FuturePh3[4]	15893	7.94	44.5		44.58	0.000247	2.46	9183.06	689.61	0.08
	157933.4	Existing[1]	15903	5.48	44.21	22.08	44.36	0.000291	3.73	7433.4	485.21	0.12
	157933.4	InterimPh1[2]	15884	5.48	44.18	22.06	44.34	0.000291	3.73	7422.63	484.96	0.12
	157933.4	Proposed Ph2[3]	15888	5.48	44.19	22.07	44.35	0.000291	3.73	7424.73	485.01	0.12
	157933.4	FuturePh3[4]	15893	5.48	44.19	22.07	44.35	0.000291	3.73	7427.24	485.06	0.12
	156882.1	Existing[1]	15903	5.55	43.88		44.08	0.000259	3.7	5948.77	470.46	0.12
	156882.1	InterimPh1[2]	15884	5.55	43.86		44.05	0.000259	3.7	5938.31	469.14	0.12
	156882.1	Proposed Ph2[3]	15888	5.55	43.87		44.06	0.000259	3.7	5940.34	469.4	0.12
	156882.1	FuturePh3[4]	15893	5.55	43.87		44.06	0.000259	3.7	5942.77	469.7	0.12
	156116.3	Existing[1]	15903	5.91	43.76		43.84	0.000261	2.29	7423.57	455.83	0.08
	156116.3	InterimPh1[2]	15884	5.91	43.74		43.82	0.000262	2.29	7413.35	455.28	0.08
	156116.3	Proposed Ph2[3]	15888	5.91	43.74		43.82	0.000261	2.29	7415.34	455.39	0.08
	156116.3	FuturePh3[4]	15893	5.91	43.75		43.83	0.000261	2.29	7417.7	455.52	0.08
	155861.6	Existing[1]	16676	6.03	43.67	20.85	43.77	0.000317	2.43	7002.9	428.05	0.09
	155861.6	InterimPh1[2]	16656	6.03	43.65	20.84	43.74	0.000318	2.43	6993.47	427.29	0.09
	155861.6	Proposed Ph2[3]	16661	6.03	43.66	20.85	43.75	0.000318	2.43	6995.29	427.43	0.09
	155861.6	FuturePh3[4]	16665	6.03	43.66	20.85	43.75	0.000317	2.43	6997.48	427.61	0.09
	155805.1		Bridge									
	155748.6	Existing[1]	16676	5.79	43.34	20.61	43.44	0.000322	2.44	6964.38	424.92	0.09
	155748.6	InterimPh1[2]	16656	5.79	43.32	20.6	43.41	0.000322	2.44	6955.4	424.18	0.09
	155748.6	Proposed Ph2[3]	16661	5.79	43.33	20.6	43.42	0.000322	2.44	6957.12	424.33	0.09
	155748.6	FuturePh3[4]	16665	5.79	43.33	20.6	43.42	0.000322	2.44	6959.22	424.5	0.09
	154890.7	Existing[1]	16989	5.42	42.89	20.32	43.11	0.00036	3.9	5779.02	900.56	0.13
	154890.7	InterimPh1[2]	16969	5.42	42.87	20.32	43.08	0.00036	3.9	5769.72	899.25	0.13
	154890.7	Proposed Ph2[3]	16973	5.42	42.87	20.32	43.09	0.00036	3.9	5771.49	899.5	0.13
	154890.7	FuturePh3[4]	16978	5.42	42.88	20.32	43.09	0.00036	3.9	5773.66	899.8	0.13

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	153992.6	Existing[1]	16989	3.83	42.74	21.42	42.84	0.000217	2.79	10281.88	1336.05	0.1
	153992.6	InterimPh1[2]	16969	3.83	42.72	21.41	42.81	0.000217	2.79	10263.24	1335.27	0.1
	153992.6	Proposed Ph2[3]	16973	3.83	42.73	21.41	42.82	0.000217	2.79	10266.8	1335.42	0.1
	153992.6	FuturePh3[4]	16978	3.83	42.73	21.41	42.82	0.000217	2.79	10271.14	1335.6	0.1
	153119.9	Existing[1]	16989	4.13	42.42	19.16	42.55	0.000534	3.08	6674.44	965.84	0.11
	153119.9	InterimPh1[2]	16969	4.13	42.39	19.15	42.52	0.000534	3.08	6665.18	964.22	0.11
	153119.9	Proposed Ph2[3]	16973	4.13	42.4	19.15	42.53	0.000534	3.08	6666.95	964.53	0.11
	153119.9	FuturePh3[4]	16978	4.13	42.4	19.16	42.53	0.000534	3.08	6669.09	964.91	0.11
	153108.9		Bridge									
	153097.9	Existing[1]	16989	4.13	42.39	19.16	42.52	0.000536	3.08	6664.13	964.04	0.11
	153097.9	InterimPh1[2]	16969	4.13	42.37	19.15	42.5	0.000536	3.08	6654.87	962.41	0.11
	153097.9	Proposed Ph2[3]	16973	4.13	42.37	19.15	42.5	0.000536	3.08	6656.64	962.72	0.11
	153097.9	FuturePh3[4]	16978	4.13	42.38	19.16	42.51	0.000536	3.08	6658.78	963.1	0.11
	152376.3	Existing[1]	16989	3.84	42.22	22.15	42.29	0.000173	2.75	10133.93	1365.56	0.09
	152376.3	InterimPh1[2]	16969	3.84	42.2	22.13	42.27	0.000173	2.75	10115.14	1363.79	0.09
	152376.3	Proposed Ph2[3]	16973	3.84	42.2	22.13	42.27	0.000173	2.75	10118.72	1364.13	0.09
	152376.3	FuturePh3[4]	16978	3.84	42.21	22.14	42.28	0.000173	2.75	10123.07	1364.53	0.09
	151996.2	Existing[1]	16989	4.14	42.18	18.15	42.24	0.000089	1.99	9937.76	1127.11	0.07
	151996.2	InterimPh1[2]	16969	4.14	42.16	18.14	42.22	0.000089	1.99	9927.51	1126.34	0.07
	151996.2	Proposed Ph2[3]	16973	4.14	42.16	18.14	42.22	0.000089	1.99	9929.46	1126.49	0.07
	151996.2	FuturePh3[4]	16978	4.14	42.17	18.15	42.23	0.000089	1.99	9931.83	1126.67	0.07
	151963.3		Bridge									
	151930.4	Existing[1]	16989	3.37	42.15	17.38	42.2	0.000081	1.94	10266.48	1156.24	0.07
	151930.4	InterimPh1[2]	16969	3.37	42.13	17.37	42.18	0.000081	1.94	10256.15	1155.3	0.07
	151930.4	Proposed Ph2[3]	16973	3.37	42.13	17.37	42.18	0.000081	1.94	10258.11	1155.48	0.07
	151930.4	FuturePh3[4]	16978	3.37	42.14	17.38	42.19	0.000081	1.94	10260.49	1155.7	0.07
	151925.3	Existing[1]	16989	2.99	42.15	14.09	42.2	0.000049	1.68	11088.53	1274.86	0.05
	151925.3	InterimPh1[2]	16969	2.99	42.13	14.1	42.17	0.000049	1.68	11078.86	1273.98	0.05
	151925.3	Proposed Ph2[3]	16973	2.99	42.14	14.1	42.18	0.000049	1.68	11080.7	1274.15	0.05
	151925.3	FuturePh3[4]	16978	2.99	42.14	14.09	42.18	0.000049	1.68	11082.93	1274.35	0.05
	151846.3		Bridge									
	151767.3	Existing[1]	16989	1.3	41.54	12.41	41.58	0.000043	1.62	11538.66	1315.77	0.05
	151767.3	InterimPh1[2]	16969	1.3	41.51	12.41	41.55	0.000043	1.62	11528.77	1314.87	0.05
	151767.3	Proposed Ph2[3]	16973	1.3	41.52	12.41	41.56	0.000043	1.62	11530.65	1315.04	0.05
	151767.3	FuturePh3[4]	16978	1.3	41.52	12.41	41.56	0.000043	1.62	11532.93	1315.25	0.05
	151736.6	Existing[1]	16989	3.46	41.41	15.79	41.54	0.000162	3.02	6855.88	649.26	0.1
	151736.6	InterimPh1[2]	16969	3.46	41.38	15.79	41.52	0.000162	3.02	6848.57	648.19	0.1
	151736.6	Proposed Ph2[3]	16973	3.46	41.39	15.79	41.53	0.000162	3.02	6849.95	648.4	0.1
	151736.6	FuturePh3[4]	16978	3.46	41.39	15.8	41.53	0.000162	3.02	6851.64	648.64	0.1
	151711.1		Bridge									
	151685.6	Existing[1]	16989	4.19	41.36	16.52	41.51	0.000176	3.1	6621.83	610.16	0.1
	151685.6	InterimPh1[2]	16969	4.19	41.34	16.52	41.48	0.000177	3.1	6614.93	606.21	0.1
	151685.6	Proposed Ph2[3]	16973	4.19	41.34	16.52	41.49	0.000176	3.1	6616.24	606.96	0.1
	151685.6	FuturePh3[4]	16978	4.19	41.35	16.53	41.49	0.000176	3.1	6617.83	607.87	0.1
	151353.8	Existing[1]	17195	4.9	41.37	20.12	41.41	0.000105	2.07	13213.37	1157.46	0.07
	151353.8	InterimPh1[2]	17174	4.9	41.34	20.11	41.39	0.000106	2.07	13196.75	1157.22	0.07
	151353.8	Proposed Ph2[3]	17178	4.9	41.35	20.11	41.39	0.000106	2.07	13199.9	1157.27	0.07
	151353.8	FuturePh3[4]	17183	4.9	41.35	20.11	41.4	0.000106	2.07	13203.74	1157.32	0.07

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	150358.8	Existing[1]	17410	3.31	41.12		41.26	0.000211	3.18	7252.34	413.04	0.11
	150358.8	InterimPh1[2]	17389	3.31	41.1		41.24	0.000211	3.18	7242.55	412.95	0.11
	150358.8	Proposed Ph2[3]	17393	3.31	41.1		41.24	0.000211	3.18	7244.41	412.96	0.11
	150358.8	FuturePh3[4]	17398	3.31	41.11		41.25	0.000211	3.18	7246.67	412.98	0.11
	149526.4	Existing[1]	17410	3.15	41.01	18.07	41.1	0.000159	2.76	9844.45	546.78	0.09
	149526.4	InterimPh1[2]	17389	3.15	40.98	18.06	41.07	0.000159	2.76	9831.42	546.63	0.09
	149526.4	Proposed Ph2[3]	17393	3.15	40.99	18.06	41.08	0.000159	2.76	9833.9	546.66	0.09
	149526.4	FuturePh3[4]	17398	3.15	40.99	18.07	41.08	0.000159	2.76	9836.9	546.7	0.09
	149122.7	Existing[1]	17410	3.15	40.86		41.02	0.00019	3.34	6807.89	359.84	0.1
	149122.7	InterimPh1[2]	17389	3.15	40.84		41	0.00019	3.34	6799.35	358.5	0.1
	149122.7	Proposed Ph2[3]	17393	3.15	40.85		41.01	0.00019	3.34	6800.97	358.76	0.1
	149122.7	FuturePh3[4]	17398	3.15	40.85		41.01	0.00019	3.34	6802.93	359.06	0.1
	148795.4	Existing[1]	17497	3.15	40.8	17.96	40.93	0.000328	3.19	7332.44	1799.56	0.1
	148795.4	InterimPh1[2]	17475	3.15	40.78	17.94	40.91	0.000328	3.18	7324.45	1799.32	0.1
	148795.4	Proposed Ph2[3]	17479	3.15	40.78	17.94	40.91	0.000328	3.18	7325.97	1799.37	0.1
	148795.4	FuturePh3[4]	17484	3.15	40.79	17.95	40.92	0.000328	3.18	7327.81	1799.42	0.1
	148768.4		Bridge									
	148741.4	Existing[1]	17497	3.04	40.67	17.83	40.81	0.000329	3.19	7327.1	1799.4	0.1
	148741.4	InterimPh1[2]	17475	3.04	40.65	17.82	40.78	0.000329	3.19	7319.11	1799.16	0.1
	148741.4	Proposed Ph2[3]	17479	3.04	40.66	17.83	40.79	0.000329	3.19	7320.63	1799.21	0.1
	148741.4	FuturePh3[4]	17484	3.04	40.66	17.83	40.79	0.000329	3.19	7322.46	1799.26	0.1
	147632.4	Existing[1]	17497	-1.17	40.48	15.09	40.6	0.000114	2.79	8150.45	490.36	0.1
	147632.4	InterimPh1[2]	17475	-1.17	40.46	15.08	40.57	0.000114	2.79	8139.21	489.85	0.1
	147632.4	Proposed Ph2[3]	17479	-1.17	40.46	15.08	40.58	0.000114	2.79	8141.35	489.95	0.1
	147632.4	FuturePh3[4]	17484	-1.17	40.47	15.08	40.58	0.000114	2.79	8143.94	490.06	0.1
	146698	Existing[1]	17497	1.88	40.33	14.89	40.47	0.000157	3.3	7665.75	663.03	0.12
	146698	InterimPh1[2]	17475	1.88	40.3	14.88	40.44	0.000157	3.3	7655.57	661.94	0.12
	146698	Proposed Ph2[3]	17479	1.88	40.31	14.88	40.45	0.000157	3.3	7657.51	662.15	0.12
	146698	FuturePh3[4]	17484	1.88	40.31	14.89	40.45	0.000157	3.3	7659.85	662.4	0.12
	145723.9	Existing[1]	17497	1.61	40.07		40.29	0.000199	4.3	7595.98	441.75	0.14
	145723.9	InterimPh1[2]	17475	1.61	40.05		40.27	0.0002	4.3	7585.28	441.41	0.14
	145723.9	Proposed Ph2[3]	17479	1.61	40.05		40.27	0.000199	4.3	7587.32	441.48	0.14
	145723.9	FuturePh3[4]	17484	1.61	40.06		40.28	0.000199	4.3	7589.78	441.55	0.14
	144753.5	Existing[1]	17497	0.07	39.89	15.82	40.09	0.000198	3.82	6568.74	417.85	0.13
	144753.5	InterimPh1[2]	17475	0.07	39.87	15.81	40.07	0.000198	3.82	6558.56	417.57	0.13
	144753.5	Proposed Ph2[3]	17479	0.07	39.87	15.81	40.08	0.000198	3.82	6560.5	417.63	0.13
	144753.5	FuturePh3[4]	17484	0.07	39.88	15.81	40.08	0.000198	3.82	6562.85	417.69	0.13
	143966.8	Existing[1]	17497	-7.47	39.75	17.13	39.94	0.000208	3.86	8370.84	1051.32	0.13
	143966.8	InterimPh1[2]	17475	-7.47	39.73	17.11	39.91	0.000208	3.86	8348.23	1047.52	0.13
	143966.8	Proposed Ph2[3]	17479	-7.47	39.73	17.11	39.92	0.000208	3.86	8352.55	1048.25	0.13
	143966.8	FuturePh3[4]	17484	-7.47	39.74	17.12	39.92	0.000208	3.86	8357.75	1049.12	0.13
	143078.2	Existing[1]	17497	-4.19	39.61		39.77	0.000158	3.43	9738.12	677.58	0.12
	143078.2	InterimPh1[2]	17475	-4.19	39.59		39.74	0.000158	3.43	9721.41	676.83	0.12
	143078.2	Proposed Ph2[3]	17479	-4.19	39.59		39.75	0.000158	3.43	9724.6	676.97	0.12
	143078.2	FuturePh3[4]	17484	-4.19	39.6		39.75	0.000158	3.43	9728.45	677.15	0.12
	142061.4	Existing[1]	17497	0.55	39.5		39.63	0.000106	3.15	9166.45	517.6	0.1
	142061.4	InterimPh1[2]	17475	0.55	39.48		39.6	0.000106	3.15	9153.63	517.45	0.1
	142061.4	Proposed Ph2[3]	17479	0.55	39.48		39.61	0.000106	3.15	9156.08	517.48	0.1
	142061.4	FuturePh3[4]	17484	0.55	39.49		39.62	0.000106	3.15	9159.04	517.52	0.1

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	141320.1	Existing[1]	17497	-2.7	39.5	13.28	39.55	0.000055	2.03	16130.06	866.61	0.07
	141320.1	InterimPh1[2]	17475	-2.7	39.48	13.27	39.53	0.000055	2.03	16108.52	866.29	0.07
	141320.1	Proposed Ph2[3]	17479	-2.7	39.48	13.28	39.53	0.000055	2.03	16112.65	866.35	0.07
	141320.1	FuturePh3[4]	17484	-2.7	39.49	13.28	39.54	0.000055	2.03	16117.61	866.43	0.07
	140116.2	Existing[1]	17497	-1.31	39.3	14.63	39.45	0.000143	3.36	10362.19	803.3	0.11
	140116.2	InterimPh1[2]	17475	-1.31	39.28	14.62	39.42	0.000143	3.36	10343.07	802.41	0.11
	140116.2	Proposed Ph2[3]	17479	-1.31	39.28	14.63	39.43	0.000143	3.36	10346.73	802.58	0.11
	140116.2	FuturePh3[4]	17484	-1.31	39.29	14.63	39.43	0.000143	3.36	10351.14	802.78	0.11
	139320	Existing[1]	17497	-2.14	39.24	13.67	39.34	0.000115	2.75	11720.54	920.28	0.09
	139320	InterimPh1[2]	17475	-2.14	39.21	13.66	39.31	0.000115	2.75	11697.41	920.07	0.09
	139320	Proposed Ph2[3]	17479	-2.14	39.22	13.67	39.32	0.000115	2.75	11701.85	920.11	0.09
	139320	FuturePh3[4]	17484	-2.14	39.22	13.67	39.32	0.000115	2.75	11707.18	920.16	0.09
	138607.9	Existing[1]	17455	-2.08	39.27	14.61	39.28	0.000026	1.46	23769.79	1319.13	0.05
	138607.9	InterimPh1[2]	17429	-2.08	39.24	14.6	39.26	0.000026	1.46	23741.65	1318.36	0.05
	138607.9	Proposed Ph2[3]	17434	-2.08	39.25	14.59	39.26	0.000026	1.46	23747.04	1318.51	0.05
	138607.9	FuturePh3[4]	17440	-2.08	39.25	14.6	39.27	0.000026	1.46	23753.53	1318.69	0.05
	137732	Existing[1]	17455	-2.4	39.17	14.14	39.25	0.000077	2.81	15479.19	1157.98	0.09
	137732	InterimPh1[2]	17429	-2.4	39.15	14.15	39.22	0.000077	2.81	15455.17	1154.62	0.09
	137732	Proposed Ph2[3]	17434	-2.4	39.15	14.15	39.23	0.000077	2.81	15459.77	1155.26	0.09
	137732	FuturePh3[4]	17440	-2.4	39.16	14.15	39.24	0.000077	2.81	15465.3	1156.04	0.09
	137113	Existing[1]	17455	-2.62	39	13.94	39.18	0.000137	3.75	9044.72	1116.36	0.11
	137113	InterimPh1[2]	17429	-2.62	38.97	13.93	39.15	0.000137	3.75	9032.25	1114.5	0.11
	137113	Proposed Ph2[3]	17434	-2.62	38.98	13.93	39.16	0.000137	3.75	9034.64	1114.85	0.11
	137113	FuturePh3[4]	17440	-2.62	38.98	13.93	39.16	0.000137	3.75	9037.51	1115.29	0.11
	136331.2	Existing[1]	17455	-2.09	38.97	13.22	39	0.000207	1.76	13803.89	713.7	0.06
	136331.2	InterimPh1[2]	17429	-2.09	38.94	13.21	38.97	0.000208	1.76	13785.97	713.48	0.06
	136331.2	Proposed Ph2[3]	17434	-2.09	38.95	13.21	38.98	0.000208	1.76	13789.41	713.53	0.06
	136331.2	FuturePh3[4]	17440	-2.09	38.95	13.21	38.98	0.000208	1.76	13793.53	713.58	0.06
	135666.2	Existing[1]	17455	-1.47	38.79		38.9	0.0001	2.99	11072.27	693.95	0.1
	135666.2	InterimPh1[2]	17429	-1.47	38.77		38.88	0.000101	2.99	11054.83	693.53	0.1
	135666.2	Proposed Ph2[3]	17434	-1.47	38.77		38.88	0.0001	2.99	11058.17	693.61	0.1
	135666.2	FuturePh3[4]	17440	-1.47	38.78		38.89	0.0001	2.99	11062.19	693.7	0.1
	134706.7	Existing[1]	17455	-1.93	38.78		38.82	0.00005	2.13	19365.78	1100.51	0.07
	134706.7	InterimPh1[2]	17429	-1.93	38.75		38.79	0.00005	2.13	19338.05	1099.94	0.07
	134706.7	Proposed Ph2[3]	17434	-1.93	38.76		38.8	0.00005	2.13	19343.36	1100.05	0.07
	134706.7	FuturePh3[4]	17440	-1.93	38.76		38.81	0.00005	2.13	19349.76	1100.18	0.07
	134090.6	Existing[1]	17455	-1.59	38.71		38.79	0.000069	2.64	15304.07	827.97	0.08
	134090.6	InterimPh1[2]	17429	-1.59	38.69		38.76	0.000069	2.64	15283.2	827.79	0.08
	134090.6	Proposed Ph2[3]	17434	-1.59	38.69		38.77	0.000069	2.64	15287.2	827.82	0.08
	134090.6	FuturePh3[4]	17440	-1.59	38.7		38.77	0.000069	2.64	15292.01	827.87	0.08
	133772.1	Existing[1]	17455	-0.79	38.65	13.2	38.76	0.000092	3.21	14416.47	909.81	0.1
	133772.1	InterimPh1[2]	17429	-0.79	38.63	13.19	38.73	0.000092	3.21	14393.48	909.49	0.1
	133772.1	Proposed Ph2[3]	17434	-0.79	38.63	13.2	38.74	0.000092	3.21	14397.89	909.55	0.1
	133772.1	FuturePh3[4]	17440	-0.79	38.64	13.2	38.74	0.000092	3.21	14403.19	909.62	0.1
	133760.1		Bridge									
	133748.1	Existing[1]	17455	-0.46	38.6	13.54	38.71	0.000097	3.27	14067.54	905.02	0.1
	133748.1	InterimPh1[2]	17429	-0.46	38.57	13.53	38.68	0.000098	3.27	14044.67	904.7	0.1
	133748.1	Proposed Ph2[3]	17434	-0.46	38.58	13.53	38.69	0.000098	3.27	14049.06	904.76	0.1
	133748.1	FuturePh3[4]	17440	-0.46	38.58	13.52	38.7	0.000097	3.27	14054.33	904.83	0.1

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	132963.8	Existing[1]	17455	-1.98	38.45	13.45	38.6	0.000146	3.43	8561.18	560.51	0.11
	132963.8	InterimPh1[2]	17429	-1.98	38.42	13.44	38.58	0.000146	3.43	8547.21	557.02	0.11
	132963.8	Proposed Ph2[3]	17434	-1.98	38.43	13.45	38.58	0.000146	3.43	8549.89	557.68	0.11
	132963.8	FuturePh3[4]	17440	-1.98	38.43	13.45	38.59	0.000146	3.43	8553.11	558.48	0.11
	131789.8	Existing[1]	17455	-2.31	38.28	12.1	38.44	0.000134	3.59	9137.43	617.15	0.11
	131789.8	InterimPh1[2]	17429	-2.31	38.26	12.09	38.41	0.000134	3.59	9123.3	616.47	0.11
	131789.8	Proposed Ph2[3]	17434	-2.31	38.26	12.1	38.42	0.000134	3.59	9126.01	616.6	0.11
	131789.8	FuturePh3[4]	17440	-2.31	38.27	12.1	38.43	0.000134	3.59	9129.27	616.75	0.11
	130765.5	Existing[1]	17455	-3.81	38.24		38.33	0.000062	2.62	11812.82	558.38	0.08
	130765.5	InterimPh1[2]	17429	-3.81	38.22		38.3	0.000062	2.62	11798.72	557.97	0.08
	130765.5	Proposed Ph2[3]	17434	-3.81	38.22		38.31	0.000062	2.62	11801.42	558.05	0.08
	130765.5	FuturePh3[4]	17440	-3.81	38.23		38.31	0.000062	2.62	11804.68	558.14	0.08
	129725.3	Existing[1]	17455	-3.71	38.14		38.25	0.000096	3.23	13222.36	896.35	0.1
	129725.3	InterimPh1[2]	17429	-3.71	38.11		38.23	0.000096	3.23	13199.64	894.82	0.1
	129725.3	Proposed Ph2[3]	17434	-3.71	38.12		38.23	0.000096	3.23	13204	895.11	0.1
	129725.3	FuturePh3[4]	17440	-3.71	38.12		38.24	0.000096	3.23	13209.24	895.46	0.1
	129163.2	Existing[1]	17455	-3.13	38.06		38.19	0.000093	3.1	9822.22	665.77	0.1
	129163.2	InterimPh1[2]	17429	-3.13	38.04		38.17	0.000093	3.1	9805.38	664.86	0.1
	129163.2	Proposed Ph2[3]	17434	-3.13	38.04		38.17	0.000093	3.1	9808.61	665.03	0.1
	129163.2	FuturePh3[4]	17440	-3.13	38.05		38.18	0.000093	3.1	9812.49	665.24	0.1
	128326.9	Existing[1]	17455	-4.05	38.02	10.33	38.11	0.000069	2.8	12525.06	1202.87	0.08
	128326.9	InterimPh1[2]	17429	-4.05	37.99	10.32	38.09	0.000069	2.8	12508.98	1202.1	0.08
	128326.9	Proposed Ph2[3]	17434	-4.05	38	10.32	38.09	0.000069	2.8	12512.06	1202.24	0.08
	128326.9	FuturePh3[4]	17440	-4.05	38	10.33	38.1	0.000069	2.8	12515.77	1202.42	0.08
	128104.6	Existing[1]	17411	-4.29	37.99	10.08	38.1	0.000072	2.88	9131.29	602.17	0.09
	128104.6	InterimPh1[2]	17381	-4.29	37.96	10.05	38.07	0.000072	2.87	9122.47	594.73	0.09
	128104.6	Proposed Ph2[3]	17387	-4.29	37.97	10.06	38.08	0.000072	2.87	9124.16	596.16	0.09
	128104.6	FuturePh3[4]	17394	-4.29	37.97	10.07	38.08	0.000072	2.87	9126.19	597.87	0.09
	128066.7		Bridge									
	128028.8	Existing[1]	17411	-4.51	37.98	9.85	38.08	0.00007	2.86	9204.5	641.08	0.09
	128028.8	InterimPh1[2]	17381	-4.51	37.95	9.84	38.06	0.00007	2.85	9195.78	640.18	0.09
	128028.8	Proposed Ph2[3]	17387	-4.51	37.96	9.84	38.06	0.00007	2.85	9197.45	640.35	0.09
	128028.8	FuturePh3[4]	17394	-4.51	37.96	9.84	38.07	0.00007	2.85	9199.46	640.56	0.09
	126647	Existing[1]	17411	-3.93	37.93		37.98	0.000045	2.31	17537.97	995.49	0.07
	126647	InterimPh1[2]	17381	-3.93	37.91		37.95	0.000045	2.31	17513.16	994.57	0.07
	126647	Proposed Ph2[3]	17387	-3.93	37.91		37.96	0.000045	2.31	17517.91	994.75	0.07
	126647	FuturePh3[4]	17394	-3.93	37.92		37.96	0.000045	2.31	17523.63	994.96	0.07
	125376.9	Existing[1]	17411	-4.05	37.73		37.88	0.000098	3.49	8102.64	507.79	0.1
	125376.9	InterimPh1[2]	17381	-4.05	37.7		37.86	0.000098	3.49	8090.26	494.9	0.1
	125376.9	Proposed Ph2[3]	17387	-4.05	37.71		37.86	0.000098	3.49	8092.6	497.37	0.1
	125376.9	FuturePh3[4]	17394	-4.05	37.71		37.87	0.000098	3.49	8095.44	500.34	0.1
	124983.5	Existing[1]	17411	-3.86	37.73	13.17	37.83	0.000082	3.13	8795.88	1279.77	0.09
	124983.5	InterimPh1[2]	17381	-3.86	37.71	13.16	37.8	0.000082	3.13	8781.98	1273.48	0.09
	124983.5	Proposed Ph2[3]	17387	-3.86	37.71	13.16	37.81	0.000082	3.13	8784.62	1274.68	0.09
	124983.5	FuturePh3[4]	17394	-3.86	37.72	13.16	37.81	0.000082	3.13	8787.82	1276.13	0.09
	124644.1	Existing[1]	17411	-3.69	37.69	12.9	37.79	0.000091	3.29	7835.08	560.45	0.1
	124644.1	InterimPh1[2]	17381	-3.69	37.66	12.89	37.77	0.000091	3.29	7826.56	560.15	0.1
	124644.1	Proposed Ph2[3]	17387	-3.69	37.67	12.89	37.77	0.000091	3.29	7828.19	560.21	0.1
	124644.1	FuturePh3[4]	17394	-3.69	37.67	12.89	37.78	0.000091	3.29	7830.15	560.28	0.1
	124591.8		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	124539.5	Existing[1]	17411	-3.74	37.66	12.86	37.77	0.000091	3.29	7844.21	560.78	0.1
	124539.5	InterimPh1[2]	17381	-3.74	37.64	12.83	37.74	0.000091	3.29	7835.7	560.48	0.1
	124539.5	Proposed Ph2[3]	17387	-3.74	37.64	12.84	37.75	0.000091	3.29	7837.33	560.53	0.1
	124539.5	FuturePh3[4]	17394	-3.74	37.65	12.85	37.76	0.000091	3.29	7839.29	560.6	0.1
	123658.2	Existing[1]	17393	-2.04	37.65		37.68	0.00004	2.1	22340.88	2045.65	0.06
	123658.2	InterimPh1[2]	17361	-2.04	37.62		37.66	0.00004	2.1	22290.21	2041.31	0.06
	123658.2	Proposed Ph2[3]	17367	-2.04	37.63		37.66	0.00004	2.1	22299.92	2042.14	0.06
	123658.2	FuturePh3[4]	17375	-2.04	37.63		37.67	0.00004	2.1	22311.58	2043.14	0.06
	123138.8	Existing[1]	17393	-4.08	37.64		37.66	0.000024	1.59	22549.32	1450.63	0.05
	123138.8	InterimPh1[2]	17361	-4.08	37.62		37.64	0.000024	1.59	22513.44	1448.01	0.05
	123138.8	Proposed Ph2[3]	17367	-4.08	37.62		37.64	0.000024	1.59	22520.31	1448.51	0.05
	123138.8	FuturePh3[4]	17375	-4.08	37.63		37.65	0.000024	1.59	22528.57	1449.11	0.05
	122627.1	Existing[1]	17393	-6.08	37.6	8.14	37.64	0.000038	1.96	14312.71	1057.49	0.06
	122627.1	InterimPh1[2]	17361	-6.08	37.57	8.12	37.62	0.000038	1.96	14286.57	1055.34	0.06
	122627.1	Proposed Ph2[3]	17367	-6.08	37.58	8.13	37.62	0.000038	1.96	14291.58	1055.75	0.06
	122627.1	FuturePh3[4]	17375	-6.08	37.58	8.13	37.63	0.000038	1.96	14297.59	1056.25	0.06
	122572.1		Mult Open									
	122517.1	Existing[1]	17393	-5.38	37.57	8.84	37.61	0.000042	2.04	13560.25	999.53	0.06
	122517.1	InterimPh1[2]	17361	-5.38	37.54	8.83	37.59	0.000042	2.04	13535.56	997.68	0.06
	122517.1	Proposed Ph2[3]	17367	-5.38	37.55	8.83	37.59	0.000042	2.04	13540.29	998.03	0.06
	122517.1	FuturePh3[4]	17375	-5.38	37.55	8.83	37.6	0.000042	2.04	13545.97	998.46	0.06
	121229.5	Existing[1]	17393	-11.37	37.49		37.55	0.000053	2.46	14296.95	900.86	0.07
	121229.5	InterimPh1[2]	17361	-11.37	37.47		37.52	0.000053	2.46	14274.65	900.61	0.07
	121229.5	Proposed Ph2[3]	17367	-11.37	37.47		37.53	0.000053	2.46	14278.93	900.66	0.07
	121229.5	FuturePh3[4]	17375	-11.37	37.48		37.54	0.000053	2.46	14284.05	900.72	0.07
	120962.2	Existing[1]	17393	-10.59	37.43		37.53	0.000077	2.95	11097.99	728.15	0.08
	120962.2	InterimPh1[2]	17361	-10.59	37.41		37.5	0.000077	2.94	11080	727.9	0.08
	120962.2	Proposed Ph2[3]	17367	-10.59	37.41		37.51	0.000077	2.94	11083.45	727.95	0.08
	120962.2	FuturePh3[4]	17375	-10.59	37.42		37.51	0.000077	2.94	11087.58	728	0.08
	120005.2	Existing[1]	17393	-7.78	37.44	7.73	37.46	0.000023	1.65	20390.87	1036.54	0.05
	120005.2	InterimPh1[2]	17361	-7.78	37.41	7.72	37.44	0.000023	1.65	20365.25	1036.31	0.05
	120005.2	Proposed Ph2[3]	17367	-7.78	37.42	7.73	37.44	0.000023	1.65	20370.16	1036.35	0.05
	120005.2	FuturePh3[4]	17375	-7.78	37.43	7.73	37.45	0.000023	1.65	20376.05	1036.41	0.05
	119952.6		Bridge									
	119900	Existing[1]	17393	-7.64	37.4	7.88	37.42	0.000024	1.67	20206.51	1034.85	0.05
	119900	InterimPh1[2]	17361	-7.64	37.38	7.86	37.4	0.000024	1.67	20180.87	1034.61	0.05
	119900	Proposed Ph2[3]	17367	-7.64	37.38	7.86	37.4	0.000024	1.67	20185.79	1034.66	0.05
	119900	FuturePh3[4]	17375	-7.64	37.39	7.87	37.41	0.000024	1.67	20191.68	1034.71	0.05
	119495.9	Existing[1]	17393	-7.21	37.4		37.41	0.000014	1.36	29396.75	1337.34	0.04
	119495.9	InterimPh1[2]	17361	-7.21	37.37		37.39	0.000014	1.36	29363.6	1337.09	0.04
	119495.9	Proposed Ph2[3]	17367	-7.21	37.38		37.39	0.000014	1.36	29369.96	1337.14	0.04
	119495.9	FuturePh3[4]	17375	-7.21	37.38		37.4	0.000014	1.36	29377.58	1337.19	0.04
	118667.7	Existing[1]	17393	-8.56	37.34		37.39	0.000036	2.24	16155.06	924.25	0.06
	118667.7	InterimPh1[2]	17361	-8.56	37.31		37.36	0.000036	2.24	16132.2	923.46	0.06
	118667.7	Proposed Ph2[3]	17367	-8.56	37.32		37.37	0.000036	2.24	16136.59	923.61	0.06
	118667.7	FuturePh3[4]	17375	-8.56	37.33		37.37	0.000036	2.24	16141.84	923.79	0.06
	118466.1	Existing[1]	17393	-8.89	37.3	5.29	37.37	0.000046	2.55	14391.13	1130.04	0.07
	118466.1	InterimPh1[2]	17361	-8.89	37.28	5.27	37.35	0.000046	2.55	14363.19	1128.08	0.07
	118466.1	Proposed Ph2[3]	17367	-8.89	37.28	5.27	37.35	0.000046	2.55	14368.55	1128.45	0.07
	118466.1	FuturePh3[4]	17375	-8.89	37.29	5.28	37.36	0.000046	2.55	14374.96	1128.91	0.07
	118418.1		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	118370.1	Existing[1]	17393	-8.87	37.27	5.31	37.34	0.000046	2.56	14331.9	1125.88	0.07
	118370.1	InterimPh1[2]	17361	-8.87	37.25	5.29	37.32	0.000046	2.56	14304.13	1123.92	0.07
	118370.1	Proposed Ph2[3]	17367	-8.87	37.25	5.29	37.32	0.000046	2.56	14309.46	1124.3	0.07
	118370.1	FuturePh3[4]	17375	-8.87	37.26	5.3	37.33	0.000046	2.56	14315.83	1124.75	0.07
	117845.4	Existing[1]	17393	-7.26	37.26		37.31	0.000043	2.34	13767.9	833.6	0.07
	117845.4	InterimPh1[2]	17361	-7.26	37.23		37.28	0.000043	2.34	13747.33	833.3	0.07
	117845.4	Proposed Ph2[3]	17367	-7.26	37.24		37.29	0.000043	2.34	13751.28	833.36	0.07
	117845.4	FuturePh3[4]	17375	-7.26	37.24		37.3	0.000043	2.34	13756	833.43	0.07
	117204.3	Existing[1]	17393	-4.6	37.24		37.28	0.000041	2.21	15735.05	1089.81	0.06
	117204.3	InterimPh1[2]	17361	-4.6	37.21		37.25	0.000041	2.21	15708.21	1086.85	0.06
	117204.3	Proposed Ph2[3]	17367	-4.6	37.22		37.26	0.000041	2.21	15713.36	1087.42	0.06
	117204.3	FuturePh3[4]	17375	-4.6	37.22		37.26	0.000041	2.21	15719.51	1088.1	0.06
	116395.7	Existing[1]	17393	-3.88	37.18		37.24	0.000043	2.38	13220.93	543.95	0.07
	116395.7	InterimPh1[2]	17361	-3.88	37.16		37.22	0.000043	2.38	13207.57	543.72	0.07
	116395.7	Proposed Ph2[3]	17367	-3.88	37.16		37.22	0.000043	2.38	13210.14	543.75	0.07
	116395.7	FuturePh3[4]	17375	-3.88	37.17		37.23	0.000043	2.38	13213.2	543.79	0.07
	116167.6	Existing[1]	17393	-3.68	37.08	7.26	37.21	0.000074	3.1	7620.2	290.95	0.09
	116167.6	InterimPh1[2]	17361	-3.68	37.05	7.24	37.18	0.000074	3.1	7613.92	290.88	0.09
	116167.6	Proposed Ph2[3]	17367	-3.68	37.06	7.25	37.19	0.000074	3.1	7615.13	290.89	0.09
	116167.6	FuturePh3[4]	17375	-3.68	37.06	7.25	37.19	0.000074	3.1	7616.56	290.91	0.09
	116121.9		Bridge									
	116076.2	Existing[1]	17393	-3.86	36.97	7.07	37.1	0.000074	3.09	7638.94	291.18	0.09
	116076.2	InterimPh1[2]	17361	-3.86	36.95	7.07	37.08	0.000074	3.09	7632.82	291.1	0.09
	116076.2	Proposed Ph2[3]	17367	-3.86	36.95	7.07	37.08	0.000074	3.09	7634	291.12	0.09
	116076.2	FuturePh3[4]	17375	-3.86	36.96	7.08	37.09	0.000074	3.09	7635.4	291.13	0.09
	115655.5	Existing[1]	17393	-5.03	36.95	7.64	37.06	0.000053	2.99	10258.88	732.25	0.09
	115655.5	InterimPh1[2]	17361	-5.03	36.93	7.62	37.04	0.000053	2.99	10241.48	731.15	0.09
	115655.5	Proposed Ph2[3]	17367	-5.03	36.93	7.62	37.04	0.000053	2.99	10244.82	731.36	0.09
	115655.5	FuturePh3[4]	17375	-5.03	36.94	7.63	37.05	0.000053	2.99	10248.8	731.61	0.09
	115635.5		Bridge									
	115615.5	Existing[1]	17393	-5.27	36.94	7.39	37.05	0.000052	2.96	10425.77	749.12	0.08
	115615.5	InterimPh1[2]	17361	-5.27	36.92	7.38	37.02	0.000052	2.96	10408.03	746.1	0.08
	115615.5	Proposed Ph2[3]	17367	-5.27	36.92	7.38	37.03	0.000052	2.96	10411.43	746.68	0.08
	115615.5	FuturePh3[4]	17375	-5.27	36.93	7.39	37.03	0.000052	2.96	10415.48	747.37	0.08
	115573.5	Existing[1]	17393	-5.72	36.95	6.44	37.03	0.000042	2.59	10862.42	513.75	0.07
	115573.5	InterimPh1[2]	17361	-5.72	36.93	6.43	37.01	0.000041	2.59	10850.23	513.68	0.07
	115573.5	Proposed Ph2[3]	17367	-5.72	36.93	6.44	37.01	0.000041	2.59	10852.57	513.69	0.07
	115573.5	FuturePh3[4]	17375	-5.72	36.94	6.44	37.02	0.000042	2.59	10855.36	513.71	0.07
	115553.5		Bridge									
	115533.5	Existing[1]	17393	-6.77	36.95	5.4	37.02	0.000037	2.49	11400.13	662.9	0.07
	115533.5	InterimPh1[2]	17361	-6.77	36.92	5.38	36.99	0.000037	2.48	11387.87	661.92	0.07
	115533.5	Proposed Ph2[3]	17367	-6.77	36.93	5.39	37	0.000037	2.48	11390.23	662.11	0.07
	115533.5	FuturePh3[4]	17375	-6.77	36.93	5.39	37	0.000037	2.48	11393.03	662.33	0.07
	115214	Existing[1]	17393	-7.96	36.89	3.92	36.99	0.000042	2.67	9309.27	616.04	0.07
	115214	InterimPh1[2]	17361	-7.96	36.87	3.91	36.97	0.000042	2.67	9294.79	612.58	0.07
	115214	Proposed Ph2[3]	17367	-7.96	36.87	3.91	36.98	0.000042	2.67	9297.56	613.25	0.07
	115214	FuturePh3[4]	17375	-7.96	36.88	3.91	36.98	0.000042	2.67	9300.87	614.04	0.07
	115168.5		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	115123	Existing[1]	17393	-8.12	36.83	3.76	36.93	0.000042	2.66	9371.54	630.72	0.07
	115123	InterimPh1[2]	17361	-8.12	36.81	3.75	36.91	0.000042	2.66	9356.78	627.27	0.07
	115123	Proposed Ph2[3]	17367	-8.12	36.81	3.75	36.91	0.000042	2.66	9359.61	627.93	0.07
	115123	FuturePh3[4]	17375	-8.12	36.82	3.75	36.92	0.000042	2.66	9362.98	628.72	0.07
	114890.5	Existing[1]	17393	-8.56	36.81	4.81	36.92	0.00005	2.8	11623.01	1284.04	0.08
	114890.5	InterimPh1[2]	17361	-8.56	36.78	4.81	36.9	0.00005	2.79	11595.37	1281.05	0.08
	114890.5	Proposed Ph2[3]	17367	-8.56	36.79	4.81	36.9	0.00005	2.8	11600.68	1281.63	0.08
	114890.5	FuturePh3[4]	17375	-8.56	36.79	4.8	36.91	0.00005	2.8	11606.99	1282.31	0.08
	114864.5		Bridge									
	114838.5	Existing[1]	17393	-9.27	36.77	4.11	36.87	0.000047	2.73	12437.46	1369.36	0.08
	114838.5	InterimPh1[2]	17361	-9.27	36.74	4.09	36.85	0.000047	2.73	12408.13	1366.38	0.08
	114838.5	Proposed Ph2[3]	17367	-9.27	36.75	4.1	36.85	0.000047	2.73	12413.76	1366.95	0.08
	114838.5	FuturePh3[4]	17375	-9.27	36.75	4.1	36.86	0.000047	2.73	12420.46	1367.63	0.08
	114492	Existing[1]	17393	-10.48	36.75		36.86	0.000053	2.75	9909.16	929.73	0.08
	114492	InterimPh1[2]	17361	-10.48	36.72		36.83	0.000053	2.75	9887.47	926.08	0.08
	114492	Proposed Ph2[3]	17367	-10.48	36.73		36.84	0.000053	2.75	9891.64	926.78	0.08
	114492	FuturePh3[4]	17375	-10.48	36.73		36.84	0.000053	2.75	9896.59	927.62	0.08
	114195.9	Existing[1]	17393	-11.52	36.74	5.12	36.84	0.000046	2.62	8900.65	799.08	0.08
	114195.9	InterimPh1[2]	17361	-11.52	36.72	5.11	36.81	0.000046	2.61	8882.02	794.97	0.08
	114195.9	Proposed Ph2[3]	17367	-11.52	36.72	5.12	36.82	0.000046	2.62	8885.6	795.76	0.08
	114195.9	FuturePh3[4]	17375	-11.52	36.72	5.12	36.82	0.000046	2.62	8889.85	796.7	0.08
	114168.9		Bridge									
	114141.9	Existing[1]	17393	-10.83	36.62	5.81	36.72	0.000051	2.69	8321.97	593.75	0.08
	114141.9	InterimPh1[2]	17361	-10.83	36.59	5.8	36.7	0.000051	2.69	8307.64	585.09	0.08
	114141.9	Proposed Ph2[3]	17367	-10.83	36.6	5.81	36.7	0.000051	2.69	8310.39	586.75	0.08
	114141.9	FuturePh3[4]	17375	-10.83	36.6	5.81	36.71	0.000051	2.69	8313.64	588.73	0.08
	114097.4	Existing[1]	17393	-7.46	36.63	6.54	36.7	0.00004	2.36	10119.28	967.35	0.07
	114097.4	InterimPh1[2]	17361	-7.46	36.6	6.53	36.68	0.00004	2.36	10096.04	963	0.07
	114097.4	Proposed Ph2[3]	17367	-7.46	36.61	6.53	36.68	0.00004	2.36	10100.5	963.84	0.07
	114097.4	FuturePh3[4]	17375	-7.46	36.61	6.53	36.69	0.00004	2.36	10105.79	964.83	0.07
	114070.4		Bridge									
	114043.4	Existing[1]	17393	-7.72	36.56	6.28	36.63	0.000039	2.35	10303.24	1001.16	0.07
	114043.4	InterimPh1[2]	17361	-7.72	36.53	6.26	36.61	0.000039	2.34	10278.78	996.73	0.07
	114043.4	Proposed Ph2[3]	17367	-7.72	36.54	6.27	36.61	0.000039	2.34	10283.48	997.58	0.07
	114043.4	FuturePh3[4]	17375	-7.72	36.54	6.27	36.62	0.000039	2.34	10289.03	998.59	0.07
	113644	Existing[1]	17393	-8.91	36.5		36.6	0.000062	2.71	9498.16	628.43	0.09
	113644	InterimPh1[2]	17361	-8.91	36.47		36.58	0.000062	2.7	9482.65	628.04	0.09
	113644	Proposed Ph2[3]	17367	-8.91	36.48		36.58	0.000062	2.7	9485.64	628.12	0.09
	113644	FuturePh3[4]	17375	-8.91	36.48		36.59	0.000062	2.7	9489.16	628.2	0.09
	113411.6	Existing[1]	17393	-9.61	36.48	3.68	36.59	0.000046	2.77	6811.04	563.43	0.08
	113411.6	InterimPh1[2]	17361	-9.61	36.45	3.66	36.57	0.000046	2.77	6806.5	562.59	0.08
	113411.6	Proposed Ph2[3]	17367	-9.61	36.46	3.67	36.57	0.000046	2.77	6807.37	562.75	0.08
	113411.6	FuturePh3[4]	17375	-9.61	36.46	3.67	36.58	0.000046	2.77	6808.41	562.94	0.08
	113374.3		Bridge									
	113337	Existing[1]	17393	-9.65	36.34	3.64	36.45	0.000046	2.78	6792.07	559.92	0.08
	113337	InterimPh1[2]	17361	-9.65	36.31	3.62	36.42	0.000046	2.78	6787.65	559.1	0.08
	113337	Proposed Ph2[3]	17367	-9.65	36.32	3.63	36.43	0.000046	2.78	6788.5	559.26	0.08
	113337	FuturePh3[4]	17375	-9.65	36.32	3.63	36.43	0.000046	2.78	6789.51	559.45	0.08
	113266.4	Existing[1]	17393	-9.11	36.24	6.93	36.42	0.000089	3.55	6891.07	492.36	0.11
	113266.4	InterimPh1[2]	17361	-9.11	36.22	6.91	36.4	0.000089	3.55	6879.38	489.85	0.11

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	113266.4	Proposed Ph2[3]	17367	-9.11	36.22	6.91	36.4	0.000089	3.55	6881.63	490.33	0.11
	113266.4	FuturePh3[4]	17375	-9.11	36.23	6.92	36.41	0.000089	3.55	6884.27	490.9	0.11
	113238.6		Bridge									
	113210.8	Existing[1]	17393	-9.46	36.17	6.57	36.35	0.000087	3.52	7035.42	576.73	0.1
	113210.8	InterimPh1[2]	17361	-9.46	36.14	6.56	36.32	0.000087	3.52	7022.15	562.48	0.1
	113210.8	Proposed Ph2[3]	17367	-9.46	36.15	6.57	36.33	0.000087	3.52	7024.68	565.11	0.1
	113210.8	FuturePh3[4]	17375	-9.46	36.15	6.57	36.33	0.000087	3.52	7027.67	568.34	0.1
	112974	Existing[1]	17393	-10.69	36.14	6	36.32	0.000101	3.5	5879.06	265.75	0.11
	112974	InterimPh1[2]	17361	-10.69	36.12	5.98	36.3	0.000101	3.49	5872.9	264.68	0.11
	112974	Proposed Ph2[3]	17367	-10.69	36.12	5.99	36.3	0.000101	3.49	5874.08	264.88	0.11
	112974	FuturePh3[4]	17375	-10.69	36.13	5.99	36.31	0.000101	3.49	5875.47	265.13	0.11
	112944.9		Bridge									
	112915.8	Existing[1]	17393	-10.82	36.08	5.87	36.26	0.0001	3.49	5897.95	269	0.1
	112915.8	InterimPh1[2]	17361	-10.82	36.06	5.85	36.24	0.0001	3.48	5891.81	267.95	0.1
	112915.8	Proposed Ph2[3]	17367	-10.82	36.07	5.85	36.24	0.0001	3.48	5892.99	268.15	0.1
	112915.8	FuturePh3[4]	17375	-10.82	36.07	5.86	36.25	0.0001	3.49	5894.38	268.39	0.1
	112575.5	Existing[1]	17393	-9.2	36.08	7.47	36.21	0.000076	3.13	9227.46	938.89	0.09
	112575.5	InterimPh1[2]	17361	-9.2	36.05	7.46	36.19	0.000076	3.13	9205.95	937.35	0.09
	112575.5	Proposed Ph2[3]	17367	-9.2	36.06	7.46	36.19	0.000076	3.13	9210.09	937.64	0.09
	112575.5	FuturePh3[4]	17375	-9.2	36.06	7.47	36.2	0.000076	3.13	9214.96	937.99	0.09
	112534.5		Bridge									
	112493.5	Existing[1]	17393	-9.47	36.01	7.2	36.14	0.000074	3.11	9416.76	952.42	0.09
	112493.5	InterimPh1[2]	17361	-9.47	35.98	7.19	36.12	0.000074	3.11	9394.86	950.86	0.09
	112493.5	Proposed Ph2[3]	17367	-9.47	35.99	7.19	36.12	0.000074	3.11	9399.08	951.16	0.09
	112493.5	FuturePh3[4]	17375	-9.47	35.99	7.19	36.13	0.000074	3.11	9404.02	951.51	0.09
	112003.3	Existing[1]	17393	-9.69	36	4.73	36.09	0.000042	2.49	8803.17	480.9	0.07
	112003.3	InterimPh1[2]	17361	-9.69	35.98	4.72	36.07	0.000042	2.49	8792.12	480.18	0.07
	112003.3	Proposed Ph2[3]	17367	-9.69	35.98	4.72	36.07	0.000042	2.49	8794.25	480.31	0.07
	112003.3	FuturePh3[4]	17375	-9.69	35.99	4.72	36.08	0.000042	2.49	8796.74	480.48	0.07
	111953.3		Bridge									
	111903.3	Existing[1]	17393	-9.84	35.92	4.58	36.01	0.000042	2.49	8836.88	483.08	0.07
	111903.3	InterimPh1[2]	17361	-9.84	35.9	4.57	35.99	0.000042	2.48	8825.69	482.35	0.07
	111903.3	Proposed Ph2[3]	17367	-9.84	35.9	4.57	35.99	0.000042	2.48	8827.78	482.49	0.07
	111903.3	FuturePh3[4]	17375	-9.84	35.91	4.57	36	0.000042	2.48	8830.24	482.65	0.07
	111853.5	Existing[1]	17393	-9.86	35.91	4.69	36.01	0.000039	2.46	8117.37	477.88	0.07
	111853.5	InterimPh1[2]	17361	-9.86	35.89	4.67	35.98	0.000039	2.46	8106.31	477.16	0.07
	111853.5	Proposed Ph2[3]	17367	-9.86	35.9	4.68	35.99	0.000039	2.46	8108.39	477.3	0.07
	111853.5	FuturePh3[4]	17375	-9.86	35.9	4.68	35.99	0.000039	2.46	8110.81	477.46	0.07
	111818.6		Bridge									
	111783.7	Existing[1]	17393	-8.67	35.85	5.88	35.95	0.000044	2.56	7544.63	429.19	0.08
	111783.7	InterimPh1[2]	17361	-8.67	35.83	5.87	35.93	0.000044	2.55	7534.74	427.91	0.08
	111783.7	Proposed Ph2[3]	17367	-8.67	35.83	5.87	35.93	0.000044	2.55	7536.6	428.15	0.08
	111783.7	FuturePh3[4]	17375	-8.67	35.84	5.87	35.94	0.000044	2.55	7538.76	428.43	0.08
	111626.7	Existing[1]	17393	-11.83	35.82	4.87	35.94	0.000056	2.83	8423.9	573.11	0.08
	111626.7	InterimPh1[2]	17361	-11.83	35.8	4.86	35.92	0.000056	2.82	8410.73	569.9	0.08
	111626.7	Proposed Ph2[3]	17367	-11.83	35.8	4.87	35.92	0.000056	2.82	8413.2	570.5	0.08
	111626.7	FuturePh3[4]	17375	-11.83	35.81	4.87	35.92	0.000056	2.83	8416.07	571.21	0.08
	111518.6		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	111410.5	Existing[1]	17393	-11.23	35.66	5.47	35.78	0.00006	2.9	8013.82	517.39	0.09
	111410.5	InterimPh1[2]	17361	-11.23	35.64	5.47	35.76	0.00006	2.89	8001.96	516.33	0.08
	111410.5	Proposed Ph2[3]	17367	-11.23	35.64	5.46	35.76	0.00006	2.89	8004.19	516.53	0.09
	111410.5	FuturePh3[4]	17375	-11.23	35.65	5.46	35.77	0.00006	2.89	8006.76	516.76	0.09
	110876.6	Existing[1]	17393	-10.43	35.65	2.4	35.74	0.000038	2.61	14174.73	1376.86	0.07
	110876.6	InterimPh1[2]	17361	-10.43	35.63	2.39	35.72	0.000038	2.61	14143.13	1375.44	0.07
	110876.6	Proposed Ph2[3]	17367	-10.43	35.63	2.39	35.72	0.000038	2.61	14149.06	1375.7	0.07
	110876.6	FuturePh3[4]	17375	-10.43	35.64	2.4	35.73	0.000038	2.61	14155.94	1376.01	0.07
	110837.8		Bridge									
	110799	Existing[1]	17393	-10.72	35.62	2.11	35.71	0.000037	2.58	14532.26	1392.91	0.07
	110799	InterimPh1[2]	17361	-10.72	35.6	2.1	35.68	0.000037	2.58	14500.13	1391.48	0.07
	110799	Proposed Ph2[3]	17367	-10.72	35.6	2.1	35.69	0.000037	2.58	14506.17	1391.75	0.07
	110799	FuturePh3[4]	17375	-10.72	35.61	2.11	35.69	0.000037	2.58	14513.15	1392.06	0.07
	110672.7	Existing[1]	17393	-13.25	35.62	2.5	35.7	0.000045	2.56	15697.73	1341.48	0.07
	110672.7	InterimPh1[2]	17361	-13.25	35.59	2.48	35.68	0.000045	2.56	15666.76	1340.6	0.07
	110672.7	Proposed Ph2[3]	17367	-13.25	35.6	2.48	35.68	0.000045	2.56	15672.57	1340.77	0.07
	110672.7	FuturePh3[4]	17375	-13.25	35.6	2.48	35.69	0.000045	2.56	15679.31	1340.96	0.07
	110643.7		Bridge									
	110614.7	Existing[1]	17393	-12.75	35.59	2.99	35.68	0.000048	2.62	15004.04	1321.6	0.08
	110614.7	InterimPh1[2]	17361	-12.75	35.57	2.98	35.66	0.000048	2.62	14973.37	1320.71	0.08
	110614.7	Proposed Ph2[3]	17367	-12.75	35.58	2.98	35.66	0.000048	2.62	14979.13	1320.88	0.08
	110614.7	FuturePh3[4]	17375	-12.75	35.58	2.98	35.67	0.000048	2.62	14985.79	1321.07	0.08
	110200.2	Existing[1]	59250	-9.11	34.34	14.74	35.32	0.000539	8.84	11060.97	566.3	0.26
	110200.2	InterimPh1[2]	59189	-9.11	34.32	14.74	35.3	0.00054	8.83	11048.18	565.93	0.26
	110200.2	Proposed Ph2[3]	59201	-9.11	34.33	14.74	35.3	0.00054	8.83	11050.57	566	0.26
	110200.2	FuturePh3[4]	59214	-9.11	34.33	14.74	35.31	0.00054	8.83	11053.36	566.08	0.26
	110154.2		Bridge									
	110108.2	Existing[1]	59250	-9.31	33.9	14.54	34.89	0.000555	8.92	10923.78	562.33	0.27
	110108.2	InterimPh1[2]	59189	-9.31	33.87	14.54	34.87	0.000555	8.91	10911.24	561.97	0.27
	110108.2	Proposed Ph2[3]	59201	-9.31	33.88	14.55	34.87	0.000555	8.91	10913.58	562.04	0.27
	110108.2	FuturePh3[4]	59214	-9.31	33.88	14.54	34.88	0.000555	8.92	10916.32	562.12	0.27
	109551.7	Existing[1]	59250	-14.28	33.69	10.44	34.58	0.000403	8	9817.35	365.99	0.23
	109551.7	InterimPh1[2]	59189	-14.28	33.66	10.42	34.56	0.000403	7.99	9809.05	365.9	0.23
	109551.7	Proposed Ph2[3]	59201	-14.28	33.67	10.43	34.56	0.000403	7.99	9810.59	365.92	0.23
	109551.7	FuturePh3[4]	59214	-14.28	33.67	10.43	34.57	0.000403	8	9812.41	365.94	0.23
	109518.7		Bridge									
	109485.7	Existing[1]	59250	-15.31	32.85	9.41	33.73	0.000396	7.95	9887.35	366.71	0.23
	109485.7	InterimPh1[2]	59189	-15.31	32.82	9.39	33.71	0.000396	7.95	9878.97	366.63	0.23
	109485.7	Proposed Ph2[3]	59201	-15.31	32.83	9.4	33.71	0.000396	7.95	9880.51	366.64	0.23
	109485.7	FuturePh3[4]	59214	-15.31	32.83	9.41	33.72	0.000396	7.95	9882.35	366.66	0.23
	109440.2	Existing[1]	59250	-16.48	32.55	9.25	33.65	0.000473	8.9	9187.75	332.72	0.25
	109440.2	InterimPh1[2]	59189	-16.48	32.53	9.25	33.62	0.000473	8.9	9180.22	332.69	0.25
	109440.2	Proposed Ph2[3]	59201	-16.48	32.53	9.24	33.63	0.000473	8.9	9181.6	332.7	0.25
	109440.2	FuturePh3[4]	59214	-16.48	32.53	9.25	33.63	0.000473	8.9	9183.25	332.71	0.25
	109395.2		Bridge									
	109350.2	Existing[1]	59250	-16.89	31.82	8.85	32.94	0.000487	8.99	9082.6	332.26	0.25
	109350.2	InterimPh1[2]	59189	-16.89	31.8	8.84	32.92	0.000487	8.98	9076.1	332.23	0.25
	109350.2	Proposed Ph2[3]	59201	-16.89	31.81	8.84	32.93	0.000487	8.98	9077.29	332.24	0.25
	109350.2	FuturePh3[4]	59214	-16.89	31.81	8.84	32.93	0.000487	8.98	9078.71	332.25	0.25
	109119	Existing[1]	59250	-17.14	31.73	10.94	32.8	0.000566	8.86	7973.87	502.78	0.25

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
	109119	InterimPh1[2]	59189	-17.14	31.71	10.92	32.78	0.000566	8.86	7966.39	502.29	0.25
	109119	Proposed Ph2[3]	59201	-17.14	31.71	10.93	32.78	0.000566	8.86	7967.76	502.38	0.25
	109119	FuturePh3[4]	59214	-17.14	31.71	10.93	32.78	0.000566	8.86	7969.4	502.49	0.25
	109103.1		Bridge									
	109087.2	Existing[1]	59250	-17.55	31.47	10.52	32.53	0.000556	8.8	8032.88	506.62	0.25
	109087.2	InterimPh1[2]	59189	-17.55	31.45	10.51	32.51	0.000556	8.8	8025.45	506.14	0.25
	109087.2	Proposed Ph2[3]	59201	-17.55	31.46	10.52	32.51	0.000556	8.8	8026.81	506.22	0.25
	109087.2	FuturePh3[4]	59214	-17.55	31.46	10.52	32.51	0.000556	8.8	8028.44	506.33	0.25
	108565.3	Existing[1]	59250	-12.77	31.36	8.22	32.15	0.000401	7.14	9684.12	546.81	0.22
	108565.3	InterimPh1[2]	59189	-12.77	31.34	8.21	32.13	0.000402	7.14	9673.44	546.49	0.22
	108565.3	Proposed Ph2[3]	59201	-12.77	31.35	8.21	32.13	0.000402	7.14	9675.4	546.55	0.22
	108565.3	FuturePh3[4]	59214	-12.77	31.35	8.21	32.13	0.000402	7.14	9677.74	546.62	0.22
	108334	Existing[1]	59250	-14.06	31.36		32.03	0.00034	6.65	12203.4	840.47	0.21
	108334	InterimPh1[2]	59189	-14.06	31.34		32.01	0.00034	6.65	12186.89	839.81	0.21
	108334	Proposed Ph2[3]	59201	-14.06	31.34		32.01	0.00034	6.65	12189.91	839.93	0.21
	108334	FuturePh3[4]	59214	-14.06	31.35		32.01	0.00034	6.65	12193.53	840.08	0.21
	107179.4	Existing[1]	59499	-20.52	30.43	5.99	31.42	0.000627	8.07	8970.13	396.53	0.24
	107179.4	InterimPh1[2]	59439	-20.52	30.41	5.97	31.4	0.000627	8.06	8962.51	396.53	0.24
	107179.4	Proposed Ph2[3]	59450	-20.52	30.42	5.97	31.4	0.000627	8.06	8963.92	396.53	0.24
	107179.4	FuturePh3[4]	59463	-20.52	30.42	5.98	31.41	0.000627	8.06	8965.59	396.53	0.24
	107158.9		Bridge									
	107138.4	Existing[1]	59499	-20.19	30.21	6.32	31.24	0.000664	8.21	8753.11	396.31	0.25
	107138.4	InterimPh1[2]	59439	-20.19	30.2	6.3	31.22	0.000664	8.21	8745.55	396.3	0.25
	107138.4	Proposed Ph2[3]	59450	-20.19	30.2	6.3	31.22	0.000664	8.21	8746.94	396.3	0.25
	107138.4	FuturePh3[4]	59463	-20.19	30.2	6.31	31.23	0.000664	8.21	8748.6	396.3	0.25
	106594	Existing[1]	59499	-16.7	30.04	5.26	30.88	0.000378	7.42	8516.91	278.14	0.22
	106594	InterimPh1[2]	59439	-16.7	30.02	5.25	30.86	0.000378	7.41	8511.62	278.07	0.22
	106594	Proposed Ph2[3]	59450	-16.7	30.02	5.26	30.87	0.000378	7.41	8512.6	278.08	0.22
	106594	FuturePh3[4]	59463	-16.7	30.02	5.25	30.87	0.000378	7.41	8513.75	278.1	0.22
	106151.4	Existing[1]	59499	-13.85	29.62	8.11	30.64	0.000502	8.14	8069.66	291.22	0.25
	106151.4	InterimPh1[2]	59439	-13.85	29.6	8.1	30.62	0.000502	8.13	8064.18	291.13	0.25
	106151.4	Proposed Ph2[3]	59450	-13.85	29.61	8.1	30.62	0.000502	8.13	8065.19	291.15	0.25
	106151.4	FuturePh3[4]	59463	-13.85	29.61	8.1	30.63	0.000502	8.13	8066.39	291.17	0.25
	106131.1		Bridge									
	106110.8	Existing[1]	59499	-12.53	29.37	9.43	30.49	0.000583	8.55	7617.12	283.66	0.27
	106110.8	InterimPh1[2]	59439	-12.53	29.35	9.42	30.47	0.000583	8.55	7611.82	283.57	0.27
	106110.8	Proposed Ph2[3]	59450	-12.53	29.35	9.42	30.48	0.000583	8.55	7612.8	283.59	0.27
	106110.8	FuturePh3[4]	59463	-12.53	29.36	9.43	30.48	0.000583	8.55	7613.96	283.61	0.27
	105705.4	Existing[1]	59499	-18.22	29.28	6.68	30.2	0.000393	7.69	8051.29	340.27	0.25
	105705.4	InterimPh1[2]	59439	-18.22	29.26	6.67	30.18	0.000393	7.69	8044.9	340.01	0.25
	105705.4	Proposed Ph2[3]	59450	-18.22	29.27	6.68	30.18	0.000393	7.69	8046.08	340.06	0.25
	105705.4	FuturePh3[4]	59463	-18.22	29.27	6.68	30.18	0.000393	7.69	8047.48	340.12	0.25
	105667.4		Bridge									
	105629.4	Existing[1]	59499	-18.43	28.97	6.48	29.89	0.000398	7.72	8016.38	338.84	0.25
	105629.4	InterimPh1[2]	59439	-18.43	28.95	6.46	29.87	0.000398	7.71	8010.03	338.58	0.25
	105629.4	Proposed Ph2[3]	59450	-18.43	28.95	6.47	29.87	0.000398	7.71	8011.2	338.63	0.25
	105629.4	FuturePh3[4]	59463	-18.43	28.96	6.47	29.88	0.000398	7.71	8012.59	338.69	0.25
	105211	Existing[1]	59499	-16.14	28.65	6.97	29.66	0.000628	8.06	7381.85	333.76	0.3
	105211	InterimPh1[2]	59439	-16.14	28.63	6.95	29.64	0.000628	8.06	7375.44	333.5	0.3
	105211	Proposed Ph2[3]	59450	-16.14	28.63	6.95	29.64	0.000628	8.06	7376.62	333.55	0.3
	105211	FuturePh3[4]	59463	-16.14	28.64	6.96	29.65	0.000628	8.06	7378.03	333.6	0.3

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	104608.2	Existing[1]	59499	-18.46	28.64		29.24	0.00039	6.24	9547.8	483.36	0.24
	104608.2	InterimPh1[2]	59439	-18.46	28.62		29.22	0.00039	6.24	9538.39	482.79	0.24
	104608.2	Proposed Ph2[3]	59450	-18.46	28.62		29.23	0.00039	6.24	9540.13	482.9	0.24
	104608.2	FuturePh3[4]	59463	-18.46	28.62		29.23	0.00039	6.24	9542.19	483.02	0.24
	104370.8	Existing[1]	59499	-19.99	27.92	9.54	29	0.000447	9.15	10166.6	491	0.27
	104370.8	InterimPh1[2]	59439	-19.99	27.9	9.52	28.98	0.000447	9.15	10157.21	490.92	0.27
	104370.8	Proposed Ph2[3]	59450	-19.99	27.91	9.52	28.98	0.000447	9.15	10158.94	490.94	0.27
	104370.8	FuturePh3[4]	59463	-19.99	27.91	9.52	28.99	0.000447	9.15	10161.01	490.95	0.27
	104350		Bridge									
	104329.2	Existing[1]	59499	-20.2	26.81	9.32	27.97	0.000496	9.48	9722.46	487.49	0.28
	104329.2	InterimPh1[2]	59439	-20.2	26.79	9.31	27.95	0.000496	9.48	9713.67	487.42	0.28
	104329.2	Proposed Ph2[3]	59450	-20.2	26.79	9.31	27.96	0.000496	9.48	9715.3	487.44	0.28
	104329.2	FuturePh3[4]	59463	-20.2	26.79	9.32	27.96	0.000496	9.48	9717.23	487.45	0.28
	103664	Existing[1]	59499	-23.03	24.17		26.97	0.001365	14.87	6729.07	681.6	0.42
	103664	InterimPh1[2]	59439	-23.03	24.15		26.95	0.001366	14.86	6716.05	679.29	0.42
	103664	Proposed Ph2[3]	59450	-23.03	24.16		26.95	0.001366	14.86	6718.46	679.72	0.42
	103664	FuturePh3[4]	59463	-23.03	24.16		26.96	0.001366	14.86	6721.35	680.23	0.42
	102875.3	Existing[1]	59499	-26.39	23.94	10.41	25.64	0.000815	12.1	7686.38	382.28	0.33
	102875.3	InterimPh1[2]	59439	-26.39	23.92	10.39	25.62	0.000815	12.1	7679.04	382.16	0.33
	102875.3	Proposed Ph2[3]	59450	-26.39	23.92	10.39	25.62	0.000815	12.1	7680.4	382.18	0.33
	102875.3	FuturePh3[4]	59463	-26.39	23.93	10.4	25.62	0.000815	12.1	7682.03	382.21	0.33
	102847.5		Bridge									
	102819.7	Existing[1]	59499	-26.43	22.69	10.36	24.61	0.000943	12.76	7228.5	375.01	0.35
	102819.7	InterimPh1[2]	59439	-26.43	22.67	10.35	24.59	0.000943	12.76	7222.05	374.91	0.35
	102819.7	Proposed Ph2[3]	59450	-26.43	22.68	10.35	24.6	0.000943	12.76	7223.25	374.93	0.35
	102819.7	FuturePh3[4]	59463	-26.43	22.68	10.35	24.6	0.000943	12.76	7224.69	374.95	0.35
	102309	Existing[1]	59499	-23.48	22.86		23.88	0.000367	8.1	7374.19	223.14	0.24
	102309	InterimPh1[2]	59439	-23.48	22.84		23.86	0.000367	8.1	7370.43	223.09	0.24
	102309	Proposed Ph2[3]	59450	-23.48	22.84		23.86	0.000367	8.1	7371.13	223.1	0.24
	102309	FuturePh3[4]	59463	-23.48	22.85		23.86	0.000367	8.1	7371.97	223.11	0.24
	101828	Existing[1]	59499	-20.7	22.38	3.45	23.61	0.000508	8.92	6971.95	298.01	0.28
	101828	InterimPh1[2]	59439	-20.7	22.36	3.44	23.59	0.000508	8.91	6966.96	297.8	0.28
	101828	Proposed Ph2[3]	59450	-20.7	22.36	3.45	23.59	0.000508	8.91	6967.89	297.83	0.28
	101828	FuturePh3[4]	59463	-20.7	22.37	3.45	23.6	0.000508	8.91	6969.01	297.88	0.28
	101790.1		Bridge									
	101752.2	Existing[1]	59499	-20.69	22.16	3.46	23.41	0.00052	8.98	6905.47	295.2	0.29
	101752.2	InterimPh1[2]	59439	-20.69	22.15	3.45	23.39	0.00052	8.98	6900.55	294.99	0.29
	101752.2	Proposed Ph2[3]	59450	-20.69	22.15	3.45	23.4	0.00052	8.98	6901.46	295.03	0.29
	101752.2	FuturePh3[4]	59463	-20.69	22.15	3.46	23.4	0.00052	8.98	6902.57	295.08	0.29
	101007.3	Existing[1]	59499	-16.93	21.94		22.91	0.000458	7.87	7559.22	277.41	0.27
	101007.3	InterimPh1[2]	59439	-16.93	21.93		22.89	0.000457	7.87	7554.57	277.37	0.27
	101007.3	Proposed Ph2[3]	59450	-16.93	21.93		22.89	0.000458	7.87	7555.44	277.38	0.27
	101007.3	FuturePh3[4]	59463	-16.93	21.93		22.89	0.000458	7.87	7556.48	277.39	0.27
	99992.6	Existing[1]	60210	-18.9	21.29		22.38	0.000548	8.39	7173.15	266.17	0.28
	99992.6	InterimPh1[2]	60150	-18.9	21.27		22.37	0.000548	8.39	7168.75	266.11	0.28
	99992.6	Proposed Ph2[3]	60161	-18.9	21.28		22.37	0.000548	8.39	7169.57	266.12	0.28
	99992.6	FuturePh3[4]	60175	-18.9	21.28		22.37	0.000548	8.39	7170.55	266.13	0.28
	98399.4	Existing[1]	60210	-20.26	20.48		21.51	0.000526	8.15	7390.4	277.5	0.28
	98399.4	InterimPh1[2]	60150	-20.26	20.46		21.49	0.000526	8.14	7385.86	277.43	0.28
	98399.4	Proposed Ph2[3]	60161	-20.26	20.47		21.5	0.000526	8.14	7386.71	277.44	0.28
	98399.4	FuturePh3[4]	60175	-20.26	20.47		21.5	0.000526	8.15	7387.71	277.46	0.28

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	97517.4	Existing[1]	60210	-19.35	20.46		21.08	0.000244	6.33	9587.73	319.88	0.2
	97517.4	InterimPh1[2]	60150	-19.35	20.45		21.07	0.000244	6.32	9582.47	319.86	0.2
	97517.4	Proposed Ph2[3]	60161	-19.35	20.45		21.07	0.000244	6.32	9583.45	319.86	0.2
	97517.4	FuturePh3[4]	60175	-19.35	20.45		21.07	0.000244	6.32	9584.61	319.87	0.2
	96028.6	Existing[1]	60210	-17.81	19.53	1.33	20.5	0.000436	7.91	7809.27	311.19	0.26
	96028.6	InterimPh1[2]	60150	-17.81	19.52	1.31	20.49	0.000436	7.91	7804.27	311.14	0.26
	96028.6	Proposed Ph2[3]	60161	-17.81	19.52	1.32	20.49	0.000436	7.91	7805.21	311.15	0.26
	96028.6	FuturePh3[4]	60175	-17.81	19.52	1.32	20.49	0.000436	7.91	7806.3	311.16	0.26
	95985.1		Bridge									
	95941.6	Existing[1]	60210	-17.87	19.37	1.27	20.34	0.000441	7.94	7776.12	310.87	0.26
	95941.6	InterimPh1[2]	60150	-17.87	19.35	1.26	20.33	0.000441	7.94	7771.14	310.82	0.26
	95941.6	Proposed Ph2[3]	60161	-17.87	19.35	1.26	20.33	0.000441	7.94	7772.07	310.83	0.26
	95941.6	FuturePh3[4]	60175	-17.87	19.36	1.26	20.33	0.000441	7.94	7773.16	310.84	0.26
	95362.9	Existing[1]	60210	-15.97	19.21		20	0.000416	7.14	8431.32	344.49	0.25
	95362.9	InterimPh1[2]	60150	-15.97	19.2		19.99	0.000416	7.14	8425.76	344.42	0.25
	95362.9	Proposed Ph2[3]	60161	-15.97	19.2		19.99	0.000416	7.14	8426.8	344.43	0.25
	95362.9	FuturePh3[4]	60175	-15.97	19.2		19.99	0.000416	7.14	8428.01	344.45	0.25
	94280.7	Existing[1]	60545	-19.82	17.82		19.33	0.000793	9.86	6314.15	281.54	0.34
	94280.7	InterimPh1[2]	60485	-19.82	17.8		19.31	0.000793	9.86	6309.83	281.43	0.34
	94280.7	Proposed Ph2[3]	60496	-19.82	17.81		19.31	0.000793	9.86	6310.64	281.45	0.34
	94280.7	FuturePh3[4]	60510	-19.82	17.81		19.32	0.000793	9.86	6311.57	281.47	0.34
	93495.6	Existing[1]	60545	-20.43	17.73		18.63	0.000554	7.62	7945.51	363.86	0.29
	93495.6	InterimPh1[2]	60485	-20.43	17.71		18.61	0.000555	7.62	7939.74	363.67	0.29
	93495.6	Proposed Ph2[3]	60496	-20.43	17.71		18.62	0.000555	7.62	7940.82	363.71	0.29
	93495.6	FuturePh3[4]	60510	-20.43	17.72		18.62	0.000555	7.62	7942.06	363.75	0.29
	92795.6	Existing[1]	60674	-20.98	17.24	-1.36	18.22	0.000537	7.95	7631.93	317.71	0.29
	92795.6	InterimPh1[2]	60614	-20.98	17.23	-1.36	18.21	0.000537	7.95	7626.96	317.59	0.29
	92795.6	Proposed Ph2[3]	60625	-20.98	17.23	-1.36	18.21	0.000537	7.95	7627.9	317.61	0.29
	92795.6	FuturePh3[4]	60639	-20.98	17.23	-1.37	18.21	0.000537	7.95	7628.96	317.64	0.29
	92741.1		Bridge									
	92686.6	Existing[1]	60674	-21.08	16.98	-1.46	17.98	0.000548	8	7582.38	316.48	0.29
	92686.6	InterimPh1[2]	60614	-21.08	16.97	-1.47	17.96	0.000548	8	7577.45	316.38	0.29
	92686.6	Proposed Ph2[3]	60625	-21.08	16.97	-1.47	17.97	0.000548	8	7578.38	316.4	0.29
	92686.6	FuturePh3[4]	60639	-21.08	16.98	-1.47	17.97	0.000548	8	7579.43	316.42	0.29
	90936.7	Existing[1]	60674	-18.64	16.15		16.95	0.000517	7.18	8481.59	417.51	0.28
	90936.7	InterimPh1[2]	60614	-18.64	16.14		16.93	0.000517	7.17	8474.99	417.43	0.28
	90936.7	Proposed Ph2[3]	60625	-18.64	16.14		16.94	0.000517	7.17	8476.23	417.44	0.28
	90936.7	FuturePh3[4]	60639	-18.64	16.14		16.94	0.000517	7.17	8477.63	417.46	0.28
	89918.4	Existing[1]	60900	-17.23	15.13		16.29	0.000728	8.69	7695.94	631.6	0.33
	89918.4	InterimPh1[2]	60840	-17.23	15.12		16.28	0.000729	8.69	7685.75	630.48	0.33
	89918.4	Proposed Ph2[3]	60851	-17.23	15.12		16.28	0.000728	8.69	7687.68	630.69	0.33
	89918.4	FuturePh3[4]	60865	-17.23	15.12		16.28	0.000728	8.69	7689.8	630.93	0.33
	88579	Existing[1]	60900	-20.97	14.2		15.3	0.000727	8.42	7229.16	353.08	0.33
	88579	InterimPh1[2]	60840	-20.97	14.18		15.28	0.000727	8.42	7223.39	352.9	0.33
	88579	Proposed Ph2[3]	60851	-20.97	14.19		15.29	0.000727	8.42	7224.48	352.93	0.33
	88579	FuturePh3[4]	60865	-20.97	14.19		15.29	0.000727	8.42	7225.67	352.97	0.33
	87591.9	Existing[1]	60900	-23.72	13.69		14.66	0.000521	7.9	7713.27	311.48	0.28
	87591.9	InterimPh1[2]	60840	-23.72	13.67		14.64	0.000521	7.89	7708.22	311.46	0.28
	87591.9	Proposed Ph2[3]	60851	-23.72	13.68		14.64	0.000521	7.89	7709.18	311.46	0.28
	87591.9	FuturePh3[4]	60865	-23.72	13.68		14.65	0.000521	7.89	7710.21	311.47	0.28

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	86660.2	Existing[1]	60900	-23.42	13.36	-6.42	14.18	0.000364	7.29	8413.43	311.36	0.24
	86660.2	InterimPh1[2]	60840	-23.42	13.34	-6.44	14.17	0.000364	7.29	8408.41	311.3	0.24
	86660.2	Proposed Ph2[3]	60851	-23.42	13.35	-6.43	14.17	0.000364	7.29	8409.37	311.31	0.24
	86660.2	FuturePh3[4]	60865	-23.42	13.35	-6.43	14.17	0.000364	7.29	8410.38	311.33	0.24
	86641.7		Bridge									
	86623.2	Existing[1]	60900	-23.61	12.93	-6.61	13.77	0.000374	7.36	8338.62	310.39	0.24
	86623.2	InterimPh1[2]	60840	-23.61	12.91	-6.62	13.75	0.000374	7.35	8333.53	310.33	0.24
	86623.2	Proposed Ph2[3]	60851	-23.61	12.91	-6.62	13.75	0.000374	7.35	8334.48	310.34	0.24
	86623.2	FuturePh3[4]	60865	-23.61	12.92	-6.61	13.76	0.000374	7.35	8335.62	310.35	0.24
	85855.2	Existing[1]	60900	-26.84	11.2		13.03	0.000971	10.87	5602	227	0.38
	85855.2	InterimPh1[2]	60840	-26.84	11.18		13.01	0.000971	10.87	5598.52	226.5	0.38
	85855.2	Proposed Ph2[3]	60851	-26.84	11.18		13.02	0.000971	10.87	5599.17	226.59	0.38
	85855.2	FuturePh3[4]	60865	-26.84	11.19		13.02	0.000971	10.87	5599.94	226.7	0.38
	85238.7	Existing[1]	60900	-29.43	10.91		12.41	0.000734	9.88	6626.89	352.16	0.33
	85238.7	InterimPh1[2]	60840	-29.43	10.9		12.4	0.000733	9.87	6621.44	351.95	0.33
	85238.7	Proposed Ph2[3]	60851	-29.43	10.9		12.4	0.000733	9.87	6622.45	351.99	0.33
	85238.7	FuturePh3[4]	60865	-29.43	10.9		12.4	0.000734	9.88	6623.66	352.04	0.33
	84561.7	Existing[1]	60900	-32.27	10.61	-8.73	11.86	0.000546	9.03	7359.67	422.92	0.29
	84561.7	InterimPh1[2]	60840	-32.27	10.59	-8.74	11.85	0.000546	9.03	7353.13	422.52	0.29
	84561.7	Proposed Ph2[3]	60851	-32.27	10.6	-8.74	11.85	0.000546	9.03	7354.35	422.59	0.29
	84561.7	FuturePh3[4]	60865	-32.27	10.6	-8.75	11.85	0.000546	9.03	7355.8	422.68	0.29
	84531.4		Bridge									
	84501.1	Existing[1]	60900	-28.97	9.98	-5.44	11.69	0.000876	10.48	5923.65	305.49	0.36
	84501.1	InterimPh1[2]	60840	-28.97	9.97	-5.44	11.67	0.000876	10.48	5919.05	305.16	0.36
	84501.1	Proposed Ph2[3]	60851	-28.97	9.97	-5.45	11.67	0.000876	10.48	5919.91	305.22	0.36
	84501.1	FuturePh3[4]	60865	-28.97	9.97	-5.44	11.68	0.000876	10.48	5920.92	305.3	0.36
	84252.6	Existing[1]	60900	-26.9	9.93	-5.56	11.35	0.00071	9.55	6554.72	446.32	0.33
	84252.6	InterimPh1[2]	60840	-26.9	9.92	-5.57	11.33	0.00071	9.54	6547.97	444.41	0.33
	84252.6	Proposed Ph2[3]	60851	-26.9	9.92	-5.57	11.33	0.00071	9.54	6549.22	444.77	0.33
	84252.6	FuturePh3[4]	60865	-26.9	9.92	-5.57	11.34	0.00071	9.55	6550.71	445.19	0.33
	84222.3		Bridge									
	84192	Existing[1]	60900	-24.1	9.26	-2.76	11.15	0.001124	11.02	5524.02	242.01	0.41
	84192	InterimPh1[2]	60840	-24.1	9.25	-2.77	11.13	0.001124	11.02	5520.42	241.97	0.41
	84192	Proposed Ph2[3]	60851	-24.1	9.25	-2.77	11.14	0.001124	11.02	5521.09	241.98	0.41
	84192	FuturePh3[4]	60865	-24.1	9.25	-2.76	11.14	0.001124	11.02	5521.88	241.98	0.41
	83635.7	Existing[1]	61411	-21.72	9.13		10.22	0.000822	8.4	7312.1	394.24	0.34
	83635.7	InterimPh1[2]	61352	-21.72	9.11		10.21	0.000822	8.4	7306.01	394.1	0.34
	83635.7	Proposed Ph2[3]	61363	-21.72	9.11		10.21	0.000822	8.4	7307.14	394.12	0.34
	83635.7	FuturePh3[4]	61376	-21.72	9.12		10.21	0.000822	8.4	7308.49	394.15	0.34
	81786.1	Existing[1]	61411	-31.97	7.86		8.87	0.000634	8.05	7626.05	358.33	0.31
	81786.1	InterimPh1[2]	61352	-31.97	7.84		8.85	0.000634	8.05	7620.41	358.26	0.31
	81786.1	Proposed Ph2[3]	61363	-31.97	7.85		8.85	0.000634	8.05	7621.46	358.27	0.31
	81786.1	FuturePh3[4]	61376	-31.97	7.85		8.86	0.000634	8.05	7622.71	358.29	0.31
	80903.1	Existing[1]	61636	-27.77	7.48	-8.99	8.27	0.00049	7.12	8669.34	408.88	0.27
	80903.1	InterimPh1[2]	61577	-27.77	7.46	-8.99	8.25	0.00049	7.12	8662.81	408.81	0.27
	80903.1	Proposed Ph2[3]	61588	-27.77	7.47	-8.99	8.25	0.00049	7.12	8664.03	408.82	0.27
	80903.1	FuturePh3[4]	61601	-27.77	7.47	-8.99	8.26	0.00049	7.12	8665.47	408.84	0.27
	80883.1		Bridge									

Profile	River Sta	Plan	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
1PCT_100yr	80863.1	Existing[1]	61636	-28.1	6.93	-9.32	7.73	0.000506	7.2	8580.02	407.83	0.27
	80863.1	InterimPh1[2]	61577	-28.1	6.91	-9.32	7.72	0.000506	7.2	8573.53	407.75	0.27
	80863.1	Proposed Ph2[3]	61588	-28.1	6.92	-9.32	7.72	0.000506	7.2	8574.74	407.77	0.27
	80863.1	FuturePh3[4]	61601	-28.1	6.92	-9.31	7.72	0.000506	7.2	8576.17	407.78	0.27
	80538	Existing[1]	61636	-33.12	7.09	-17.01	7.41	0.00015	4.58	13471.92	521.38	0.16
	80538	InterimPh1[2]	61577	-33.12	7.07	-17.02	7.4	0.00015	4.57	13463.59	520.78	0.16
	80538	Proposed Ph2[3]	61588	-33.12	7.07	-17.02	7.4	0.00015	4.57	13465.14	520.89	0.16
	80538	FuturePh3[4]	61601	-33.12	7.08	-17.02	7.4	0.00015	4.58	13466.98	521.02	0.16

Existing Conditions[1]: Model includes FEMA Effective geometry data with the Existing Conditions HMS model flows.
InterimPh1[2]: Model includes FEMA Effective geometry data with the Phase 1 Interim (Basin) HMS model flows.
ProposedPh2[3]: Model includes FEMA Effective geometry data with the Phase 2 Proposed (Channel Impvs) HMS model flows.
FuturePh3[4]: Model includes FEMA Effective geometry data with the Phase 3 Future (Storm Sew Impvs) HMS model flows.

Appendix F: Geotechnical Report by Geotech Engineering and Testing

GEOTECHNICAL STUDY
IMPROVEMENTS OF HCFCD W140-01-00 CHANNEL
NORTH OF I-10 & SOUTH OF WESTVIEW DRIVE FROM
GESSNER ROAD TO EAST OF BUNKER HILL ROAD
TIRZ CIP NO. T-1734
LAN PROJECT NO. 130-10384-017
HARRIS COUNTY, TEXAS

PROJECT NO. 12-568E

TO

LOCKWOOD, ANDREWS & NEWNAM, INC.
HOUSTON, TEXAS

BY

GEOTECH ENGINEERING AND TESTING

SERVICING

TEXAS, LOUISIANA, NEW MEXICO, OKLAHOMA

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AUGUST 2013

TEXAS BOARD OF PROFESSIONAL ENGINEERS
REGISTRATION NUMBER F-001183

GEOTECH ENGINEERING and TESTING
ACCREDITED
Geotechnical, Environmental, Construction Materials, and Forensic Engineering

Lockwood, Andrews & Newnam, Inc.
2925 Briarpark Drive, Suite 400
Houston, Texas 77042

Project No. 12-568E
Report No. 1
Report Type: 10/29/E
August 30, 2013

Attention: Mr. Brian R. Whitney, P.E.

GEOTECHNICAL STUDY
IMPROVEMENTS OF HCFCD W140-01-00 CHANNEL
NORTH OF I-10 & SOUTH OF WESTVIEW DRIVE FROM
GESSNER ROAD TO EAST OF BUNKER HILL ROAD
TIRZ CIP NO. T-1734
LAN PROJECT NO. 130-10384-017
HARRIS COUNTY, TEXAS

Gentlemen:

Submitted here is the report of Geotech Engineering and Testing (GET) geotechnical study for the improvements to HCFCD W140-01-00 Channel at the above referenced location. This study was conducted in general accordance with our proposal No. P12-156, Revision II, dated August 09, 2012. Authorization to proceed with this study was received through a notice to proceed for Task Order 939/2 (LAN Project Number 130-10384-017), signed by Mr. Robert J. Fiederlein, Senior Program Manager with Lockwood, Andrews & Newnam, Inc. on August 14, 2012.

This report presents the results of our field exploration and laboratory testing together with design recommendations for the improvements to HCFCD W140-01-00 Channel in Harris County, Texas. Our recommendations for the channel improvements are in general accordance with Harris County Flood Control District (HCFCD), Policy, Criteria, and Procedure Manual, December 2010 (Ref. 1).

We appreciate the opportunity to be of service. Should you have any questions or need additional assistance, please call.

Very truly yours,

GEOTECH ENGINEERING AND TESTING

Alex Kwon, M.S.C.E.
Project Manager

Moe Tavassoli, Ph.D., P.E.
Engineering Manager

AK/MT/DAE/ak

Copies Submitted: (1) Hard Copy – Lockwood, Andrews & Newnam, Inc. – Mr. Brian R. Whitney, P.E.
(1) PDF Copy Email – Mr. Brian R. Whitney, P.E.

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1.0 EXECUTIVE SUMMARY

It is planned to improve HCFCD channel W-140-01-00 located north of I-10 and south of Westview Drive from Gessner Road to East of Bunker Hill Road in Harris County, Texas. A site vicinity map is presented on Plate 1. The improvement may include widening, deepening and straightening of the channel alignment by constructing a gravity block wall. The proposed channel improvement is about 6,000-ft. Furnished information indicates that depth of existing channel is about 12-ft. Our engineering analyses and recommendations provided in this report are in general accordance with Harris County Flood Control District (HCFCD), Policy, Criteria, and Procedure Manual, December 2010 (Ref. 1).

Soil stratigraphy and groundwater conditions for the proposed channel improvements were explored conducting by twelve (12) soil test borings (Borings B-1 through B-12) along the channel alignment to a depth of 25-ft to evaluate soil stratigraphy and to obtain soil samples for laboratory testing. In addition, three (3) piezometers (P-1 through P-3) were installed along the channel alignment to evaluate groundwater conditions. Due to site accessibility problems, a portable rig was used to drill Borings B-1, B-5 and B-8 through B-11. Results of these data and our engineering analyses are summarized below:

1. In general, based on our field exploration and laboratory test data, the soils in the area of the existing channel generally consist of stiff to hard brown, dark brown, light gray and reddish brown sandy lean clay fill or medium dense light gray, brown or dark brown sandy silt to about 4-ft. This is underlain by soft to hard light gray, light brown, reddish brown, dark brown clays to about 12 to 25-ft. However, layers of medium dense to dense light gray, light brown, brown or reddish brown silty sands were encountered between the depths of 12- to 25-ft in Borings B-1 through B-7. All borings were terminated at a depth of 25-ft.

2. Borings B-3, B-8 and B-12 were converted to piezometers P-1, P-2 and P-3, respectively, after completion of the field exploration.

   The water level readings measured in Piezometers P-1 through P-3 indicate that the range of stabilized groundwater level is approximately between El. +69.5 and El. +60.1 which corresponds to a depth of 9 to 20-ft the below existing grade. Therefore, groundwater dewatering may be required. **Dewatering is very important on this project in order to prevent potential bottom blow up in the sands encountered in some of the borings.** In the event that groundwater is encountered during construction, it is our opinion that groundwater should be lowered to a depth of at least three-ft below the deepest excavation grade in order to provide dry working conditions and firm bedding. Any minor water inflow in cohesive soil layers can probably be removed using a sump-pump or a trench sump-pump immediately. Wellpoint system can be used in the area where sands are present.

3. Slope stability analyses were performed for the furnished cross sections of the channel using GSTABL7 with STEDwin computer program for Short-Term (ST), Rapid-Drawdown (RDD) and Long-Term (LT) conditions. A summary of the factors of safety for the analyzed slopes is provided in this report. Based on the results of slope stability analysis, gravity wall slope ratio of 1 horizontal to 10 vertical, 1(h):10(v), will satisfy the required factors of safety for the design of the channel.

4. Dispersive characteristics of the subsoils along the channel alignment were evaluated by Pinhole and Crumb tests. In general, our analyses show that the on-site clay soils are non-dispersive. However, erosion and sloughing of the channel slope can still occur, especially in the areas where inlet pipe or other drainage structures enter the channel. Excessive erosion can lead to a loss of ground and gradual (progressive) sloughing of the slopes. Consequently, progressive slope failures can occur. In view of this, we recommend dressing of the channel basin slopes with surface erosion control systems including, grass cover, riprap or concrete lining.

5. The results of our field investigation and laboratory test results indicate that cohesionless soils (i.e. silty sands) exist within the slope and bottom of the existing channel. These soils are highly permeable and will not retain water. We understand that the channel basin will have a wet bottom. In view of this, a liner system may be needed to prevent water loss through these permeable soils. Furthermore, **Dewatering is very important in construction of the proposed channel in order to prevent potential bottom blow up in the sands.**

2.0 INTRODUCTION

It is planned to improve HCFCD channel W-140-01-00 located north of I-10 and south of Westview Drive from Gessner Road to east of Bunker Hill Road in Harris County, Texas. A site vicinity map is presented on Plate 1. The improvement may include widening, deepening and straightening of the channel by constructing a gravity block wall. Approximate length of channel improvement is about 6,000-ft. The depth of channel is about 12-ft. Furnished information indicates that different channel designs, including 20-ft wide U-shaped concrete channel, 8' x 4' rectangular concrete channel or gravity block wall channel are being considered for the proposed improvements.

The purpose of our work was to conduct a field exploration, laboratory testing and engineering analyses to develop recommendations for the proposed channel improvement and to evaluate the factors of safety of the channel slopes using detailed slope stability analysis.

This report briefly describes the field exploration and laboratory testing followed by our engineering analyses and recommendations in general accordance with Harris County Flood Control District (HCFCD), Policy, Criteria, and Procedure Manual, December 2010 (Ref. 1).

3.0 REVIEW OF EXISTING REPORTS

We reviewed the Geotechnical Investigation Report for the Memorial City Redevelopment Authority W140 Detention Pond in Houston, Texas, dated August 19, 2011, performed by Geotest Engineering, Inc. The report indicates that six (6) soil borings (GB-1 through GB-6) were drilled to depths ranging from 20- to 30-ft below existing ground surface to evaluate the subsurface soils and groundwater conditions.

The subsoils as revealed by Borings GB-1 through GB-6 consist of predominantly cohesive soils to the termination depths of 20-to 30-ft (El. 56.51- to El. 47.42-ft), except in borings GB-1, GB-5 and GB-6. The sandy lean clay (CL) and lean clay with sand (CL) are of low to high plasticity with liquid limits ranging from 23 to 45 and plasticity indices ranging from 9 to 25. The fines content (percent passing No. 200 sieve) of the sandy lean clay and lean clay with sand ranged from 61 to 81 percent. The fat clay (CH) soils are of high plasticity with liquid limits ranging from 52 to 61, and plasticity indices ranging from 31 to 37. The fines content of the fat clay soils ranged from 82 to 98 percent. The fines content of sand (SP) and silty sand (SM) ranged from 8 to 17 percent and the fines content of silt (ML) is about 72 percent.

Groundwater was encountered during drilling at depths ranging between 15.3-ft and 24-ft (El. 64.85-ft and El. 58.61-ft) in all the borings except in borings GB-3 and GB-4. In borings GB-3 and GB-4, no groundwater was encountered during drilling. The groundwater level measured 24 hours or more, after drilling was completed, ranged from 16.3 to 24.75-ft (El. 60.61-ft to El. 54.91-ft).

Using GSTABLE 7 computer program, Geotest Engineering, Inc. performed slope stability for the proposed detention pond with 3(H):1(V) earthen slope. The results of slope stability analysis met the minimum factor of safety. Geotest Engineering, Inc. recommends the side slope to be no steeper than 3(H):1(V) along western and northern banks and 4(H):1(V) along entire eastern and southern banks of the detention pond.

4.0 FIELD EXPLORATION

4.1 Drilling and Sampling

At the request of the client, the soil conditions were explored by conducting twelve (12) soil test borings (B-1 through B-12), located approximately as shown on Plate 2. The soil boring locations were discussed with Mr. Philip L. Taylor, P.E. of Lockwood, Andrews & Newnam, Inc. prior to drilling. Soil samples were obtained continuously at boring locations from the ground surface to 20-ft and at five-ft interval thereafter to the completion depth of the borings at 25-ft. Due to the site access problem, a portable rig was used to drill Borings B-1, B-5 and B-8 through B-11. The cohesive soils were sampled in general accordance with ASTM D 1587.

Cohesionless soils were generally sampled with a split-spoon sampler driven in general accordance with the Standard Penetration Test (SPT), ASTM D 1586. This test is conducted by recording the number of blows required for a 140-pound weight falling 30 inches to drive the sampler 12 inches into the soil. Driving resistance for the SPT, expressed as blows per foot of sampler resistance (N), is tabulated on the boring logs.

Soil samples were examined and classified in the field, and cohesive soil strengths were estimated using a calibrated hand penetrometer. This data, together with a classification of the soils encountered and strata limits, is presented on the soil stratigraphy profiles, Plates 3 through 5. Logs of borings and a key to the log terms and symbols are presented in Appendix A.

Depth to groundwater is important for design and construction of the proposed channel basin. For this reason, borings were initially drilled dry and the depth at which groundwater was first encountered was recorded. A wet rotary boring technique was used thereafter to the completion depth of the borings. Water levels were measured after a 24-hour period in the boreholes. Water level observations made during and 24-hours after drilling are indicated at the bottom portion of the individual logs.

4.2 Piezometer Installation

Borings B-3, B-8 and B-12 were converted to piezometers P-1, P-2 and P-3, respectively, after completion of drilling and sampling. The piezometers consist of a three-inch diameter PVC riser pipe connected to a 10-foot long section of 0.01-inch slotted well screen. The riser pipe extends above the ground surface and is sealed with water tight flush mounted locking cap. After the boring was drilled, the riser pipe and well screen assembly were installed in the borehole and sealed with Bentonite. Several days after the piezometers installation, the piezometers were developed by the use of a water bailer purging several well volumes of static water. The water levels were periodically measured to evaluate stabilized groundwater table. The piezometers installation data are shown on Plates 6 through 8. A summary of the piezometer readings is presented in the "Piezometer Reading Table" on Plate 9.

5.0 LABORATORY TESTS

5.1 General

Soil classifications and shear strengths were further evaluated by laboratory tests on representative samples of the major strata. The laboratory tests were performed in general accordance with ASTM Standards. Specifically, ASTM D 2487 is used for classification of soils for engineering purposes. A summary of the laboratory tests performed is presented on Plates 10 through 15.

5.2 Classification Tests

As an aid to visual soil classifications, physical properties of the soils were evaluated by classification tests. The tests were conducted in general accordance with ASTM Standards. These tests consisted of natural moisture content tests (ASTM D 4643), percent finer than the No. 200 sieve tests (ASTM D 1140), Atterberg limit determinations (ASTM D 4318, Method A) and dry unit weights. Similarity of these properties is indicative of uniform strength and compressibility characteristics for soils of essentially the same geological origin. Results of these tests are tabulated on the boring logs at respective sample depths.

5.3 Strength Tests

Undrained shear strengths of the cohesive soils measured in the field were verified by calibrated hand penetrometer, unconfined compressive strength tests (ASTM D 2166), unconsolidated-undrained tests (ASTM D 2850) and torvane tests. The test results are also presented on the boring logs.

Effective soil strength parameters were also obtained by performing consolidated-undrained (CIU) triaxial compression tests (ASTM D 4767). Results of these tests plotted in accordance with Mohr's criteria for shearing failure are presented in Appendix B. The interpreted effective strength parameters, angle of internal friction and cohesion together with stress-strain curves are all shown in Appendix B. The triaxial tests were conducted by HTS, Inc. The A2LA certificate for this company is also presented in Appendix B.

5.4 Particle Size Analysis Tests

This test was conducted in general accordance with ASTM D 422, the Standard Method for Particle-Size Analysis of Soils. The soil sample was first separated into two portions using the No. 10 (2.0-mm) sieve. A sieve analysis was performed on the soil samples retained on the No. 200 sieve, if any obtained. The portion of soil samples passing the No. 10 sieve then went into the hydrometer tests followed by another sieve analysis to complete the particle size distribution curve. Soil samples had to be soaked in the sodium hexametaphosphate solution (40 g/L), dispersed by stirring the beaker, and kept in the sedimentation cylinder in order to obtain accurate hydrometer readings. This test was performed on selected samples obtained from Borings B-2 through B-4, B-6, B-7 and B-12. The test results are presented in Appendix C.

5.5 Dispersive Soils Characterization Tests

5.5.1 General

The dispersive characteristic of the clay soils at this site was evaluated by performing Pinhole tests and Crumb tests on selected samples obtained from Borings B-1 through B-6 and B-8 through B-10. These tests are described briefly below. The test results are discussed in this report and are presented in Appendix D.

5.5.2 Pinhole Tests

The pinhole tests were conducted in general accordance with ASTM D 4647, Method A. The dispersability of the soil specimen is evaluated from the appearance of the flowing solution emerging from the specimen, the rate of flow, and the final size of the hole through the specimen. The test method uses distilled water flowing horizontally though a 1.0-mm diameter hole punched in the soil specimen, under a hydraulic head of 50 mm at the beginning and increasing gradually to 180-mm, 380-mm and 120-mm as required. The initial 50-mm head provides the principle differentiation between dispersive and non-dispersive clays. Flow from dispersive soils will be distinctly dark and the hole in the specimen will enlarge rapidly with a resultant increase in the flow rate. Flow from slightly to moderate dispersive soils will be slightly dark with a constant hole size and flow rate. Flow from non-dispersive clays will be completely clear with no measurable increase in hole size. The pinhole test results are presented in Appendix D.

5.5.3 Crumb Tests

The crumb tests were performed in accordance with ASTM D 6572 procedures. The dispersibility of the soils is evaluated by the texture of distilled water solution when a 1.5-cm diameter or square soil sample is introduced in this solution. Dispersive soils will lead to the solution becoming cloudy, while non-dispersive soils will lead to the solution remaining clear. The dispersibility of these soils is evaluated by the degree of sample reaction in the water. Grade 1 indicates no reaction, Grade 2 indicates slight reaction, Grade 3 indicates moderate reaction and Grade 4 indicates strong reaction. The crumb test results are also presented in Appendix D.

5.6 Soil Sample Storage

Soil samples tested or not tested in the laboratory will be stored for a period of two weeks subsequent to submittal of the final report. The samples will be discarded after this period, unless we are instructed otherwise.

6.0 GENERAL SOILS AND DESIGN CONDITIONS

6.1 Site Conditions

Currently, the existing channel alignment consists of concrete U-shaped channel or natural earth channel. Grass, brush and trees exist on top of the channel banks. Project site pictures were taken during our site visit and drilling operations. These pictures are presented on the cover page and Appendix E.

6.2 Soil Stratigraphy

Details of subsoil conditions at each boring location are presented on the respective boring logs. In general, the soil stratigraphy for the proposed channel improvements are as follows:

Stratum No.	Range of Depth, ft.	Soil Description
I	0 – 4	FILL: SANDY SILT, medium dense, light gray, brown, dark brown, with root fibers, clay pockets (ML)
II	0 – 4	FILL: SANDY LEAN CLAY, stiff to hard, light gray, gray, dark gray, light brown, dark brown, with root fibers, ferrous and calcareous nodules, sands, moist (CL)
III	2 – 16	SANDY LEAN CLAY, soft to hard, light gray, light brown, brown, with root fibers to 6', ferrous and calcareous nodules, sands, moist (CL)
IV	2 – 25	LEAN CLAY WITH SAND, stiff to hard, light gray, gray, light brown, brown, dark brown, with root fibers to 6', ferrous and calcareous nodules, sands, moist (CL)
V	10 – 25	FAT CLAY, firm to hard, light gray, gray, light brown, reddish brown, with ferrous and calcareous nodules, moist (CH)
VI	12 – 25	SILTY SAND, medium dense to dense, light gray, light brown, brown, reddish brown, with clay pockets, moist to wet (SM)

6.3 Soil Properties

Soil strength and index properties and how they relate to design of the proposed channel are summarized below:

Stratum No.	Soil Type	PI(s)	SPT	Soil Expansivity	Soil Strength, tsf	Remarks
I	Fill: Sandy Silt (ML)	–	21	Non-Expansive	–	Moisture Sensitive
II	Fill: Sandy Lean Clay (CL)	9 – 22	–	Non-Expansive	0.56 – 2.72	–
III	Sandy Lean Clay (CL)	10 – 25	–	Non-to Moderately Expansive	0.23 – 2.99	–
IV	Lean Clay with Sand (CL)	8 – 30	–	Non-to Moderately Expansive	0.56 – 2.80	–
V	Fat Clay (CH)	31 – 53	–	Expansive to Highly Expansive	0.31 – 2.74	–
VI	Silty Sand (SM)	–	16 – 42	Non-Expansive	–	Moisture Sensitive

Legend: PI = Plasticity Index
SPT = Standard Penetration Tests

6.4 Water-Level Measurements

The soil borings were drilled dry to evaluate the presence of perched or free-water conditions. The levels where free water was encountered in the open boreholes during and 24-hours after drilling are shown on the boring logs. Furthermore, Borings B-3, B-8 and B-12 were converted to piezometers P-1, P-2 and P-3, respectively, after completion of the field work. The detailed piezometer readings are presented on Plate 9. Groundwater measurements are summarized below:

Boring No.	Ground Elevation, ft.	Measured Groundwater Elevation, ft.	
		During Drilling	After 24 hours
B-1	80.08	66.08	68.08
B-2	79.19	65.19	67.19
B-3	77.58	62.58	66.58
B-4	80.29	Dry	Dry
B-5	80.71	56.71	58.71
B-6	79.41	61.41	64.41
B-7	80.03	64.03	66.03
B-8	78.80	60.80	62.80
B-9	78.80	Dry	Dry
B-10	77.88	59.88	61.88
B-11	77.67	62.67	64.67
B-12	80.51	60.51	62.51

Fluctuations in groundwater generally occur as a function of seasonal moisture variation, temperature, groundwater withdrawal, water level in the existing channel and future construction activities that may alter the surface drainage and subdrainage characteristics at the proposed project site.

We recommend that the groundwater level be verified just before construction of the proposed channel. We also recommend that GET be immediately notified if a noticeable change in groundwater occurs from that mentioned in our report. We would be pleased to evaluate the effect of any groundwater changes on our design and construction sections of this report.

7.0 CHANNEL IMPROVEMENT RECOMMENDATIONS

7.1 General

It is planned to improve HCFCD channel W-140-01-00 located north of I-10 and south of Westview Drive from Gessner Road to east of Bunker Hill Road in Harris County, Texas. The improvement may include widening, deepening and straightening of the channel alignment. Approximate length of channel improvement is about 6,000-ft. The depth of channel is about 12-ft. Furthermore, we understand that U-shaped concrete channel or gravity wall will be used for channel. Our recommendations for slope-stability and erosion protection for the improvement of channel (W140-01-00) are in general accordance with HCFCD, Policy, Criteria, and Procedure Manual, December 2010 (Ref. 1).

7.2 Soil Stratigraphy

<u>STA. 53+00 to STA. 32+00 (Borings B-1 through B-4)</u>

Based on Borings B-1 through B-4, subsurface soils generally consist of sandy clay (CL) fill soils from El. +80.3 to El. +76.3-ft. and sandy silt (ML) fill soils from El. +80.1 to El. +75.2-ft. Clay (CL) soils were generally encountered from El. +78.1 to El. +65.2-ft. Silty sand (SM) soils were generally encountered from El +68.1-ft to El. +52.6-ft. Clay (CH) soils were generally encountered from El. +60.3-ft to the maximum completion depth at El. +52.6-ft.

<u>STA. 32+00 to STA. 11+00 (Borings B-5 through B-7)</u>

Based on Borings B-5 through B-7, subsurface soils generally consist of sandy clay (CL) fill soils from El. +78.7 to El. +75.4-ft. Clay (CL) soils were generally encountered from El. +78.1 to El. +64.7-ft. Silty sand (SM) soils were generally encountered from El +68.1-ft to El. +55.7-ft. Clay (CH) soils were generally encountered from El. +59.4-ft to the maximum completion depth at El. +54.4-ft.

<u>STA. 11+00 to STA 0+00 (Borings B-8 through B-12)</u>

Based on Borings B-8 through B-12, subsurface soils generally consist of sandy clay (CL) fill soils from El. +80.5 to El. +73.7-ft. Clay (CL) soils were generally encountered from El. +76.8 to the maximum completion depth at El. +52.7-ft.

7.3 Dispersive Soils Characterization Test Results

Dispersive characteristics of the subsoils for the proposed channel improvements were evaluated by Pinhole tests. Based on the results of Pinhole tests, presented in Appendix D, the on-site clay soils are generally non-dispersive in Pinhole tests. However, dispersive silty sands were encountered in some of the borings drilled along the project alignment.

7.4 Slope Stability Analysis

7.4.1 General

Slope stability analysis of the channel using GSTABL7 with STEDwin computer program (Ref. 2) was performed for the furnished cross sections for the three following conditions: (a) Short-term (ST), (b) Rapid-Drawdown (RDD) conditions and (c) Long-term (LT) conditions. The Short-term (ST) parameters represent the end of construction loading conditions. The Rapid draw-down (RDD) represents a flooded condition where the water rises to the top of the slope, then recedes fast enough leaving an unbalanced piezometric head behind the slope. Long-term (LT) design values are applicable to soil gravity loads and continuously applied live loads (maintenance vehicle loads, dozer loads, etc.). The long term represents a steady-state soil parameter condition.

This report presents the slope stability analysis for the proposed channel improvements based on three furnished cross-sections at Sta. 11+00, Sta. 32+00 and Sta. 53+00 as shown in Plate 16.

7.4.2 Design Parameters

Short-terms strengths (Ref. 3) were estimated from undrained test data including hand penetrometer, torvane, unconfined compression, and unconsolidated undrained triaxial tests. Soil strength for the long-term and rapid draw-down conditions (Ref. 4 and Ref. 5) were estimated from correlations between the soil index properties, consolidated undrained triaxial tests, residual and soften secant friction angles (Ref. 5) and previous work experience with similar soils of the same geologic origin. In general, the residual shear strengths parameters are used for the slope stability analyses, instead of the peak shear strengths obtained in the laboratory tests. Furthermore, $(\overline{CIU})$ triaxial tests were performed on selected soil samples from borings B-3 (8- to 10-ft), B-4 (6- to 8-ft and 12- to 14-ft), B-6 (8- to 10-ft), B-7 (8- to 10-ft) and B-12 (20- to 22-ft) to obtain long-term and rapid drawn-down soil strength parameters. The triaxial test results are presented in Appendix B. The design soil parameters used in the analysis for the three furnished cross-sections are as follows:

STA. 0+00 to STA. 11+00 (Borings B-8 through B-12)

Soil Conditions					Design Strength Parameters					
					Short Term		Rapid Draw Down		Long Term	
Elevation Range, ft.	Symbol	Description	γ_t, pcf	γ_s, pcf	c_0 , psf	ϕ_0	c', psf	ϕ'	c'', psf	ϕ''
+77.0 to +76.0	CL	Fill: Sandy Clay	120	125	1,000	–	125	18	125	20
+76.0 to +64.0	CL	Clay with Sand	120	125	2,000	–	275	23	250	25
+64.0 to +30.0	CH	Clay	120	125	2,000	–	275	18	250	20
+77.0 to +66.0	–	Gravity Wall	130	135	–	40	–	40	–	40
+77.0 to +65.0	–	Backfill	130	135	–	35	–	35	–	35

STA. 11+00 to STA. 32+00 (Borings B-5 through B-7)

Soil Conditions					Design Strength Parameters					
					Short Term		Rapid Draw Down		Long Term	
Elevation Range, ft.	Symbol	Description	γ_t, pcf	γ_s, pcf	c_0 , psf	ϕ_0	c', psf	ϕ'	c'', psf	ϕ''
+80.0 to +76.0	CL	Fill: Sandy Clay	120	125	1,000	–	200	20	180	22
+76.0 to +68.0	CL	Sandy Clay	120	125	2,000	–	300	27	275	30
+68.0 to +30.0	SM	Silty Sand	120	125	–	30	–	30	–	30
+80.0 to +69.0	–	Gravity Wall	130	135	–	40	–	40	–	40
+80.0 to +68.0	–	Backfill	130	135	–	35	–	35	–	35

STA. 32+00 to STA. 53+00 (Borings B-1 through B-4)

Soil Conditions					Design Strength Parameters					
					Short Term		Rapid Draw Down		Long Term	
Elevation Range, ft.	Symbol	Description	γ_t, pcf	γ_s, pcf	c_0 , psf	ϕ_0	c', psf	ϕ'	c'', psf	ϕ''
+80.0 to +76.0	CL	Fill: Sandy Clay	120	125	1,000	–	200	20	180	22
+76.0 to +66.0	CL	Sandy Clay	120	125	2,000	–	300	27	275	30
+66.0 to +30.0	SM	Silty Sand	120	125	–	30	–	30	–	30
+80.0 to +71.0	–	Gravity Wall	130	135	–	40	–	40	–	40
+80.0 to +70.0	–	Backfill	130	135	–	35	–	35	–	35

Where:

γ_t = Total unit weight of soils, pcf
γ_s = Saturated unit weight of soils, pcf
c_o, c', c'' = Undrained, consolidated undrained and consolidated drained, cohesion, psf
ϕ_o, ϕ', ϕ'' = Undrained, consolidated undrained and consolidated drained, angle of internal friction, degrees

7.4.3 Results of Slope Stability Analyses

Slope stability analyses were performed on the furnished cross sections using the computer program "GSTABL7 with STEDwin". The modified Bishop method of analysis was used for the slope stability analysis. In the Modified Bishop analysis method, slope stability is evaluated along a circular arc. The degree of safety is measured by comparison of the driving forces (soil gravity loading, surcharge, etc.) causing movement with the soil friction and cohesive forces resisting failure. The ratio of resisting forces to driving forces defines the factor of safety. During construction, a dozer or other construction equipment are expected to be operated at the project site area. A live load of 250 psf was used on top of the bank in our short term and long term slope stability analysis to represent the unit surcharge load applied to the ground surface by the dozer, construction equipment or maintenance vehicles.

For the slope analyzed, the stability was evaluated for numerous radii representing trial circles originating from a grid system. Trial circle centers selected to incorporate the failure are illustrated in Appendix G. A summary is provided below for the factors of safety for the analyzed gravity wall with wall slope ratio of 1(H): 7(V) to 10(V):

	Slope	Factor of Safety		
Sta. No	Ratio	Short Term	Rapid Draw Down	Long Term
Sta. 0+00 to Sta. 11+00	1(H): 7(V)	5.98	1.37	1.78
Sta. 11+00 to Sta. 32+00	1(H): 7(V)	3.61	1.30	1.72
Sta. 32+00 to Sta. 53+00	1(H): 10(V)	5.65	2.09	2.33

For a stable slope, HCFCD requires minimum safety factors of 1.3 for the Short Term (ST) condition, 1.25 for the Rapid Draw Down (RDD) condition, and 1.5 for the Long Term (LT) condition.

7.5 Recommended Slope Ratios

Based on the results of slope stability analyses discussed above, gravity wall slope ratio of 1 horizontal to 10 vertical, 1(h):10(v), will satisfy the required factors of safety for the design of the channel. However, slope ratio of 1 horizontal to 8 vertical, 1(h):8(v), will perform better for maintenance and safety purposes.

7.6 Slope Erosion Protection

7.6.1 General

Our laboratory testing indicated the on-site clay soils are generally non-dispersive. Erosion problems are usually associated with channel slopes especially where control structures such as outfall and weir structures will be located. Excessive erosion can lead to a loss of ground and gradual (progressive) sloughing of the slopes. Consequently, progressive slope failures can occur. Our recommendations for slopes erosion protection are as follows:

7.6.2 Slope Erosion Protection

Our erosion protection recommendations are generally in accordance with HCFCD, Policy, Criteria, and Procedure Manual, October 2010 (Ref. 1). Dressing of the channel slopes with surface erosion control systems should ensure successful long-term performance. These systems may consist of the following:

7.6.2.1 Grass Cover

Grass cover can provide a suitable erosion protection system provided the root systems can sustain the peak velocities from the rain water. Turf grass shall be established per the guidelines contained in Section 10.3 of HCFCD, Policy, Criteria, and Procedure Manual, December 2010 (Ref. 1). Periodic observation of channel basin slopes should be planned to identify areas that may require a more positive erosion protection system.

7.6.2.2 Riprap

Ripraps are stone or broken concrete rubbles widely used for erosion protection of slopes. Protection of the toe is critical for providing acceptable stability. The design and construction of rip-rap for the channel locations should be in general accordance with Section 10.5 - Riprap and Appendix D- Riprap Detail Sheet of HCFCD, Policy, Criteria, and Procedure Manual, December 2010 (Ref. 1) and Section 02378 - Riprap and Granular Fill of HCFCD Standard Specifications, August 2005 (Ref. 6).

7.6.2.3 Geotextiles

Geotextiles may be placed directly against the slope to serve as a filter layer to prevent migration on site through a crushed stone rip-rap layer. The rip-rap layer should consist of four to eight-inch diameter crushed stone with thicknesses on the order of 12-inches. In the areas of steeper slopes, gabions should be used for support of the geotextile and rip-rap layer. Alternatively, geotextiles are now available that can be used without rip-rap to minimize erosion.

7.6.2.4 Concrete Lining

This type of erosion control system is effective when placed on top of subgrade soils compacted to at least 95% of maximum standard density (ASTM D 698) at a moisture content between optimum and + 3% of optimum. The concrete lining shall be constructed per the guidelines presented in Section 10.4 - Concrete Lining and Appendix D of HCFCD, Policy, Criteria, and Procedure Manual, December 2010 (Ref. 1). The minimum concrete lining thickness on slope and bottom should be five inches in accordance with HCFCD standard, and be reinforced in each direction with reinforcement equal to about 0.51% of the concrete area. In the areas on the sloped surfaces where loose or soft soils are encountered, these areas should be excavated to a minimum depth of at least six (6) inches and be filled with Class A non-structural concrete in accordance with Section 03310 of HCFCD Specifications, August 2005 (Ref. 6). The loose or soft soils should be removed, moisture conditioned and recompacted to at least 95% of maximum density (ASTM D 698). Drainage holes should be placed at fixed intervals at the lower portion of concrete lining not exceeding 15-ft to prevent hydrostatic pressure build up behind the concrete liner.

8.0 GRAVITY WALL RECOMMENDATIONS

8.1 General

We understand that the proposed improvements may utilize gravity wall structures at this site. Excavation and groundwater control for construction of this structure should be in accordance with our recommendations provided in construction consideration section of this report (Section 9).

8.2 Lateral Earth Pressure

Lateral earth pressures for the gravity wall vary with structure type, wall rigidity, soil type and degree of compaction of the backfill soil. Gravity walls must be designed to withstand lateral earth loads and surcharge pressures plus any hydrostatic pressures that may develop due to possible entrapped surface water behind the walls, unless an effective drainage system is provided.

The proposed gravity wall will be subjected to lateral active and passive earth pressures as shown on Plate 17. The lateral active and passive earth pressures may be computed by the use of the following equations.

Active Lateral Earth Pressure:

For Sands/Silts Backfill $P_a = 85(H+h) + 0.5q$
For Clay Backfill $P_a = 102(H+h) + 0.7q$

Where: P_a = active lateral earth pressure, psf
H = height of wall above the dredge line, ft
h = height of the wall below the dredge line, ft.
q = surcharge loading, psf

Allowable Passive Lateral Earth Pressure:

For Sands/Silts $P_p = 100h$
For Clays $P_p = 1000$

Where: P_p = Allowable passive lateral earth pressure, psf

The passive lateral earth pressure given above includes a factor of safety of 2.0. The passive lateral earth pressure is applicable only if the soil in front of the wall will not erode away during the life of the structure. It is recommended that the backfill behind the wall be select cohesionless granular materials for the gravity wall with less than 5 percent passing the No. 200 sieve.

We recommend the exposed subgrade be uniformly proofrolled to at least 95 percent of Standard Proctor (ASTM D 698) maximum dry density at a moisture content between optimum and +3% of optimum. The excavation, trenching, foundation, embedment, and backfilling for the proposed gravity wall shall be in accordance with HCFCD Standard Specifications, August 2005 (Ref. 6), Section 02315 – Excavation and Backfilling.

8.3 Allowable Bearing Pressure

Bearing capacity is the ability of the soil to safely carry the pressure placed on the soil without undergoing a shear failure with accompanying large settlements. Based on the results of the field and laboratory testing and bearing capacity theory, a net allowable bearing capacity in of 1,500 psf (Dead load + sustained live load) can be used for supported of the gravity wall seated in the naturally occurring very stiff clay subsoils. The allowable loading for total load (Dead + live load) will be 50 percent larger. The allowable soil concrete adhesion at the base of the gravity wall is 200 psf for cohesive subgrade.

If the gravity wall is supported in the silty sand/sandy silt subsoils, a net allowable bearing capacity of 1,000 psf can be used for dead load. The allowable loading for total load (Dead + live load) will be 50 percent larger. We recommend that the above-mentioned bearing capacities be reduced by 50 percent if the subgrade soils become saturated or have potential for saturation. For cohesionless subgrade, a coefficient of friction of 0.3 may be used between the foundation bottom and the supporting soils against sliding.

9.0 CHANNEL STRUCTURES RECOMMENDATIONS

9.1 General

We understand that channel improvements may utilize U-shaped concrete channel, 8' x 4' rectangular concrete channel or box culverts at this site. Excavation and groundwater control for construction of these structures should be in accordance with our recommendations provided in construction consideration section of this report (Section 9). The proposed box culverts may be designed in accordance with the parameters presented on Plate 18.

9.2 Allowable Bearing Pressure

We understand that the box culverts, if used, may be supported on a seal slab foundation at about El. +64-ft. The allowable bearing pressures for the seal slab foundation at this elevation are as follows:

Foundation Type	Elevation, ft.	Allowable Net Bearing Pressure, psf	
		Dead Load*	Total Load (Dead + Live)
Seal Slab	+64.0	2,000	2,500

* Dead load + sustained live load

Footings proportioned in accordance with the above bearing capacity values will have a safety factor of 2.5 and 2.0 with respect to shearing failure for dead and total loading, respectively.

9.3 Bedding and Backfilling

The proposed concrete channel structures should be placed on a well prepared, properly compacted working surface. Cast-in-place culverts can be supported on the natural soils provided subgrade is protected from construction disturbances and surface water is not allowed to pond within the excavation. We recommend the exposed subgrade be uniformly proofrolled to at least 95 percent of Standard Proctor (ASTM D 698) maximum dry density at a moisture content between optimum and +3% of optimum. The excavation, trenching, foundation, embedment, and backfilling for the proposed inlet and outlet structures shall be in accordance with HCFCD Standard Specifications, August 2005 (Ref. 6), Section 02315 – Excavation and Backfilling.

Sand used in the cement-stabilized sand backfill sections should be free of clay lumps, organic materials, or other deleterious substances, and should have a PI less than 4 for the cement-stabilized sand, and not more than 15% passing the No. 200 sieve. Cement stabilized sand should conform to the HCFCD Standard Specifications, August 2005 (Ref. 6), section 02321 – Cement Stabilized Sand.

9.4 Buoyancy

The proposed outlet structure may experience uplift loads from the groundwater during flood conditions. The box culverts should perform satisfactorily if a design factor of safety against uplift loads of 2.0 is used. In general, the hydrostatic pressure will be resisted by the dead weight of the structure, weight of the overburden soils above the top of the box culverts and the friction or adhesion between the walls and natural soils or fill. A submerged unit weight of 60 pounds per cubic foot (pcf) and 85 pcf can be used for soils and concrete, respectively, to compute the resistance to uplift loads. An adhesion value of 200 psf can be used between the backfill and the box culverts to resist the uplift loads. A factor of safety of 2.0 is included in the adhesion value.

10.0 CONSTRUCTION CONSIDERATIONS

10.1 Constructability

We understand that the project alignment is very narrow with existing structures on both sides of the alignment. Excavations for the proposed wall system must be designed and constructed to provide a safe working space, provide access for construction activities and protect structures, utilities and other structure adjacent to the excavation. The design of excavation support system requires consideration of a variety of factors that affect the performance of the excavation support system and could impact on the wall structure itself. Generally the excavation support system can consist of sheet pile walls, soldier piles and soil nailed walls. Regardless the type of excavation support system used, it is our opinion that the method, means and sequence of excavation support system should be the responsibility of the contractor for the project who should be experienced with installation of excavation support system.

10.1.1 Sheet Pile Wall

A sheet pile wall consists of a series of interlocking sheets that form a corrugated pattern in the plan view of the wall. The sheets are either driven or vibrated into the ground. The sheets extend well below the bottom of the excavation for stability. These sheets are fairly flexible and can support only small heights of earth without bracing. Sheet pile walls can be installed quickly and easily in ideal soil conditions. The presence of debris, utilities, or obstructions will make the use of sheet piling difficult since these features will either damage the sheet pile or in the case of a utility, be damaged by the sheet pile. Furthermore, driving sheet piles will cause vibration that may impact the integrity of adjacent structures, utility, pavement, etc.

10.1.2 Soldier Pile Wall

A soldier pile wall consists of structural steel shape columns spaced 4 to 8 feet apart and driven into the ground or placed in predrilled holes. The soldier piles extend well below the level of the bottom of excavation for stability. As the excavation progresses, lagging is placed between the soldier piles to retain the earth behind the wall. The lagging could be timber or concrete planks. The soldier piles are relatively flexible and are capable of supporting only modest heights of earth without bracing. Soldier piles can also be installed in more different ground conditions than can a sheet pile wall. The spacing allows the installation of piles around utilities. The finite dimension of the pile allows drilling of holes through obstructions, making the soldier pile and lagging wall more versatile than the sheet pile wall.

10.1.3 Soil Nailed Wall/Slope

Soil nailed wall/slope system can be also used for excavation support system. The soil nailing is an in-situ reinforcement technique wherein nails are inserted into a soil mass to reinforce the soil. This system consists of a large number of reinforcing elements drilled and grouted into the slope/wall mass. The system consists (a) removal of all vegetation from the ditch slope, (b) proofrolling and compacting all slopes, (c) covering the slope with shortcrete, (d) drill anchors into the face of the wall/slope and (e) placement of facing on the wall/slope.

10.2 Site Drainage

It is recommended that site drainage be well developed. Surface water should be directed away from the top bank of the slope. Drainage weep holes should be placed at fixed intervals not exceeding 15-ft on the concrete lining (if used) to prevent ponding of water behind the concrete liner.

10.3 Groundwater Control

We understand that the maximum channel depth will be about 12-ft (El. +64.0). Water level observations were made during and at 24-hours after drilling. The range of short term groundwater level is approximately between El. +66.5 and El. +62.8 after 24-hours of drilling.

The water level readings measured in Piezometers P-1 through P-3 indicate that the range of stabilized groundwater level is approximately between El. +69.5 and El. +60.1. Therefore, groundwater dewatering may be required. **Dewatering is very important on this project in order to prevent potential bottom blow up in the sands.** In the event that groundwater is encountered during construction, it is our opinion that groundwater should be lowered to a depth of at least three-ft below the deepest excavation grade in order to provide dry working conditions and firm bedding. Any minor water inflow in cohesive soil layers can probably be removed using a sump-pump or a trench sump-pump immediately. Wellpoint system can be used in the area where sands are present.

Design of a wellpoint system should consider the amount of groundwater to be lowered and the permeability of the affected soils. The selection and proper implementation of an effective groundwater control system is the responsibility of the contractor. The design of dewatering system for groundwater and surface water control should be in accordance with the City of Houston Specifications, Section 01578 − Control of Ground Water and Surface Water and Item 3.1 of Section 02241 of HCFCD Standard Specifications, August 2005 (Ref. 6).

10.4 OSHA Soil Classifications

The subsoils can be classified in accordance with Occupational Safety and Health Administration (OSHA) Standards, dated October 31, 1989 of the Federal Register. OSHA classification system categorizes the soil and rock in four types based on shear strength and stability. The description of four (4) types in classification system is summarized in the Appendix G.

Based on our geotechnical exploration and laboratory test results, details of soil classifications at each boring are summarized in the OSHA Soil Classification and Trench Safety Recommendations presented in Appendix H.

10.5 Excavations

Each side of an excavation or trench which is five-ft or deeper must be protected by sheeting/bracing shoring or sloped. Based on soil strength data and OSHA soil classifications, temporary (less than 24 hours) open-trenched, non-surcharged, and unsupported excavations should be made on slopes of about 1.5(h):1(v). Vertical cuts can be constructed, provided shoring and bracing are used for the excavation wall stability. Benched excavation can also be used with average slopes of about 1(h):1(v) and steps should not be higher than five-ft. In all cases, excavations should conform to OSHA guidelines. Flatter slopes may have to be used if large amounts of sand need to be excavated for deep installations. Specifications should require that no water be allowed to pond in the excavations. The surface slopes should be protected from deterioration and weathering if they are to be left open for more than 24 hours.

Excavations should be performed with equipment capable of providing a relatively clean bearing area. Excavation equipment should not disturb the soil beneath the design excavation bottom and should not leave large amounts of loose soil in the excavation.

The bearing surface should be protected against disturbance and deterioration by completing the box culverts installation and backfilling operations as quickly as possible. The excavation bottom should be properly sloped to allow any water to infiltrate into the convenient location along the edge of the excavation. Water should not be allowed to stand on the bearing areas.

Based on our field exploration and laboratory test results, cohesionless soils are most likely to be encountered during excavation. In addition, shallow groundwater table exists at the project sites. Therefore, bottom blow up will be an issue during excavation. The excavation process should be properly monitored by an experienced geotechnical engineer.

10.6 Earthwork

In general, site preparation and earthwork should conform to HCFCD Specifications (Ref. 6). Our recommendations on the earthwork preparation are summarized below:

1. Remove all soft soils, vegetation, root fibers and any organic materials from the face of the slopes.

2. The bearing surface should be protected against disturbance and deterioration by completing the back-filling operations as quickly as possible. The excavation bottom should be properly sloped to allow any water infiltrating into the excavation at the convenient location along the edge of the excavation. Water should not be allowed to stand on the bearing area.

3. Remove all soft and wet soils. The excavation bottom areas should then be proofrolled with a loaded dump truck, or similar pneumatic-tired equipment with loads ranging from 25- to 50-tons. The proofrolling serves to compact surficial soils and to detect any soft or loose zones. The proofrolling should be conducted in accordance with TxDOT Standard Specification Item 216. Any soils deflecting excessively under moving loads should be undercut to firm soils and recompacted. The proofrolling operations should be observed by an experienced geotechnician.

4. Scarify the subgrade, add moisture, or dry if necessary, and recompact to 95% of the maximum dry density as determined by ASTM D 698 (Standard Proctor). The moisture content at the time of compaction of subgrade soils should be within ±2% of the Proctor optimum value. We recommend that the degree of compaction and moisture in the subgrade soils be verified by field density tests at the time of construction.

5. If off-site fills are used to stabilize or construct the slope, they should consist of sandy clay (CL) soils with liquid limit of less than 50 and plasticity index between 15 to 30, non-dispersive in Pinhole test Method A and 60% to 85% passing the No. 200 sieve. In addition, each layer should be placed in lifts not exceeding 8-inches and compacted to 95% of maximum Proctor dry density (ASTM D 698). Off-site fills shall be in accordance with HCFCD Standard Specifications, section 02314 Part Two (Ref. 6).

6. Side slopes should be compacted to 95% of standard Proctor density (ASTM D 698) with moisture content within ± 2% of the Proctor optimum, using a heavy crawler tractor, winching the compactor up and down the slope with cable (Yo-Yo fashion) or a Vibrator tractor compactor.

10.7 Fill Requirement

Fill requirements should be in accordance with Section 02314 of HCFCD Standard Specifications, August 2005 (Ref. 6).

10.8 Construction Surveillance

Construction surveillance and quality control tests should be planned to verify materials and placement in accordance with the specifications. The recommendations presented in this report were based on a discrete number of soil test borings. Soil type and properties may vary across the site. As a part of quality control, if this condition is noted during the construction, we can then evaluate and revise the design and construction to minimize construction delays. We recommend the following quality control procedures be followed by a qualified engineer or technician during the construction of the proposed channel basin:

- Observe all phases of excavations.
- Observe the site stripping, sloping and proofrolling.
- Monitor the dewatering during excavation for potential bottom blow up.
- Verify the compaction of subgrade soils.
- Evaluate the quality of fill and monitor the fill compaction for all lifts.
- Monitor concrete placement, conduct slump tests and make concrete cylinders.

It is the responsibility of the client to notify GET when each phase of the construction is taking place so that proper quality control and procedures are implemented.

11.0 RECOMMENDED ADDITIONAL STUDIES

This report has been on assumed conditions/characteristics of the proposed development where specific information was not available. It is recommended that the civil engineer and structural engineer along with any other design professionals involved in this project carefully review these assumptions to ensure they are consistent with the actual planned development. When discrepancies exist, they should be brought to our attention to ensure they do not affect the conclusions and recommendations provided herein. We recommend that GET be retained to review the plans and specifications to ensure that the geotechnical related conclusions and recommendations provided herein have been correctly interpreted as intended.

12.0 STANDARD OF CARE

The recommendations described herein were conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the geotechnical engineering profession practicing contemporaneously under similar conditions in the locality of the project. No other warranty or guarantee, expressed or implied, is made other than the work was performed in a proper and workmanlike manner.

13.0 REPORT DISTRIBUTION

This report was prepared for the sole and exclusive use by our client, based on specific and limited objectives. All reports, boring logs, field data, laboratory test results, maps and other documents prepared by GET as instruments of service shall remain the property of GET. Reuse of these documents is not permitted without written approval by GET. GET assumes no responsibility or obligation for the unauthorized use of this report by other parties and for purposes beyond the stated project objectives and work limitations.

14.0 REFERENCES

1. "Harris County Flood Control District Policy, Criteria, and Procedure Manual", by Harris County Flood Control District, 2010.

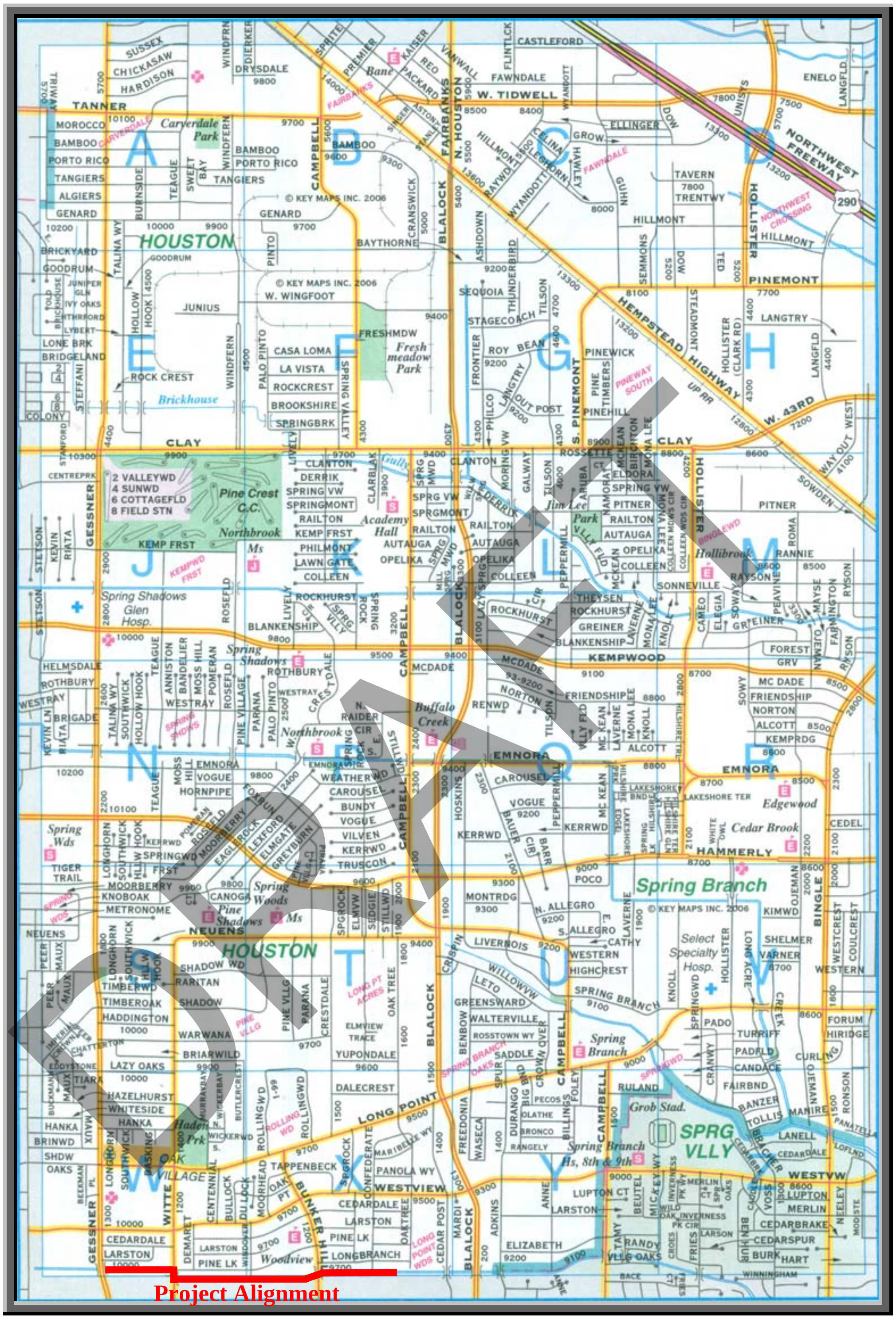
2. "GSTABL7 with STEDwin", by Gregory, P.E. Gregory Geotechnical Software, 2003.

3. "An Engineering Manual for Slope Stability Studies", by J.M. Duncan and A.L. Buchigwani, University of California at Berkley, Department of Engineering, 1975.

4. "Cohesion Intercept in Effective Stress-Stability Analysis", by G. Mesri, and M.E.M. Abdel-Ghaffar, Journal of Geotechnical Engineering, Vol. 119, No. 8, August 1993, pp. 1229-1249.

5. "Shear Strength Correlations and Remedial Measure Guidelines for Long-Term Stability of Slopes Constructed of Highly Plastic Clay Soils", by A. A. Saleh and Stephen G. Wright, Center for Transportation Research Bureau of Engineering Research, The University of Texas at Austin, October, 1997.

6. "Harris County Flood Control District 2005 Standard Specifications Book", by Harris County Flood Control District, August 2005.



*** Harris County Key Map 450**

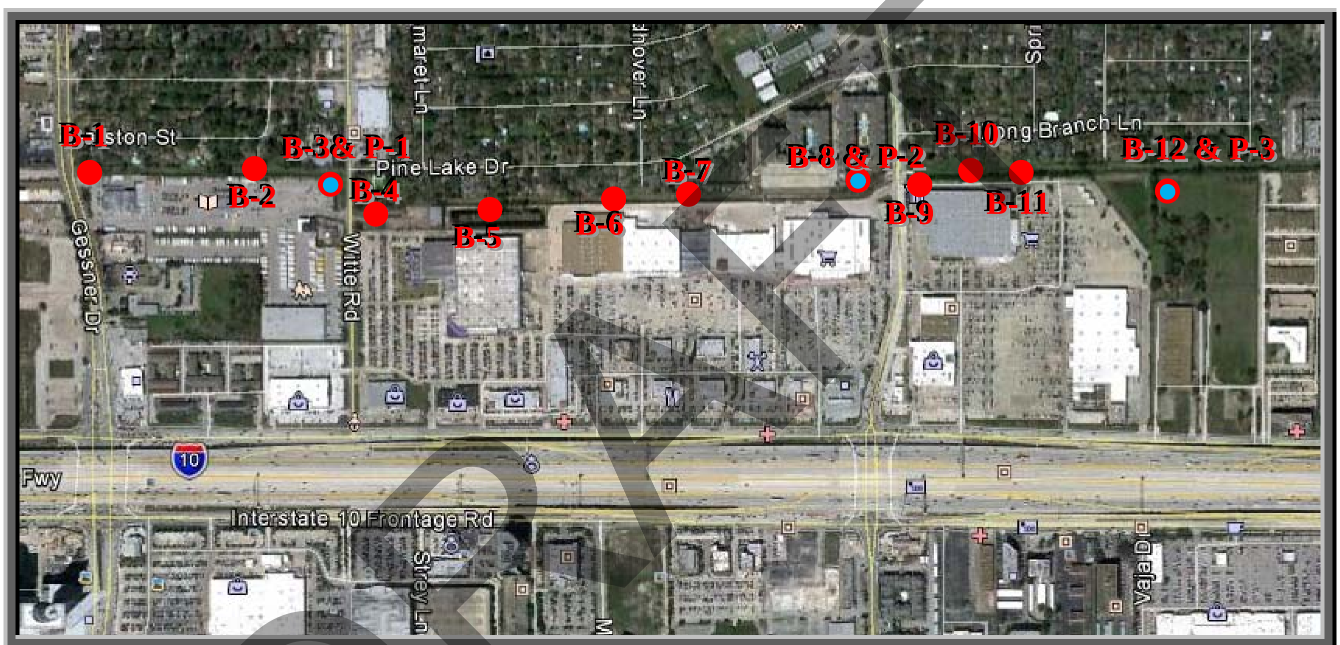
SITE VICINITY MAP

PROJECT: Geotechnical Study for HCFCD 140-01-00 Channel Improvement
Harris County, TX

SCALE: NOT TO SCALE	DATE: AUGUST 2013	PROJECT NO.: 12-568

NORTH

GEOTECH ENGINEERING AND TESTING **PLATE 1**



DRAFT

Legend:

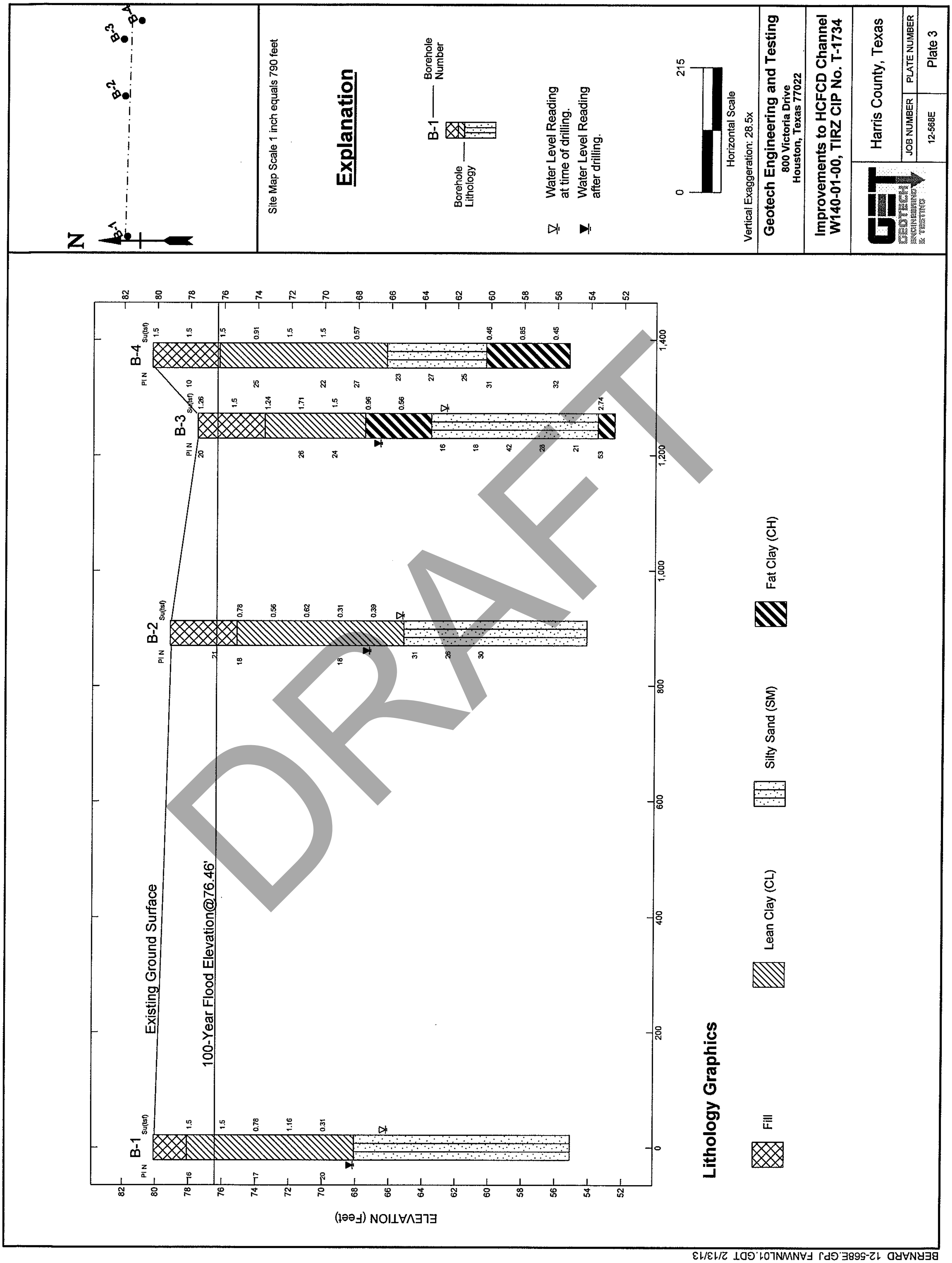
●: Soil Boring

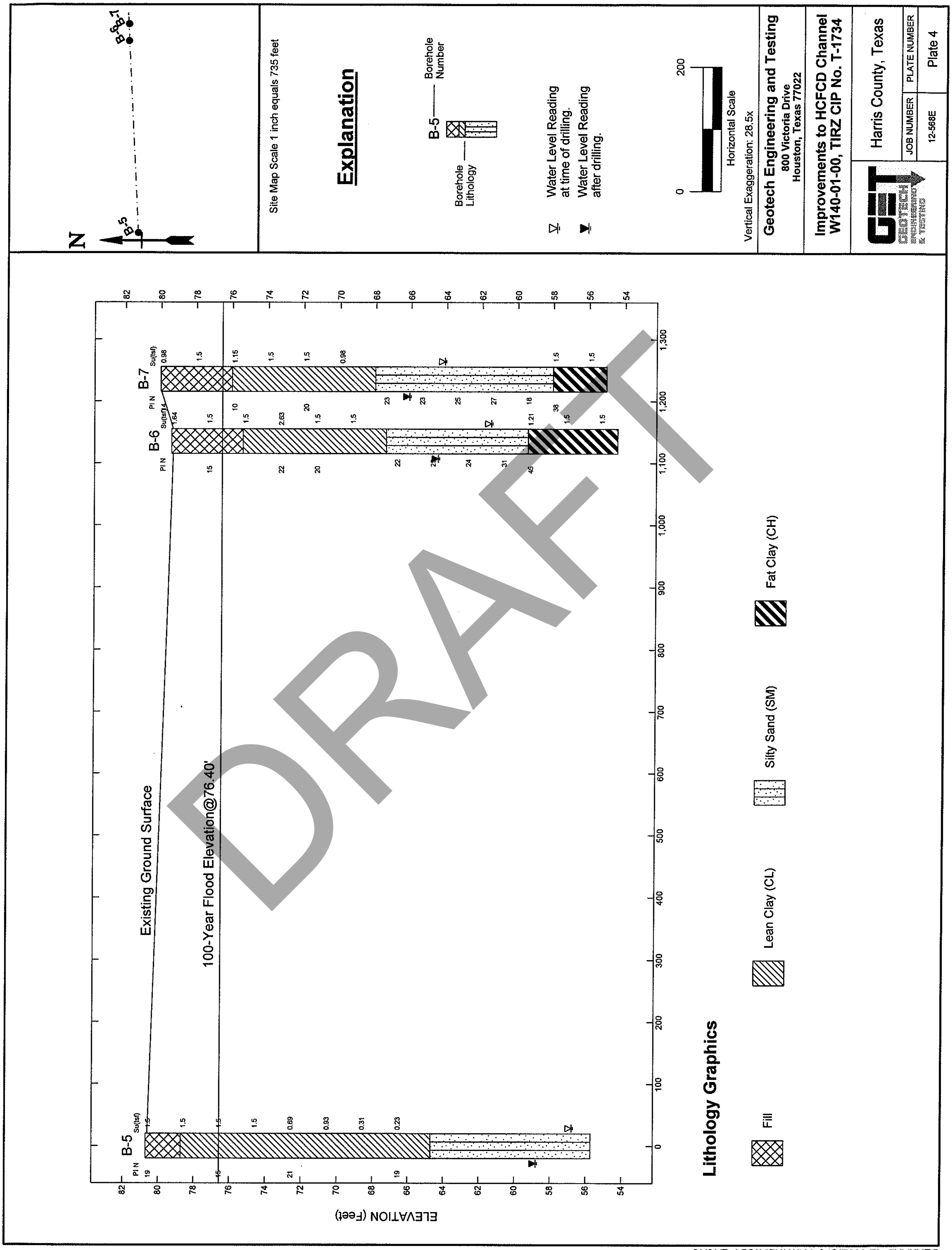
●: Piezometer Was Installed in the Boring

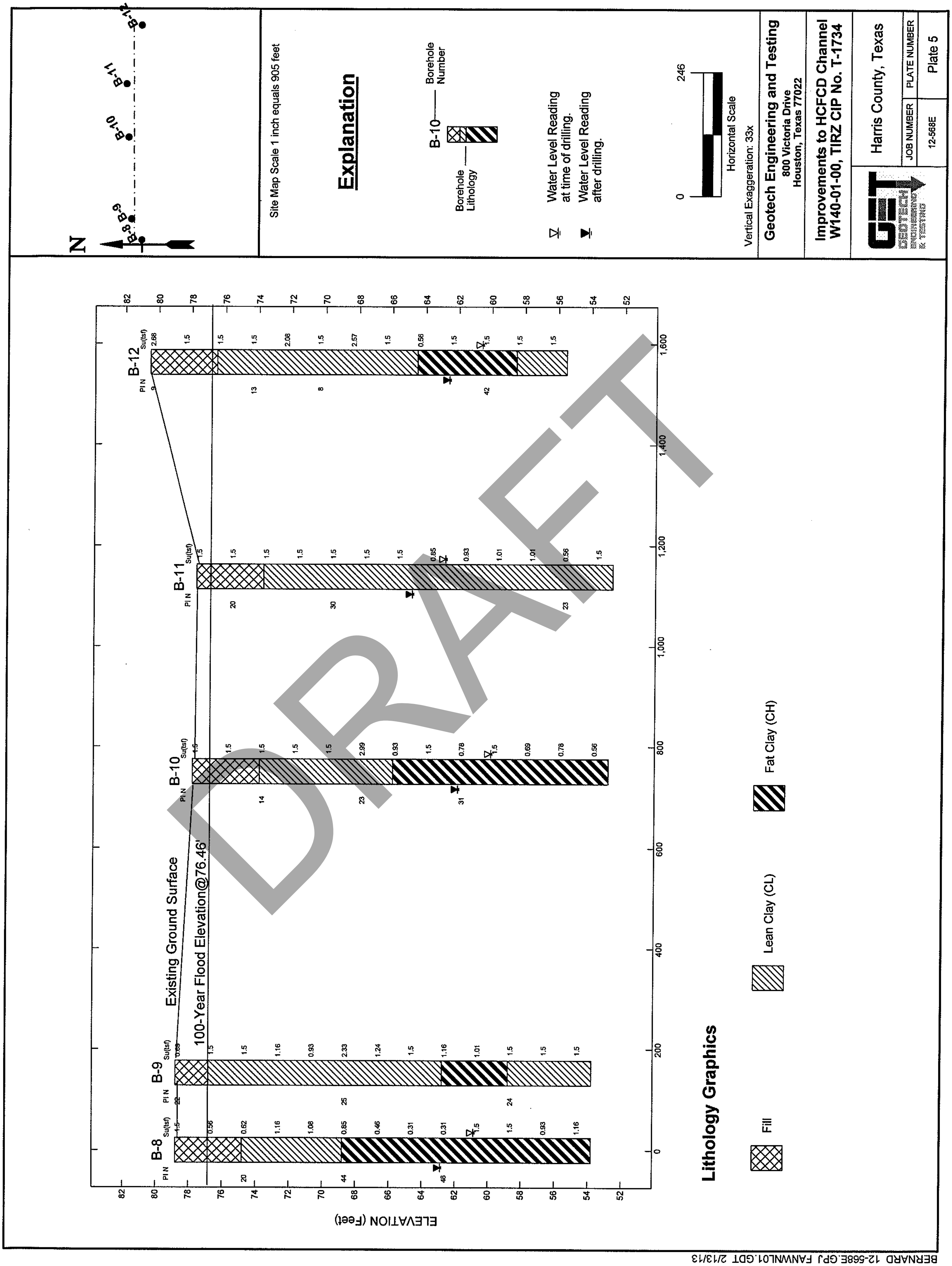
Notes: Borings B-2 through B-4, B-6, B-7 and B-12 were drilled using a Truck mounted drilling rig. Borings B-1, B-5 and B-8 through B-11 were drilled using a portable drilling rig.

PLAN OF BORINGS/ PIEZOMETERS			NORTH
PROJECT: Geotechnical Study for HCFCD 140-01-00 Channel Improvement Harris County, TX			
SCALE: NOT TO SCALE	DATE: AUGUST 2013	PROJECT NO.: 12-568	

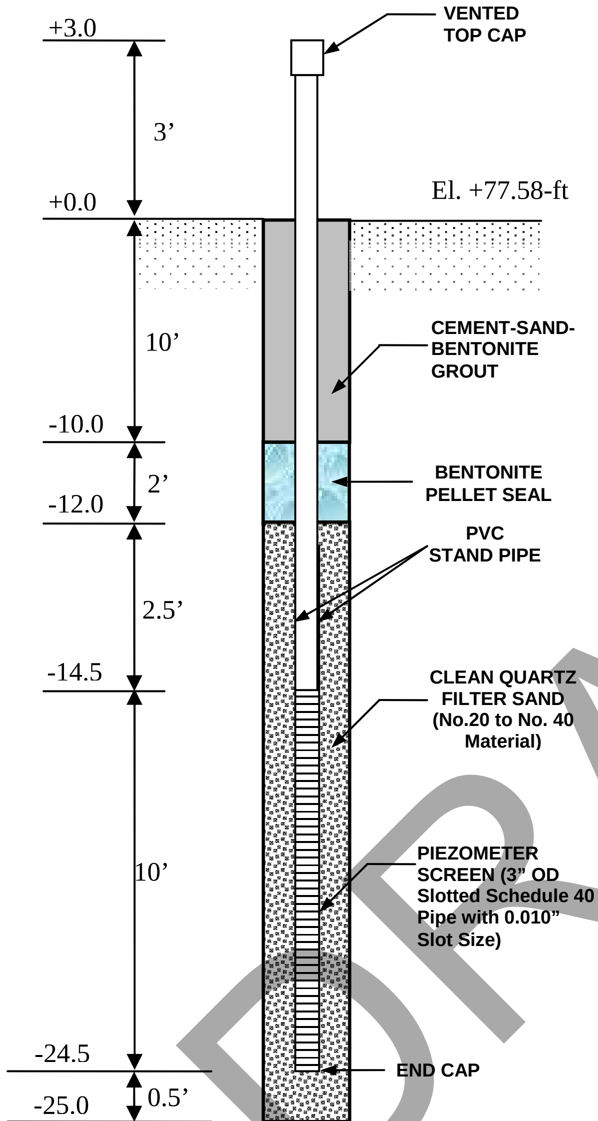
GEOTECH ENGINEERING AND TESTING **PLATE 2**


Site Map Scale 1 inch equals 790 feet
N
B-1
B-2
B-3
B-4
Explanation
Borehole Number
Borehole Lithology
Water Level Reading at time of drilling.
Water Level Reading after drilling.
0
215
Horizontal Scale
Vertical Exaggeration: 28.5x
Geotech Engineering and Testing
800 Victoria Drive
Houston, Texas 77022
Improvements to HCFCD Channel W140-01-00, TIRZ CIP No. T-1734
Harris County, Texas
JOB NUMBER
12-568E
PLATE NUMBER
Plate 3
Existing Ground Surface
100-Year Flood Elevation@76.46'
ELEVATION (Feet)
PI N
Su(tsf)
Lithology Graphics
Fill
Lean Clay (CL)
Silty Sand (SM)
Fat Clay (CH)
DRAFT
BERNARD 12-568E.GPJ FANWNL01.GDT 2/13/13


Site Map Scale 1 inch equals 735 feet
Explanation
Borehole Number
Borehole Lithology
B-5
Water Level Reading at time of drilling.
Water Level Reading after drilling.
Horizontal Scale
Vertical Exaggeration: 28.5x
Geotech Engineering and Testing
800 Victoria Drive
Houston, Texas 77022
Improvements to HCFCD Channel W140-01-00, TIRZ CIP No. T-1734
Harris County, Texas
JOB NUMBER
12-568E
PLATE NUMBER
Plate 4
B-5
B-6
B-7
Existing Ground Surface
100-Year Flood Elevation@76.40'
ELEVATION (Feet)
Lithology Graphics
Fill
Lean Clay (CL)
Silty Sand (SM)
Fat Clay (CH)
DRAFT
BERNARD 12-568E.GPJ FANWNL01.GDT 2/13/13


Site Map Scale 1 inch equals 905 feet
Explanation
Borehole Number
Borehole Lithology
Water Level Reading at time of drilling.
Water Level Reading after drilling.
Horizontal Scale
Vertical Exaggeration: 33x
Geotech Engineering and Testing
800 Victoria Drive
Houston, Texas 77022
Improvements to HCFCD Channel W140-01-00, TIRZ CIP No. T-1734
Harris County, Texas
JOB NUMBER
12-568E
PLATE NUMBER
Plate 5
Existing Ground Surface
100-Year Flood Elevation@76.46'
ELEVATION (Feet)
Lithology Graphics
Fill
Lean Clay (CL)
Fat Clay (CH)
B-8
B-9
B-10
B-11
B-12
BERNARD 12-568E.GPJ FANWNL01.GDT 2/13/13
DRAFT

PIEZOMETER INSTALLATION DATA (P-1)



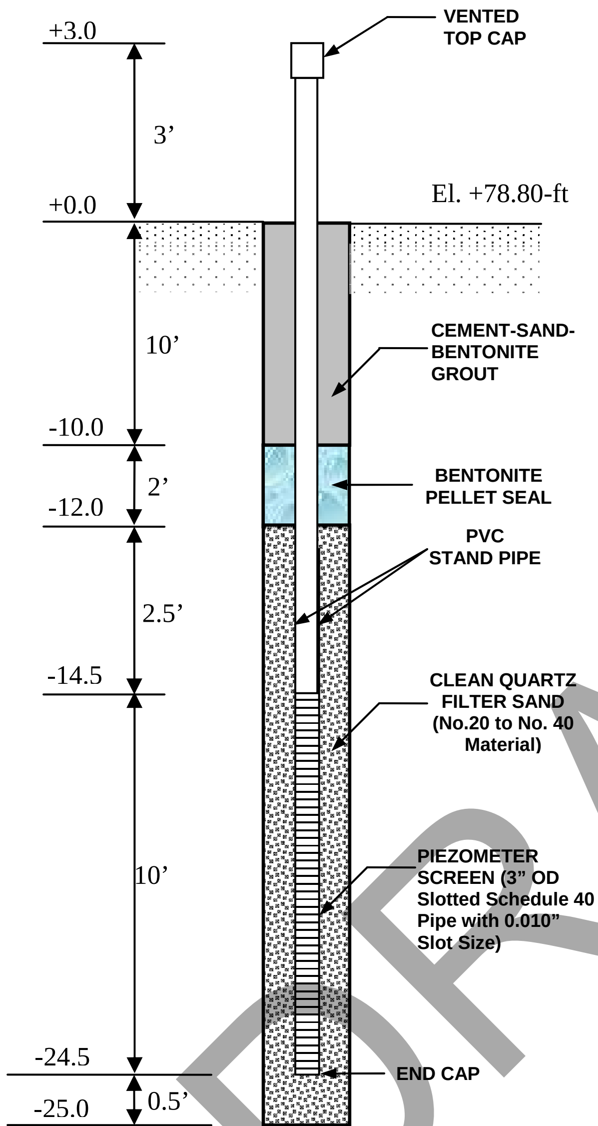
Installation and Development Details

Piezometer No	:	P-1*
Location	:	Boring No. B-3
Installation Date	:	09/06/2012
Drilling Method	:	Dry Auger Wet Rotary
Development Date	:	09/24/2012 10/09/2012
Development Method	:	Plunging

Water Level Data		Depth Below Grade	Elevation, (ft)
During Drilling	:	15.0'	62.48
After Installation	:	11.0'	66.58
Before Development	:	10.1'	67.48
After Development	:	8.3'	69.28
Before Development	:	8.9'	68.68
After Development	:	8.1'	69.48

* Boring B-3 was converted to Piezometer P-1

PIEZOMETER INSTALLATION DATA (P-2)



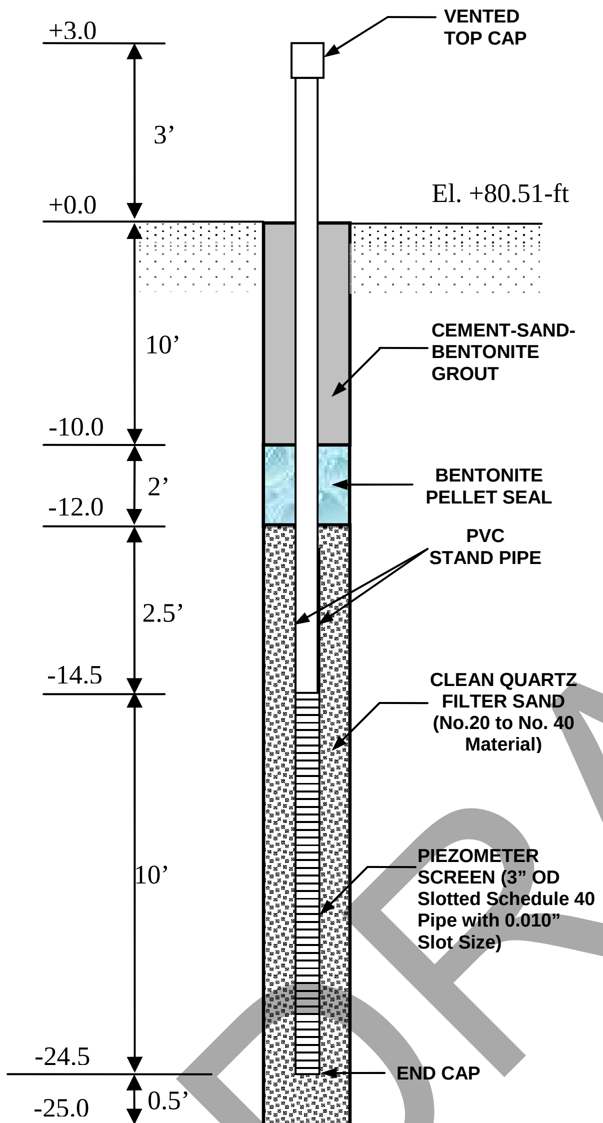
Installation and Development Details

Piezometer No	:	P-2*
Location	:	Boring No. B-8*
Installation Date	:	09/10/2012
Drilling Method	:	Dry Auger Wet Rotary
Development Date	:	09/24/2012 10/09/2012
Development Method	:	Plunging

Water Level Data		Depth Below Grade	Elevation, (ft)
During Drilling	:	18.0'	60.80
After Installation	:	16.0'	62.80
Before Development	:	14.0'	64.80
After Development	:	11.9'	66.90
Before Development	:	13.5'	65.30
After Development	:	11.8'	67.00

* Boring B-8 was converted to Piezometer P-2

PIEZOMETER INSTALLATION DATA (P-3)



Installation and Development Details

Piezometer No	:	P-3*
Location	:	Boring No. B-12*
Installation Date	:	09/06/2012
Drilling Method	:	Dry Auger Wet Rotary
Development Date	:	09/24/2012 10/09/2012
Development Method	:	Plunging

Water Level Data		Depth Below Grade	Elevation, (ft)
During Drilling	:	20.0’	60.51
After Installation	:	18.0’	62.51
Before Development	:	20.7’	59.81
After Development	:	19.5’	61.01
Before Development	:	20.0’	60.51
After Development	:	19.7’	60.81

* Boring B-12 was converted to Piezometer P-3

PIEZOMETER READING TABLE

Piezometer No./Depth	Existing Ground Surface Elevation, ft.	Groundwater Depth During Drilling from Existing Ground Surface, ft.	Piezometric Level with Respect to Existing Ground Surface, ft.					
			September 24, 2012			October 09, 2012		
			Before Bailing	After Bailing		Before Bailing	After Bailing	
				Time (Min.)	Depth		Time, (Min.)	Depth
P-1 (25')	+77.58	15.0	10.1'	1	9' 8"	8.9'	1	8’ 6”
				2	9' 6"		2	8' 5"
				5	8' 6"		5	8' 3"
				10	8' 3"		10	8' 1"
				20	8' 3"		20	8' 1"
				30	8' 3"		30	8' 1"
				60	8' 3"		60	8' 1"
P-2 (25')	+78.80	18.0	14.0'	1	12' 9"	13.5'	1	13' 2"
				2	12.5"		2	12' 9"
				5	12' 1"		5	12' 4”
				10	12' 0"		10	12' 1"
				20	12' 0"		20	11 9"
				30	11' 9"		30	11' 8"
				60	11’ 9"		60	11' 8"
				Time (Min.)	Depth		Time, (Min.)	Depth
P-3 (25')	80.51	20.0	20.7’	1	20' 7"	20.0'	1	19' 11"
				2	20' 5"		2	19' 11"
				5	20' 2"		5	19' 11"
				10	20' 1"		10	19' 9"
				20	19' 9"		20	19' 7"
				30	19' 7"		30	19' 7"
				60	19' 5"		60	19' 7"

Note: Borings B-3, B-8 and B-12 were converted to Piezometers P-1, P-2 and P-3, respectively.

Summary of Laboratory Tests

Project: Improvements to HCFCD Channel W140-01-00

GET Project No.: 12-568E

Location: Harris County, Texas

Page 1 of 6

Client: LAN
Harris County Flood Control District

Boring No.	Sample Depth (feet)	Soil Classification	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits (%) LL	PL	PI	-200 Sieve (%)	Undrained Shear Strength (tsf)	Strain (%)	Lateral Pressure (psi)	Remarks
B-1	0 – 2	Fill: Sandy Silt (ML)	9									
	2 – 4	Sandy Clay (CL)	7		32	16	16	58				
	4 – 6	Sandy Clay (CL)	12									
	6 – 8	Sandy Clay (CL)	17		34	17	17					6'-8' Grade 1
	8 – 10	Sandy Clay (CL)	14									(Non-Dispersive)
	10 – 12	Sandy Clay (CL)	17		36	16	20	57				
	12 – 14	Silty Sand (SM)	21									
	14 – 16	Silty Sand (SM)	18									
	16 – 18	Silty Sand (SM)	16									
	18 – 20	Silty Sand (SM)	22									
	20 – 22	Silty Sand (SM)	22									
	22 – 24	Silty Sand (SM)	21									
	24 – 25	Silty Sand (SM)	16									
B-2	0 – 2	Fill: Sandy Silt (ML)	11					58				
	2 – 4	Fill: Sandy Silt (ML)	14									
	4 – 6	Sandy Clay (CL)	8		35	17	18					
	6 – 8	Sandy Clay (CL)	17									
	8 – 10	Sandy Clay (CL)	18									
	10 – 12	Sandy Clay (CL)	18		35	17	18					10'-12' Grade 1
	12 – 14	Sandy Clay (CL)	19									(Non-Dispersive)
	14 – 16	Silty Sand (SM)	23									
	16 – 18	Silty Sand (SM)	22									
	18 – 20	Silty Sand (SM)	24									
	20 – 22	Silty Sand (SM)	23									
	22 – 24	Silty Sand (SM)	21									
	24 – 25	Silty Sand (SM)	22									

PLATE 10

Summary of Laboratory Tests

Project: Improvements to HCFCD Channel W140-01-00

GET Project No.: 12-568E

Location: Harris County, Texas

Page 2 of 6

Client: LAN
Harris County Flood Control District

Boring No.	Sample Depth (feet)	Soil Classification	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits (%)			-200 Sieve (%)	Undrained Shear Strength (tsf)	Strain (%)	Lateral Pressure (psi)	Remarks
					LL	PL	PI					
B-3	0 − 2	Fill: Sandy Clay (CL)	16	111	37	17	20	65	1.26	9.08	0	
	2 − 4	Fill: Sandy Clay (CL)	13						0.92	14.5	3	
	4 − 6	Clay (CL)	16									
	6 − 8	Clay (CL)	17	119	45	19	26	76	1.71	10.9	0	
	8 − 10	Clay (CL)	16		42	18	24	76				8'-10' Grade 1
	10 − 12	Clay (CH)	34	90					2.23	14.2	9	CU Test (8'10')
	12 − 14	Clay (CH)	35									C' = 236.8 psf
	14 − 16	Silty Sand (SM)	24					12				ϕ'= 27.9 °
	16 − 18	Silty Sand (SM)	23									
	18 − 20	Silty Sand (SM)	27									
	20 − 22	Silty Sand (SM)	20									
	22 − 24	Silty Sand (SM)	27						1.9	4.7	20	
	24 − 25	Clay (CH)	28	98	75	22	53		2.74	10	0	24' - 25' ND1 Non-Dispersive
B-4	0 – 2	Fill: Sandy Clay (CL)	8									
	2 − 4	Fill: Sandy Clay (CL)	6		24	14	10					
	4 − 6	Sandy Clay (CL)	8						2.54	9.78	4	
	6 − 8	Sandy Clay (CL)	10	117	43	18	25	63	0.91	10.9	0	6'-8' Grade 1
	8 − 10	Sandy Clay (CL)	10									CU Test (6'-8')
	10 − 12	Sandy Clay (CL)	13		40	18	22					C' = 261.4 psf
	12 − 14	Sandy Clay (CL)	24	110	44	17	27	56	0.57	9.83	0	ϕ'= 28.3 °
	14 − 16	Silty Sand (SM)	20									10'-12' ND1 Non-Dispersive
	16 − 18	Silty Sand (SM)	22									CU Test (10'-12')
	18 − 20	Silty Sand (SM)	26					17				C' = 241.7 psf
	20 − 22	Clay (CH)	25		50	19	31					ϕ'= 21.3 °
	22 − 24	Clay (CH)	21						0.49	10.9	19	
	24 − 25	Clay (CH)	22	100	50	18	32	88	0.45	10	0	

PLATE 11

Summary of Laboratory Tests

Project: Improvements to HCFCD Channel W140-01-00

GET Project No.: 12-568E

Location: Harris County, Texas

Page 3 of 6

Client: LAN
Harris County Flood Control District

Boring No.	Sample Depth (feet)	Soil Classification	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits (%) LL	PL	PI	-200 Sieve (%)	Undrained Shear Strength (tsf)	Strain (%)	Lateral Pressure (psi)	Remarks
B-5	0 – 2	Fill: Sandy Clay (CL)	7		36	17	19					
	2 – 4	Sandy Clay (CL)	12									
	4 – 6	Sandy Clay (CL)	12		32	17	15					
	6 – 8	Sandy Clay (CL)	14									
	8 – 10	Sandy Clay (CL)	14		38	17	21	61				
	10 – 12	Sandy Clay (CL)	14									
	12 – 14	Sandy Clay (CL)	18									
	14 – 16	Sandy Clay (CL)	18		35	16	19	68				14'-16' Grade 1
	16 – 18	Silty Sand (SM)	20									
	18 – 20	Silty Sand (SM)	19									
	20 – 22	Silty Sand (SM)	14					25				
	22 – 24	Silty Sand (SM)	19									
	24 – 25	Silty Sand (SM)	16									
B-6	0 – 2	Fill: Sandy Clay (CL)	7	110					1.64	8.6	0	
	2 – 4	Fill: Sandy Clay (CL)	7		29	14	15	56	2.41	8.4	3	
	4 – 6	Sandy Clay (CL)	10									
	6 – 8	Sandy Clay (CL)	11	118	39	17	22	64	2.63	9.56	0	6'-8' Non-Dispersive
	8 – 10	Sandy Clay (CL)	9		37	17	20	61	1.97	14.2	6	CU Test (8'-10')
	10 – 12	Sandy Clay (CL)	18									C' = 263.5 psf
	12 – 14	Silty Sand (SM)	22					39				ϕ'= 30.8 °
	14 – 16	Silty Sand (SM)	24									10'-12' Grade 1
	16 – 18	Silty Sand (SM)	22									
	18 – 20	Silty Sand (SM)	22									
	20 – 22	Clay (CH)	28	104	65	20	45	87	1.21	9.5	0	
	22 – 24	Clay (CH)	18									
	24 – 25	Silty Sand (SM)	22						2.49	8	19	

PLATE 12

Summary of Laboratory Tests

Project: Improvements to HCFCD Channel W140-01-00

GET Project No.: 12-568E

Location: Harris County, Texas

Page 4 of 6

Client: LAN
Harris County Flood Control District

Boring No.	Sample Depth (feet)	Soil Classification	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits (%) LL	PL	PI	-200 Sieve (%)	Undrained Shear Strength (tsf)	Strain (%)	Lateral Pressure (psi)	Remarks
B-7	0 – 2	Fill: Sandy Clay (CL)	6	113	29	15	14	57	0.98	9.4	0	
	2 − 4	Fill: Sandy Clay (CL)	8									
	4 − 6	Sandy Clay (CL)	7	108	24	14	10		1.15	9.4	0	
	6 − 8	Sandy Clay (CL)	10						2.64	10.5	6	
	8 − 10	Sandy Clay (CL)	7		36	16	20	64				CU Test (8'-10')
	10 − 12	Sandy Clay (CL)	17	106					0.98	9.4	0	C' = 277.2 psf
	12 − 14	Silty Sand (SM)	23									ϕ'= 38.1 °
	14 − 16	Silty Sand (SM)	26					36				
	16 − 18	Silty Sand (SM)	24									
	18 − 20	Silty Sand (SM)	20									
	20 − 22	Silty Sand (SM)	19									
	22 − 24	Clay (CH)	20		58	20	38	96				
	24 − 25	Clay (CH)	22						1.77	9.12	19	
B-8	0 – 2	Fill: Sandy Clay (CL)	13									
	2 − 4	Fill: Sandy Clay (CL)	18									
	4 − 6	Clay (CL)	15		36	16	20	78				
	6 − 8	Clay (CL)	16									
	8 − 10	Clay (CL)	16									
	10 − 12	Clay (CH)	22		67	23	44					10'-12' Grade 1
	12 − 14	Clay (CH)	21									
	14 − 16	Clay (CH)	22									
	16 − 18	Clay (CH)	21		69	21	48	95				
	18 − 20	Clay (CH)	27									
	20 − 22	Clay (CH)	23									
	22 − 24	Clay (CH)	17									
	24 − 25	Clay (CH)	26									

PLATE 13

Summary of Laboratory Tests

Project: Improvements to HCFCD Channel W140-01-00

GET Project No.: 12-568E

Location: Harris County, Texas

Page 5 of 6

Client: LAN
Harris County Flood Control District

Boring No.	Sample Depth (feet)	Soil Classification	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits (%) LL	PL	PI	-200 Sieve (%)	Undrained Shear Strength (tsf)	Strain (%)	Lateral Pressure (psi)	Remarks
B-9	0 – 2	Fill: Sandy Clay (CL)	18		40	18	22					
	2 – 4	Clay (CL)	12									
	4 – 6	Clay (CL)	13									
	6 – 8	Clay (CL)	16									
	8 – 10	Clay (CL)	16									
	10 – 12	Clay (CL)	14	116	43	18	25	87	2.33	12.9	0	
	12 – 14	Clay (CL)	17									
	14 – 16	Clay (CL)	18									
	16 – 18	Clay (CH)	20									
	18 – 20	Clay (CH)	20									
	20 – 22	Clay (CL)	15		43	19	24	79				20'-22' Grade 1
	22 – 24	Clay (CL)	13									
	24 – 25	Clay (CL)	17									
B-10	0 – 2	Fill: Sandy Clay (CL)	15									
	2 – 4	Fill: Sandy Clay (CL)	15									
	4 – 6	Sandy Clay (CL)	12		29	15	14	68				4'-6' Grade 1
	6 – 8	Sandy Clay (CL)	14									
	8 – 10	Sandy Clay (CL)	13									
	10 – 12	Sandy Clay (CL)	12	123	40	17	23		2.99	11.3	0	
	12 – 14	Clay (CH)	28									
	14 – 16	Clay (CH)	18									
	16 – 18	Clay (CH)	16		50	19	31	87				
	18 – 20	Clay (CH)	19									
	20 – 22	Clay (CH)	18									
	22 – 24	Clay (CH)	18									
	24 – 25	Clay (CH)	19									

PLATE 14

Summary of Laboratory Tests

Project: Improvements to HCFCD Channel W140-01-00

GET Project No.: 12-568E

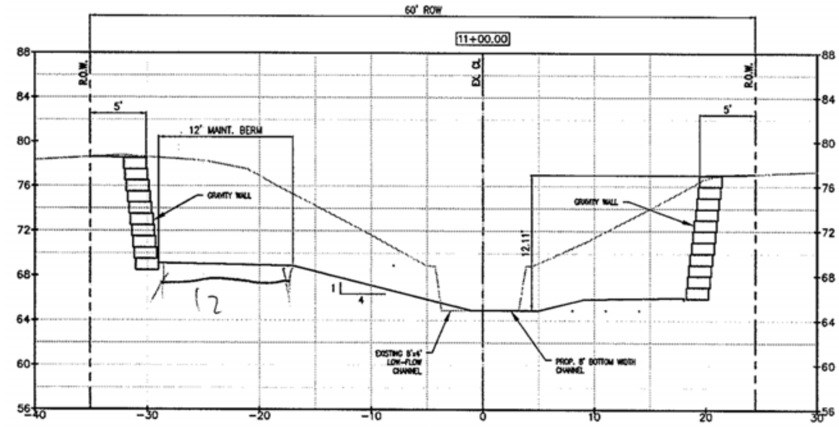
Location: Harris County, Texas

Page 6 of 6

Client: LAN
Harris County Flood Control District

Boring No.	Sample Depth (feet)	Soil Classification	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits (%) LL	PL	PI	-200 Sieve (%)	Undrained Shear Strength (tsf)	Strain (%)	Lateral Pressure (psi)	Remarks
B-11	0 – 2	Fill: Sandy Clay (CL)	7									
	2 – 4	Fill: Sandy Clay (CL)	12		36	16	20	67				
	4 – 6	Clay (CL)	10									
	6 – 8	Clay (CL)	14									
	8 – 10	Clay (CL)	16		48	18	30					
	10 – 12	Clay (CL)	15									
	12 – 14	Clay (CL)	18									
	14 – 16	Clay (CL)	18									
	16 – 18	Clay (CL)	16									
	18 – 20	Clay (CL)	14									
	20 – 22	Clay (CL)	17									
	22 – 24	Clay (CL)	16		40	17	23	76				
	24 – 25	Clay (CL)	13									
B-12	0 – 2	Fill: Sandy Clay (CL)	6	119	23	14	9	62	2.68	5.4	0	
	2 – 4	Fill: Sandy Clay (CL)	7						2.72	4.71	2	
	4 – 6	Clay (CL)	12									
	6 – 8	Clay (CL)	10		28	15	13	81	2.8	3.28	6	
	8 – 10	Clay (CL)	16	118					2.08	9.5	0	
	10 – 12	Clay (CL)	8		23	15	8	77				
	12 – 14	Clay (CL)	14	121					2.57	8.7	0	12'-14' ND1 Non-Dispersive
	14 – 16	Clay (CL)	21						1.25	7.65	12	
	16 – 18	Clay (CH)	31									
	18 – 20	Clay (CH)	33									
	20 – 22	Clay (CH)	22		62	20	42					CU Test (20'-22')
	22 – 24	Clay (CL)	8						1.78	14.3	18	C' = 206.6 psf
	24 – 25	Clay (CL)	12									ϕ'= 24.5 °

PLATE 15



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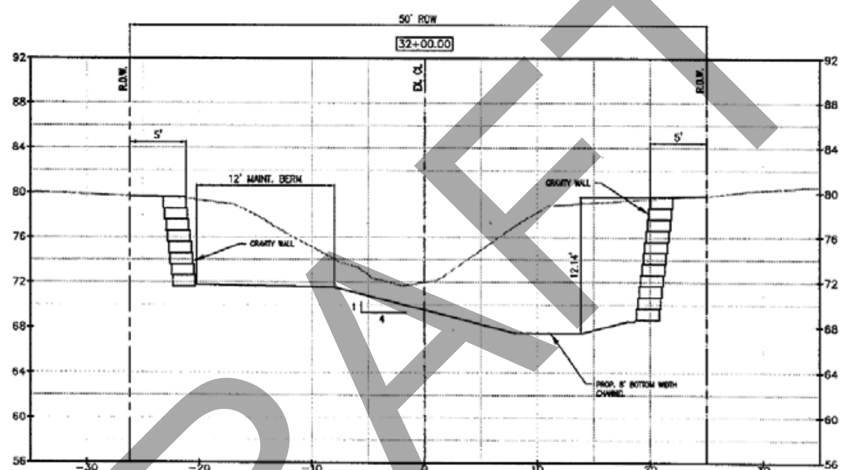

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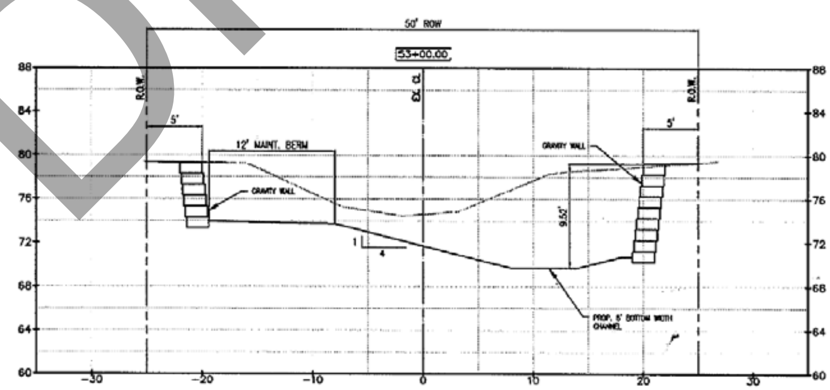

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CROSS SECTIONS FOR SLOPE STABILITY ANALYSIS (NOT TO SCALE)

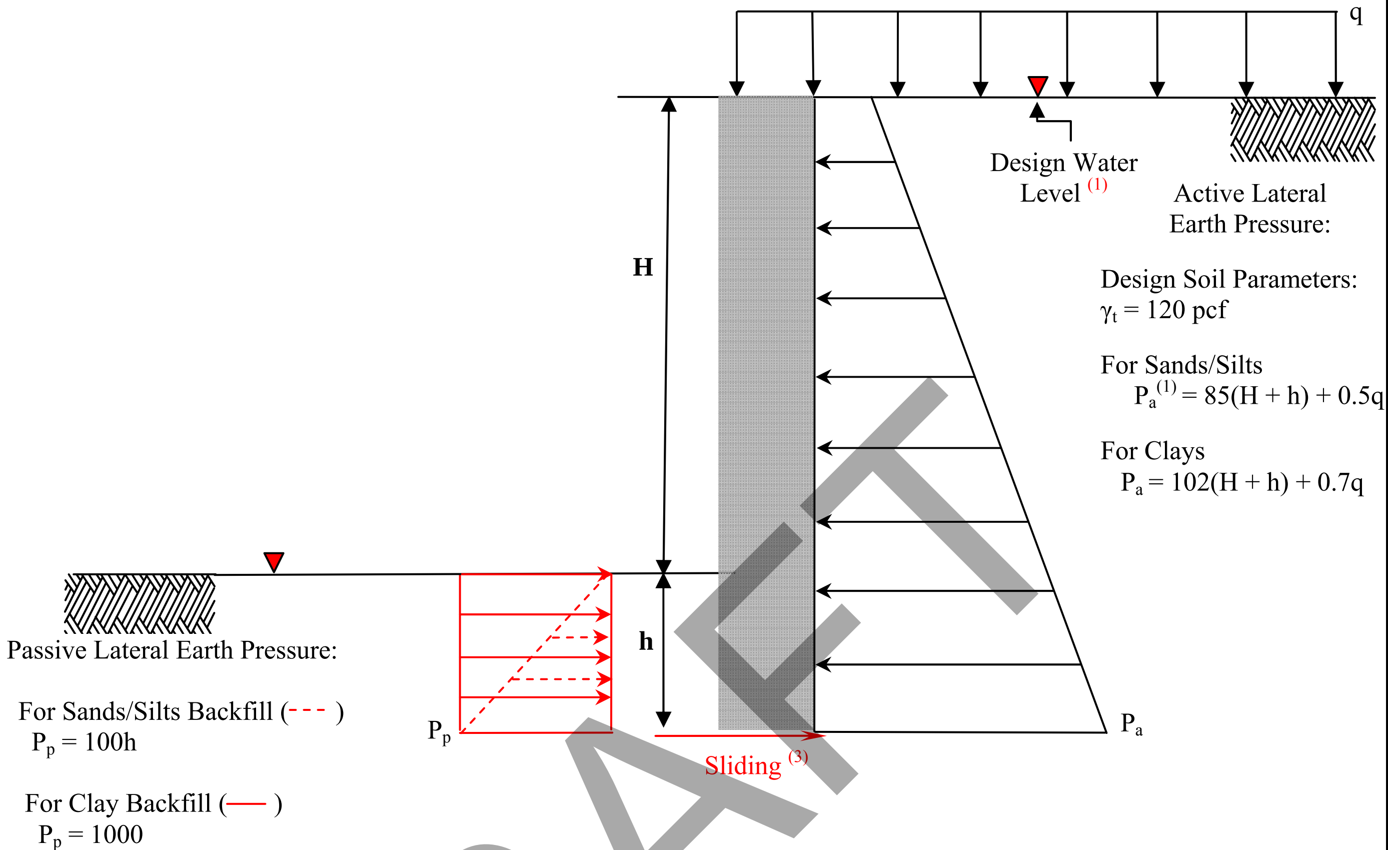
PROJECT: Geotechnical Study for HCFCD 140-01-00 Channel Improvement
Harris County, Texas

SCALE: NOT TO SCALE	DATE: AUGUST 2013	PROJECT NO.: 12-568E

NORTH

GEOTECH ENGINEERING AND TESTING **PLATE 16**

LATERAL EARTH PRESSURE DIAGRAM OF GRAVITY WALL



Notes: (1) Hydrostatic pressure load of 62.4 pcf per foot of wall height assuming groundwater at grade, have been added to the lateral loads, unless positive measures are taken to relieve hydrostatic pressures.

(2) We assumed a horizontal backfill behind the wall.

(3) Allowable adhesion against sliding: 200 psf (Clay)

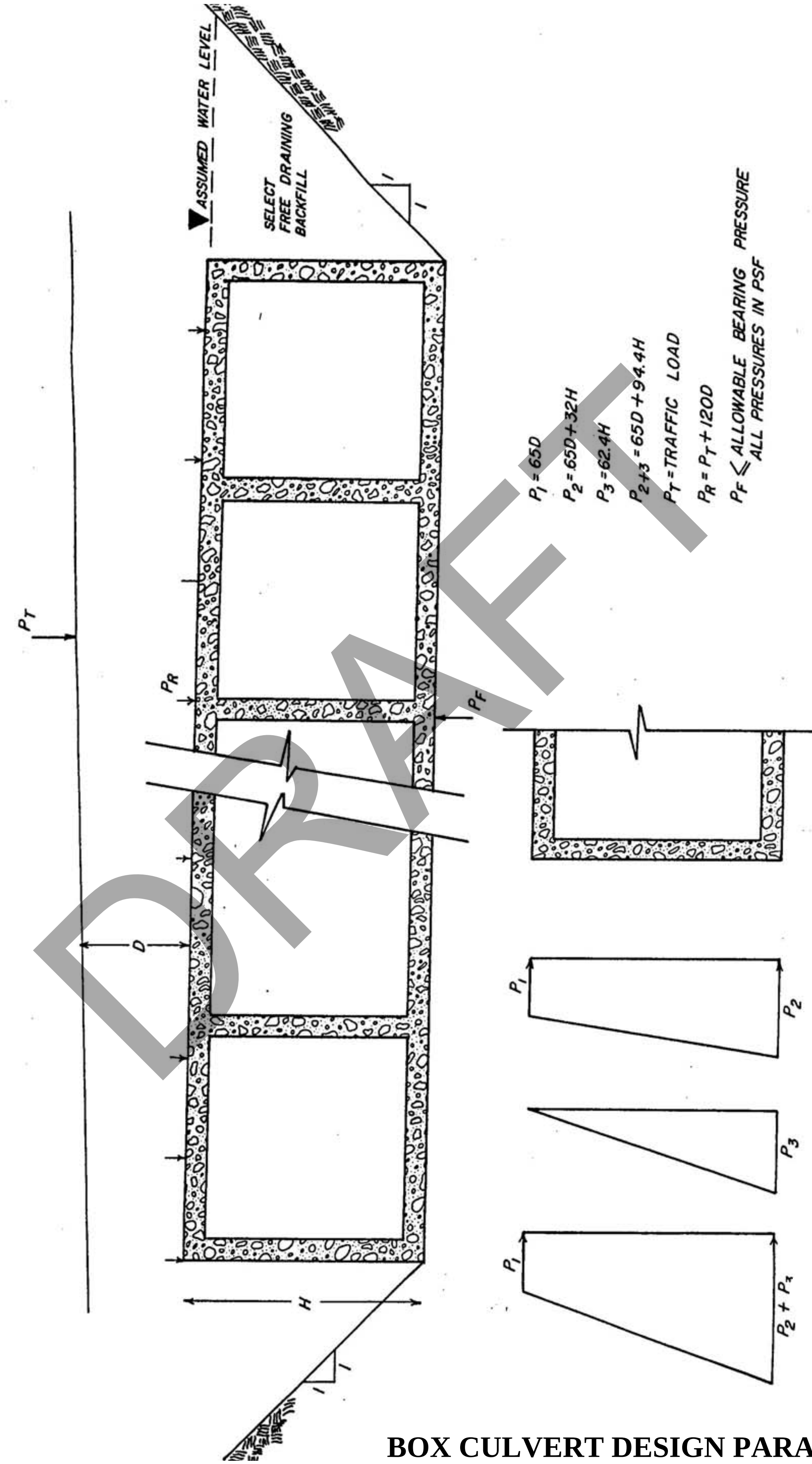
(4) Allowable Friction coefficient against sliding: 0.3 (Sands)

(5) Assumed that compacted clay with shear strength of 1,000 psf in front of the wall in calculating the passive pressures.

(5) Where: P_a = Active earth pressure, psf per foot of wall.
P_p = Allowable passive earth pressure, psf per foot of wall. This includes a factor of safety of 2.0.
H = Height of the retaining wall above the design grade line, ft .
h = Height of the retaining wall below the design grade line, ft .
q = Surcharge load in psf, due to construction equipment loading or soil supported loads on top of the retaining wall. A surcharge load of 250 psf can be assumed for the weight of construction equipment/traffic.
γ_t = Total unit weight of soil.

LATERAL EARTH PRESSURE DIAGRAM		
PROJECT: Geotechnical Study for HCFCD 140-01-00 Channel Improvement Harris County, TX		
SCALE: NOT TO SCALE	DATE: AUGUST 2013	PROJECT NO.: 12-568E

GEOTECH ENGINEERING AND TESTING **PLATE 17**



BOX CULVERT DESIGN PARAMETERS

Appendix G: Phase I Environmental Site Assessmment for N. Gessner Rd. & W 140 Briar Branch

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

PHASE I ENVIRONMENTAL SITE ASSESSMENT

N. GESSNER RD. & W 140 BRIAR BRANCH FEASIBILITY STUDY

Houston, Texas

April 18, 2013

REPORT NO. 092012-A

Prepared for:

Memorial City Redevelopment Authority
on behalf of
Tax Increment Reinvestment Zone No. 17 (TIRZ 17)

Prepared by:

Lockwood Andrews & Newnam, Inc.
Firm No. 2614
2925 Briarpark
Houston, Texas 77042

STATE OF TEXAS
CHRISTINE H. KIRBY
94776
LICENSED
PROFESSIONAL ENGINEER

Christine H. Kirby

Table of Contents

APPENDICES:

I. EXECUTIVE SUMMARY

A summary of the findings for the Phase I Environmental Site Assessment (ESA) for the N. Gessner & W 140 Briar Branch Improvements is provided below. Details are neither included nor fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of this summary.

- The N. Gessner project is located north of IH-10, and extends along N. Gessner Rd. and Witte Rd. from IH-10 to Long Point Rd. in Houston Harris County, Texas. The total N. Gessner project length is approximately 1.3 miles.

- The W 140 Briar Branch project is located north of IH-10, and extends along W 140 Briar Branch from N. Gessner Rd. to 500 feet to the east of Confederate Rd. in Houston, Harris County, Texas. The W 140 Briar Branch project length is approximately 1.1 miles.

- The proposed work along N. Gessner Rd. and Witte Rd. include improvements to drainage, traffic, roadway, and utilities. It also includes cross sectional and depth improvements to W 140 Briar Branch.

- The regulatory database search identified thirteen (13) Leaking Underground Storage Tank sites and one (1) Voluntary Cleanup Program (VCP) site within the specified search radius.

The facilities identified in the regulatory agency database review that appear to constitute a Recognized Environmental Condition (REC), based on facility characteristics and environmental settings at the time of this assessment study, are listed below. Based on the Phase I ESA for the N. Gessner & W 140 Briar Branch Improvements, there are eight (8) potential RECs present.

- Daniel Industries. 9720 Old Katy Rd. **TXVCP** Fabrication/Machine Shop. Phase: Conditional. Contaminant categories: VOCs, SVOCs, metals, chlorinated solvents, and TP. Media affected: Soils/Groundwater. Currently, there is a pump and treat system to assist with on-site remediation. Certificate of Completion issued on 05/18/2005. **Further investigation is recommended.**

- Exxon Mobil 63740. 1002 Gessner Rd. **LPST** Exxon Gas Station no longer exists; CVS pharmacy currently resides on this property. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. According to TCEQ records, three monitoring wells were sampled in May 2005, all levels were below action limits. Therefore **no further investigation is recommended**.

- Mister Car Wash 2. 1038 Gessner Rd. **LPST** Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. There are two monitoring wells located near the western side of the property. According to TCEQ records from March 9, 2006 soil contaminant concentrations exceed residential and commercial health-based concentrations. There is an impervious cover in the area limiting the potential exposure of these contaminants in the subsurface. TCEQ notes that any remaining contaminant levels and potential exposure pathways should be evaluated when conducting any future soil excavation or construction activities at this site. Therefore **further investigation is recommended.**

- Fire Station 49. 1212 Gessner Rd. **LPST** Status code: Final concurrence issued, case closed. Ground water is affected and a public or domestic water supply well is located between 0.25 and 0.5 miles from the UST/AST system or source area. According to TCEQ records from June 16, 2010 soil contaminant concentrations were below health-based target levels and construction worker exposure target levels. Therefore **no further investigation is recomemded.**

- EZ Food Store. 9941 Long Point Rd. **LPST** Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. TCEQ records do not provide enough information regarding the extent of contamination. Therefore **further investigation is recommended.**

- Spring Branch Memorial Rentals. 10102 Long Point Rd. **LPST** Spring Branch Memorial Rentals no longer exists; First National Bank currently resides on this property. Status code: Final concurrence pending documentation of well plugging. Groundwater is affected no apparent threats or impact to receptors. TCEQ did not contain any records regarding this property. Therefore **further investigation is recommended.**

- EZ Stop N Shop. 1311 Gessner Rd. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. TCEQ did not contain any records regarding this property. Therefore **further investigation is recommended.**

- Spring Branch ISD. 1066 Gessner Bldg. B. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. TCEQ did not contain any records regarding this property. Therefore **further investigation is recommended.**

Based on ASTM E 1527-05 criteria, LAN recommends Phase II sampling on the following six areas to quantify possible contamination from eight RECs in the vicinity of the subject alignment: Daniel Industries (9720 Old Katy Rd.), Mister Car Wash 2 (1038 Gessner Rd.), EZ Food Store (9941 Long Point Rd.), Spring Branch Memorial Rentals (10102 Long Point Rd.), EZ Stop N Shop (1311 Gessner Rd.), and Spring Branch ISD (1066 Gessner Rd).

II. INTRODUCTION

A. Purpose

The purpose of the Phase I ESA is to investigate the subject alignment through a combination of historical research and site reconnaissance in order to determine the likelihood of any environmental risks or liabilities. These results are to develop information to identify Recognized Environmental Conditions (RECs). A REC is the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of hazardous substances or petroleum products.

B. Detailed Scope of Work

This Phase I ESA was performed in accordance with ASTM E 1527-05 and the City of Houston Department of Public Works Infrastructure Design Manual. The scope of work includes the following tasks:

- Review of Federal and State regulatory agency database records to assess any documented RECs near the subject alignment. The database prepared by Environmental Data Resources, Inc. (EDR), dated August 20, 2012, contains information on:
  - Federal National Priority List (NPL) sites within 1.0 mile:
  - Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites within 500 feet;
  - CERCLIS sites designated No Further Remedial Action Planned (NFRAP) on or adjoining the subject alignment;
  - Resource Conservation and Recovery Act (RCRA) Corrective Action Activity (CORRACTS) within 500 feet;
  - Federal RCRA Treatment, Storage, and Disposal Facilities (TSDF) within 0.5 mile;
  - RCRA generators on or adjoining the subject alignment;
  - Emergency Response Notification System (ERNS) listings on the subject alignment;
  - Texas Hazardous Waste Sites including state NPL, CERCLIS, and Texas Voluntary Cleanup (VCP) sites within 0.5 mile;
  - Leaking Petroleum Storage Tanks (LPSTs) within 500 feet; and
  - Registered Underground Storage Tanks (USTs) on or adjoining the subject alignment.
- Compare selected historical and current aerial photographs to identify changes in land uses near the subject alignment over time and to determine potential environmental concerns related to the use of the subject alignment or adjacent properties. Sources of aerial photography are the Agricultural Stabilization and Conservation Service (ASCS) (1953), the United States Geological Survey (USGS) (1968), Texas Department of Transportation (TxDOT) (1979, 1989), United States

Geological Survey (1995), United States Department of Agriculture (2004), and the Environmental Data Resources (EDR) (2005, 2008).

- Review Emergency Release Reports, pipeline maps, flood plain maps, and wetlands maps.
- Review City directories and interview individuals with knowledge of the subject alignment in order to assess the historical ownership, development, and use of the subject alignment and adjacent properties.
- Conduct visual site reconnaissance of the subject alignment and the adjoining properties, and interview available individuals with knowledge of the subject alignment in order to assess any current RECs.
- Prepare a report that summarizes the results of the investigation and provides recommendations regarding further investigation to fully determine and quantify potential environmental liabilities associated with the subject alingnment.

C. Limitations of Scope and Services

This assessment is limited to the visual observation of surface conditions within the subject alignment, interviews with public agencies and other persons knowledgeable of the subject alignment, and a review of reasonably ascertainable data. For the purposes of this ESA, reasonably ascertainable data is defined as interview information that could be obtained from property owners, individuals present during the site visit, and any agency records and historical maps that could be readily obtained through a commercial source. The information obtained was not further verified unless it was known to be incorrect or conflicted with other information previously obtained. Lockwood, Andrews & Newnam, Inc. (LAN) does not guarantee the completeness or accuracy of the regulatory agency files and site listings. Therefore, this report does not contain any information that was not provided or was not known by the individuals that were interviewed at the time this site assessment was performed.

The ESA is intended to reduce, but not eliminate, uncertainty regarding the potential for RECs in connection with the subject alignment. The following conditions were not included in the scope of work:

- Naturally occurring toxins in subsurface soils, rocks, and water or toxicity of on-site flora;
- Biological hazards;
- Health effects of electromagnetic radiation from high-voltage power lines;
- Drinking water quality including lead in drinking water;
- Asbestos-containing building materials or lead-based paint;
- Radon and other naturally occurring radioactive materials; or
- Surface or subsurface contamination.

There is no guarantee that not finding the indicators of hazardous substances or petroleum products assumes that these materials do not exist within the subject alignment. No subsurface investigations were performed to identify any closed landfills within the subject alignment. This report is based on the regulations in effect at the time it was prepared.

LAN has completed this Phase I ESA in general accordance with ASTM E 1527-05, unless otherwise specified, for the N. Gessner & W 140 Briar Branch Improvements. The guidelines and procedures used to perform this ESA are consistent with the City of Houston's Infrastructure design Manual guidelines for conducting Phase I ESAs.

D. User Reliance

This Phase I ESA report has been prepared for the exclusive use and reliance of the Tax Increment Reinvestment Zone No. 17 (TIRZ 17) and City of Houston for this project. Use or reliance by any other party is prohibited without written authorization of LAN, TIRZ 17, or the City of Houston. Reliance on this Phase I ESA by the client and all authorized parties will be subject to the terms, conditions, and limitations stated in the ESA report.

III. SITE DESCRIPTION

The N. Gessner project is located north of IH-10, and extends along (1) N. Gessner Rd. from IH-10 to Long Point Rd., and (2) Witte Rd. from IH-10 to Long Point Rd. in Houston, Harris County, Texas. The project length is approximately 1.3 miles.

The W 140 Briar Branch project is located north of IH-10, and extends along W 140 Briar Branch from N. Gessner Rd. to 500 feet to the east of Confederate Rd. (between Confederate Rd. and Oak Tree Dr.) in Houston, Harris County, Texas. The project length is approximately 1.1 miles

A. Location

The proposed work along N. Gessner Rd. and Witte Rd. include utility adjustments, water line replacement, full pavement replacement, provision of pedestrian amenities, traffic access management strategies, and additional box culvert from IH-10 to Westview Dr. Additionally N. Gessner Rd. includes an additional 48″ RCP waterline from Westview Dr. to Long Point Rd.

The proposed work along W 140 Briar Branch include cross sectional improvements and a new depth of approximately 13 feet.

The project location map is included in Appendix 1.

B. Current Land Use

Land use in the subject alignment is predominantly commercial. Various retail businesses and restaurants surround the area. The area also includes some residential properties around Westview Dr., and to the north of W 140 Briar Branch.

C. Site and Vicinity General Characteristics

1. Geology and Soils

The subject alignment is located in Harris County, which lies in the Quaternary Gulf Coastal Plain of Texas. According to Soil Survey of Harris County, Texas the surface soil mapping units along the proposed project consists of Addicks-Urban land complex (**Ak**) and Gessner-Urban land complex (**Gu**).

The Addicks-Urban land complex (Ak) consists of deep, neutral, nearly level (slope from 0 to 1 percent), loamy soils on upland prairies. These soils are poorly drained, and therefore runoff and internal drainage are slow. Permeability is moderate, and the available water capacity is high. The depth to the water table is about 12 to 21 inches. This land has been significantly impacted by urban development over the last century and is currently used residential and commercial purposes.

The Addicks soil has a surface layer of friable, neutral, black loam about 11 inches thick. The layer below that is friable, neutral, dark gray loam about 12 inches thick. The next layer is about 26 inches thick and consists of friable, moderately alkaline, light gray loam that is about 20 percent, by volume, visible calcium carbonate. The layer at a depth of about 49 inches is firm, moderately alkaline, light gray loam that has distinct yellow and yellowish brown mottles and is about 5 percent visible calcium carbonate.

The Gessner-Urban land complex (Gu) consists of deep, nearly level (slope from 0 to 1 percent), loamy soils. These soils are poorly drained with an available water capacity of about 10 inches. The runoff surface is very slow and the soils are saturated with water during the winter and spring. This land has been significantly impacted by urban development over the last century and is currently used for residential and commercial purposes.

The Gessner soil layers consists of, 0 to 7 inches of dark grayish brown loam, and light brownish gray dry. The layer bellow consists of 9 inches and it is grayish brown loam, and light brownish gray dry. The following layer consists of 18 inches and it is dark gray loam, and gray dry. It is followed by a 19 inches layer light brownish gray loam, and light gray dry.

In general, both mapping units also contain Urban Land soil mapping unit. Urban land consists of soils that have been altered or covered by buildings and other urban structures, making classification impractical. Typical structures are single-unit and multiple-unit dwellings, streets, schools, churches, parking lots, office buildings, shopping centers that are less than 40 acres in size, and few industrial sites. The soils in this unit have been altered by cutting, filling, and grading in urban development. Also included are remnants of undisturbed soil and areas where the natural soil is covered by fill material.

The soil survey maps can be found in Appendix 1.

2. Topography and Surface Water Drainage

The Hedwig Village, Texas, United States Geological Survey (USGS) topographical quadrangle map, dated 1995, identifies the slope of the natural ground surface of the subject alignment. Based on the available information, it can be reasonably assumed that surface water flows in a south-southeast, towards W 140 Briar Branch and Buffalo Bayou. The typical elevation of the subject alignment ranges between 82 and 91 feet above sea level.

3. Hydrogeology

The key water bearing aquifers located underneath the subject alignment are the Chicot Aquifer and the Evangeline Aquifer. Both the Chicot and Evangeline aquifers are composed of lenticular deposits of sand compressible clay but bear different hydraulic conductivities. The general direction of groundwater flow is assumed to be in the same direction as the slope of the natural historic ground elevation.

The subject alignment area's Hydrologic Group is classified as Class B/D. The area includes soils having very slow infiltration rates with a seasonal high water table but can be drained.

4. Floodplain Data

Floodplain characteristics for the subject alignment were found in the Flood Insurance Rate Map (FIRM) Number 48201C0645L revised on June 18, 2007. The FIRMs are maintained and published by the Federal Emergency Management Agency (FEMA). The subject alignment lies within the Unshaded Zone X, which means the subject alignment has been determined to be inside the 100-year flood plain. The Flood Insurance Rate Map is included in Appendix 1.

5. Wetlands

The map provided by the Environmental Data Resources (EDR) Data Map-Corridor Study on August 20, 2012 shows no wetlands listed in the National Wetlands Inventory within the vicinity of the subject alignment. The EDR Data Map-Corridor Study can be found in Appendix 5.

IV. HISTORICAL RECORDS REVIEW

A. Aerial Photographs

Historic and recent aerial photographs were provided by EDR to identify changes in land uses on and around the subject alignment over time and to determine potential environmental concerns.

Aerial photographs were obtained for review from the Agricultural Stabilization and Conservation Service (ASCS) (1944, 1953), the United States Geological Survey (USGS) (1968), Texas Department of Transportation (TxDOT) (1979, 1989), the

Environmental Data Resources (EDR) (1995), United States Department of Agriculture (USDA) (2004), and the Environmental Data Resources (EDR) (2005). Best available copies for each decade have been provided. Apparent conditions for each aerial photograph are summarized below, and reproductions of the aerial photographs are included in Appendix 2.

- The 1944 ASCS aerial shows that the subject alignment is undeveloped. Early stages of IH-10, Witte Rd., and W 140 Briar Branch appear.
- The 1953 ASCS aerial shows that the subject alignment remains mostly undeveloped. New early development along Gessner Rd. and Long Point Rd. is observed. W 140 Briar Branch extends west of Witte Rd.
- The 1968 USGS aerial photograph shows significant residential and commercial development. N. Gessner Rd. extends further south connecting with IH-10. Long Point Rd. extends further west connecting Witte Rd. and N. Gessner Road. Westview Rd. extends further west from Witte Rd. to N. Gessner Rd.
- The 1979 TxDOT aerial photograph shows commercial and residential development around the subject alignment. Commercial growth is specially seen around IH-10. Residential growth is observed north of W 140 Briar Branch. IH-10 is further developed to a major highway. Long Point Rd. is extended and further developed.
- The 1989 TxDOT aerial photograph shows no significant change along the subject alignment compared to the 1979 TxDOT aerial photograph.
- The 1995 EDR aerial photograph shows commercial development adjacent to the east of Witte Rd. along IH-10.
- The 2004 USDA-CIR aerial photograph shows no significant change in the subject alignment. Further commercial development is observed in the commercial buildings adjacent to the east of Witte Rd. IH-10 expansion construction is also shown.
- The 2005 EDR aerial photograph shows no significant change along the subject alignment compared to the 2004 USDA-CIR aerial photograph.

B. USGS Topographic Maps

Historic and recent USGS topographic maps were included in the EDR-Corridor Study report to identify changes in surface topography on and around the subject area over time. The USGS Topographic Maps are used to visually identify historic and current conditions on or near the subject alignment. Apparent conditions for each topographic map are summarized below, and reproductions of the maps are included in Appendix 3.

- Year: 1918. Quad: Hillendahl, TX. Series: 7.5. Few roads exist, including Long Point Rd., Katy Rd., Jeannetta Rd. There is also minor residential presence surrounding the subject alignment. Spring Branch creek and Rummel Creek are shown draining into Buffalo Bayou. The elevation along subject alignment is approximately 80 to 90 feet above sea level.

- Year: 1919. Quad: Addicks, TX. Series: 15. The topography of the subject alignment has not changed compared to 1918. Project area is still undeveloped.
- Year: 1955. Quad: Addicks, TX. Series: 15. Significant development appears in the vicinity of the project, including the villages of Bunker Hill, Piney Point, Hunters Creek, Spring Valley, and Hedwig Village. N. Gessner Rd., Witte Rd., and Long Point Rd. are further developed and are shown on the map. Drainage improvements have been made in the vicinity that includes W 140 Briar Branch.
- Year: 1970. Quad: Hedwig Village, TX. Series: 7.5. Residential development continues to grow in the area. Memorial City Shopping Center, a golf course, and some other commercial development appear along IH-10. IH-10 is expanded into a 6-lane freeway. Buildings appear in surrounding areas of the project.
- Year: 1982. Quad: Hedwig Village, TX. Series: 7.5. The subject alignment remains mostly unchanged, with the exception of new buildings along the IH-10 corridor, and further residential development to the west of N. Gessner Rd. Memorial City Shopping Center growth continuous.
- Year: 1995. Quad: Hedwig Village, TX. Series: 7.5. The subject alignment remains mostly unchanged. The golf course is replaced with a building. Further commercial development is observed along IH-10.

C. City Directories

Morrison & Fourmy's City Directory, Polk's City Directory, Southwestern Bell Yellow Pages, and Cole's Criss Cross Directory for the City of Houston were reviewed in the EDR-Corridor Study Report. Business directories including city, cross reference and telephone directories were reviewed, when available, at approximately 5 year intervals for the years spanning 1962 to 2004. Data obtained indicates when particular addresses came into existence, whether or not the property was (or is) vacant, and the names of occupying facilities. A review of the city directories, using select addresses along the subject alignment, did not reveal any significant information regarding past or present use. The EDR-City Directory search results are included in Appendix 4.

D. Sanborn Maps

The Sanborn Company began preparing maps of central business districts in the late nineteenth century for use by fire insurance companies. The Sanborn maps were updated periodically and expanded geographically through the twentieth century. These maps often indicate construction materials of specific building structures and the location of gasoline storage tanks. Based upon review of the statewide Sanborn

Map index, no Sanborn Maps were found for the subject alignment. The EDR's Sanborn map report can be found in Appendix 4.

V. REGULATORY AGENCY RECORDS REVIEW

EDR was contracted to conduct a corridor study review for the subject alignment. The database report, prepared by EDR and dated August 20, 2012, includes information on:

- Federal National Priority List (NPL) sites within 1.0 mile:
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) sites within 500 feet;
- CERCLIS sites designated No Further Remedial Action Planned (NFRAP) on or adjoining the subject alignment;
- Resource Conservation and Recovery Act (RCRA) Corrective Action Activity (CORRACTS) within 500 feet;
- Federal RCRA Treatment, Storage, and Disposal Facilities (TSDF) within 1.0 mile;
- RCRA generators on or adjoining the subject alignment;
- Emergency Response Notification System (ERNS) listings on the subject alignment;
- Texas Hazardous Waste Sites including state NPL, CERCLIS and Texas Voluntary Cleanup (VCP) sites within 0.5 mile;
- Leaking Petroleum Storage Tanks (LPSTs) within 500 feet; and
- Registered Underground Storage Tanks (USTs) on or adjoining the subject alignment.

The executive summary of the EDR's corridor study search is in Appendix 5. The report in its entirety totals 250 pages. Reports on each of the RECs have been extracted from the full body of the EDR corridor study and follow the executive summaries. Some of the facilities have more than one report because the title or address was recorded slightly differently.

A. National Priority List (NPL)

The database research performed by EDR revealed no NPL sites within the 1-mile search radius.

B. Comprehensive Environmental Response and Compensation Liabilities Information System (CERCLIS)

The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) contains data on potentially hazardous waste sites, which are either proposed to or on the National Priorities List (NPL), and sites that are in the screening and assessment phase for inclusion on the NPL. The database research performed by EDR identified no CERCLIS sites within 500 feet of the subject alignment.

C. No Further Remedial Action Planned (NFRAP)

NFRAP sites are those where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund Action or NPL consideration. No NFRAP sites were located within 500 feet of the subject alignment.

D. Corrective Action Activity (CORRACTS)

CORRACTS is a list of handlers with RCRA Corrective Action Activity and shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity. No CORRACTS sites are within 500 feet of the subject alignment.

E. Federal Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal Facilities (TSDF)

The Resource Conservation and Recovery Act (RCRA) oversee sites that generate, store, treat, or dispose of hazardous waste. Activities at these Treatment, Storage, and Disposal Facilities (TSDF) are tracked. No sites exist within 1.0 mile of the subject alignment.

F. RCRA Generators

The Resource Conservation and Recovery Act (RCRA) oversees sites that generate, store, treat, or dispose of hazardous waste. Generators are categorized by the amount of waste they generate: conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg. of acutely hazardous waste per month; small quantity generators (SQGs) generate between 100 kg. and 1,000 kg. of hazardous waste per month; and large quantity generators generate (LQG) over 1,000 kg. of hazardous waste or over 1 kg. of acutely hazardous waste per month. The database research performed by EDR identified one (1) RCRA-CESQG generator located on or adjoining the subject alignment. The site is described below.

- Target No. 1435. 984 Gessner Rd. RCRA-CESQG. Waste Codes: D001, D002, and D011. Reported date 6/29/2005. No violations found.

G. Leaking Underground Storage Tanks (LTANKS)

The Leaking Underground Storage Tank incident reports contain an inventory of reported leaking underground storage tank incidents from the Texas Commission on Environmental Quality database. The database search performed by EDR revealed thirteen (13) LTANKS sites, which include:

- Spring Branch Memorial Rentals. 10102 Long Point Dr. Status code: Final concurrence pending documentation of well plugging. Groundwater is affected no apparent threats or impact to receptors.
- EZ Food Store. 9941 Long Point Rd. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors.
- EZ Stop N Shop. 1311 Gessner Rd. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors.
- Fire Station 49. 1212 Gessner Rd. Status code: Final concurrence issued, case closed. Ground water is affected and a public or domestic water supply well is located between 0.25 and 0.5 miles from the UST/AST system or source area.
- Spring Branch ISD. 1066 Gessner Bldg. B. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors.
- Mister car Wash 2. 1038 Gessner Rd. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors.
- Enterprise Rent-A-Car. 10104 Old Katy Rd. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors.
- Exxon Mobil 63740/Citgo I-10 and Gessner. 1002 Gessner Rd. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors.
- Union Pacific Railroad. 10050 Katy Fwy. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors.
- Business Park. 10001 Old Katy Rd. Status code: Final concurrence issued, case closed. Soil contamination only, requires full site assessment & RAP.
- Shell. 10097 Katy Fwy. Status code: Final concurrence pending documentation of well plugging. Groundwater is affected, no apparent threats or impact to receptors.
- Motivated Enterprises LLC. 999 Gessner Rd. Status code: Final concurrence pending documentation of well plugging. Groundwater is affected, no apparent threats or impacts to receptors.
- Former Gas Station. 10135 Katy Fwy. Status code: Monitoring**.** Groundwater is affected and a public or domestic water supply well is located between 0.25 and 0.5 miles from the UST/AST system or source.

H. Underground Storage Tanks (UST)

The Underground Storage Tank (UST) Database contains registered USTs, which are regulated under Subtitle I of RCRA. The data comes from the Texas Commission on Environmental Quality database. The database search performed by EDR revealed 19 sites, which include:

- Smile Mart, currently a Chevron Gasoline Station. 10101 Long Point Rd. Three (3) 8,000 to 10,000-gal composite tanks installed in 1989. Status: In use. One (1) 550-gal FRP (Fiberglass-Reinforced Plastic) tank installed in 1989. Status: Permanently filled in place. Five (5) 550 to 5,000-gal steel tanks installed on 1958. Status: Removed from ground.
- Auto Brokers. 10090 Long Point Rd. Four (4) 6,000-gal steel tanks installed in 1970. Status: Removed from the ground.
- Spring Branch Memorial Rentals. 10102 Long Point Dr. Three (3) 500 to 6,000-gal steel tanks with installation date unknown. Status date: 1988. Status: Removed from the ground.
- EZ Food Store. 9941 Long Point Rd. One (1) 20,000-gal steel tank installed in 1979. Status: In use.
- National Floral Services. 1340 Gessner Rd. Four (4) steel tanks with unknown capacity and installation date. Tank registration date in 1989. Status: Permanently filled in place.
- EZ Stop N Shop. 1311 Gessner Rd. Two (2) 10,000-gal steel tanks installed in 1973. Status: Removed from the ground.
- Fire Station 49. 1212 Gessner Rd. Two (2) 1,000-gal FRP tanks installed in 1977. Status: Removed from the ground.
- Check Cashing. 1223 Witte Rd. One (1) 5,000-gal steel tank with unknown installation date. Registration date: 1991. Status: In use. Four (4) 5,000-gal steel tanks with unknown installation date. Registration date: 1991. Status: Removed from the ground.
- Old Amoco Station. 1102 Witte Rd. Three (3) 4,000-gal steel tanks with unknown installation date. Registration date: 1990. Status: Removed from the ground.
- Spring Branch ISD. 1066 Gessner Rd. Four (4) 10,000-gal steel tanks installed from 1978 to 1990. Status: In use. Four (4) 500 to 10,000-gal steel tanks installed from 1967 to 1974. Status: Removed from the ground.
- The Riley Corporation. 1060 Witte Rd. One (1) 8,000-gal steel tank installed in 1980. Status: Removed from the ground.
- Mister Car Wash 2. 1038 Gessner Rd. Three (3) 8,000 to 10,000-gal FRP tanks installed in 1979. Status: In use. Three (3) 3,000-gal FRP tanks installed in 1997. Status: In use.
- Enterprise Rent-A-Car. 10104 Old katy Rd. One (1) 10,000-gal steel tank installed in 1981. Status: Removed from the ground.
- Citgo I-10/Exxon Mobile 63740 and Gessner. 1002 Gessner Rd. Four (4) 1,000 to 12,000-gal FRP tanks installed in 1983. Status: Removed.
- Union Pacific Railroad. 10050 Katy Fwy. One (1) 550-gal steel tank installed in 1987. Status: Removed from the ground. Three (3) 6,000 to 8,000-gal steel tanks with unknown installation date. Registration date: 1991. Status: removed from the ground.
- Business Park. 10001 Old Katy Rd. Five (5) 1,000 to 2,000 gal Steel tanks were installed in 1979. Status: Removed from the ground.
- Daniel Industries. 9720 Old Katy Rd. One (1) 12,000-gal steel tank installed in 1980. Status: Removed from the ground. One (1) 5,000-gal steel tank installed in 1974. Status: Removed from the ground.

- Shell. 10097 Katy Fwy. Four (4) 10,000-gal FRP tanks installed in 1982. Status: Removed from the ground.
- Shell. 999 Gesnner Rd. Three (3) 10,000-gal FRP tanks installed from 1977 to 1981. Status: Removed from the ground.

I. Emergency Response Notification System (ERNS)

The Emergency Response Notification System is a national computer database system that is used to store information reported releases of oil and hazardous substances into the environment. The database research performed by EDR did not find any ERNS sites listed on the subject alignment.

J. Texas Voluntary Cleanup Program Sites (TX VCP)

In 1995, the Texas legislature amended the Texas Solid Waste Disposal Act and created the Voluntary Cleanup Program. The voluntary cleanup program has focused on "brownfields," abandoned industrial or commercial sites in urban areas that have remained undeveloped because of contamination and fear of liability. The Texas Voluntary Cleanup Program operates in partnership with the EPA's Brownfields Initiative. EDR performed a search for TX VCP sites near the subject alignment in which one (1) was found.

- Daniel Industries. 9720 Old Katy Rd. Fabrication/Machine Shop. Phase: Conditional. Contaminant categories: VOCs (Volatile Organic Compound), SVOCs (Semi-Volatile Organic Compound), metals, chlorinated solvents, and TP. Media affected: Soils/Groundwater. Institutional Controls: nonresidential, pump and treat, no groundwater use. Certificate of Completion issued on 05/18/2005.

K. Solid Waste Municipal Landfill

The database research performed by EDR revealed no Solid Waste Municipal Landfill sites with 500 feet of the subject alignment.

L. Aboveground Storage Tanks (AST)

The database research performed by EDR found no aboveground storage tank sites within the search radius.

VI. SITE RECONNAISSANCE

A drive-by and partial walk-through site reconnaissance was completed on August 28, 2012. The weather was hot and humid. A photographic overview can be found in Appendix 6.

A. Methodology and Limiting Conditions

Site reconnaissance was completed in the form of a drive-by and walk-through survey. One limiting condition included accessing W 140 Briar Branch as it was either fenced or blocked by buildings.

B. Observations Made During Site Reconnaissance

All sites listed with potential concern in the regulatory agency review were verified. Visual inspection of the sites to identify any past activities or new development that may pose an environmental threat to the subject alignment was limited due to restricted areas.

The following table provides a summary of the items observed during the Site Reconnaissance. No problematic evidence was noted.

Category	Item or Feature	Item or Feature Observed
Aboveground Chemical or Waste Storage	Evidence of aboveground storage tanks	
	Drums, barrels and containers greater than 5 gallons	X
Underground Chemical or Waste Storage, Drainage or Collection Systems	Evidence of underground storage tanks or ancillary UST equipment	
	Sumps, cisterns, catch basins and/or drywalls	
	Septic tanks and/or leach fields	
	Pipeline markers	
Electrical Transformers/PCB's	Pad or pole mounted transformers	X
Evidence of Releases or Potential Releases	Stressed vegetation	
	Stained soil	
	Stained pavement or similar service	X
	Trash, debris and/or other waste materials	X
	Dumping or disposal areas	X
	Construction/demolition debris and/or dumped fill dirt	
	Surface water discoloration, odor, sheen and/or floating free product	
	Strong, pungent or noxious odors	
Other Notable Site Features	Surface water bodies	
	Quarries or pits	
	Monitoring wells	X

During the site visit, a Chevron Gasoline Station was identified at 10101 Long Point Rd., formerly Smile Mart. Two monitoring wells were located close to the underground gasoline storage tank. TCEQ does not have registered leaking petroleum storage tanks at this location. Therefore no leaks have been reported from this property.

Businesses along N. Gessner Rd. and Witte Rd. include several automobile services shops such as auto parts retail stores, oil change, repairs, transmission services, and tire shops. A small amount of pavement stains were observed on these sites, and at 10101 Long Point Rd., Chevron Gasoline Station.

Approximately seven electrical transformers of moderate to old condition were observed Along N. Gessner Rd. and Witte Rd. No evidence of stressed vegetation was observed.

A metal recycler container of approximately 40 gal was observed adjacent to 10021 Long Point Rd., currently a Goodyear tire shop followed by a transmission service repair center. The recycler container belongs to the recycling company, Palos. A representative from Palos Company was contacted via telephone, the conversation can be found in appendix 7.

Trash and debris were observed mainly on W140 Briar Branch and Gessner Rd., along Witte Rd., and along Long Point Rd. A Disposal area was located at 1219 Witte Rd. in front of a possibly abandoned building. Residual paint and other containers were also observed adjacent to a Korean BBQ Restaurant located at 10017 Long Point Rd. The containers are starting to rust.

A total of four monitoring wells were observed, two of them on Mister Car Wash 2 at 1038 Gessner Rd., and two at a Chevron Gasoline Station at 10101 Long Point Rd., formerly Smile Mart. Additionally a sample well was located on Enterprise Rent-A-Car at 10104 IH-10.

A photographic overview of the site reconnaissance is included in Appendix 6.

VIII. INTERVIEWS

A. Interviews with Government Officials

- A written inquiry was made to Nekiea (Nikki) Corpening of the City of Houston Fire Department regarding documented hazardous material incidents on or adjacent to the subject alignment. The Hazmat Chemical Release database list provided showed 45 possible sites with hazardous material incidents since August 2002. The most notorious hazardous incidents are listed in the following table.

Date	Address	Mapkey	Chemical Released	Amount Released
8/30/2002	820 Gessner Rd.	490A	Diesel	10 gal
10/2/2002	9900 Old Katy Rd.	490A	Suspicious Substance	Undetermined Amount
6/30/2003	820 Gessner Rd.	490A	Diesel	1200 gal
2/3/2006	920 Frostwood	490A	Mineral Oil	30 gal
2/14/2006	1002 Gessner Rd.	490A	Unknown	Undetermined Amount
2/16/2006	902 Frostwood	490A	Unknown	Undetermined Amount
10/22/2006	921 Gessner Rd.	490A	Unknown	Undetermined Amount
12/21/2006	900 Gessner Rd.	490A	Ammonia anhydrous	Undetermined Amount
5/18/2007	10070 W. IH 10	490A	Diesel	20 gal

8/12/2009	920 Frostwood	490A	Unknown	Undetermined Amount

The complete Hazmat Chemical Release database can be found in Appendix 7. The most significant incident occurred on June 2003, at 820 Gessner Rd. where 1200 gallons of Diesel were released. This site is located outside a radius of 0.5 miles from the subject alignment. No impact is anticipated from these sites.

- Ms. Phillips of the City of Houston Department of Health and Human Services was also contacted. Written correspondence via fax returned no incidents found.

Correspondence with these government officials can be found in Appendix 7

B. Interviews with Owners/Operators

- Ms. Tammie Porch with Texas Commission on Environmental Quality (TCEQ) was contacted to request records information on the following sites:

  - Daniel Measurement and Control. 9720 Old Katy Rd. TXVCP
  - Spring Branch Memorial Rentals. 10102 Long Point Dr. LPST
  - EZ Food Store. 9941 Long Point Rd. LPST
  - EZ Stop N Shop. 1311 Gessner Rd. LPST
  - Fire Station 49. 1212 Gessner Rd. LPST
  - Spring Branch ISD. 1066 Gessner Bldg. B. LPST
  - Mister car Wash 2. 1038 Gessner Rd. LPST
  - Enterprise Rent-A-Car. 10104 Old Katy Rd. LPST
  - Exxon Mobil 63740. 1002 Gessner Rd. LPST
  - Union Pacific Railroad. 10050 Katy Fwy. LPST
  - Business Park. 10001 Old Katy Rd. LPST
  - Shell. 10097 Katy Fwy. LPST
  - Motivated Enterprises LLC. 999 Gessner Rd. LPST
  - Former Gas Station. 10135 Katy Fwy. LPST

  TCEQ records revealed an incomplete Release Determination Report (RDR) for Shell at 10097 Katy Fwy., received on May 05, 2009. The RDR indicates that a 500 gallon, used oil underground storage tank was discovered during excavation for storm sewer pipe installation, and it was removed on December 15, 2008. **Further investigation is recommended.** Notes and relevant documentation are included in Appendix 7.

- Mr. Lorenzo with Palos Recycler Company was contacted via phone on August 28, 2012 to request more information about the recycler container located adjacent to 10021 Long Point Rd. He confirmed that recycling is done in a normal basis. The conversation telephone log can be found in Appendix 7.

- Ms. Carrolyn Hay is the primary TCEQ Coordinator for the former Exxon Mobil 63740 at 1002 Gessner Rd, currently a CVS Pharmacy. Ms. Carrolyn was contacted via e-mail on September 17, 2012 to request more information regarding this site. A response was received on September 18, 2012 indicating that there is no other information for this site after the RDR of 2005 which is located in Appendix 7. The email conversation can also be found in Appendix 7

X. FINDINGS AND CONCLUSIONS

LAN has performed a Phase I ESA of the subject alignment in conformance with the scope and limitations of ASTM Practice E 1527-05 and the City of Houston Department of Public Works and Engineering ECRE Standard Practices for ESAs. Any exceptions to or deletions from this practice are described in Section II C of this report. This assessment revealed eight (8) RECs in connection with the subject project.

A summary below provides recommendations regarding further investigations of the findings/potential RECs:

- Daniel Industries. 9720 Old Katy Rd. **TXVCP** Fabrication/Machine Shop. Phase: Conditional. Contaminant categories: VOCs, SVOCs, metals, chlorinated solvents, and TP. Media affected: Soils/Groundwater. Currently, there is a pump and treat system to assist with on-site remediation. Certificate of Completion issued on 05/18/2005. **Further investigation is recommended.**

- Exxon Mobil 63740. 1002 Gessner Rd. **LPST** Exxon Gas Station no longer exists; CVS pharmacy currently resides on this property. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. According to TCEQ records, three monitoring wells were sampled in May 2005, all levels were below action limits. Therefore **no further investigation is recommended**.

- Mister car Wash 2. 1038 Gessner Rd. **LPST** Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. There are two monitoring wells located near the western side of the property. According to TCEQ records from March 9, 2006 soil contaminant concentrations exceed residential and commercial health-based concentrations. There is an impervious cover in the area limiting the potential exposure of these contaminants in the subsurface. TCEQ notes that any remaining contaminant levels and potential exposure pathways should be evaluated when conducting any future soil excavation or construction activities at this site. Therefore **further investigation is recommended.**

- Fire Station 49. 1212 Gessner Rd. **LPST** Status code: Final concurrence issued, case closed. Ground water is affected and a public or domestic water supply well is located between 0.25 and 0.5 miles from the UST/AST system or source area. According to TCEQ records from June 16, 2010 soil contaminant concentrations were below health-based target levels and construction worker exposure target levels. Therefore **no further investigation is recomemded.**

- EZ Food Store. 9941 Long Point Rd. **LPST** Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. TCEQ records do not provide enough information regarding the extent of contamination. Therefore **further investigation is recommended.**

- Spring Branch Memorial Rentals. 10102 Long Point Dr. **LPST** Spring Branch Memorial Rentals no longer exists; First National Bank currently resides on this property. Status code: Final concurrence pending documentation of well plugging. Groundwater is affected no apparent threats or impact to receptors. TCEQ did not contain any records regarding this property. Therefore **further investigation is recommended.**

- EZ Stop N Shop. 1311 Gessner Rd. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. TCEQ did not contain any records regarding this property. Therefore **further investigation is recommended.**

- Spring Branch ISD. 1066 Gessner Bldg. B. Status code: Final concurrence issued, case closed. Groundwater is affected, no apparent threats or impact to receptors. TCEQ did not contain any records regarding this property. Therefore **further investigation is recommended.**

Based on ASTM E 1527-05 criteria, LAN recommends Phase II sampling on the following six areas to quantify possible contamination from eight RECs in the vicinity of the subject alignment: Daniel Industries (9720 Old Katy Rd.), Mister Car Wash 2 (1038 Gessner Rd.), EZ Food Store (9941 Long Point Rd.), Spring Branch Memorial Rentals (10102 Long Point Rd.), EZ Stop N Shop (1311 Gessner Rd.), and Spring Branch ISD (1066 Gessner Rd).

IX. REFERENCES

Aerial Photograph, ASCS 1944.

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Federal Emergency Management Agency (FEMA), June 18, 2007. Flood Insurance Rate Map Number 48201C0645L, Harris County, Texas and Incorporated Areas.

U.S. Department of the Interior, Geological Survey. USGS, Denver CO.

- Year: 1918. Quad: Hillendahl, TX. Series: 7.5.
- Year: 1919. Quad: Addicks, TX. Series: 15.
- Year: 1955. Quad: Addicks, TX. Series 15.
- Year: 1970. Quad: Hedwig Village, TX Series: 7.5.
- Year: 1982. Quad: Hedwig Village, TX. Series: 7.5.
- Year: 1995. Quad: Hedwig Village, TX. Series: 7.5.

National Resources Conservation Service, United States Department of Agriculture, August 22, 2012. Custom Soil Resource Report for Harris County, Texas.

X. LIST OF PREPARERS

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Engineer I

Appendix H: Request for Variance from Harris County Flood Control District

REQUEST FOR VARIANCE
FROM HARRIS COUNTY FLOOD CONTROL DISTRICT

Submitted By: Derek St. John Phone: 713-821-0380 Email: dstjohn@lan-inc.com

Company: Lockwood, Andrews & Newnam, Inc. Date: 12/23/2013

Proposed Project Description

Name: Briar Branch Regional Drainage Improvements Request # 1 of 4

Type: Regional Flood Damage Reduction for W140-01-00 Watershed

Location: North of I-10, West of Blalock Rd, East of Gessner Rd. See Exhibit 1. (include map)

Existing Condition (show information on map or drawing)

HCFCD Maintained Facilities: W140-01-00 (Briar Branch) is an HCFCD maintained ditch

Existing Right-of-Way for HCFCD facility: ROW width is 60' downstream of Bunker Hill

Topography: W140-01-00 is a perched channel, with significant structural flooding north of the channel.

Other Pertinent Data Related to Variance Request:
HCFCD maintenance department & Urban Channel Design Guidelines committee were consulted to select the design which meets all HCFCD maintenance needs while maximizing the flood damage reduction benefits

Variance Request

Specific criteria you want to vary: HCFCD PCPM Criteria 5.4.2 specifies 2:1 side slopes for concrete-lined channels. Request is to use vertical retaining walls downstream of Bunker Hill Rd instead of concrete-lined slopes.

Explain why the criteria needs to be varied or is not applicable: HCFCD Standard channel section does not provide adequate conveyance for regional flood damage reduction. Request achieves large conveyance area increase.

Explain how the basis for the criteria will be satisfied: Purpose of criteria is to allow maintenance of channel bottom and stability of slopes. Access to channel bottom will be provided and wall design will ensure stability of slopes.

List attachments supporting variance request (preliminary design report excerpt, construction drawings, calculations, photographs, maps, etc.):

HCFCD to fill in this area *DEV ID #* ______________

Dept./Section	Reviewer	Date	Comments/Recommendation
☐ Project Review ☐ Property Mgnt ☐ Planning ☐ Environmental ☐ Other			

Justification of Decision: ______________________________

Approval of Final Decision: ______________________ ______________________
(Signature) (Date)

REQUEST FOR VARIANCE
FROM HARRIS COUNTY FLOOD CONTROL DISTRICT

Harris County Flood Control District

Submitted By: Derek St. John Phone: 713-821-0380 Email: dstjohn@lan-inc.com

Company: Lockwood, Andrews & Newnam, Inc. Date: 12/23/2013

Proposed Project Description

Name: Briar Branch Regional Drainage Improvements Request # 2 of 4

Type: Regional Flood Damage Reduction for W140-01-00 Watershed

Location: North of I-10, West of Blalock Rd, East of Gessner Rd. See Exhibit 1. (include map)

Existing Condition (show information on map or drawing)

HCFCD Maintained Facilities: W140-01-00 (Briar Branch) is an HCFCD maintained ditch

Existing Right-of-Way for HCFCD facility: ROW width is 60' downstream of Bunker Hill

Topography: W140-01-00 is a perched channel, with significant structural flooding north of the channel.

Other Pertinent Data Related to Variance Request:
HCFCD maintenance department & Urban Channel Design Guidelines committee were consulted to select the design which meets all HCFCD maintenance needs while maximizing the flood damage reduction benefits

Variance Request

Specific criteria you want to vary: HCFCD PCPM Criteria 5.5.3 specifies maintenance berm widths of 20' one side and 10' other side for concrete lined channels. Request is for berm widths of 15' on the north side and 10' on the south side.

Explain why the criteria needs to be varied or is not applicable: HCFCD Standard berm widths do not provide adequate conveyance for regional flood damage reduction. Request achieves large conveyance area increase.

Explain how the basis for the criteria will be satisfied: Purpose of criteria is to allow maintenance of channel slopes. Per request 1 of 4, slopes will be replaced with vertical walls. Maintenance of walls will be from channel bottom.

List attachments supporting variance request (preliminary design report excerpt, construction drawings, calculations, photographs, maps, etc.):

HCFCD to fill in this area *DEV ID #* ______________

Dept./Section	Reviewer	Date	Comments/Recommendation
☐ Project Review ☐ Property Mgnt ☐ Planning ☐ Environmental ☐ Other			

Justification of Decision: ______________________________

Approval of Final Decision: ______________________ ______________________
(Signature) (Date)

REQUEST FOR VARIANCE
FROM HARRIS COUNTY FLOOD CONTROL DISTRICT

Submitted By: Derek St. John Phone: 713-821-0380 Email: dstjohn@lan-inc.com
Company: Lockwood, Andrews & Newnam, Inc. Date: 12/23/2013

Proposed Project Description

Name: Briar Branch Regional Drainage Improvements Request # 3 of 4
Type: Regional Flood Damage Reduction for W140-01-00 Watershed
Location: North of I-10, West of Blalock Rd, East of Gessner Rd. See Exhibit 1. (include map)

Existing Condition (show information on map or drawing)

HCFCD Maintained Facilities: W140-01-00 (Briar Branch) is an HCFCD maintained ditch
Existing Right-of-Way for HCFCD facility: ROW is 50' upstream of Bunker Hill Rd
Topography: W140-01-00 is a perched channel, with significant structural flooding north of the channel.
Other Pertinent Data Related to Variance Request:
HCFCD maintenance department & Urban Channel Design Guidelines committee were consulted to select the design which meets all HCFCD maintenance needs while maximizing the flood damage reduction benefits

Variance Request

Specific criteria you want to vary: HCFCD PCPM Criteria 12.2.5 specification for ROW width for an enclosed channel will only allow 2-6'x6' RCBs within the existing 50' ROW. Request is to use 2-10'x7' RCBs upstream of Bunker Hill Rd.

Explain why the criteria needs to be varied or is not applicable: HCFCD Standard conduit size does not provide adequate conveyance for regional flood damage reduction. Request achieves large conveyance area increase.

Explain how the basis for the criteria will be satisfied: Purpose of criteria is to ensure conduits are constructible. Proposed project will be constructed with temporary shoring, with the added expense born by TIRZ 17 not HCFCD.

List attachments supporting variance request (preliminary design report excerpt, construction drawings, calculations, photographs, maps, etc.):

HCFCD to fill in this area *DEV ID #* ______________

Dept./Section	Reviewer	Date	Comments/Recommendation
☐ Project Review ☐ Property Mgnt ☐ Planning ☐ Environmental ☐ Other			

Justification of Decision: ____

Approval of Final Decision: ______________________ ______________________
(Signature) (Date)

REQUEST FOR VARIANCE
FROM HARRIS COUNTY FLOOD CONTROL DISTRICT

Submitted By: Derek St. John Phone: 713-821-0380 Email: dstjohn@lan-inc.com
Company: Lockwood, Andrews & Newnam, Inc. Date: 12/23/2013

Proposed Project Description

Name: Briar Branch Regional Drainage Improvements Request # 4 of 4

Type: Regional Flood Damage Reduction for W140-01-00 Watershed

Location: North of I-10, West of Blalock Rd, East of Gessner Rd. See Exhibit 1. (include map)

Existing Condition (show information on map or drawing)

HCFCD Maintained Facilities: W140-01-00 (Briar Branch) is an HCFCD maintained ditch

Existing Right-of-Way for HCFCD facility: ROW is 50' upstream of Bunker Hill Rd

Topography: W140-01-00 is a perched channel, with significant structural flooding north of the channel.

Other Pertinent Data Related to Variance Request:
HCFCD maintenance department & Urban Channel Design Guidelines committee were consulted to select the design which meets all HCFCD maintenance needs while maximizing the flood damage reduction benefits

Variance Request

Specific criteria you want to vary: HCFCD PCPM Criteria 5.5.3 specifies maintenance berm widths of 20' each side for grass-lined channels. Request is for berm widths of 15' on the north side and 10' on the south side.

Explain why the criteria needs to be varied or is not applicable: Coupled with HCFCD standard 4:1 side-slopes, Standard berm widths do not allow even 2 feet of depth in existing ROW. Request allows reasonable depth for swale.

Explain how the basis for the criteria will be satisfied: Purpose of criteria is to allow maintenance of channel slopes. Per request 3 of 4, channel will be enclosed with RCBs. Request is to allow a shallow swale over conduits.

List attachments supporting variance request (preliminary design report excerpt, construction drawings, calculations, photographs, maps, etc.):

HCFCD to fill in this area *DEV ID #* ______________

Dept./Section	Reviewer	Date	Comments/Recommendation
☐ Project Review ☐ Property Mgnt ☐ Planning ☐ Environmental ☐ Other			

Justification of Decision: ____________________

Approval of Final Decision: ____________________ ____________________
(Signature) (Date)

Appendix I: Coordination and Correspondence with HCFCD

Agenda

W140-01-00 (Briar Branch) Open Channel Improvements
October 18, 2013

1. Introductions
2. Project Background and Problem Statement (Presentation)
3. Planned Regional Improvement (Presentation)
4. Proposed Channel Improvements (Presentation)
5. Design and Maintenance Considerations (Presentation)
6. Questions and Discussion
7. Next Steps and Path Forward

Briar Branch Channel Improvements
(Units W140-01-00)

Channel Improvements Alternative Summary

Memorial City Redevelopment Authority

TIRZ 17 REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

October 3, 2013

PROPOSED CHANNEL IMPROVEMENTS TO BRIAR BRANCH (HCFCD UNIT #. W140-01-00)

Introduction: TIRZ 17 contracted with LAN to identify feasible channel Improvement alternatives for W140-01-00 that meet the flood damage reduction requirements of the region and can be reasonably constructed and maintained.

Project Justification:

- April 2009 event brought attention to the regional drainage issues in the upper W140-01-00 watershed.
- TIRZ 17 commissioned a study of the region that concluded the following:
    - 484 homes estimated as susceptible to flooding upstream of Blalock for the 100-yr event.
    - Flooding causes:
        - A depressed (lowered) area between the "Long Point" fault and the channel comprising of approximately 520 acres.
        - Perched channel scenario with large residential areas below channel top banks. Channel does not function at an acceptable service level for the contributing region.
        - Inadequate overland flow conveyance to the channel as a result of perched channel.
        - Inadequate storm sewer conveyance to the channel caused primarily by bank full channel conditions with lower depressed over bank areas drained by storm sewer.
    - Projects must be self-mitigating as no watershed wide improvement options are available and the project cannot increase WSEL downstream.

Regional Flood Damage Reduction Solution:

- Phase I: Regional Detention Mitigation: Mitigate the potential for downstream impacts with 47 acre-feet of regional detention located 1300 feet east of Bunker Hill Road. Currently under construction.
- Phase II: Channel Improvements to W140-01-00: Lower WSEL in channel to a level that will allow adequate system function. Improvement limits from Gessner to 1300 feet east of Bunker Hill Road.
- Phase III: Storm Sewer Conveyance Improvements: Maximize effectiveness of the improved channel condition with storm sewer conveyance improvements.

W140-01-00 Channel Characteristics:

- Limited ROW. Average 50' easement, maintained by HCFCD.
- Average channel depth varies from two (2) feet to ten (10) Feet.
- Channel determined non-jurisdictional waters of the US per USACE determination letter dated February 20, 2013 (File No. SWG-2012-00174).

Channel Improvement Alternatives: *Recommended

Alternative	Description	Notes
A	Rectangular Concrete Low	Extension of existing channel section from 1,300 feet east of Bunker Hill upstream to Gessner Road
B	Dry Bottom Storage Channel	Maximum cross-sectional area at minimum flow line slope. Near vertical wall configuration with all-weather surface maintenance berm in channel on bench.
C	Wet Bottom Storage Channel	Maximum cross-sectional area with flat flow line slope and habitat depth storage pools. Vertical wall configuration with maintenance berm in channel on bench.
D*	Hybrid Storage Channel	Alternative B with relaxed side slopes (less vertical), slightly less cross-sectional area, and a single high wall. All-weather surface maintenance berm in channel.
E	Storm Sewer Box Enclosure	Large box culvert with a shallow swale and inlet structures above the boxes to collect contributing runoff and to allow for equalizing storage.

Channel Improvement Alternative Recommendation: Alternative D is recommended as it provides the best blend of flood damage reduction benefits and maintenance considerations. Alternative D doubles the existing channel volume providing approximately 14 acre-feet of in-line channel storage and removes nearly 80 structures from flooding.

Channel Design Considerations:

Consideration	Recommended Alternative D
Maximize Channel Storage	Provides a compromise of channel storage and conveyance with 14 acre-feet of additional channel storage. This solution provides a reasonable balance between flood damage benefit (storage), maintenance, and construction cost.
Maintenance	
• Maintenance Access	Provides continues maintenance access with hardened surface. Proposed 15' Maintenance access berm to be located in the channel above a 1-inch 2-hour event, approximately at the midpoint in the channel vertically.
• Mowing Effort and Cost	Regular maintenance is designed to be limited to mowing 8' section between top bank and ROW. However, the ideal is to use low maintenance vegetation in these areas to limit mowing and minimize mowing.
• Desiltation Effort and Cost	Desiltation pools are planned at major storm sewer outfalls to minimize sediment transport and to provide easily accessible locations for channel maintenance.
• Hydrostatic Pressure/ Water Behind Wall	Minimal overland surface drainage due to perched channel nature, as majority of storm water originates from storm sewer. Benefit of modular concrete wall is that it allows water to drain through it, and filtered compacted granular material behind concrete wall. This minimizes hydrostatic loading of the wall. Small HDPE drains may be necessary in some locations to collect small ponding areas at the top of wall and drop it through the base of wall. Larger overflow areas will be collected in storm sewer systems.
• Long Term Structural Stability and Repair	All outfall pipes to channel proposed to be concrete. Wall foundation will be either compacted dense graded crushed stone, or lean concrete leveling pad. A 60-in deep (3,300-lb) block will be the base of the wall with 41-in deep blocks up to the top of wall. A 9-inch set-back is proposed to improve stability, and wall design will be engineered to exceed recommended factors of safety. The exposed wall toe will be protected with armored surface. Deconstruction and reconstruction of portions of wall for repairs can be handled without large equipment.
Constructability	
• Construction within ROW	Interlocking modular concrete blocks are recommended to minimize construction footprint and to maintain construction with the ROW. Temporary shoring is anticipated.
• Groundwater Control	Groundwater was determined to be an average of 12-14 feet deep. The proposed channel bottom is elevated above the measured groundwater elevation. Some groundwater control is anticipated for the foundation design.
• Safety	Guard rails are proposed at all roadway crossings. Safety handrails are proposed along the top of walls in excesses of 3 feet in height. No rails are proposed within channel. Perched channel and proposed water surface elevations minimize chance for hydraulic obstruction.

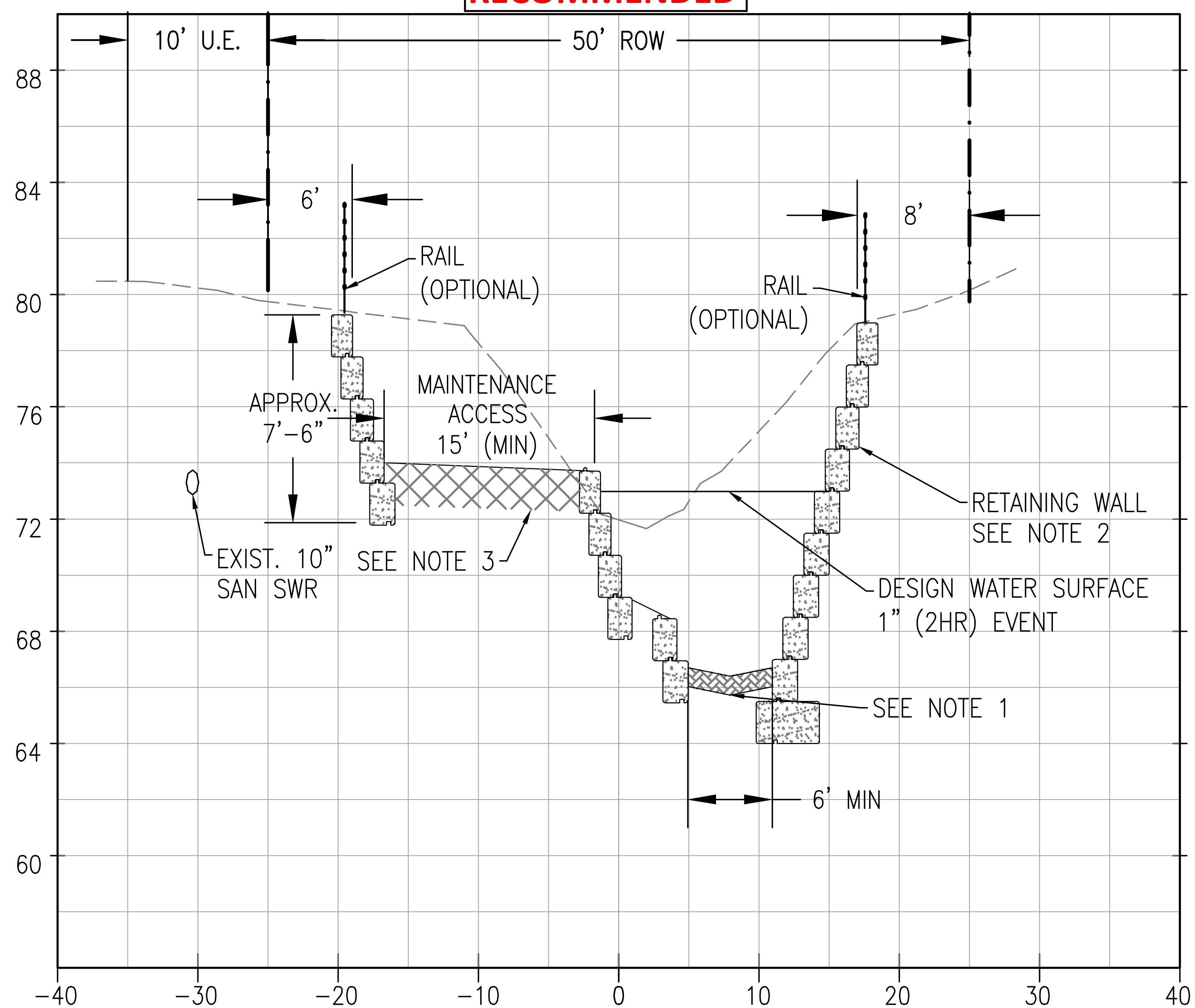
Attachments:

1. Proposed Alternative Typical Sections
2. Alternative Decision Matrix

SCALE: 1"=10' HORIZ
1"=5' VERT

ALT D: HYBRID STORAGE CHANNEL

RECOMMENDED



NOTES:

1. BOTTOM OF CHANNEL COULD BE A MIXTURE OF RIPRAP, GEOCELL WITH GRANULAR MATERIAL AND/OR OTHER MATERIALS TO PROVIDE EROSION PROTECTION, ALLOW FOR ESTABLISHMENT OF VEGETATION, AND TO DEFINE THE FLOWLINE OF THE CHANNEL FOR EASIER LONG-TERM MAINTENANCE. IF NECESSARY A HARDENED CONCRETE SURFACE CAN BE CONSIDERED.

2. MODULAR BLOCK GRAVITY WALLS ARE SHOWN, DIFFERENT RETAINING WALL OPTIONS ARE CONSIDERED IN THE REPORT.

3. MAINTENANCE ACCESS PATH TO BE AN APPROVED ALL WEATHER SURFACE AND ELEVATED ABOVE A DESIGN STORM EVENT. ELEVATION SHOWN IS AN APPROXIMATE 1" (2HR) EVENT.

INTERIM REVIEW ONLY
Document incomplete: not intended for regulatory approval, permit, or construction.
BRIAN R. WHITNEY
81591
9/18/2013
Lockwood, Andrews & Newnam, Inc.
ID # 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 8d
ALTERNATIVE D:
HYBRID STORAGE CHANNEL

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY
DRAWING SCALE: | CITY DWG NO.
VERT:
HORZ:
SHEET:

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Table 2 – Decision Matrix

Decision Matrix For Briar Branch Channel Improvement Alternatives

Alt.	Description	Estimated Construction Cost	Structures Removed From Flooding (10-Year)	Avg. Cross Sectional Area		Channel Volume		Average Flow Velocity (ft/s) 10-Year	Mowing Challenges	Desiltation Challenges	Potential Cost Share Partner	Constructability Challenges	Water Quality Benefit	Amenity Benefit
				SF	Difference	Ac-ft	Difference							
	Existing			102		15		2.8	High[1,2]	High[1,2]	Low	N/A	Fair[1]	Poor[1,2]
A	Rectangular Concrete Low Flow	$ 6,200,000	90	143	+42	17	+2.6	3.2	Low[3]	Medium[2,3]	Low	Average[1,2]	Poor[1,2]	Poor[1,2]
B	Dry Bottomed Storage Channel	$ 9,500,000	129	326	+224	34	+18.9	2.0	Medium[1,4]	Low[3,4]	Medium[1]	High[2,4,5]	Good[3,4]	Good[3,4]
C	Wet Bottomed Storage Channel	$10,700,000	142	403	+301	51	+36.5	1.8	Low[4]	Medium[1,4]	Medium[1]	High[2,4,5]	Excellent[4,5]	Excellent[3,4,5]
D	Hybrid Storage Channel	$ 9,200,000	104	248	+146	29	+13.9	1.8	Low[4]	Low[3,4]	Medium[1]	Low[2,3,6]	Good[3,4]	Good[3,4]
E	Storm Sewer Box Enclosure	$13,200,000	106	128	+26	27	+12.6	2.0	Low[4]	Medium[5]	Low[1]	Medium[7]	Poor[1,2]	Poor[1,2]

Channel Length = 5,800 LF

Mowing Challenges Notes Key
1: Slopes too steep for tractor mowers
2: Obstructions and trees prevent mowing access
3: Concrete areas minimize mow areas
4: Maximum 4:1 slopes with good access

Desiltation Challenges Notes Key
1: Grass-lined areas where silt accumulates
2: Limited equipment access
3: Designed desiltation locations
4: Good equipment access
5: Must use vacuum truck to desilt subsurface boxes

Potential Cost Share Partner Notes Key
1: Possible Management District participation

Constructability Notes Key
1: Requires extensive cast in place concrete
2: Limited staging areas
3: Requires moderate temporary shoring
4: Requires extensive temporary shoring
5: Requires large wall foundations
6: Requires large wall foundations on only one side of the section
7: Difficult to move large boxes into place

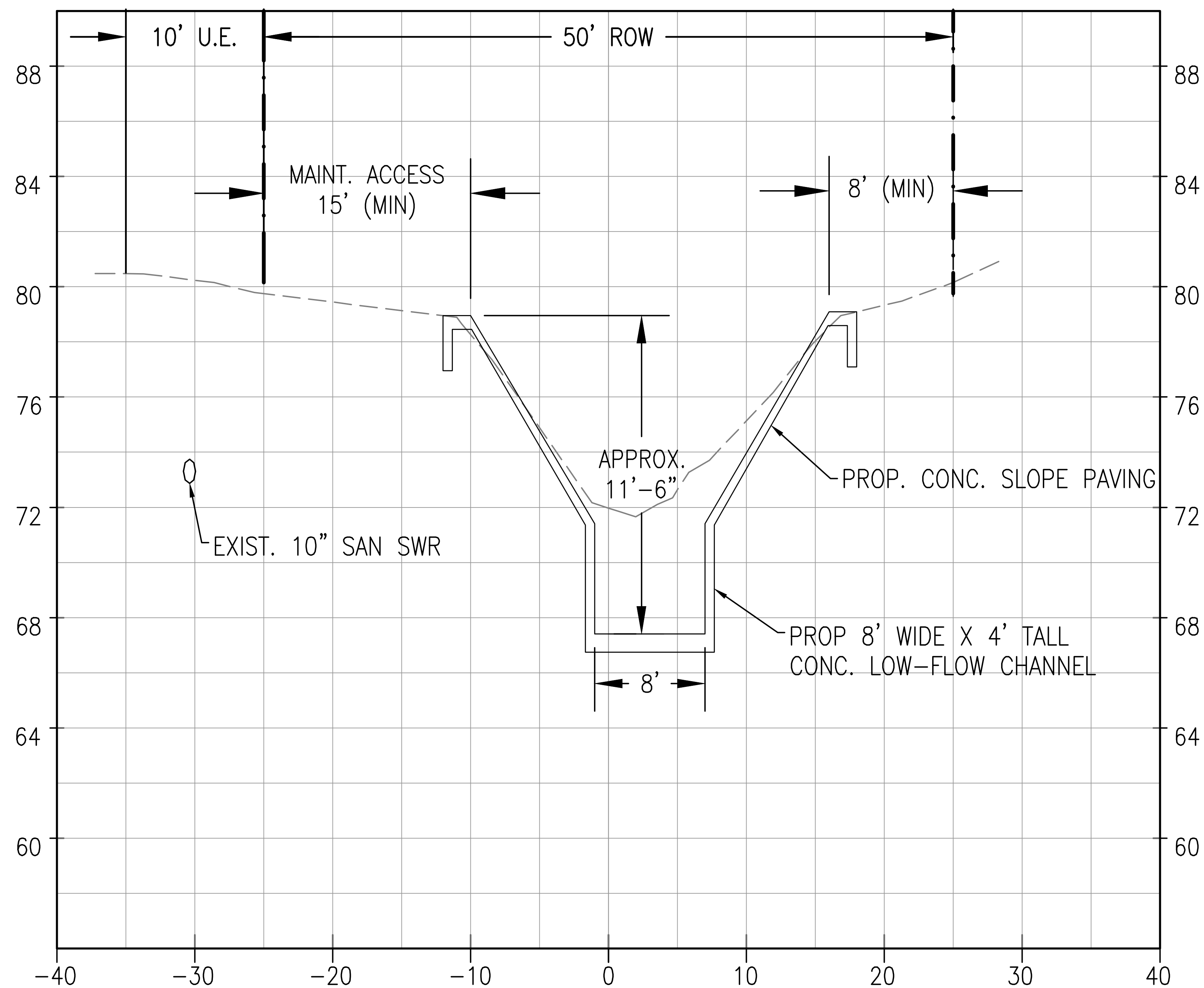
Water Quality Notes Key
1: Little/no vegetation
2: High suspended solids
3: Moderate vegetation
4: Lowered suspended solids
5: Vegetation and wildlife potential in water pools.

Amenity Notes Key
1: No sidewalks
2: No landscaping
3: Jogging path
4: Landscaping
5: Normal water pool

Additional Channel Section Alternatives

SCALE: 1"=10' HORIZ
1"=5' VERT

ALT A: CONCRETE LOW–FLOW (EXTENSION OF EXISTING SECTION D.S. OF BUNKER HILL)



NOTES:

1. CONCRETE SLOPE PAVING AND LOW-FLOW CHANNEL PER HCFCD CHANNEL LINING DETAILS.

INTERIM REVIEW ONLY
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BRIAN R. WHITNEY
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9/18/2013
Lockwood, Andrews & Newnam, Inc.
ID # 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 8a
ALTERNATIVE A:
CONCRETE LOW-FLOW

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY
DRAWING SCALE: | CITY DWG NO.
VERT:
HORZ:
SHEET:

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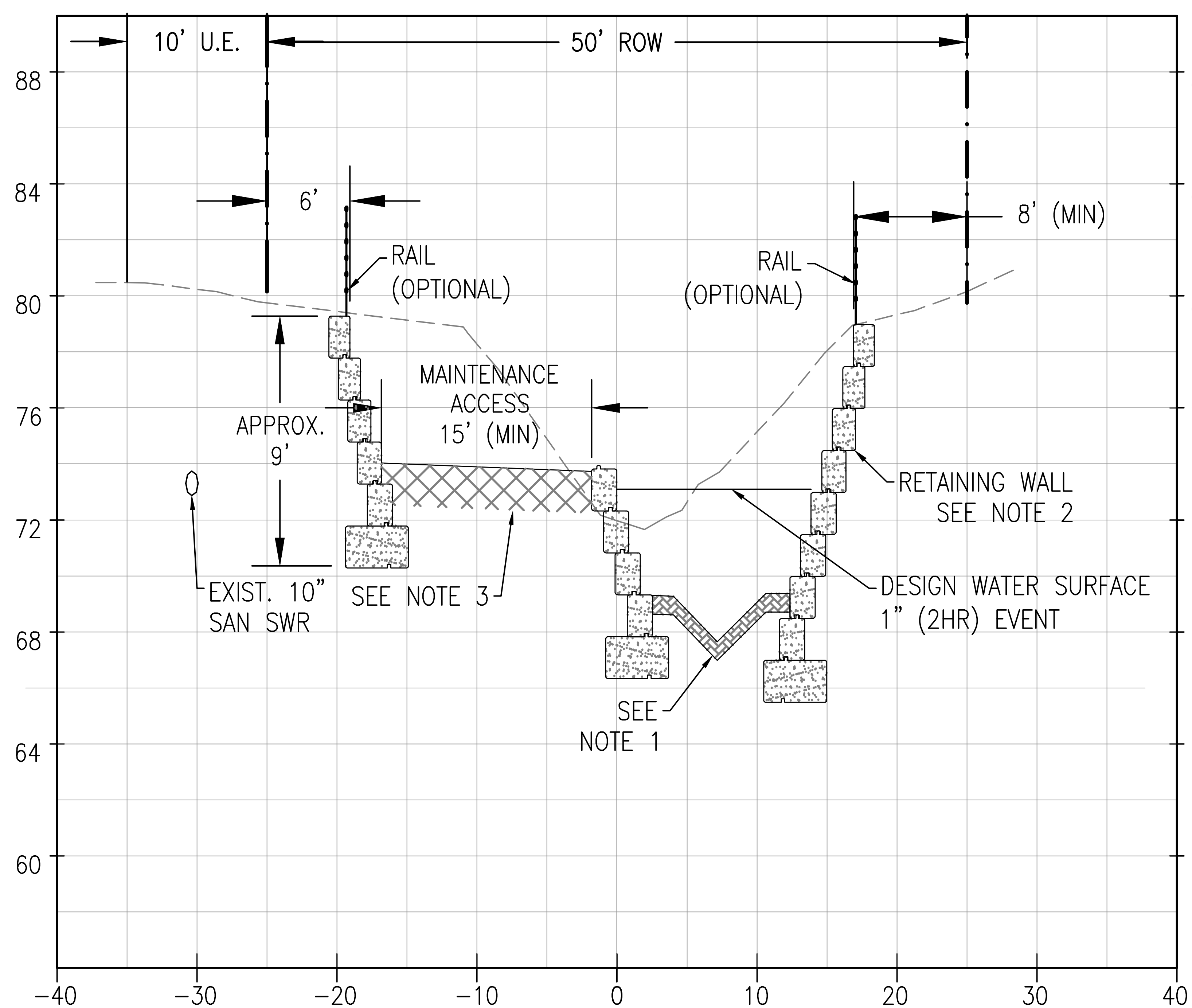
SCALE: 1"=10' HORIZ
1"=5' VERT

ALT B: DRY BOTTOM STORAGE CHANNEL



NOTES:

1. BOTTOM OF CHANNEL COULD BE A MIXTURE OF RIPRAP, GEOCELL WITH GRANULAR MATERIAL AND/OR OTHER MATERIALS TO PROVIDE EROSION PROTECTION, ALLOW FOR ESTABLISHMENT OF VEGETATION, AND TO DEFINE THE FLOWLINE OF THE CHANNEL FOR EASIER LONG-TERM MAINTENANCE. IF NECESSARY A HAZARD CAN BE CONSIDERED.

2. MODULAR BLOCK GRAVITY WALLS ARE SHOWN, DIFFERENT RETAINING WALL OPTIONS ARE CONSIDERED IN THE REPORT.

3. MAINTENANCE ACCESS PATH TO BE AN (APPROVED) ALL WEATHER SURFACE AND ELEVATED ABOVE DESIGN STORM EVENT. ELEVATION SHOWN TO AN APPROXIMATE 1" (2HR) EVENT.

INTERIM REVIEW ONLY
Document incomplete: not intended for regulatory approval, permit, or construction.
BRIAN R. WHITNEY
Engineer
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Registration Number
9/16/2013
Date
Lockwood, Andrews & Newnam, Inc.
ID # 2614

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 8b
ALTERNATIVE B:
DRY BOTTOM STORAGE CHANNEL

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

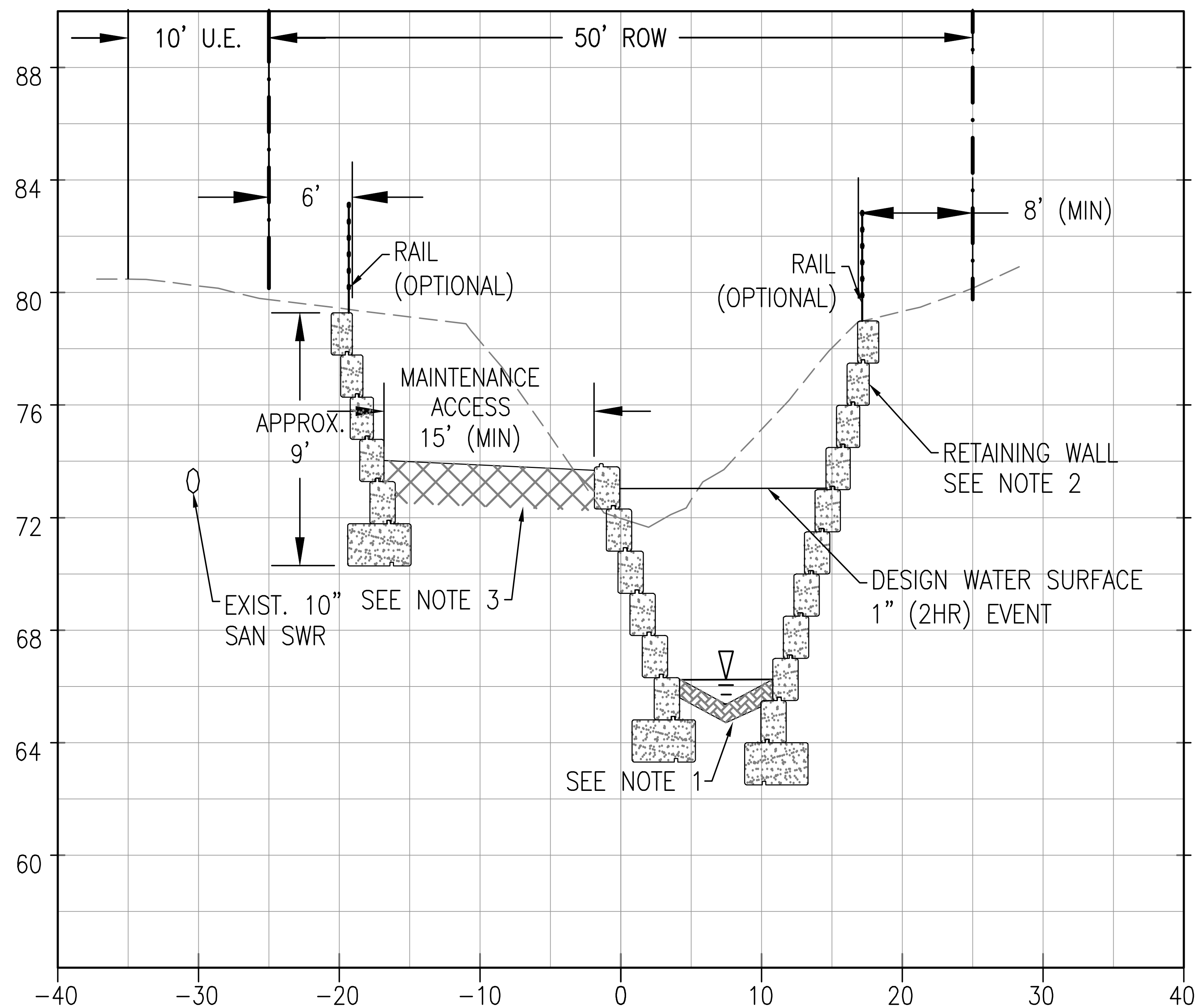
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: FACILITY
DRAWING SCALE: CITY DWG NO.
VERT:
HORZ:
SHEET:

C:\PROJECTWISE\DGGREANEY\D0139346\08-PROPOSED BRIAR BRANCH CROSS SECTION ALT-BRW.DWG 9/9/2013 9:05:30 AM Greaney, David G.

0 5' 10' 15'
SCALE: 1"=10' HORIZ
1"=5' VERT

ALT C: WET BOTTOM STORAGE CHANNEL



NOTES:

1. BOTTOM OF CHANNEL WILL BE A MIXTURE OF RIPRAP, GEOCELL WITH GRANULAR MATERIAL AND/OR OTHER MATERIALS TO PROVIDE EROSION PROTECTION, ALLOW FOR ESTABLISHMENT OF VEGETATION, AND TO DEFINE THE FLOWLINE OF THE CHANNEL FOR EASIER LONG-TERM MAINTENANCE.

2. MODULAR BLOCK GRAVITY WALLS ARE SHOWN, DIFFERENT RETAINING WALL OPTIONS ARE CONSIDERED IN THE REPORT.

3. MAINTENANCE ACCESS PATH TO BE AN (APPROVED) ALL WEATHER SURFACE AND ELEVATED ABOVE DESIGN STORM EVENT. ELEVATION SHOWN TO AN APPROXIMATE 1" (2HR) EVENT.

INTERIM REVIEW ONLY
Document incomplete: not intended for regulatory approval, permit, or construction.
BRIAN R. WHITNEY
Engineer
81591
Registration Number
9/18/2013
Date
Lockwood, Andrews & Newnam, Inc.
ID # 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
A LEO A DALY COMPANY

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 8c
ALTERNATIVE C:
WET BOTTOM STORAGE CHANNEL

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

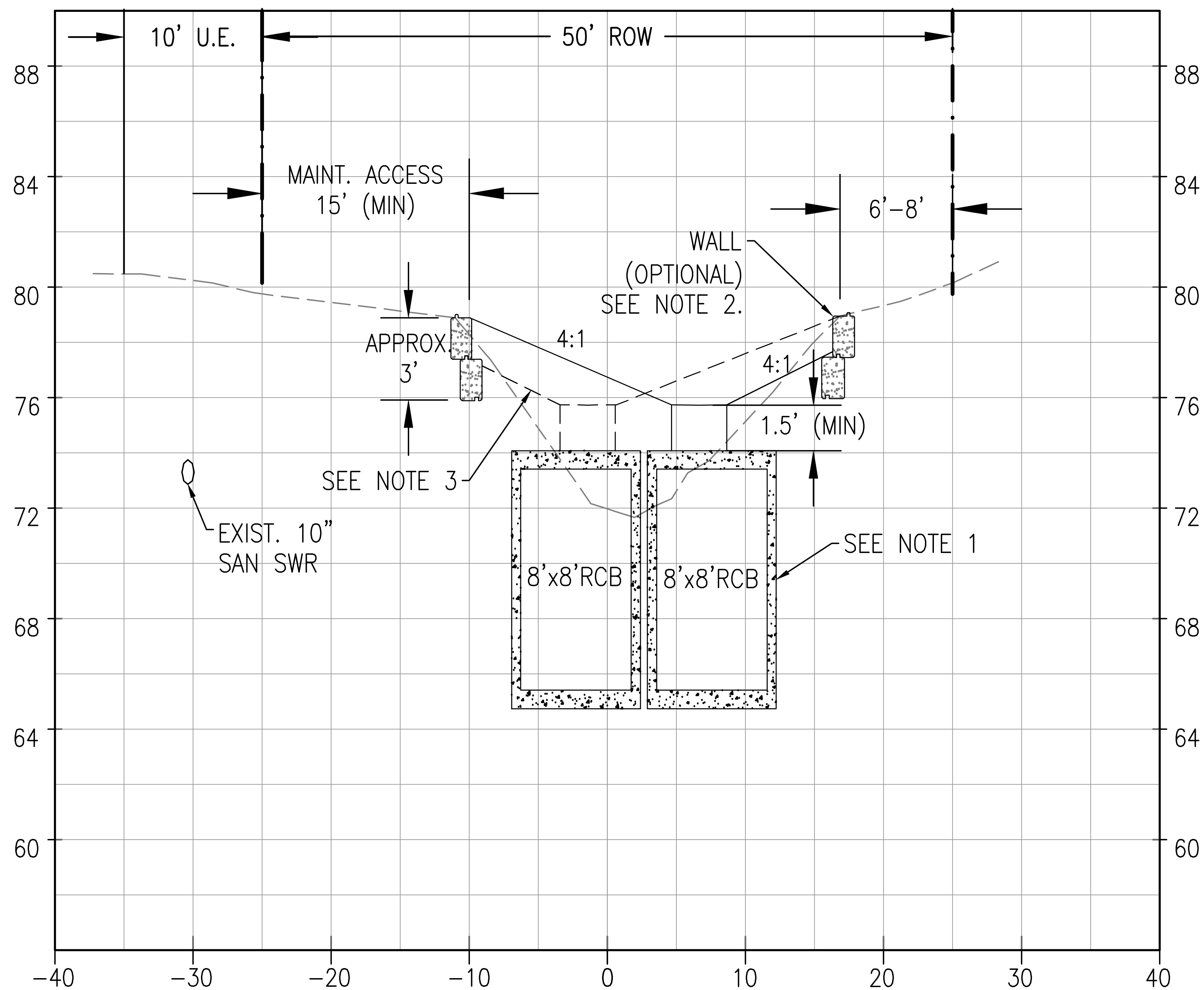
WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.: | FACILITY
DRAWING SCALE: | CITY DWG NO.
VERT:
HORZ:
SHEET:

C:\PROJECTWISE\DGGREANEY\D0139346\08–PROPOSED BRIAR BRANCH CROSS SECTION ALT–BRW.DWG 9/9/2013 9:05:30 AM Greaney, David G.

0 5' 10' 15'
SCALE: 1"=10' HORIZ
1"=5' VERT

ALT E: STORM SEWER BOX ENCLOSURE



NOTES:

1. ESTIMATED BOX SIZE BASED ON PRELIMINARY ANALYSIS AND SUBJECT TO CHANGE WITH ADDITIONAL IMPACT STUDY.

2. CHANNEL BOTTOM MAY MEANDER FROM LEFT TO RIGHT. LOW GRAVITY WALLS MAY BE NECESSARY.

3. MAY BE NECESSARY TO MAINTAIN 4:1 SLOPE (MAX) AND TO PROVIDE AMENITY BENEFITS.

INTERIM REVIEW ONLY
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BRIAN R. WHITNEY
Engineer
81591
Registration Number
9/16/2013
Date
Lockwood, Andrews & Newnam, Inc.
ID # 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
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BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 8e
ALTERNATIVE E:
STORM SEWER BOX ENCLOSURE

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET:

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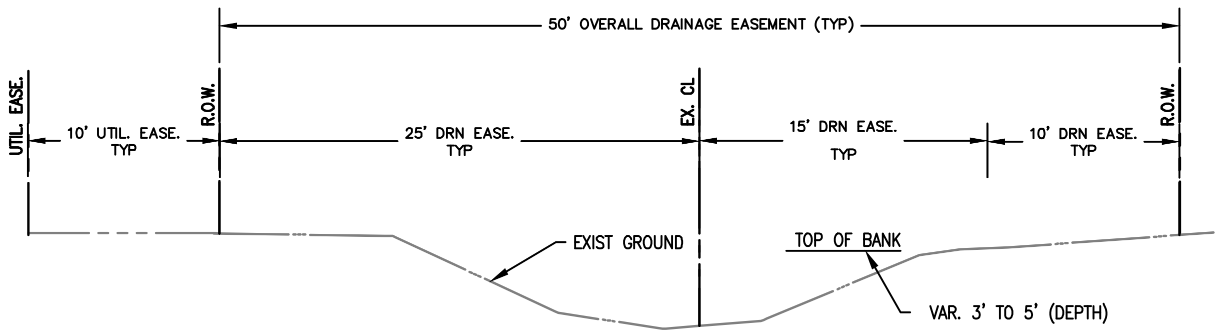
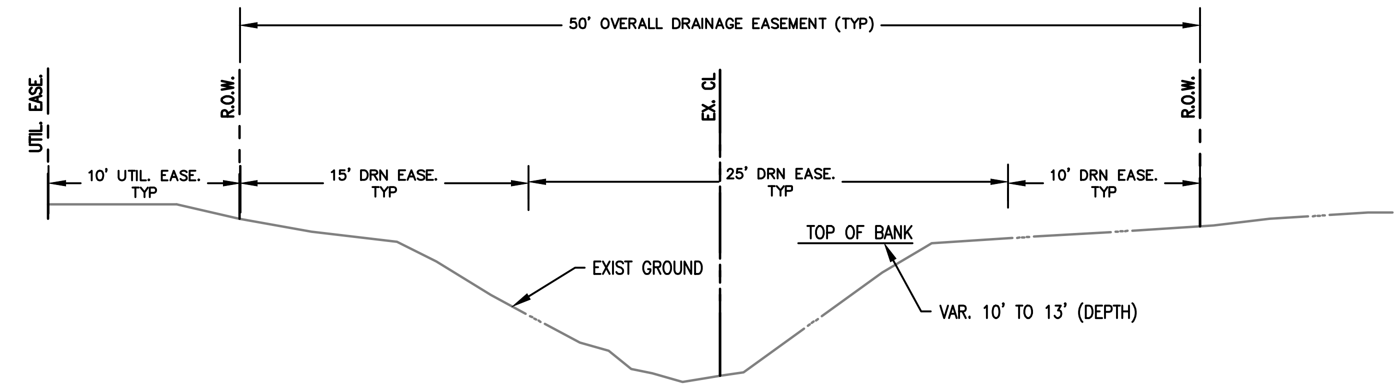
Existing Channel Cross Sections

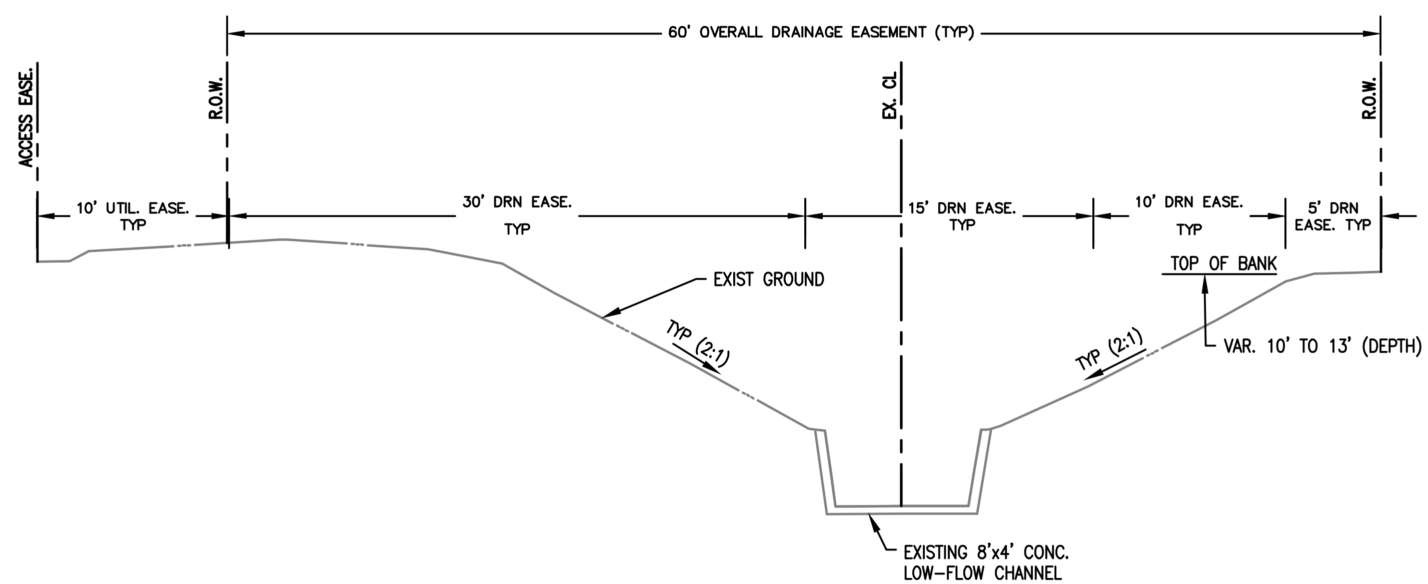


EXISTING W140-01-00 CHANNEL
AVG CHANNEL AREA = 55 SF
FROM GESSNER TO WITTE RD.



EXISTING W140-01-00 CHANNEL
AVG CHANNEL AREA = 120 SF
FROM WITTE RD. TO BUNKER HILL RD.

0 5 10
1"=10'-0"



EXISTING W140-01-00 CHANNEL
8'x4' RECT CHANNEL w/ (2:1) GRASS SS
AVG CHANNEL AREA = 220 SF
EAST OF BUNKER HILL RD.

INTERIM REVIEW ONLY
Document incomplete: not intended for regulatory approval, permit, or construction.
BRIAN R. WHITNEY
Engineer
81591
Registration Number
9/16/2013
Date
Lockwood, Andrews & Newnam, Inc.
ID # 2614

MEMORIAL CITY REDEVELOPMENT AUTHORITY

Lockwood, Andrews & Newnam, Inc.
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BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 6
EXISTING BRIAR BRANCH
TYPICAL SECTIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET:
6 OF 16

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CONFERENCE MEMORANDUM

PLANNING
ENGINEERING
PROGRAM MANAGEMENT

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MIAMI, FL
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SACRAMENTO, CA
SAN ANTONIO, TX
SAN MARCOS, TX
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WACO, TX

Date: 10/22/2013 **Filing Data Code 1-03**

Project No.:	130-10384-017
Project:	Briar Branch (W140-01-00) Channel Impvoements Meeting With HCFCD Re: Non-Standard Urban Channel Improvement
Client:	MCRDA
Conference Date:	10/18/2013
Conference Location:	HCFCD Offices 9900 Northwest Fwy, Houston, TX
Attendees:	Don Huml - MCRDA (TIRZ 17) Carl Woodward - HCFCD Alem Gebriel - HCFCD Bryan Elliot- HCFCD Gary Zika- HCFCD Richard Webber - HCFCD Joel Mendez - HCFCD Rob Fanning - HCFCD Rafael Ortega - LAN Derek St. John - LAN Brian Whitney - LAN

Routing	

Conference Purpose:	Discuss guidelines for Urban Channel Design, especially as relates to Briar Branch (W140-01-00)

Discussion:
The following summarizes our understanding of the subject matter covered in this conference. If this differs from your understanding, please notify us in writing within five days.

1. Mr. St.John gave an overview of the project to everyone as a way to review why the project needs to look at channel improvements that do not generally follow the HCFCD Design Guidelines. The flooding and drainage issues in the area are significant enough to justify the use of non-standard methods to improve the channel and maximize benefits to the neighboring communities.
2. Project Phasing include Phase 1 the Briar Branch Detention Basin (under construction), Phase II the channel improvements to Briar Branch, and Phase III storm sewer improvements from the adjacent neighborhoods to the Phase II channel improvements to provide flooding relief.
3. Channel is generally perched with the top of bank a few feet higher than existing roadway grades north of the channel, and the most critical areas are south of the Long Point Fault line.
4. Channel has been ruled as Non-Jurisdictional by the USACE, however there was a question in regard to using the stream tool that the USACE has been using on recent projects. Carl asked that Katie look into this for this channel as this may impact what types of channel improvements may be allowed.
5. St. John reviewed the existing channel sections that are grass and maintained with hand equipment as the larger mowers are not able to access the channel. There are a number of areas where there are still encroachments left from the de-silt project that was done by HCFCD about 5-years ago.
6. St. John reviewed the proposed cross-sections and mainly discussed the proposed hybrid channel section.
7. There was some discussion on the size of the blocks and Mr. Whitney said that the blocks ranged in weight from about 2,500lbs for the 41-inch deep blocks that are 18-inches tall, to about 3,300 lbs for the 60-inch deep blocks that would be used for the wall foundation.
8. Rafael Ortega suggested that if there is some questions in regard to the design of the retaining walls would HCFCD like to see a peer-review of the design to have more comfort in the ability of the retaining walls to perform.
9. Gary mentioned that the Geotechnical requirements are the primary factor in the design and that Kris would need to have approval. St. John mentioned that the Geotech Report is included in the Channel Improvement Preliminary Engineering Report that was submitted to

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HCFCD.

10. Gary also mentioned that Steve Fitzgerald would like to see some case studies or examples of projects that have been constructed to review long term performance, and if possible to walk or review these. The primary concern is in regard to building the foundations of these walls in varied soil conditions.
11. Overall there was a discussion of how to better communicate the gravity wall design process and to get HCFCD more comfortable with the option. In addition what is the long term performance of walls that have been constructed, and are there any situations similar to Briar Branch.
12. There was a discussion about the amount of ROW and going to a 15-ft maintenance berm on each side. With this scenario there is only 20-ft remaining in the middle and it would require completely vertical walls to get any reasonable flow area in the channel at the flowlines required for this project.
13. Access Management – HCFCD emphasized that they would want access ramps to go all the way to the flowline of the channel. It would not be adequate to elevate the maintenance berm above the 1" (2HR) event. Therefore, each zone between major roads would need to have at least one ramp all the way to the bottom that a Bobcat or other small track equipment could navigate.
14. The conversation turned toward the use of a box enclosure as it would solve a number of HCFCD concerns. It would be safer with less of a drop from top of bank to the flowline of the channel above the box culverts. HCFCD does not have any objections to maintaining a box culvert system as they believe that velocities will be better and it would self-clean. This option minimizes the depth of gravity walls and is a more proven technique in this area. Sandra Musgrove who was not at the meeting raised a number of issues, and said at the bottom that an enclosed section should be considered. Gary and others at HCFCD implied that Sandra was generally approving the use of an enclosure. If this is done then there would likely be limited objections to the project and it may get approved much quicker.
15. Mr. St.John and Whitney noted that this option is one of the most difficult to mitigate as it tends to send flows downstream too efficiently. There would need to be some restrictions in the system and other possible control structures to help slow the flow and better utilize the overflow weir at the Phase I detention basin to best effect. Some mix of gravity wall and box culvert may be appropriate where boxes can be used on locations where there is less room and adjacent structures at the ROW. Mr. Whitney emphasized that there will be a need to keep a number of tools available to effectively mitigate impacts to Briar Branch downstream of the project, and that the suggestion of only using an enclosure may create other problems.
16. Mr. Ortega suggested that it may be possible to use this project as a pilot study of the modular block systems to help provide some data for local long term data. LAN would review the limits of the project and identify those locations where box culverts may be more appropriate and where gravity wall areas may be an option.
17. HCFCD was generally favorable to the idea of a pilot study, but it was discussed that this may be something that would be more appropriate for the Urban Channel Committee. The idea from Carl was that this should be a smaller group of persons that review this in more detail as the large committee may take a much longer time to consider the options.
18. Since Sandra was not able to make the meeting some of the points from her review were discussed from a list that was handed out to everyone. These include concerns about using granular material for the foundations, adding sufficient maintenance ramps to get to the flowline of the channel, discussion of low maintenance plants, desiltation methods that would put the pools downstream of outfalls, long term structural stability and repair, safety, toe wall protection with concrete as geo-cells were not recommended, details for pipes going through walls. Sandra suggested that there can be a partnership opportunity between HCFCD and TIRZ 17 that could reduce the long range maintenance cost.
19. Don Huml emphasized that the TIRZ 17 is committed to getting this project done, and there are a large number of citizens in the area asking why it has not been done already. They are ready to commit resources to the Phase II and III efforts.
20. Some of the Task Items from this meeting are as follows;
    - Katy at HCFCD would review need for any USACE involvement with the channel as this channel is non-jurisdictional
    - LAN would review the alignment to identify areas where it may be more feasible to use an enclosed section vs. Alternative D with gravity walls.
    - LAN would investigate case studies or other projects that may be in the area, or provide data to show where the modular block gravity walls have been used in similar conditions,

CONFERENCE MEMORANDUM

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TAMPA, FL
WACO, TX

and if there is any long term performance data to provide to HCFCD.

- In addition there was a section of ROW that Richard Weber noticed that may be 60-ft of ROW south of the apartments west of Bunker Hill. LAN's survey did not pick this up, but there is 60-ft of distance between the fences. LAN would ask the surveyor to confirm the easements in this area and the need for any additional easements.

Distribution	**Prepared By**
Attendees	Signature:
	Print Name: Brian Whitney, P.E.

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HOUSTON, TX 77042
TEL 713.266.6900
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Agenda

W140-01-00 (Briar Branch) Open Channel Improvements
December 4th, 2013

1. Introductions
2. Recap of 10/18/2013 Meeting and Subsequent HCFCD Recommendation
3. Enclosed Channel Considerations
4. Next Steps

SHEET ___ of ____

Harris County Flood Control District
Watershed Management Department

Attendance Sign-In Sheet

Subject **RE: Project Coordination for Briar Branch Channel Modifications- Enclosure Alternative; TIRZ 17, W140-01-00, Houston KM 450WX & 490AB, Pct 4**

Location: **10555 Northwest Freeway, Suite 170, Houston, TX 77092 - Conf Rm 123**

Date **December 4, 2013, Wednesday at 2:30 PM**

Name	Organization	Telephone	Fax	E-Mail
ROB FANNING	HCFCD	713 684-4133		robert.fanning@hcfcd.
Ric Weber	HCFCD	713 684 4083		richard.weber@hcfcd.org
Derek St.John	LAN	713-269-7782		dstjohn@lan-inc.com
Herb Herndon	HCFCD	(713) 316-4871		herb.herndon@hcfcd.org
MARK McGARITY	"	713 316 4877		mark.mcgarity@hcfcd.org
Todd Miller	HCFCD	(713) 316-3771		dennis.miller@hcfcd.org
Chris Frerich	LAN	713-266-6900x6121		cpfrerich@lan-inc.com
Rafael Ortega	LAN	713 821 0425		rortega@LAN-inc.com
Don Hunt	TIRZ 17	713 829-5720		donhunt@houstontirz17.org

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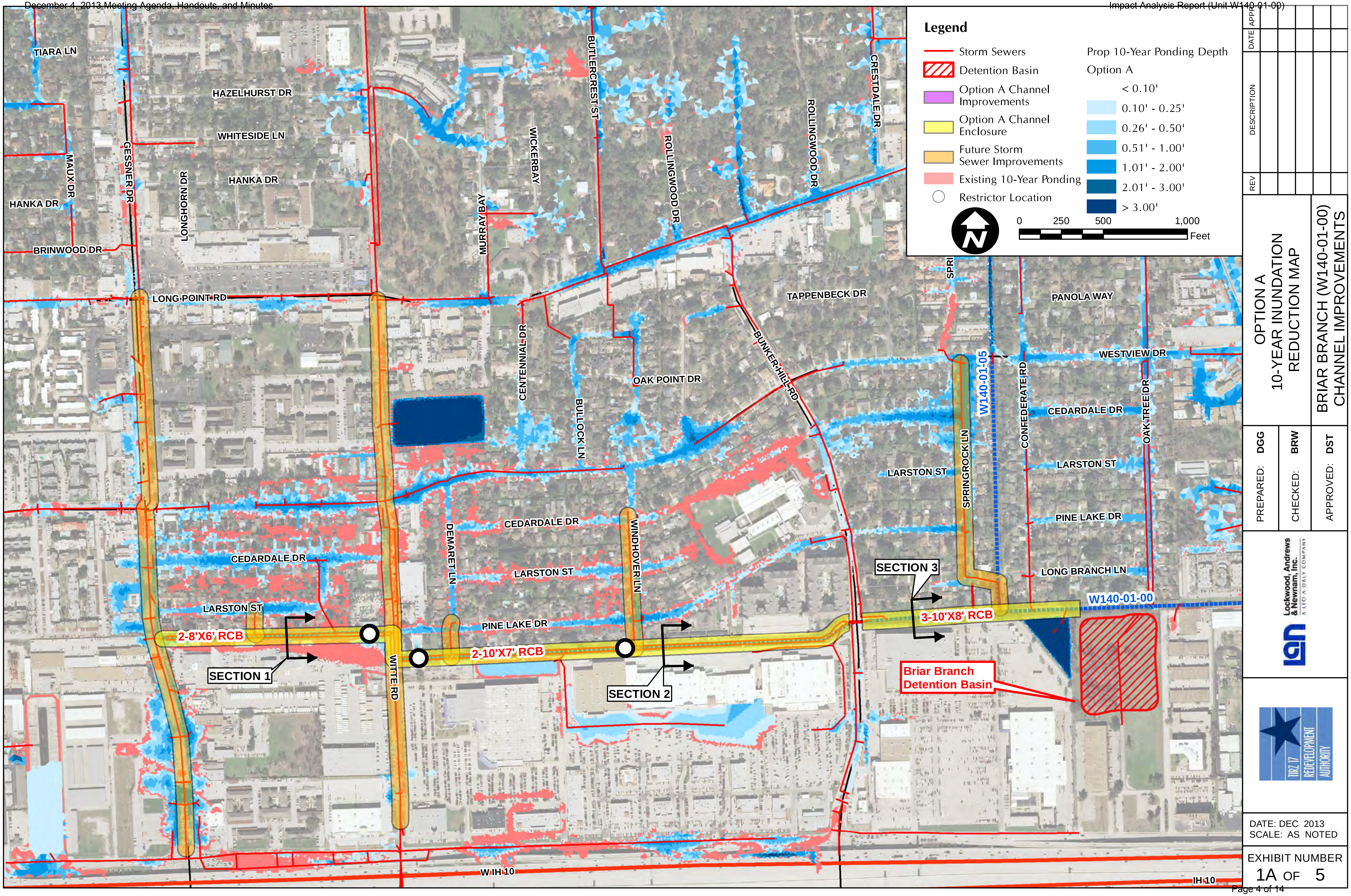
TIRZ 17 REDEVELOPMENT AUTHORITY

Agenda

W140-01-00 (Briar Branch) Open Channel Improvements
December 4th, 2013

1. Introductions
2. Recap of 10/18/2013 Meeting and Subsequent HCFCD Recommendation
3. Enclosed Channel Considerations
4. Next Steps



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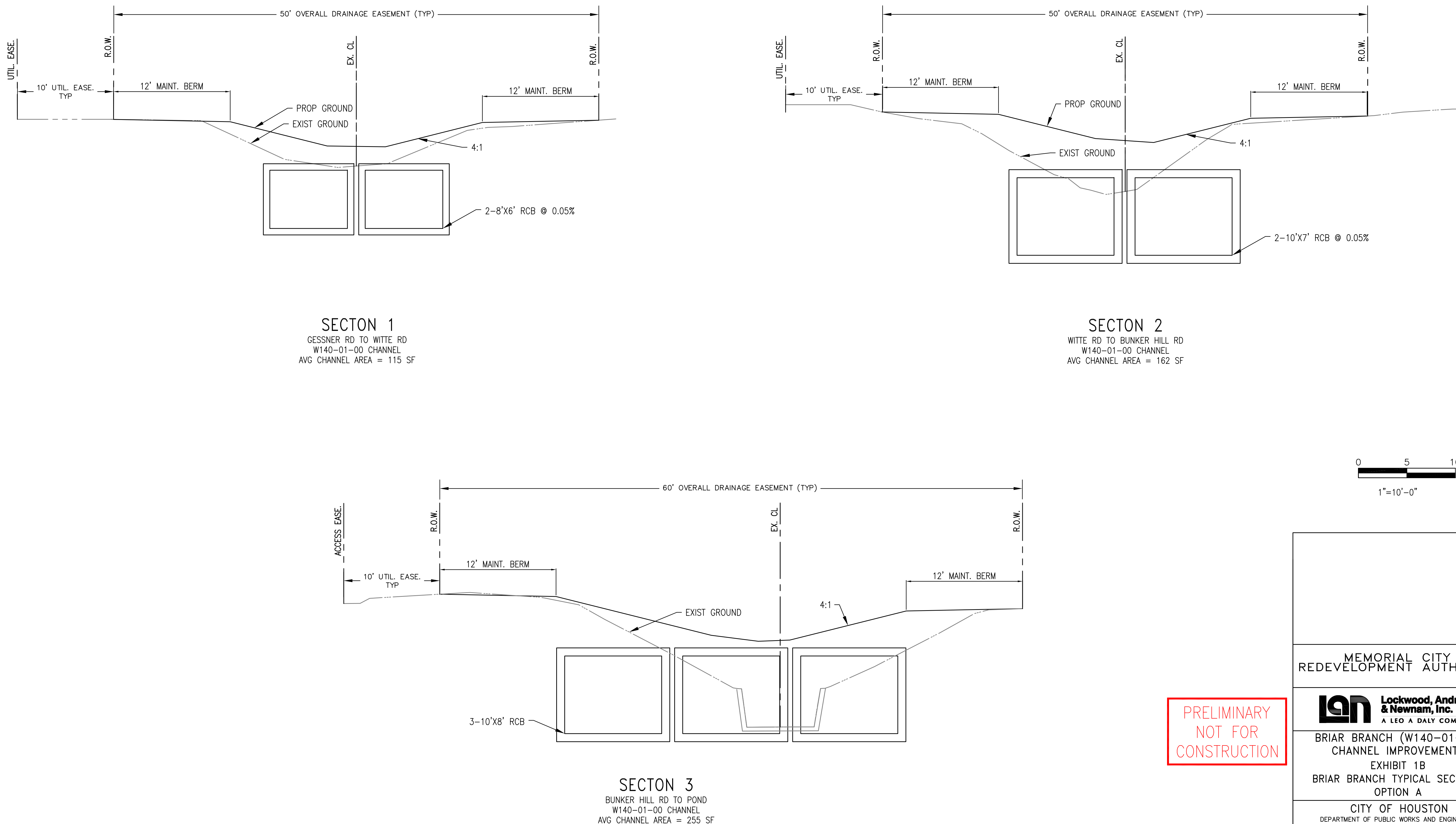

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MEMORIAL CITY REDEVELOPMENT AUTHORITY

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BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 1B
BRIAR BRANCH TYPICAL SECTIONS
OPTION A

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET:
1B OF 5

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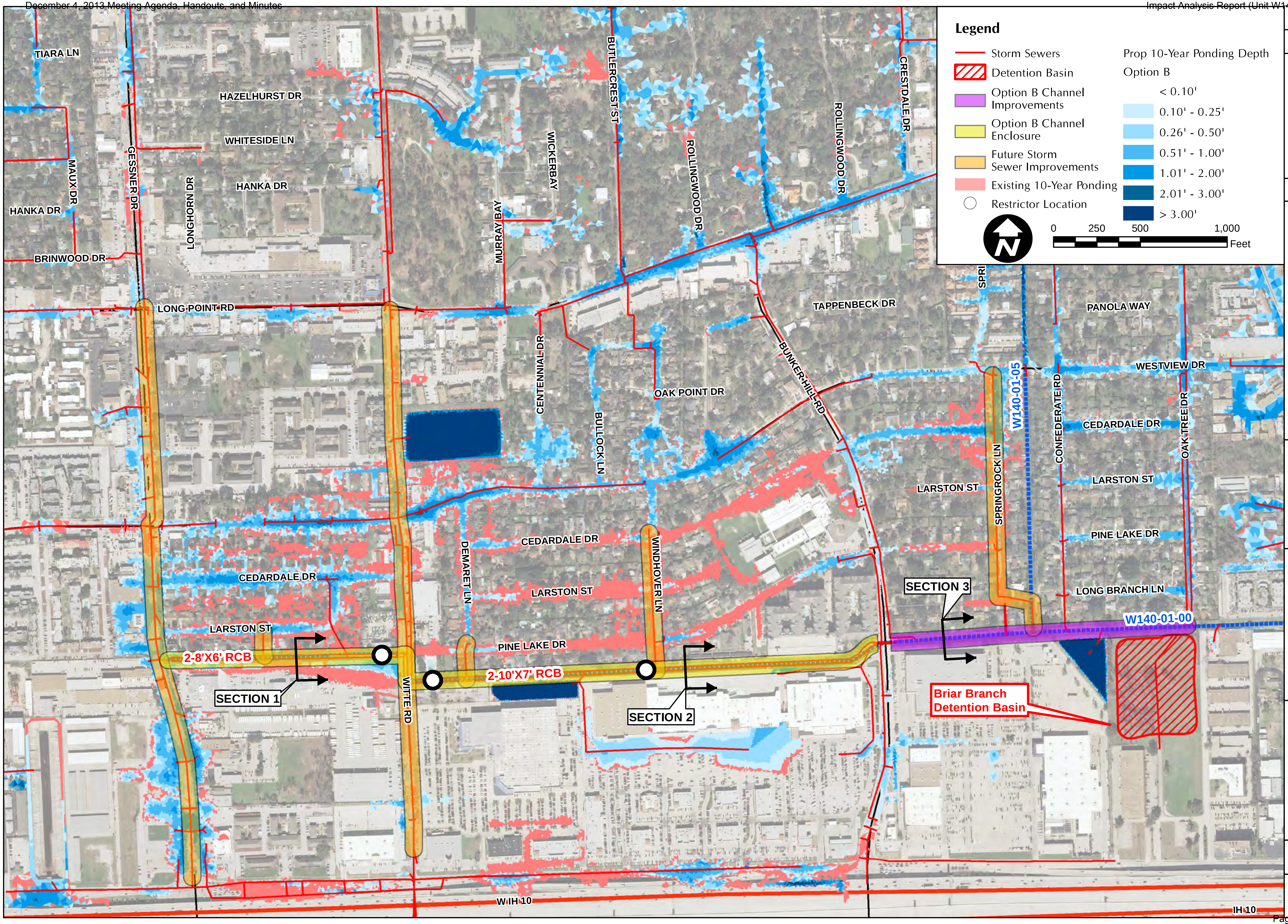

OPTION B
10-YEAR INUNDATION REDUCTION MAP

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS

REV	DESCRIPTION	DATE	APP

PREPARED: DGG
CHECKED: BRW
APPROVED: DST

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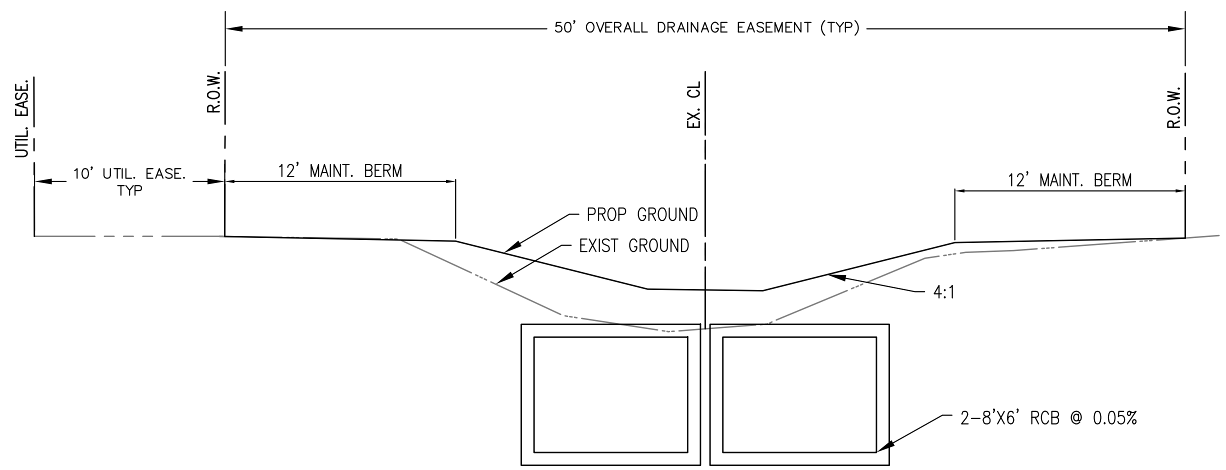
TIRZ 17 REDEVELOPMENT AUTHORITY

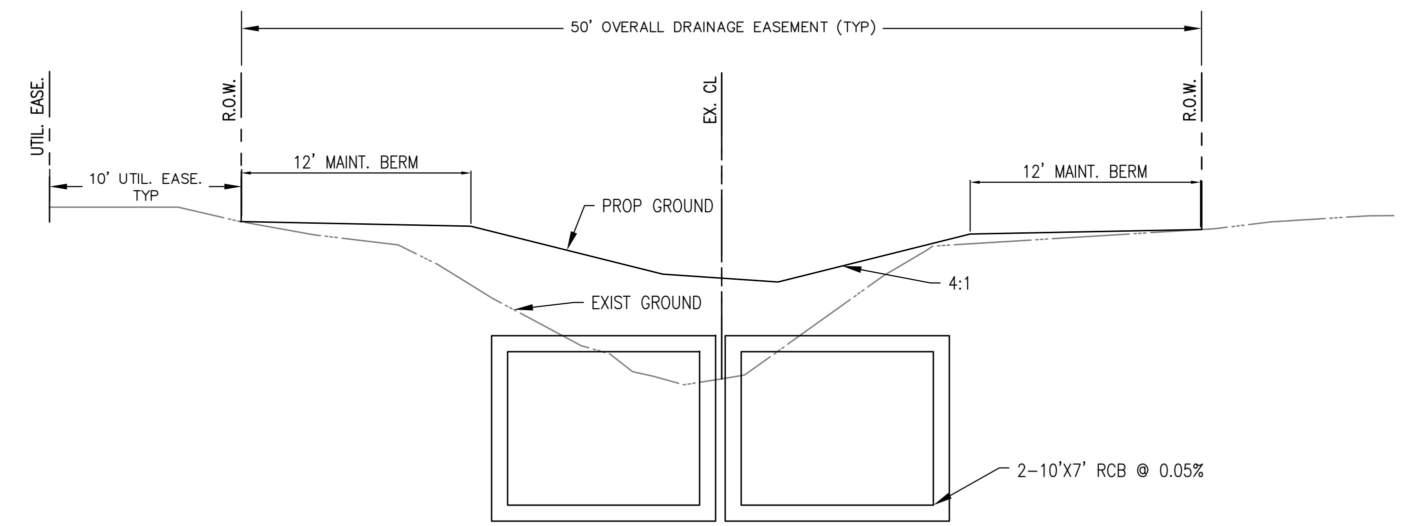
DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
2A OF 5

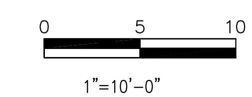
Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\W140-01 PER - Nov 2013\02A_OptionB_Inundation.mxd 12/4/2013 11:00:36 AM cpfrerich

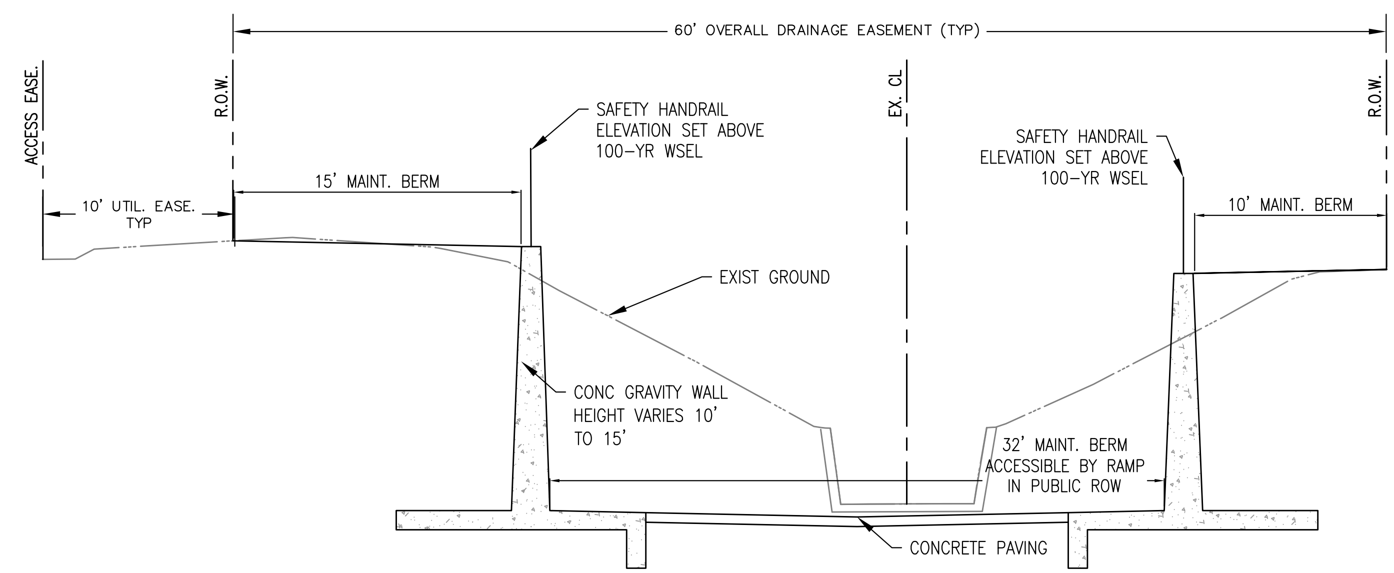


SECTON 1
GESSNER RD TO WITTE RD
W140-01-00 CHANNEL
AVG CHANNEL AREA = 115 SF



SECTON 2
WITTE RD TO BUNKER HILL RD
W140-01-00 CHANNEL
AVG CHANNEL AREA = 162 SF





SECTON 3
BUNKER HILL RD TO POND
W140-01-00 CHANNEL
AVG CHANNEL AREA = 430 SF

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BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 2B
BRIAR BRANCH TYPICAL SECTIONS
OPTION B

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ

FILE NO.:
FACILITY
DRAWING SCALE:
CITY DWG NO.
VERT:
HORZ:
SHEET:
2B OF 5

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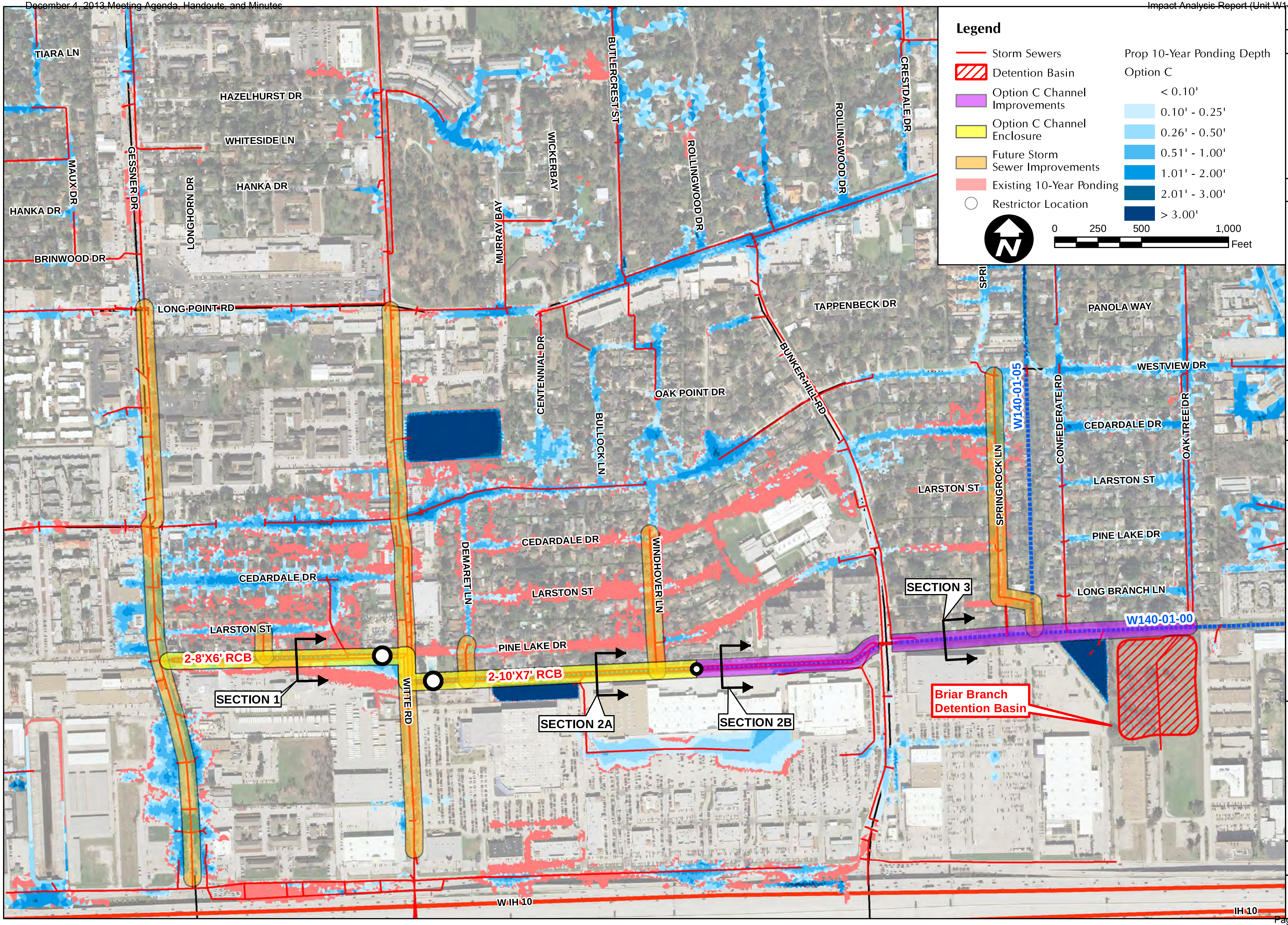

OPTION C
10-YEAR INUNDATION REDUCTION MAP

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS

REV	DESCRIPTION	DATE	APP

PREPARED: DGG
CHECKED: BRW
APPROVED: DST

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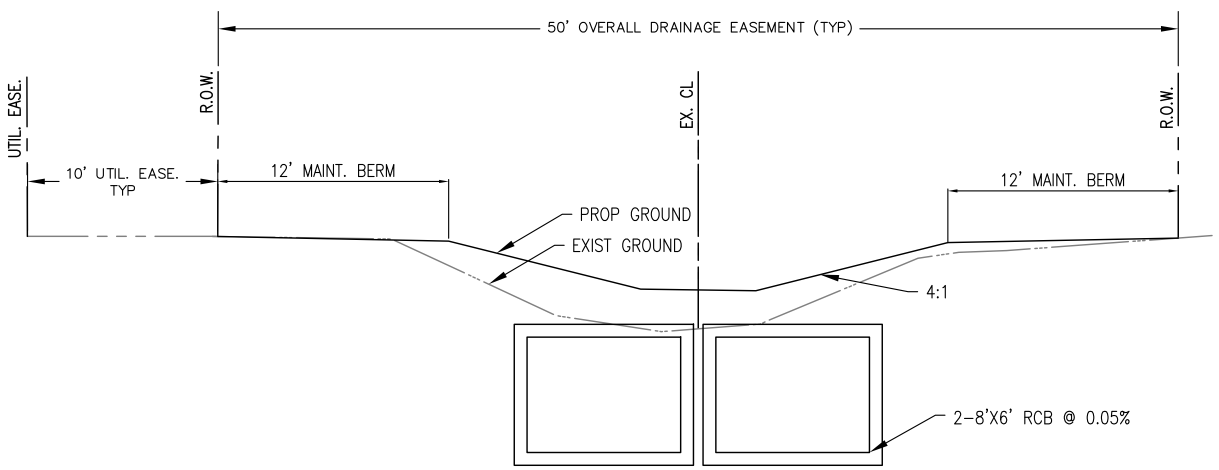
TIRZ 17 REDEVELOPMENT AUTHORITY

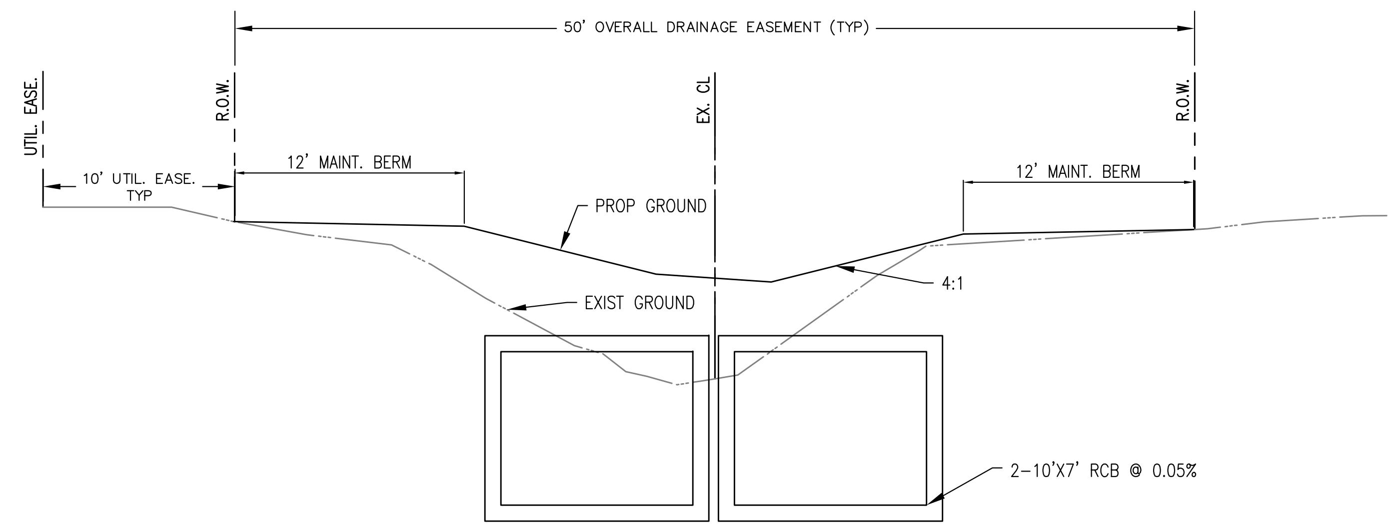
DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
3A OF 5

Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\W140-01 PER - Nov 2013\03A_OptionC_Inundation.mxd 12/4/2013 12:07:55 PM cpfreirich

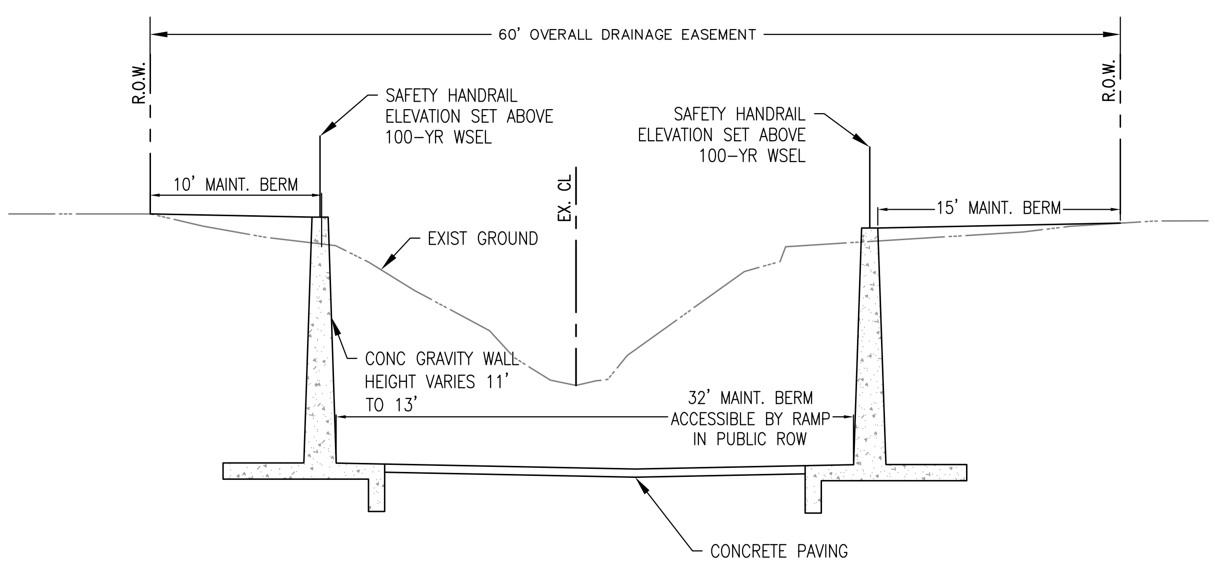


SECTON 1
GESSNER RD TO WITTE RD
W140-01-00 CHANNEL
AVG CHANNEL AREA = 115 SF

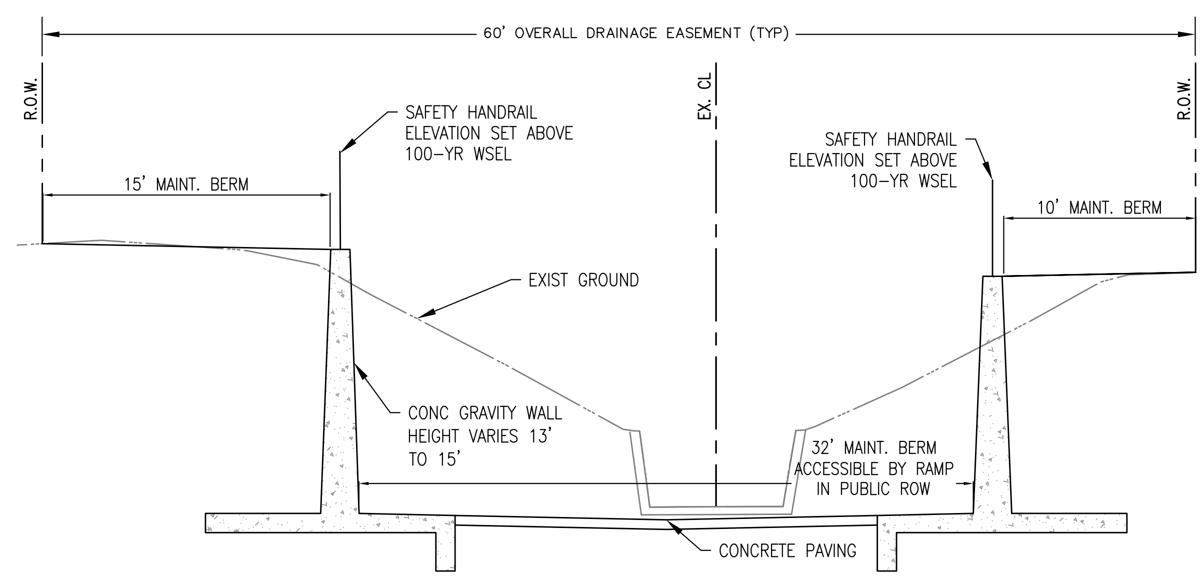


SECTON 2A
WITTE RD TO WINDHOVER DR
W140-01-00 CHANNEL
AVG CHANNEL AREA = 162 SF

0 5 10
1"=10'-0"



SECTON 2B
WINDHOVER DR TO BUNKER HILL RD
W140-01-00 CHANNEL
AVG CHANNEL AREA = 405 SF



SECTON 3
BUNKER HILL RD TO POND
W140-01-00 CHANNEL
AVG CHANNEL AREA = 430 SF

PRELIMINARY
NOT FOR
CONSTRUCTION

MEMORIAL CITY
REDEVELOPMENT AUTHORITY

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BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS
EXHIBIT 3B
BRIAR BRANCH TYPICAL SECTIONS
OPTION C

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

WATER	WASTEWATER	TRAFFIC
ST. & BRIDGE	STORMWATER	SWQ
FILE NO.:	FACILITY	
DRAWING SCALE:	CITY DWG NO.	
VERT: HORZ:		
SHEET: 3B OF 5		

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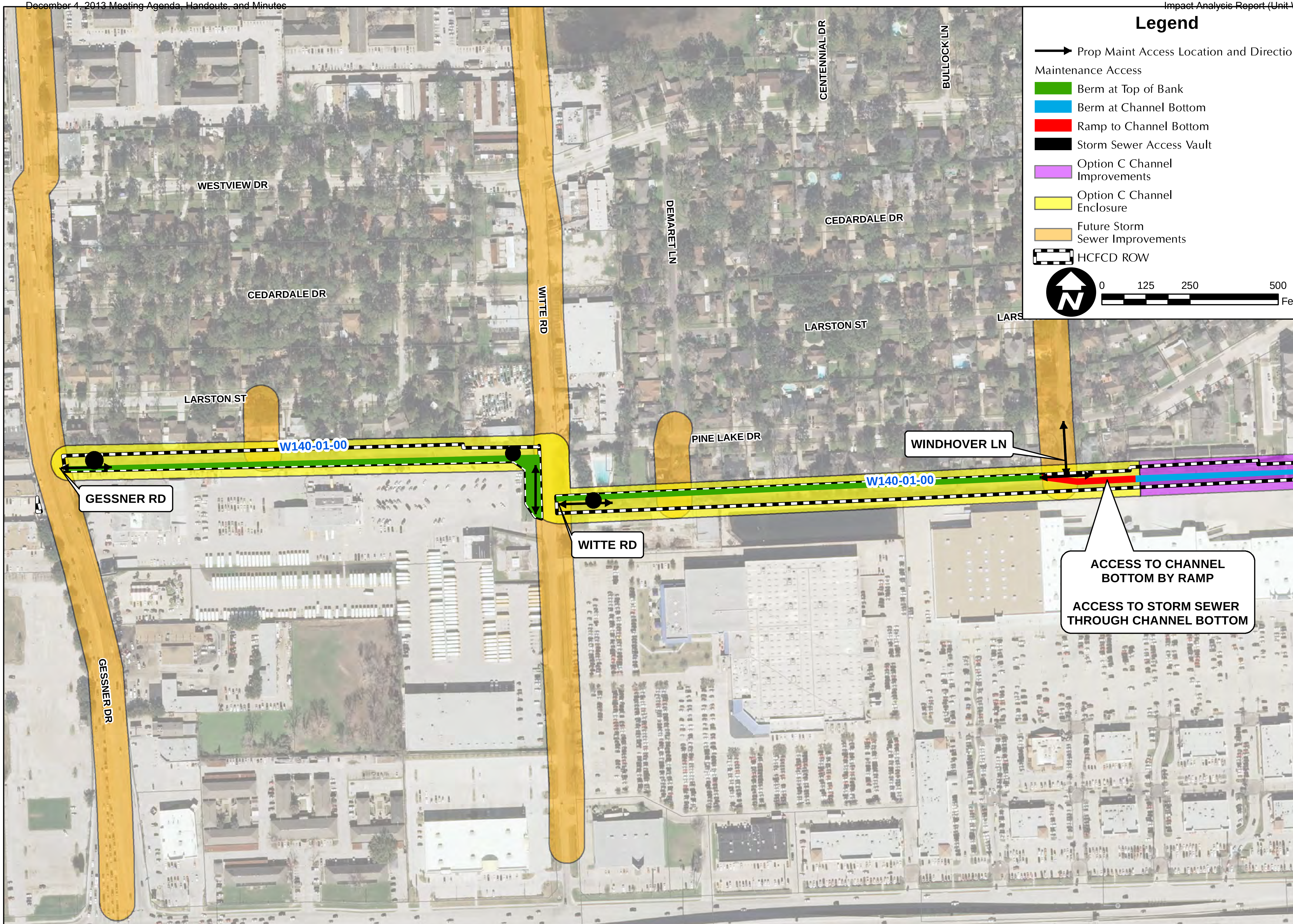

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REV	DESCRIPTION	DATE	APPR

OPTION C
MAINTENANCE ACCESS PLAN

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS

PREPARED: DGG
CHECKED: BRW
APPROVED: DST

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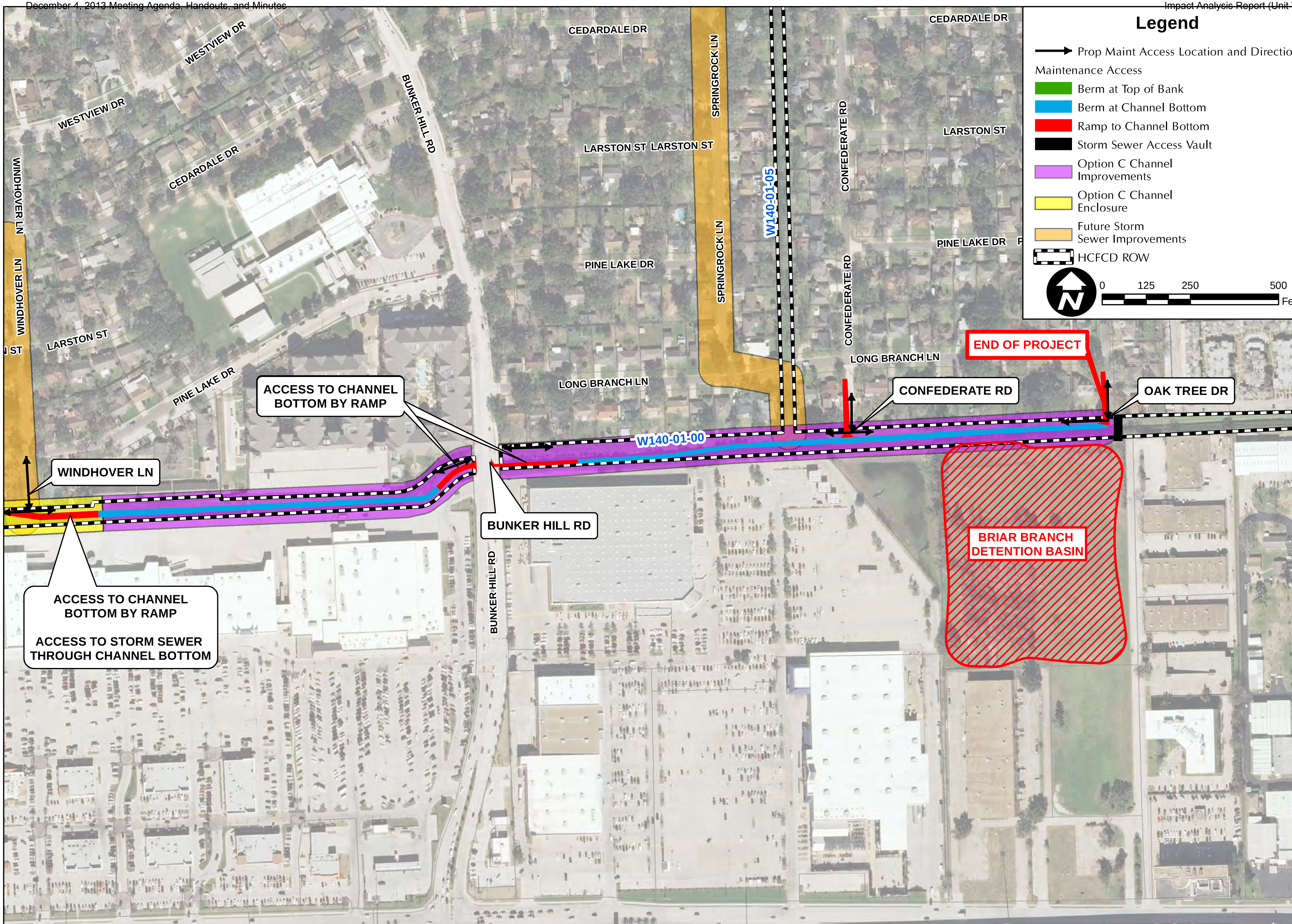
TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
4A OF 5



Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\W140-01 PER - Nov 2013\4b_Maintenance Access.mxd 12/4/2013 12:40:07 PM cpfrerich

REV	DESCRIPTION	DATE	APPR

OPTION C
MAINTENANCE ACCESS PLAN

BRIAR BRANCH (W140-01-00)
CHANNEL IMPROVEMENTS

PREPARED: DGG
CHECKED: BRW
APPROVED: DST

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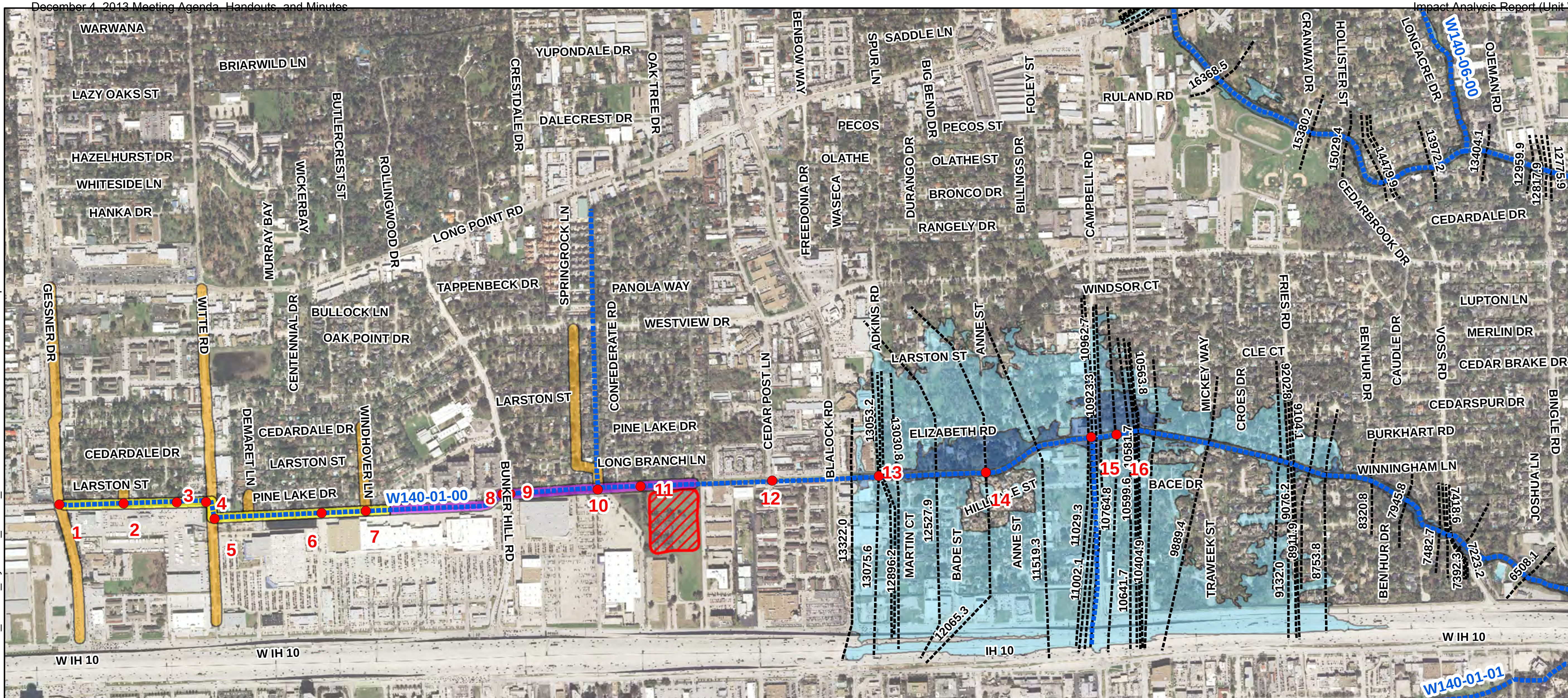
4B OF 5



Dynamic Model Impact Analysis Results							
		10-YEAR WSEL RESULTS			100-YEAR WSEL RESULTS		
Node	Station	EXISTING	OPTION C	DIFFERENCE (FT)	EXISTING	OPTION C	DIFFERENCE (FT)
1	21026	80.73	80.29	-0.44	80.84	80.56	-0.27
2	20481	80.07	79.29	-0.78	80.89	80.43	-0.46
3	19981	80.06	79.21	-0.85	80.86	80.35	-0.52
4	19701	80.09	78.83	-1.26	80.98	80.29	-0.69
5	19481	79.25	78.11	-1.15	79.84	79.78	-0.06
6	18481	78.26	77.15	-1.12	79.02	78.52	-0.50
7	18066	77.46	75.21	-2.25	78.45	76.95	-1.50
8	16756	75.30	74.92	-0.38	76.77	76.34	-0.43
9	16681	75.19	74.74	-0.45	76.47	75.96	-0.51
10	15863	74.79	74.69	-0.10	76.18	75.83	-0.35
11	15381	74.66	74.65	-0.01	75.86	75.77	-0.09
12	14232	73.91	73.80	-0.11	74.98	74.82	-0.16
13	13031	73.00	72.92	-0.08	73.83	73.70	-0.13
14	12065	72.13	72.07	-0.06	72.89	72.77	-0.12
15	11029	70.11	70.07	-0.04	70.92	70.75	-0.17
16	10765	69.26	69.23	-0.02	69.82	69.68	-0.13

Legend

- Analysis Nodes
- Option C Channel Improvements
- Option C Channel Enclosure
- Future Storm Sewer Improvements
- Existing Detention Pond
- Effective Model Streams
- Effective Model Cross Sections

FEMA Effective Floodplains

- 100-Year
- 500-Year

0 500 1,000 2,000 Feet

REV | DESCRIPTION | DATE | APP

RECOMMENDED ALTERNATIVE DYNAMIC MODEL IMPACT ANALYSIS RESULTS

BRIAR BRANCH (W140-01-00) CHANNEL IMPROVEMENTS

PREPARED: CPF
CHECKED: BRW
APPROVED: DST

Lockwood, Andrews & Newnam, Inc.
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TIRZ 17 REDEVELOPMENT AUTHORITY

DATE: DEC 2013
SCALE: AS NOTED

EXHIBIT NUMBER
5 OF 5

Map Document: L:\130-10384-017\4-0-Production\4-08-GIS\MXD\W140-01 PER - Nov 2013\5_Future_Dynamic_Model_Results.mxd 12/4/2013 12:52:35 PMcpfreich

CONFERENCE MEMORANDUM

PLANNING
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Date: 12/11/2013 **Filing Data Code 1-03**

Project No.:	130-10384-017
Project:	Briar Branch (W140-01-00) Channel Impvoements Meeting With HCFCD Re: Non-Standard Urban Channel Improvement
Client:	MCRDA
Conference Date:	12/4/2013
Conference Location:	HCFCD Offices 10555 Northwest Fwy, Houston, TX
Attendees:	Don Huml - MCRDA (TIRZ 17) Carl Woodward - HCFCD Herb Herndon - HCFCD Rob Fanning - HCFCD Richard Webber - HCFCD Mark McGarity - HCFCD Todd Miller - HCFCD Rafael Ortega - LAN Derek St. John - LAN Chris Frerich- LAN

Routing	

Conference Purpose:	Discuss guidelines for Urban Channel Design, especially as relates to Briar Branch (W140-01-00)

Discussion:
The following summarizes our understanding of the subject matter covered in this conference. If this differs from your understanding, please notify us in writing within five days.

1) Don communicated to the attendees that TIRZ 17is working to improve Briar Branch (W140-01-00). The TIRZ board is pushing to begin detailed design of the channel improvements by January 1st. LAN is the engineering consultant responsible for the channel PER.
2) Derek summarized the previous meeting on this project, which was on October 18th, 2013. He reiterated that, because of ROW constraints, the channel improvements cannot meet HCFCD criteria for maintenance berm widths, channel bottom width, and maximum side slopes. The action items from the October meeting included further evaluation of enclosing Briar Branch with concrete boxes.
3) Derek presented three improvement options for enclosing Briar Branch:
   a) Fully enclosed (Gessner to detention basin – under construction) – this option has adverse hydraulic impacts downstream of the basin which cannot be mitigated.
   b) Enclosed from Gessner to Bunker Hill, Open from Bunker Hill to detention basin – this option can achieve no-impact, but only by a very narrow margin.
   c) Enclosed from Gessner to Windhover, Open from Windhover to detention basin – this option can definitely achieve no-impact.
   d) All three options include maintenance access to the channel bottom. Additionally, these options account for future storm sewer improvements to serve the neighborhoods north of the channel.
4) Carl indicated that the option with the open channel section extending upstream to Bunker Hill Road would likely be acceptable and that extending the open channel upstream of Bunker Hill Road could be acceptable as well.
5) In response to specific questions regarding the PER process, Carl stated HCFCD's policy is not to respond to PERs. HCFCD would prefer to see an Impact Analysis report submitted before they commit to any particular section or limits for a particular section.
6) Herb also noted that based on their internal review, HCFCD would respond to the Impact Analysis with "Conditional Concurrence", as opposed to a "Letter of No Objection" committing HCFCD to the general concept of the configuration and limits of the sections. Once the final design plans are generated, the impact analysis report must be updated to reflect the final design and resubmitted for final approval.
7) Carl further stated the Impact Analysis needs to include all phases of the proposed projects for to be accounted for benefiting from the channel improvements – not just the channel itself. HCFCD

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CONFERENCE MEMORANDUM

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would prefer for the Impact Analysis to also contain:

a) A discussion of why the standard HCFCD channel sections do not work for this project.
b) A list of variances from standard HCFCD channel criteria
c) Detailed information on maintenance access
d) Separate analysis of both Phase 2 (Channel Improvements) and Phase 3 (Storm Sewer Improvements)
e) A list of proposed storm sewer projects and their respective pipe sizes

2) Action items:
   a) LAN to submit an impact analysis based on the enclosed channel configuration for conditional approval by HCFCD.

Distribution	**Prepared By**	
Attendees	Signature:	
	Print Name:	Derek St. John, P.E.

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From: Woodward, Carl (Flood Control) <CarlW.Woodward@hcfcd.org>
Sent: Wednesday, October 30, 2013 12:52 PM
To: St.John, Derek; Herndon, Herb (Flood Control); Mendez, Joel (Flood Control)
Subject: FW: W140-01-00

Derek-
See below for our decision on the channel cross section. Please coordinate with Herb on the remainder of the project. Thanks.

Carl W. Woodward, P.E., CFM
Watershed Management Department Manager
Harris County Flood Control District
9900 Northwest Freeway | Houston, Texas 77092
713-684-4000 (main) | 713-684-4250 (direct)
carl.woodward@hcfcd.org | www.hcfcd.org

From: Musgrove, Sandra (Flood Control)
Sent: Wednesday, October 30, 2013 12:39 PM
To: Woodward, Carl (Flood Control)
Cc: Zika, Gary (Flood Control)
Subject: W140-01-00

At the Directors meeting, we discussed Derek St. Johns proposal for W140-01-00 (the nearly vertical wall constructed of blocks). I showed Mike the cross section drawing LAN provided and explained the cost difference.

It was the consensus that an enclosure would be preferable. Alan Potok said he would like to see a small channel above the enclosure, a maximum of 3 feet deep. (We don't want hand railings.)

Since Watershed is the point of contact, I will turn this back over to you to move forward with coordination with LAN.

Sandra A. Musgrove, P.E.
Director, Infrastructure Division
Harris County Flood Control District
7522 Prairie Oak Drive | Houston, Texas 77086
713-684-4000 (main) | 713-684-4112(direct) | 281-924-5170 (cell)
sandra.musgrove@hcfcd.org | www.hcfcd.org

HARRIS COUNTY FLOOD CONTROL DISTRICT
9900 Northwest Freeway
Houston, Texas 77092
713-684-4000
www.hcfcd.org

December 27, 2013

Mr. Derek St. John, P.E., CFM
Lockwood, Andrews & Newnam, Inc.
2925 Briarpark, Suite 400
Houston, TX 77042

Re: W140-01-00 Modification by TIRZ 17

Dear Mr. St. John:

This letter is in response to e-mail correspondence of December 12, 2013 wherein you provided me a summary of three options you have been discussing with both our Watershed Management Department and also our Urban Channel Design planning committee. As I understand your concern, you are hesitant to proceed with detailed impact analysis and any form of a project development report without some confirmation from Flood Control District that the hydraulic section you are presenting would be acceptable for maintenance. Three options have been presented, being combinations of multiple box culverts and concrete open channel. You are, at this time, recommending multiple box culverts from Gessner Road to Bunker Hill Road and an open concrete vertical wall section from Bunker Hill Road to an existing detention basin owned by TIRZ 17. In that recommended section you have 12 ft. maintenance berms on either side of the box culverts and maintenance berms of 15 ft. and 10 ft. on either side of the concrete channel section.

The idea that the channel sections being proposed depart significantly from the sections outlined in the Flood Control District Policy, Criteria and Procedures Manual (PCPM) is driven by the fact that acquisition of additional right-of-way is prohibitively expensive and disruptive to the community. We concur with this fact. The maintenance access widths are the minimum acceptable for our equipment based on the conceptual channel sections proposed. We will not accept anything less. We do not have adequate information to yet determine if the proposed design section meets our requirements for structural stability and hydraulic capacity which are studies you should undertake and provide as part of the impact analysis you intend to perform (including appropriate supporting field investigations). Of the conceptual sections provided we do want to offer the following comments.

For any modification to one of our channel reaches where we would replace an earthen section (or partial box section) with a full enclosure or concrete vertical wall, we would first want to attempt to maximize the capacity within the right-of-way for obvious difficulties in expanding the section in the future (given our requirements for maintenance access). It appears your conceptual sections do that, but please confirm such to be the case. If this is a case where additional capacity could be achieved if additional mitigation were available, we would like to understand that and determine if there is a partnership role the Flood Control District should take based on the benefit to the community. Any partnership would be a function of funding and Commissioners Court approval.

December 27, 2013
Mr. Derek St. John, P.E., CFM
Lockwood, Andrews & Newnam, Inc.

Page 2

For the conceptual vertical wall section, we request that the channel bottom be a reinforced base that ties the walls together structurally unless there is a sound reason not to do so. Our concern is the section as shown, absent geotechnical and structural analysis, may be unstable. Should you proceed with the box culvert section, please consider converting the three box section to one where the center box has an open top rather than full enclosure.

As a summary statement, either the conceptual box sections or the conceptual vertical wall section is acceptable subject to the changes discussed. However, you must demonstrate that you meet all of the hydraulic and technical design considerations outlined in the PCPM. Should you have any questions, please feel free to contact me or continue to work through the Watershed Management Department.

Sincerely,

Alan J. Potok, P.E.
Director, Engineering and Construction Division

AJP:abr

cc: Don Huml, TIRZ 17
Sandra Musgrove
Carl Woodward
Richard Scott
Steve Fitzgerald
Mike Talbott
Russ Poppe