

## **APPENDIX E**

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Downtown Specific Plan Hydraulic Study, City of Roseville



January 2008



# Downtown Specific Plan Hydraulic Study

City of Roseville



Prepared by **RBF**  
CONSULTING

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## **Executive Summary**

### **Downtown Specific Plan Hydraulic Study**

The City of Roseville is currently creating the Downtown Specific Plan and updating the Royer/Saugstad Park Master Plan. Included in these projects are proposed improvements along the Dry Creek downtown corridor that could potentially impact the existing 100-year floodplain. Proposed projects include:

- New Fire Station Headquarters Facility and Royer Park to Harding Blvd. Bike Trail
- Royer Park Improvements – Amphitheater, Grand Staircase, New Pedestrian Bridge, Creek Walk, Relocation of the Ice House Bridge, Library Bridge, and Bike Trail
- New 9-Hole Golf Course at Saugstad Park

To evaluate the effects of these proposed projects, RBF Consulting reviewed and updated the downtown Dry Creek HEC-RAS model for the study area from Folsom Road to Saugstad Park. Changes were made to the existing, or baseline, model based on new information received from field and aerial surveys, as well as visual observations and site photographs. New cross sections were added to the HEC-RAS model at approximately 100-foot intervals along the entire study area.

#### **Recommendations**

**New Fire Station Headquarters and Bike Trail:** The combined result of the proposed improvements between Lincoln Street and Folsom Road would be a reduction in water surface elevations for the 100-year flood event. This condition proves favorable for the purchase of the additional property and the development of the headquarters building.

**Creek Walk:** The Creek Walk element, if designed as shown in the current Planning Exhibits, would increase the 100-year water surface elevations by more than the permissible amount of 0.10 feet. However, if the pedestrian path is set at the existing top of bank elevation, then the improvements could be implemented under the condition that the Creek Walk would not be accessible during a major storm event.

**Royer Park Improvements:** Based on the conceptual design information currently available for this analysis, the pedestrian bridge and grand staircase, in combination with the relocation of the Ice House Bridge and proposed bike path, would not increase the floodplain elevations at the proposed locations or upstream. However, the favorable results are based on an alignment other than the one presented in the planning exhibits. Consideration of other alignments and configurations for the two bridges will require additional hydraulic analysis. Additionally, the relocated Library Bridge in combination with the new Amphitheater has no significant impact on water surface elevations.

**New 9-Hole Golf Course at Saugstad Park:** Although minimal design information for the proposed golf course is available, a conservative estimate of the potential impacts on the water surface elevations was made by adding one foot of fill over the proposed the golf course area. The resulting impacts are an increase in water surface elevations at the proposed golf course area of up to 0.26 feet with the impact continuing far upstream of Douglas Boulevard. Additional information regarding conditions at the golf course site and a preliminary design is required to perform a more detailed hydraulic analysis.

# **Downtown Specific Plan Hydraulic Study**

## **Introduction**

The City of Roseville is currently creating the Downtown Specific Plan and Royer/Saugstad Park Master Plan. Many elements of the Plan include proposed improvements along the Dry Creek downtown corridor that could potentially impact the existing 100-year floodplain. This document was prepared for the City Planning Department in support of the proposed improvements that are located in the floodplain. The purpose of this report is to present the results of the hydraulic analysis completed by RBF Consulting to determine the potential impacts of those improvements. Recent, detailed topographic data was used to update the existing City-approved model and subsequently used to develop a new model incorporating the proposed improvements for the downtown update and revitalization. The study area encompasses Dry Creek from Folsom Road to south of Douglas Boulevard near Cherry Street, including Royer Park and Saugstad Park. A map of the study area is presented in Figure 1.

## **Background**

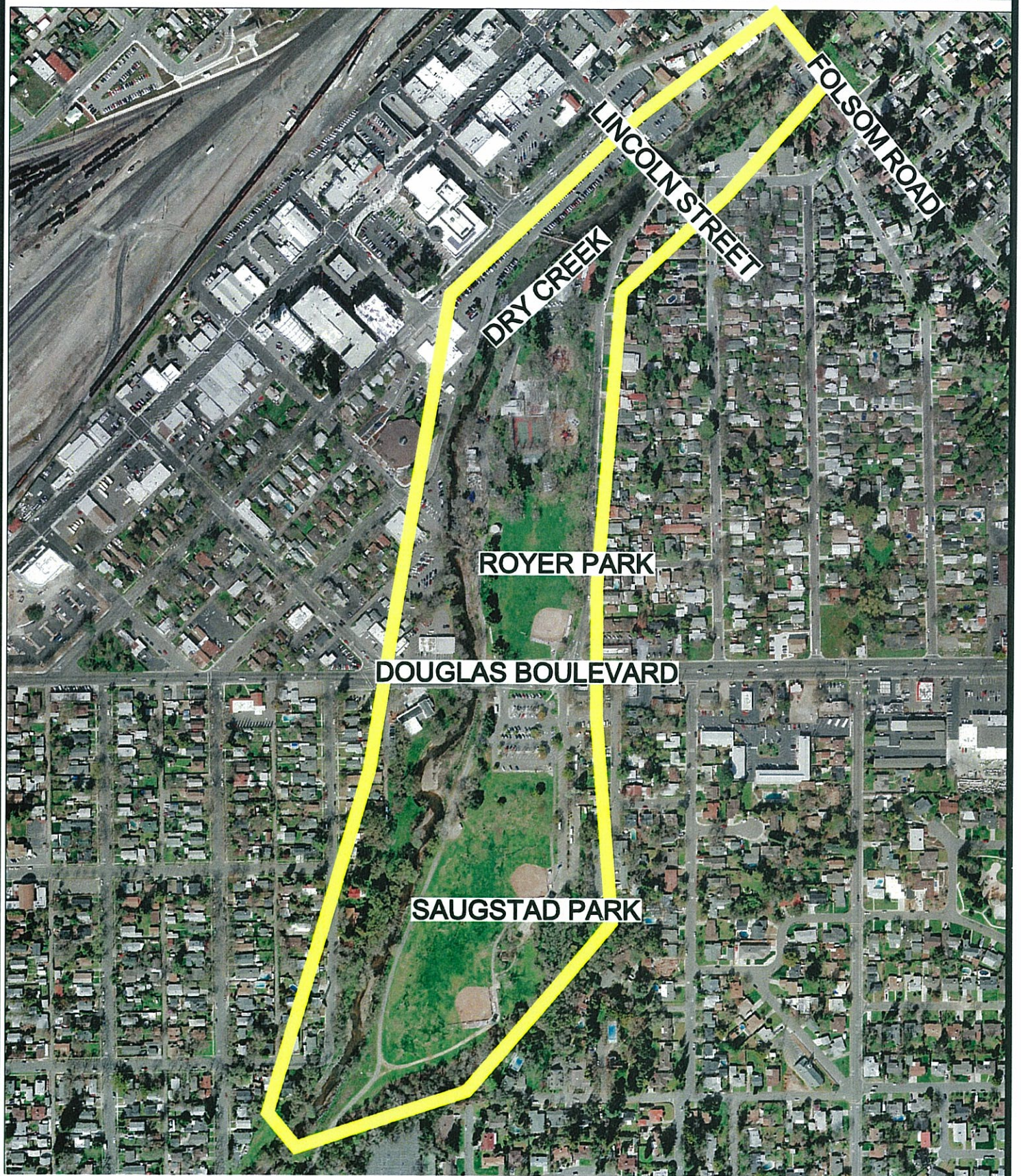
The current HEC-RAS model for Dry Creek, including all of the tributaries in the watershed, was originally developed in HEC-2 format. The model was converted to HEC-RAS and modified to run in the most recently released versions of the software. Revisions have been made to the model by various consultants as development has occurred in the City.

Based on the HEC-RAS hydraulic model developed for City-approved studies, the City has identified a “regulatory floodplain” that exceeds the special flood hazard area mapped by FEMA. Within the regulatory floodplain is the City designated “Nolte Future Floodplain.” The Nolte Future Floodplain model was created using hydrology data representing observed flooding scenarios and projected growth. The regulatory floodplain accepted and referred to by the City is presented in Exhibit A.

## **Adjusted Base Model**

In July of 2007, RBF Consulting completed both aerial and field surveys of the study area. The new topographic data was incorporated into the existing HEC-RAS model for that portion of Dry Creek within the downtown Roseville area. The existing HEC-RAS model for Dry Creek includes Antelope Creek and Cirby Creek, the upstream reaches of the watershed. For this analysis, the reach of Dry Creek, above the confluence with Cirby Creek, was modified from river station 79816 at Folsom Road to river station 75557 at the downstream end of Saugstad Park.

RBF Consulting reviewed and updated the downtown Dry Creek HEC-RAS model for the study area from Folsom Road to Saugstad Park. Changes were made to the existing, or baseline, model based on the new information received from the field and aerial surveys, as well as visual observations and site photographs. The new model for the study area is referred to in the following discussion as the adjusted base model.



**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
FIGURE 1.  
STUDY AREA**

New cross sections were added to the existing HEC-RAS model at approximately 100-foot intervals along the entire study area. The geometry for the new cross sections is based on the field survey data collected in July of 2007. At those locations in the existing model where cross-sections already existed, the geometry data was replaced with the more recent information. The roughness coefficient,  $n$ , used at adjacent existing cross sections was used at each new cross section. The  $n$ -values along the overbanks of the creek were compared to site photos and adjusted as necessary to better represent observed roughness.

Existing bridges in the baseline model that were modeled in the HEC-2 standard method were modified so that the piers and abutments matched the actual bridge geometry.

The deck of the Ice House Bridge is several feet above the 100-year water surface elevation and therefore is not modeled as a bridge crossing. Instead, the abutment on the left bank was represented in the cross-section geometry as an obstruction and ineffective flow areas are included in the geometry of the impacted cross sections. Existing and new river stations and their approximate locations are shown in Exhibit A. Photographs of the bridges located within the study area are presented in Figures 2 through 6.



**Figure 2. Folsom Road Bridge, Looking Upstream from the Left Bank**



**Figure 3. Lincoln Street Bridge, Downstream to the Left**



**Figure 4. Ice House Bridge, Abutment on Left Bank**



**Figure 5. Existing Library Bridge, From Left Bank**



**Figure 6. Douglas Boulevard Bridge, Looking Downstream from the Left Bank**

The minimum channel elevations of existing cross sections were adjusted to reflect the new survey information. The adjusted elevations were determined by linear interpolation of the July 2007 survey data. When compared to the minimum channel elevations in the baseline model, there is a net decrease of 1 to 6 feet. The adjusted minimum channel elevations along the study area are shown in Table 1.

**Table 1. Adjustments to Minimum Channel Elevations**

<b>River Station</b>	<b>Existing Minimum Channel Elevation</b>	<b>Adjusted Minimum Channel Elevation</b>	<b>Delta</b>
79816.7	130.50	129.53	-0.97
<i>79791.7</i>	Folsom Road Bridge		
79766.7	130.70	129.28	-1.42
79715.1	130.50	128.32	-2.18
79468.8	130.50	127.62	-2.88
79243.6	130.00	127.02	-2.98
79194.4	130.00	127.31	-2.69
79191.4	129.50	127.35	-2.15
<i>79166.05</i>	Lincoln Street Bridge		
79140.7	129.50	127.95	-1.55
79128.7	130.30	128.10	-2.20
79077.4	129.80	128.34	-1.46
78804.69	129.50	126.98	-2.52
78736.69	129.10	126.61	-2.49
78341.69	128.50	127.37	-1.13
77679.49	125.80	122.90	-2.90
77631.49	125.20	124.54	-0.66
77606.49	124.80	124.61	-0.19
<i>77603.74</i>	Library Bridge		
77600.99	124.80	124.61	-0.19
77571.99	125.10	119.75	-5.35
77251.49	126.00	123.83	-2.17
77218.99	125.10	122.81	-2.29
<i>77175.89</i>	Douglas Boulevard Bridge		
77132.89	124.00	123.15	-0.85
77078.29	123.60	122.96	-0.64
76871.09	123.10	119.79	-3.31
76536.69	123.10	119.58	-3.52
76150.19	121.30	119.03	-2.27
75780.19	120.70	118.56	-2.14

The minimum channel elevation just upstream of Douglas Boulevard showed a net decrease of approximately 6 feet below the baseline model elevation. Field investigations verified the existence of a large, deep hole in the main channel of the creek between Douglas Boulevard and the Library Bridge. This indicates that scour may be occurring at this location. Further investigations are recommended to determine the need for channel stabilization in this area in conjunction with other improvements to Dry Creek along Royer Park. A profile plot of the minimum channel elevations is included in Appendix A.

Some of the existing buildings adjacent to the creek were not adequately represented in the baseline model. Existing buildings, as well as existing fences that are perpendicular to the direction of flow, were added to the model from Folsom Road to Douglas Boulevard to Cherry Street at Saugstad Park. On the left overbank, the Veteran's Building, the tennis court fencing, baseball field fencing, and bathroom and maintenance buildings are represented in the cross section overbank areas as obstructions. Existing homes along Park Drive were also added to the left overbank area. On the right overbank, the library building and the courthouse were added as obstructions at the nearest adjacent cross sections. At river station 77251, the right overbank area was extended to better represent the existing ground elevations. The existing building immediately adjacent to the creek was represented in the adjusted base model as an obstruction.

Contractions and expansions in the flow at bridge crossings and buildings and structures in the floodplain create ineffective flow areas. Typically, a contraction ratio of 1:1 upstream and an expansion ratio ranging from 2:1 to 4:1 downstream of obstructions and bridges are used to establish the limits of ineffective flow. Ineffective flow areas are areas of the cross section that will contain water that is not actively being conveyed. Ineffective flow areas are often used to describe portions of a cross section in which water will pond, but the velocity of that water, in the downstream direction, is close to or equal to zero. This water is included in the storage calculations and other wetted cross section parameters, but it is not included as part of the active flow area. Improvements within existing ineffective flow areas will not have a significant effect on calculated water surface elevations along this portion of Dry Creek. Station and elevation data defining the limits of the existing ineffective flow areas were adjusted, or otherwise added to, the geometry data for each impacted cross section in the model. Potential improvement areas throughout the study area are presented in Exhibit B. The floodplain is divided into two areas: Improvements Permitted and Improvements May Have Impacts – Detailed Study Required.

The adjustments to the baseline model resulted in an overall decrease in the 100-year water surface elevation at the upstream limit of the study area near Folsom Road Bridge. The change in water surface elevations within the study area ranges from +0.64 feet at river station 76536 (near Saugstad Park) to -0.60 feet at river station 79715 (just downstream of Folsom Road). A comparison of the water surface elevations for the baseline model and the adjusted base model are presented in Table 2. HEC-RAS output data for the Adjusted Base model, including output tables and cross section plots, is presented in Appendix A.

**Table 2. Comparison of Water Surface Elevations between Baseline Model and Adjusted Base Model**

<b>River Station</b>	<b>Baseline</b>	<b>Adjusted Base</b>	<b>Delta</b>
79816.7	148.06	147.92	-0.14
79791.7	Folsom Road Bridge		
79766.7	147.19	146.80	-0.39
79715.1	147.18	146.58	-0.60
79468.8	146.98	146.62	-0.36
79191.4	145.73	145.76	0.03
79166.05	Lincoln Street Bridge		
79140.7	145.39	145.43	0.04
79128.7	144.65	144.16	-0.49
79077.4	144.81	144.55	-0.26
78804.69	143.77	143.88	0.11
78736.69	142.91	143.49	0.58
78341.69	143.08	143.19	0.11
77631.49	142.40	142.42	0.02
77606.49	142.34	142.38	0.04
77603.74	Library Bridge		
77600.99	142.33	142.37	0.04
77571.99	142.30	142.36	0.06
77251.49	142.11	142.19	0.08
77218.99	142.07	142.00	-0.07
77175.89	Douglas Boulevard Bridge		
77132.89	141.34	140.84	-0.50
77078.29	140.51	140.69	0.18
76536.69	139.86	140.50	0.64
76150.19	139.60	139.55	-0.05
75780.19	139.40	139.47	0.07

## **Velocity Distributions**

Utilizing the Adjusted Base model, the bank-full flow condition and the resulting velocity distributions were analyzed for three sections of the study area:

### ***Folsom Road to Lincoln Street***

The bank-full flow condition occurs at a flow of 2,500 cubic feet per second (cfs), which is 57% of the 10-year flow. The resulting velocity distribution ranges from 4.4 to 6.4 feet per second (fps) at the centerline of the channel to 1 fps near the banks of the channel. The velocity distribution at river station 79708 is included in Appendix B as a typical distribution for the sections from Folsom Road to Lincoln Street.

### ***Lincoln Street to Douglas Boulevard***

The bank-full flow condition occurs at a flow of 4,360 cfs, which is 100% of the 10-year flow. Typically, only the 2-year event is contained in the bank-full flow condition. The resulting velocity distributions range from 5.6 to 9.5 fps at the centerline of the channel to 1 fps near the banks of the channel. At river stations 78678 and 77571, there was a significant change in minimum channel elevation between the baseline model and the adjusted base model. The velocity distributions for these two sections are included in Appendix B.

### ***Saugstad Park (Downstream of Douglas Boulevard)***

The bank-full flow condition occurs at a flow of 1,000 cfs, which is 17% of the 10-year flow. The resulting velocity distributions range from less than 1.1 fps to 3.5 fps at the centerline of the channel to less than 1 fps near the banks of the channel. The typical velocity distribution along Saugstad Park is represented by river station 76158 and is included in Appendix B.

## **Downtown Specific Plan Phased Improvements**

A copy of the City's Royer/Saugstad Park Master Plan Update, Illustrative Plan, is presented in Figure 7. Cross section geometry in the Adjusted Base model was modified to reflect the proposed improvements within the floodplain, including the proposed fire station near the Lincoln Street Bridge, the proposed bike path between Lincoln Street and Folsom Road, the downtown pedestrian bridge, a relocated Ice House Bridge, new bike path on the left bank and other improvements along Royer Park.



**LEGEND**

**CONNECTIONS**

- C1 DOWNTOWN BRIDGE
- C2 MIDBLOCK CROSSWALK 1
- C3 MIDBLOCK CROSSWALK 2
- C4 GRAND STAIRCASE, RAMP & WATER FEATURE
- C5 OAK STREET REALIGNMENT
- C6 RELOCATED ICE HOUSE BRIDGE
- C7 CREEK WALK
- C8 LIBRARY BRIDGE
- C9 CLASS 1 BIKEWAY
- C10 DOWNTOWN GATEWAY AND STREET TREES
- C11 STEEP TREES
- C12 WALKWAYS
- C13 GRANT STREET
- C14 WALKWAY DEVELOPMENT (MU)
- C15 TOWN SQUARE
- C16 VETERAN'S GARDEN
- C17 LIBRARY AMPHITHEATRE
- C18 CREEK ACCESS
- C19 "DIT" CREEK JUMP
- C20 INTERACTIVE WATER FEATURE/SANITATION PLAZA
- C21 CREEK INSPIRED ART ELEMENT PLAZA
- C22 EXPANDED BASKETBALL
- C23 SOUTH GROUP PICNIC
- C24 RENOVATED NORTH GROUP PICNIC
- C25 PARK CAFE AND TREE BOSQUE
- C26 RENOVATION WHELF
- C27 LIBRARY IMPROVEMENTS
- C28 RENOVATED PARKING LOT & DROP OFF
- C29 TENNIS COURTS
- C30 SAUGSTAD PARK IMPROVEMENTS
- C31 PUBLIC SAFETY BUILDING (PSB)
- C32 BUILD BETWEEN THE BRIDGES
- C33 CREEK RESTORATION & FLOOD CONVEYANCE
- C34 BANK RECONTOURING
- C35 CREEK RESTORATION/ENTRIES
- C36 RIPARIAN FOREST THROUGHOUT CREEK CORRIDOR
- C37 RIPARIAN PLANT DEMONSTRATION GARDEN
- C38 FLOOD PLAIN ENHANCEMENT

The following areas were examined in the Adjusted Base model to determine the net effect of the proposed improvements on the 100-year water surface elevations:

***Proposed Fire Station Site (Stand Alone Improvements)***

The City proposes to purchase additional land at the corner of Lincoln Street and Linda Drive to construct a new fire station headquarters facility. The intended improvements include an expanded parking lot and new fire station and administration building. Cross-section geometry in the Adjusted Base model was modified to reflect the proposed improvements, per the preliminary site plan for the “Headquarters Fire Station” received from the City Planning Department.

Per the City’s published Design Standards, dated March 2007, the minimum finish grade elevation at the expanded parking lot was assumed to be one foot below the 100-year water surface elevation. Cross sections adjacent to the proposed parking lot, as well as the existing lot, were adjusted to reflect the proposed elevation. The result is a net fill of approximately 2 feet at the new parking lot and a cut of approximately 1 foot at the existing parking lot. Obstructions and areas of ineffective flow were added to the model or revised to account for the proposed fire station buildings. A majority of the proposed fire station site and new parking lot is located within existing ineffective flow areas created by the contraction at the Lincoln Street Bridge and the existing fence located at river station 79540. Results indicate a slight increase in the water surface elevation at more than one cross section adjacent to the proposed improvements. Although the increases range from 0.01 feet to 0.08 feet and are within the City’s acceptable limits, it is preferred that the impact of improvements be isolated, rather than continuing several thousand feet upstream.

***Proposed Fire Station Site (with Bike Trail Improvements and Undercrossing)***

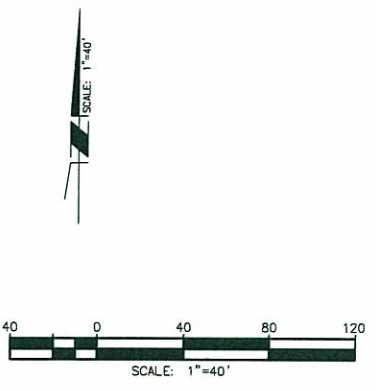
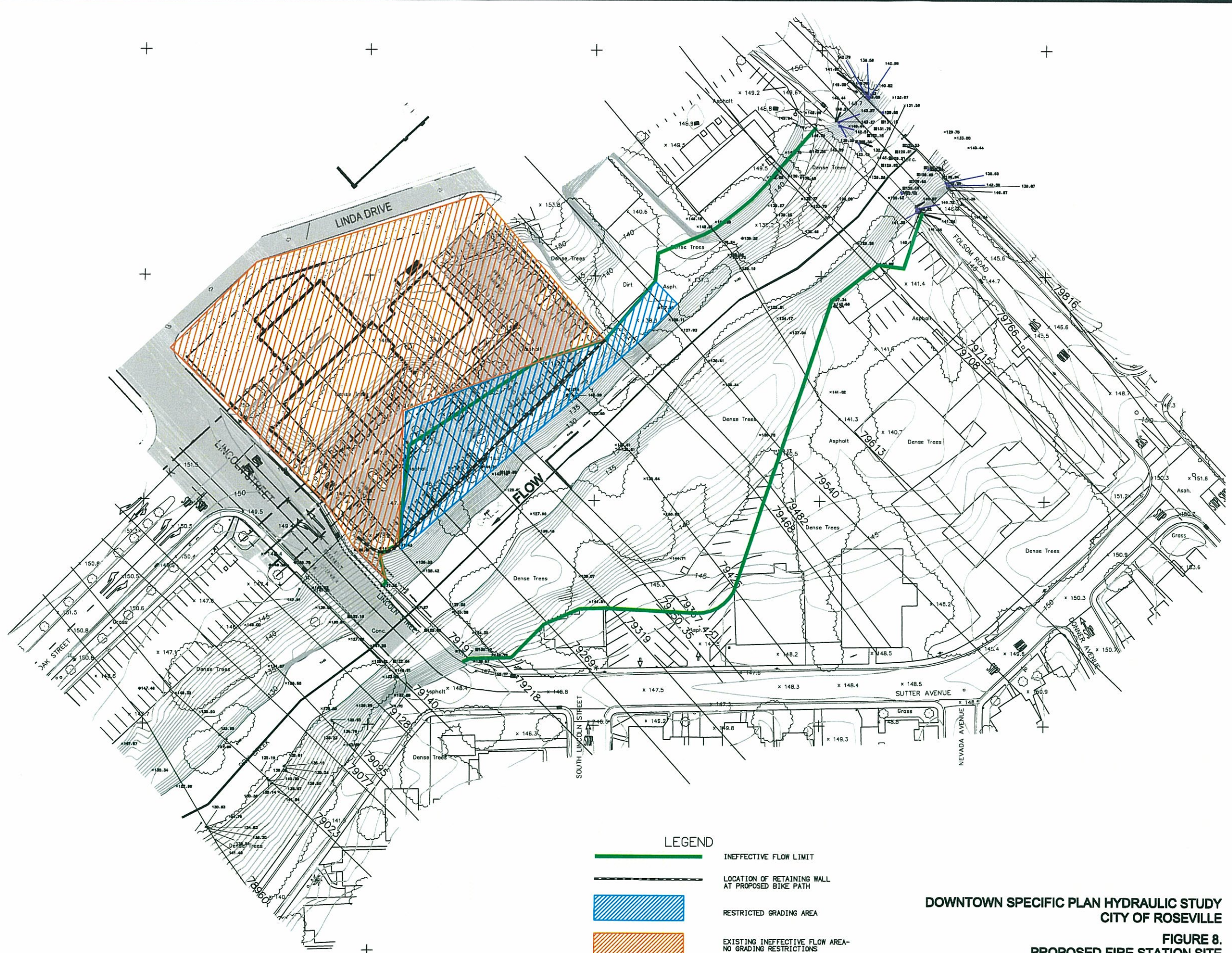
From river station 79816 to 79482, the Adjusted Base model was edited to reflect the proposed bike path currently being designed for the City. The geometry of the proposed bike path is based on the 60% design plans for the “Royer Park to Harding Blvd. Bike Trail” prepared by URS, dated March 2007. The plans include improvements for the bike path from the northeast corner of the existing parking lot to Folsom Road and beyond to Harding Boulevard. A copy of the partial plan set is included in Appendix C. The typical section in this design has a ‘bench’ of 14 feet to accommodate the paved bike path.






RBF prepared a conceptual design for the bike path from the northeast corner of the existing lot to the downstream side of Lincoln Street, per discussions with City staff. The conceptual design includes a crossing under the existing bridge at Lincoln Street. The width of the bike path bench in the cross section geometry was increased to 18 feet, based on the City standards. To minimize the impact on the existing parking lot area due to the bike path design elevation and maximum design grades, the typical section represented in the model includes a retaining wall adjacent to the parking lot. Cross sections from 79468 to 79218 were edited to reflect the proposed bike path and retaining wall.

The net effect of the proposed fire station and bicycle path improvements would be a decrease in water surface elevations from Lincoln Street to Folsom Road. At two cross sections, 79191 and 79218, just upstream of Lincoln Street, the change in water surface

elevation is 0.06 feet and 0.08 feet, respectively. These two sections are located within 80 feet of the upstream face of the bridge. The slight increase in water surface elevation is isolated to that location where the overall increase in flow area is impacted by the contraction caused by the bridge. *Based on the results of the hydraulic model, there is no significant increase in water surface elevations between Lincoln Street and Folsom Road if the proposed fire station improvements are constructed in combination with the proposed bike path and undercrossings.*

The water surface profile for each of the two scenarios, Fire Station and Fire Station with Bike Path, are presented in Table 3. Figure 8 presents the preliminary layout of the proposed fire station, the proposed bike path, existing ineffective flow limits and the location of the proposed retaining wall. Presented in Appendix D are plots of the cross sections adjacent to the fire station parking lot that incorporate the proposed grading adjustments and bike path design. Typical sections show the preliminary design parameters for the bike path adjacent to the site.



- LEGEND**
-  INEFFECTIVE FLOW LIMIT
  -  LOCATION OF RETAINING WALL AT PROPOSED BIKE PATH
  -  RESTRICTED GRADING AREA
  -  EXISTING INEFFECTIVE FLOW AREA- NO GRADING RESTRICTIONS
  -  79425 HEC-RAS CROSS-SECTION

**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
CITY OF ROSEVILLE**

**FIGURE 8.  
PROPOSED FIRE STATION SITE**

**RBF**  
CONSULTING

PLANNING ■ DESIGN ■ CONSTRUCTION

207 ARDEN BOULEVARD, SUITE 200  
SACRAMENTO, CALIFORNIA 95834-2303  
916.228.1100 ■ FAX 916.228.9707 ■ WWW.RBF.COM

**Table 3. Dry Creek 100-year Water Surface Elevations (WSEL) for Adjusted Base, Fire Station, and Fire Station with Bike Path Scenarios**

Dry Creek 100-Year WSEL (ft)					
River Station	Adjusted Base	Proposed Fire Station - without Bike Path	Delta	Proposed Fire Station with Bike Path	Delta
84214.4	154.16	154.17	0.01	154.16	-0.01
84011.8	153.77	153.77	0.00	153.76	-0.01
83548.9	153.06	153.07	0.01	153.04	-0.02
83181.9	152.54	152.55	0.01	152.52	-0.02
82911.9	151.93	151.94	0.01	151.91	-0.02
82629.7	151.44	151.46	0.02	151.41	-0.03
82269.7	151.30	151.31	0.01	151.26	-0.04
81989.7	151.19	151.21	0.02	151.16	-0.03
81669.7	150.99	151.01	0.02	150.95	-0.04
81379.7	150.56	150.59	0.03	150.51	-0.05
81041.2	150.00	150.03	0.03	149.93	-0.07
80726.2	149.55	149.60	0.05	149.47	-0.08
80434.1	149.30	149.35	0.05	149.21	-0.09
80225.1	148.12	148.20	0.08	147.99	-0.13
79852.1	148.24	148.31	0.07	148.11	-0.13
79816.7	147.92	148.00	0.08	147.76	-0.16
79791.7	Folsom Road Bridge				
79766.7	146.80	146.87	0.07	146.70	-0.10
79715.1	146.58	146.63	0.05	146.25	-0.33
79708	146.68	146.75	0.07	146.53	-0.15
79613	146.77	146.83	0.06	146.59	-0.18
79540	146.70	146.76	0.06	146.54	-0.16
79482	146.67	146.73	0.06	146.52	-0.15
79468.8	146.62	146.64	0.02	146.51	-0.11
79425	146.46	146.50	0.04	146.44	-0.02
79367	146.13	146.15	0.02	146.10	-0.03
79350	146.11	146.13	0.02	146.08	-0.03
79319	146.07	146.13	0.06	146.08	0.01
79269.*	145.89	145.88	-0.01	145.89	0.00
79218	145.62	145.61	-0.01	145.70	0.08
79191.4	145.76	145.75	-0.01	145.82	0.06
79166.05	Lincoln Street Bridge				
79140.7	145.43	145.42	-0.01	145.41	-0.02

## **Royer Park**

The Adjusted Base model was modified to reflect proposed improvements along Dry Creek from Lincoln Street to Douglas Boulevard and Saugstad Park. Information received from the City regarding the proposed improvements is at the conceptual design level. Planning exhibits, including the “Royer/Saugstad Park Master Plan Update, Illustrative Plan” and “Sections/Elevations,” were utilized to determine the design assumptions used to modify the cross section geometry. The edited Adjusted Base model is referred to as the ‘Proposed Improvements’ model.

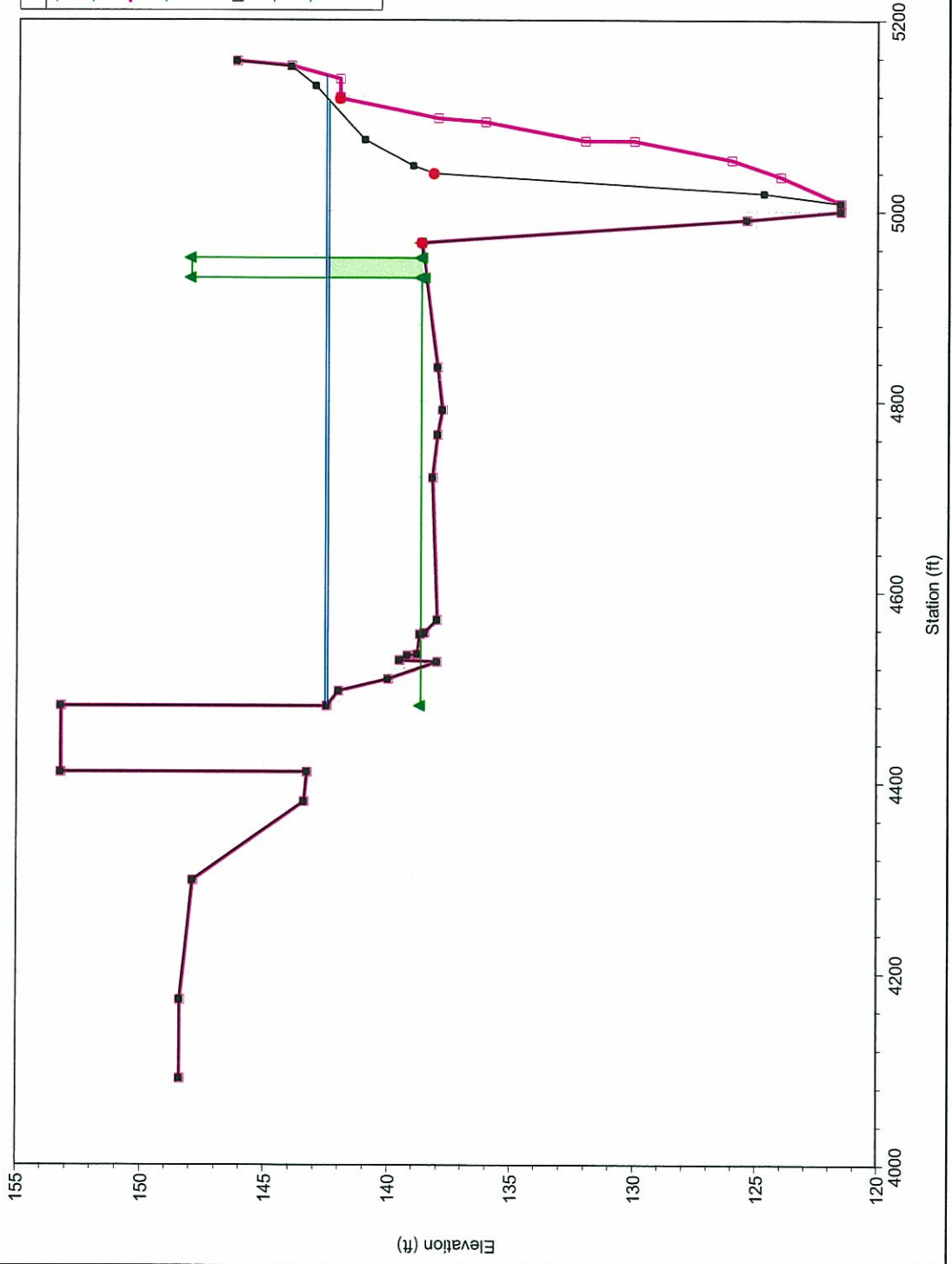
The existing library bridge located at river station 77603 in the Adjusted Base model, was moved upstream to river station 77700 in the edited model according to the location shown in the Illustrative Plan. Bridge geometry and dimensions for the proposed new bridge are based on the plan and section exhibits for the Library Bridge, Section B. The Library Bridge relocation is proposed in combination with a creek bank lay back at the Amphitheater. The right bank at river stations 77807, 77718, 77678 and 77631 was modified to reflect the proposed design shown in Section B. The improvements extend to Royer Street and would effectively remove the short extension of Taylor Street that currently exists adjacent to the existing courthouse. Figures 9 and 10 are plots of river stations 77807 and 77718 showing the modified geometry due to the proposed improvements compared to the existing geometry. The effect of the new bridge on the water surface elevations is negligible given that a similar bridge currently exists just downstream. The creek bank modifications at the proposed Amphitheater provide additional flow area. An increase in flow area reduces the slope of the energy grade, resulting in an expected increase in the depth of flow. There is a slight increase in the water surface elevations for approximately 200 feet upstream of the proposed bridge location, however, the increase is 0.09 feet or less.

A pedestrian bridge and grand staircase is proposed as a new connection between the Civic Center and Royer Park. Preliminary bridge geometry and dimensions for the proposed bridge are based on the plan and section exhibits for the Downtown Pedestrian Bridge, Section D. Based on the conceptual drawings, the pedestrian bridge deck is intended to be above the level of the 100-year water surface elevation. This is similar to the existing conditions at the Ice House Bridge; therefore, a new bridge crossing was not added to the model. Instead, the alignment of the bridge was adjusted so that the location of the necessary support structure on the park side of the creek is within the existing ineffective flow area. An obstruction was added to the cross section geometry to represent this structure.

The Ice House Bridge currently spans Dry Creek at a level above the 100-year water surface elevation, and the existing ramp and abutment just north of the Veteran’s building have a minimal impact on the flow in the floodplain. If the Ice House Bridge were realigned, as indicated in the Illustrative Plan and Exhibit B, the required access ramp structure would impede the flow in the floodplain and could cause an increase in water surface elevations. A realignment of the Ice House Bridge is intended to convey the proposed bike path from the park on the left bank across the creek to the right bank. The proposed bike path is intended to pass under the pedestrian bridge. Cross sections near the proposed pedestrian bridge were modified to include a bike path ‘bench’ similar to that being used for the bike path design near the fire station. Modifying the geometry

### Dry Creek

Geom: Dry Creek Royer Park - ADJUSTED BASE Flow: Dry Creek Shed  
 River = Dry Creek Reach = Above Cirby RS = 77718 Added July 2007

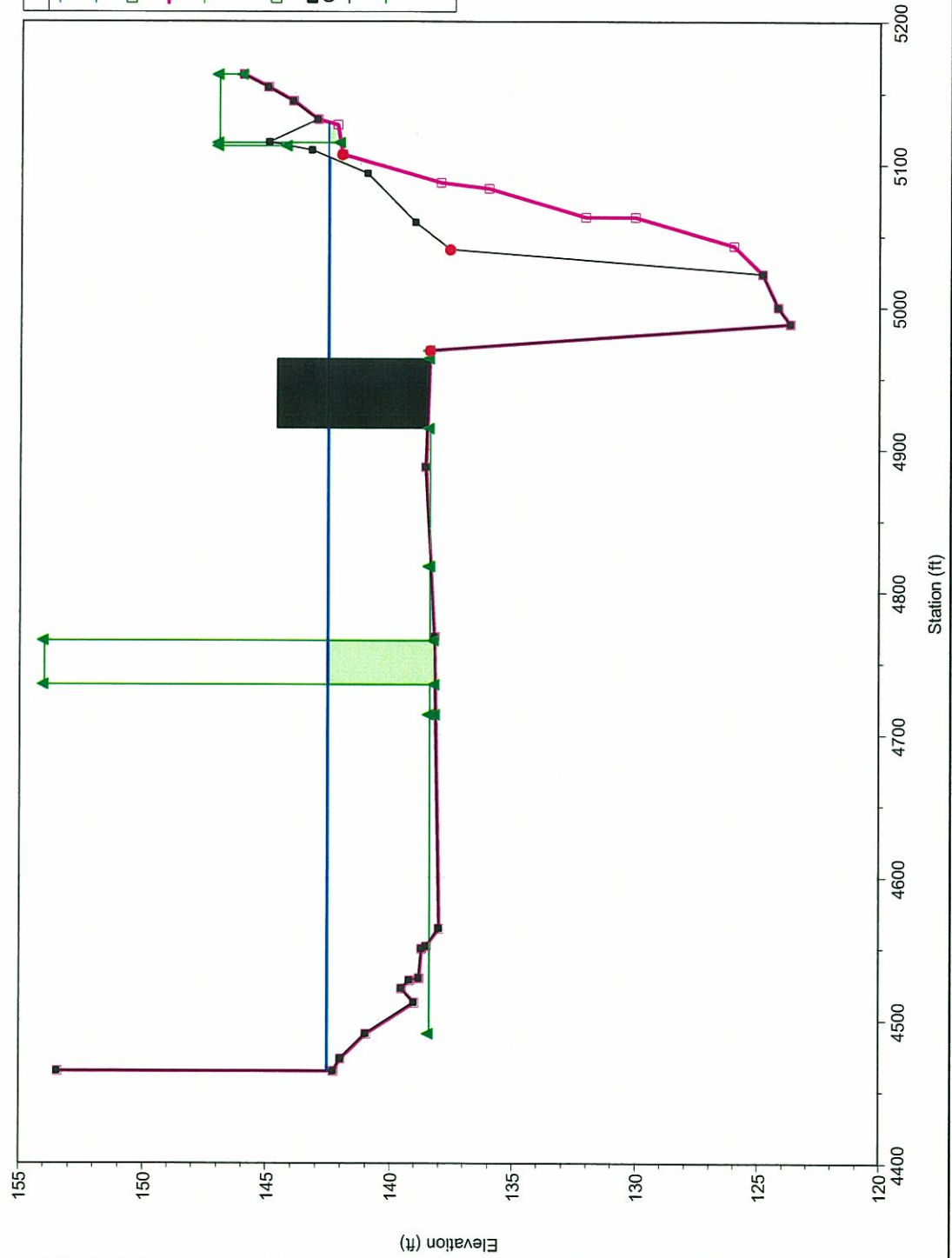


#### Legend

- WS 100 - Prop. Imp
- WS 100 - Adj Base
- Ground - Prop. Imp
- Ineff. Flow - Prop. Imp
- Bank Stat - Prop. Imp
- Ineff. Flow - Adj Base
- Ground - Adj Base
- Ineff. Flow - Adj Base
- Bank Stat - Adj Base

### Dry Creek

Geom: Dry Creek Royer Park - ADJUSTED BASE Flow: Dry Creek Shed  
 River = Dry Creek Reach = Above Cirby RS = 77807 Added July 2007



Legend	
WS 100 - Prop. Imp	(Blue line)
WS 100 - Adj Base	(Black line)
Ineff. Flow - Prop. Imp	(Green line with triangles)
Ground - Prop. Imp	(Pink line with squares)
Ineff. Flow - Prop. Imp	(Green line with triangles)
Bank Stat - Prop. Imp	(Red dot)
- Royer Park -	(Black rectangle)
Obstruction - Adj Base	(Black rectangle)
Ground - Adj Base	(Black line)
Ineff. Flow - Adj Base	(Green line with triangles)
Bank Stat - Adj Base	(Red dot)

to account for the bike path increased the flow area at those cross sections and offsets any potentially negative impacts due to the abutment structures at both the realigned Ice House Bridge and the proposed pedestrian bridge.

Based on the conceptual design of the proposed Creek Walk, as shown in the planning exhibits, the pedestrian path on the right bank of the creek is intended to be above the 100-year flood level. Under existing conditions, there is significant storage volume available on the right overbank of the creek during the 100-year storm event. If the right bank elevation is raised to accommodate the Creek Walk (approximately 4 feet at some locations), the existing storage areas would be effectively cut off from the floodplain and water surface elevations from Douglas Boulevard to Lincoln Street could increase significantly.

According to the proposed plans for the Downtown improvements, the pair of existing tennis courts in Royer Park will be removed and relocated to Saugstad Park. Removal of the tennis courts, and the approximately 18-foot high chain link fence enclosure, from the existing floodplain significantly increases the effective flow area from river station 78118 to 77890.

Preliminary plans for the Saugstad Park area also include the removal of the baseball fields and related buildings to accommodate a proposed 9-hole golf course. Design of the golf course has not yet been begun. For the purposes of this study, the City requested that the hydraulic model be modified to simulate a one-foot fill over the area from river station 76709 to 75780. This is a conservative representation of the potential golf course impacts. Results of the analysis indicate increases in the water surface elevations at the modified cross sections of up to 0.26 feet. The impact perpetuates upstream of the park and Douglas Boulevard.

A comparison of the resulting water surface elevations for the Proposed Improvements model without the golf course modifications to the Adjusted Base model is presented in Table 4.

**Table 4. Dry Creek 100-year Water Surface Elevations for Existing Conditions and Proposed Improvements**

River Station	Adjusted Base	Proposed Improvements	Delta
79191.4	145.76	145.60	-0.16
79166.05	Lincoln Street Bridge		
79140.7	145.43	145.23	-0.19
79128.7	144.16	144.19	0.03
79095	144.57	144.60	0.03
79077.4	144.55	144.58	0.03
79023	144.51	144.55	0.04
78960	144.30	144.34	0.04
78804.69	143.88	143.92	0.04
78736.69	143.49	143.54	0.05
78678	142.76	142.82	0.07
78629	143.11	143.17	0.06
78597		142.80	n/a
78546		142.86	n/a
78541		143.09	n/a
78492	143.14	143.17	0.02
78385	142.96	142.88	-0.08
78341.69	143.19	143.05	-0.14
78295	143.14	142.96	-0.17
78187	143.07	142.89	-0.18
78118	142.94	142.81	-0.13
78080	142.74	142.66	-0.08
78014.99	142.71	142.65	-0.06
77943	142.69	142.60	-0.09
77890	142.56	142.58	0.02
77807	142.52	142.58	0.06
77718	142.46	142.55	0.09
77705		142.47	n/a
77700	New Library Bridge		
77692		142.44	n/a
77679.49	142.45	142.47	0.02
77631.49	142.42	142.44	0.02
77606.49	142.38	142.34	-0.04
77603	Old Library Bridge		
77600.99	142.37	142.34	-0.03
77571.99	142.36	142.33	-0.03
77505	142.34	142.30	-0.03
77436	142.28	142.25	-0.03
77338	142.19	142.16	-0.03
77251.49	142.19	142.15	-0.03
77218.89	142.00	141.96	-0.04
77175.89	Douglas Boulevard Bridge		
77132.89	140.84	140.64	-0.20

## **Recommendations**

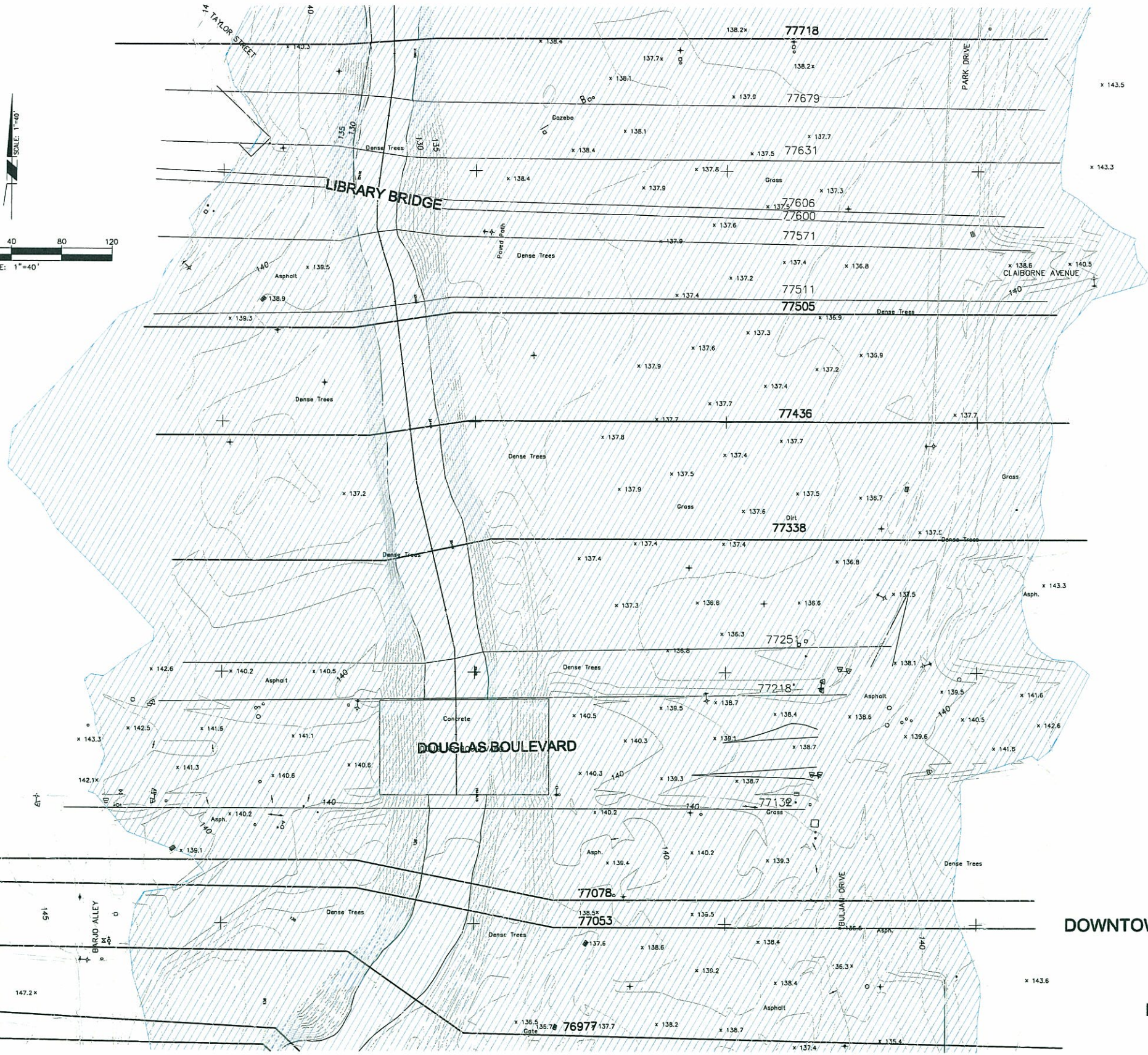
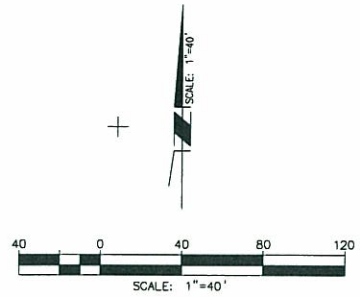
During preparation of this report, the City was evaluating the purchase of the additional lot required to develop the proposed fire station headquarters site. Figure 8 was prepared at the request of the Planning Department to present the results of the hydraulic modeling of Dry Creek to determine the impacts of the proposed building, parking lot expansion and bike path. ***The combined result of the proposed improvements between Lincoln Street and Folsom Road would be a reduction in water surface elevations for the 100-year flood event. This condition proves favorable for the purchase of the additional property and the development of the headquarters building.***

The Creek Walk element, if designed as shown in the current Planning Exhibits, would increase the 100-year water surface elevations by more than the permissible amount of 0.10 feet. However, if the design elevation of the pedestrian path is set at the existing top of bank elevation, than the improvement could be implemented under the condition that the Creek Walk would not be accessible during a major storm event.




The Library Bridge relocation is proposed in combination with an amphitheater feature. The creek bank modifications at the proposed Amphitheater provide additional flow area. An increase in flow area reduces the slope of the energy grade, resulting in an expected increase in the depth of flow. There is a slight increase in the water surface elevations for approximately 200 feet upstream of the proposed bridge location, however, the increase is 0.09 feet or less. The effect of the new bridge on the water surface elevations is negligible given that a similar bridge currently exists just downstream and will be removed.

***Based on the conceptual design information currently available for this analysis, the pedestrian bridge and grand staircase, in combination with the relocation of the Ice House Bridge and proposed bike path extension, would not increase the floodplain elevations at the proposed locations or upstream.*** However, the favorable results are based on an alignment other than the one presented in the planning exhibits. Consideration of other alignments and configurations for the two bridges will require additional hydraulic analysis.

At this time there is minimal design information for the proposed golf course at Saugstad Park. A conservative estimate of the potential impacts on the water surface elevations was made by adding one foot of fill over the proposed the golf course area. The resulting impacts are an increase in water surface elevations at the proposed golf course area of up to 0.26 feet with the impact continuing far upstream of Douglas Boulevard. Additional information regarding conditions at the golf course site and preliminary design is required to perform a more detailed hydraulic analysis.



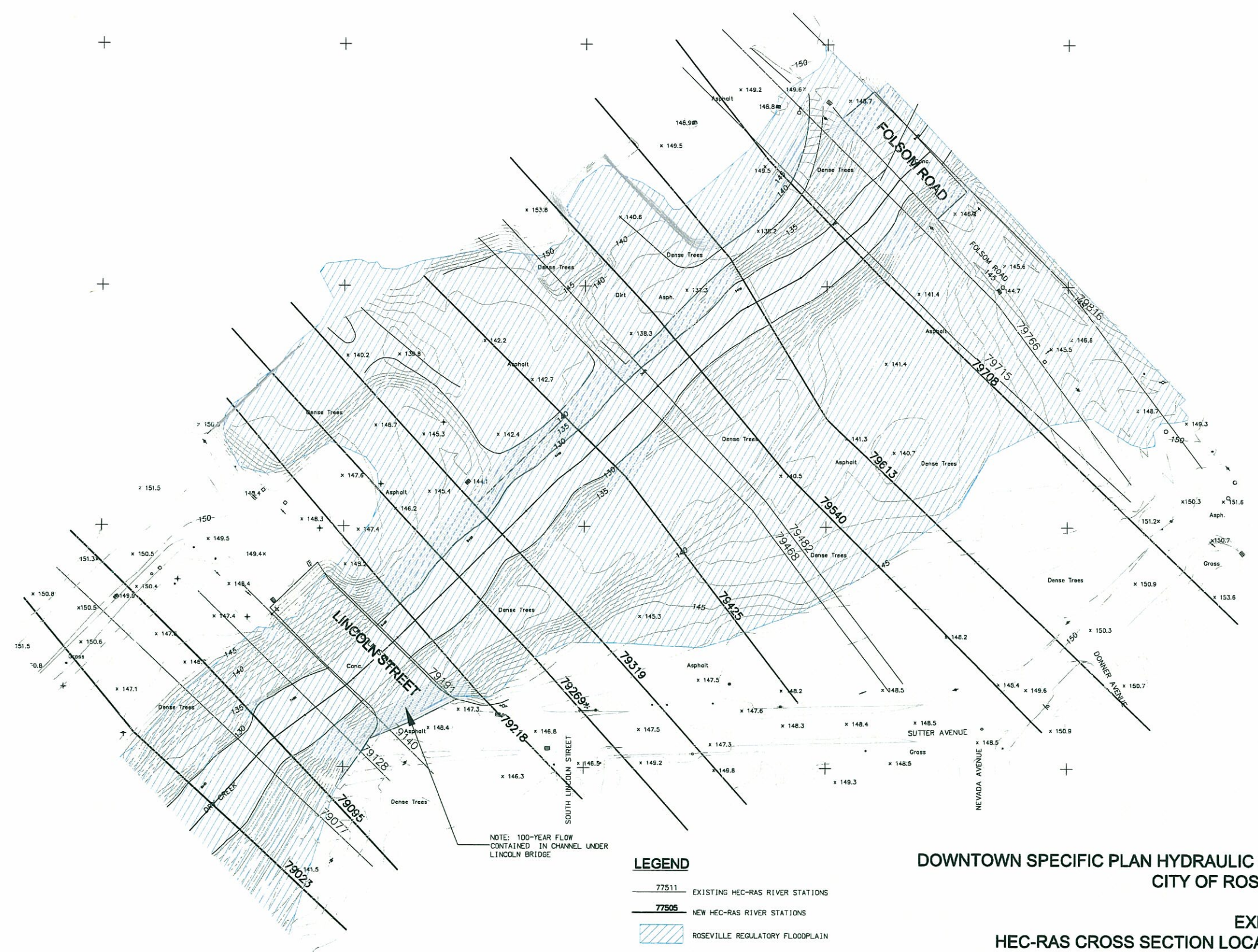
**LEGEND**

-  77511 EXISTING HEC-RAS RIVER STATIONS
-  77505 NEW HEC-RAS RIVER STATIONS
-  ROSEVILLE REGULATORY FLOODPLAIN

**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
CITY OF ROSEVILLE**




**EXHIBIT A  
HEC-RAS CROSS SECTION LOCATIONS  
SHEET 1 OF 4**

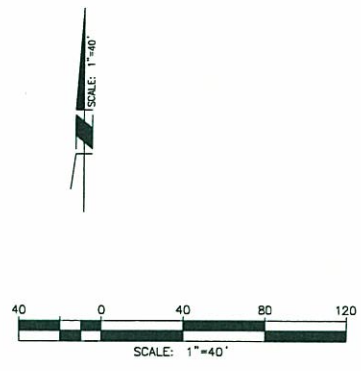


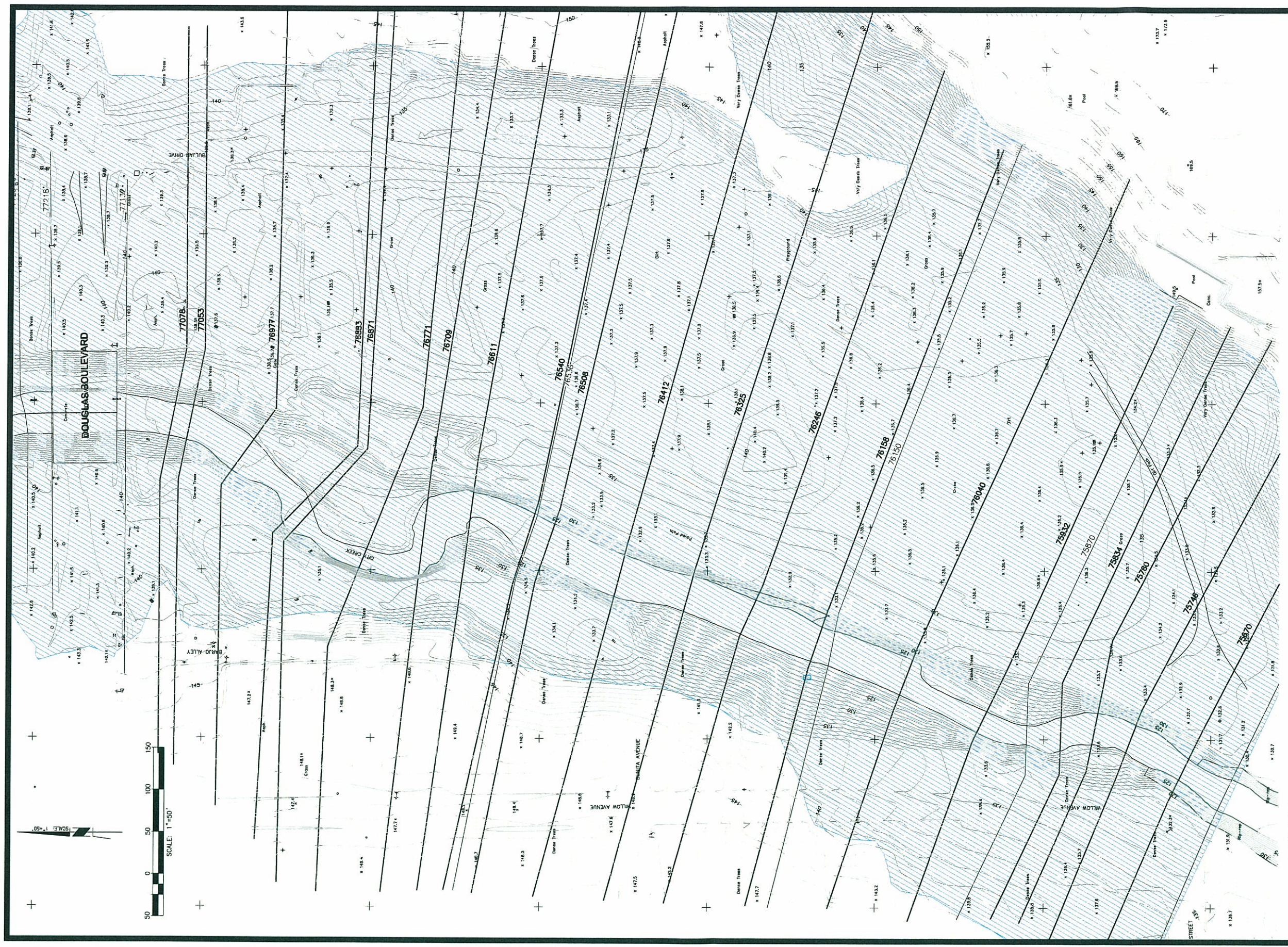


**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
CITY OF ROSEVILLE**

**EXHIBIT A  
HEC-RAS CROSS SECTION LOCATIONS  
SHEET 3 OF 4**

- LEGEND**
-  77511 EXISTING HEC-RAS RIVER STATIONS
  -  77505 NEW HEC-RAS RIVER STATIONS
  -  ROSEVILLE REGULATORY FLOODPLAIN



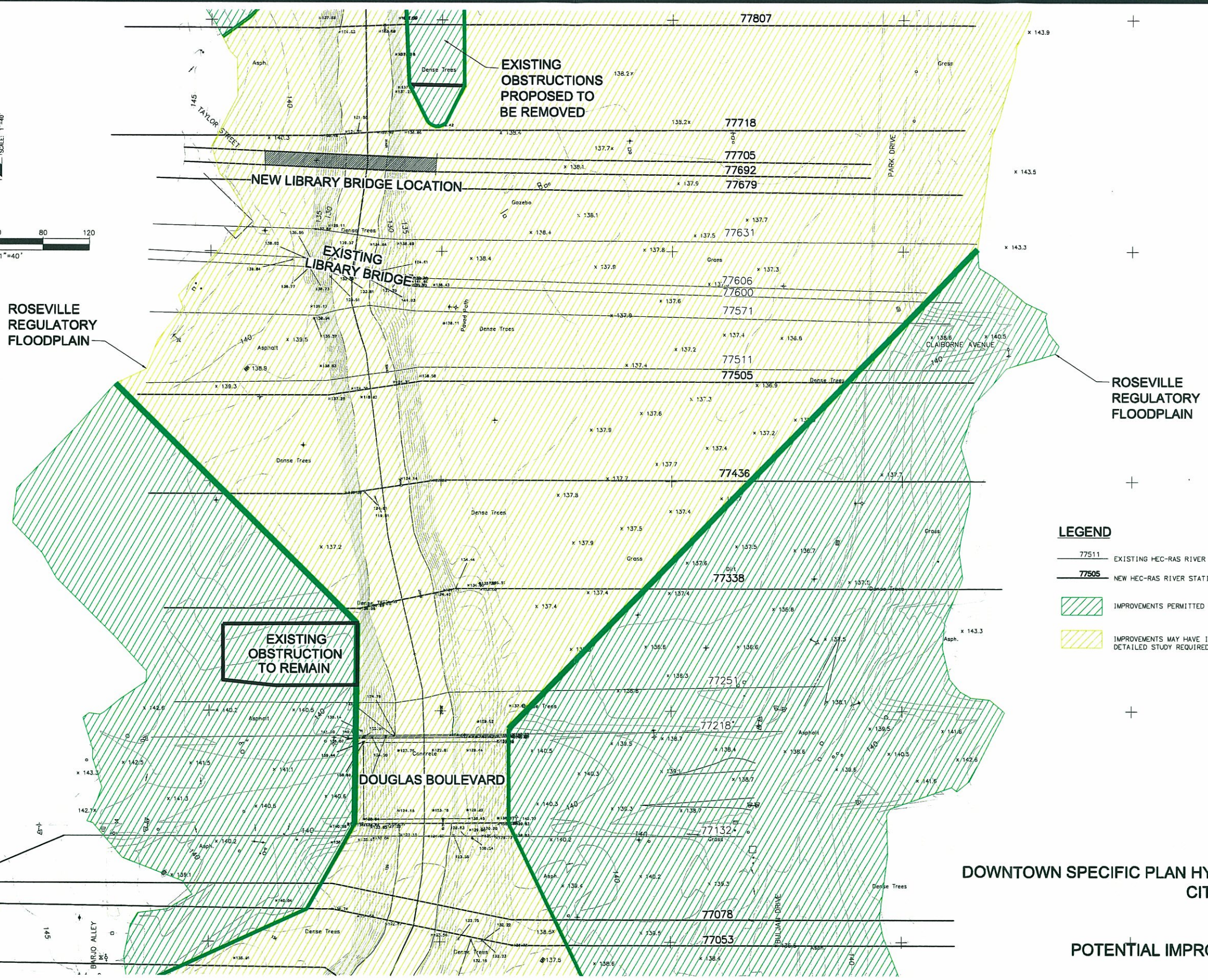
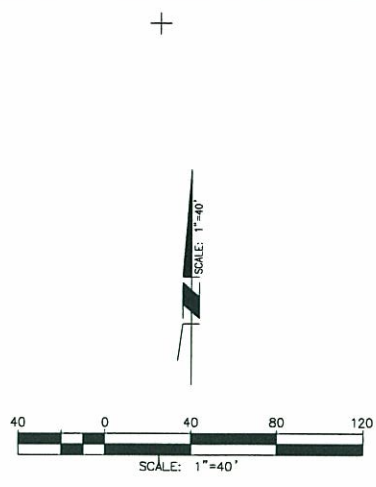


**LEGEND**

- 7511 EXISTING HEC-RAS RIVER STATIONS
- 7805 NEW HEC-RAS RIVER STATIONS
- ROSEVILLE REGULATORY FLOODPLAIN

**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
CITY OF ROSEVILLE**

**EXHIBIT A  
HEC-RAS CROSS SECTION LOCATIONS  
SHEET 4 OF 4**

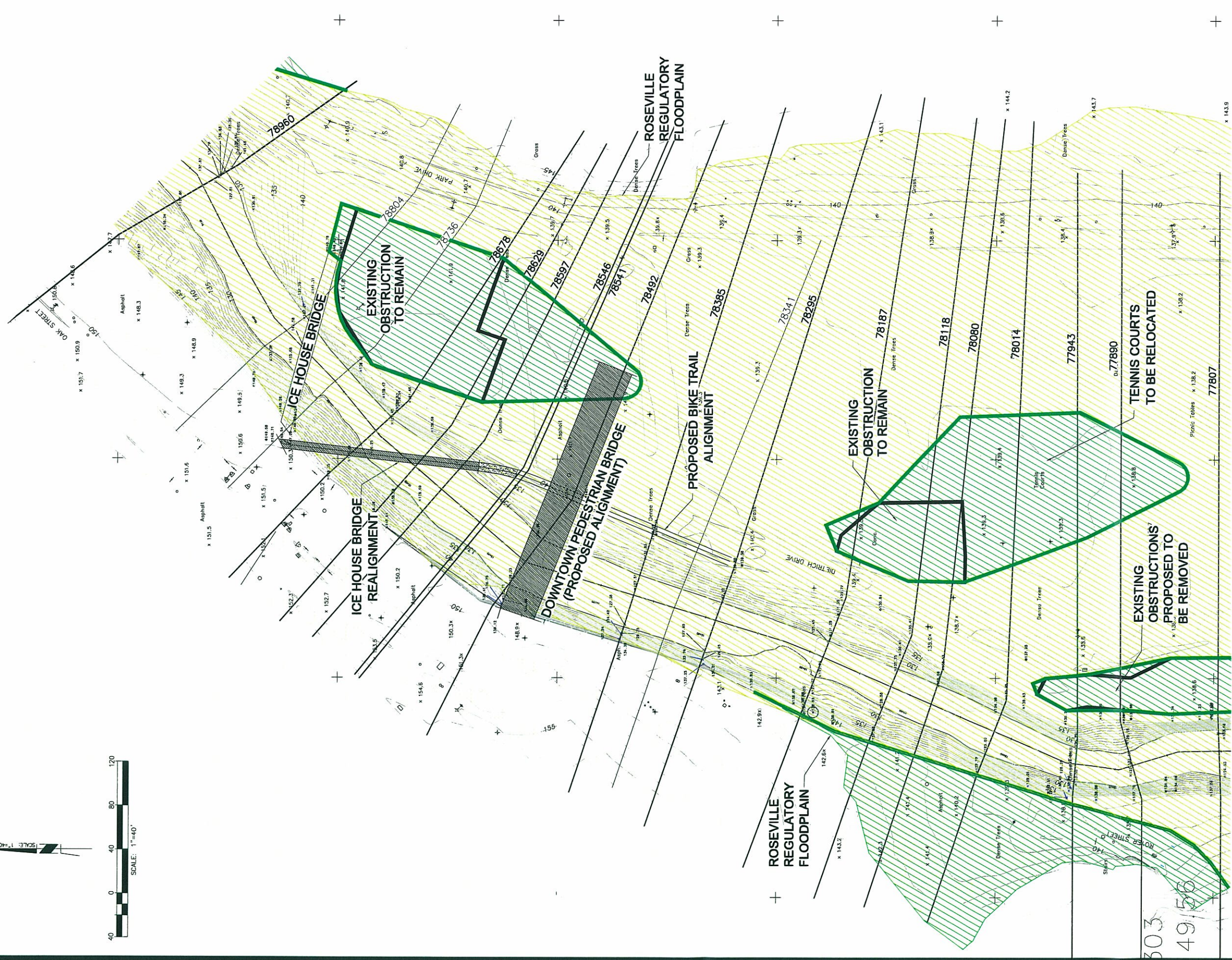


**LEGEND**

- 77511 EXISTING HEC-RAS RIVER STATIONS
- 77505 NEW HEC-RAS RIVER STATIONS
- IMPROVEMENTS PERMITTED - NO IMPACTS
- IMPROVEMENTS MAY HAVE IMPACTS - DETAILED STUDY REQUIRED

**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
CITY OF ROSEVILLE**

**EXHIBIT B  
POTENTIAL IMPROVEMENT AREAS  
SHEET 1 OF 4**



**LEGEND**

- 77511 EXISTING HEC-RAS RIVER STATIONS
- 77605 NEW HEC-RAS RIVER STATIONS
- IMPROVEMENTS PERMITTED - NO IMPACTS
- IMPROVEMENTS MAY HAVE IMPACTS - DETAILED STUDY REQUIRED

**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
CITY OF ROSEVILLE**

**EXHIBIT B  
POTENTIAL IMPROVEMENT AREAS  
SHEET 2 OF 4**

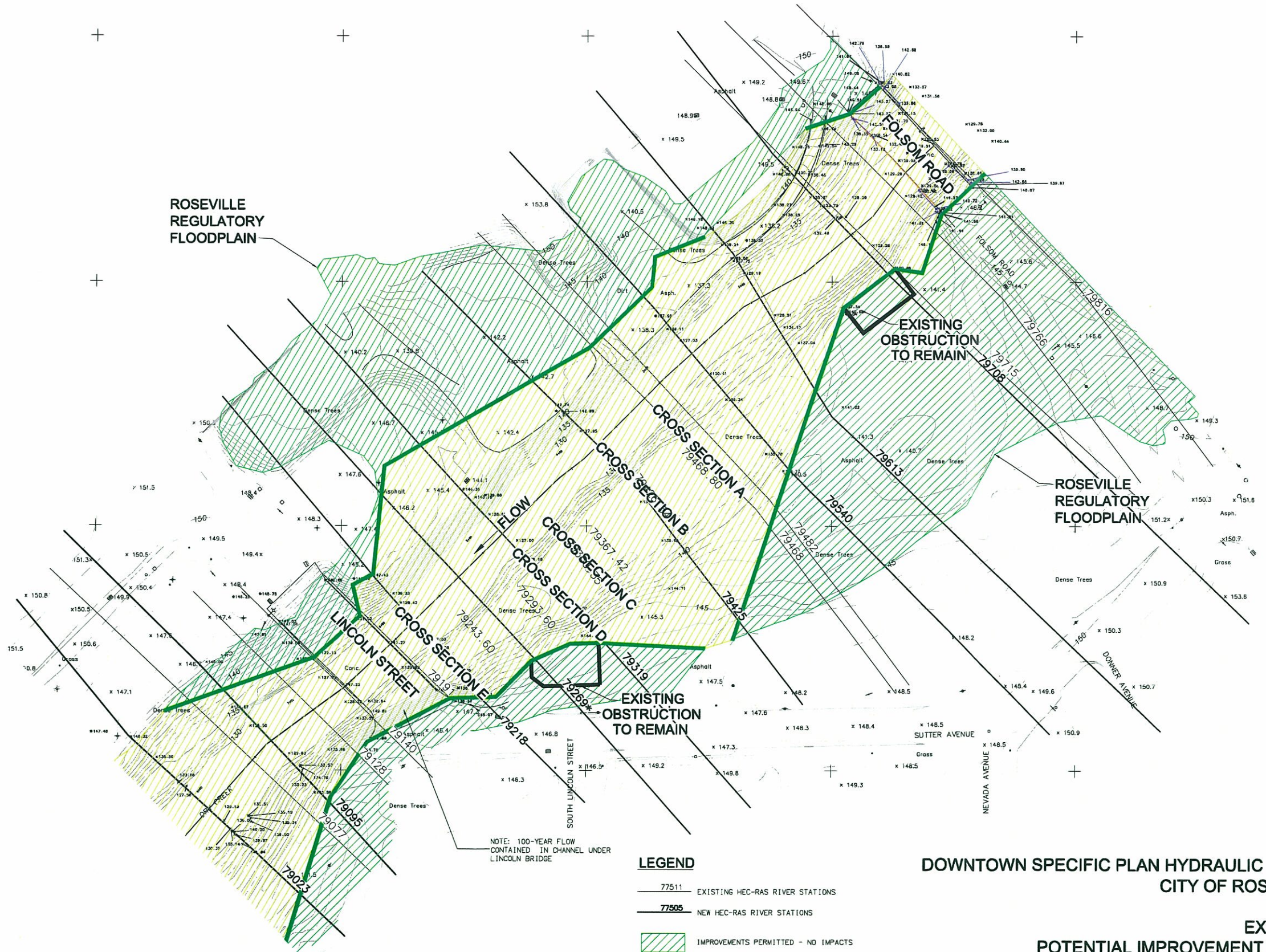


PLANNING • DESIGN • CONSTRUCTION  
220 ARDEN BOULEVARD, SUITE 200  
DANFORTH, CALIFORNIA 95618-2000  
916.425.1000 • FAX 916.425.1001

303  
49.56







ROSEVILLE REGULATORY FLOODPLAIN



ROSEVILLE REGULATORY FLOODPLAIN

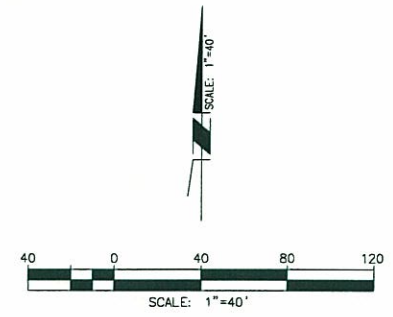
NOTE: 100-YEAR FLOW CONTAINED IN CHANNEL UNDER LINCOLN BRIDGE

**LEGEND**

-  77511 EXISTING HEC-RAS RIVER STATIONS
-  77505 NEW HEC-RAS RIVER STATIONS
-  IMPROVEMENTS PERMITTED - NO IMPACTS
-  IMPROVEMENTS MAY HAVE IMPACTS - DETAILED STUDY REQUIRED

**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
CITY OF ROSEVILLE**

**EXHIBIT B  
POTENTIAL IMPROVEMENT AREAS  
SHEET 3 OF 4**





SCALE: 1"=50'



**LEGEND**

- 77511 EXISTING HEC-RAS RIVER STATIONS
- 77505 NEW HEC-RAS RIVER STATIONS
- IMPROVEMENTS PERMITTED - NO IMPACTS
- IMPROVEMENTS MAY HAVE IMPACTS - DETAILED STUDY REQUIRED

**DOWNTOWN SPECIFIC PLAN HYDRAULIC STUDY  
CITY OF ROSEVILLE**

**EXHIBIT B  
POTENTIAL IMPROVEMENT AREAS  
SHEET 4 OF 4**



PLANNING ■ DESIGN ■ CONSTRUCTION  
220 ARDEN BOULEVARD, SUITE 200  
SACRAMENTO, CALIFORNIA 95834-2000  
TEL: 916.487.1100 FAX: 916.487.1101

**APPENDIX A**  
**HEC-RAS Output Tables and Cross Section Plots for the Adjusted**  
**Base Model and Proposed Improvements Model**

HEC-RAS Plan: bridge mods River: Dry Creek Reach: Above Cirby Profile: 100

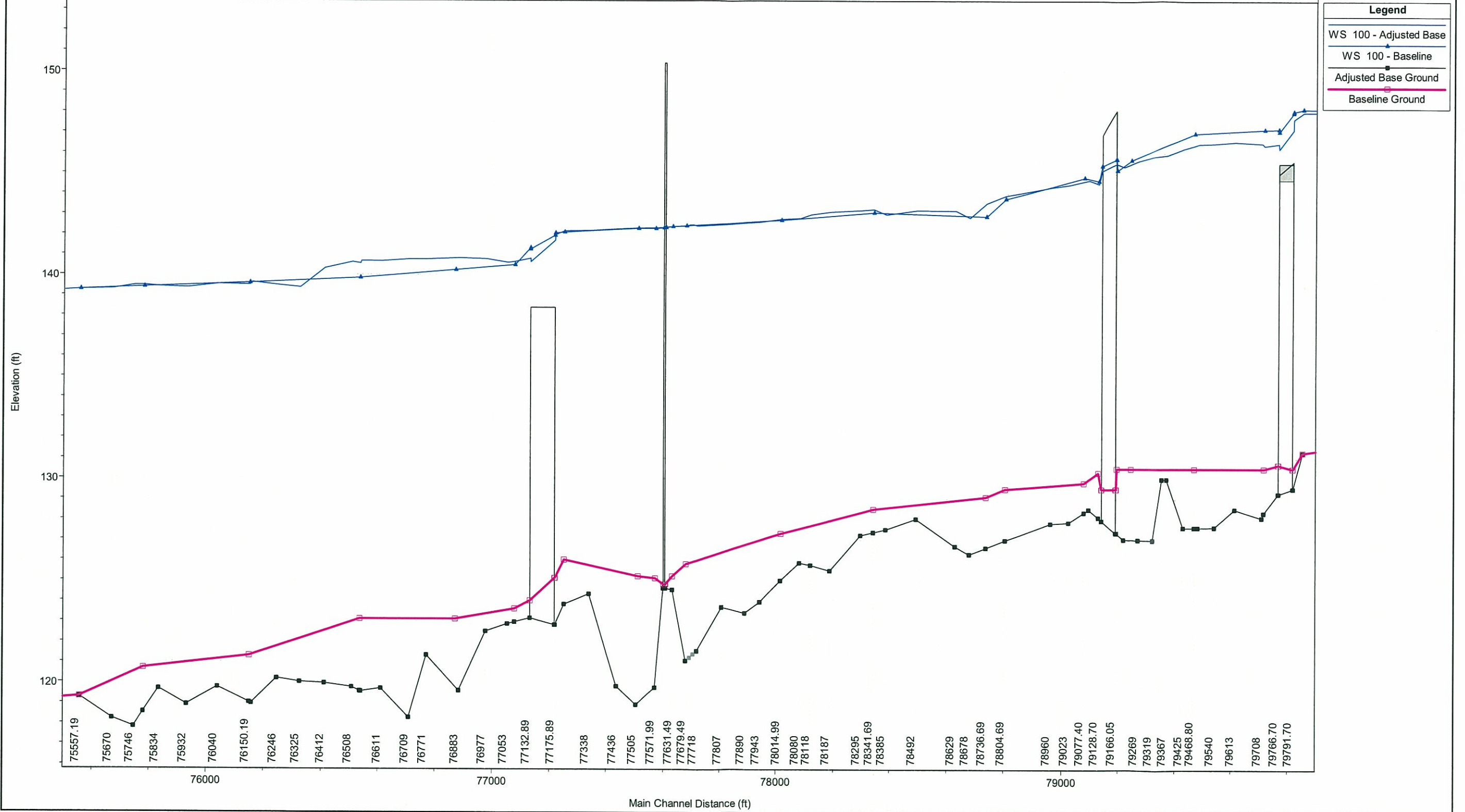
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Above Cirby	84214.40	100	10460.00	145.00	154.1442		154.50	0.002873	5.355	2252.66	344.77	0.33
Above Cirby	84011.80	100	10365.00	143.00	153.7433		153.99	0.002002	4.469	2689.54	401.44	0.28
Above Cirby	83548.90	100	10365.00	141.30	153.0251		153.21	0.001621	3.805	3014.73	415.54	0.24
Above Cirby	83181.90	100	10365.00	138.90	152.4946		152.71	0.001516	4.479	2878.95	344.52	0.24
Above Cirby	82911.90	100	10365.00	138.80	151.8757		152.18	0.001927	4.764	2402.44	295.14	0.27
Above Cirby	82629.70	100	10365.00	138.60	151.3756		151.68	0.001604	6.012	2582.41	360.77	0.31
Above Cirby	82269.70	100	10365.00	136.90	151.2215		151.31	0.000581	3.690	5286.65	1057.17	0.19
Above Cirby	81989.70	100	10365.00	135.50	151.1094		151.18	0.000419	3.159	6013.48	1169.75	0.16
Above Cirby	81669.70	100	10365.00	135.10	150.9015		151.02	0.000574	3.772	4275.49	770.80	0.18
Above Cirby	81379.70	100	10365.00	134.70	150.4385		150.77	0.001232	5.828	3029.58	688.04	0.27
Above Cirby	81041.20	100	10365.00	134.40	149.8308		150.25	0.001893	6.182	2522.35	649.41	0.32
Above Cirby	80726.20	100	10365.00	133.10	149.3533		149.68	0.001191	5.345	3207.51	647.22	0.27
Above Cirby	80434.10	100	10365.00	132.00	149.0815		149.36	0.000925	5.041	3587.73	612.26	0.24
Above Cirby	80225.10	100	10365.00	132.00	147.7932		148.93	0.002765	8.801	1949.31	411.39	0.45
Above Cirby	79852.10	100	10365.00	131.30	147.9062		148.23	0.000690	5.109	3276.40	460.58	0.23
Above Cirby	79816.70	100	10365.00	129.53	147.5423	139.95	148.16	0.001889	6.494	1874.90	340.54	0.31
Above Cirby	79791.70		Bridge									
Above Cirby	79766.70	100	10365.00	129.28	146.4041	140.00	147.29	0.001955	7.417	1390.89	303.11	0.36
Above Cirby	79715.10	100	10365.00	128.32	146.0916	141.39	147.15	0.002562	7.151	1522.37	226.51	0.34
Above Cirby	79708	100	10365.00	128.09	146.3690	140.29	147.01	0.001573	6.651	1745.06	243.17	0.33
Above Cirby	79613	100	10365.00	128.51	146.4300	139.21	146.83	0.000915	4.155	2556.81	340.50	0.21
Above Cirby	79540	100	10365.00	127.63	146.3828	139.37	146.76	0.000764	3.961	2613.87	372.48	0.20
Above Cirby	79482	100	10365.00	127.62	146.2949	139.05	146.71	0.001072	6.129	2509.93	334.84	0.29
Above Cirby	79468.80	100	10365.00	127.62	146.3163	139.17	146.68	0.001170	5.861	2585.87	387.32	0.28
Above Cirby	79425	100	10365.00	127.61	146.2447	138.88	146.63	0.001188	5.165	2278.83	389.23	0.26
Above Cirby	79367	100	10365.00	130.00	145.8863	140.05	146.51	0.002326	7.271	1858.24	363.82	0.34
Above Cirby	79350	100	10365.00	130.00	145.8653	139.77	146.46	0.002103	7.059	1891.27	305.08	0.32
Above Cirby	79319	100	10365.00	127.00	145.8572	139.11	146.37	0.001889	5.807	1804.70	298.94	0.33
Above Cirby	79269	100	10365.00	127.01	145.6716	138.72	146.27	0.001932	6.200	1673.87	202.16	0.33
Above Cirby	79218	100	10365.00	127.03	145.4706	138.84	146.16	0.002042	6.653	1557.91	143.01	0.34
Above Cirby	79191.40	100	10365.00	127.35	145.5972	136.99	146.05	0.001052	5.404	1917.85	142.05	0.26
Above Cirby	79166.05		Bridge									
Above Cirby	79140.70	100	10365.00	127.95	145.2313		145.95	0.002020	6.780	1528.71	115.53	0.33
Above Cirby	79128.70	100	10365.00	128.10	144.1906	138.81	145.83	0.002340	10.399	1051.82	121.47	0.48
Above Cirby	79095	100	10365.00	128.50	144.6012	138.65	145.56	0.001743	7.841	1331.17	181.42	0.40
Above Cirby	79077.40	100	10365.00	128.34	144.5849	138.76	145.52	0.001756	7.750	1346.59	164.17	0.40
Above Cirby	79023	100	10365.00	127.86	144.5472	138.27	145.40	0.001725	7.547	1546.67	199.78	0.38
Above Cirby	78960	100	10365.00	127.81	144.3414	138.12	145.28	0.001867	8.029	1577.98	217.89	0.40
Above Cirby	78904.69	100	10365.00	126.98	143.9208	137.56	144.97	0.001938	8.380	1547.65	236.96	0.41
Above Cirby	78736.69	100	10365.00	126.61	143.5350	138.01	144.80	0.002519	9.188	1366.15	195.58	0.47
Above Cirby	78678	100	10365.00	126.29	142.8224	138.30	144.58	0.003247	10.885	1194.92	195.94	0.53
Above Cirby	78629	100	10365.00	126.69	143.1711	138.34	144.25	0.002127	8.745	1723.63	358.66	0.44
Above Cirby	78597	100	10365.00	126.69	142.8006	138.17	144.15	0.002762	9.752	1571.42	400.31	0.47
Above Cirby	78546	100	10365.00	127.58	142.8608	137.67	143.93	0.003067	8.700	1695.50	423.32	0.48
Above Cirby	78541	100	10365.00	127.58	143.0859	137.71	143.82	0.001999	7.152	1963.37	426.15	0.39
Above Cirby	78492	100	10365.00	128.03	143.1672	137.10	143.68	0.001194	5.926	2320.88	401.52	0.31
Above Cirby	78385	100	10365.00	127.51	142.8826	137.13	143.52	0.001485	6.820	2337.20	441.95	0.36
Above Cirby	78341.69	100	10365.00	127.37	143.0477	137.87	143.37	0.001207	5.352	2518.47	510.78	0.27
Above Cirby	78295	100	10365.00	127.22	142.9640	137.09	143.31	0.001271	5.506	2481.03	472.91	0.27
Above Cirby	78187	100	10365.00	125.49	142.8947	135.79	143.17	0.000915	4.857	2740.80	477.26	0.23
Above Cirby	78118	100	10365.00	125.75	142.8074	136.38	143.11	0.001005	5.050	2651.10	463.00	0.25
Above Cirby	78080	100	10365.00	125.86	142.6566	137.51	143.05	0.001334	5.984	2381.78	465.87	0.29
Above Cirby	78014.99	100	10365.00	124.99	142.6465	136.56	142.95	0.000981	5.406	2717.74	553.28	0.25
Above Cirby	77943	100	10365.00	123.95	142.6030	136.62	142.86	0.001014	5.092	2889.03	585.11	0.23
Above Cirby	77890	100	10365.00	123.40	142.5792	136.59	142.81	0.000826	4.735	3091.35	598.27	0.22
Above Cirby	77807	100	10365.00	123.69	142.5838	133.81	142.72	0.000513	3.499	3762.39	664.80	0.17
Above Cirby	77718	100	10365.00	121.55	142.5536	132.25	142.68	0.000412	3.250	4009.34	661.07	0.16
Above Cirby	77705	100	10365.00	121.40	142.4718	135.25	142.66	0.000696	4.327	3422.06	663.72	0.20
Above Cirby	77700		Bridge									
Above Cirby	77692	100	10365.00	121.20	142.4386	134.69	142.62	0.000667	4.265	3469.26	664.09	0.20
Above Cirby	77679	100	10365.00	122.90	142.4655		142.60	0.000512	3.409	3771.44	643.66	0.17
Above Cirby	77631.49	100	10365.00	124.54	142.4427	134.55	142.58	0.000490	3.453	3826.56	662.97	0.17
Above Cirby	77606.49	100	10365.00	124.61	142.3441	136.76	142.55	0.000916	4.441	3139.03	655.71	0.22
Above Cirby	77600.99	100	10365.00	124.61	142.3370	136.68	142.54	0.000902	4.449	3146.37	655.24	0.22
Above Cirby	77571.99	100	10365.00	119.75	142.3260	134.35	142.51	0.000642	4.262	3377.69	618.15	0.19
Above Cirby	77505	100	10365.00	118.92	142.3040	134.34	142.46	0.000550	3.992	3849.89	736.12	0.18
Above Cirby	77436	100	10365.00	119.81	142.2464	134.86	142.42	0.000609	4.223	3631.48	682.52	0.19
Above Cirby	77338	100	10365.00	124.33	142.1600	134.92	142.36	0.000620	4.303	3197.49	566.00	0.20
Above Cirby	77251.49	100	10365.00	123.83	142.1522	134.22	142.30	0.000458	3.641	3586.83	543.65	0.17
Above Cirby	77218.89	100	10365.00	122.81	141.9599	133.54	142.24	0.000706	5.182	3301.39	760.62	0.22
Above Cirby	77175.89		Bridge									
Above Cirby	77132.89	100	10365.00	123.15	140.6355	133.40	141.29	0.000963	7.035	2048.72	646.44	0.31
Above Cirby	77078.29	100	13825.00	122.96	140.6034	135.42	141.21	0.001033	7.057	2483.57	516.09	0.32
Above Cirby	77053	100	13825.00	122.87	140.5547	134.96	141.18	0.001084	6.563	2224.97	551.60	0.34
Above Cirby	76977	100	13825.00	122.50	140.7266	133.49	141.03	0.000457	4.355	3299.07	571.74	0.21
Above Cirby	76883	100	13825.00	119.60	140.7789	131.12	140.95	0.000285	3.769	4656.93	718.79	0.17
Above Cirby	76771	100	13825.00	121.34	140.7216	131.74	140.92	0.000285	3.841	4088.95	518.44	0.17
Above Cirby	76709	100	13825.00	118.29	140.7226	128.13	140.90	0.000212	3.703	4353.92	589.95	0.15
Above Cirby	76611	100	13825.00	119.71	140.6277	133.62	140.87	0.000414	4.543	3858.66	658.18	0.20

HEC-RAS Plan: bridge mods River: Dry Creek Reach: Above Cirby Profile: 100 (Continued)

Reach	River Sta	Profile	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
Above Cirby	76540	100	13825.00	119.56	140.6310	132.70	140.83	0.000329	4.164	4307.46	691.16	0.18
Above Cirby	76536.69	100	13825.00	119.58	140.5012	134.63	140.81	0.000558	5.494	3809.41	690.53	0.23
Above Cirby	76508	100	13825.00	119.77	140.5679	133.31	140.76	0.000352	4.232	4488.97	731.64	0.19
Above Cirby	76412	100	13825.00	119.96	140.2578	135.30	140.69	0.000830	6.538	3464.20	659.52	0.28
Above Cirby	76325	100	13825.00	120.03	139.4549	135.41	140.52	0.001840	9.460	2289.93	580.54	0.41
Above Cirby	76246	100	13825.00	120.19	139.4803	135.00	140.33	0.001501	8.589	2458.36	768.79	0.37
Above Cirby	76158	100	13825.00	118.98	139.5854	134.15	140.13	0.000951	7.019	2943.16	755.31	0.30
Above Cirby	76150.19	100	13825.00	119.03	139.4662	135.58	140.11	0.001192	7.537	2676.87	772.44	0.33
Above Cirby	76040	100	13825.00	119.77	139.4205	132.27	139.97	0.000930	6.763	2956.00	786.97	0.30
Above Cirby	75932	100	13825.00	118.92	139.3591	132.51	139.86	0.000817	6.560	3114.78	722.70	0.29
Above Cirby	75934	100	13825.00	119.69	139.4068	131.03	139.75	0.000567	5.217	3655.10	688.75	0.24
Above Cirby	75780.19	100	13825.00	118.56	139.4717	133.58	139.67	0.000623	3.702	4032.07	501.25	0.16
Above Cirby	75746	100	13825.00	117.83	139.4772	131.86	139.64	0.000531	3.284	4457.01	670.33	0.15
Above Cirby	75670	100	13825.00	118.24	139.2962	134.88	139.57	0.001017	4.494	3509.39	531.80	0.20
Above Cirby	75557.19	100	13825.00	119.30	139.2675	131.31	139.47	0.000509	3.609	4235.54	422.42	0.15
Above Cirby	75233.4	100	13825.00	118.90	138.9949		139.27	0.000698	4.146	3477.03	356.86	0.17
Above Cirby	74898.10	100	13825.00	118.70	138.8039		139.04	0.000607	4.074	3822.49	355.96	0.17
Above Cirby	74518.10	100	13825.00	117.60	138.1341		138.67	0.001453	5.931	2401.05	217.66	0.25
Above Cirby	74008.10	100	13825.00	117.20	137.0045		137.82	0.001980	7.920	2615.22	311.30	0.33
Above Cirby	73943.30	100	13825.00	117.30	137.0324	129.43	137.55	0.001553	6.267	3369.35	604.16	0.29
Above Cirby	73919.30		Bridge									
Above Cirby	73895.30	100	13825.00	117.00	133.2422	129.52	134.76	0.005987	10.030	1609.48	355.20	0.54
Above Cirby	73820.40	100	7845.00	117.00	133.4160		134.01	0.002177	6.982	1763.90	324.17	0.33
Above Cirby	73565.30	100	7844.00	117.00	132.5654		133.32	0.002994	7.736	1664.33	403.61	0.38
Above Cirby	73481.30	100	7844.00	116.90	131.4346		132.90	0.005608	9.914	905.01	125.49	0.50
Above Cirby	73345.30	100	7844.00	115.10	131.9819		132.26	0.001073	4.911	2092.19	288.96	0.22
Above Cirby	73277.20	100	7844.00	115.60	131.9863		132.17	0.000795	4.160	2711.91	409.53	0.20
Above Cirby	73112.9	100	8019.00	114.90	132.0030		132.07	0.000242	3.000	5198.94	744.76	0.15
Above Cirby	72982.9	100	8019.00	115.30	131.7823		132.01	0.000458	4.371	2712.19	410.78	0.21

Dry Creek Plan: 1) Royer Park - 2) DCRoseville  
Geom: Dry Creek Royer Park - ADJUSTED BASE Flow: Dry Creek Shed

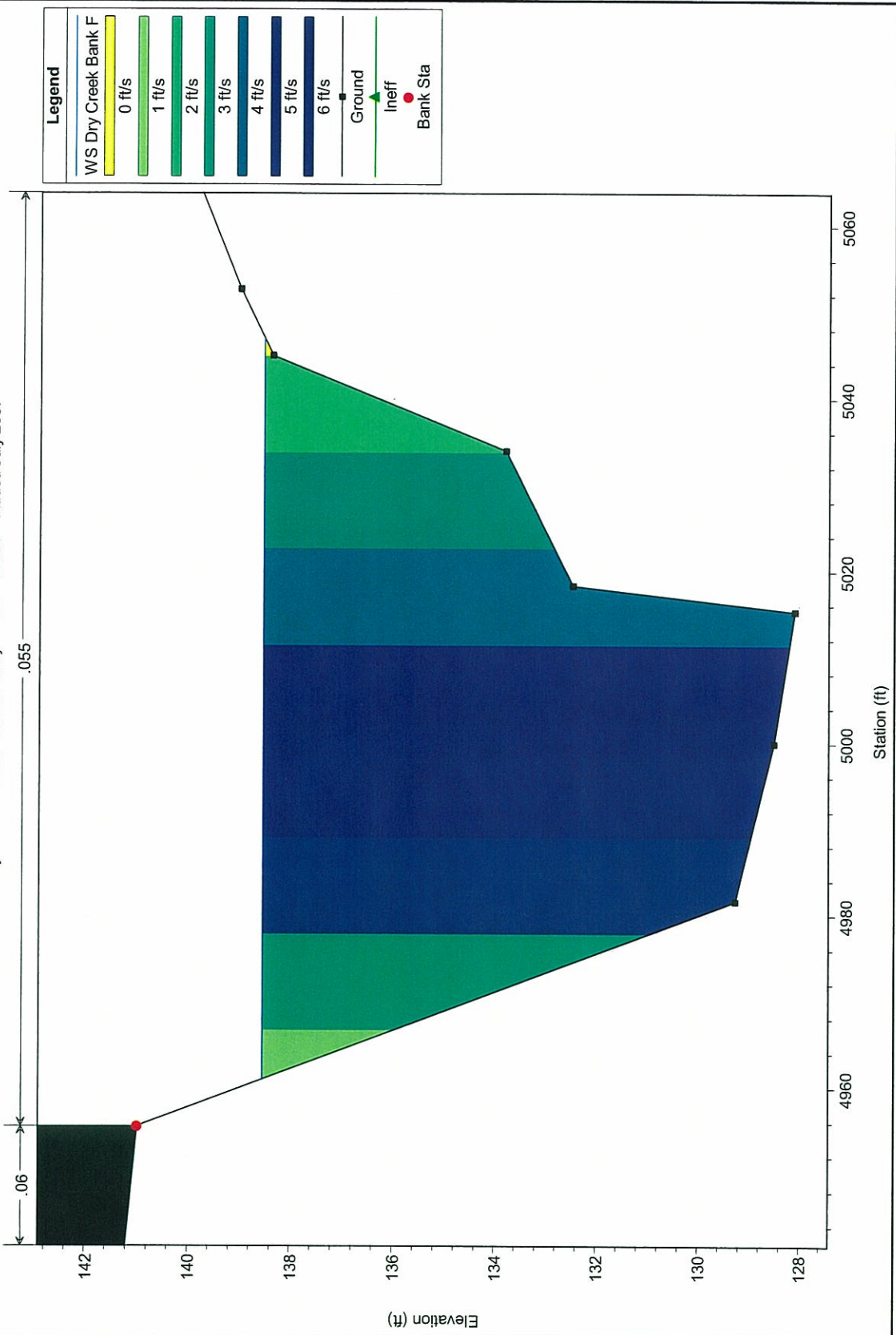
Dry Creek Above Cirby



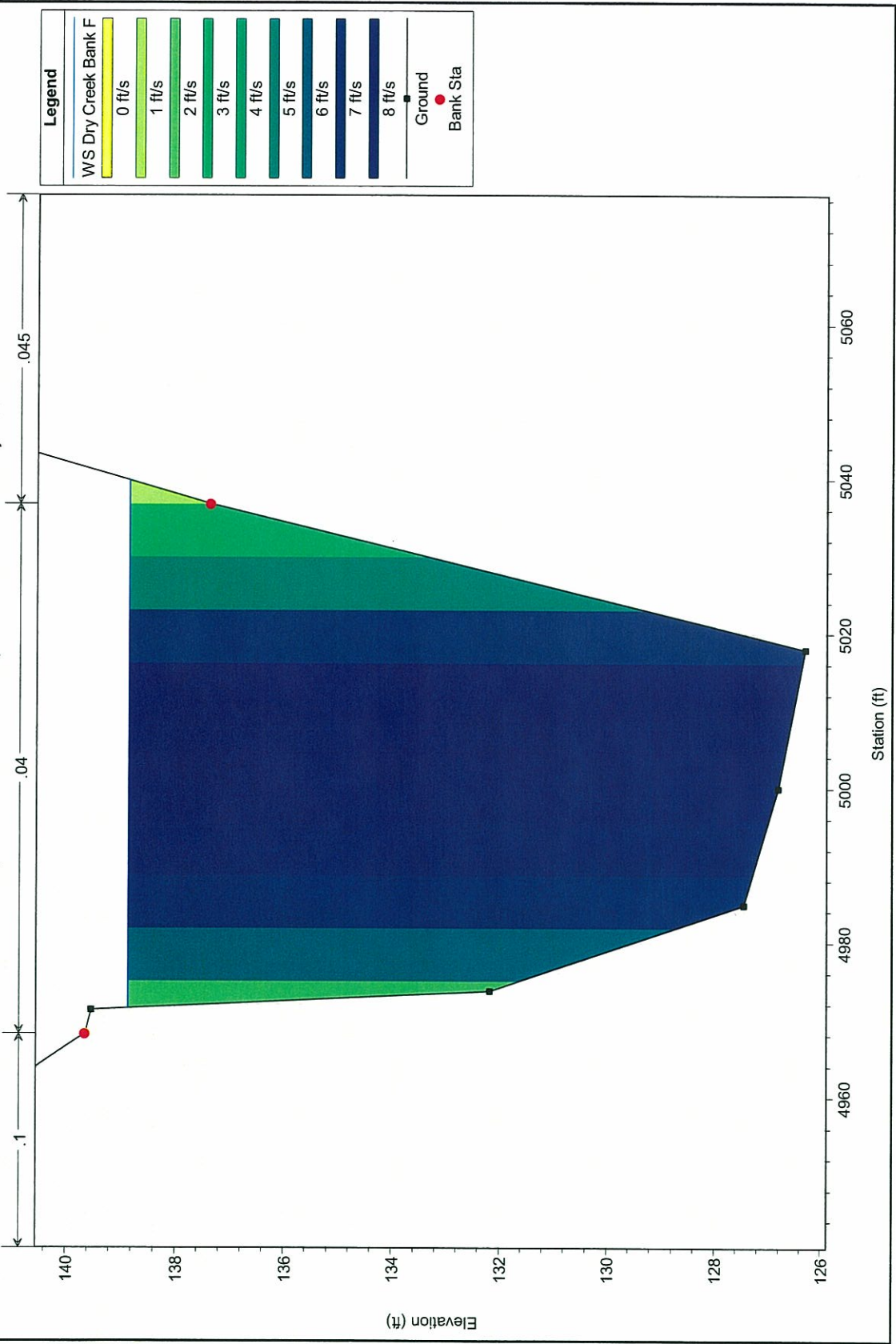
**APPENDIX B**  
**Adjusted Base Condition – Velocity Distributions**

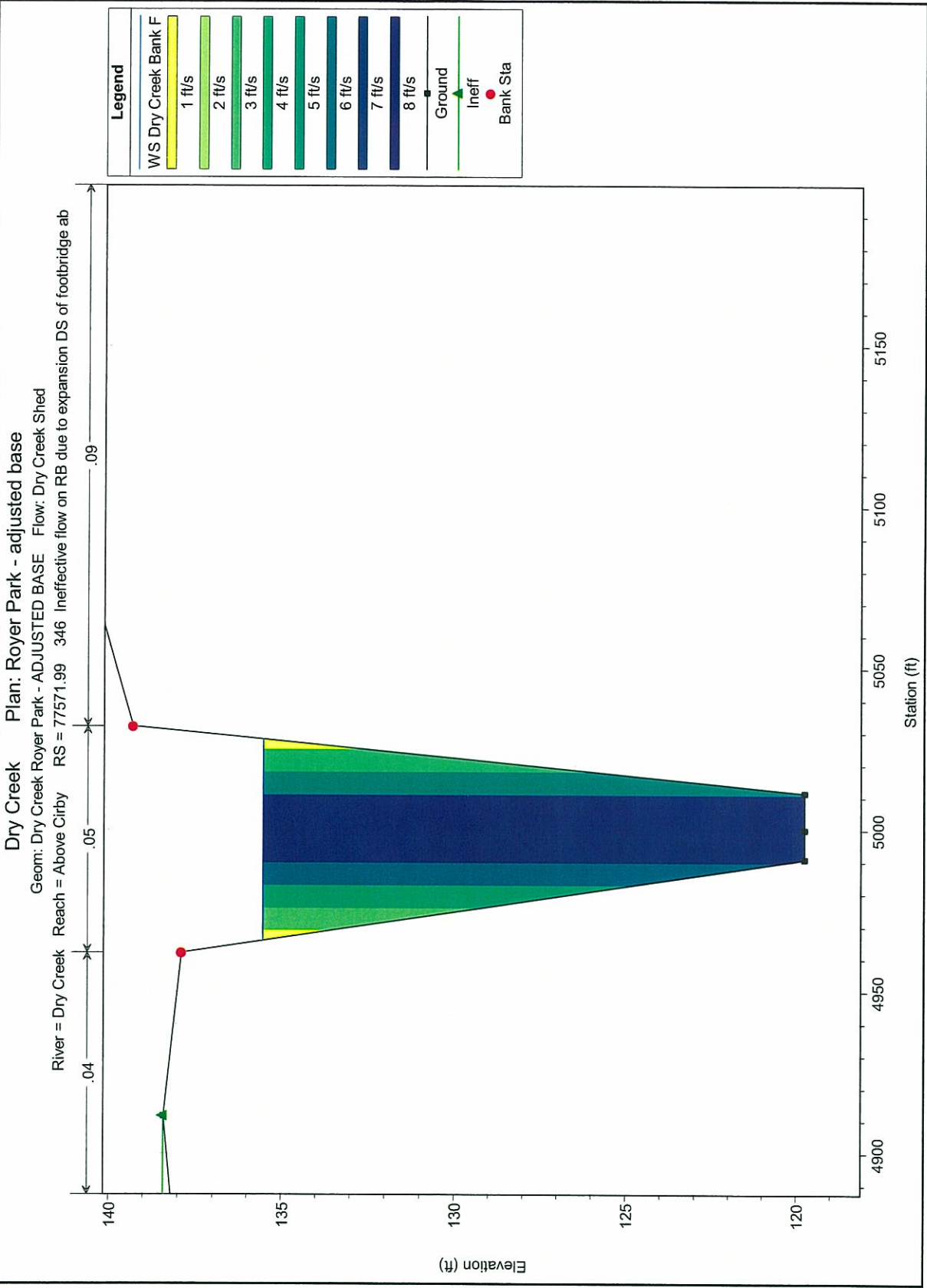
Dry Creek Plan: Royer Park - adjusted base

Geom: Dry Creek Royer Park - ADJUSTED BASE Flow: Dry Creek Shed  
River = Dry Creek Reach = Above Kirby RS = 79708 Added July 2007

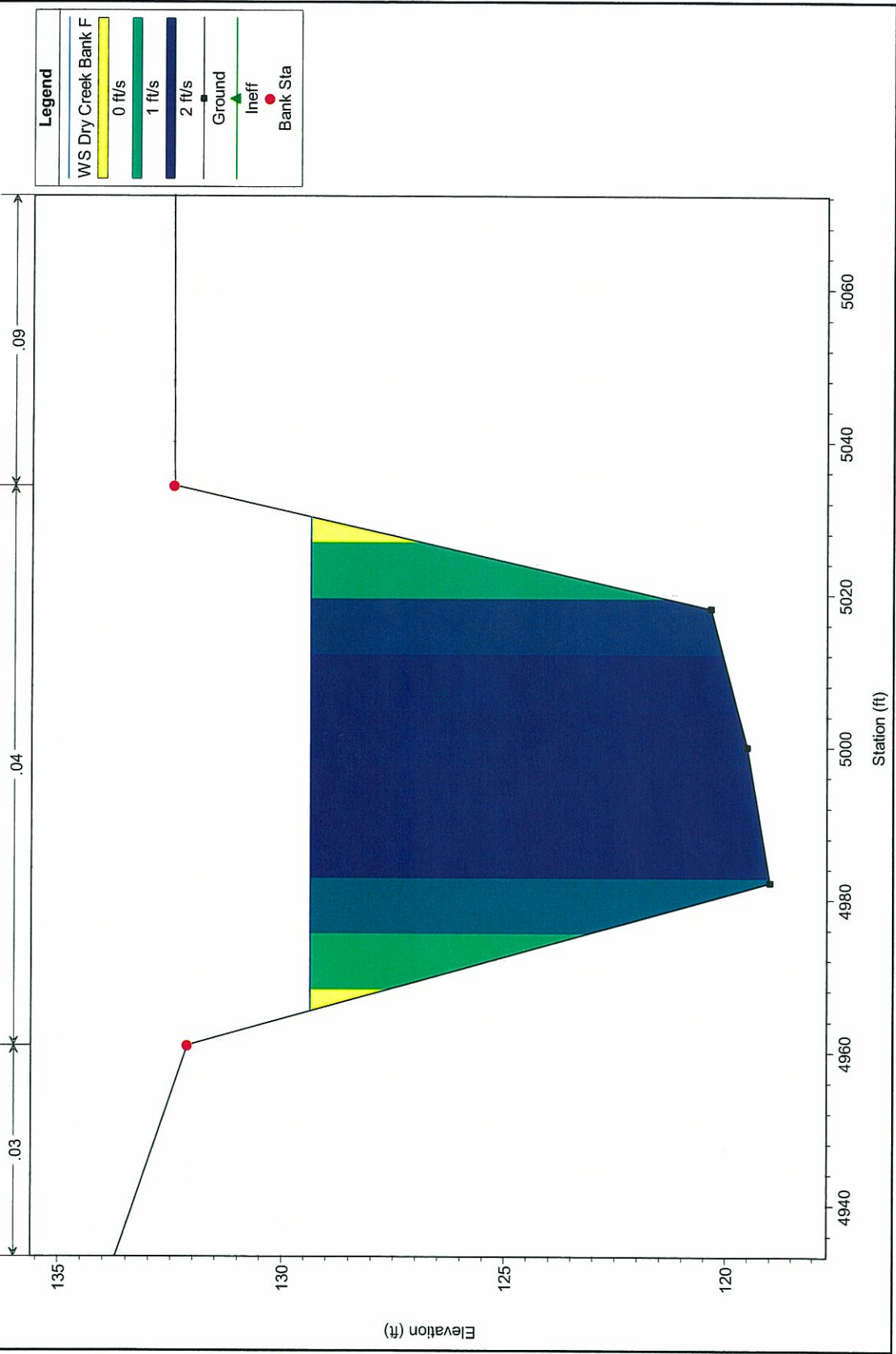


Dry Creek Plan: Royer Park - adjusted base  
 Geom: Dry Creek Royer Park - ADJUSTED BASE Flow: Dry Creek Shed  
 River = Dry Creek Reach = Above Cirby RS = 78678 Added July 2007





Dry Creek Plan: Royer Park - adjusted base  
 Geom: Dry Creek Royer Park - ADJUSTED BASE Flow: Dry Creek Shed  
 River = Dry Creek Reach = Above Cirby RS = 76158 Added July 2007

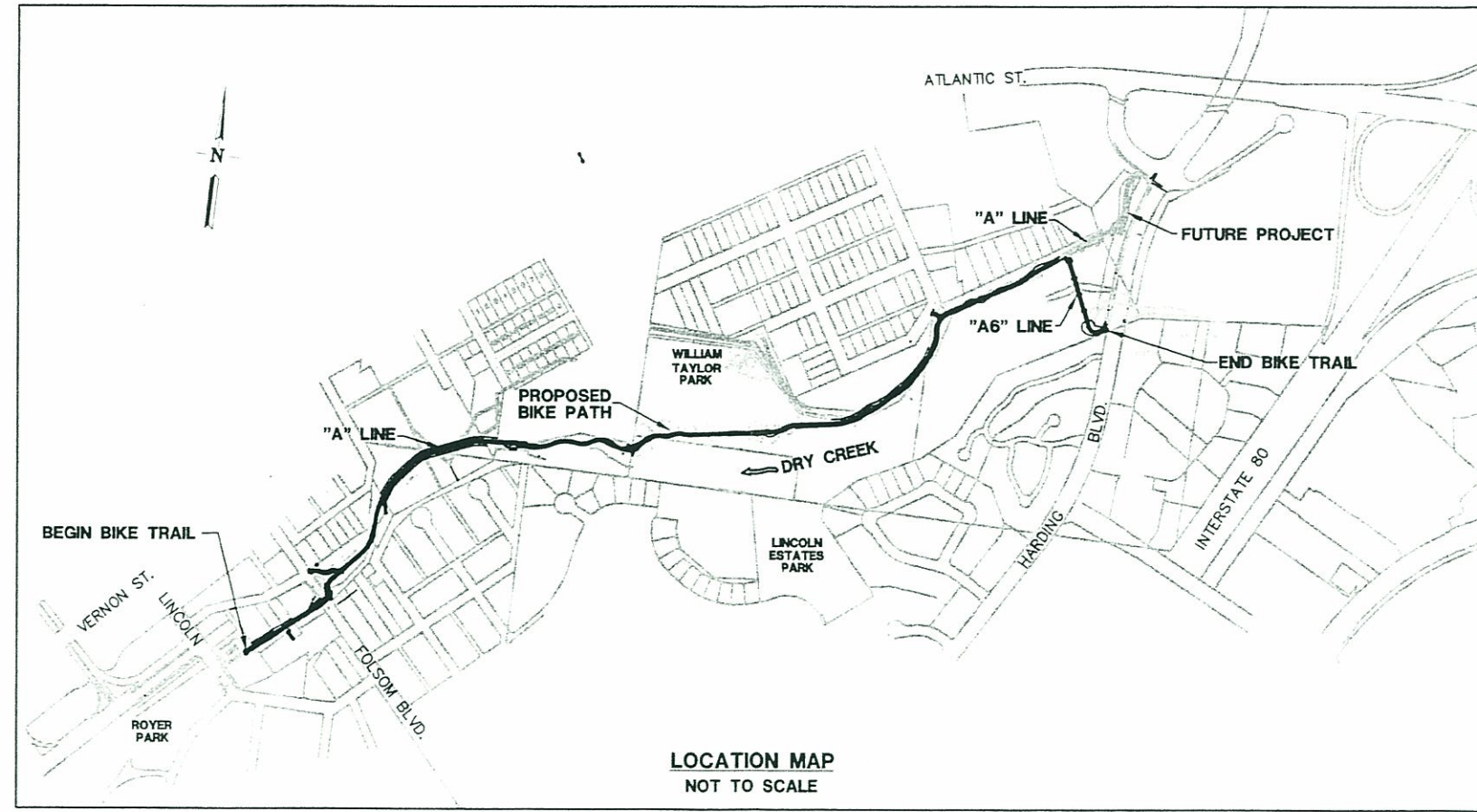


**APPENDIX C**  
**Partial Plan Set - Royer Park to Harding Blvd. Bike Trail (60%**  
**Design Drawings)**

# CITY OF ROSEVILLE IMPROVEMENT PLANS FOR ROYER PARK TO HARDING BLVD. BIKE TRAIL

### INDEX OF SHEETS

NO	ID	DESCRIPTION
1	T-1	TITLE SHEET
2	GN-1	GENERAL NOTES
3-4	X-1 TO X-2	TYPICAL CROSS SECTIONS
5-16	L-1 TO L-12	PLAN & PROFILE
17-18	C-1 TO C-2	CONSTRUCTION DETAILS
19-20	R-1 TO R-2	RETAINING WALLS



### CITY AND UTILITY CONTACT INFORMATION

CONTACT	UTILITY	REPRESENTATIVES	PHONE
-	U.S.A.	U.S.A.	800-642-2444
CHUCK WILLIAMS	TELEPHONE	ROSEVILLE TELEPHONE	786-1195
EMILY PEARSON	GAS	PACIFIC GAS & ELECTRIC	(530) 889-3147
LARRY LAYTON	ELECTRIC	CITY OF ROSEVILLE	774-5610
CARL WALKER	ENGINEERING	CITY OF ROSEVILLE	746-1349
-	POLICE	CITY OF ROSEVILLE	774-5100
-	FIRE	ROSEVILLE FIRE DEPT.	774-5805
ED KRIZ	WATER	CITY OF ROSEVILLE	774-5750
ART O'BRIEN	SEWER	CITY OF ROSEVILLE	774-5750
MARK DUBY	CABLE T.V.	COMCAST CABLE	648-8310

### LEGEND

PROPOSED	DESCRIPTION	EXISTING
	STORM DRAIN	
	SANITARY SEWER	
	WATER	
	MANHOLE	
	TRAFFIC SIGN	
	MONUMENT	
	POWER POLE/JOINT POLE	
	UTILITY VAULT	
	STREET LIGHT	
	FENCE	
	BARRICADE	
	CURB LINE	
	EASEMENT LINE	
	TREE	
	SLOPE & DIRECTION	
	SPOT ELEVATION	
	EARTH DITCH	

APPROVAL RECOMMENDED BY:

\_\_\_\_\_  
RHON L. HERNDON  
SENIOR CIVIL ENGINEER  
CITY OF ROSEVILLE

APPROVED BY:

\_\_\_\_\_  
ROB JENSEN  
DIRECTOR OF PUBLIC WORKS/CITY ENGINEER  
CITY OF ROSEVILLE

APPROVED BY:

\_\_\_\_\_  
KEYLE MCKINNEY  
SENIOR CIVIL ENGINEER  
CITY OF ROSEVILLE ENVIRONMENTAL UTILITIES DEPT.

SUBMITTED BY:

\_\_\_\_\_  
JORGE AGUILAR RCE 48704 9-30-08 DATE  
URS PROJECT MANAGER

**60% SUBMITTAL**

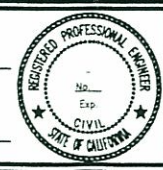
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NO.	REVISIONS	BY	DATE

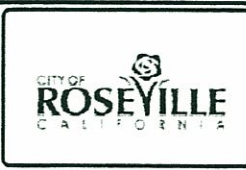
BENCH MARK	
ELEVATION	DATUM
DESCRIPTION	

DESIGN BY : MJK
DRAWN BY : NGK
CHECKED BY : JA
SCALE : NONE
DATE : 03-19-07
PROJ NO. : 27560620

	DATE
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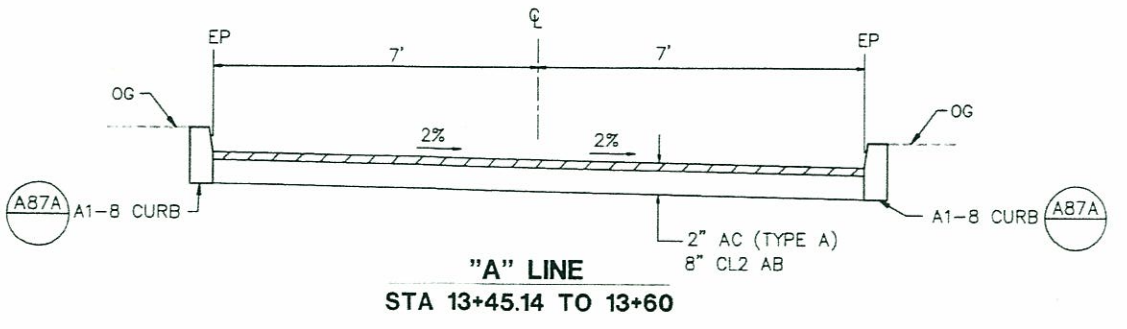
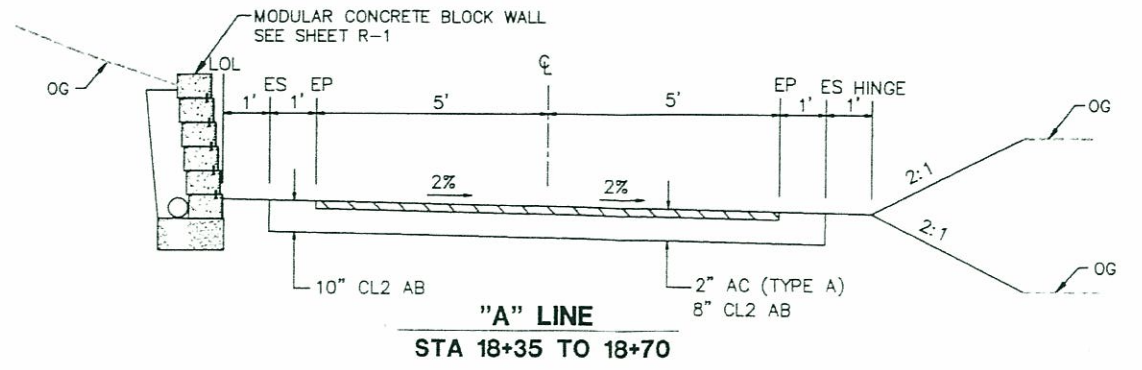
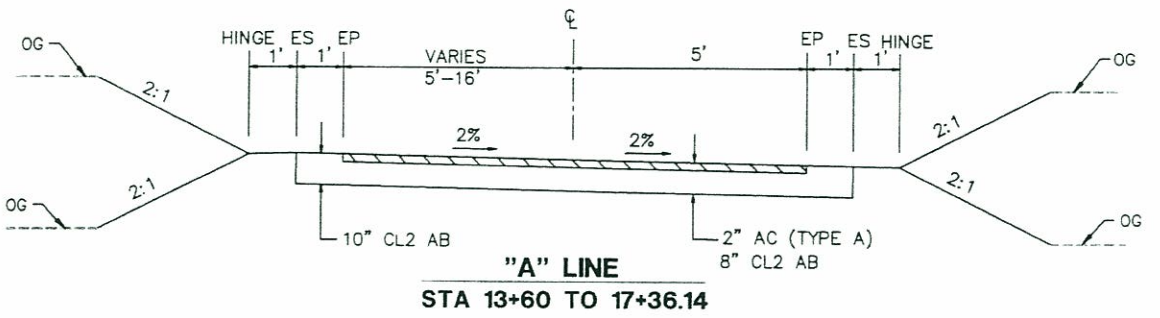
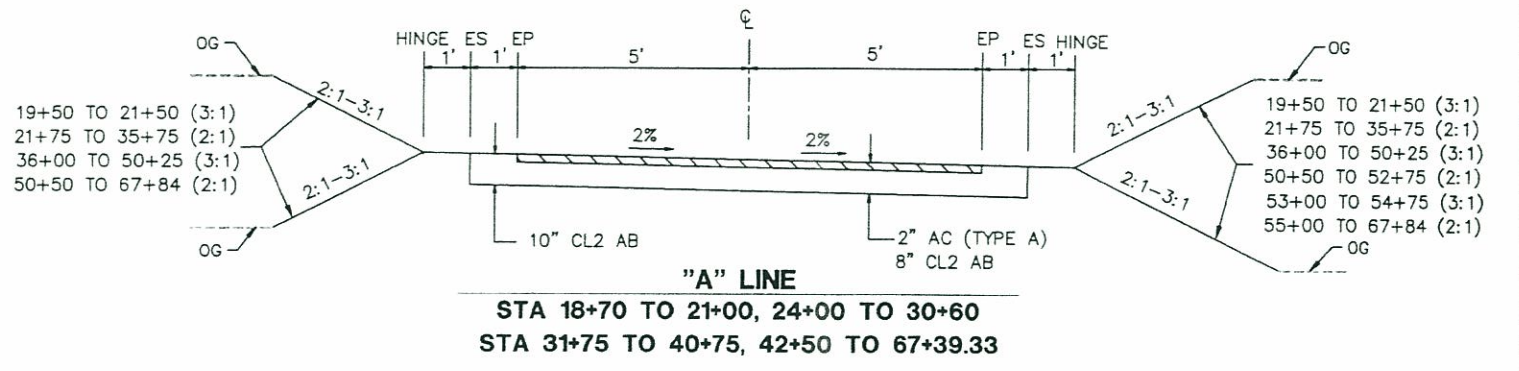
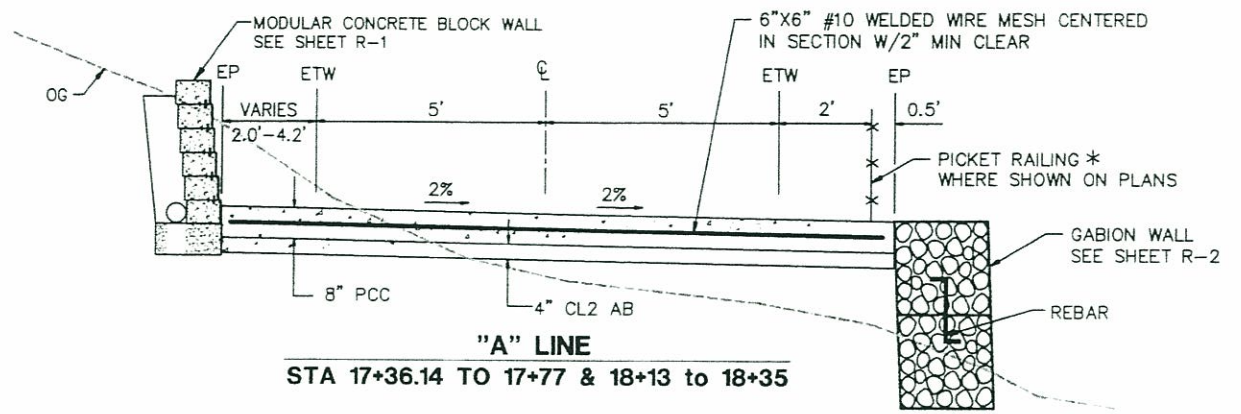
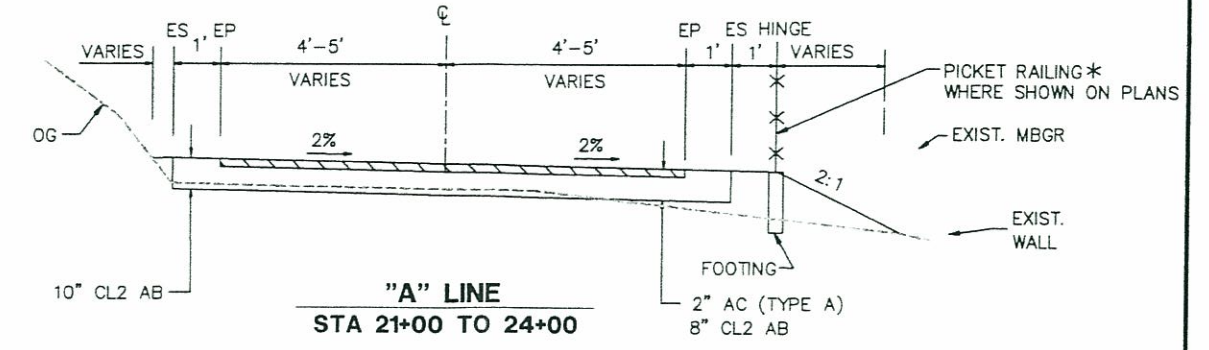
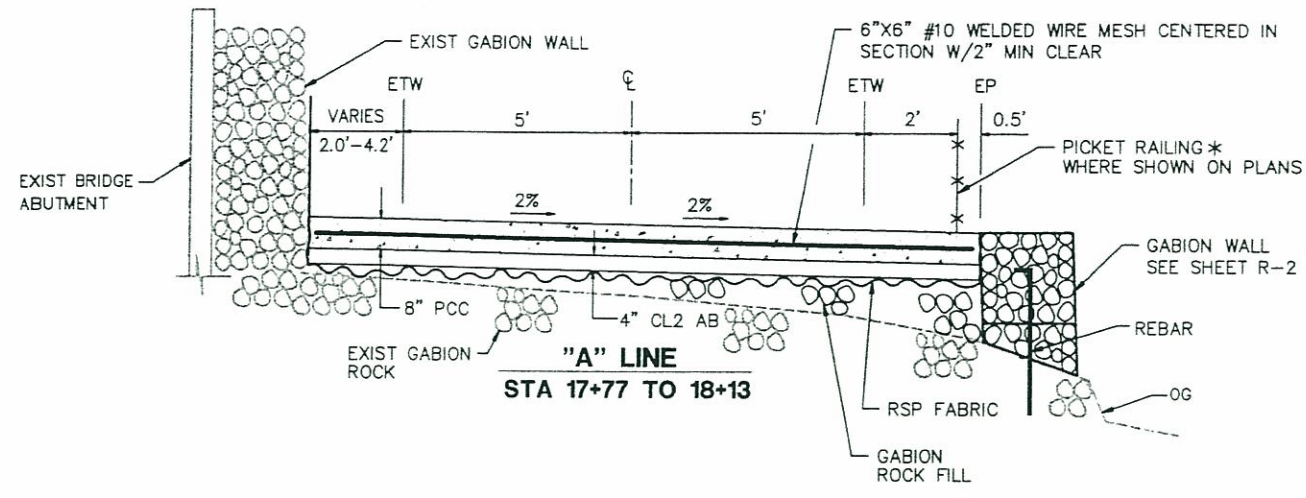
**URS**  
ENGINEERING • PLANNING • SURVEYING  
1380 LEAD HILL BLVD, SUITE 100  
ROSEVILLE, CA 95661 (916) 784-3900



**ROYER PARK TO HARDING BLVD. BIKE TRAIL**

TITLE SHEET

CITY OF ROSEVILLE CALIFORNIA



\* SEE C SHEETS

60% SUBMITTAL

X-1


P:\27560620-URP\B7106-RD\G\MASTERS\SHETS\X-1.dwg 3/16/2007 4:17:42 PM PBT

NO.	REVISIONS	BY	DATE
1	UPDATES TO PROJECT	CHR	10/97

BENCH MARK	
ELEVATION	DATUM
DESCRIPTION	

DESIGN BY : MJK
DRAWN BY : NGK
CHECKED BY : JA
SCALE : NOT TO SCALE
DATE : 03-19-07
PROJ NO. : 27560620

DATE \_\_\_\_\_

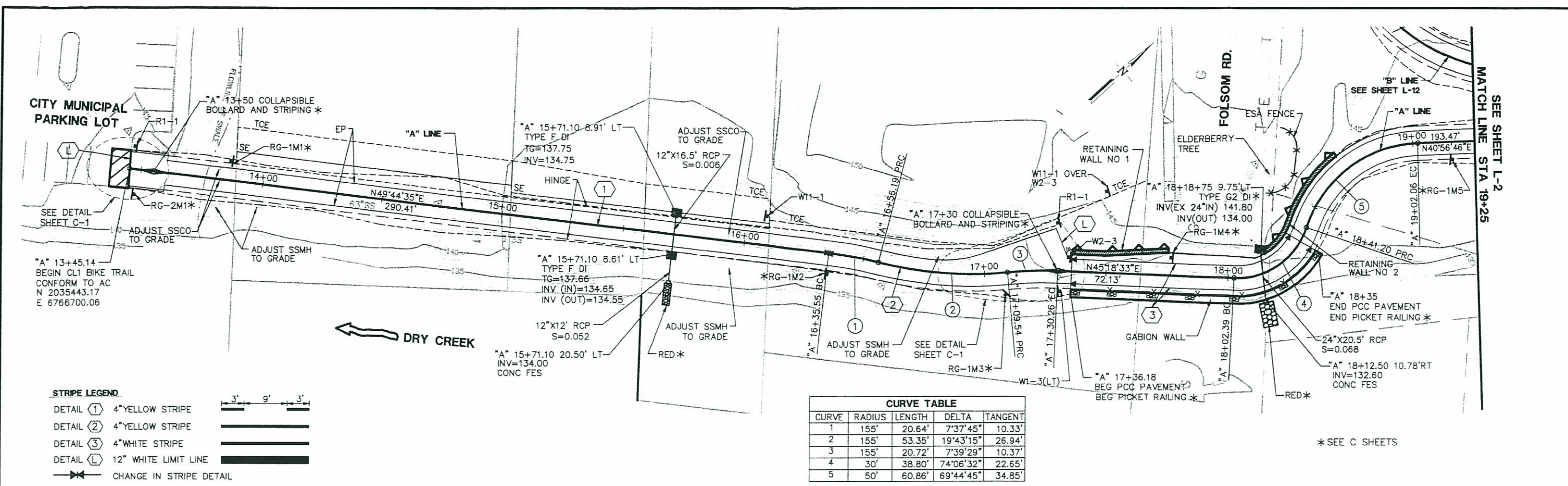


**URS**  
ENGINEERING • PLANNING • SURVEYING  
1380 LEAD HILL BLVD, SUITE 100  
ROSEVILLE, CA 95661 (916) 784-3900

CITY OF ROSEVILLE  
CALIFORNIA

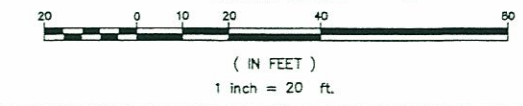
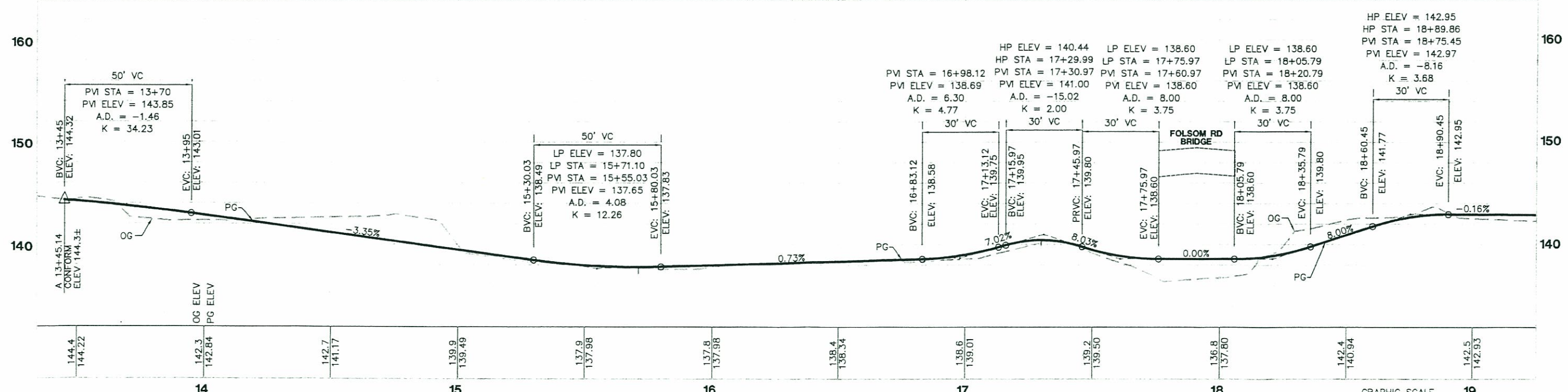
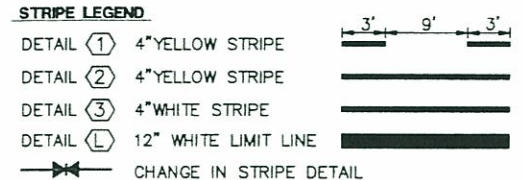
ROYER PARK TO HARDING BLVD. BIKE TRAIL  
TYPICAL SECTIONS  
CITY OF ROSEVILLE CALIFORNIA

X  
OF  
X



**CURVE TABLE**

CURVE	RADIUS	LENGTH	DELTA	TANGENT
1	155'	20.64'	7°37'45"	10.33'
2	155'	53.35'	19°43'15"	26.94'
3	155'	20.72'	7°39'29"	10.37'
4	30'	38.80'	74°06'32"	22.65'
5	50'	60.86'	69°44'45"	34.85'

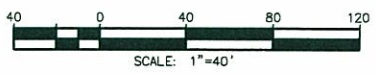
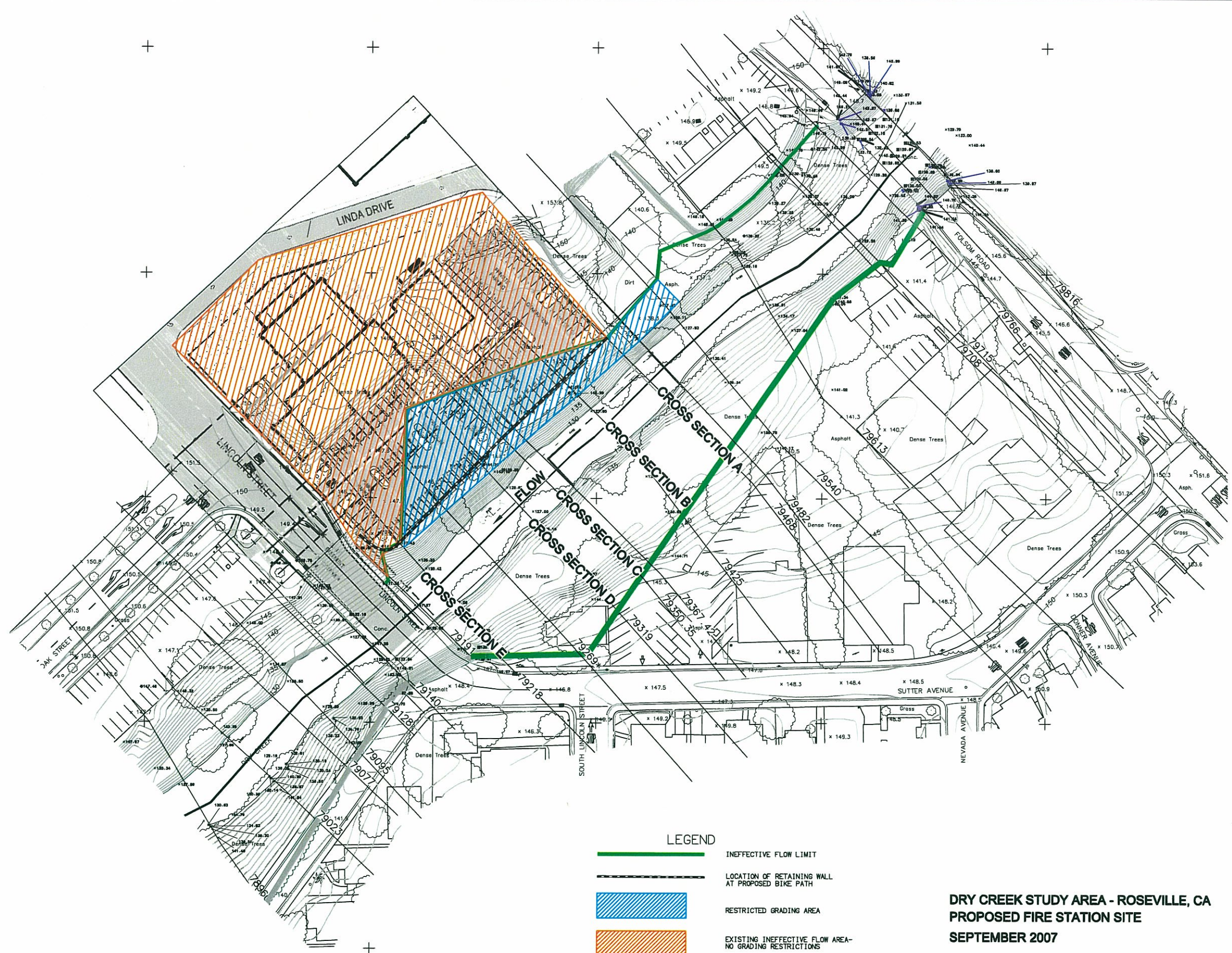







60% SUBMITTAL

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NO.	REVISIONS	BY	DATE																													
BENCH MARK	ELEVATION	DATUM																														
X																																
or																																
X																																

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**APPENDIX D**  
**Fire Station Site – Preliminary Design Sections for Bike Path at**  
**Existing Parking Lot**

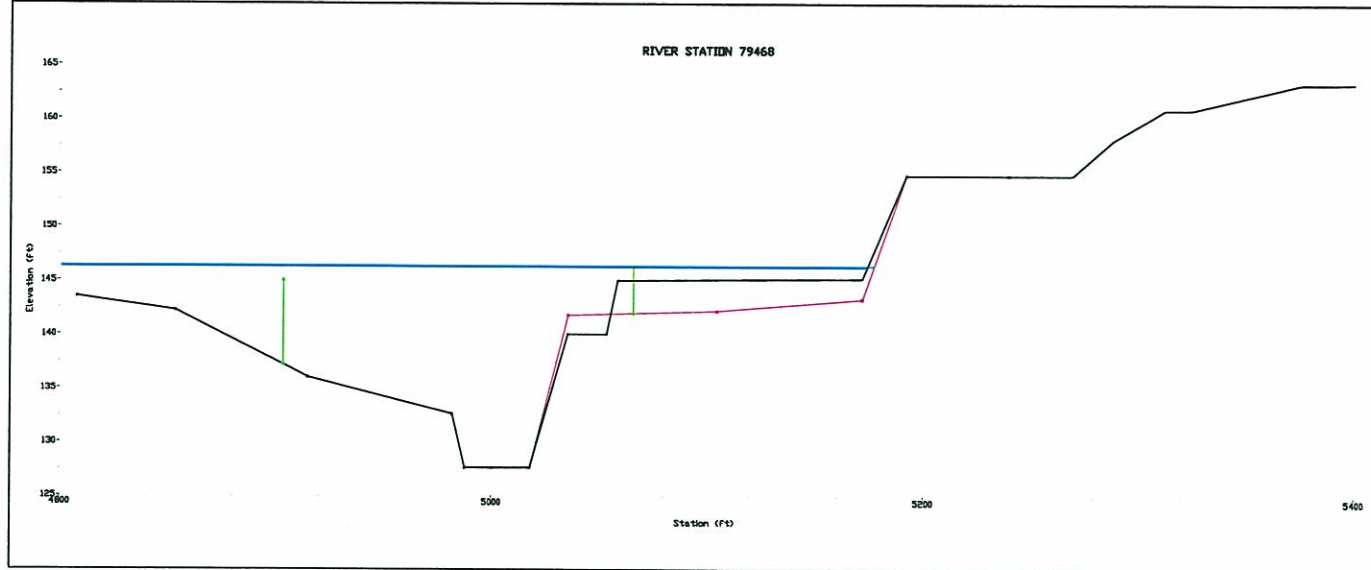


LEGEND	
	INEFFECTIVE FLOW LIMIT
	LOCATION OF RETAINING WALL AT PROPOSED BIKE PATH
	RESTRICTED GRADING AREA
	EXISTING INEFFECTIVE FLOW AREA- NO GRADING RESTRICTIONS
	79425 HEC-RAS CROSS-SECTION

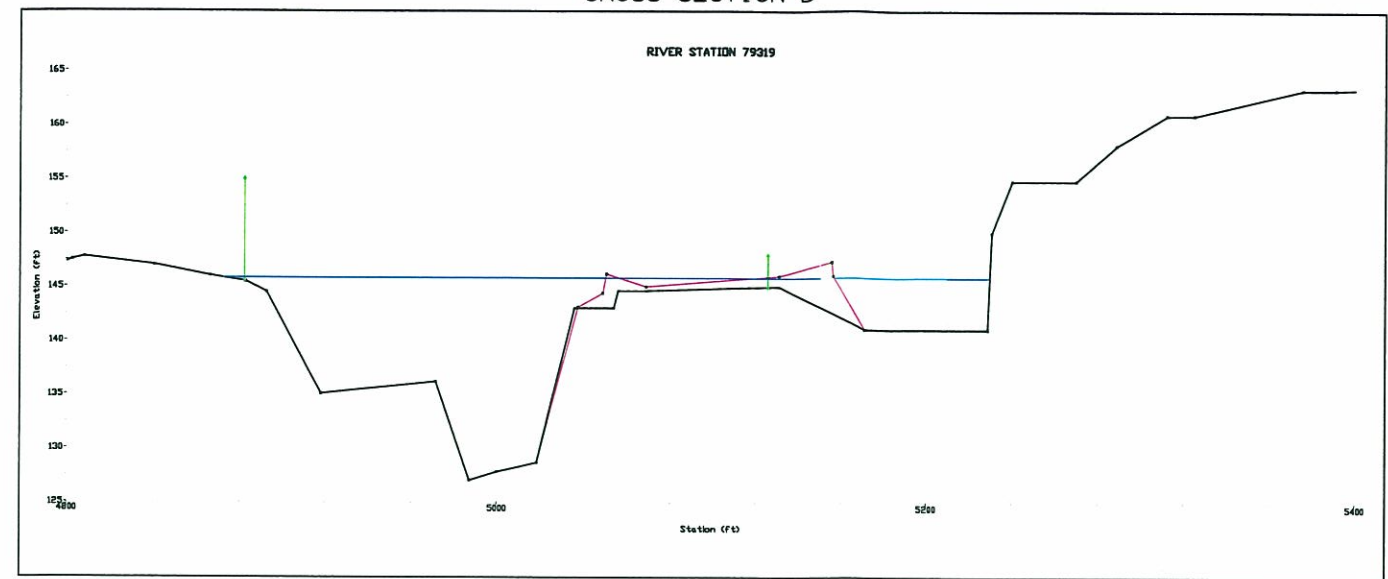
**DRY CREEK STUDY AREA - ROSEVILLE, CA**  
**PROPOSED FIRE STATION SITE**  
**SEPTEMBER 2007**



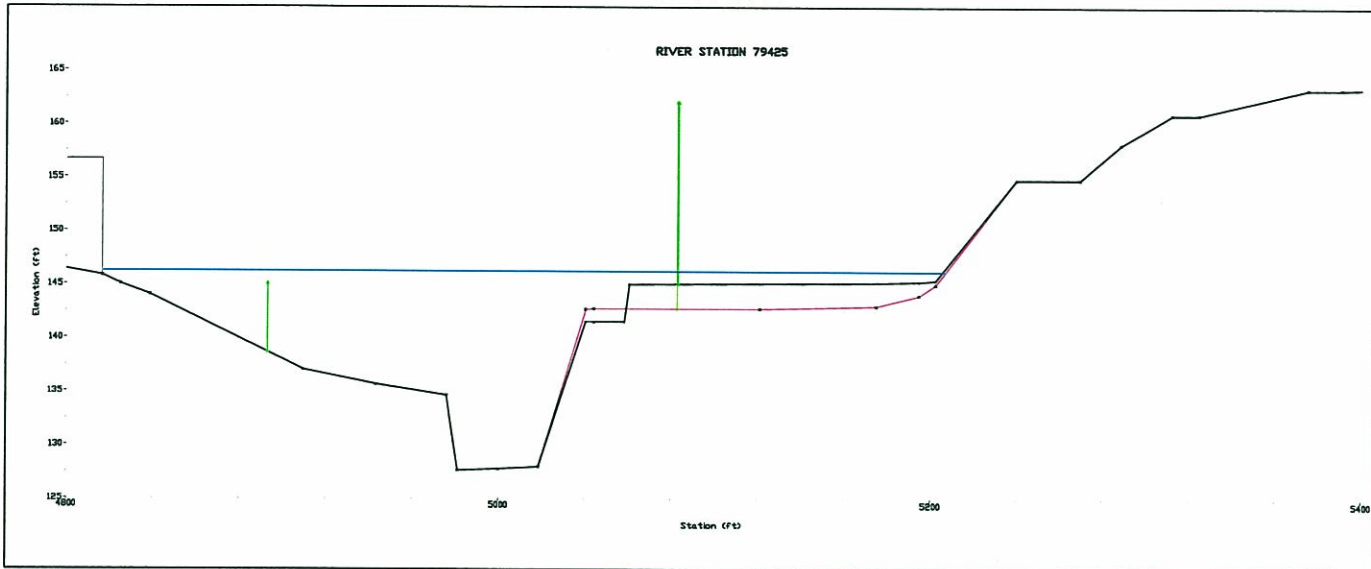
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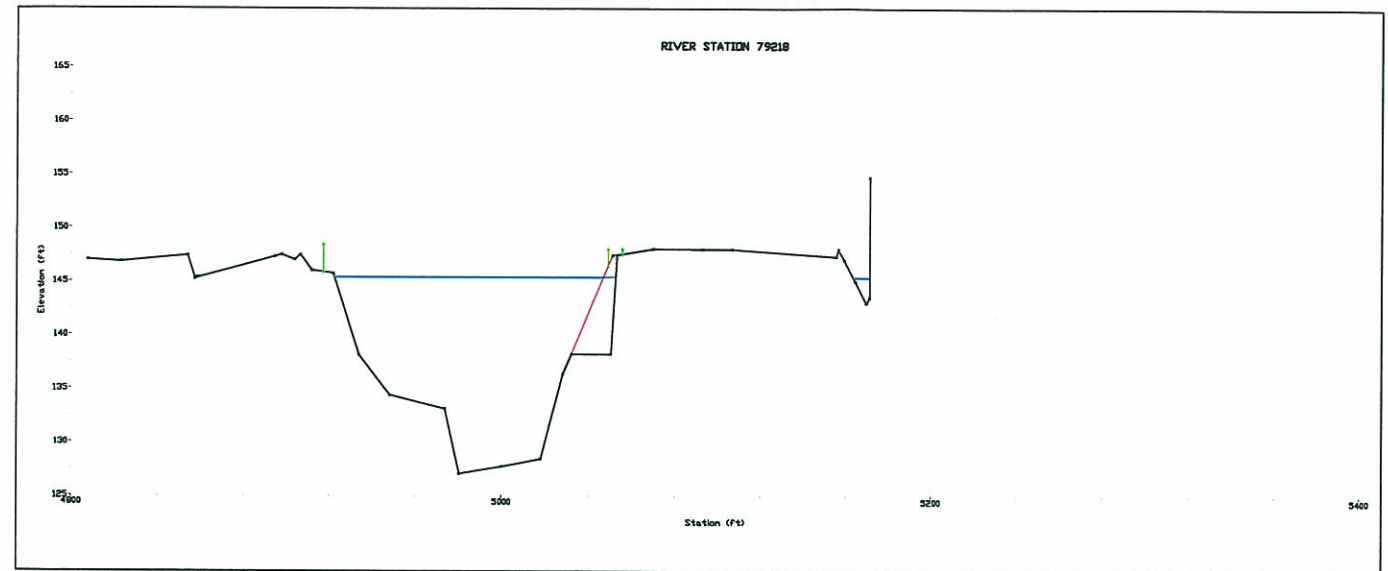
CROSS SECTION D



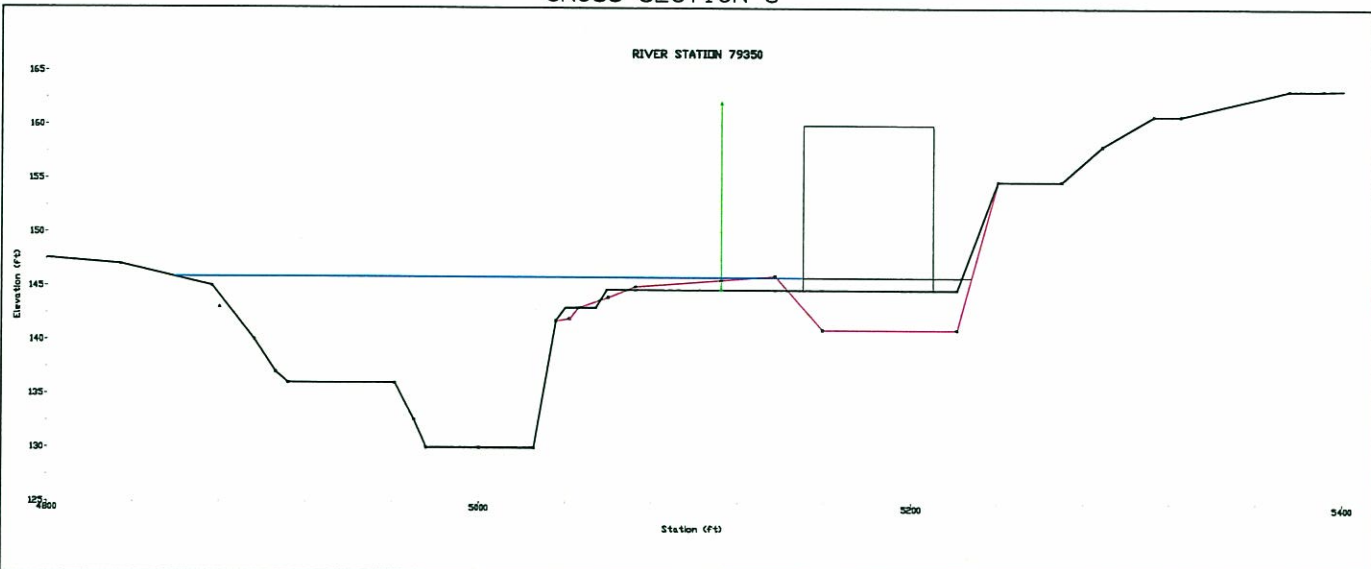
CROSS SECTION B



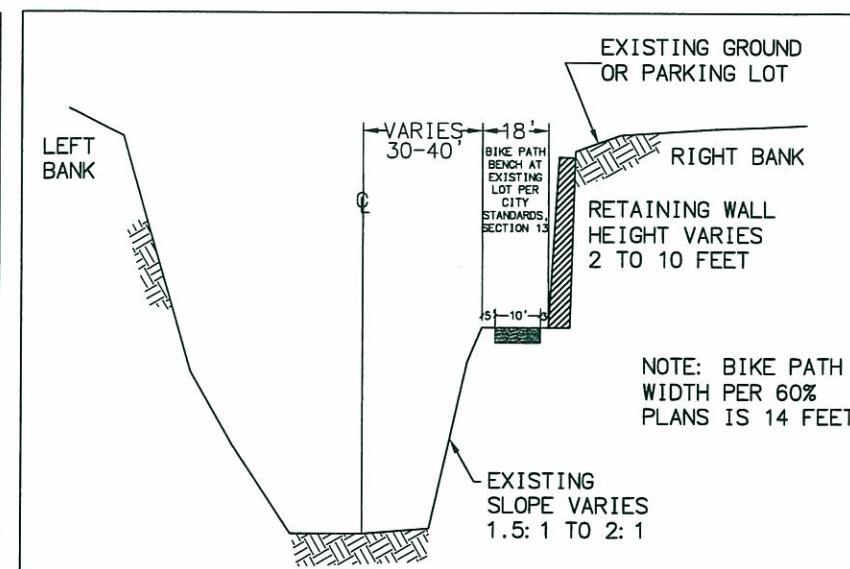
CROSS SECTION E



CROSS SECTION C



TYPICAL CROSS SECTION FOR PROPOSED BIKEPATH AT FIRE STATION SITE



LEGEND

- EXISTING GROUND SURFACE
- EXISTING 100-YEAR WATER SURFACE ELEVATION
- EXISTING OBSTRUCTION
- EXISTING INEFFECTIVE FLOW LIMIT
- PROPOSED GROUND SURFACE
- PROPOSED 100-YEAR WATER SURFACE ELEVATION
- PROPOSED OBSTRUCTION
- PROPOSED INEFFECTIVE FLOW LIMIT

NOTE: IN LOCATIONS WHERE THE PROPOSED AND EXISTING GROUND SURFACE, 100-YEAR WATER SURFACE ELEVATION, OBSTRUCTION, OR INEFFECTIVE FLOW LIMITS ARE THE SAME, THE PROPOSED IS SHOWN ON TOP OF THE EXISTING

**DRY CREEK STUDY AREA**  
**CROSS SECTIONS FOR PROPOSED FIRE STATION**  
**SEPTEMBER 2007**



**2101 Arena Boulevard  
Sacramento, CA 95834  
916.928.1113**

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