RECOMMENDED PROJECTS

16.1 OVERVIEW

Flooding problem areas and their recommended solutions have been identified and described in this chapter. Figure 16-1 shows the locations of all recommended projects. Proposed project information includes planning level structures and non-structures scenario solutions associated with costs and benefits analysis. Planning level costs are the cost of the improvement based on non-detailed quantity estimates. All estimates are based primarily on SWFMWD contour maps, aerial maps, and limited survey data. Unit costs utilized in developing planning level costs were taken from the Construction Contract History, FDOT State Estimates Office, Engineering Support Services, July 1995 through June 1996. The criteria used to evaluate the technical feasibility of each of the proposed projects is contained in Chapter 13, Alternatives Analysis.

Recommended projects will be presented and discussed in the sequences of the major conveyance systems as described in the previous chapters. These projects are:

Delaney Creek Main Channel

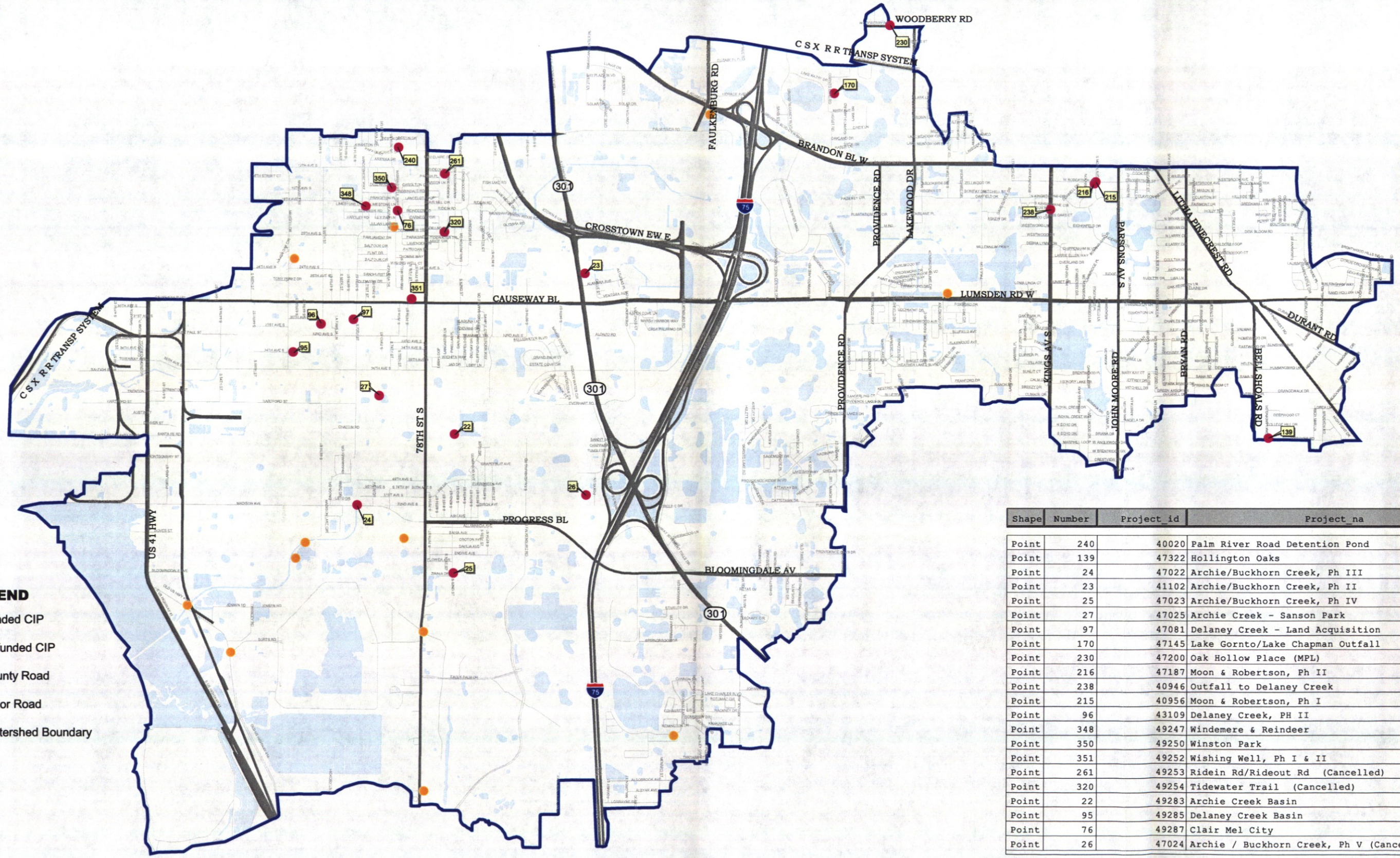
1. Upgrade the U.S. Highway 41 Bridge
2. Channel Improvements
3. Upgrade the Maydell Drive Bridge
4. Upgrade the 70th Street South Bridge

Lateral “A”

1. Upgrade the culvert between Haven Oak Circle and private driveway

Lateral “B”

1. Upgrade the culvert at Robindale Road
2. Channel improvements
3. Upgrade the culvert at Balfour Circle



Shape	Number	Project_id	Project_na
Point	240	40020	Palm River Road Detention Pond
Point	139	47322	Hollington Oaks
Point	24	47022	Archie/Buckhorn Creek, Ph III
Point	23	41102	Archie/Buckhorn Creek, Ph II
Point	25	47023	Archie/Buckhorn Creek, Ph IV
Point	27	47025	Archie Creek - Sanson Park
Point	97	47081	Delaney Creek - Land Acquisition
Point	170	47145	Lake Gornto/Lake Chapman Outfall
Point	230	47200	Oak Hollow Place (MPL)
Point	216	47187	Moon & Robertson, Ph II
Point	238	40946	Outfall to Delaney Creek
Point	215	40956	Moon & Robertson, Ph I
Point	96	43109	Delaney Creek, PH II
Point	348	49247	Windemere & Reindeer
Point	350	49250	Winston Park
Point	351	49252	Wishing Well, Ph I & II
Point	261	49253	Ridein Rd/Rideout Rd (Cancelled)
Point	320	49254	Tidewater Trail (Cancelled)
Point	22	49283	Archie Creek Basin
Point	95	49285	Delaney Creek Basin
Point	76	49287	Clair Mel City
Point	26	47024	Archie / Buckhorn Creek, Ph V (Cancelled)

Hillsborough County
Florida

Department of Public Works
Engineering Division
Stormwater Management
Section

DELANEY CREEK AREA STORMWATER MANAGEMENT MASTER PLAN SEPTEMBER 2000

FIGURE 16-1

DELANEY CREEK AREA
CIP PROJECTS LOCATION
MAP

Lateral "C"

1. Channel improvements
2. Upgrade the culverts at Ridein Road and Rideout Road

Lateral "E-1"

1. Upgrade the culverts at Palm River Road, Frank Adamo Drive (State Road 60)

16.1.1 DELANEY CREEK SUBWATERSHED

The Delaney Creek subwatershed originates at a point approximately 4000 feet north of Pauls Drive/Causeway Boulevard (State Road 676) intersection and flows west approximately 8.0 miles to its eventual discharge into Hillsborough Bay. There are interconnection points between this subwatershed and the Delaney Pop-off Canal subwatershed. With the proposed recommendations for the Delaney Pop-off Canal subwatershed, the ultimate LOS is B. Table 15.1 shows the landmark elevations, water surface elevations, and flood level designations for the Proposed LOS. Detailed locations where flooding is predicted to occur for the 25-year/24-hour storm event is shown in Exhibit 15-1.

16.1.1.1 Delaney Creek Main Channel

The Delaney Creek Main Channel System incorporates the Clair Mel City area located between 54th Street South and the Crosstown Expressway in an east/west direction and Palm River Road and Causeway Boulevard in the north/south direction. This area includes Laterals "A" (21lxxx model series), "B" (212xxx model series), "C" (2130xx model series) and "C-1" (2135xx model series).

As identified in the Existing Condition chapter of this report, the Clair Mel City area provides a low level of flood protection based on computer model results as well as the numerous resident complaints for street and yard flooding.

Channel cross section improvements are proposed between McKay Bay and the Causeway Boulevard crossing. The proposed cross section with this alternative is approximately 3.50 miles (18640 feet) in length. The new cross sections were designed to preserve the existing/or proposed (by the Delaney Creek Stormwater Management Improvements Project, Phase I) top of banks location and to reshape the bank slopes to a 2 (horizontal) to 1 (vertical) on both sides. The channel cross section increases the channel capacity to match the upstream cross

sections proposed by the Delaney Creek improvement project which was permitted in 1993.

U.S. Highway 41 bridge upgrade - Based on the model simulations, the water surface elevation exceeds the U.S. Highway 41 overtopping elevation 7.95 (NGVD) for the 50-year storm event or higher after all the channel improvements proposed with the 1992 Delaney Creek channel improvements project. In order to correct the flooding, an additional 8' x 12' concrete box culvert to the existing three concrete box culverts is proposed at this location.

The effectiveness of this improvement in relieving the flooding conditions upstream of this location and providing a 50-year design storm LOS for the U.S. Highway 41 structure is shown in the Alternative 1 profile plots of Exhibit 13-1a and in the flooding comparison Table 13.1.

Maydell Drive Bridge upgrade - The existing 9' x 17.50' concrete box culvert will be replaced with a 12' x 32' Conspan. This upgrade has been included in the model as part of 1993 channel improvements project. The Maydell Drive Bridge upgrade is under the design development stage at this time.

The 70th Street South Bridge upgrade - The channel improvement upstream of this location, resulted in an increase in flow rate and consequently of the head loss at 70th Street Bridge structure.

The computer model results reflected the necessity of decreasing the water surface elevation upstream of this location to provide the adequate tail water conditions for Laterals “B”, “C” and “C-1” within the Clair Mel City area. There are flooding complaint records for a nearby location what can be attributed to the undersize structure - the cross section of the 70th Street South Bridge.

The existing concrete bridge is proposed to be replaced with 12' x 32' Conspan structure (the same size and shape as the Maydell Drive structure).

Based on the model simulations, the water surface elevation decreases by 2.8 feet for a 25-year storm event and 3.3 feet for the 100-year storm event with the proposed improvements.

The effectiveness of this improvement in stage reduction and relieving the flooding conditions upstream of this location is shown in the Alternative 1 profile plots of Exhibit 13-1a and in the flooding comparison Table 13.1.

16.1.1.2 Lateral "A" (model # 211xxx series)

Channel cross section improvements between the confluence with Delaney Creek and 20th Avenue South are proposed. These proposed cross sections for the approximately 0.90 miles (4800 feet) of natural channel alignment has been designed preserving the existing top of banks location and reshaping the bank slopes to a 3 (horizontal) to 1 (vertical) on both sides.

The existing 48" CNT and two 48" CMPs between Haven Oak Circle and the private driveway east of the Maydell Drive crossing will be replaced with 5'x 16' concrete box culverts. The existing conditions model results reflect an overtopping water surface elevation at these locations which are confirmed by the recorded flood complaints of this area.

16.1.1.3 Lateral "A-1" (model # 2115xx series)

This system will be analyzed together with the Delaney Pop-off Canal, Archie Creek and North Archie Creek systems due to their interconnection with the Delaney Creek subwatershed system.

16.1.1.4 Lateral "B" (model # 212xxx series)

Channel cross section improvements are recommended between the confluence with Delaney Creek and Robindale Road. The proposal is for cross section improvement for this approximately 0.7 miles (3780 feet) of natural channel alignment width as well as the reshaping of the bank slopes to a 2 (horizontal) to 1 (vertical) on both sides. All this work should be performed within the existing 80 foot drainage right-of-way. There is also proposed a 1260' channel cross section improvement on the ditch along Balfour Circle where a flood complaint was recorded and model results predicted flooding occurrences for all design storm events.

The remaining 0.6 miles (3288 feet) of natural channel within the Lateral "B" system shall be cleaned of nuisance vegetation and debris.

Based on the model simulation, the culverts under Tidewater Trail and Robindale Road are undersized resulting in road overtopping for all of the design storm events at Robindale Rd crossing respectively Tidewater Trail crossing except the 2.33-year design storm event.

The construction of a neighborhood drainage system that will provide flood relief to the Clair Mel City residents in the vicinity of Lateral "B" will require the complete rehabilitation of the conveyance system, along the main channel that serves this subdivision. In addition to the

natural channel cleaning and cross section improvements mentioned at the beginning of this section, the culvert replacement at Tidewater Trail and Robindale Road is part of the Lateral "B" flooding control improvements.

The proposed culvert replacements are as follows:

1. Tidewater Trail location, the existing twin 36" x 60" ERCPs will be replaced with 5' x l2' concrete box culvert.

2. Robindale Road location, the existing twin 30" x 54" ERCPs will be replaced with a 4' x 12' concrete box culvert.

3. Balfour Circle location, the existing 48" CMP will be replaced with a 4' x 6' concrete box culvert.

The effectiveness of these improvements in stage reduction and relieving the flooding conditions within the Lateral "B" drainage system is shown in the Alternative 1 profile plots of figure 13-4 and in the flooding comparison table 13.4.

16.1.1.5 Lateral "C" (model # 213xxx series)

Recommendations include channel cross section improvements between the confluence with Delaney Creek and Rideout Road. The proposed cross section for this approximately 0.85 mile (4480 feet) of natural channel alignment has been designed to increase the Lateral "C" main channel width and reshape the bank slopes to a 2 (horizontal) to 1 (vertical) on both sides. All this work should be performed within the existing 80 foot drainage right-of-way.

Based on the model simulation, the culverts under Tidewater Trail, Ridein Road and Rideout Road are undersized resulting in a road overtopping for the 10-year design storm event or greater at Tidewater Trail, 5-year design storm event or greater at Ridein Road and Rideout Road crossing.

The construction of a neighborhood drainage system that will provide the Clair Mel City residents in the vicinity of Lateral "C" adequate flood protection will require the complete rehabilitation of the conveyance system, along the main channel that serves this subdivision. In addition to the natural channel cross section improvements mentioned at the beginning of this subsection, the culvert replacement at Tidewater Trail, Ridein Road and Rideout Road is part of the Lateral "C" flooding control improvements.

The proposed culvert replacements are as follows:

1. Tidewater Trail location, the existing twin 36” x 54” ERCPs will be replaced with 5' x 14' concrete box culvert.

2. Ridein Road location, the existing twin 30” x 54” ERCPs will be replaced with a 4' x l2' concrete box culvert.

3. Rideout Road location, the existing 34” x 53” ERCP will be replaced with a 4' x 8' concrete box culvert.

The effectiveness of these improvements in stage reduction and relieving the flooding conditions within the Lateral “C” drainage system is shown in the Alternative 1 profile plots of Exhibit 13-1a and in the flooding comparison Table 13.4.

16.1.1.6 Lateral “E-1” (model # 2155xx series)

A flooding concern area which was identified by both the model and complaint records is along Lateral “E- 1” system between the Palm River Road crossing and Frank Adamo Drive (State Road 60). It was determined based on model results and field observations that the Palm River Road culvert is undersized (existing 6' x 5' concrete box culvert) compared to the four 48” x 72” ERCP (four 4' x 6' elliptical reinforced concrete pipes). The model predicted a 1.40 foot head loss for a 25-year design storm event at this location. Also flooding complaints were recorded at a location upstream of Palm River Road crossing.

16.1.2 DELANEY POP-OFF CANAL SUBWATERSHED

The Delaney Creek Pop-off Canal watershed extends east to about U.S. Highway 301. The conveyance system consists of man-made ditches with no evidence of natural channel sections and generally flows south and west from U.S. Highway 301 to Hillsborough Bay. Major road crossings include U.S. Highway 301 at the eastern extremity, 78th Street near the middle and Madison Avenue (State Road 676A) and U.S. Highway 41 at its western extremity. With the proposed recommendations for the Delaney Pop-off Canal subwatershed, the ultimate LOS is B. Table 15.2 shows the landmark elevations, water surface elevations, and flood level designations for the proposed LOS. Detailed locations where flooding is predicted to occur for the 25-year/24-hour storm event is shown in Exhibit 15-2.

16.1.2.1 Delaney Pop-off Main channel

The SWMM also predicts flooding at the 78th Street South crossdrain. The water surface elevation across this pipe is as much as 0.68 for the mean annual design storm event. A few channel cross sections are found to be critical with regards to the upstream flooding problems. The 1999 survey information shows a significant reduction in cross section width from upstream to downstream south of Madison Avenue crossing. The channel upstream of Madison Avenue also has a significant impact on the adjacent tributaries systems. With the proposed recommendations for the Delaney Pop-off Canal subwatershed, the ultimate LOS is B. Table 15.2 shows the landmark elevations, water surface elevations, and flood level designations for the proposed LOS. Detailed locations where flooding is predicted to occur for the 25-year/24-hour storm event is shown in Exhibit 15-2.

Three alternatives were examined to alleviate the existing flooding conditions. Preliminary cost estimate calculations were based on the County's guide and comparative pricing. It was determined that Alternative 1 of Chapter 15 is the most effective option to improve the Delaney Pop-off Canal conveyance system. The County's recommended solution is to upgrade the structure at Madison Avenue as well as channel cross section improvements. The planning level cost estimate for this recommendation is included in Appendix F.

16.1.2.2 Tributary "B" (model # 247xxx series)

Tributary "B" System incorporates the Sanson Park subdivision. This channel runs from west to east for approximately 2400 feet to its confluence with Delaney Pop-off Canal.

Three alternatives were examined to alleviate the existing flooding conditions. Preliminary cost estimate calculations were based on the County's guide and comparative pricing. It was determined that Alternative 1 of Chapter 15 is the most effective option to improve the Delaney Pop-off Canal conveyance system. The County's recommended solution is diverting the flow through the Canterbury Lakes Regional Stormwater Detention Facility Project that is currently under review by the governmental regulatory agencies. The planning level cost estimate for this recommendation is included in Appendix F.

16.1.2.3 Tributary "F" (model # 2425xx series)

The Tributary "F" System incorporates the neighborhood east of the Fortuna Acres subdivision. This channel runs east to west for approximately 1300 feet until the confluence with the Delaney Pop-off Canal.

Three alternatives were examined to alleviate the existing flooding conditions. Preliminary cost estimate calculations were based on the County's guide and comparative pricing. It was determined that Alternative 1 of Chapter 15 is the most effective option to improve the Delaney Pop-off Canal conveyance system. The County's recommended solution is to upgrade several structures and install an outfall structure for the existing pond in the Fortuna Acres subdivision. The planning level cost estimate for this recommendation is included in Appendix F.

16.1.2.4 Evergreen Estates System (model # 2520xx series)

The Evergreen Estates System incorporates the Evergreen Estates subdivision located between Falkenburg Road and U.S. Highway 301 and north to Causeway Boulevard. Three alternatives were examined to alleviate the existing flooding conditions. Preliminary cost estimate calculations were based on the County's guide and comparative pricing. It was determined that Alternative 1 of Chapter 15 is the most effective option to improve the Delaney Pop-off Canal conveyance system. The County's recommended solution is to upgrade several structures and improve channel cross sections. The planning level cost estimate for this recommendation is included in Appendix F.

16.1.3 North Archie Creek Subwatershed

The North Archie Creek subwatershed extends as far east as Providence Avenue and as far north as the Crosstown Expressway. This watershed is similar to the Delaney Creek Pop-off Canal subwatershed in that it is drained by a system of man-made ditches and flows in a south and west direction to Hillsborough Bay. Some improvements and extensions to the ditch system have been made in the eastern portions of the subwatershed as a result of the Interstate 75 and U.S. Highway 301 construction. A portion of North Archie Creek west of 78th Street has been relocated and expanded by Cargill, Inc.

16.1.3.1 North Archie Creek Main Channel

The structure at 82nd Street was predicted to flood in the North Archie Creek Main Channel system for the 25-year storm event. Three alternatives were examined to alleviate the existing flooding conditions. Preliminary cost estimate calculations were based on the County's guide and comparative pricing. It was determined that Alternative 1 is the most effective option to improve the North Archie Creek conveyance system. The County's recommended solution is

to clean and de-snag the channel of all silt and vegetation between 82nd street and 78th street.

16.1.3.2 Tributary "B"

The structure at Endive Avenue was predicted to flood in the Tributary "B" system for the 25-year storm event. Three alternatives were examined to alleviate the existing flooding conditions. Preliminary cost estimate calculations were based on the County's guide and comparative pricing. It was determined that Alternative 1 is the most effective option to improve the North Archie Creek conveyance system. The County's recommended solution is to construct a new a culvert to connect Tributaries "A" and "B". This 60" RCP should be installed along Endive Avenue at Tributary "B" to alleviate the flooding near Endive Avenue and 82nd Street. The flows will be diverted to Tributary "A" located behind the back lots of 79th Street. The planning level cost estimate for this recommendation is included in Appendix F.

16.1.4 ARCHIE CREEK SUBWATERSHED

The Archie Creek subwatershed generally lies east of Hillsborough Bay, north of Riverview Drive and west of U.S. Highway 301. It is divided approximately into thirds by 78th Street and Interstate 75. The watershed is drained by a system of man-made ditches from east to west into Hillsborough Bay. A notable feature of this watershed is Cargill, Inc.'s large agri-chemical complex located west of 78th Street and east of U.S. Highway 41. The 326-acre gypstack is located north of the creek and south of the 238- acre cooling ponds (waste water retention pond system) in which construction is underway for expansion. With the proposed recommendations for the Archie Creek LOS System, the ultimate LOS is satisfied with the exception of an isolated areas of the Cargill complex and the Bay. Table 15.4 shows the landmark elevations, water surface elevations, and flood level designations for the proposed LOS. Detailed locations where flooding is predicted to occur for the 25-year/24-hour storm event is shown in Exhibit 15-4.

16.1.4.1 Archie Creek Main Channel (I-75 to Krycul Avenue)

The structures at Krycul Avenue and both Mint Julip Circle crossings were predicted to flood in the Archie Creek Main system for the 25-year storm event. Three alternatives were examined to alleviate the existing flooding conditions. Preliminary cost estimate calculations were based on the County's guide and comparative pricing. It was determined that Alternative 1 is the most effective option to improve the Archie Creek conveyance system. The County's recommended solution is to improve the channel cross sections between Bucks Ford Drive in the Lake St. Charles subdivision and Mint Julip Circle in the Ashley Oaks subdivision. Also, structural upgrade to the two culverts under Mint Julip Circle and the culvert under Krycul Avenue. The planning level cost estimate for this recommendation is included in Appendix F.

16.1.4.2 Tributary "A"

The structure at 78th Street was predicted to flood in the Tributary "A" system for the 25-year storm event. Three alternatives were examined to alleviate the existing flooding conditions. Preliminary cost estimate calculations were based on the County's guide and comparative pricing. It was determined that Alternative 1 is the most effective option to improve the Archie Creek conveyance system. The County's recommended solution is to upgrade the culvert under 78th Street located south of the TSI building. In addition, channel cross sections upstream and downstream of the structure will be improved. The planning level cost estimate for this recommendation is included in Appendix F.

MAINTENANCE PLAN

18.1 BACKGROUND INFORMATION

18.1.1 TERMS AND DEFINITIONS

18.1.1.1 Maintenance

The term, "maintenance," can mean a variety of things. In the context of this Maintenance Plan, maintenance is defined as that collection of activities required to keep a component, system, infrastructure asset, or facility functioning as it was originally designed and constructed to function. As such, maintenance focuses on activities that will maintain function in preference to appearance.

Routine maintenance is a term that refers to scheduled, programmed maintenance – sometimes called proactive or preventive maintenance. The County tries to closely schedule Routine Maintenance, although emergencies and weather can cause problems with scheduling. Examples of routine maintenance services include:

- Herbicide Spraying
- Preventive components such as vegetation mowing
- Palliative components such as filling erosion gullies

Extraordinary maintenance is a response to an unanticipated, deteriorated condition. It is possible to effectively schedule some extraordinary maintenance activities, when primarily the result of observed, long-term deterioration. Sometimes the deterioration is not easily seen and the condition is unobserved until the problem is serious enough to repair or replace (such as damage from an underground pipe failure). Examples of extraordinary maintenance services include:

- Responding to incident reports
- Repair, replacement, or rehabilitation not otherwise scheduled

- "Good Neighbor" response to flooding emergencies

Repair, rehabilitation, and replacement activities may be either routine or extraordinary maintenance. However, renovation activities, such as a significant change in a culvert size or the construction of a detention area, are usually capital improvement projects; especially, if of such a size as to require an external contractor to accomplish.

18.1.1.2 Life-cycle Cost

The system life-cycle cost approach recognizes that the cost of infrastructure consists of various components, such as the following:

- Initial construction cost
- Periodic maintenance cost
- Rehabilitation cost
- Replacement cost
- Historic trends in the value of goods and services

The general notion, of life-cycle cost, is important to consider when preparing a maintenance plan. For example, the general trend is for routine maintenance costs to drop, after a major rehabilitation or repair. Being lowest immediately after initial construction is also common for such costs. Also, it is possible to spend a bit more for the initial construction by specifying materials and details that have proven to have low periodic maintenance costs, long replacement periods, or low rehabilitation costs.

Historic trends are generally for increasing costs. This is due to several factors such as the following:

- Inflation – for example, in cost of money, materials, and labor
- System aging – requiring more effort to achieve the same performance (i.e., level of service)
- Technological enhancements – consider increases in performance made possible by new materials, methods, or systems

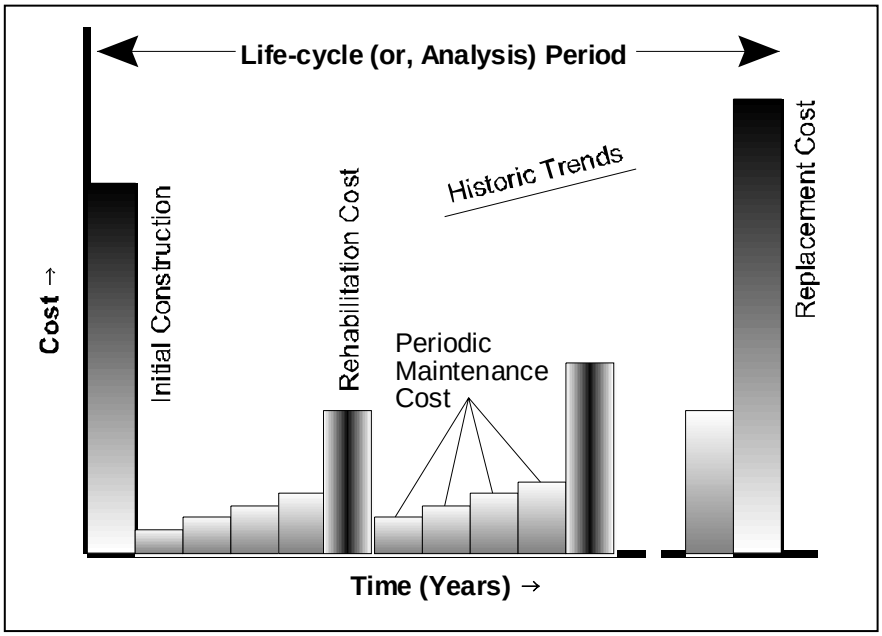
- Changing regulatory requirements – such as, requiring aquatic weed control when not an original project requirement

- Adding functional requirements – for example, adding a public boat ramp where there was none before

- Increased or enhanced performance standards – such as, adding flood management (such as increased level of service (LOS) definition) to an agricultural drainage project.

The relationships between these cost components are illustrated in Figure 18-1.

Figure 18-1
Life-cycle Cost Components



18.1.1.3 Deterioration

Deterioration is a loss of function, or functional characteristic, of an essential element of the stormwater management infrastructure. While County activities include structure operation for stormwater management, especially during flooding situations, the majority of maintenance activities are directed at coping with infrastructure deterioration. Through routine maintenance, it is possible to maximize the useful life of the infrastructure. Through extraordinary maintenance, it is possible to restore a lost or reduced function of an element of the infrastructure.

There are many different factors that contribute to Infrastructure Deterioration and that are beyond the control of the County. These are summarized below.

Corrosion. All common construction materials corrode or lose material due to chemical interaction with the environment. Some materials appear to last longer than others. Corrugated metal culvert pipes are especially susceptible to corrosion, even if galvanized and coated with asphalt, especially in well-aerated water that contains dissolved salt. This condition is very common near the coastline of Hillsborough County. The most common corrosion of steel pipes is in the wet-dry and splash zones (i.e., mostly on the top and side of the pipe). Corrosion is often seen before it becomes so serious a problem that the culvert pipe collapses. Sometimes the corrosion happens behind a coating or on the soil side of the pipe and goes unseen until collapse happens.

Mechanical systems, such as pumps, electrical controls, in addition to common construction materials, such as culverts, are susceptible to galvanic or induced electric current corrosion. Small differences in the chemistry of the soil, water, or deposited salts can considerably accelerate the corrosion rate. Pump impellers, for example, are particularly susceptible to saltwater corrosion. As it happens, very tiny changes in pump impeller dimensions greatly affects the capacity of the pump to move water.

Fatigue. Fatigue is a weakening of a material from repeated, cyclic application of a load. This is very common with roadway cross drains that are subject to frequent, high wheel loads (i.e., along well-traveled roads and shallow culverts). There are very few external, warning signs of fatigue. When the strength of the culvert has gotten sufficiently low, it simply collapses without any advance warning.

Wear. Structural components, such as operable slide gates, wear due to friction and abrasion during operations. Mechanical systems such as stormwater pumps are subject to abrasion from the suspended matter in stormwater. Consistent with the need to minimize wear

and to minimize the amount of oil and grease that enters stormwater runoff, it is necessary to periodically lubricate structures and test the operation of mechanical systems such as pumps.

Erosion and Sedimentation. Erosion and sedimentation are opposite sides of the same coin. Erosion is the removal of material (in this case, soil) while sedimentation is its movement and deposition at a different location. All land areas, including streams, erode and deposit in varying amounts. When the amount of soil that moves into a stream reach equals the amount that moves out of the reach, the reach is in equilibrium.

The ideal situation is an equilibrium channel configuration that also meets stormwater level of service criteria, environmental permit requirements, and navigational requirement, if any. Simply removing sedimentation can actually accelerate channel erosion by upsetting the equilibrium between erosion and sedimentation. Therefore, it is necessary to manage erosion at the same time as removing sedimentation.

The capability of a channel to convey water is directly related to the channel geometry (i.e., depth, width, side slopes, and bed slope) and to the type of material that lines the sides and bottom (i.e., soil, grass, concrete, etc.).

Erosion happens throughout a drainage basin as a result of natural conditions and constructed alterations. In engineering, this is commonly expressed in the form of the "Uniform Soil Loss Equation," which relates erosion rate in a basin or watershed to soil types, land slope, land use practices, erosion control practices, rainfall patterns, and similar factors. The County cannot control the majority of the factors that influence erosion, beyond the physical conditions in the drainage canals themselves. Therefore, the erosion rate within a given watershed can change over time and without warning, producing an increase in the sedimentation rate in the channel.

The County has an active erosion management program in place. Vegetation management, including mowing, hand-cutting, and a reduction in herbicide application, are major components of the bank and channel erosion management program. Bank and channel stabilization (i.e., concrete slabs, riprap, articulated blocks and mats, etc.) and hard-lining are constructed in problem areas and are inspected as a part of the mowing program. When damaged areas are discovered, repairs are scheduled.

Unanticipated Structural Damage. When mowing, running over unseen gullies can cause the mower deck to "scalp" the grass, exposing bare soil to rainfall or flowing water. Sometimes a culvert may have a heavier load placed over it than it was designed to support. The culvert may settle or move, or it may open up a gap at the joints between pipe sections, or it could fracture and collapse. Also, soil conditions may be such that differential settlement happens over a long period of time. Collapse of culvert pipes or sewer lines that did not

apparently have adequate bedding or cover are common. When this happens, repairs are programmed as soon as practical.

Fouling. Fouling happens when biological growth, such as algae or barnacles, coats, covers, or blocks a structure and reduces its effectiveness. Continued monitoring and routine maintenance minimize the risk from fouling. The public is encouraged to avoid using the canals to dispose of yard waste and trimmings that can decompose and provide excess nutrients to encourage biological growth.

Junk and Debris Removal. Even with a continuing public education program to not dispose of junk and debris in the canals, it is necessary to frequently remove junk and debris to prevent it moving through the system as flotsam and possibly blocking culverts and water management structures. Removing junk and debris also removes habitat opportunities for undesirable wildlife.

Latent or Hidden Defects. Some of these problems happen as the result of latent defects showing up some time after the initial construction. Latent defects can come from either the original construction material having a small, undetected flaw, or from poor quality control during the fabrication or installation of the construction materials. As defects are identified, repairs are programmed as soon as practical or, if failure does not seem immediate, monitor their condition.

18.2 DELANEY CREEK AREA WATERSHED ASSETS

The Delaney Creek Area watershed includes a primary channel drainage system that receives and conveys discharge from numerous secondary and local stormwater systems to Tampa Bay. Hillsborough County manages a considerable list of assets associated with the entire watershed's drainage system. Various improvements to the drainage system have been recommended, which will add to the asset list.

The continued operation and maintenance of these assets is necessary to maintain the expected stormwater and water quality treatment levels of service provided by the drainage system. In addition, these day-to-day (i.e., routine or scheduled) and incident response (i.e., extraordinary) maintenance activities are creditable to the County's overall rating under the Federal Emergency Management Agency's Flood Insurance Administration Community Rating System.

In Hillsborough County, the County's Roadway Maintenance Division, which has divided the County into four service areas: North, South, East, and West. Each service area performs the various maintenance activities for stormwater structures located within their boundaries. The Delaney Creek Area watershed falls within portions of the Central and South Service Areas.

18.3 COORDINATION WITH FEMA FIA's CRS PROGRAM

18.3.1 BACKGROUND

The Federal Emergency Management Agency (FEMA) promotes community-level management of emergencies (such as: flooding, windstorm, etc.). A separate initiative within FEMA, called the Flood Insurance Administration (FIA), administers the national flood insurance program. Communities are rated for insurance purposes using the Community Rating System (CRS).

The CRS program encourages communities to undertake 18 different activities that FEMA recognizes as methods to reduce hazard (in this case, flood) damages. These activities are organized into creditable activities that include:

- Public Information
- Mapping and Regulation
- Flood Damage Reduction
- Flood Preparedness.

Maintenance of the stormwater management system (FEMA calls this the "drainage system") is a creditable activity under the CRS program.

18.3.2 CRS PROGRAM COORDINATION

The County maintenance is responsible for several tasks under the FEMA heading of "Activity 540, Drainage System Maintenance." The following is an abbreviated response, item by item, to the Drainage System Maintenance Program requirements. In some cases, reference is made to other sections of this document. The terminology comes from the CRS Coordinator's Manual.

18.3.2.1 Activity 540, Drainage System Maintenance

A. Channel and basin Debris Removal (CDR)

1. Inspections of the system are conducted at least once a year. Storm events in the County are frequent, especially during the wet season from May through November. Whenever unusually prolonged rain events happen, or potentially damaging single rainfall events occur, it is customary to visually inspect the primary drainage system to check for debris and flotsam blockages, structural failures, or erosion failures. Any observed deficiencies are reported and programmed for maintenance response.

2. An important component of the maintenance activities relating to this CRS activity is the incident response process. Any citizen may report any concern with the drainage system, including channel and basin debris removal. All incident reports are assigned to a supervisor to investigate and respond. If an inspection identifies a need for maintenance, repair, or rehabilitation, the problem is reported and evaluated for inclusion in the routine or scheduled maintenance programs. If the problem is in a basin that has not yet been improved, the condition is reported to the County's stormwater staff, and the feasibility of interim repairs is considered. In these ways, any identified maintenance need receives an appropriate response.

3. County maintenance maintains lists, both informally and formally, of problem structures or areas. These areas receive frequent monitoring during prolonged or intense rainfall events to ensure that flooding can be kept as minimal as feasible.

4. The County has an ongoing, capital improvements program (CIP) that funds improvements to the drainage system. Program management of the CIP is outside of the County Maintenance Operations.

B. Stream Dumping Regulations (SDR)

1. The County has regulations that prohibit in-stream dumping of yard and industrial debris.

2. Literature on this subject is distributed. Storm drain markers and area maps are distributed to voluntary groups. Regulations are explained to citizens when inspecting incident reports, if appropriate to the reported problem.

C. Coastal Erosion Protection Maintenance (EPM)

1. The County has regulations protecting coastal areas from activities that can accelerate erosion. The State of Florida also has the Coastal Zone Protection Program. County Maintenance does not specifically manage coastal erosion protection maintenance programs, unless damage is found to adversely impact freshwater discharges from the drainage system.

18.3.2.2 Impact Adjustment Credit

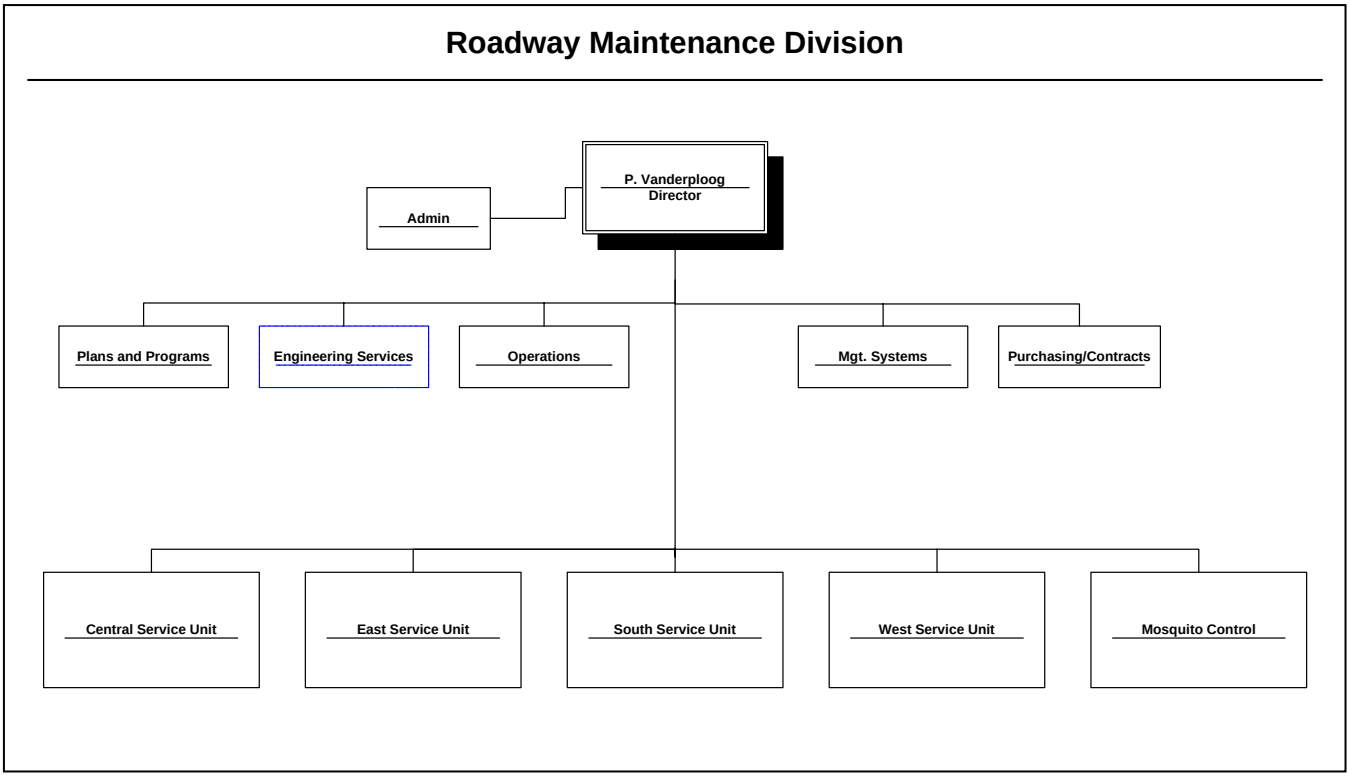
The County maintenance's authority and responsibility extends to the entire jurisdictional area of the County. Undeveloped areas deliberately receive less frequent maintenance than the developed and populated areas. Maintenance is not improvement. Where the basin CIP program is not yet complete, the existing system is maintained to its most feasible condition until such time as it can be repaired or rehabilitated.

18.3.2.3 Activity 540 Documentation

1. **Responsibility**. Responsibility for drainage system maintenance rests with the Director of the Roadway Maintenance Division. As shown on the Organization Chart, Figure 18-2, the Director may delegate responsibility and authority to subordinates, for specific maintenance or inspection activities.

2. **Description of Community's Drainage System**. The County is presently in the process of identifying all the Stormwater Assets that it owns. This inventory is scheduled to be completed by December 2001.

Figure 18-2
Organization Chart



3. **Inspection Processes**. Copies of inspection and incident response forms are kept in County maintenance files, and are available for examination.

4. **Debris Removal Procedures**. Procedure descriptions are maintained in County maintenance records, and are available for examination.

5. **Records**. The records that document inspections and debris removal are kept in County maintenance files, and are available for examination.

18.4 CURRENT MAINTENANCE PROGRAM ELEMENTS

The stormwater system, or drainage, maintenance program is driven by established maintenance schedules, incident driven inspections, routine inspections and requests generated from residents of the County. These activities are consolidated into three program components:

- Routine, or scheduled, and drainage conveyance system, or on-condition, maintenance
- Drainage incident response, or extraordinary, maintenance
- Major facilities rehabilitation, which is usually scheduled but based on-condition

18.4.1 ROUTINE AND DRAINAGE CONVEYANCE SYSTEM MAINTENANCE

The ongoing routine and drainage conveyance system maintenance program is a proactive process that is responsible for the periodic maintenance of the existing stormwater management facilities throughout the County to assure that existing facilities meet their intended level of service (i.e., performance).

Routine and drainage conveyance system maintenance activities conducted by the County include:

- Repair or replacement of damaged or deteriorated cross-drain and side-drain pipe culverts and box culverts (on-condition).
- Cleaning and removal of flow-obstructing debris and silt from cross-drain and side-drain pipe culverts, storm sewers and box culverts (on-condition).
- Repair or replacement of damaged, deteriorated, or inadequate catch basin inlets and manholes (on-condition).

- Clean and remove trash, rocks, silt and debris from catch basin inlets and manholes (on-condition).
- Install new pipe culverts (scheduled).
- Construct small drainage structures (scheduled).
- Cleaning and reshaping canals and off-system drainage ditches using specialized equipment such as Menzi Muck All Terrain Excavator (on-condition).
- Roadside ditch cleaning and reshaping using Gradalls and similar equipment (scheduled).
- Limited access mowing using specialized equipment or hand labor (scheduled).

18.4.2 EXTRAORDINARY (DRAINAGE INCIDENT RESPONSE) MAINTENANCE

A substantial portion of the County's operation of the maintenance program is extraordinary in that maintenance actions are initiated in response to inspector observations (on-condition but of a high priority and not suitable to a scheduled maintenance approach), citizen complaints and extreme weather/flooding conditions. Drainage incident maintenance is intended to provide an effective, short-term response to reported drainage incidents or complaints.

Upon receipt of a complaint or observation of a problem, a County inspector investigates and prepares a work effort report. The inspector's report will identify whether or not the County is authorized to resolve the problem, provides an estimate of the level of effort required and assesses the safety factors involved, such as the roadway integrity. This report is reviewed and assessed by supervisory staff and a priority level is assigned. Table 18-A.1 lists the various priority codes in use and designates the time frame goal for completion of the work. The priority code sets the deadline for resolution by the County.

Table 18-A.1
Drainage Incident Priority Codes

Priority Code	Response Time Goal
00	No Priority (no action taken)
01	Immediate Response
02	2 Hours
03	5 Hours
04	24 Hours
05	1 Working Day
06	3 Working Days
07	5 Working Days
08	Within 1 Week
09	Within 2 Weeks
98	As per schedule
99	To be scheduled

County staff has estimated that 80% of their available resources are utilized performing extraordinary maintenance work as the result of incident responses. This leaves only 20% of the County's resources available to perform the routine or scheduled maintenance activities.

18.4.3 MAJOR FACILITIES REHABILITATION

The major facilities maintenance program involves replacing, rehabilitating, or retrofitting facilities to achieve design condition performance, erosion control and slope stabilization, filter cleanup and rehabilitation, and removal of accumulated silt. This program is a routine or scheduled maintenance activity of existing stormwater facilities on a prioritized basis. Key work activities in this program include:

- Sediment removal
- Reconstruction of ditch cross-sections and profiles
- Repair, rehabilitation and reconstruction of storm sewers
- Repair, rehabilitation and reconstruction of stormwater control structures

18.4.4 Work Tracking System

Hillsborough County Roadway Maintenance Division has recently upgraded to a new version of their work tracking system, Hansen Version 7 Enterprise Solution from Hansen Information Technologies. Through the Hansen system's activity definition, users may describe work requirements for performing tasks at varying levels of detail. Each activity definition is used to describe the work requirements for the job at hand.

Hansen uses an activity-based costing system, which is intended as a management tool instead of an accounting method. It essentially combines two different cost statements. The first cost statement reflects the basic cost groups by cost center. The second provides a deeper breakdown by activity minus non-productive time. Ultimately, the cost of a unit quantity of activities performed can be determined. The County can use Hansen's activity-based costing methods to help determine and justify their budgetary requirements.

Preventive maintenance schedules may also be created for both asset groups and individual assets within the Hansen system. The system can then develop reports that summarize the costs associated with a specific group of work orders. The Hansen system upgrade was extensive and is still in the implementation stages. Once fully integrated into the County's operations, it will provide the ability to generate detailed reports regarding the management of the maintenance function. This information should assist the County to improve maintenance unit operations and in determining the optimal distribution of staff, effort and equipment.

18.5 OVERALL PROGRAM ASSESSMENT

The current maintenance program is approximately 80% extraordinary maintenance. Comparison to other county's programs shows that this is not unusually high. However, it does point out that the vast majority of the cost, in terms of labor, equipment and materials, expended by the County is in response to complaints at the expense of planned maintenance activities. This reduces overall efficiency and can introduce quality control issues such as by using available trades and equipment and not necessarily the most appropriate to the task at hand.

The County does not have an accurate inventory or map of the facilities it is responsible for maintaining. Currently, it does not have a published set of maintenance standards. A maintenance management plan is under development. The current maintenance program is heavily reliant upon the institutional knowledge and experience of its staff.

The County is currently developing a facilities maintenance inventory and accompanying stormwater system mapping. This inventory is anticipated to include ditches, canals, ponds,

culverts, bridges, cross drains, side drains, control structures and other facilities maintained by the County. State, Federal and railroad rights-of-way and drainage components will be included in the mapping, but shown with a different color or line type to indicate non-County owned/maintained facilities. Currently, the County has compiled a database of canals and ponds with information regarding the maintenance frequency/type, ownership, current condition and location.

For each County facility listed in the inventory, the collected information and data should include (at a minimum):

- Description
- Location
- Last inspection date
- Last maintenance date
- Scheduled inspection interval
- Scheduled maintenance interval
- Current condition
- Scheduled repair, rehabilitation or replacement

The inventory will become a valuable tool for scheduling of maintenance activities, performance of regular system inspections, identifying unit costs, and development of annual budgets. Problem areas could be more readily identified and scheduled maintenance performed. This would assist the County in improving overall operational effectiveness.

Following the development of the facilities inventory, the County should attempt to identify the appropriate inspection and maintenance intervals. Estimates based on environmental and construction permit conditions, staff experience, or recommended standards can be used initially, with modifications made as site specific knowledge is developed. However, these scheduled maintenance activities should be coordinated and, where duplicative operations happen, critically examined to look for labor, equipment and materials scheduling efficiencies.

18.6 FINDINGS, ISSUES, RECOMMENDATIONS

18.6.1 FINDINGS

The following key findings were made during the development of this maintenance plan:

- Approximately 80% of the County's operation is extraordinary, rather than routine or scheduled maintenance. The County is frequently inundated with phone calls regarding maintenance of adjacent systems whenever and wherever maintenance crews are observed to be working.
- The County is having difficulty filling open positions, resulting in staff resources below budgeted levels.
- A more user-friendly maintenance system needs to be developed to ensure the completeness, accuracy and integrity of the maintenance performance data.
- A detailed maintenance facility inventory is needed.
- Defined maintenance standards are needed.
- Improvements in equipment inventory, maintenance records, as related to equipment operating hours or cycles, are needed to identify failing equipment and justify the need for new or additional equipment.
- Several Menzi Muck All Terrain Excavators are reportedly old and unreliable. As a highly used and frequently depended on piece of equipment, replacement may be justified.
- Non-County owned facilities are not being sufficiently maintained by the responsible entities

18.6.2 ISSUES

18.6.2.1 Acceptance of Aging Stormwater Systems for Maintenance

Recent new land developments, that have had their stormwater management and drainage systems transferred to the County for operation and maintenance, have shown unexpected evidence of accelerated aging.

18.6.2.2 Use of Stormwater Infrastructure Beyond Design Service Life

This is particularly an issue for culverts and bridge-culverts where long-term contact with soil and water can cause deterioration. Also, changes in climate and environmental conditions can alter the rate of deterioration. For example, the Florida Department of Transportation suggests the following design service life (i.e., average years to perforation), under ideal conditions (no chemical attack, no galvanic or induced electric current corrosion, no mechanical damage, abrasion, etc.), for 16-gage (gauge), galvanized, steel culvert pipe:

- With soil-water acidity of 7.0 (pH) and resistivity of 50,000 (ohm/cm) ..... 50 years
- With soil-water acidity of 6.0 (pH) and resistivity of 3,000 (ohm/cm) ..... 20 years

For comparison, typical values for seawater are an acidity of 8.0 (pH) and resistivity of a few hundred ohm/cm. Solutions with a pH of 7.0 are considered neutral; 6.0 pH is acidic; and, 8.0 pH is alkaline. Solutions with a low resistivity have a higher concentration of dissolved salts (dissolved salts conduct electricity and result in lower resistivity values). The above figures follow common sense where one expects to see more deterioration when the pipe is in an environment that is either acid or salty or both.

18.6.2.3 Public Access and Risk

It seems logical to permit public access to the public right-of-way associated with the County stormwater system. Normal and adequate, routine maintenance that meets the stormwater level of service requirements may still have minor gullies, woody vegetation cut off near ground level (but, protruding above ground), steep channel side-slopes, deep water pools in channel, and other physical hazards. In addition, the public has a tendency to "modify" the public right-of-way for their convenience (such as adding a platform to sit or stand on while fishing, etc.), which creates hazards for work crews and equipment.

18.6.2.4 Public Perception

Each person (i.e., public) has his or her own perception about what is an acceptable level of maintenance. Many understand that the canals can look somewhat "rough" and not have any loss of conveyance capacity (that is, they will provide the design stormwater level of service). Many Incident Reports come from individuals who expect the County facilities to be a visual and architectural amenity to their property.

18.6.2.5 Inadequate Access for Crews and Equipment

Many areas of the County stormwater management facilities lack access suitable for the safe passage of crews and equipment. In some cases, crews and small tools for hand-clearing are used when equipment would be much more efficient and cost-effective. Where it is possible to locate a willing landowner, a permanent maintenance easement is secured at no cost to the County. However, there are several areas where this has not been possible and some areas where effective maintenance is virtually impossible.

18.6.2.6 Technological Innovation

It is important to continue to look for ways to improve service. For example, as a direct result of experience with metal pipe corrosion and deterioration, only reinforced concrete or high-density polyethylene (HDPE) culvert pipes, or similar long service life materials, are being used on County projects.

18.6.2.7 Public Policy and Regulatory Changes

Public policy and regulatory changes will continue to create funding challenges affecting County stormwater system maintenance. Examples of this include National Point Discharge Elimination System (NPDES) and Phase II FDEP regulatory requirements. There are also opportunities for improved efficiency through changes in public policy, rules, regulations, and laws in Hillsborough County.

18.6.2.8 Primary Versus Secondary Drainage Systems

A primary drainage system is the canal or culvert pipe that drains a whole basin or watershed to a main system. A secondary drainage system conveys water to the primary system. Main systems discharge to a receiving body such as Tampa Bay. All drainage systems are branched, to greater or lesser degrees, like a tree. In that case, the trunk is the primary drainage system and the branches and twigs make up the secondary drainage system.

A failure in a primary drainage system may cause deep and prolonged flooding to a large portion of the basin or watershed. On the other hand, a failure in a secondary drainage system may cause flooding, but usually only of a shallow or intermittent nature, and very localized. Because of resource limitations, smaller, secondary drainage systems such as side and back lot-line swales are typically the responsibility of the property owner; however, County policy is not clear on this point.

18.6.2.9 Repair, Replacement, and Rehabilitation of Existing Stormwater Systems

In response to Incident Reports, repair, replacement, and rehabilitation projects are handled as extraordinary maintenance. However, doing so often places demands on a fiscal year's budget, in terms of both dollars and staff time, resulting in scheduling problems for the remaining routine maintenance activities.

18.6.2.10 Dollar Limits on Repair and Rehabilitation Projects

Extraordinary maintenance requiring wholesale replacements of aging stormwater systems is frequently discovered during inspections of Incident Reports. These projects may

results in unanticipated demands on County maintenance capacity (e.g., limits placed by available funding).

18.6.2.11 Inadequate Maintenance of Non-County Systems

System maintenance that should fall to homeowners associations is generally not being done in an adequate manner. By policy, the County does not maintain private stormwater systems, but will step in where situations happen that affect County-owned and maintained systems.

18.6.2.12 County Ownership and Right-of-Way Unclear

In the past, the County has had trouble identifying County rights-of-way and easements. As a result, maintenance activities were often performed on non-County owned systems. The County staff now attempts to establish ownership before performing maintenance through coordination with the County's Real Estate Department. The County's current policy is to only perform maintenance on County-owned facilities.

18.6.2.13 Maintenance Standards

The County is currently in the process of developing a set of maintenance standards, but this information was not available for review or summary here. These standards will relate the typical work tasks performed by the County to system performance-related standards (e.g., percent of culvert sediment accretion, etc.), establishing unit quantities for equipment, staff, and production rates. This document will be essential to assessing on-condition situations and scheduling labor, equipment and materials. The successful implementation of the Hansen system should help provide valuable information for the continued revision and updating of this document.

18.6.2.14 Response Prioritization Process

Whether thought of as a triage approach or whatever, resource limitations compared with uncertain demands require a system of prioritization to ensure that the critical functions of the stormwater management system will be maintained and that the risk to the public, in terms of loss of life and property, is minimal. For example, in areas where system rehabilitation is

recommended to improve a stormwater or water quality level of service deficiency, maintenance activities should remain palliative and as necessary to minimize risk to life and property. Another example would be a blocked 12-inch diameter driveway culvert when compared to a fallen tree blocking a headwall in the main creek system - the first can wait while the second could cause considerable flooding.

18.6.2.15 Driveway Culverts

A significant number of drainage incident response events are related to unblocking, repairing, or replacing private driveway culverts. Equally important, there are frequent debates with property owners over the aesthetics of the replacement installation. Considering that the basic driveway culvert primarily benefits the homeowner, it would seem that the maintenance of the driveway and driveway culvert should be the homeowner's responsibility.

18.6.3 RECOMMENDATIONS

- Develop a maintenance features inventory and mapping system to help plan and schedule maintenance activities. This inventory should include ditches, canals, ponds, culverts, bridges, cross drains, side drains, control structures and other stormwater system related facilities maintained by the County. In addition, state, Federal and railroad rights-of-way and related drainage components should be included in the mapping, but shown with a different color or line type to indicate non-County facilities.

- Records of inspection and maintenance should be incorporated into the inventory system

- Increase the County's efforts to fully staff the budgeted and approved positions at the County.

- Conversion to the updated Hansen system should be done with an adequate quality assurance process, to ensure the accuracy and precision of the data.

- The County Road Maintenance Division should consider developing a lease program to stock additional equipment to be shared between the County Maintenance Units. A County lease program would permit rapid deployment of backup equipment, and thereby reducing the amount of downtime currently experienced at the Maintenance Units.
- Revise the set of maintenance standards for the activities the County performs. This should be done in conjunction with the Hansen system.

- Investigate the methodology for recording the inventory of equipment, including maintenance records and operating hours or cycles for each piece of equipment. This will help identify failing equipment and justify the need for new/additional equipment. The need for new/additional equipment should be re-evaluated annually.

- Continue and expand the public education programs pertaining to the maintenance zones and the scheduling of maintenance. By informing the public about scheduled maintenance, maintenance standards, and identifying the zones of maintenance, the number of complaints will be reduced.

- Aggressively enforce the requirements of the County's MS4 NPDES permit, regarding illicit discharges. Public education combined with an effective inspection and detection program can help to reduce the frequency of these discharges. Consider developing an in-house training program to help maintenance crews better report illicit discharges so that they can be investigated as a part of the incident response process.

- Continue to regularly monitor facilities not owned by the County and formally notify the responsible entities of the need to perform maintenance (such as: FDOT, railroad, etc.). The monitored facilities and contact information for each should be included in the County's facility inventory.

- Continue to observe and note the occurrence of failing infrastructure (such as: culverts, headwalls, ditches, water control structures, mitigation areas, etc.) and schedule them for maintenance. In other words, make reasonable efforts to advance on-condition maintenance activities from extraordinary to scheduled maintenance.

- Develop a work need survey report form or reporting process to identify maintenance needs that may be observed during routine maintenance or scheduled inspections.

- Continue to develop recommended maintenance standards.

FINAL RECOMMENDATIONS

19.1 INTRODUCTION

The following is a list of recommendations compiled for the Delaney Creek Area (DCA) Watershed. Some recommendations have been implemented for work for the 2000/2001 fiscal years under the Capital Improvement Projects (CIP) while others are based on the master plan process. Three (3) 2000 CIP projects under design have been included in this Preferred Plan. In addition, three (3) CIP projects are identified and recommended and will be under design in fiscal year 2001. Two of the 2001 CIP projects are related to the Evergreen Estates subdivision and Madison Avenue culvert and channel improvements within the Delaney Pop-off Canal subwatershed. The third 2001 CIP is a proposed by-pass channel upstream of the 82nd Street cross-drain in the North Archie Creek subwatershed. Projects without CIP monies are expected to go through the Capital Improvement process and be funded in order of urgency and funding for future fiscal years.

Table 19.1
List of Recommendations

	Subwatershed	Project Name	Planning Level Cost	Remarks	Rank
1	**Delaney Creek**	Delaney Creek Improvements Phase I	$4,100,000*	Channel improvement at from Hillsborough Bay to Causeway Boulevard. **(Y2001 CIP# 47081)**	1
2		Maydell Drive Bridge	$145,000*	Upgrade existing with Conspan bridge **(Y2000CIP#62104)**	7
3		70th Street S. Bridge	$322,000	Upgrade bridge to a Conspan	10
4		Oak Haven Circle And Maydell Drive	$113,000	Upgrade structures of Maydell Drive to concrete box culvert (CBC)	9
5		U.S. Highway 41	$360,000	Adding a 8'x12' CBC	8
6		Lateral "B" Improvements	$1,440,000	Channel improvements, upgrade structures at Tidewater, Robindale and Balfour Roads	11
7		Lateral "C" Improvements	$1,250,000	Channel improvements, upgrade structures at Tidewater, Ridein and Rideout Roads	12
8		Lateral "E-1" Improvements	$290,000	Upgrade structures at Palm River Road and State Road 60	13

Table 19.1
List of Recommendations - cont'd.

	Subwatershed	Project Name	Planning Level Cost	Remarks	Rank
9	**Delaney Pop-off Canal**	Delaney Pop-Off Canal Improvements	$67,756*	Culvert upgrade at 78th Street and channel improvement for Sanson Park **(Y2000CIP# 49283)**	3
10		Canterbury Lakes Regional Detention Facility	$1,000,000*	Proposed attenuation pond for Sanson Park subdivision **(Y2000CIP# 47025)**	2
11		Evergreen Estates	$100,000*	**(Y2001CIP# 41102)**	4
12		Madison Avenue	$100,000*	**(Y2001CIP# 47022)**	5
13		Old U.S. Highway 41	$50,000	Upgrade structure	19
14		Fortuna Acres Improvements	$113,000	Channel improvements to Tributary "F" between 50th and 51st Streets and installation of control structure at existing Fortuna Acres pond	14
15	**North Archie Creek**	82nd Street	$100,000 *	**(Y2001CIP# 47023)**	6
16		Old US Highway 41	$81,000	Addition of box culvert near the existing structure	15
17	**Archie Creek**	78th Street Culvert Replacement	$30,000	Culvert replacement located south of TSI building and north of Eagle Palm Drive, channel improvements	16
18		Krycul Avenue / Ashley Oaks Improvement	$200,000	Culvert upgrade at Mint Julip Circle and Krycul Avenue west of the Ashley Oaks subdivision	17
19		78th Street Pond	$140,000	Creation of a pond east of 78th Street near junk yard	18

* - CIP Adopted Budget

19.2 WATER QUALITY RECOMMENDATIONS

1. All vegetation maintenance activities should be designed to remove the vegetation from the system. Cutting or herbiciding vegetation merely contributes to muck build up and releases nutrients back into the system. Equipment should be purchased or developed to "bag" cut vegetation when mowing ditches or swales where the cut materials may otherwise be transported downstream to a receiving waterbody. Aquatic vegetation management should likewise focus on removal of the vegetation from the system by mechanical harvesting. This

will remove nutrients from the system, minimize muck/sediment buildup, and minimize mosquito problems. Efforts should be made to compost these materials and reuse as fertilizer or mulch.

2. With reference to Table 19.1 List of Recommendations: Channel improvements, clearing and snagging, if possible should include reshaping the channel to facilitate maintenance, i.e. gentler slopes to make mowing and bagging of the vegetation possible. (#'s 4,9,11, and 12).

3. Use the STREAMWATCH program to assist in developing land use specific EMCs that can be used to "calibrate" and verify the pollutant loading and removal model. Emphasis should be put on one of the creeks other than Delaney Creek, as EPC has much data on this system to date. This recommendation should be implemented as soon as possible after acceptance of this watershed plan. A minimum of two sites should be chosen.

4. Water flow information should be gathered in conjunction with the EPC's sampling information on Delaney Creek. This should be done in partnership with EPC and/or the United States Geological Service, if possible, or separately if not.

5. Restoration of oligohaline habitat is a goal of the Tampa Bay Estuary Program. One project of at least five acres should be undertaken every five years to aid in this restoration. This can most likely be accomplished with assistance of the SWIM program and the TBEP.

6. The LAKEWATCH program should continue to expand its monitoring program in the watershed and provide an important water quality and aquatic plant species baseline for this area that is rapidly urbanizing.

7. The Adopt-A-Pond program has equipment that should be used to aid in specific small-scale restoration programs using their criteria.

8. Upon completion of the stormwater inventory, an inspection system should be added to the maintenance plan that will aid in the detection of illicit discharges into the County's stormwater system. This system should be designed to maximize the credits to the County under the FEMA's Community Rating System.

9. Pathogens are a concern in the watershed. Untreated discharges from dairies, faulty septic tank / sanitary systems and other unpermitted discharges can contribute large amounts of these organisms as well as affecting BOD. A study should be undertaken to identify these areas and develop a systematic plan to provide treatment to "hot spot" areas using specific Best Management Practices to reduce the loading from these sources.

10. A watershed specific septic tank study should be completed which: identifies the location of

septic tanks, assesses their impacts on water quality, and recommends management techniques to improve their efficiency. The Planning and Growth Management Department (PGMD) has proposed such a study countywide, and this study should be completed.

11. Assimilative capacity studies should be conducted on lakes in this watershed in order to determine proper regulatory needs for protection of the lakes. Once the assimilative capacity studies are completed, the information should be used to develop a lake management plan for each lake.

19.3 NATURAL SYSTEMS

1. Programs such as the Pepper Busters and County's Adopt-A-Pond should be expanded in the watershed to aid in controlling nuisance vegetation. Plants from the EPPC's category one list should be targeted. A program should be instituted for single family homeowners, that has as an incentive, free access to dumpsters or special garbage pick-up for large amounts of nuisance vegetation that they have removed.

2. Nutria have been observed in several areas in and around the watershed. Those areas should be identified and a plan should be developed in conjunction with Hillsborough County Animal Control and/or the Florida Fish and Wildlife Conservation Commission for the implementation of removal/management plan. This animal should be controlled while it is still in small numbers.

3. Forested uplands have been drastically reduced in the watershed. The sand pine ecosystem has been completely eliminated from the watershed. Pine flatwoods and upland hardwood forests have been reduced by more than 90 %. Mixed forests have been reduced by 62 %. A ten-acre restoration project should be undertaken every five years with upland forested restoration as its primary goal.

4. Since it has been observed that listed species in the watershed do not always use typical habitat, partnerships should be developed with wildlife organizations and County agencies to better manage these areas for these species. For instance, a nest box program could be explored and instituted for the "Florida" kestrel if it can be identified on golf courses or ballfields in the watershed. Likewise, mowing and other maintenance in areas used by long-legged wading birds, sandhill cranes and wood storks should be done with these species being considered. This should be an update in the maintenance plan.

5. The ELAPP's Madison Road site should be pursued. The County Stormwater Section should work in conjunction with ELAPP to develop a restoration plan that would increase the

likelihood of the site being acquired. Coastal parcels should also be pursued as potential sites for oligohaline habitat restoration projects.

6. Restoration projects in the watershed shall strive to offset the effects of habitat fragmentation and establish corridors in conjunction with the Hillsborough County Greenways Program and the ELAPP program. Wetland mitigation projects, especially mitigation banks that are or will be located in the watershed should also be followed. A GIS-based system should be developed that could track the locations of these areas with information provided by the regulatory agencies and County departments. In this plan, the bypass channel and Canterbury Lakes Regional detention facility should be applied toward this goal.

7. Existing areas of natural buffers such as wetland conservation area setbacks should be identified and preserved. These areas should contribute to the Greenways and ELAPP programs. Projects similar to the Delaney Creek Restoration project should be explored for Archie and North Archie creeks.

8. The large borrow pit in subbasin 290500 in the Archie Creek Subwatershed has been found to be an important feeding area for migrating shorebirds in Hillsborough County. Many of the shorebirds that migrate through Florida have been observed on this site and have been reported on the local birdwatching listserver. It is recommended that the County purchase this parcel and that the water levels be managed to maximize use by these birds. This could be done in conjunction with the ELAPP program or the Audubon Society of Florida.

19.4 WATER SUPPLY

1. Consideration should be given to the aquifer recharge potential when siting stormwater treatment systems. Care should be taken to avoid moving water from an area of high recharge potential to an area of low potential.

2. The possibility of slowing or stopping saltwater intrusion into the watershed's freshwater aquifers with the use of injection wells located along the coastal area should be further explored. This can be done using a variety or combination of sources such as potable, reclaimed or treated stormwater.
3. Water conservation and the use of reclaimed water should be encouraged through educational programs including LaMP/LAKEWATCH and STREAMWATERWATCH. The establishment of the Falkenburg Road water treatment plant presents an opportunity to explore this option.

19.5 POLLUTANT LOADING AND REMOVAL MODEL (PLRM)

1. One of the lessons learned in using the PLR model is that impervious surfaces are the main component in the creation of pollutant loads. A method should be developed to track the amount of impervious surface in the watershed. The County has minimal parking requirements for specific land uses that are governed by zoning. The Planning and Growth Management Department should revisit these requirements and do whatever possible to reduce these requirements or amend them to encourage the use of other alternatives where appropriate.

2. Another problem in using the model is in the determination of pollutant loads for future proposed land uses. This drawback is due to the incompatibility in translating the existing land use based on SWFWMD's application of FLUCCS codes into the future land use designations of the Planning Commission, which does not use FLUCCS codes. The Planning Commission should be urged to adopt the FLUCCS code in predicting future land use or develop a system that is directly comparable to FLUCCS. Presently the Planning Commission's system groups diverse land uses such as residential and commercial into mixed urban uses. This should be done prior to the next updating of this portion of the watershed plan.

3. This watershed plan should be continuously updated with "As-Builts" submitted electronically by the developer.

4. The capability of the PLRM should be expanded in the area of land uses that can be entered into the model. This is especially important in the agricultural land uses. The aggregated category is a combination of disparate land uses ranging from tree crops to pasture and dairies, different row crops to aquaculture. All these land uses will almost certainly have vastly different pollutant loading potential. The County should immediately embark on a program to develop as many specific EMC values as possible for these land uses to be used in future applications of the model.

5. One of the existing conditions that was not addressed in the PLRM assessments was the removal capacity of the Delaney Creek Rehabilitation Project (CIP #41039) in Section 34 Township 29 Range 19. This was due to the difficulty in assigning treatment values to the various subbasins assumed to be treated by the project. Upon approval of this plan, a study should be implemented to resolve these issues so that this project can be taken into account in future updates of this plan.

19.6 WATER QUALITY TREATMENT LEVEL OF SERVICE

1. To increase the water quality treatment level of service, stormwater ponds built in this watershed should be the Conservation Wet Detention design to maximize pollution load reductions. Those areas with the lowest level of service, LOS F, and highest pollutant loads for nitrogen and total suspended solids should be targeted.

19.7 REVIEW OF EXISTING REGULATIONS

1. Based on the results of the pollutant load model, and literature values for Best Management Practices, current SWFWMD regulations do not appear to be adequate to "hold-the-line" on nitrogen loading to Tampa Bay. Hillsborough County should immediately begin working with SWFWMD, TBEP, and FDEP to address this issue. The SWFWMD's Conservation Method of stormwater treatment with its permanent pool and increased residence time merits further investigation.

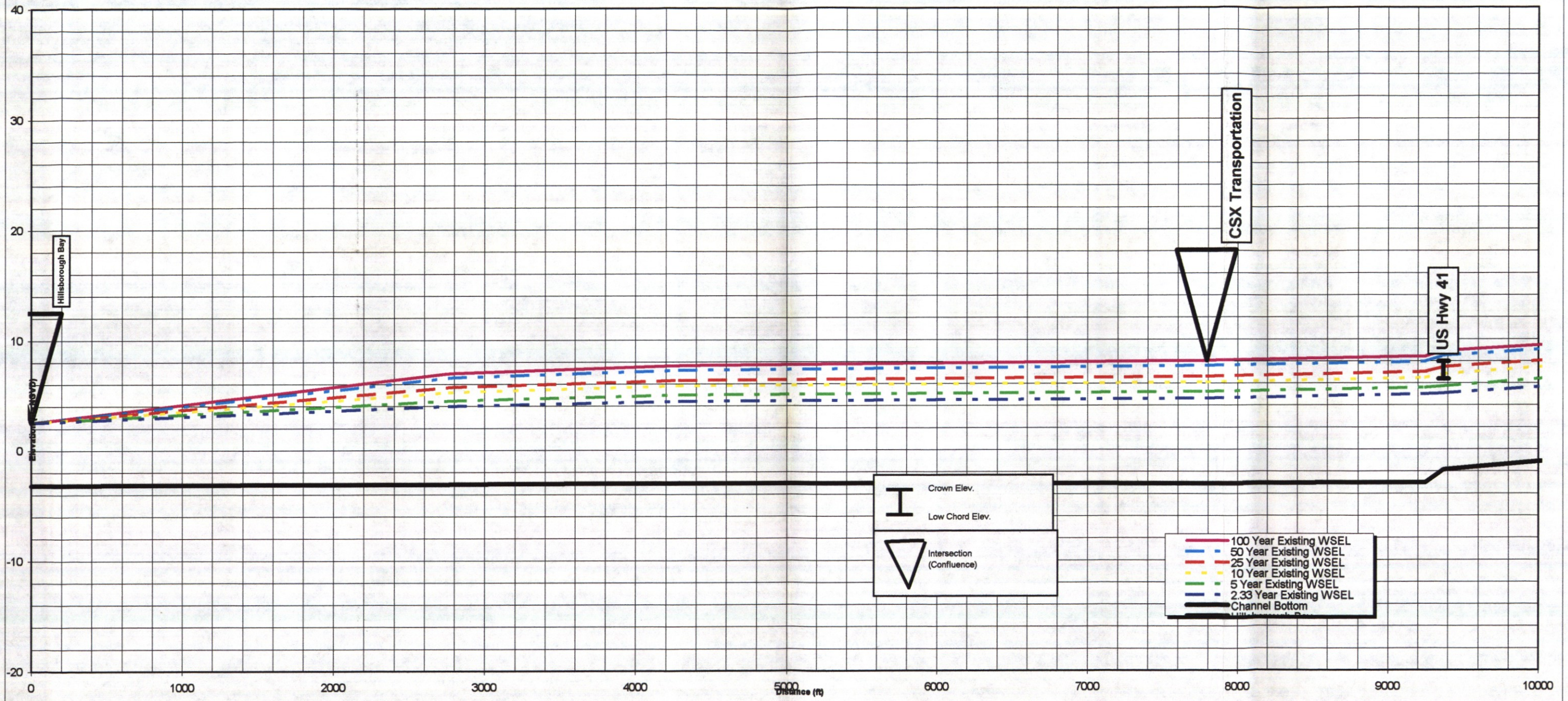
2. The Environmental Protection Commission should be approached to see what could be in terms of reducing the amount of wetland impacts to "watershed important" habitats. This watershed importance should be a consideration in any request to impact wetlands. A coordinated effort should be made to better place mitigation wetlands in areas of already existing significant habitat.

3. Sedimentation and erosion has been identified as a significant source of pollutant load in the watershed. PGMD should reassess the need for mass grading of projects over 2 acres. Developers should be encouraged to grade small areas at a time rather than clearing entire project areas at one time. Erosion control techniques should required in all construction plans and then be inspected during construction in addition to the requirement of inspection prior to construction to ensure their continued maximum efficiency.

4. Low Impact Development techniques should be required in this watershed to minimize the volume of runoff and therefore the total pollutant load. As part of this recommendation, a team of representatives from the various County and State regulatory agencies as well as the regulated community should be immediately formed to develop a Hillsborough County Low Impact Development Technical Manual and incentives to carry out its recommendations once it has been developed.

5. All CIP's should include life-cycle costing, a maintenance plan, and mitigation plan if appropriate for the facility. In addition, sediment transport has been a problem in Delaney Creek and sediment control devices, such as sumps, should be incorporated into as many projects as possible.

6. Upon adoption of this plan, all CIP projects should incorporate water quality BMP's into their design. The type of treatment used shall be based on the LOS parameter contributing the greatest load in the subbasin that the project(s) is being constructed. This aspect should be tracked so that a number of parameters can be addressed with subsequent projects and that a single parameter is not addressed by multiple projects. A matrix or flowchart should be developed that will aid the designers in choosing the appropriate parameter to be addressed and using the best BMP(s) to achieve that goal.



Delaney Creek Area Watershed

Computed Water Surface Profile

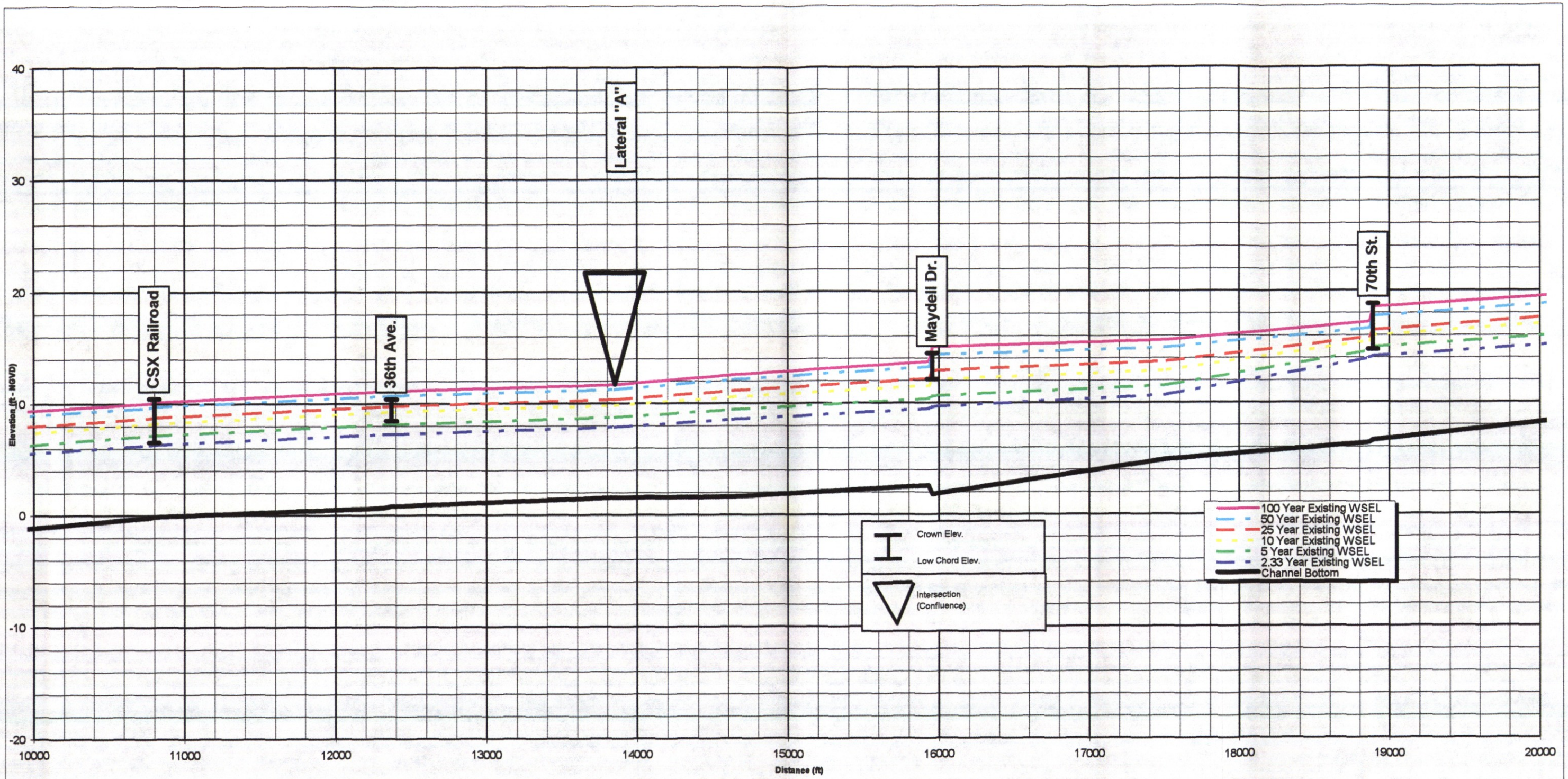
September 2000

Exhibit 6.1a

Exisitng Condition Model

Delaney Creek Sub-watershed- Main System

Sheet 1 of 6



DELANEY CREEK AREA

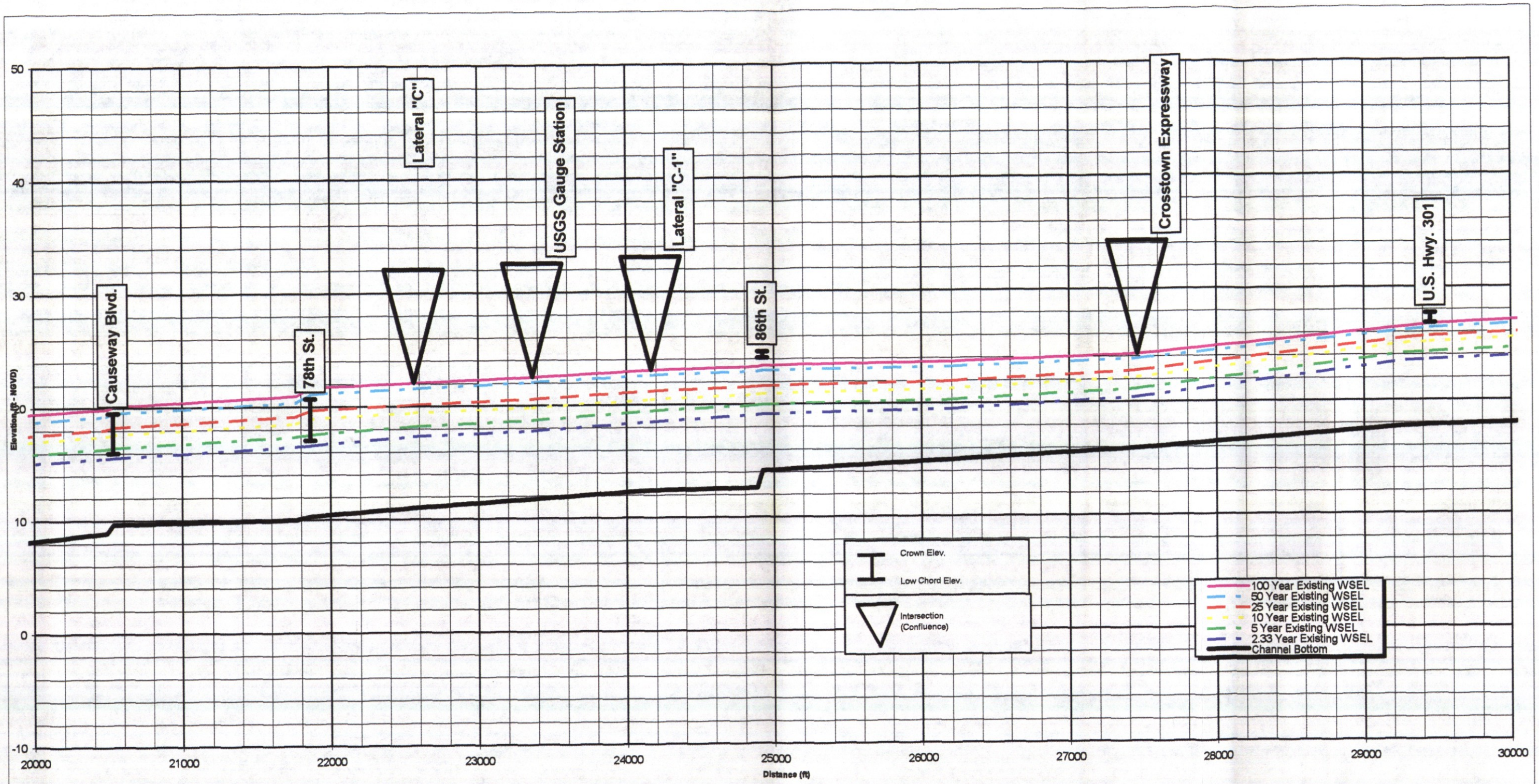
Computed Water Surface Profile

September 2000

Exhibit 6-1b

Exisiting Condition Model

Delaney Creek Sub-watershed/ Main Channel



DELANEY CREEK AREA

Computed Water Surface Profile

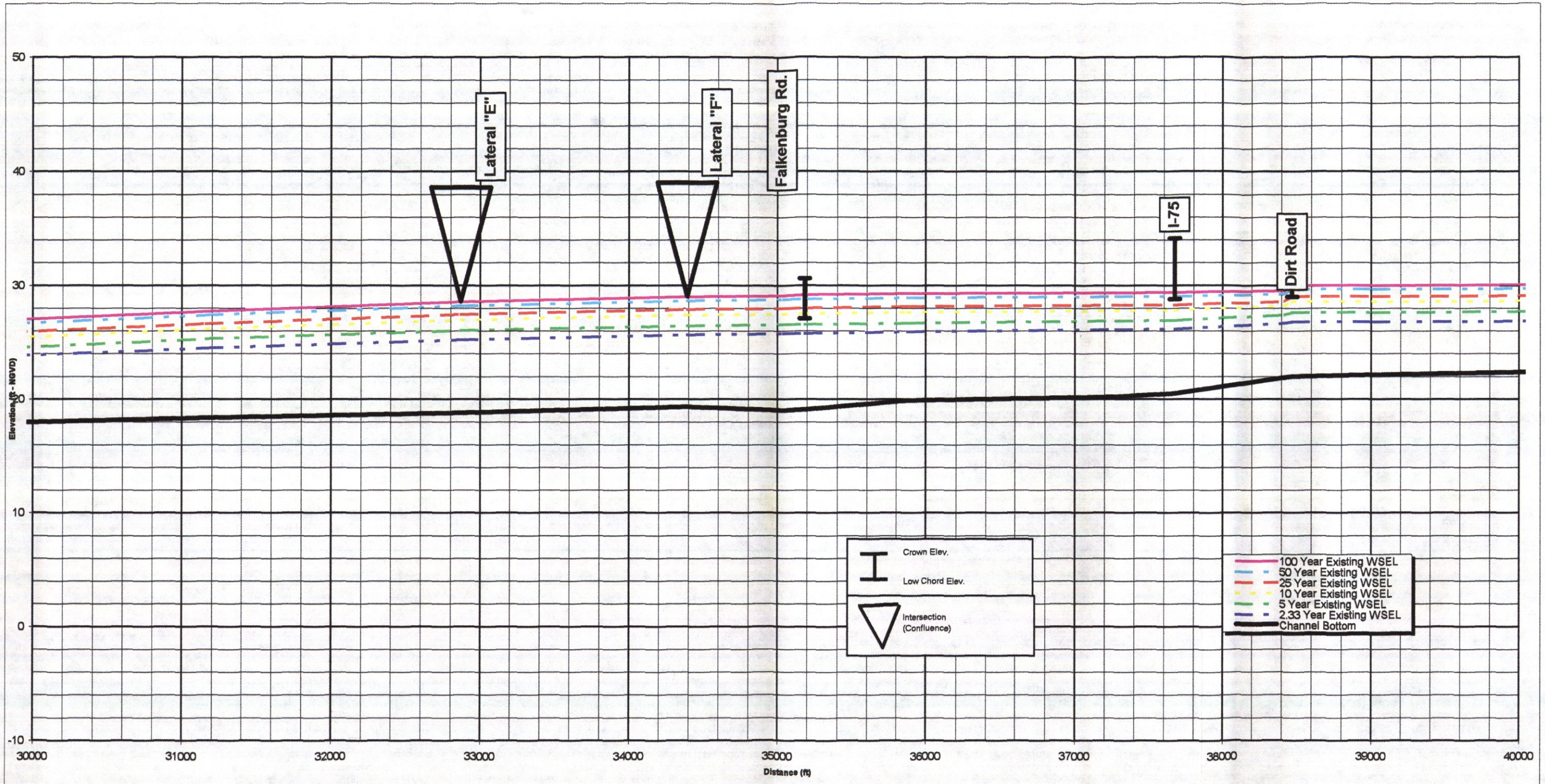
September 2000

Exhibit 6-1c

Exisiting Condition Model

Delaney Creek Sub-watershed/ Main Channel

Sheet 3 of 6



DELANEY CREEK AREA

Computed Water Surface Profile

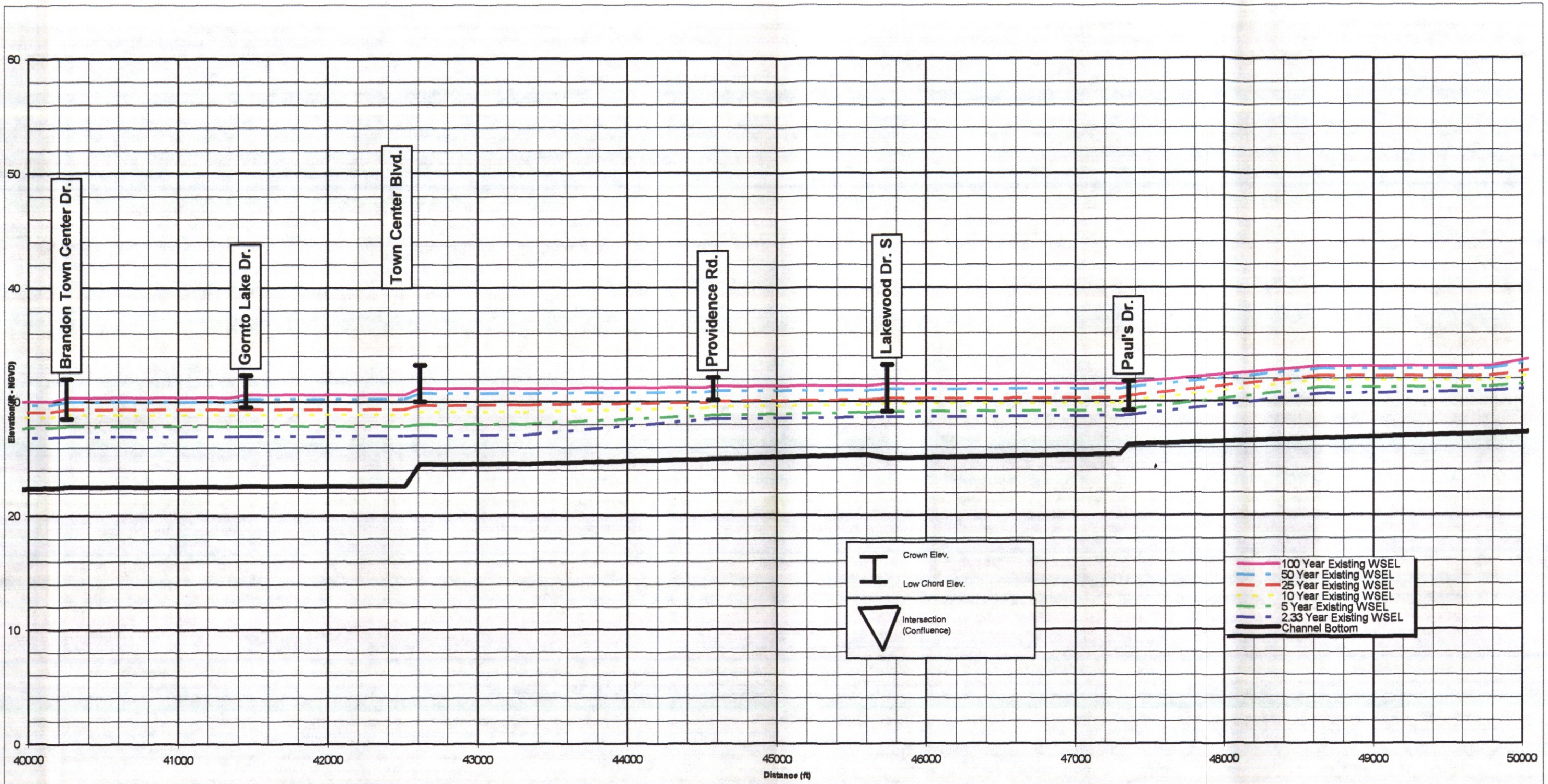
September 2000

Exhibit 6-1d

Exisiting Condition Model

Delaney Creek Sub-watershed/ Main Channel

Sheet 4 of 6



DELANEY CREEK AREA

Computed Water Surface Profile

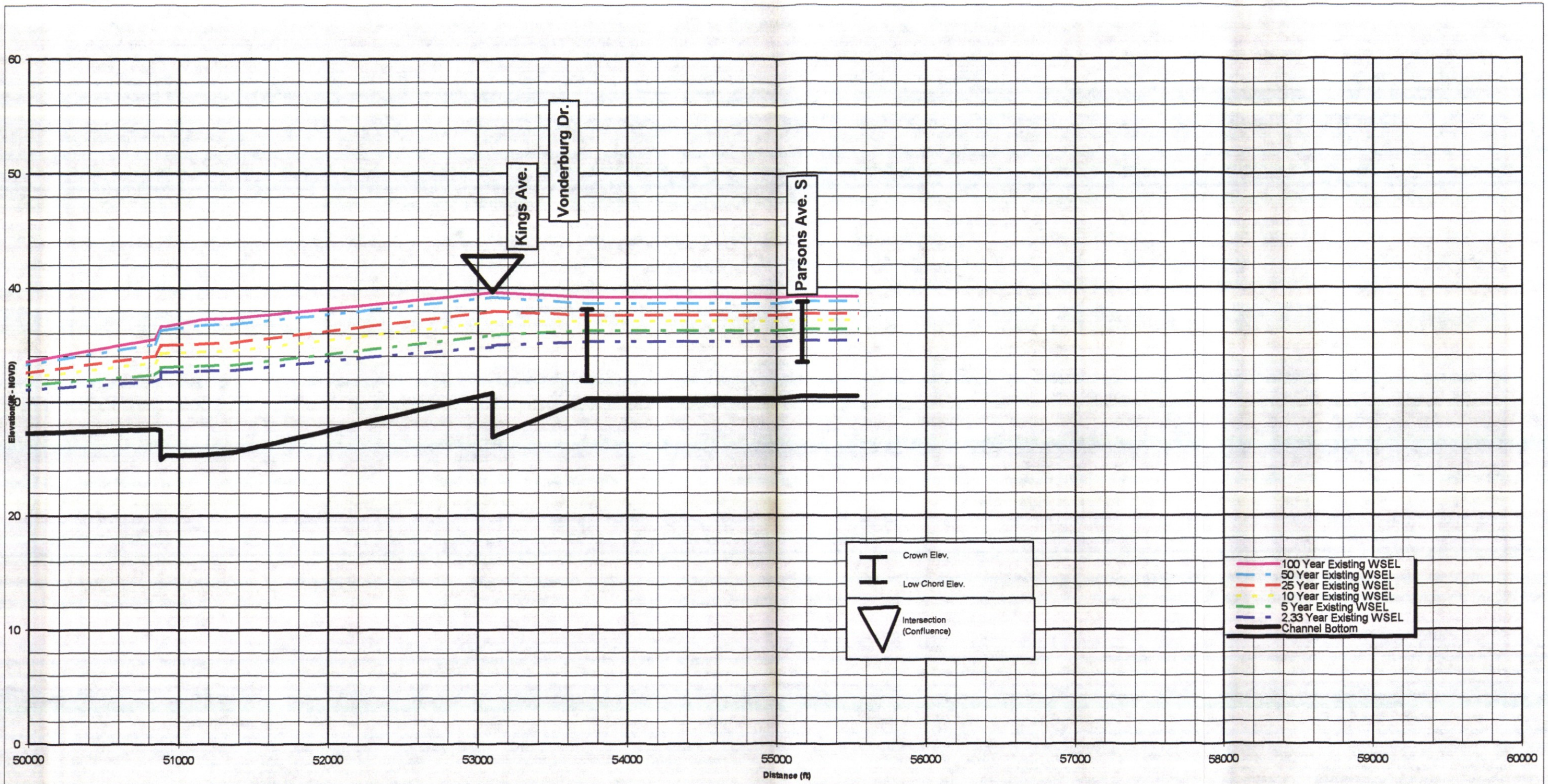
September 2000

Exhibit 6-1e

Exisiting Condition Model

Delaney Creek Sub-watershed/ Main Channel

Sheet 4 of 6



DELANEY CREEK AREA

Computed Water Surface Profile

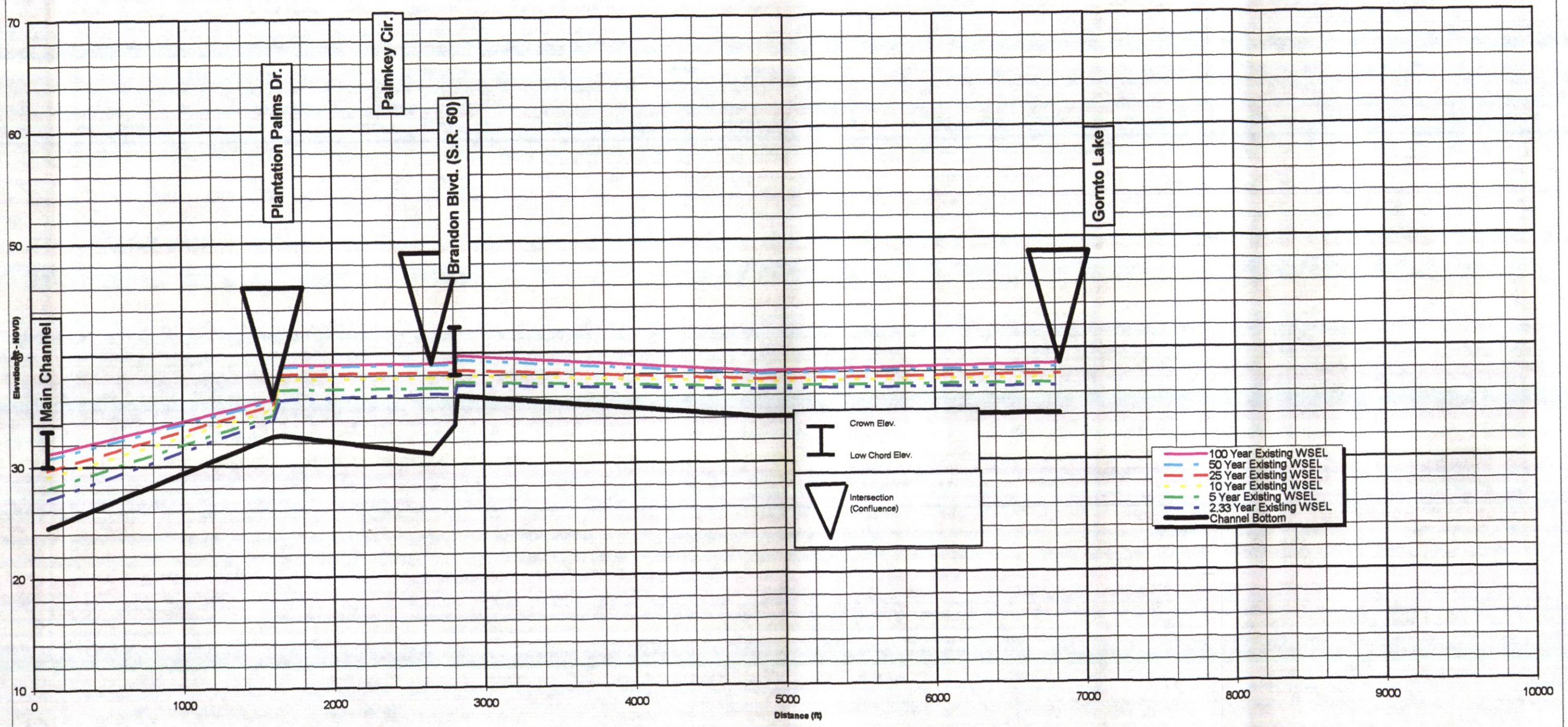
September 2000

Exhibit 6-1f

Exisiting Condition Model

Delaney Creek Sub-watershed/ Main Channel

Sheet 4 of 6



DELANEY CREEK AREA

Computed Water Surface Profile

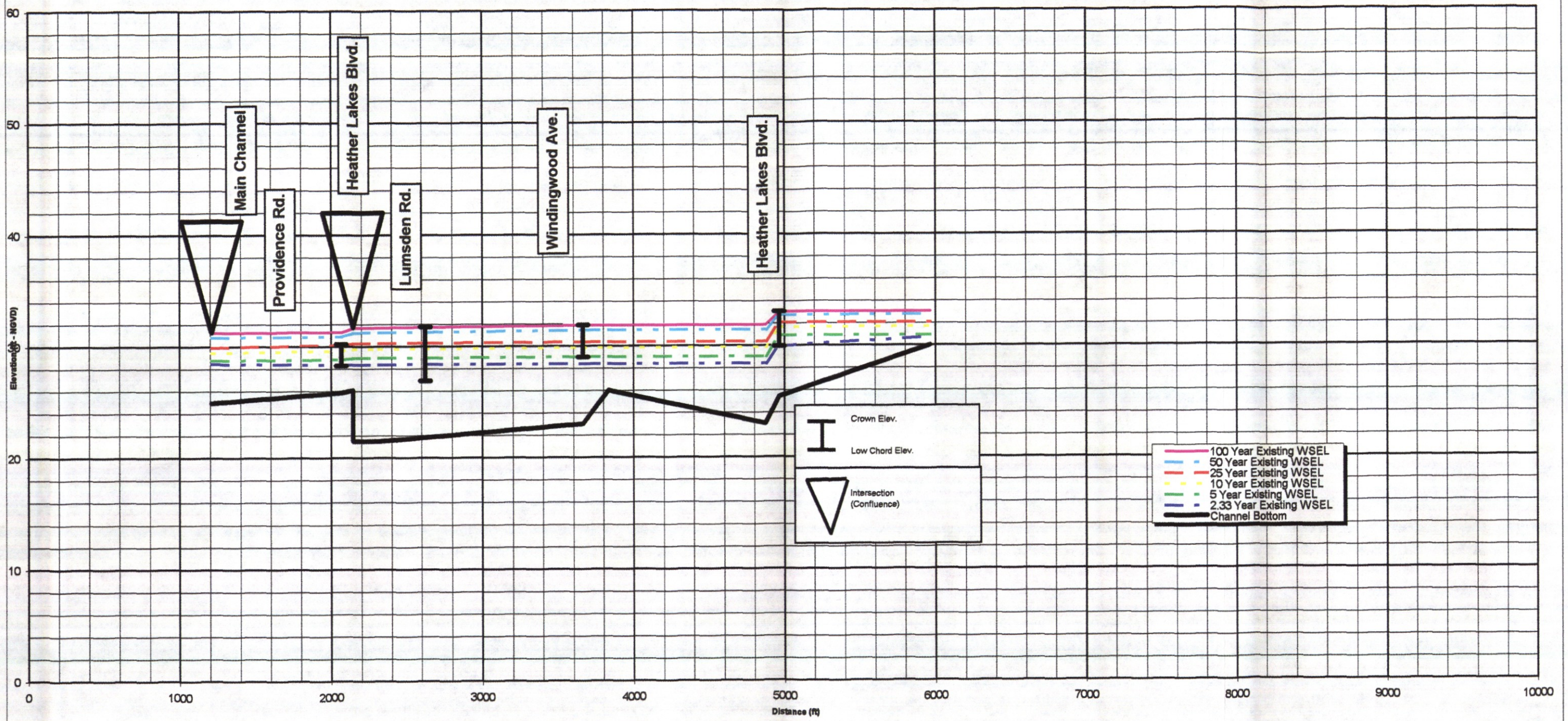
September 2000

Exhibit 6-1g

Existing Condition Model

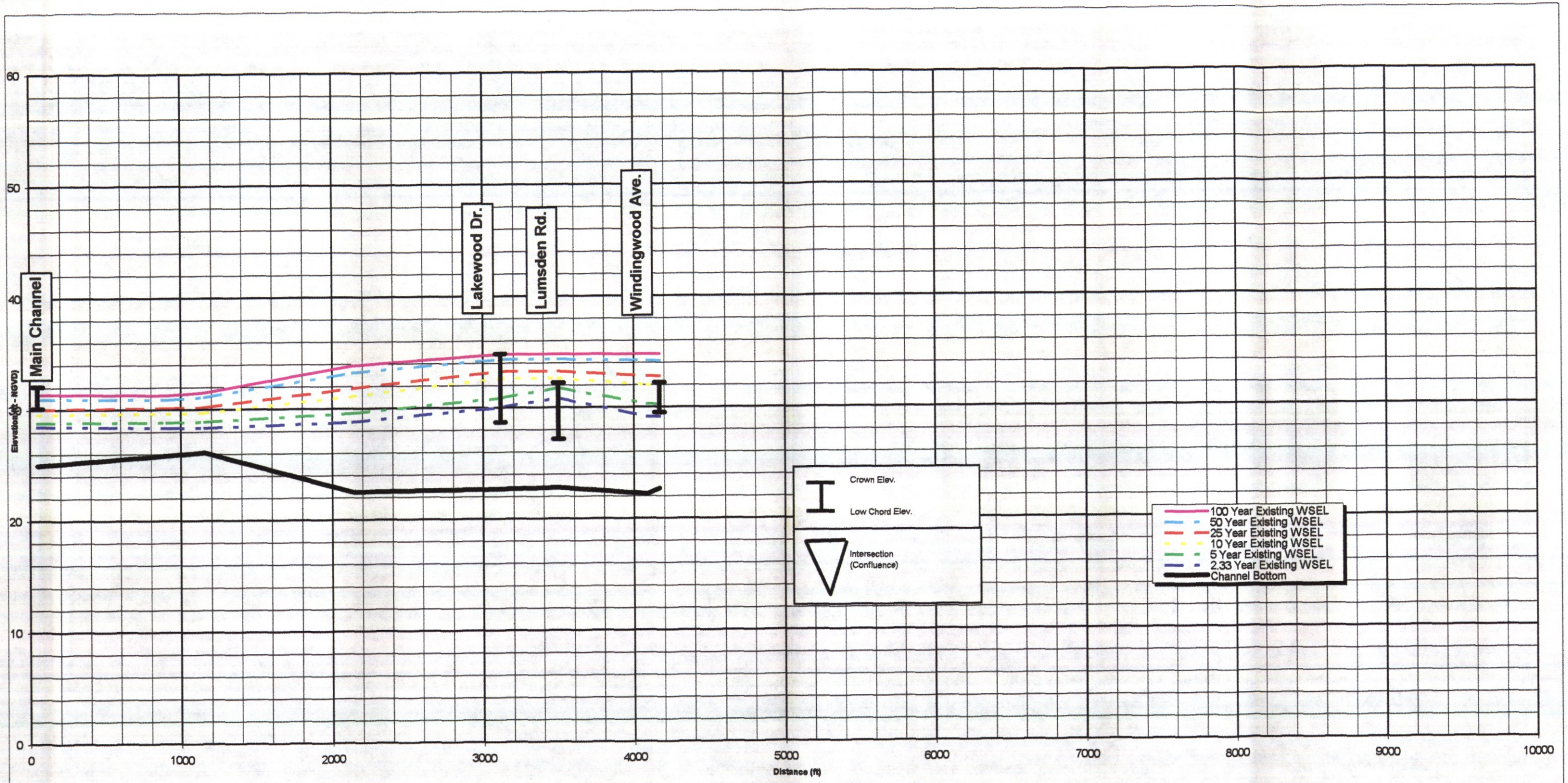
Delaney Creek / Gornto Lake

Sheet 1 of



DELANEY CREEK AREA
Computed Water Surface Profile
September 2000

Exhibit 6-1h
Existing Condition Model
Delaney Creek / Heather Lakes Lateral - East
Sheet 1 of



DELANEY CREEK AREA

Computed Water Surface Profile

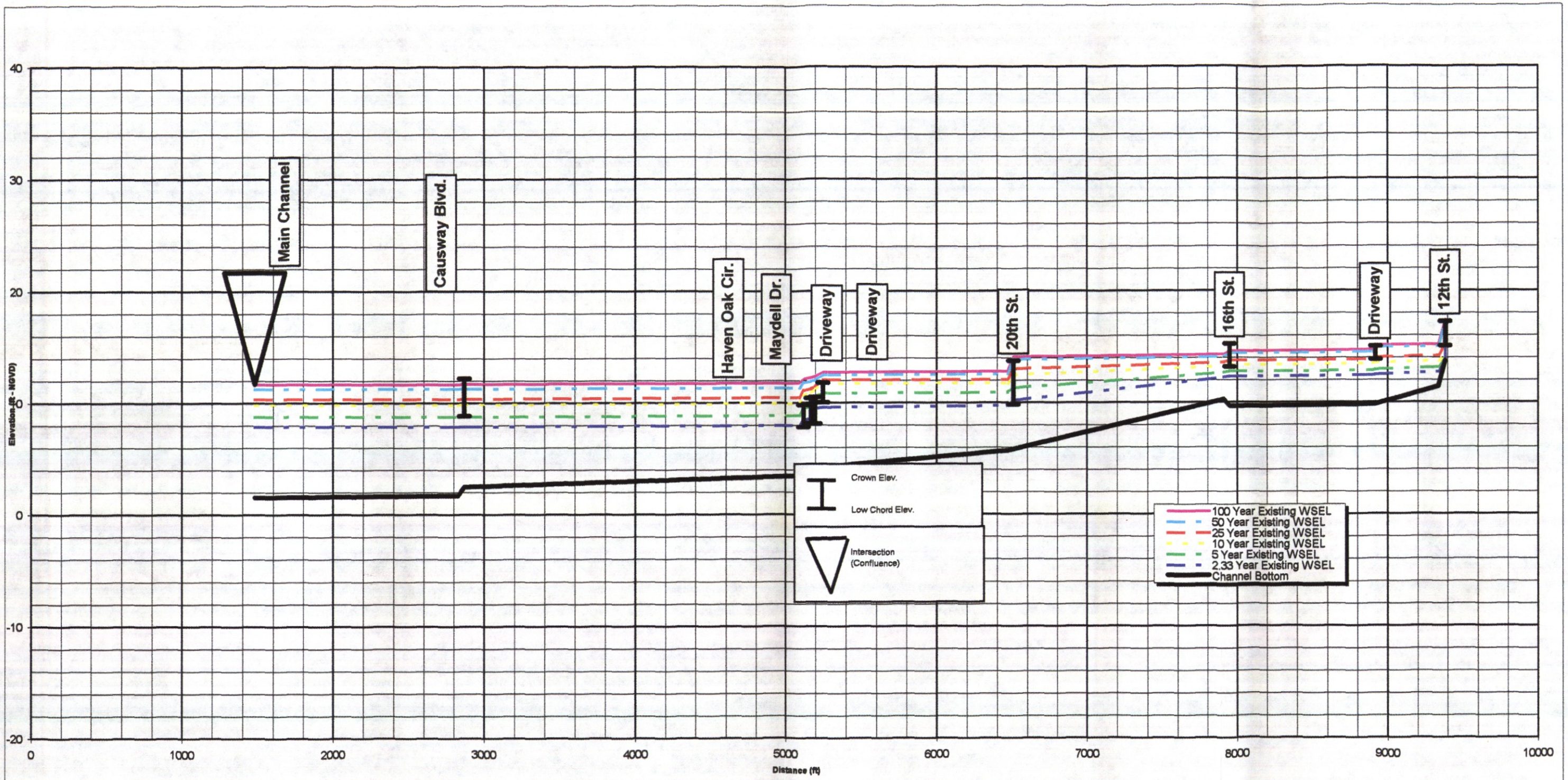
September 2000

Exhibit 6-1i

Existing Condition Model

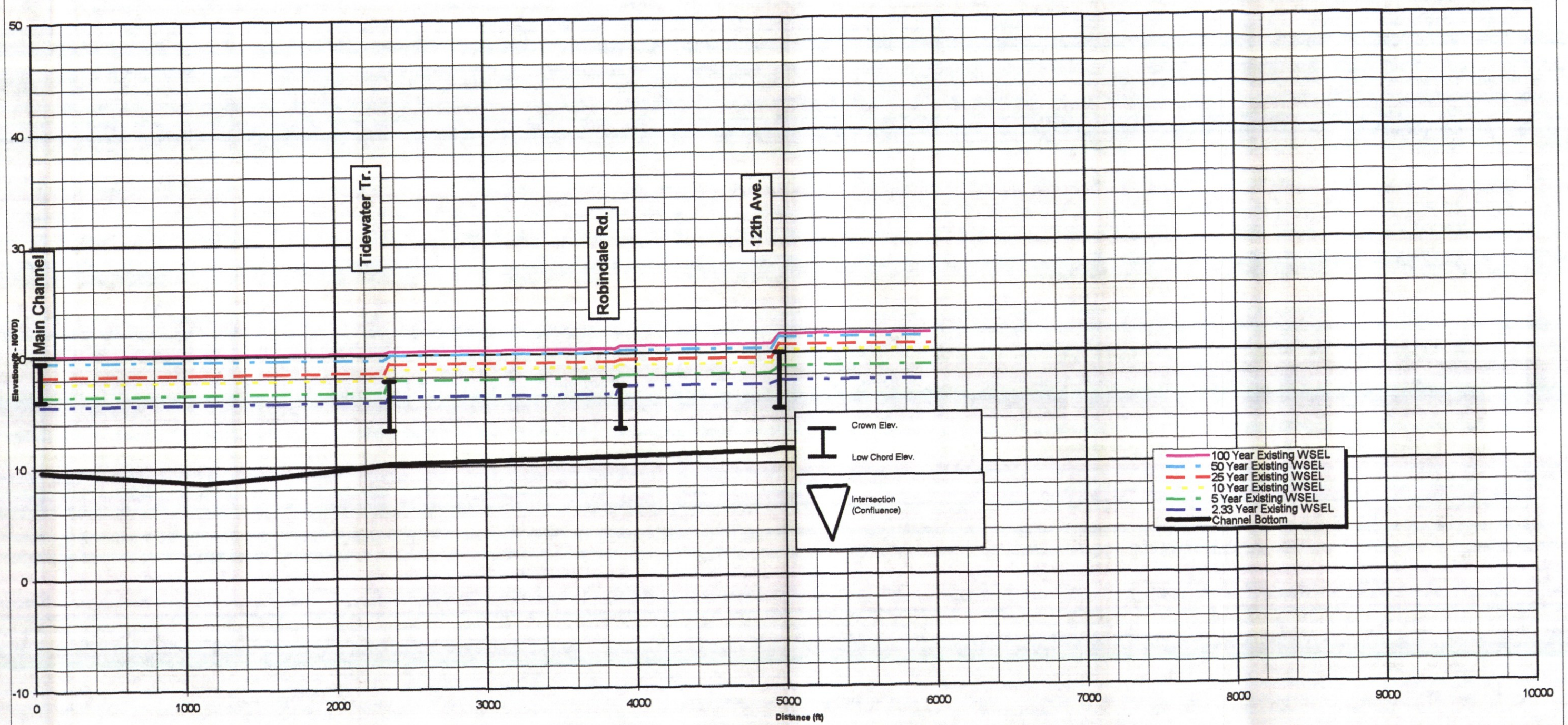
Delaney Creek / Heather Lakes Lateral West

Sheet 1 of



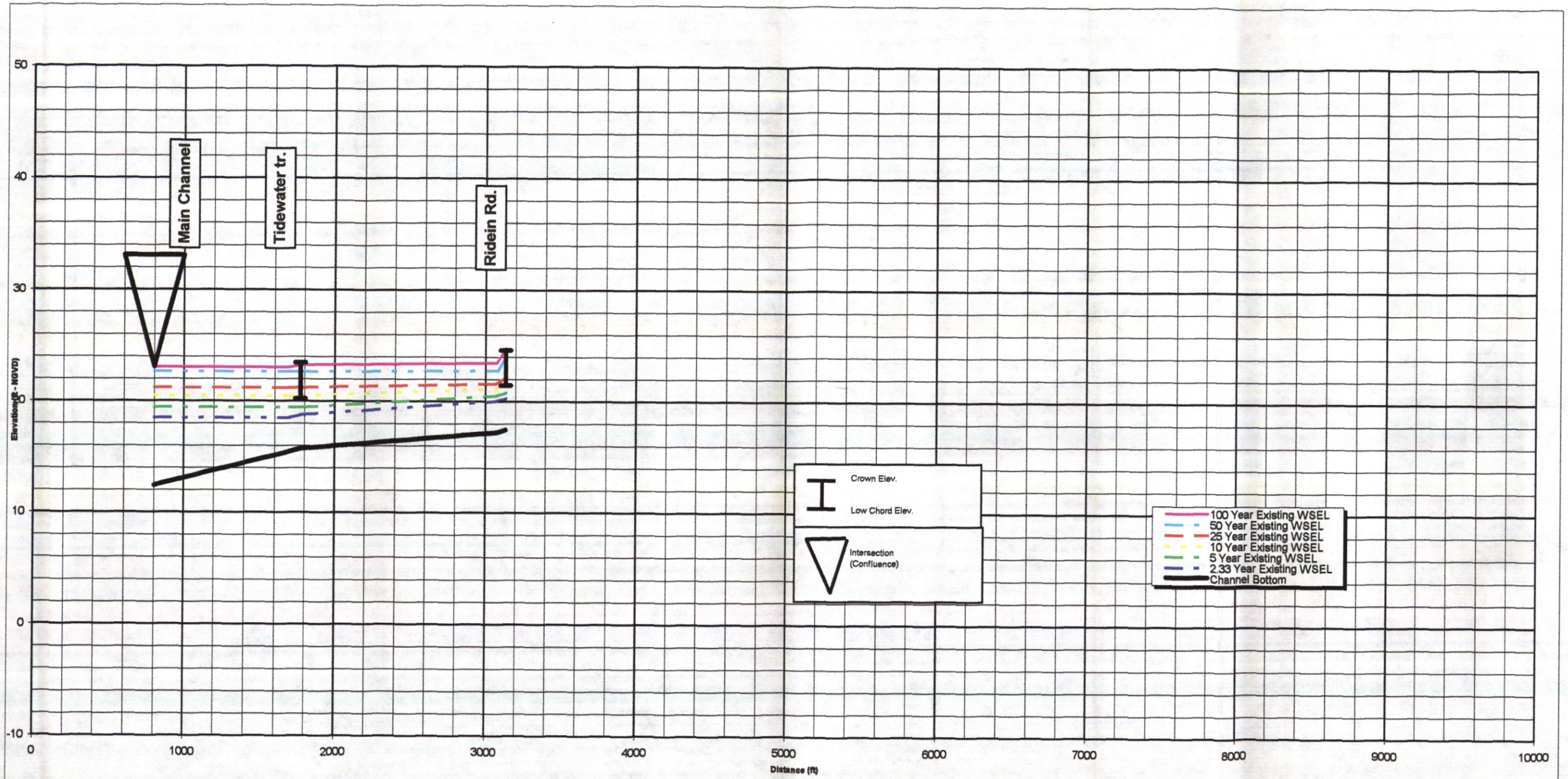
DELANEY CREEK AREA
Computed Water Surface Profile
September 2000

Exhibit 6-1j
Existing Condition Model
Delaney Creek / Lateral "A"
Sheet 1 of



DELANEY CREEK AREA
Computed Water Surface Profile
September 2000

Exhibit 6-1k
Existing Condition Model
Delaney Creek / Lateral "B"
Sheet 1 of



DELANEY CREEK AREA

Computed Water Surface Profile

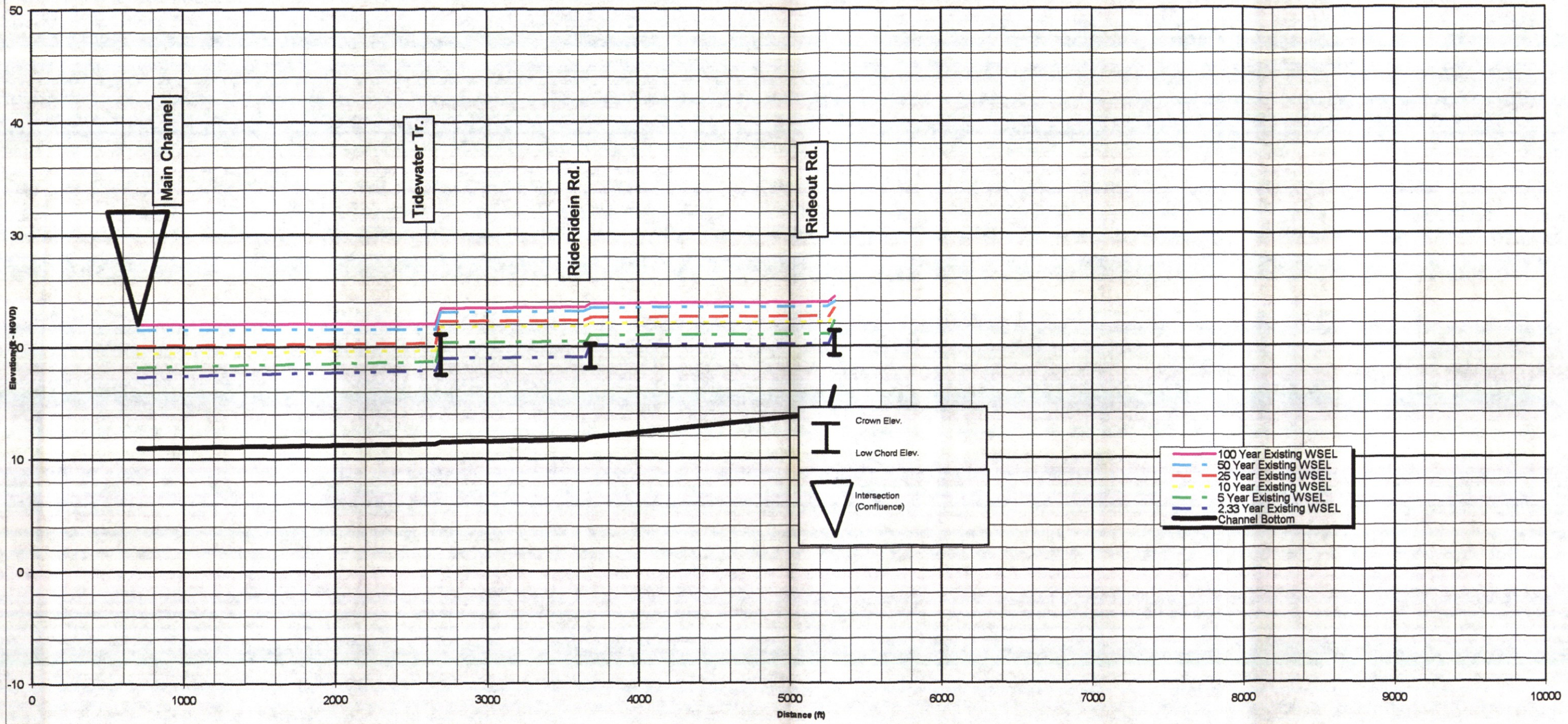
September 2000

Exhibit 6-1l

Existing Condition Model

Delaney Creek / Lateral "C-1"

Sheet 1 of



DELANEY CREEK AREA

Computed Water Surface Profile

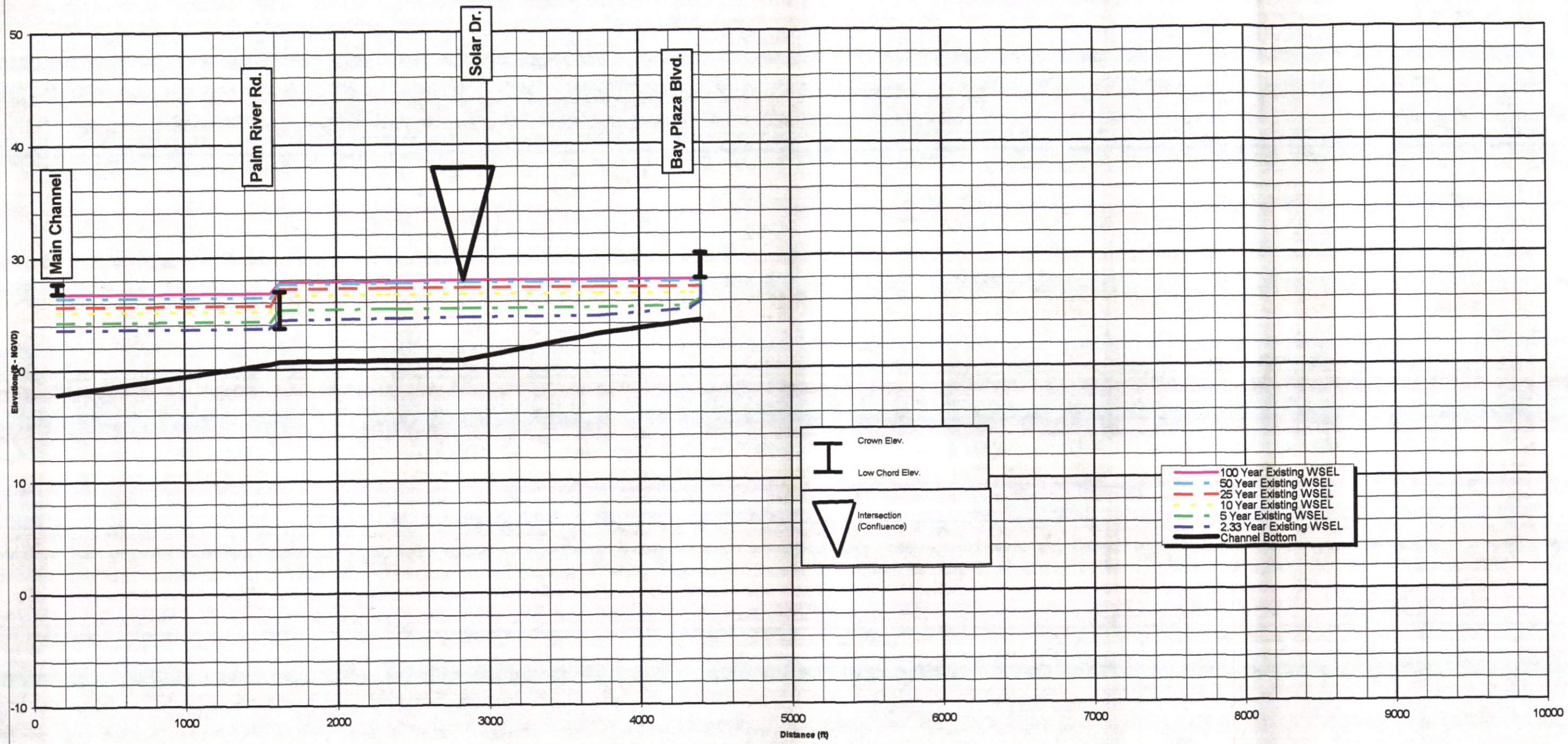
September 2000

Exhibit 6-1m

Existing Condition Model

Delaney Creek / Lateral "C"

Sheet 1 of



DELANEY CREEK AREA

Computed Water Surface Profile

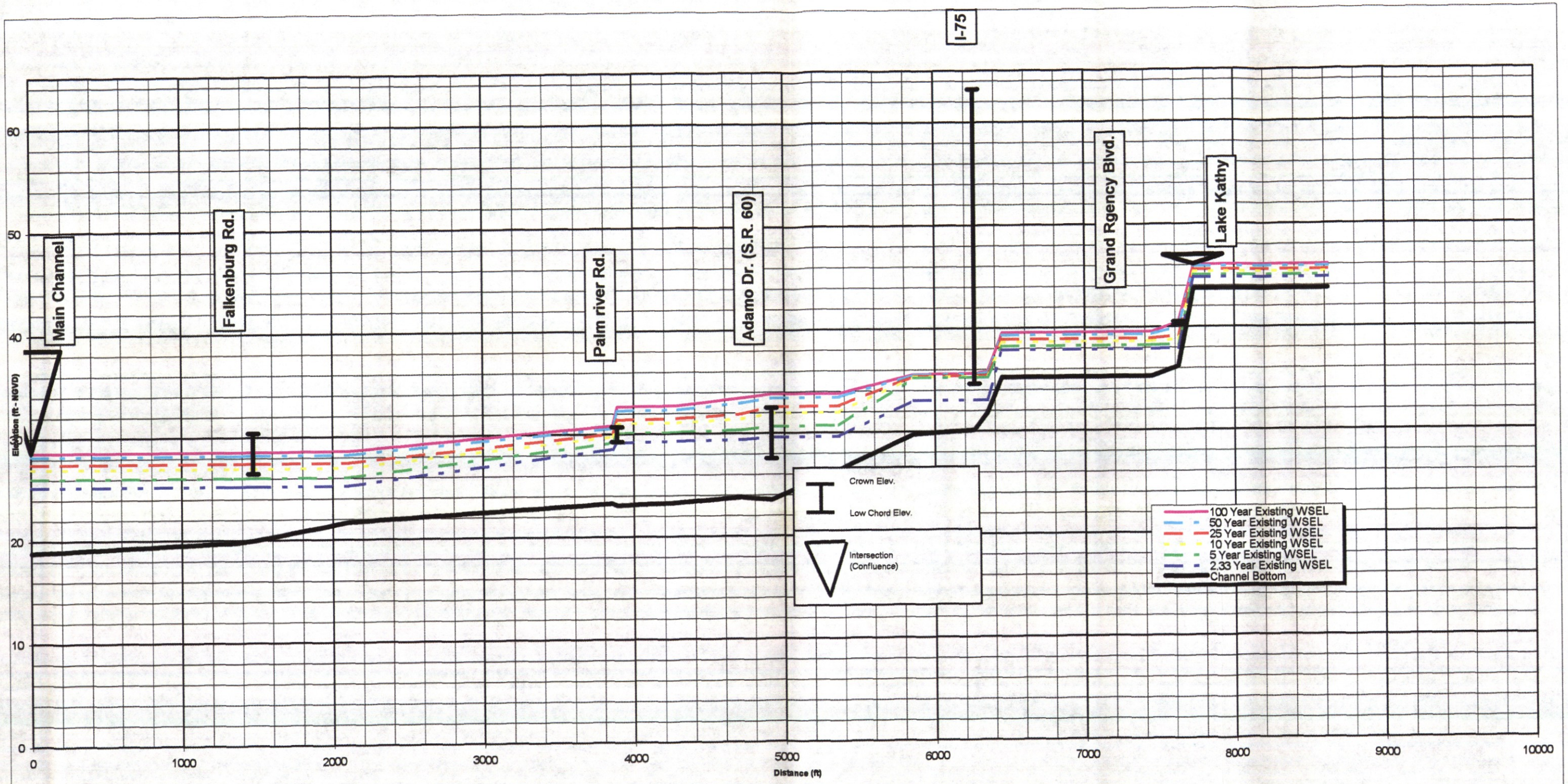
September 2000

Exhibit 6-1n

Exisitng Condition Model

Delaney Creek / Lateral "D"

Sheet 1 of



DELANEY CREEK AREA

Computed Water Surface Profile

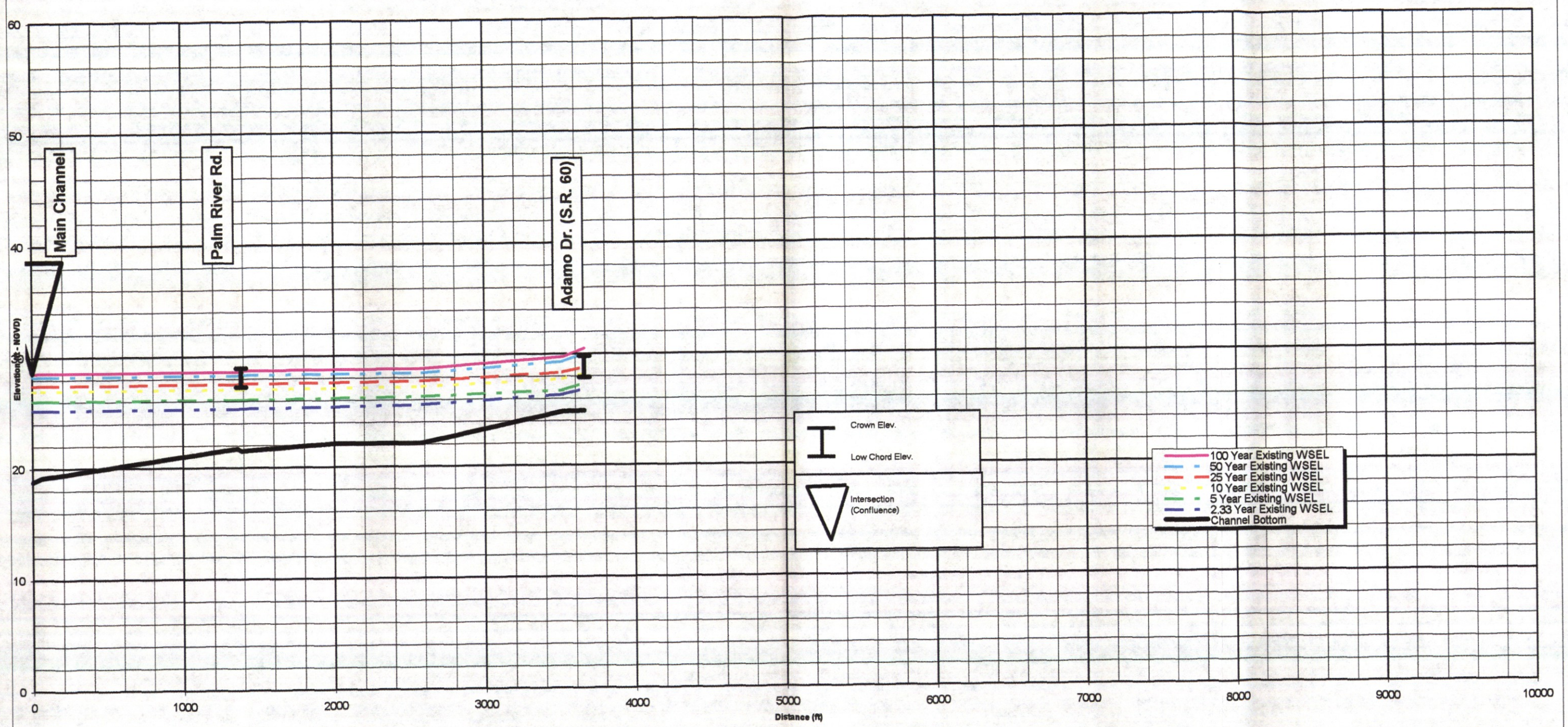
September 2000

Exhibit 6-1o

Existing Condition Model

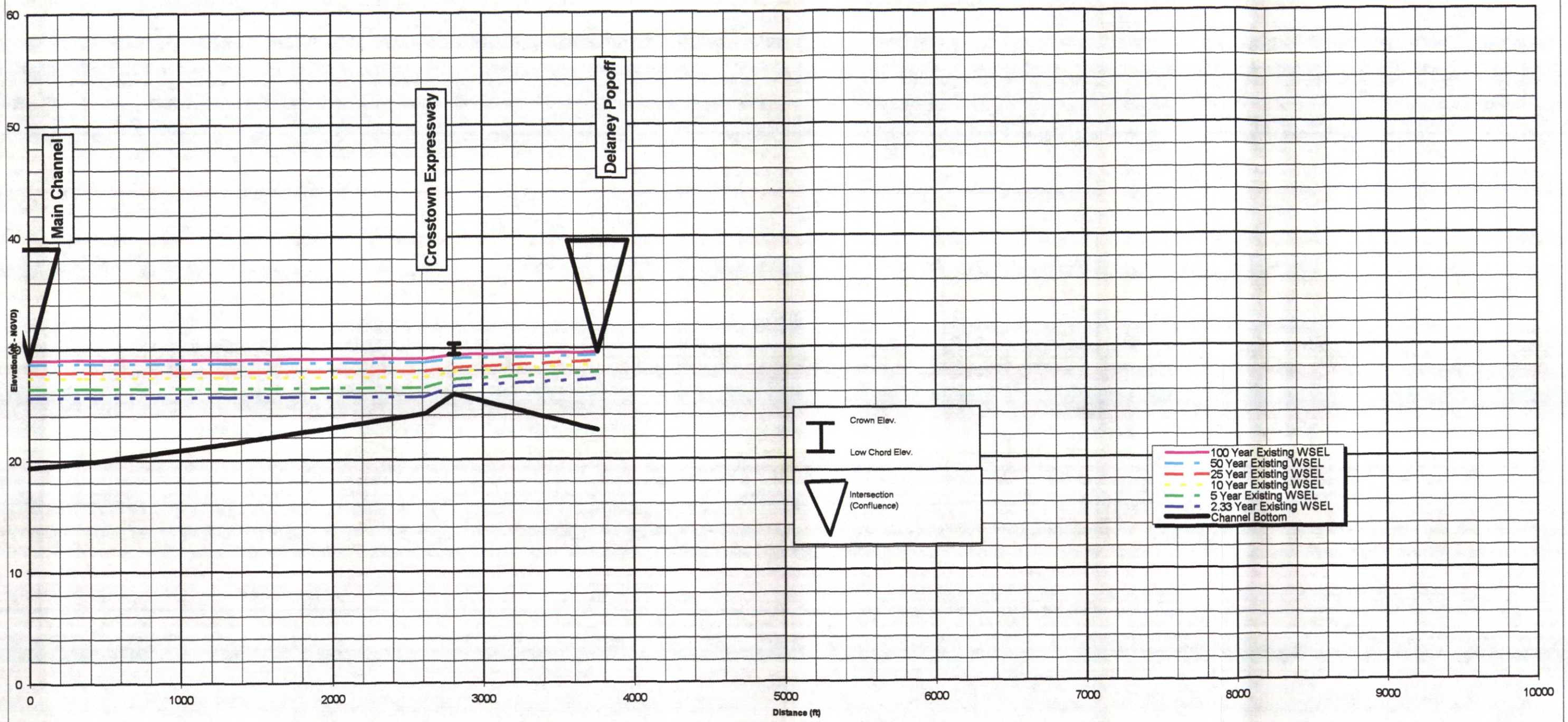
Delaney Creek / Lateral "E-1"

Sheet 1 of



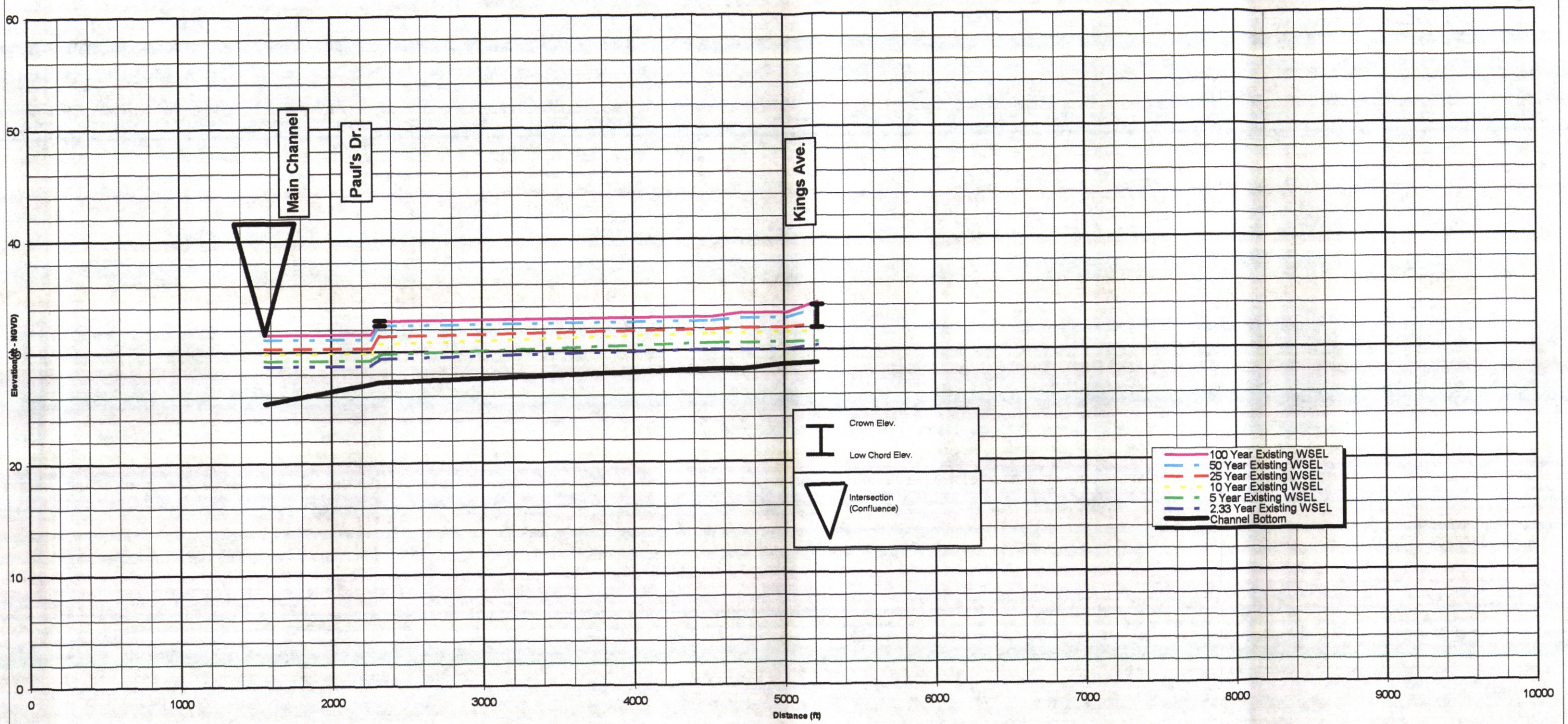
DELANEY CREEK AREA
Computed Water Surface Profile
September 2000

Exhibit 6-1p
Existing Condition Model
Delaney Creek / Lateral "E"
Sheet 1 of



DELANEY CREEK AREA
Computed Water Surface Profile
September 2000

Exhibit 6-1q
Exisitng Condition Model
Delaney Creek / Lateral "F"
Sheet 1 of



DELANEY CREEK AREA
Computed Water Surface Profile
September 2000

Exhibit 6-1r
Existing Condition Model
Delaney Creek / Lumsden Rd. North Ditch Lateral
Sheet 1 of

Delaney Creek Existing LOS

2/28/01

Table 6.1

DELANEY CREEK SUB-WATERSHED EXISTING LEVEL OF SERVICE											Flood Level Designations					
		Landmark Elevations			Water Surface Elevations											
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
1C	210010	5.25	5.30	5.60	4.41	4.99	5.82	6.32	7.22	7.65	A	A	D	D	D	D
1C	210020	6.05	6.50	7.50	4.63	5.23	6.10	6.63	7.59	8.06	A	A	B	C	D	D
1C	210025	6.45	6.70	7.50	4.49	4.85	6.05	6.76	8.20	8.98	A	A	A	C	D	D
6	210040	6.50	7.20	8.20	5.04	5.71	6.80	7.45	8.48	8.90	A	A	B	C	D	D
6	210060	10.55	10.50	11.00	6.36	7.18	8.25	8.79	9.76	10.17	A	A	A	A	A	A
6	210065	10.75	11.00	12.00	5.93	6.56	7.75	8.61	9.81	10.24	A	A	A	A	A	A
6	210080	10.70	12.00	12.00	7.27	8.15	9.26	9.79	10.74	11.16	A	A	A	A	B	B
6	210090	11.55	12.10	12.60	7.91	8.79	9.86	10.37	11.28	11.71	A	A	A	A	A	B
13/6	210100	11.25	11.80	12.30	8.59	9.47	10.59	11.16	12.14	12.58	A	A	A	A	C	D
13	210120	12.15	12.50	12.00	9.68	10.63	12.10	12.91	14.32	15.04	A	A	D	D	D	D
12	210125	11.95	12.50	13.00	12.54	12.73	12.96	13.10	13.34	13.45	C	C	C	D	D	D
13	210150	18.55	18.50	19.00	14.13	14.93	15.96	16.46	17.73	18.55	A	A	A	A	A	C
12	210170	18.05	18.80	19.30	15.57	16.46	17.62	18.28	19.52	20.12	A	A	A	B	D	D
12	210180	19.85	19.00	19.50	16.47	17.37	18.51	19.16	20.37	20.96	A	A	A	C	D	D
18	210190	19.25	21.40	20.90	16.60	17.57	18.94	19.70	21.15	21.69	A	A	A	B	D	D
18	210200	19.95	21.50	22.00	17.36	18.25	19.44	20.15	21.58	22.07	A	A	A	B	C	D
18	210210	22.65	24.50	25.00	18.52	19.46	20.49	21.23	22.65	23.08	A	A	A	A	B	B
18	210230	22.55	24.50	25.00	19.16	20.01	20.96	21.66	23.02	23.45	A	A	A	A	B	B
23	210260	27.45	25.50	25.70	23.61	24.29	25.17	25.68	26.44	26.79	A	A	A	C	D	D
23	210280	29.60	997.50	998.00	25.26	26.08	26.99	27.49	28.26	28.60	A	A	A	A	A	A
24	210290	27.85	28.00	29.70	25.70	26.49	27.42	27.91	28.68	29.03	A	A	A	B	C	C
24/29	210300	31.50	997.50	998.00	25.97	26.75	27.68	28.18	28.97	29.33	A	A	A	A	A	A
29	210332	35.50	37.50	39.00	29.35	30.32	31.77	32.71	34.58	35.54	A	A	A	A	A	B
29	210333	44.45	40.50	41.00	37.28	37.96	38.81	39.32	40.23	40.65	A	A	A	A	A	C
30	210335	997.25	997.50	998.00	26.76	27.49	28.26	28.65	29.28	29.58	E	E	E	E	E	E
30	210336	997.25	997.50	998.00	27.05	27.50	28.31	28.70	29.33	29.63	E	E	E	E	E	E
30	210350	997.25	997.50	998.00	27.03	27.92	28.94	29.41	30.09	30.47	E	E	E	E	E	E
30	210360	997.25	997.50	997.00	27.05	27.94	28.95	29.42	30.34	30.73	E	E	E	E	E	E
5	211010	13.05	12.50	13.00	7.91	8.80	9.87	10.38	11.30	11.72	A	A	A	A	A	A
12	211060	9.45	11.50	12.00	9.62	10.89	11.73	12.05	12.52	12.76	B	B	C	D	D	D
12	211080	12.75	13.50	14.00	10.22	11.34	12.47	13.04	13.88	14.13	A	A	A	B	C	D
12	211100	15.45	15.50	16.00	12.34	12.77	13.37	13.75	14.41	14.61	A	A	A	A	A	A
12	211110	997.25	22.20	22.70	19.34	19.44	19.58	19.67	19.82	19.89	A	A	A	A	A	A
5	211115	16.95	16.30	16.20	14.83	15.08	15.39	15.59	16.00	16.18	A	A	A	A	A	A
5	211030	13.25	13.60	15.20	8.42	9.48	10.66	11.09	11.79	12.14	A	A	A	A	A	A
11	211160	17.55	17.60	18.10	16.23	16.60	16.87	16.95	17.18	17.35	A	A	A	A	A	A
11	211165	17.55	18.60	19.10	17.24	17.32	17.44	17.51	17.64	17.71	A	A	A	A	B	B
5	211185	15.95	16.00	16.50	14.85	15.10	15.37	15.51	15.76	15.87	A	A	A	A	A	A
13	211510	15.75	15.50	16.00	11.25	12.09	13.78	14.39	15.08	15.70	A	A	A	A	A	C
13/6	211530	999.25	999.50	1000.00	13.55	14.35	15.41	15.88	16.65	17.00	E	E	E	E	E	E
12	212000	16.95	18.50	19.00	15.69	16.57	17.71	18.36	19.56	20.15	A	A	B	B	D	D
12	212030	17.95	20.50	21.00	15.88	16.85	18.15	18.92	20.27	20.68	A	A	B	B	B	C

Delaney Creek Existing LOS

2/28/01

Table 6.1

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		Landmark Elevations			Water Surface Elevations											
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
12	212040	18.45	19.50	19.00	15.72	16.61	17.74	18.39	19.57	20.16	A	A	A	A	D	D
12	212060	18.05	19.50	19.00	15.83	16.75	17.95	18.67	19.97	20.63	A	A	A	B	D	D
12	212080	17.35	18.50	19.00	16.32	17.79	18.75	19.21	20.00	20.35	A	B	C	D	D	D
12	212100	17.15	18.50	20.00	17.12	18.10	19.00	19.50	20.34	20.71	A	B	C	C	D	D
11	212130	18.85	20.50	21.00	17.59	18.87	20.27	20.77	21.46	21.76	A	B	B	C	D	D
18	213010	20.75	22.50	23.00	18.99	20.41	21.80	22.31	23.11	23.45	A	A	B	B	D	D
18	213040	21.45	23.50	24.00	20.14	21.04	22.10	22.63	23.48	23.86	A	A	B	B	B	C
17	213060	24.25	25.50	26.00	21.40	22.19	22.86	23.29	24.05	24.42	A	A	A	A	A	B
18	213510	24.05	25.50	26.00	18.78	19.47	20.49	21.24	22.68	23.27	A	A	A	A	A	A
18	213530	23.65	25.50	26.00	20.29	20.83	21.66	22.28	23.94	24.78	A	A	A	A	B	B
18	213800	997.25	997.50	998.00	24.45	24.73	25.08	25.29	25.66	25.83	E	E	E	E	E	E
18	213810	997.25	997.50	998.00	27.63	27.83	28.10	28.26	28.57	28.72	E	E	E	E	E	E
23	214012	27.45	997.50	998.00	27.10	27.56	28.13	28.46	29.06	29.31	A	B	B	B	B	B
17/23	214020	27.85	997.50	998.00	24.64	25.43	26.69	27.27	27.75	27.93	A	A	A	A	A	B
23	214040	997.25	997.50	998.00	29.42	30.24	31.21	31.70	32.57	32.98	E	E	E	E	E	E
23	214053	29.05	997.50	998.00	27.22	27.65	28.23	28.58	29.24	29.55	A	A	A	A	B	B
24	214500	997.25	997.50	998.00	25.35	25.51	25.74	25.88	26.36	27.10	E	E	E	E	E	E
23	215010	28.75	997.50	998.00	25.35	26.15	27.06	27.58	28.37	28.76	A	A	A	A	A	B
23	215023	30.25	29.40	29.90	25.03	26.09	27.07	27.62	28.49	29.11	A	A	A	A	A	A
23	215041	30.15	997.50	998.00	28.04	28.17	28.66	29.24	30.00	30.28	A	A	A	A	A	B
23	215042	31.15	997.50	998.00	28.04	28.21	28.90	29.52	30.08	30.36	A	A	A	A	A	A
23	215051	997.25	997.50	998.00	26.75	27.61	28.85	29.63	31.04	31.65	E	E	E	E	E	E
23	215060	32.15	30.50	31.00	26.37	26.76	27.77	28.37	29.33	29.75	A	A	A	A	A	A
23	215070	32.15	30.50	32.50	26.87	27.39	28.24	28.85	30.09	30.51	A	A	A	A	A	C
23/29	215500	31.15	29.30	30.50	25.27	26.08	27.00	27.49	28.26	28.61	A	A	A	A	A	A
23/29	215520	31.25	31.75	33.75	29.20	30.09	31.02	31.43	32.30	32.71	A	A	A	B	C	C
29	215530	31.65	32.75	33.75	29.65	30.71	31.98	32.59	33.45	33.83	A	A	B	B	C	D
29	215537	997.25	997.50	998.00	31.44	32.72	34.59	35.85	37.58	38.04	E	E	E	E	E	E
29	215538	32.25	32.50	40.00	29.51	30.04	30.81	31.34	32.56	33.19	A	A	A	A	C	C
29	215542	53.25	40.00	56.90	37.91	38.27	38.68	38.92	39.36	39.57	A	A	A	A	A	A
29	215550	52.25	40.30	56.90	37.93	38.31	38.80	39.15	40.03	40.50	A	A	A	A	A	C
24	216000	29.75	29.20	29.70	25.70	26.49	27.43	27.93	28.71	29.05	A	A	A	A	A	A
24	216500	997.25	997.50	998.00	25.69	26.36	26.98	27.47	28.19	28.49	E	E	E	E	E	E
24	216510	997.25	997.50	998.00	25.69	26.36	26.98	27.47	28.19	28.49	E	E	E	E	E	E
30	217000	997.25	997.50	998.00	26.88	27.72	28.65	29.12	29.76	30.10	E	E	E	E	E	E
30	217020	997.25	997.50	998.00	27.80	28.36	29.12	29.58	30.47	30.92	E	E	E	E	E	E
30	220000	999.25	999.50	1000.00	27.13	28.10	29.18	29.79	30.80	31.25	E	E	E	E	E	E

Delaney Creek Existing LOS

2/28/01

Table 6.1

DELANEY CREEK SUB-WATERSHED EXISTING LEVEL OF SERVICE											Flood Level Designations					
		Landmark Elevations			Water Surface Elevations											
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
36	220010	32.05	997.50	998.00	28.49	28.80	29.48	29.98	30.89	31.31	A	A	A	A	A	A
36	220040	30.25	30.10	34.70	28.65	29.14	29.83	30.30	31.15	31.58	A	A	A	C	C	C
36	220050	30.45	30.70	31.40	28.77	29.23	29.89	30.34	31.17	31.59	A	A	A	A	C	D
41	220060	31.25	32.50	34.00	28.81	29.34	30.06	30.50	31.30	31.71	A	A	A	A	B	B
41	220070	33.90	33.50	34.00	30.65	31.20	31.84	32.22	32.84	33.09	A	A	A	A	A	A
41	220110	36.25	37.25	38.75	32.67	33.09	34.31	35.01	36.33	36.67	A	A	A	A	B	B
41	220130	36.50	37.25	38.75	32.75	33.19	34.43	35.14	36.77	37.27	A	A	A	A	B	C
41	220140	36.25	37.25	38.75	32.81	33.27	34.52	35.24	36.87	37.37	A	A	A	A	B	C
41	220170	44.25	37.50	38.00	33.90	34.42	35.19	35.87	36.81	37.31	A	A	A	A	A	A
41	220180	44.25	45.50	53.00	33.96	34.60	35.80	36.79	39.00	40.25	A	A	A	A	A	A
41	220190	44.25	38.50	45.00	34.98	35.90	37.02	37.97	39.21	39.62	A	A	A	A	C	C
41	220195	41.75	42.00	43.00	35.08	35.13	35.21	35.26	35.39	35.45	A	A	A	A	A	A
41	220200	39.25	40.25	41.00	35.29	36.27	37.09	37.62	38.63	39.19	A	A	A	A	A	A
45	220210	40.00	40.00	41.00	35.39	36.39	37.15	37.74	38.81	39.24	A	A	A	A	A	A
30	221000	31.05	30.00	41.00	27.65	28.12	29.19	29.80	30.82	31.27	A	A	A	A	C	C
30	221030	33.25	34.25	36.00	28.64	29.10	29.84	30.33	31.43	31.82	A	A	A	A	A	A
30/36	221500	35.25	35.50	36.00	34.21	34.59	35.11	35.48	35.89	36.00	A	A	A	B	C	D
30/36	221520	46.35	48.00	49.00	36.34	36.86	37.77	38.24	38.92	39.07	A	A	A	A	A	A
29/35	221540	43.25	41.50	43.00	37.08	37.38	37.98	38.46	39.38	39.77	A	A	A	A	A	A
35	221550	45.25	46.50	48.00	36.59	36.83	37.21	37.46	37.94	38.17	A	A	A	A	A	A
29/35	221560	51.25	41.50	43.00	36.67	36.95	37.40	37.72	38.36	38.68	A	A	A	A	A	A
35	221580	52.25	53.00	54.60	38.59	39.62	41.14	42.06	43.74	44.51	A	A	A	A	A	A
36	222000	32.05	32.50	33.50	28.36	28.87	29.65	30.16	30.96	31.36	A	A	A	A	A	A
36	222020	32.00	32.50	33.00	28.41	28.99	29.80	30.31	31.26	31.71	A	A	A	A	A	A
36	222030	31.05	30.50	31.90	28.41	28.99	29.80	30.31	31.28	31.72	A	A	A	A	C	C
37	222040	32.35	30.90	32.00	28.42	29.00	29.82	30.33	31.32	31.77	A	A	A	A	C	C
37	222050	32.25	32.40	33.00	28.44	29.06	29.89	30.39	31.44	31.89	A	A	A	A	A	A
37	222060	33.35	33.60	34.10	28.44	29.06	29.89	30.39	31.45	31.90	A	A	A	A	A	A
37	222080	32.35	32.50	33.10	28.47	29.13	29.96	30.46	31.49	31.92	A	A	A	A	A	A
42	222090	33.25	35.00	36.00	30.77	30.95	31.70	32.10	32.77	33.06	A	A	A	A	A	A
36	222500	31.65	31.90	35.00	28.83	29.62	31.13	31.86	33.24	33.88	A	A	A	B	C	C
37	222520	32.40	33.50	34.80	29.15	30.29	31.99	32.81	34.20	34.79	A	A	A	B	C	C
37	222530	32.35	33.50	34.80	29.14	30.27	31.97	32.80	34.19	34.78	A	A	A	B	C	C
37	222540	32.03	32.50	34.30	28.72	29.55	30.79	31.49	32.76	33.33	A	A	A	A	C	C
36	223000	31.50	32.00	33.00	30.01	30.15	30.40	30.56	31.04	31.47	A	A	A	A	A	A
36	223020	40.25	40.50	41.00	27.03	27.33	27.82	28.17	31.66	33.16	A	A	A	A	A	A
36	223030	34.75	31.00	35.00	33.50	33.98	34.30	34.46	34.73	34.85	C	C	C	C	C	C

Delaney Creek Existing LOS

2/28/01

Table 6.1

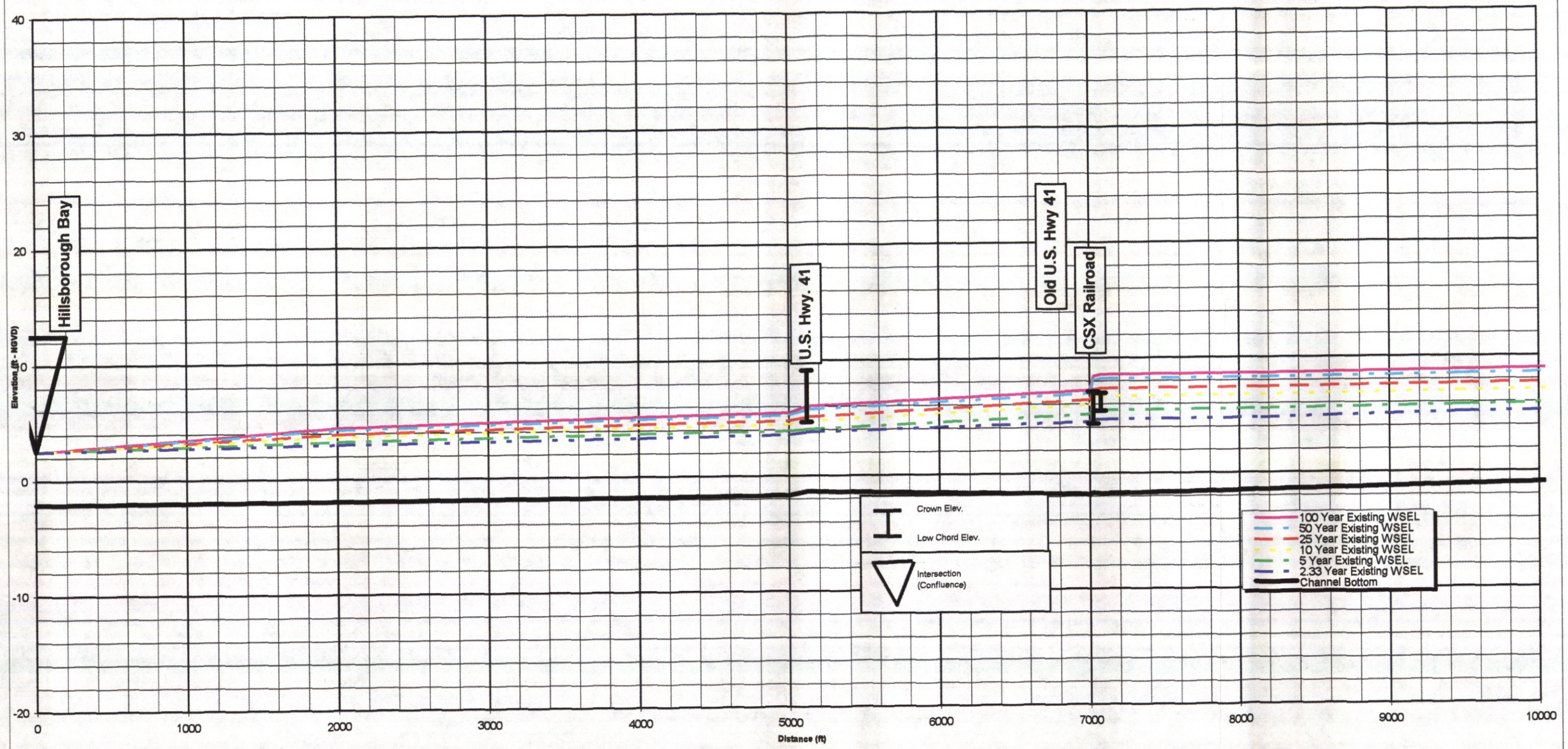
DELANEY CREEK SUB-WATERSHED EXISTING LEVEL OF SERVICE		Landmark Elevations			Water Surface Elevations						Flood Level Designations					
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
35	223050	36.25	40.50	56.00	31.76	32.10	32.52	32.76	33.18	33.37	A	A	A	A	A	A
41	224010	29.25	35.50	37.00	29.39	29.80	30.72	31.40	32.37	32.77	B	B	B	B	B	B
41	224050	34.25	35.50	36.00	30.41	30.76	31.68	32.28	33.67	34.28	A	A	A	A	A	B
41	225010	34.25	35.50	37.00	31.89	32.44	33.57	34.21	35.31	35.80	A	A	A	A	B	C
41	225017	37.25	39.50	40.00	36.97	38.14	39.07	39.54	40.30	40.62	A	B	B	C	D	D
41	225110	45.25	46.50	47.00	38.71	38.90	39.22	39.69	40.46	40.80	A	A	A	A	A	A
41	225120	38.25	40.50	41.00	38.90	39.09	39.35	39.80	40.58	40.93	B	B	B	B	C	C
41	225130	47.15	49.50	51.00	34.98	35.90	37.02	37.98	39.22	39.63	A	A	A	A	A	A
41	225140	44.25	44.80	46.00	34.98	35.90	37.02	37.97	39.21	39.63	A	A	A	A	A	A
41	225150	997.25	997.50	998.00	39.32	41.98	43.52	43.79	44.19	44.36	E	E	E	E	E	E
41	225160	997.25	997.50	998.00	43.92	44.06	44.26	44.38	44.62	44.71	E	E	E	E	E	E
45	226000	37.37	37.50	39.00	35.39	36.40	37.16	37.75	38.83	39.27	A	A	A	C	C	D
45	227000	50.25	45.50	56.00	43.19	43.48	43.96	44.29	44.93	45.24	A	A	A	A	A	A
45	227010	997.25	997.50	998.00	46.84	47.12	47.31	47.68	48.29	48.66	E	E	E	E	E	E
45	227020	997.25	997.50	998.00	45.35	46.17	46.40	46.72	47.35	47.70	E	E	E	E	E	E
45	227030	52.25	41.70	53.00	46.28	47.69	50.34	50.65	51.25	51.59	C	C	C	C	C	C
49	227040	59.05	60.50	61.00	57.41	57.94	58.32	58.48	58.96	59.22	A	A	A	A	A	B
45/46	227050	55.25	47.50	48.00	31.52	35.92	41.92	45.42	51.00	53.76	A	A	A	A	D	D
49	227060	89.05	79.20	95.00	72.52	73.36	74.75	75.75	77.81	78.86	A	A	A	A	A	A
49	227070	89.15	89.20	89.00	83.67	84.36	85.31	85.88	86.93	87.41	A	A	A	A	A	A
50	227080	73.85	74.10	74.60	69.90	70.34	70.72	71.06	71.75	72.09	A	A	A	A	A	A
50	227090	74.65	75.50	76.00	73.59	73.97	74.51	74.84	75.48	75.78	A	A	A	B	B	C
30	230005	30.25	997.50	998.00	28.57	29.09	29.73	30.12	30.92	31.33	A	A	A	A	B	B
30	230012	32.75	997.50	998.00	30.47	30.90	31.58	31.99	32.75	33.05	A	A	A	A	B	B
30	230030	30.25	30.90	31.40	28.53	29.06	29.71	30.10	30.84	31.21	A	A	A	A	B	C
31	230033	32.75	997.50	998.00	31.07	31.45	32.04	32.44	33.24	33.64	A	A	A	A	B	B
37	230090	32.35	31.80	32.50	29.43	29.83	30.45	30.84	31.59	31.93	A	A	A	A	A	C

Delaney Creek Existing LOS

2/28/01

Table 6.1

DELANEY CREEK SUB-WATERSHED EXISTING LEVEL OF SERVICE											Flood Level Designations					
		Landmark Elevations			Water Surface Elevations											
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
42	230170	35.05	40.00	41.00	31.96	32.34	33.08	33.56	34.47	34.88	A	A	A	A	A	A
42	230180	41.25	41.50	42.00	32.23	33.13	34.32	34.81	35.40	35.63	A	A	A	A	A	A
46	230190	36.75	41.00	42.00	32.23	33.13	35.45	38.18	40.17	40.86	A	A	A	B	B	B
46	230200	48.25	48.50	49.50	46.80	47.54	48.46	49.01	50.00	50.43	A	A	B	C	D	D
42	231000	34.45	35.00	36.00	31.46	32.03	32.59	32.92	33.49	33.74	A	A	A	A	A	A
42	232000	34.05	40.00	41.00	32.98	32.98	33.74	34.50	36.02	36.82	A	A	A	B	B	B
42/46	233000	43.91	44.50	46.00	41.05	41.92	42.93	43.48	44.32	44.61	A	A	A	A	B	C
45/46	233010	0.00	0.00	0.00	40.00	40.00	40.00	40.00	51.00	53.76	D	D	D	D	D	D
42	234000	0.00	0.00	0.00	31.00	31.00	31.00	31.00	31.00	31.00	D	D	D	D	D	D



DELANEY CREEK AREA

Computed Water Surface Profile

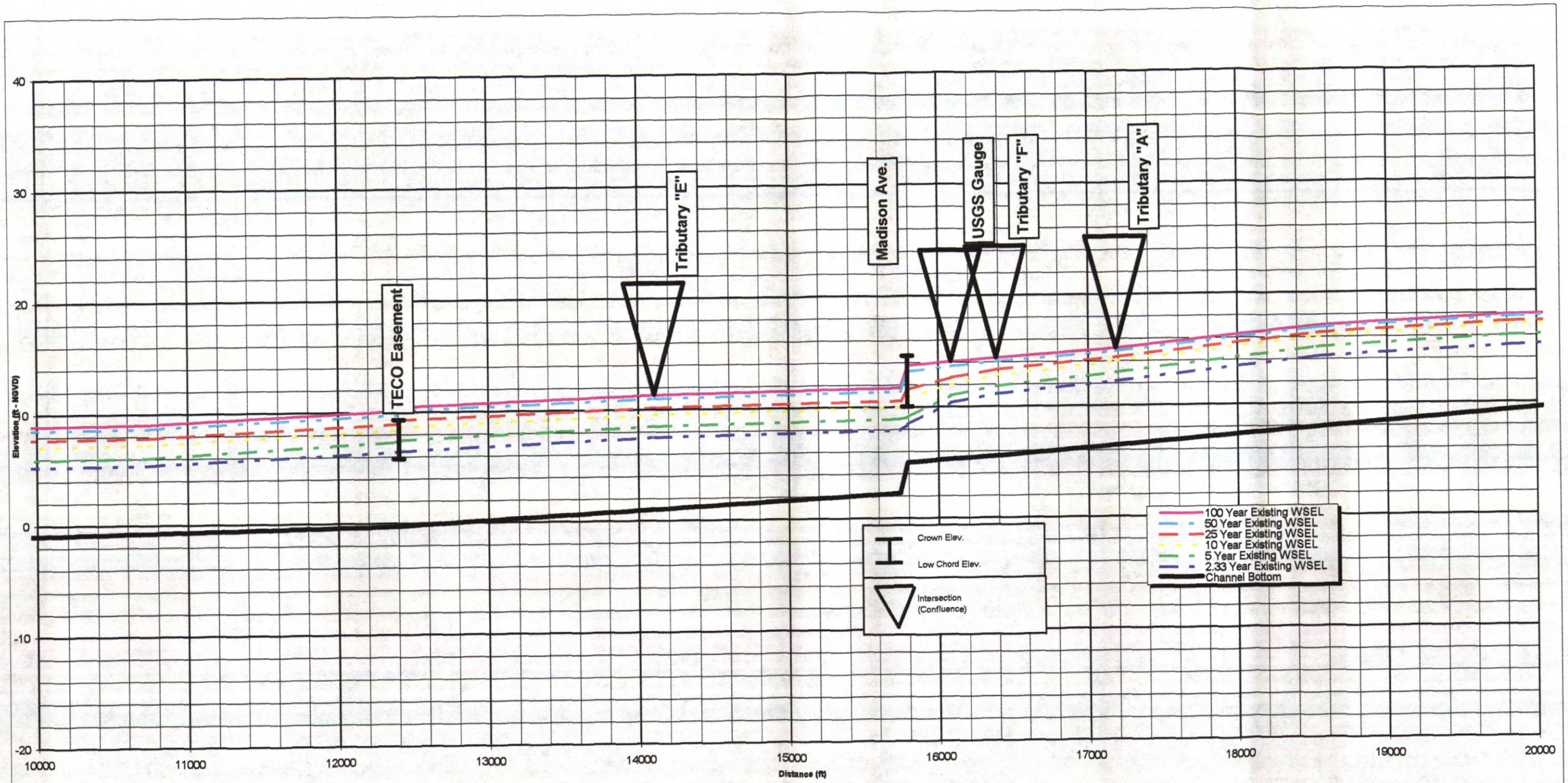
September 2000

Exhibit 6-2a

Existing Condition Model

Delaney Popoff Canal Main Channel

Sheet 1 of 4



DELANEY CREEK AREA

Computed Water Surface Profile

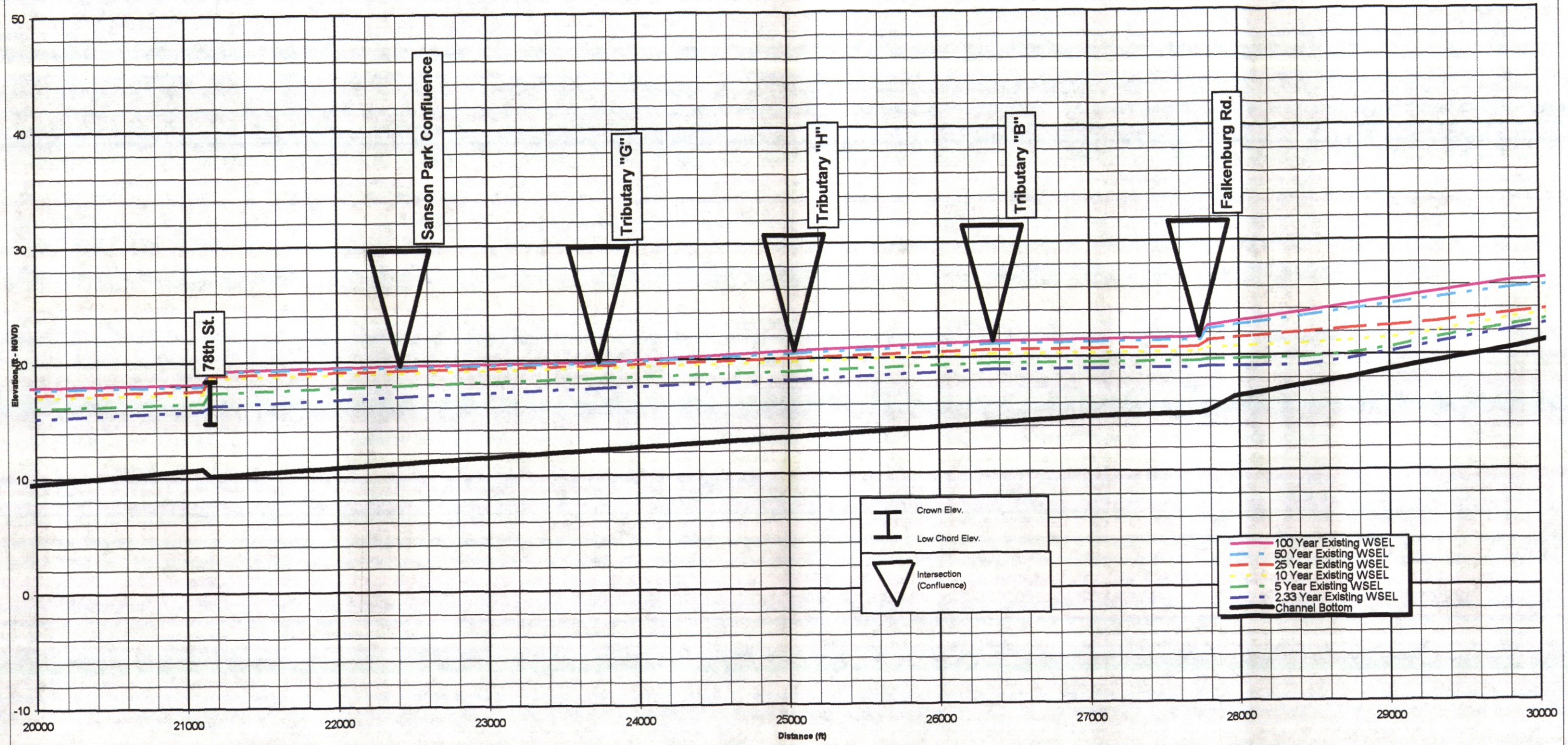
September 2000

Exhibit 6-2b

Existing Condition Model

Delaney Popoff Canal Main Channel

Sheet 2 of 4



DELANEY CREEK AREA

Computed Water Surface Profile

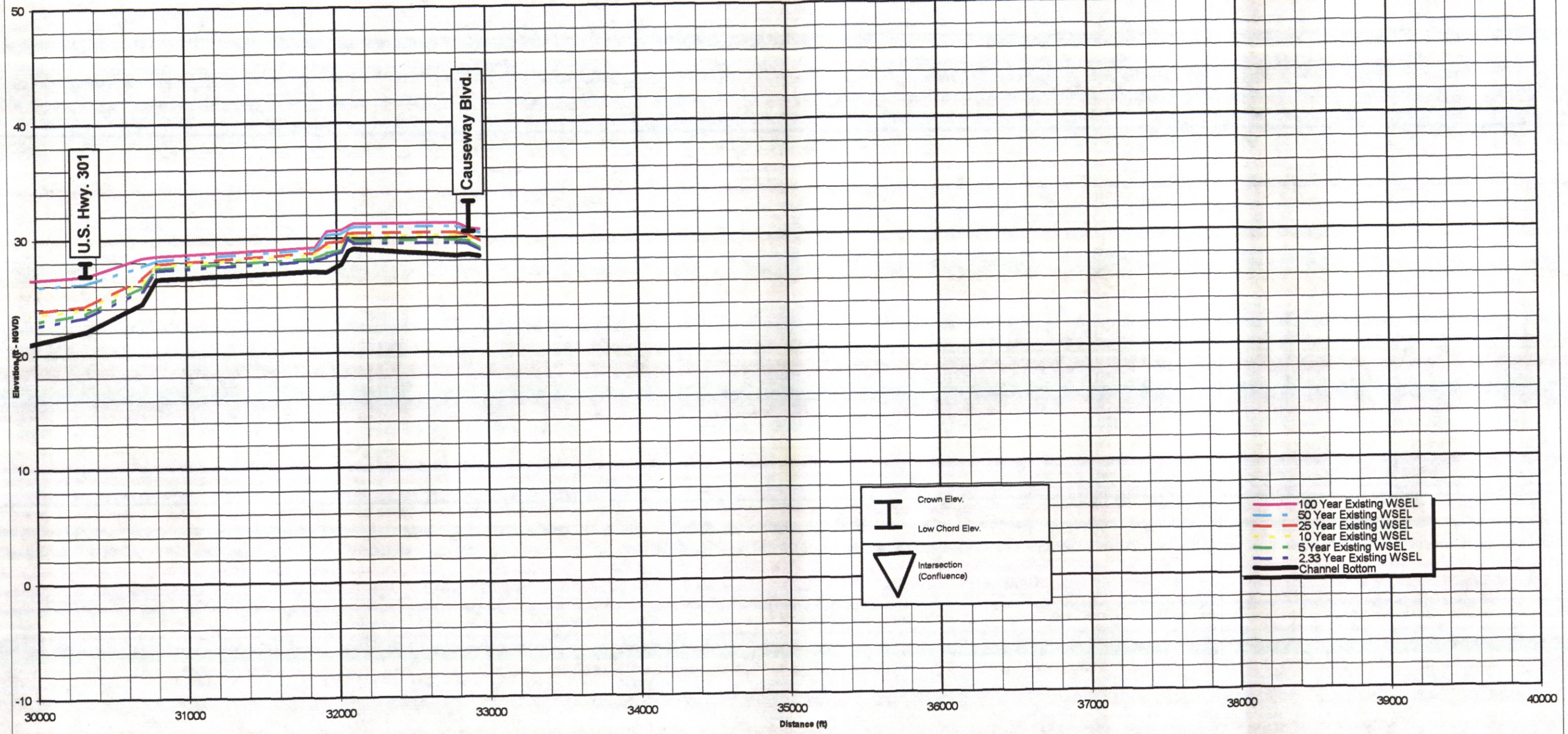
September 2000

Exhibit 6-2c

Existing Condition Model

Delaney Popoff Canal Main Channel

Sheet 3 of 4



DELANEY CREEK AREA

Computed Water Surface Profile

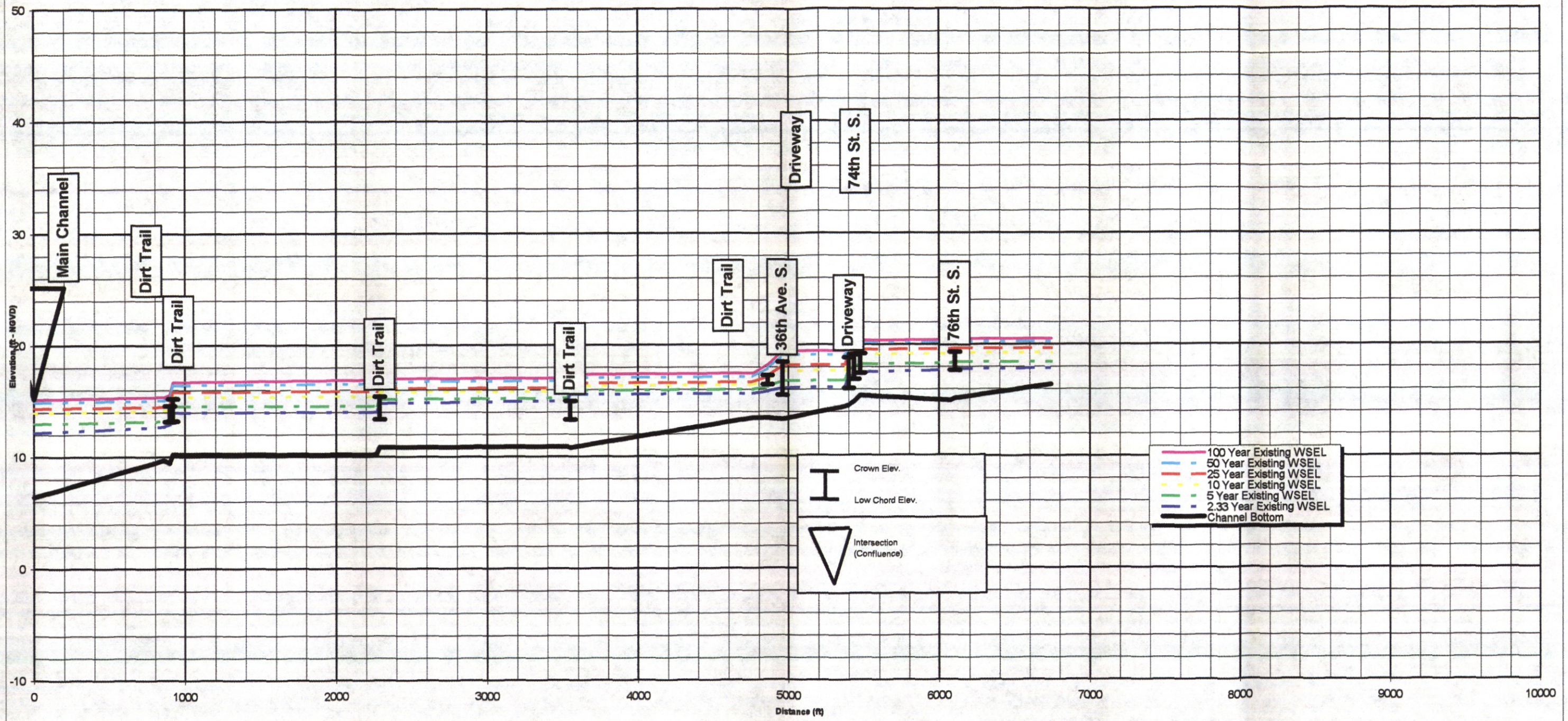
September 2000

Exhibit 6-2d

Existing Condition Model

Delaney Popoff Canal Main Channel

Sheet 4 of 4



DELANEY CREEK WATERSHED

Computed Water Surface Profile

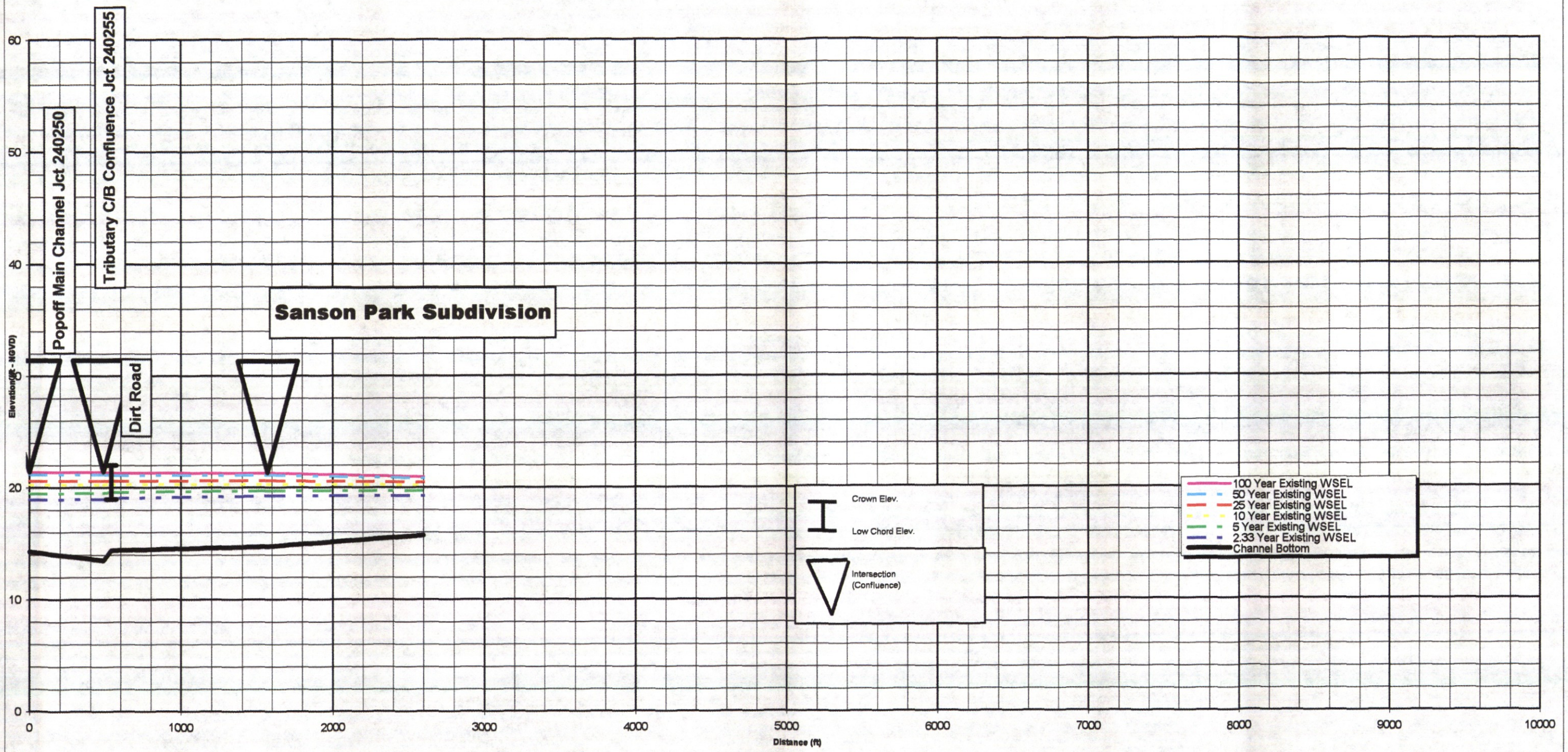
September 2000

Exhibit 6-2e

Existing Condition Profile

Delaney Popoff Canal Tributary "A"

Sheet 1 of



DELANEY CREEK WATERSHED

Computed Water Surface Profile

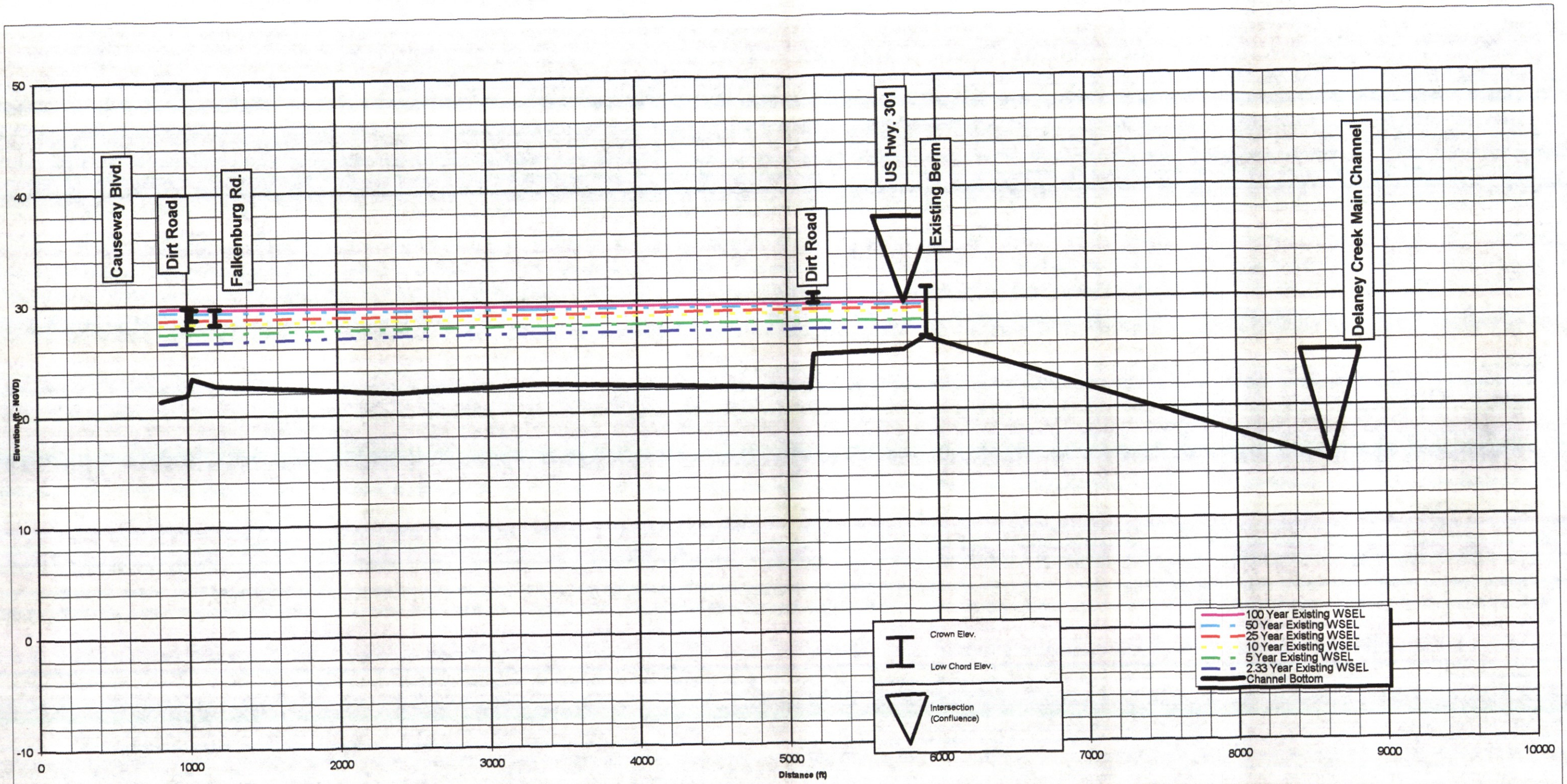
September 2000

Exhibit 6-2f

Existing Condition Profile

Delaney Popoff Canal/ Tributary "B" -Sanson Park

Sheet 1 of



DELANEY CREEK WATERSHED

Computed Water Surface Profile

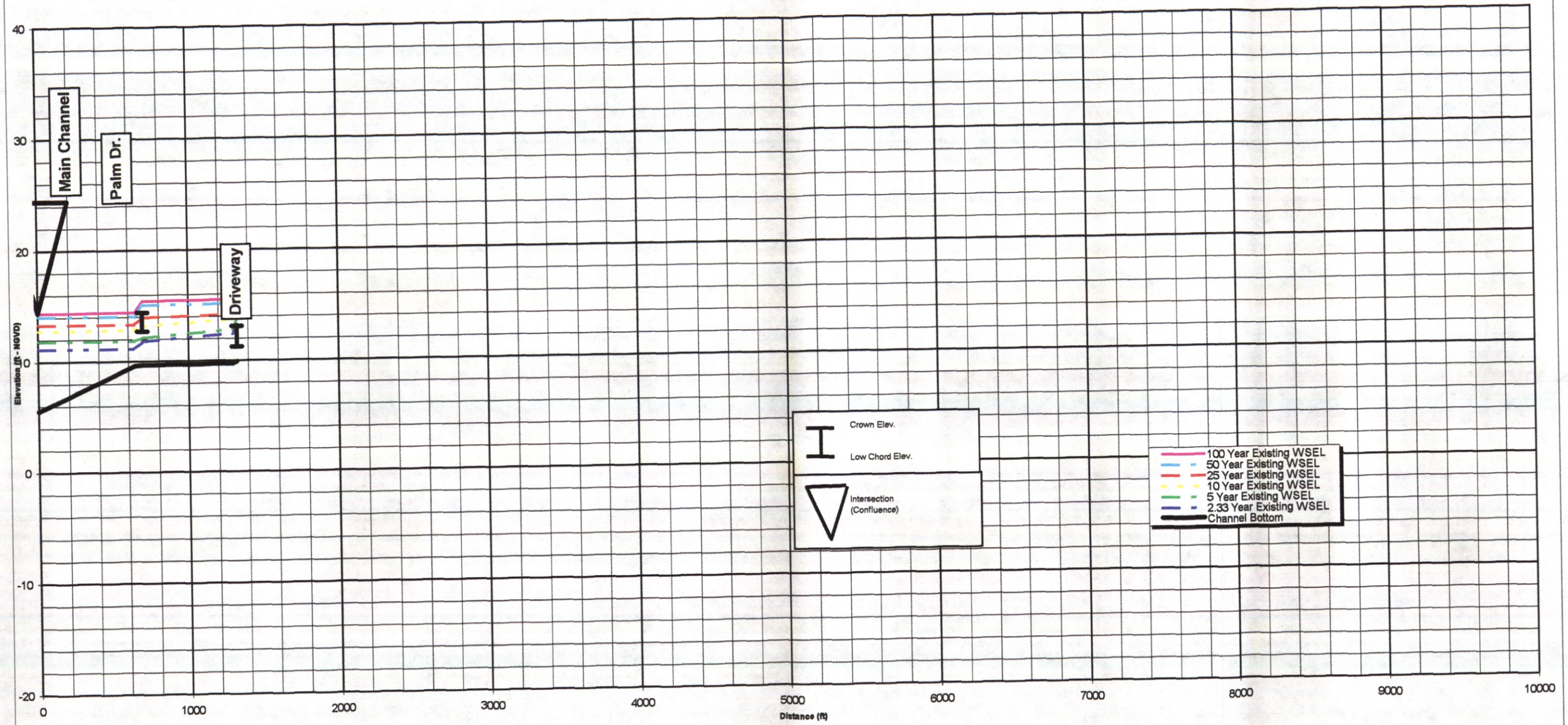
September 2000

Exhibit 6-2g

Existing Condition Profile

Delaney Popoff Canal/ Evergreen Estates System

Sheet 1 of



Delaney Creek Watershed
Computed Water Surface Profile
September 2000

Exhibit 6-2h
Existing Condition Profile
Delaney Popoff Canal/Tributary "F"
Sheet 1 of

Delaney Pop-off Canal Existing LOS

2/28/01

Table 6.2

DELANEY POP-OFF CAN Archie Creek Area (Existing Conditions) EXISTING LEVEL OF SERVICE Level of Service Analysis											Flood Level Designations				
		Landmark Elevations			Water Surface Elevations										
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	100-yr
2	200000	7.70	7.40	10.40	7.64	7.80	8.08	8.86	10.29	10.98	C	C	C	C	D
2	200010	7.70	7.40	10.40	7.55	7.70	8.08	8.86	10.29	10.98	C	C	C	C	D
2	200020	8.40	999.00	999.00	8.58	8.66	8.78	8.86	10.29	10.98	B	B	B	B	D
2	200025	8.55	8.60	10.70	8.71	8.79	8.91	8.99	10.29	10.98	C	C	C	C	D
2	200030	999.00	999.00	999.00	7.99	8.11	8.27	8.86	10.29	10.98	E	E	E	E	E
2	200040	999.00	999.00	999.00	6.60	6.74	8.08	8.86	10.29	10.98	E	E	E	E	E
2	200050	8.45	999.00	999.00	5.66	6.74	8.08	8.86	10.29	10.98	A	A	A	B	D
2	200065	999.00	999.00	999.00	3.41	3.83	4.29	4.59	5.43	5.77	E	E	E	E	E
2	200070	7.85	999.00	999.00	4.08	5.14	6.52	7.31	8.34	8.69	A	A	A	A	D
7	200090	8.55	5.90	6.40	4.27	5.44	7.04	7.92	9.03	9.42	A	A	D	D	D
6	200100	7.95	5.80	7.30	5.16	6.17	7.62	8.18	9.33	9.75	A	C	D	D	D
7	200110	9.45	999.00	999.00	5.51	6.61	8.05	9.09	10.59	11.18	A	A	A	A	D
7&6&2013	200120	8.55	8.80	9.30	5.98	6.87	8.26	9.28	10.82	11.44	A	A	A	C	D
6	200130	10.50	999.00	999.00	6.23	7.09	8.56	9.54	11.20	11.89	A	A	A	A	D
6&13	200140	10.20	10.80	11.30	8.33	8.94	9.69	10.20	11.40	12.07	A	A	A	B	D
14	200150	15.95	14.70	15.20	14.01	14.07	14.16	14.22	14.35	14.64	A	A	A	A	D
14	200335	10.25	12.70	13.40	9.30	9.57	9.89	10.34	11.71	12.43	A	A	A	B	D
7	200300	0.00	0.00	0.00	7.39	8.49	9.07	9.36	10.06	10.63	D	D	D	D	D
7	200310	9.05	9.30	9.80	7.63	8.73	9.62	10.41	11.90	12.63	A	A	C	D	D
7	200315	999.00	999.00	999.00	7.68	8.74	9.64	10.42	11.92	12.65	E	E	E	E	E
7	200320	9.65	999.00	999.00	7.64	8.88	9.86	10.47	12.02	12.78	A	A	B	B	D
7	200330	10.25	999.00	999.00	9.27	9.54	9.86	10.33	11.76	12.48	A	A	A	B	D
															D
															D
8	240040	9.05	999.00	999.00	3.80	4.01	4.70	5.09	5.73	6.04	A	A	A	A	D
8	240050	6.95	999.00	999.00	4.48	5.10	5.91	6.36	6.93	7.20	A	A	A	A	D
8	240060	6.95	7.70	8.40	4.65	5.40	6.55	7.23	8.06	8.42	A	A	A	B	D
8	240070	7.75	7.75	8.00	4.68	5.44	6.63	7.34	8.20	8.56	A	A	A	A	D
8	240080	8.55	9.30	9.80	4.76	5.54	6.71	7.42	8.27	8.63	A	A	A	A	D

Delaney Pop-off Canal Existing LOS

2/28/01

Table 6.2

DELANEY POP-OFF CAN Archie Creek Area (Existing Conditions) EXISTING LEVEL OF SERVICE Level of Service Analysis											Flood Level Designations				
		Landmark Elevations			Water Surface Elevations										
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	100-yr
8	240085	999.00	999.00	999.00	5.36	5.49	5.69	5.89	6.82	7.34	E	E	E	E	E
8	240090	8.55	8.70	9.20	5.20	5.79	6.94	7.61	8.47	8.83	A	A	A	A	D
8	240100	8.35	8.35	8.70	5.40	6.03	7.18	7.82	8.67	9.04	A	A	A	A	D
14	240110	999.00	999.00	999.00	6.40	7.29	8.33	8.90	9.74	10.09	E	E	E	E	E
14	240120	14.55	14.80	15.30	7.08	8.07	9.14	9.79	10.64	10.97	A	A	A	A	D
14	240130	999.00	999.00	999.00	7.49	8.47	9.51	10.14	10.99	11.32	E	E	E	E	E
14	240135	12.75	13.00	13.60	10.19	10.33	10.51	10.62	11.01	11.34	A	A	A	A	D
14	240140	15.45	15.70	16.70	7.92	8.88	9.91	10.54	11.40	11.73	A	A	A	A	D
14	240150	13.75	14.00	14.50	8.43	9.05	10.77	11.50	13.16	13.73	A	A	A	A	D
14	240160	13.50	13.90	14.40	11.12	11.80	12.73	13.29	14.02	14.37	A	A	A	A	D
14	240170	999.00	999.00	999.00	12.17	12.96	13.93	14.34	14.89	15.17	E	E	E	E	E
14	240180	999.00	999.00	999.00	14.23	15.06	16.03	16.36	16.84	17.04	E	E	E	E	E
14	240190	999.00	999.00	999.00	15.11	16.01	16.98	17.27	17.71	17.89	E	E	E	E	E
14	240200	17.85	15.70	17.00	15.79	16.43	17.27	17.55	17.97	18.14	C	C	D	D	D
19	240210	18.45	17.70	19.00	16.22	17.27	18.62	18.86	19.16	19.27	A	A	C	C	D
19	240220	23.05	999.00	999.00	16.96	17.91	19.05	19.29	19.63	19.75	A	A	A	A	D
19	240230	999.00	999.00	999.00	17.56	18.39	19.32	19.49	19.72	19.82	E	E	E	E	E
19	240231	999.00	999.00	999.00	17.56	18.40	19.33	19.49	19.72	19.82	E	E	E	E	E
19	240235	999.00	999.00	999.00	20.27	20.33	20.46	20.53	20.67	20.73	E	E	E	E	E
25	246500	999.00	999.00	999.00	18.18	18.90	19.84	20.29	20.97	21.22	E	E	E	E	E
19	240255	999.00	999.00	999.00	18.99	19.52	20.28	20.63	21.18	21.40	E	E	E	E	E
25	244020	34.55	999.00	999.00	25.50	25.50	25.50	25.50	25.50	25.50	A	A	A	A	D
25	240380	32.65	999.00	999.00	27.29	27.47	27.71	27.86	28.16	28.56	A	A	A	A	D
25	240390	34.55	999.00	999.00	28.02	28.26	28.57	28.74	29.06	29.20	A	A	A	A	D
25	240400	999.00	999.00	999.00	28.39	28.72	29.24	29.61	30.29	30.60	E	E	E	E	E
25	240410	34.45	999.00	999.00	28.81	28.97	29.36	29.71	30.40	30.72	A	A	A	A	D
25	240420	34.45	999.00	999.00	29.92	30.06	30.20	30.36	30.79	31.08	A	A	A	A	D
25	240430	34.45	999.00	999.00	29.56	29.82	30.20	30.45	30.99	31.27	A	A	A	A	D
25	240440	34.45	34.70	35.20	29.56	29.82	30.19	30.45	30.99	31.27	A	A	A	A	D
25	240450	32.45	32.70	33.20	29.42	29.66	29.99	30.20	30.58	30.77	A	A	A	A	D
25	240460	999.00	999.00	999.00	28.89	29.06	29.39	29.70	30.41	30.69	E	E	E	E	E
14	241000	999.00	999.00	999.00	5.41	6.04	7.18	7.82	8.68	9.04	E	E	E	E	E
14	241010	12.55	12.80	13.30	5.45	6.04	7.18	7.82	8.68	9.04	A	A	A	A	D
14	241020	12.65	999.00	999.00	10.77	10.84	11.03	11.16	11.40	11.50	A	A	A	A	D
14	241030	13.15	999.00	999.00	11.58	11.64	11.72	11.77	11.86	11.90	A	A	A	A	D
14	241500	999.00	999.00	999.00	6.48	7.58	8.74	9.19	9.88	10.07	E	E	E	E	E
14	241510	999.00	999.00	999.00	11.43	11.56	11.75	11.88	12.11	12.22	E	E	E	E	E
14	241509	999.00	999.00	999.00	10.46	10.59	10.79	10.91	11.15	11.26	E	E	E	E	E
14	242000	999.00	999.00	999.00	7.49	8.48	9.51	10.14	10.99	11.33	E	E	E	E	E
14	242010	999.00	999.00	999.00	8.48	8.89	9.51	10.14	10.99	11.33	E	E	E	E	E
14	242020	999.00	999.00	999.00	10.38	10.60	10.91	11.10	11.44	11.59	E	E	E	E	E
13	242030	999.00	999.00	999.00	12.16	12.31	12.52	12.64	12.87	12.97	E	E	E	E	E
14	242500	14.45	14.70	15.20	11.13	11.81	12.74	13.30	14.04	14.39	A	A	A	A	D

Delaney Pop-off Canal Existing LOS

2/28/01

Table 6.2

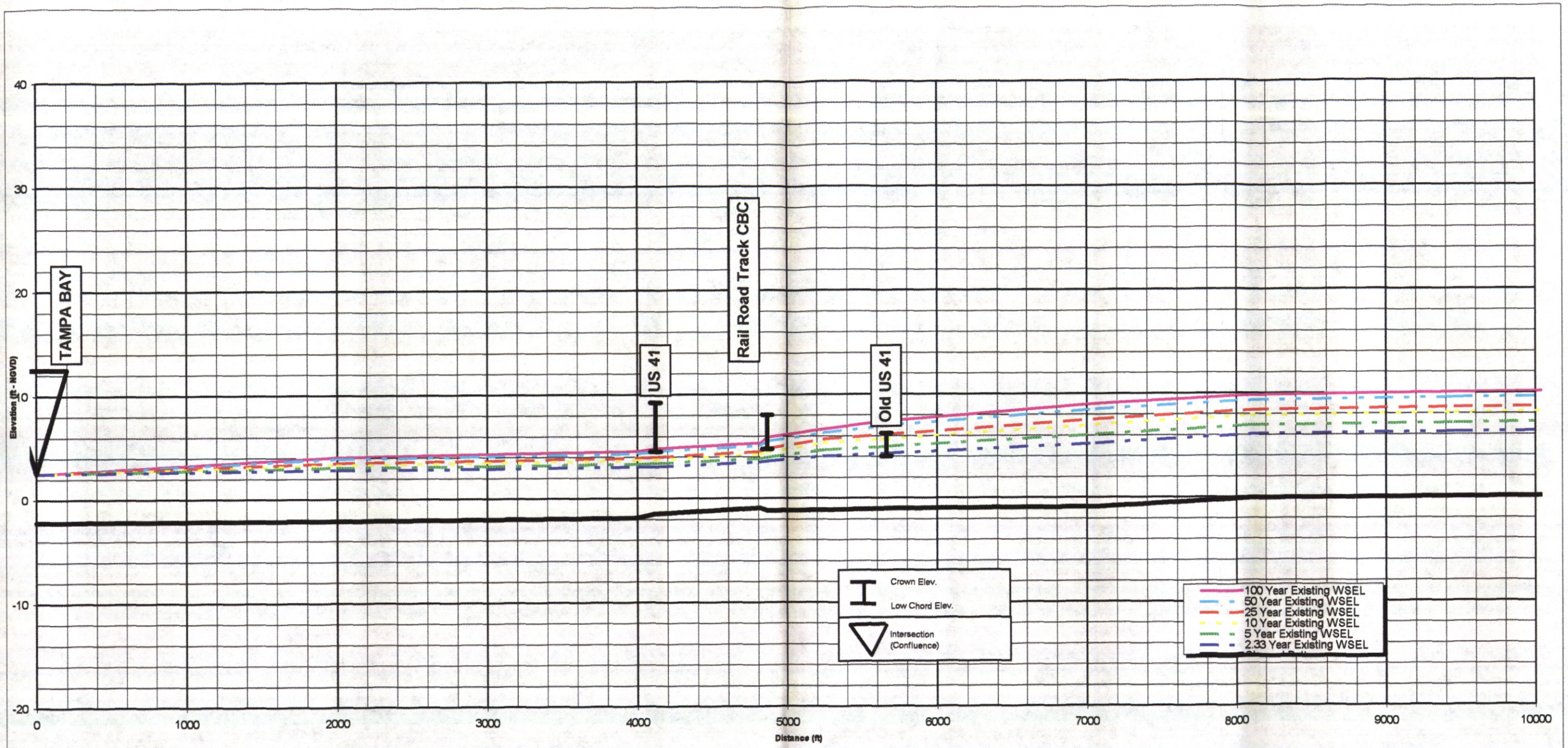
DELANEY POP-OFF CAN Archie Creek Area (Existing Conditions) EXISTING LEVEL OF SERVICE Level of Service Analysis											Flood Level Designations				
		Landmark Elevations			Water Surface Elevations										
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	100-yr
14	242510	13.95	15.30	15.80	11.83	12.15	13.18	13.93	15.06	15.43	A	A	A	A	D
14	242520	13.50	14.40	14.90	12.45	12.83	13.70	14.13	15.14	15.51	A	A	B	B	D
14	242530	13.20	13.20	14.20	13.24	13.69	14.05	14.28	15.22	15.59	C	C	C	D	D
14	242800	11.55	13.80	14.30	11.98	13.02	13.35	13.54	14.08	14.41	B	B	B	B	D
14	243000	999.00	999.00	999.00	12.72	13.18	14.08	14.50	15.07	15.37	E	E	E	E	E
14	243005	15.75	14.70	15.20	13.64	13.75	13.89	13.97	14.15	14.51	A	A	A	A	D
14	243010	15.05	15.30	15.80	12.98	13.43	14.27	14.76	15.32	15.59	A	A	A	A	D
13	243020	15.75	999.00	999.00	14.02	14.58	15.37	15.85	16.45	16.72	A	A	A	B	D
14	243021	18.45	18.30	18.80	15.03	15.31	15.69	15.92	16.74	17.01	A	A	A	A	D
13	243030	16.85	16.70	17.20	14.04	14.58	15.42	15.88	16.59	16.92	A	A	A	A	D
13	243035	15.25	999.00	999.00	14.21	14.55	15.42	15.89	16.59	16.92	A	A	B	B	D
13	243040	999.00	999.00	999.00	14.83	15.18	15.82	16.15	16.75	17.04	E	E	E	E	E
13	243050	18.25	18.50	19.00	15.03	15.29	15.87	16.19	16.81	17.07	A	A	A	A	D
13	243060	18.25	18.50	19.00	15.60	15.96	16.37	16.60	17.09	17.39	A	A	A	A	D
13	243070	20.25	999.00	999.00	15.64	16.01	16.43	16.66	17.16	17.46	A	A	A	A	D
13	243080	18.65	999.50	100.00	15.86	16.28	16.86	17.18	17.90	18.23	A	A	A	A	D
13	243090	17.45	17.10	18.00	16.16	16.79	17.68	18.20	19.12	19.44	A	A	C	D	D
13	243100	19.45	20.00	20.50	16.25	16.82	17.69	18.21	19.13	19.46	A	A	A	A	D
13	243110	19.45	19.50	20.00	17.08	17.72	18.51	19.11	19.56	19.70	A	A	A	A	D
13	243120	18.45	18.70	19.20	17.35	18.04	18.89	19.41	19.97	20.19	A	A	C	D	D
13	243130	19.45	20.00	20.50	17.55	18.28	19.15	19.58	20.16	20.40	A	A	A	B	D
13	243135	18.95	17.90	19.40	17.90	17.98	18.10	18.17	18.30	18.36	C	C	C	C	D
13	243140	19.45	19.70	20.20	17.73	18.34	19.17	19.60	20.19	20.43	A	A	A	B	D
13	243150	20.45	18.70	21.20	17.83	18.45	19.27	19.66	20.26	20.51	A	A	C	C	D
13	243160	20.45	21.10	21.60	17.89	18.46	19.27	19.67	20.26	20.51	A	A	A	A	D
13	243500	999.00	999.00	999.00	15.00	15.48	15.88	16.20	16.80	17.00	E	E	E	E	E
13	243510	999.00	999.00	999.00	14.62	15.19	15.87	16.20	16.81	17.04	E	E	E	E	E
13	243520	999.00	999.00	999.00	14.62	15.20	15.88	16.20	16.81	17.05	E	E	E	E	E
19	244010	999.00	999.00	999.00	22.17	22.54	22.97	23.25	23.88	24.35	E	E	E	E	E
19	244510	999.00	999.00	999.00	18.96	19.55	20.31	20.67	21.25	21.48	E	E	E	E	E
19	246000	999.00	999.00	999.00	19.13	19.34	19.51	19.60	19.76	19.83	E	E	E	E	E
20&19	246010	999.00	999.00	999.00	21.04	21.32	21.86	22.21	22.79	23.02	E	E	E	E	E
20	246020	999.00	999.00	999.00	22.46	22.69	22.93	23.08	23.39	23.54	E	E	E	E	E
25&19	246035	31.65	999.00	999.00	22.51	22.74	22.99	23.12	23.37	23.49	A	A	A	A	D
25&26	246040	30.25	30.50	31.00	22.54	22.88	23.24	23.44	23.80	23.96	A	A	A	A	D
25	246050	31.95	999.00	999.00	22.54	22.88	23.25	23.45	23.82	23.98	A	A	A	A	D
25	246060	30.25	999.00	999.00	22.54	22.88	23.25	23.45	23.82	23.98	A	A	A	A	D
25	246070	35.00	999.00	999.00	34.39	34.42	34.46	34.49	34.54	34.56	A	A	A	A	D
19	246505	999.00	999.00	999.00	18.38	18.91	19.85	20.31	21.00	21.26	E	E	E	E	E
19	246510	999.00	999.00	999.00	18.40	18.91	19.85	20.31	21.00	21.26	E	E	E	E	E
25	246520	999.00	999.00	999.00	26.16	26.19	26.24	26.27	26.32	26.35	E	E	E	E	E

Delaney Pop-off Canal Existing LOS

2/28/01

Table 6.2

DELANEY POP-OFF CAN Archie Creek Area (Existing Conditions) EXISTING LEVEL OF SERVICE Level of Service Analysis											Flood Level Designations				
		Landmark Elevations			Water Surface Elevations										
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	100-yr
19	247000	999.00	21.70	22.20	19.08	19.61	20.29	20.63	21.14	21.33	A	A	A	A	D
19	247010	19.10	20.40	21.40	19.27	19.74	20.30	20.63	21.12	21.31	B	B	B	C	D
19	247020	19.10	20.00	21.40	19.28	19.74	20.25	20.50	20.85	20.98	B	B	C	C	D
19	247030	21.00	21.00	21.50	20.78	20.82	20.88	20.92	20.99	21.02	A	A	A	A	D
19	247040	22.65	22.90	23.40	22.35	22.59	22.89	23.06	23.37	23.51	A	A	B	C	D
19	247050	21.90	22.30	23.00	22.35	22.60	22.90	23.08	23.40	23.55	C	C	C	D	D
19	247060	21.45	22.00	23.00	21.44	21.71	22.16	22.41	22.82	23.01	A	B	C	C	D
19	247070	21.00	22.00	23.00	21.90	21.98	22.25	22.50	22.91	23.09	B	B	C	C	D
25	244030	32.65	999.00	999.00	25.87	25.94	26.04	26.10	26.21	26.26	A	A	A	A	D
19	247500	999.00	999.00	999.00	18.99	19.52	20.28	20.63	21.18	21.40	E	E	E	E	E
19	247510	23.25	22.80	23.30	18.99	19.52	20.28	20.63	21.21	21.47	A	A	A	A	D
19	247520	23.23	24.00	24.50	19.04	19.55	20.29	20.64	21.22	21.50	A	A	A	A	D
19	247530	999.00	999.00	999.00	19.06	19.56	20.29	20.64	21.23	21.57	E	E	E	E	E
19	247535	25.25	24.70	25.70	20.66	21.25	22.04	22.12	22.28	22.40	A	A	A	A	D
19	247540	24.95	24.70	26.20	19.98	20.34	20.83	21.14	21.58	21.73	A	A	A	A	D
19	247550	27.65	26.50	27.60	20.07	20.42	20.90	21.19	21.65	21.80	A	A	A	A	D
19	247801	26.15	26.00	29.00	22.91	23.11	23.53	23.79	24.18	24.34	A	A	A	A	D
19	247805	28.51	999.00	999.00	28.26	28.30	28.36	28.40	28.47	28.50	A	A	A	A	D
19	247810	26.75	27.40	29.00	25.54	25.78	26.08	26.28	26.60	26.74	A	A	A	A	D
19	247820	27.85	28.50	30.10	26.19	26.25	26.33	26.49	26.92	27.13	A	A	A	A	D
19	240355	34.45	999.00	999.00	22.65	22.96	23.51	24.10	26.22	27.15	A	A	A	A	D
19	248020	28.95	29.20	29.70	25.60	25.64	25.69	25.73	25.78	25.81	A	A	A	A	D
25	248040	30.55	31.70	33.20	28.17	28.80	29.77	30.43	31.04	31.16	A	A	A	A	D
25	249000	33.75	999.00	999.00	28.43	28.52	28.61	28.68	28.90	29.00	A	A	A	A	D
25	249030	999.00	999.00	999.00	28.18	28.36	28.60	28.75	29.03	29.18	E	E	E	E	E
25	249040	999.00	999.00	999.00	30.35	30.46	30.61	30.71	30.89	30.97	E	E	E	E	E
25	250000	999.00	999.00	999.00	26.21	26.61	27.12	28.31	29.15	29.47	E	E	E	E	E
25	250005	34.85	999.00	999.00	27.27	27.68	28.33	28.80	29.23	29.48	A	A	A	A	D
25	250010	32.55	999.00	999.00	26.22	26.62	27.13	28.31	29.15	29.47	A	A	A	A	D
25&31	250011	34.55	999.00	999.00	26.57	26.80	27.13	28.31	29.16	29.48	A	A	A	A	D
25	250030	33.65	999.00	999.00	26.58	27.36	28.16	28.58	29.31	29.64	A	A	A	A	D
24	250040	999.00	999.00	999.00	26.59	27.41	28.21	28.64	29.35	29.68	E	E	E	E	E
25	250050	31.85	999.00	999.00	28.24	28.53	28.85	29.05	29.41	29.65	A	A	A	A	D
25	250090	999.00	999.00	999.00	28.39	28.71	29.30	29.64	30.41	30.69	E	E	E	E	E
25	250110	31.50	31.20	34.00	30.34	30.51	30.76	30.92	31.23	31.38	A	A	A	A	D
25	250120	999.00	999.00	999.00	30.19	30.39	30.55	30.59	30.69	30.74	E	E	E	E	E
25	250330	30.40	999.00	999.00	28.17	28.33	28.55	28.69	28.95	29.10	A	A	A	A	D
25	250510	999.00	999.00	999.00	26.35	26.69	27.24	28.21	29.11	29.46	E	E	E	E	E
25	250520	999.00	999.00	999.00	26.43	26.80	27.40	28.22	29.17	29.54	E	E	E	E	E
25	250525	30.70	999.00	999.00	26.43	26.80	27.40	28.23	29.17	29.54	A	A	A	A	D
25	250527	32.55	999.00	999.00	29.27	29.30	29.33	29.36	29.41	29.44	A	A	A	A	D
25	250530	33.35	34.10	34.60	28.69	29.28	29.40	29.56	29.83	29.92	A	A	A	A	D
25	250550	999.00	999.00	999.00	29.56	29.63	29.70	29.74	29.82	29.85	E	E	E	E	E



DELANEY CREEK AREA

Computed Water Surface Profile

September 2000

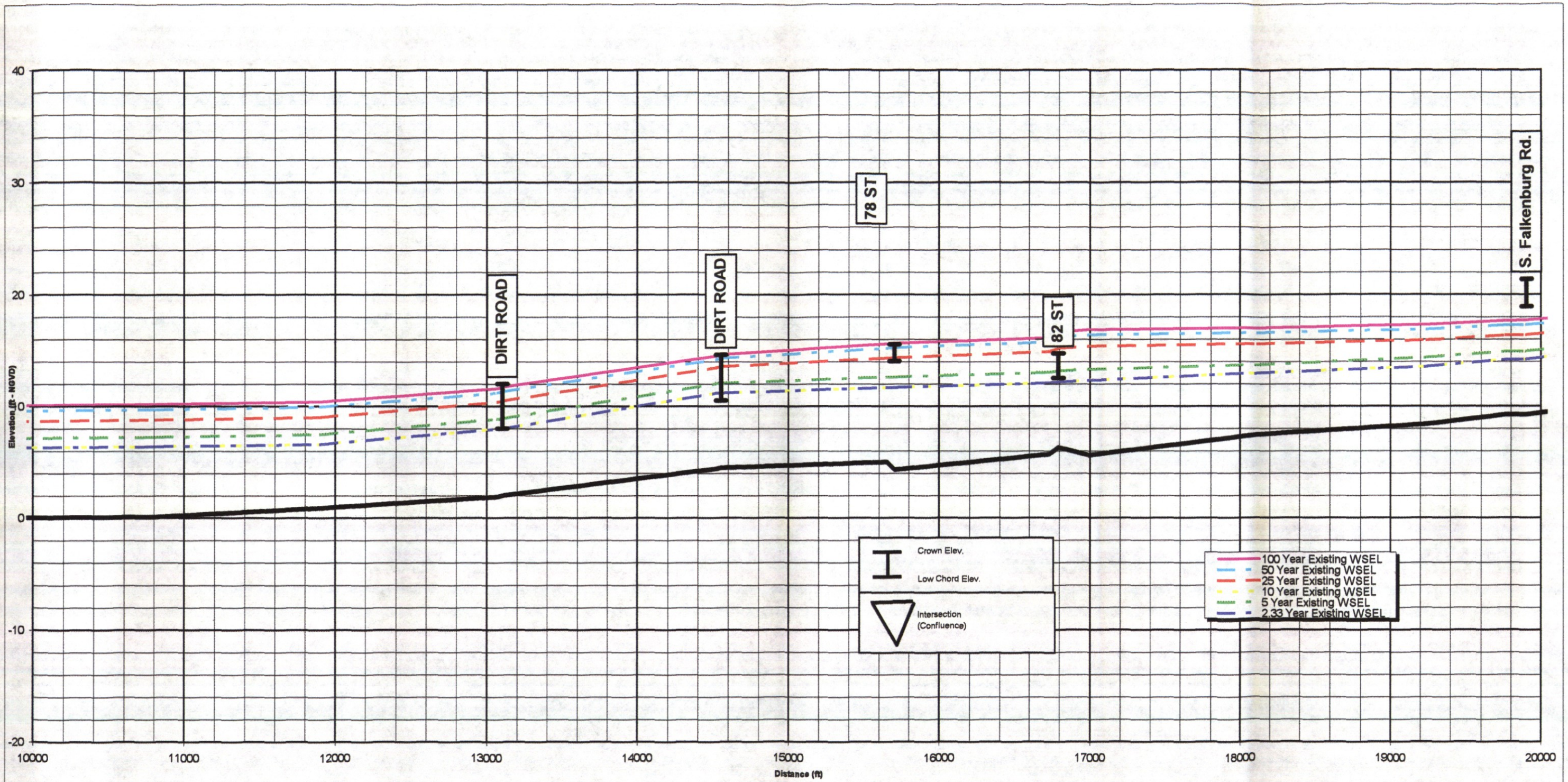
Exhibit 6-3a

Existing Condition Model

North Archie Creek Sub-watershed/ Main Channel

Sheet 1 of

4



DELANEY CREEK AREA

Computed Water Surface Profile

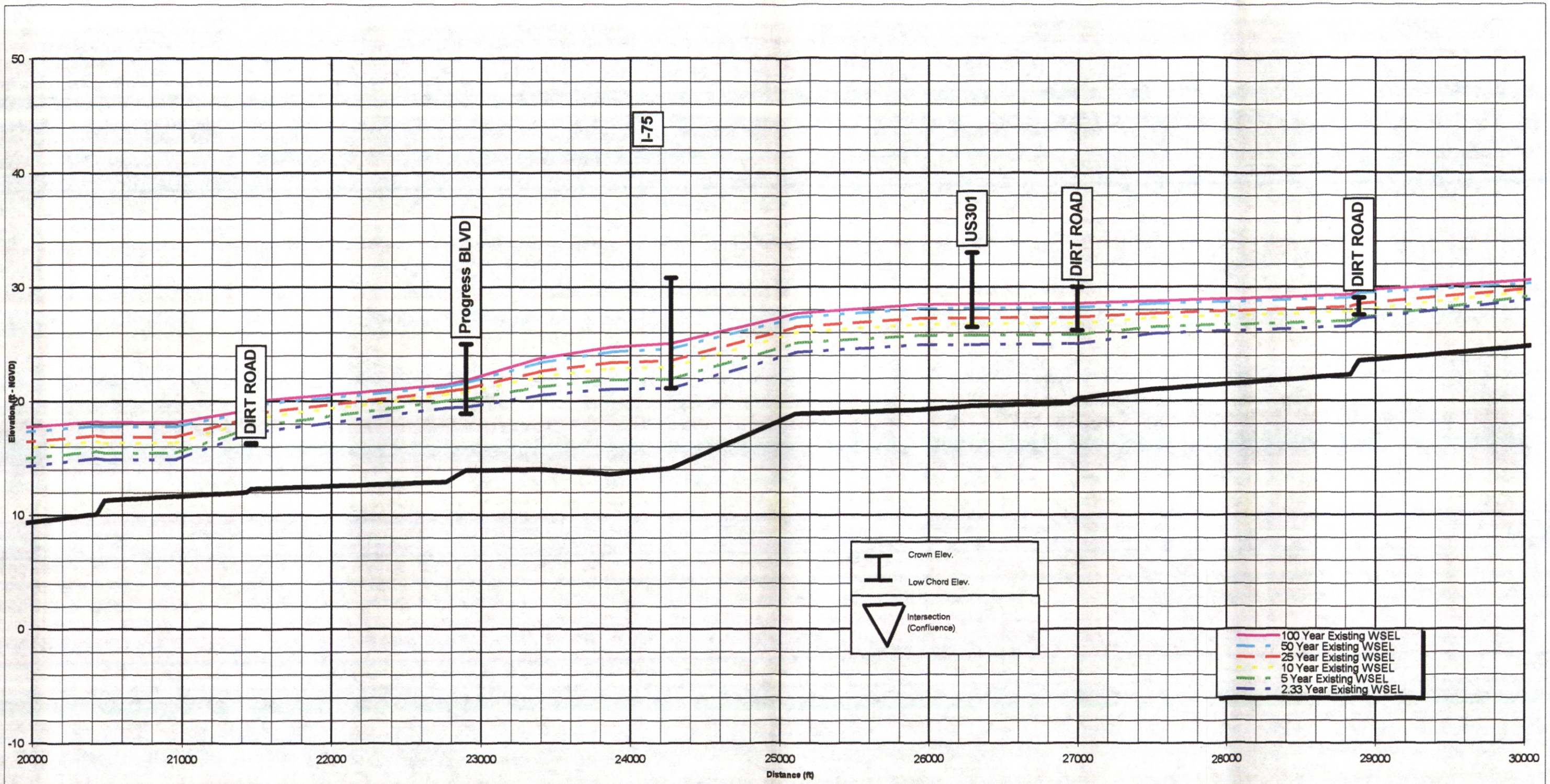
September 2000

Exhibit 6-3b

Existing Condition Model

North Archie Creek Sub-watershed/ Main Channel

Sheet 2 of



DELANEY CREEK AREA

Computed Water Surface Profile

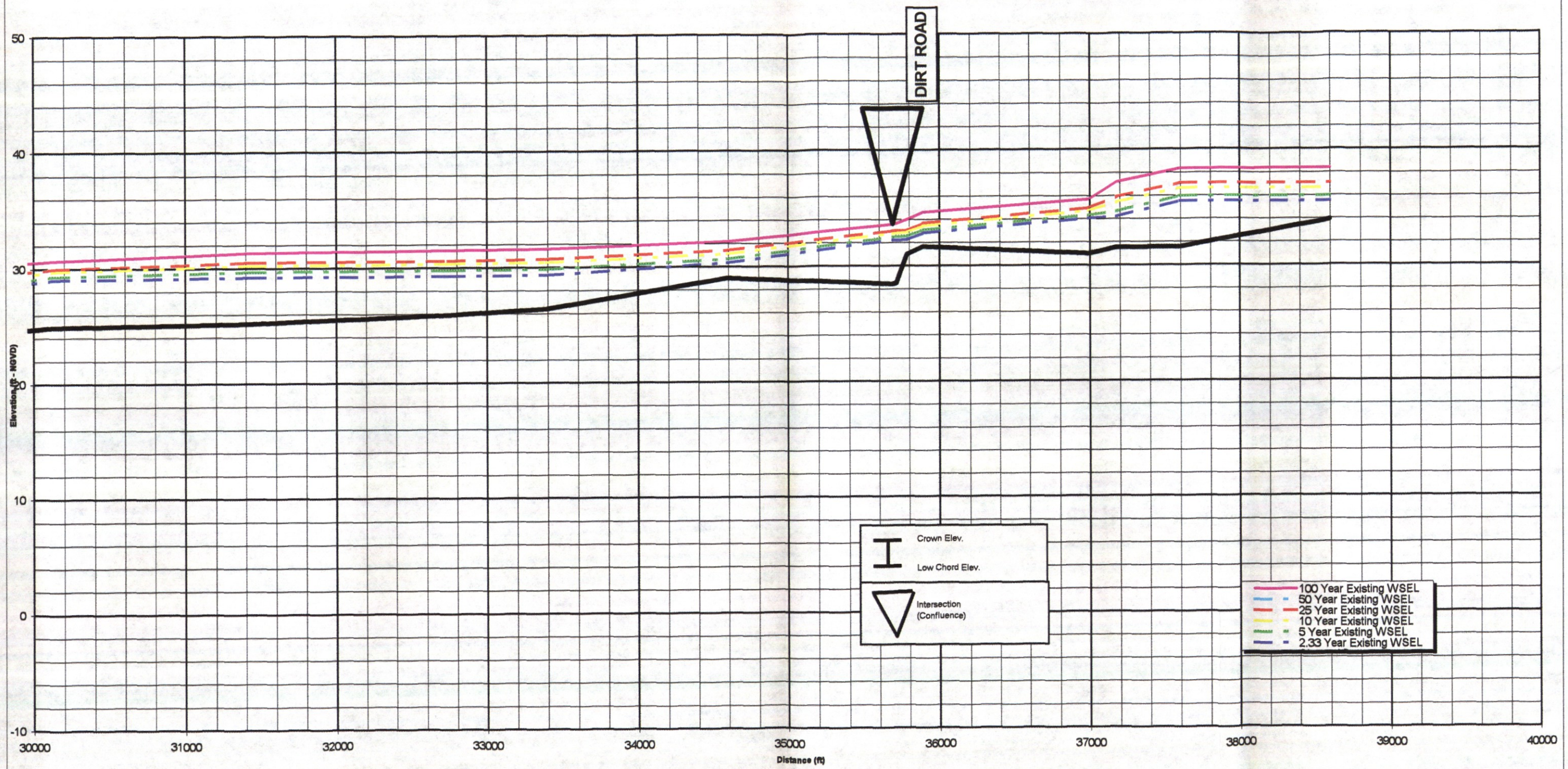
September 2000

Exhibit 6-3c

Existing Condition Model

North Archie Creek Sub-watershed/ Main Channel

Sheet 3 of 4



DELANEY CREEK AREA

Computed Water Surface Profile

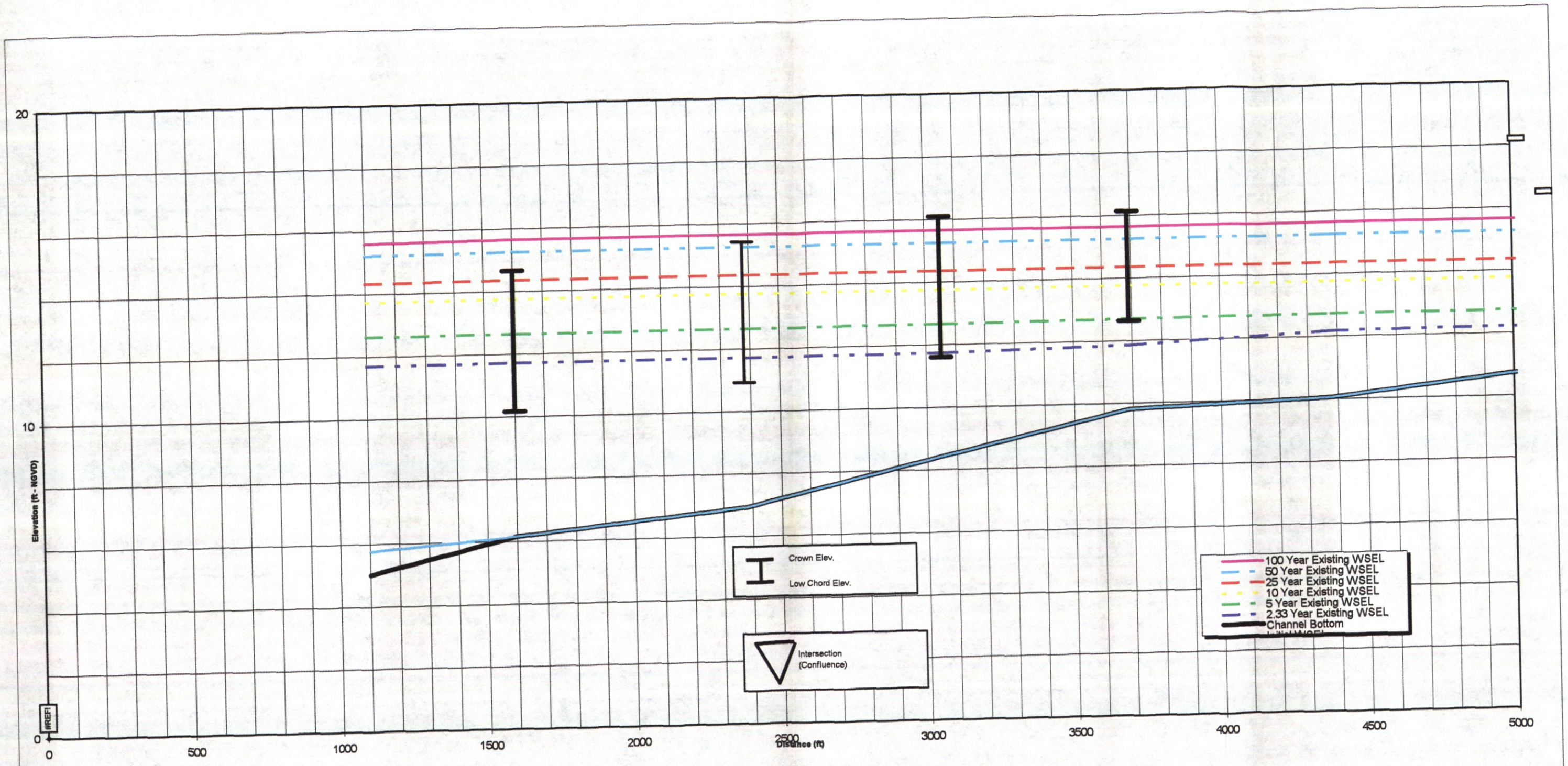
September 2000

Exhibit 6-3d

Existing Condition Model

North Archie Creek Sub-watershed/ Main Channel

Sheet 4 of 4



Delaney Creek Watershed

Computed Water Surface Profile

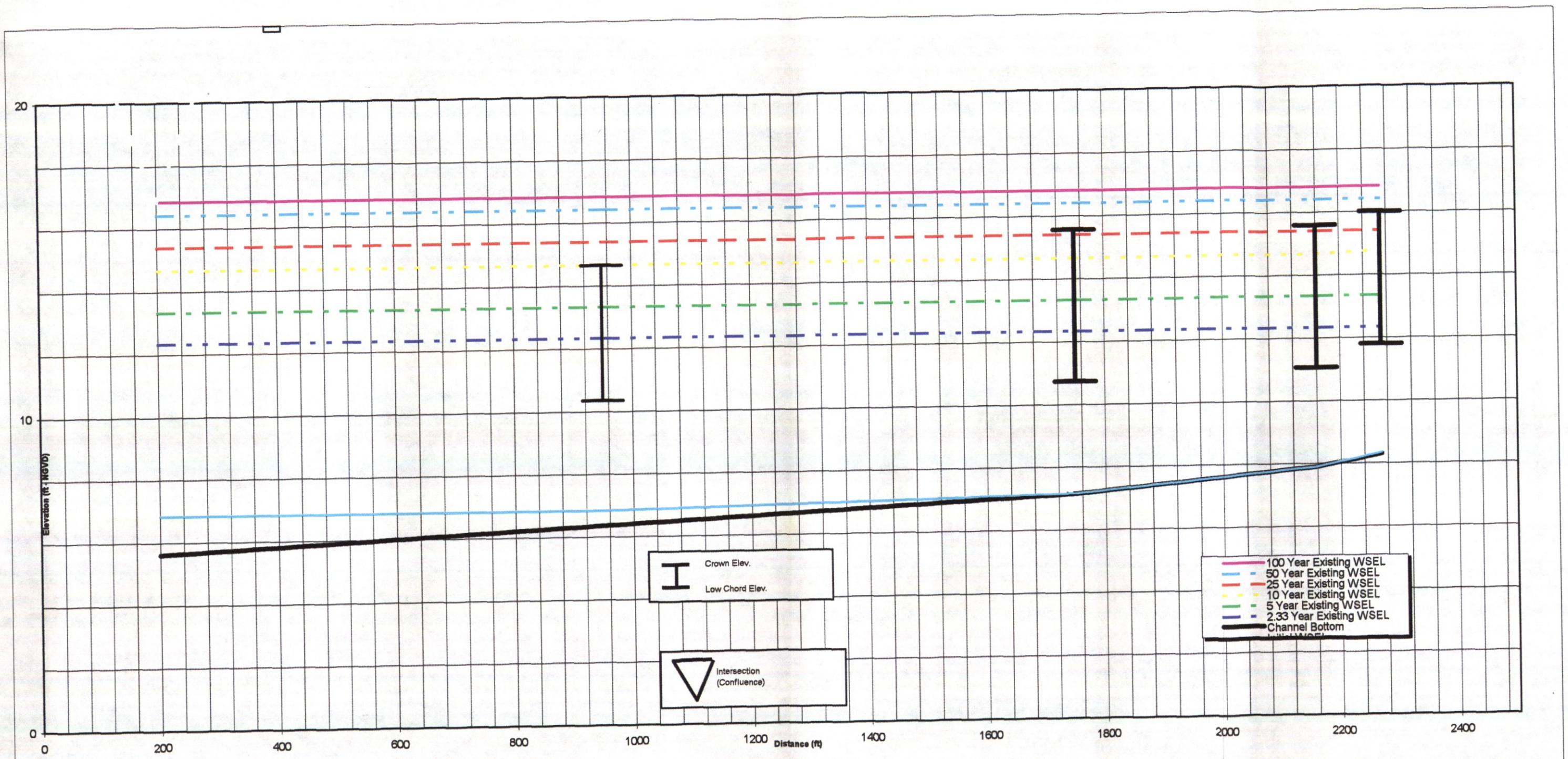
August 2000

Exhibit 6.3e

Existing Condition Profile

North Archie Creek Sub-watershed- Tributary "A"

Sheet 1 of



Delaney Creek Watershed

Computed Water Surface Profile

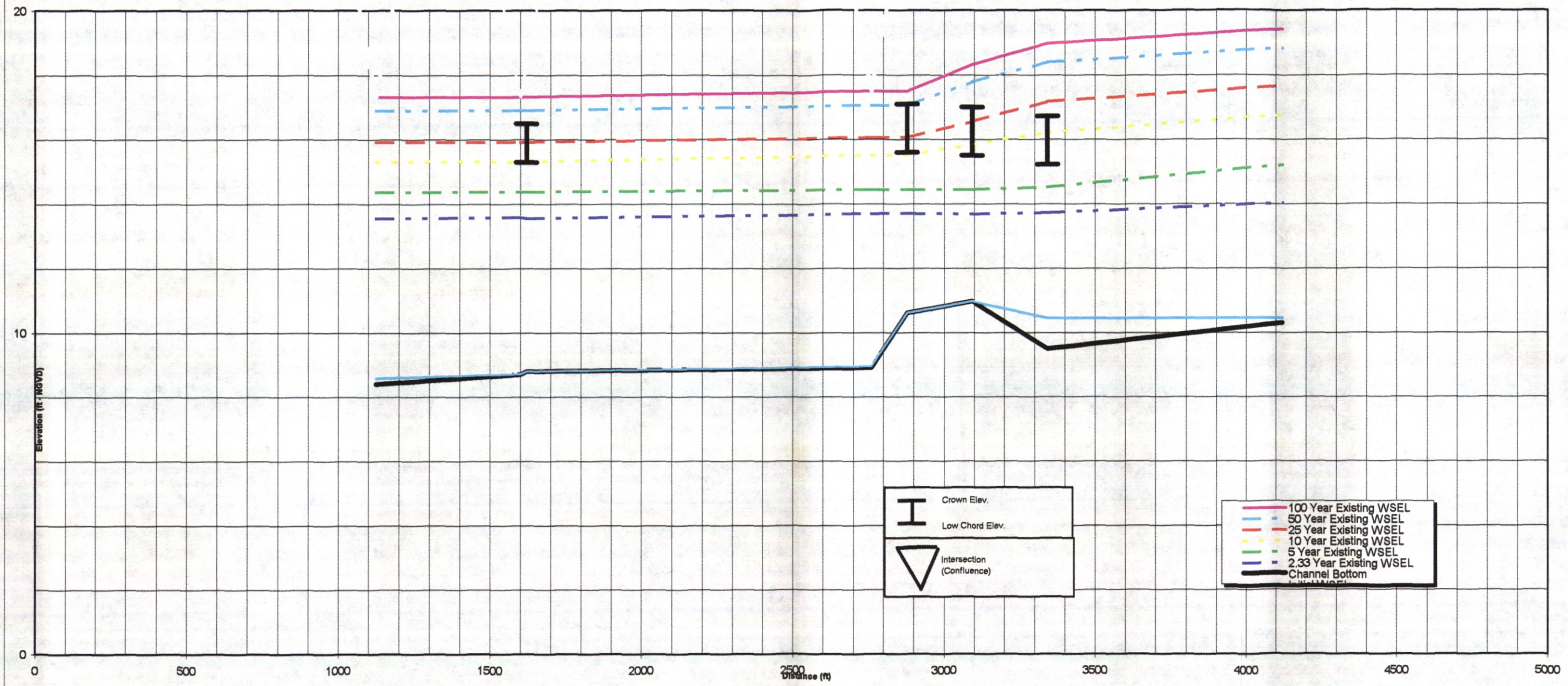
August 2000

Exhibit 6.3f

Existing Condition Profile

North Archie Creek Sub-watershed- Tributary "B"

Sheet 1 of



Delaney Creek Watershed

Computed Water Surface Profile

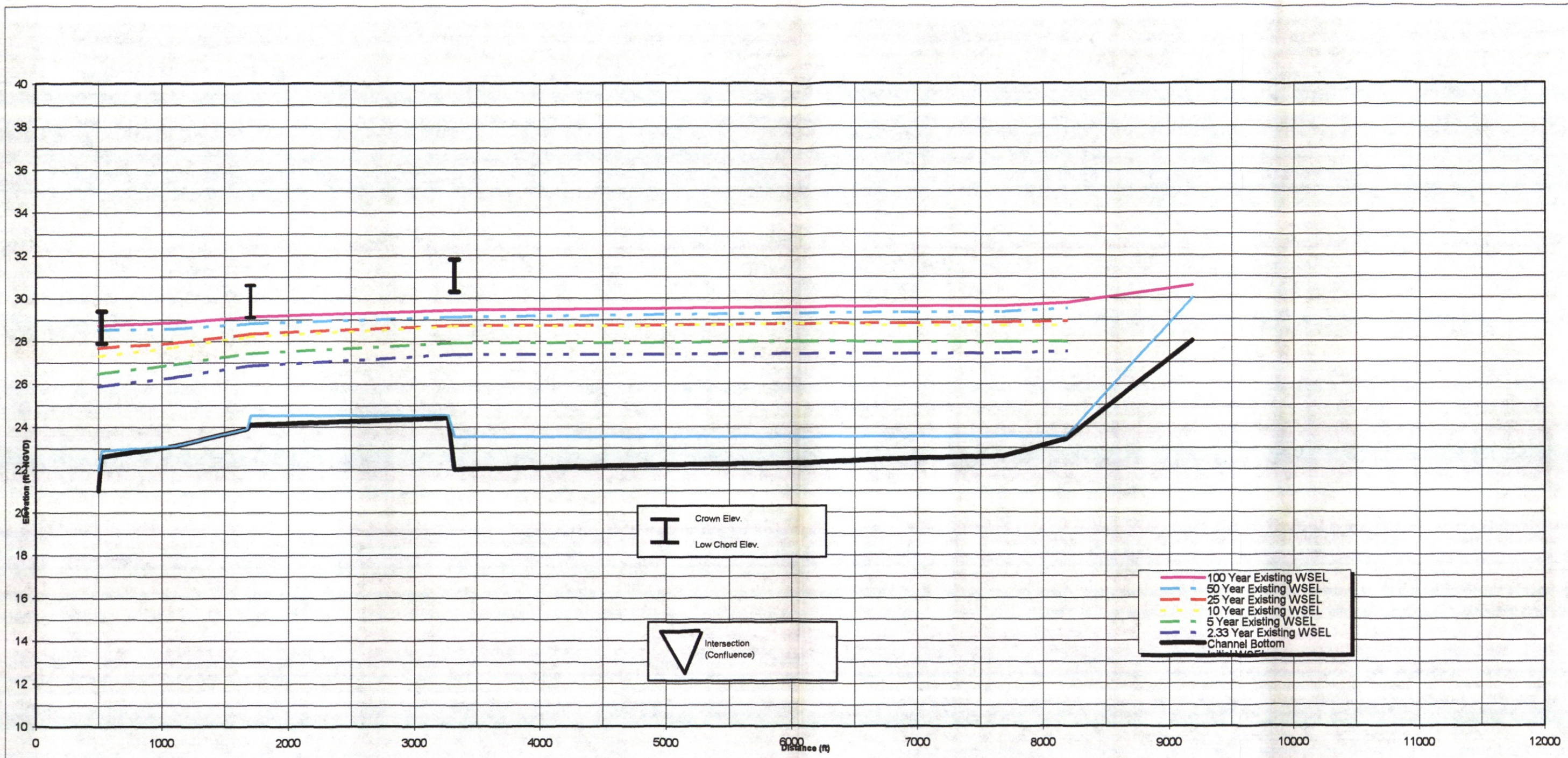
September 2000

Exhibit 6.3g

Existing Condition Profile

North Archie Creek Sub-watershed- Tributary "C"

Sheet 1 of



Delaney Creek Watershed

Computed Water Surface Profile

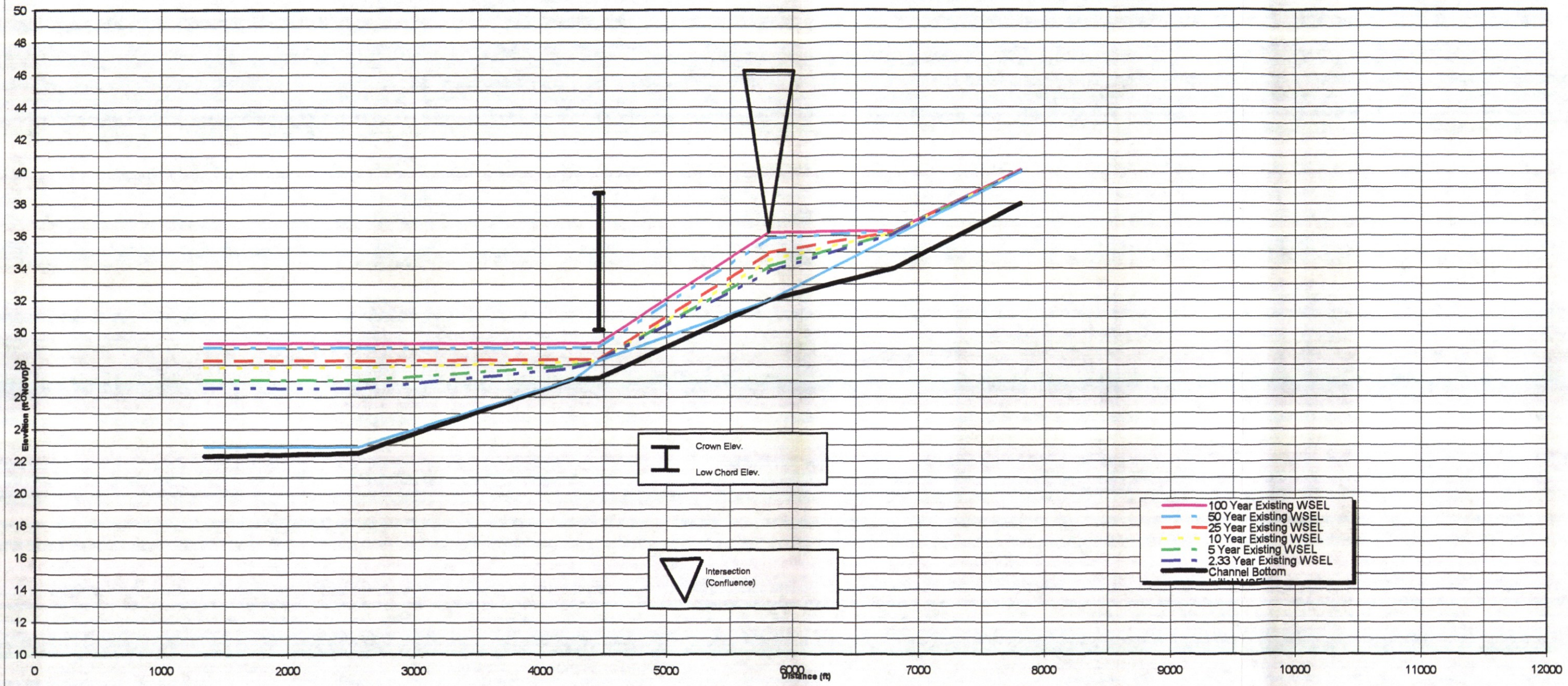
September 2000

Exhibit 6.3h

Existing Condition Profile

North Archie Creek Sub-watershed- Tributary "D"

Sheet 1 of



Delaney Creek Watershed

Computed Water Surface Profile

August 2000

Exhibit 6.3i

Existing Condition Profile

North Archie Creek Sub-watershed- Tributary "E"

Sheet 1 of

North Archie Creek Existing LOS

9/14/00

Table 6.3

Story Board	Subbasin	Water Surface Elevations 2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	Flood Level Designations 2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
	250000	26.22	26.61	27.12	28.29	29.14	29.46	E	E	E	E	E	E
	260000	2.50	2.50	2.50	2.50	2.50	2.50	A	A	A	A	A	A
	260010	2.84	3.05	3.33	3.50	3.89	4.07	A	A	A	A	A	A
8	260020	2.90	3.14	3.47	3.66	4.10	4.31	A	A	A	A	A	A
8	260030	3.05	3.33	3.68	3.89	4.34	4.56	A	A	A	A	A	A
8	260040	3.07	3.37	3.74	3.98	4.55	4.80	A	A	A	A	A	A
8	260050	3.50	3.85	4.27	4.51	5.07	5.33	E	E	E	E	E	E
8	260060	3.57	3.95	4.43	4.78	5.47	5.88	A	A	A	C	C	C
8	260065	3.57	3.95	4.43	4.78	5.56	5.99	A	A	A	A	A	A
8	260070	4.07	4.66	5.32	5.69	6.30	6.66	A	A	A	A	A	B
8	260080	4.30	4.95	5.68	6.09	6.94	7.37	A	A	A	A	B	B
8	260090	4.30	4.96	5.70	6.12	6.98	7.42	A	A	A	A	A	C
8	260100	5.23	6.09	7.04	7.54	8.53	9.04	E	E	E	E	E	E
8,15	260110	6.09	6.92	7.88	8.40	9.34	9.81	A	A	A	A	A	A
15	260120	6.27	7.12	8.10	8.62	9.57	10.05	A	A	A	A	A	A
15	260130	6.42	7.29	8.28	8.81	9.74	10.21	A	A	A	A	A	A
15	260140	6.62	7.50	8.51	9.03	9.96	10.42	A	A	A	A	A	A
15	260145	7.99	8.89	9.89	10.39	11.22	11.61	A	A	A	A	A	A
15	260160	8.00	8.91	9.95	10.47	11.34	11.76	A	A	A	A	A	A
15	260170	11.22	12.08	13.08	13.57	14.33	14.67	E	E	E	E	E	E
	260180	11.70	12.63	13.73	14.33	15.22	15.61	B	B	B	B	B	B
14	260190	11.70	12.63	13.73	14.33	15.22	15.61	A	A	B	B	B	B
20	260200	11.71	12.64	13.74	14.36	15.26	15.66	A	A	A	A	A	A
21	260201	14.08	14.09	14.11	14.36	15.26	15.66	A	A	A	A	A	A
21	260202	14.07	14.09	14.10	14.33	15.22	15.61	E	E	E	E	E	E
20,21	260210	12.13	13.07	14.24	14.90	15.78	16.15	A	A	A	A	A	A
	260220	12.18	13.17	14.49	15.22	16.23	16.65	E	E	E	E	E	E
20,21	260230	12.34	13.34	14.66	15.40	16.43	16.86	A	A	B	B	D	D
20	260235	12.99	13.72	14.89	15.59	16.60	17.03	A	A	A	A	D	D
21	260240	13.56	14.38	15.32	15.93	16.90	17.32	A	A	A	A	A	A
20	260250	14.20	14.92	15.83	16.38	17.29	17.69	A	A	A	A	A	A
	260255	14.21	14.93	15.85	16.40	17.31	17.70	E	E	E	E	E	E
	260260	15.01	15.62	16.50	17.00	17.86	18.23	E	E	E	E	E	E
20	260270	14.90	15.49	16.37	16.88	17.79	18.18	E	E	E	E	E	E

North Archie Creek Existing LOS

9/14/00

Table 6.3

Story Board	Subbasin	Water Surface Elevations						Flood Level Designations					
		2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
20,26	260275	14.90	15.49	16.37	16.88	17.79	18.18	E	E	E	E	E	E
26	260280	17.15	17.60	18.18	18.51	19.02	19.22	E	E	E	E	E	E
26,27	260290	17.24	17.76	18.48	18.92	19.68	20.01	E	E	E	E	E	E
26	260300	19.45	20.07	20.62	20.89	21.28	21.46	A	A	A	A	A	A
26	260310	19.48	20.14	20.77	21.09	21.61	21.86	A	A	A	A	A	A
20,26	260312	21.37	21.40	21.43	21.45	21.61	21.86	A	A	A	A	A	A
26	260315	20.52	21.27	22.14	22.61	23.38	23.74	E	E	E	E	E	E
26	260320	21.09	21.90	22.86	23.39	24.35	24.76	E	E	E	E	E	E
26	260330	21.11	21.94	22.97	23.54	24.61	25.08	A	A	A	A	A	A
26	260331	25.25	25.32	26.03	26.53	27.34	27.70	A	A	A	A	A	A
26	260340	24.29	25.10	26.02	26.52	27.33	27.69	A	A	A	B	B	B
26	260350	21.12	21.93	22.97	23.55	24.62	25.09	A	A	A	A	A	A
26	260360	24.96	25.76	26.75	27.27	28.11	28.48	A	A	A	A	A	A
26	260370	24.97	25.77	26.77	27.30	28.15	28.52	A	A	A	A	A	A
26	260372	30.09	30.11	30.13	30.15	30.18	30.19	A	A	A	A	A	A
26	260380	26.80	26.92	27.08	27.30	27.96	28.20	A	A	A	A	A	A
26	260390	25.03	25.83	26.83	27.35	28.21	28.56	A	A	A	A	A	A
26	260400	25.03	25.83	26.84	27.38	28.23	28.58	A	A	A	A	A	A
26	260410	27.27	27.35	27.46	27.54	27.90	28.10	A	A	A	A	A	A
20	261000	11.72	12.64	13.75	14.36	15.26	15.66	A	B	B	B	B	D
20	261010	11.72	12.65	13.75	14.36	15.26	15.66	A	B	B	B	B	D
20,21	261020	11.74	12.66	13.75	14.36	15.26	15.66	A	A	A	A	B	B
14	261021	15.47	15.48	15.50	15.51	15.53	15.66	A	A	A	A	A	B
	261030	11.86	12.71	13.77	14.36	15.26	15.65	E	E	E	E	E	E
20	261040	12.18	12.73	13.77	14.36	15.26	15.65	A	A	A	B	B	B
20	261050	12.23	12.75	13.78	14.37	15.26	15.65	A	A	A	A	B	B
20	261060	12.42	12.84	13.80	14.38	15.27	15.65	A	A	A	A	A	A
20	261061	15.76	15.79	15.84	15.87	15.93	15.96	A	A	A	A	A	A
20	261062	15.47	15.50	15.54	15.57	15.61	15.65	B	B	B	B	B	B
20	262000	12.34	13.34	14.66	15.40	16.42	16.84	A	B	D	D	D	D
20	262010	12.34	13.34	14.67	15.41	16.42	16.82	A	A	B	B	B	D
20	262020	12.34	13.35	14.68	15.41	16.42	16.82	A	B	B	B	D	D
20	262030	12.34	13.35	14.77	15.41	16.42	16.82	A	A	B	B	D	D
	263000	13.57	14.39	15.32	15.93	16.91	17.32	E	E	E	E	E	E

North Archie Creek Existing LOS

9/14/00

Table 6.3

Story Board	Subbasin	Water Surface Elevations 2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	Flood Level Designations 2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
20	263010	13.56	14.39	15.32	15.93	16.91	17.33	A	A	A	A	A	A
20	263020	13.70	14.45	15.51	16.07	17.07	17.50	A	A	A	A	A	A
20,26	263030	13.71	14.45	15.52	16.07	17.07	17.50	A	A	A	A	A	A
	263040	13.69	14.45	15.84	16.57	17.79	18.33	E	E	E	E	E	E
20	263050	13.73	14.53	16.22	17.18	18.40	18.98	A	A	A	B	D	D
20	263060	14.03	15.22	16.78	17.66	18.84	19.43	A	A	B	B	D	D
26,27	264000	19.48	20.12	20.95	21.14	21.45	21.58	A	A	A	A	A	A
27	264010	23.70	23.76	23.84	23.89	23.98	24.03	E	E	E	E	E	E
26	265000	21.04	21.22	21.44	21.60	21.94	22.11	A	A	A	A	A	A
26	265001	20.51	20.71	21.01	21.30	21.75	21.95	A	A	A	A	A	A
26	265010	21.48	21.69	21.99	22.19	22.58	22.83	A	A	A	A	B	B
26	266000	21.10	21.92	22.89	23.42	24.39	24.82	A	A	A	A	A	A
26	266010	30.13	30.16	30.20	30.23	30.27	30.29	A	A	A	A	A	A
26	266020	30.14	30.17	30.21	30.24	30.28	30.31	A	A	A	A	B	B
26	266030	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	##	##	##	###	##	#N/A
26	267000	26.84	26.97	27.15	27.31	27.82	28.04	A	A	A	A	A	A
26	267010	26.86	26.99	27.18	27.34	27.80	28.01	A	A	A	A	A	A
26	267010	26.86	26.99	27.18	27.34	27.80	28.01	E	E	E	E	E	E
26	269000	32.08	32.10	32.12	32.13	32.16	32.17	A	A	A	A	A	A
26	269010	32.43	32.75	33.27	33.62	34.07	34.14	A	A	A	A	A	A
26	270000	25.91	26.51	27.30	27.69	28.54	28.76	A	A	A	A	A	A
26	270010	26.56	27.05	27.83	28.27	29.07	29.34	A	A	A	A	B	B
	270020	27.18	27.28	27.98	28.50	29.45	29.72	E	E	E	E	E	E
32	270030	29.03	29.32	29.73	29.97	30.39	30.67	A	A	A	A	A	A
22	270035	29.08	29.33	29.73	29.97	30.39	30.67	E	E	E	E	E	E
32	270040	29.23	29.69	30.23	30.51	31.05	31.33	A	A	A	A	A	A
32	270041	29.25	29.72	30.34	30.79	31.54	31.91	A	A	A	A	A	A
32	270042	29.26	29.72	30.34	30.80	31.55	31.92	A	A	A	A	A	A
32	270043	29.32	29.53	29.99	30.32	30.91	31.23	A	A	A	A	A	A
32	270044	29.33	29.57	30.06	30.52	30.91	31.24	A	A	A	A	A	A
32	270045	29.24	29.51	29.94	30.32	30.92	31.25	A	A	A	A	A	A
32	270046	31.29	31.90	32.66	32.96	33.32	33.44	A	A	A	A	A	A

North Archie Creek Existing LOS

9/14/00

Table 6.3

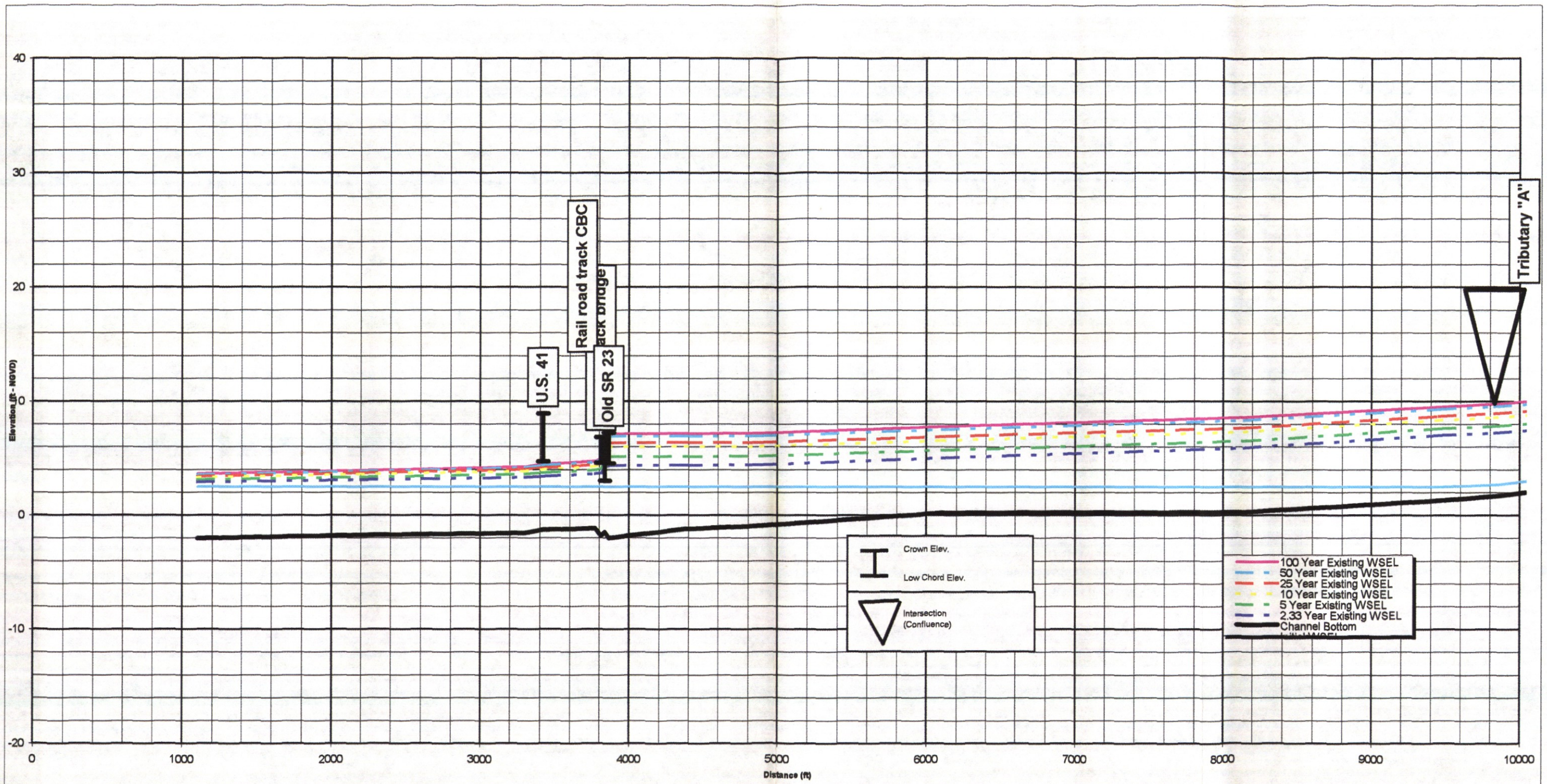
Story Board	Subbasin	Water Surface Elevations 2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	Flood Level Designations 2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
	270050	29.30	29.79	30.35	30.62	31.20	31.50	B	B	B	B	B	B
	270055	29.30	29.79	30.35	30.62	31.20	31.50	E	E	E	E	E	E
32	270060	30.54	31.25	31.90	32.28	33.05	33.43	A	A	A	A	A	A
31,32	270065	30.54	31.25	31.90	32.29	33.05	33.43	A	A	A	A	A	A
32	270070	29.34	29.83	30.42	30.71	31.29	31.60	A	A	A	A	A	A
	270080	30.34	30.67	31.10	31.43	31.93	32.20	E	E	E	E	E	E
32	270090	32.25	32.52	32.81	33.03	33.38	33.58	E	E	E	E	E	E
	270100	32.25	32.53	32.83	33.07	33.45	33.67	E	E	E	E	E	E
31,32	270110	32.28	32.57	32.91	33.08	33.75	34.04	E	E	E	E	E	E
31	270120	32.83	33.10	33.45	33.69	34.29	34.63	E	E	E	E	E	E
	270125	31.77	31.87	32.01	32.30	33.06	33.45	A	A	A	A	A	A
31,32	270130	34.06	34.34	34.70	34.95	35.44	35.69	B	B	B	B	B	B
31	270140	34.20	34.66	35.43	35.92	36.80	37.21	B	B	B	B	B	B
31	270150	35.52	35.96	36.63	37.07	37.94	38.35	B	B	B	B	B	B
37,38	270151	35.52	35.97	36.64	37.08	37.94	38.36	B	B	B	B	B	B
26	270500	25.91	26.51	27.32	27.70	28.55	28.76	E	E	E	E	E	E
	270505	26.32	26.92	27.72	27.94	28.59	28.88	E	E	E	E	E	E
26	270510	26.85	27.43	28.20	28.33	28.81	29.12	E	E	E	E	E	E
26	270515	26.32	26.92	27.72	27.94	28.59	28.88	E	E	E	E	E	E
26	270520	26.86	27.44	28.22	28.35	28.83	29.15	A	A	A	A	A	A
26	270521	26.81	27.23	27.99	27.81	28.54	28.81	A	A	A	A	A	A
26	270525	28.06	28.52	29.17	29.59	30.39	30.77	A	A	A	A	A	A
26	270530	27.37	27.92	28.68	28.73	29.12	29.44	A	A	A	A	A	A
	270540	27.38	27.93	28.70	28.75	29.14	29.45	E	E	E	E	E	E
	270570	27.39	27.94	28.71	28.75	29.23	29.53	E	E	E	E	E	E
25	270580	27.43	28.02	28.83	28.82	29.31	29.60	A	A	A	A	A	A
25	270585	27.41	27.96	28.73	28.82	29.31	29.60	E	E	E	E	E	E
25	270590	27.42	27.96	28.72	28.85	29.34	29.62	E	E	E	E	E	E
31	270592	29.64	29.68	29.73	29.75	29.81	29.83	E	E	E	E	E	E
31	270594	29.56	29.59	29.63	29.66	29.72	29.74	E	E	E	E	E	E
31	270596	29.66	29.70	29.75	29.78	29.84	29.86	E	E	E	E	E	E
25,31	270610	28.95	28.98	29.03	29.05	29.34	29.63	E	E	E	E	E	E
25,31	270620	27.43	27.96	28.72	28.88	29.37	29.64	E	E	E	E	E	E
30,31	270630	27.52	27.97	28.72	28.93	29.53	29.78	A	A	A	A	A	A

North Archie Creek Existing LOS

9/14/00

Table 6.3

Story Board	Subbasin	Water Surface Elevations						Flood Level Designations					
		2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr	100-yr
30,31	270640	30.26	30.32	30.41	30.46	30.56	30.60	E	E	E	E	E	E
26,32	272000	26.53	27.05	27.84	28.28	29.07	29.35	A	A	A	A	A	A
	272010	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	E	E	E	E	E	E
32	272020	27.81	27.98	28.20	28.34	29.07	29.35	A	A	A	A	A	A
27,33	272030	28.27	28.27	28.27	28.35	29.08	29.36	A	A	A	A	A	A
27,33	272035	33.00	33.00	33.00	33.00	33.00	33.00	E	E	E	E	E	E
33	272036	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	E	E	E	E	E	E
33	272040	33.81	34.13	34.51	34.98	35.88	36.25	E	E	E	E	E	E
33	272050	36.16	36.19	36.23	36.26	36.31	36.34	A	A	A	A	A	A
33	272060	38.06	38.07	38.08	38.09	38.11	38.12	A	A	A	A	A	A
33	272070	40.06	40.07	40.09	40.10	40.11	40.12	A	A	A	A	A	A
33	272080	40.05	40.06	40.10	40.19	40.34	40.40	A	A	A	A	A	A
32	273000	29.03	29.32	29.74	29.98	30.42	30.68	A	A	A	A	A	A
32	273010	32.22	32.52	32.94	33.17	33.61	33.81	A	A	A	A	A	A
32	273015	33.75	33.90	34.13	34.29	34.61	34.77	A	A	A	A	A	A
32	273020	34.24	34.56	34.91	35.09	35.40	35.55	A	A	A	A	A	A
32	273021	35.02	35.03	35.13	35.47	36.29	36.70	A	A	A	A	A	A
32	273025	34.45	34.75	35.09	35.28	35.61	35.76	A	A	A	A	A	A
32	273030	34.26	34.60	35.13	35.47	36.28	36.70	A	A	A	A	A	A
32	273040	34.24	34.60	35.13	35.47	36.29	36.71	A	A	A	A	A	A
32	273500	34.59	34.88	35.30	35.58	36.14	36.41	A	A	C	C	C	C
33	273510	34.71	34.89	35.31	35.60	36.17	36.45	A	A	A	A	A	A
33	273520	34.72	34.89	35.31	35.60	36.17	36.45	A	A	A	A	A	A
33	273525	40.06	40.07	40.10	40.19	40.35	40.40	B	B	B	B	B	B
33	273530	39.62	40.04	40.11	40.21	40.39	40.45	C	C	C	C	C	C
33	273800	34.45	34.75	35.10	35.28	35.61	35.76	A	A	A	A	A	A
33	273810	34.60	34.89	35.33	35.62	36.20	36.48	A	A	A	A	A	A
33	273820	40.13	40.16	40.19	40.21	40.24	40.26	D	D	D	D	D	D
31	274000	31.67	31.76	31.91	32.29	33.06	33.44	D	D	D	D	D	D
31	274010	31.68	31.76	31.91	32.29	33.06	33.44	A	A	A	B	B	B
31	274025	31.72	31.81	31.94	32.29	33.06	33.44	E	E	E	E	E	E
31	274030	31.75	31.85	31.99	32.30	33.06	33.44	A	A	A	A	B	B
25	276000	27.38	27.93	28.70	28.75	29.14	29.45	A	A	A	A	A	A
25,26	276010	31.41	31.65	31.94	32.12	32.44	32.60	E	E	E	E	E	E



DELANEY CREEK AREA

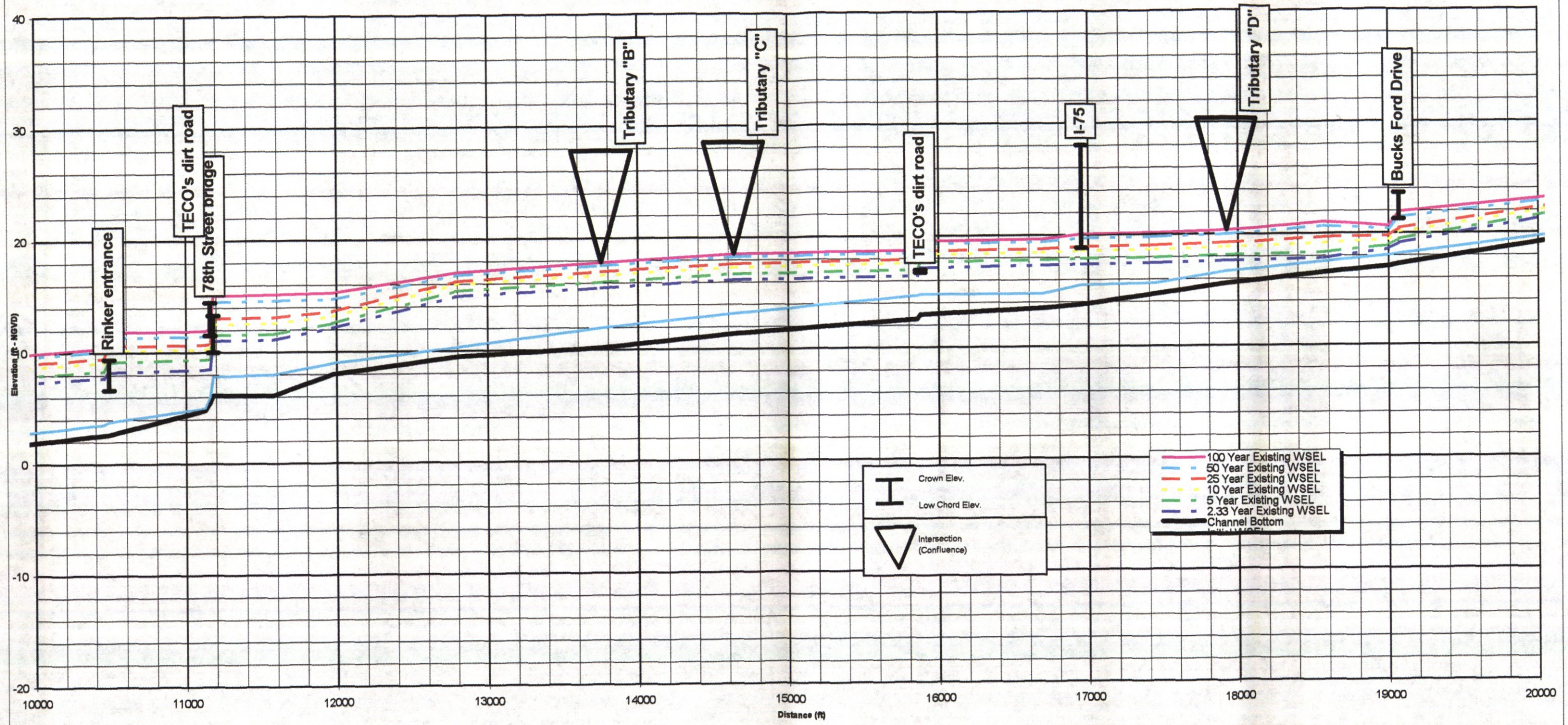
Computed Water Surface Profile

September 2000

Exhibit 6.4a

Existing Condition Model

Archie Creek Sub-watershed/Main Channel



DELANEY CREEK AREA

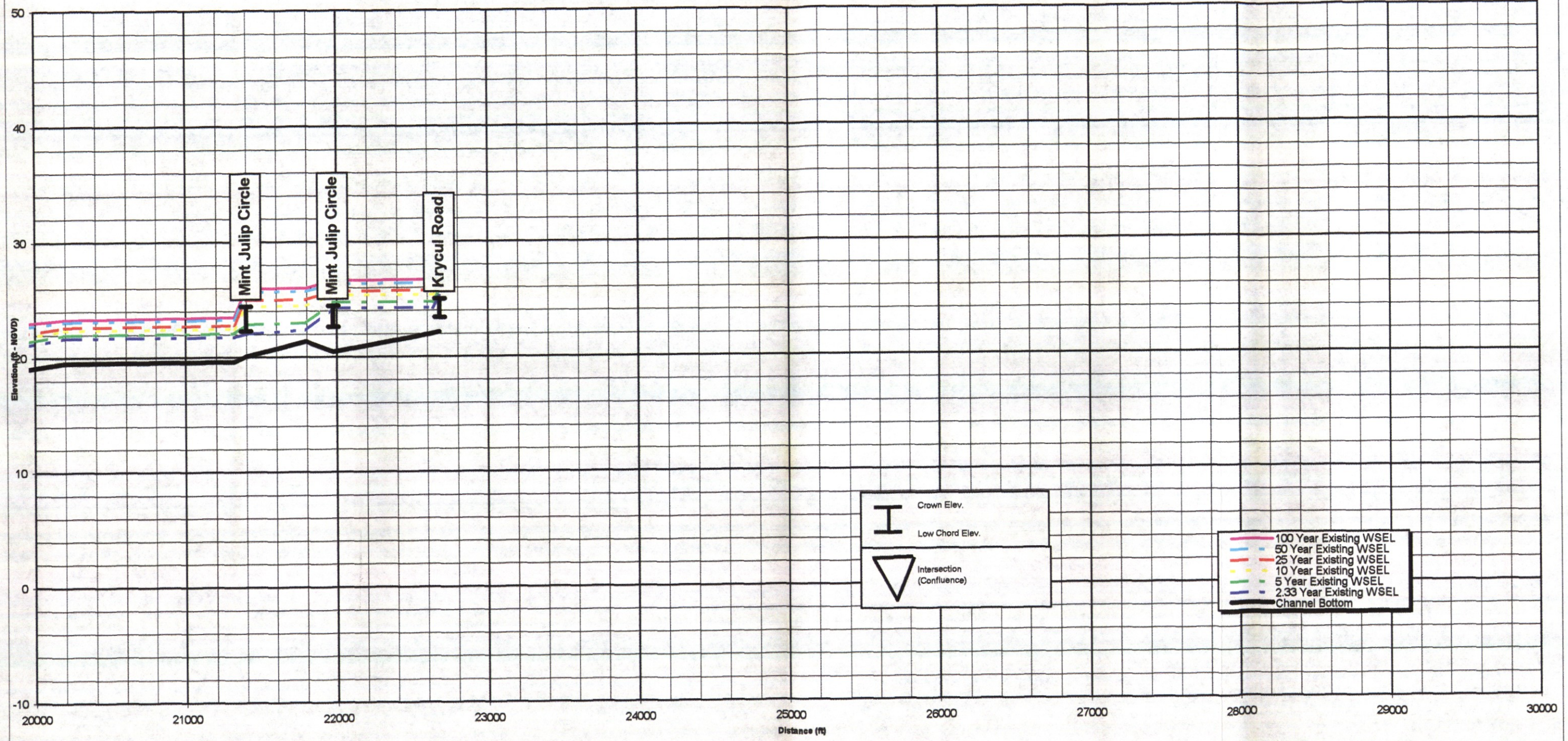
Computed Water Surface Profile

September 2000

Exhibit 6.4b

Existing Condition Model

Archie Creek Sub-watershed/Main Channel



DELANEY CREEK AREA

Computed Water Surface Profile

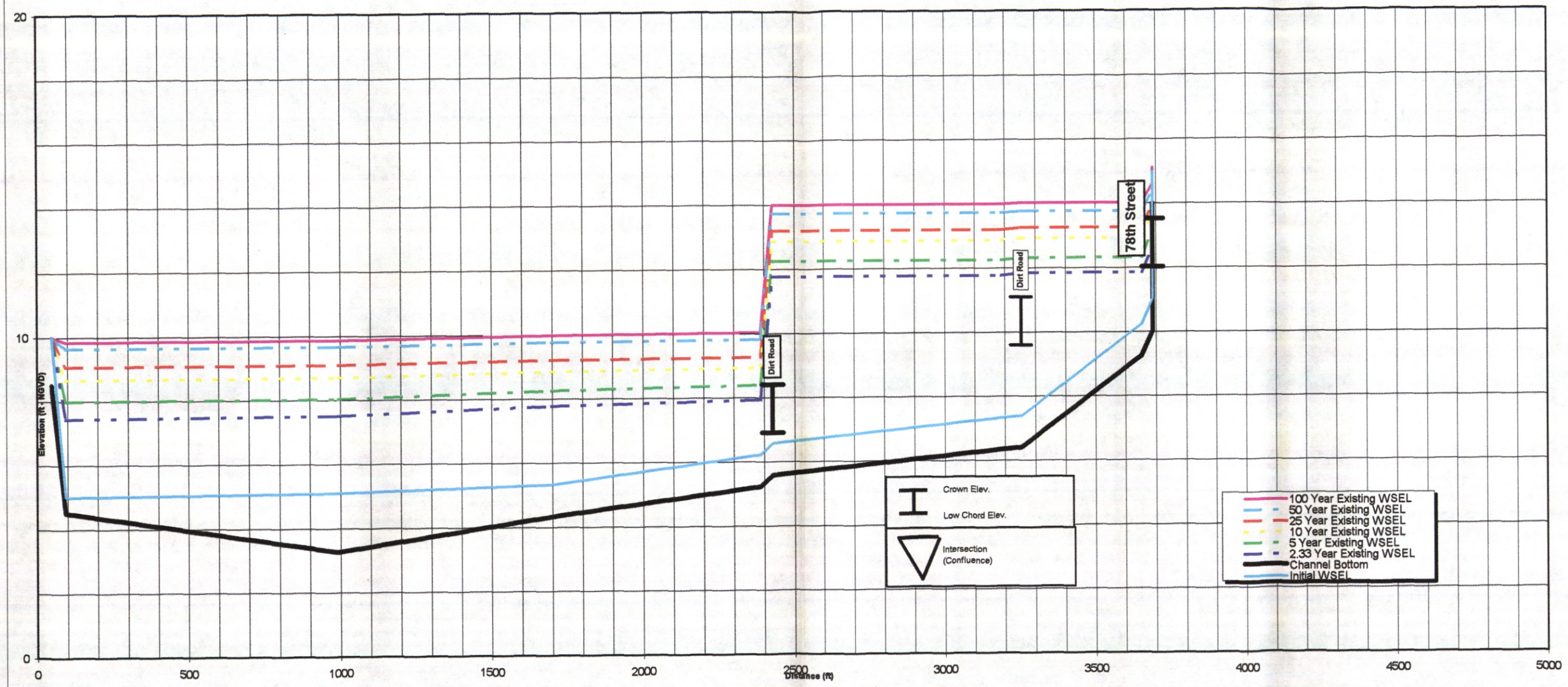
September 2000

Exhibit 6.4c

Existing Condition Model

Archie Creek Sub-watershed/Main Channel

Sheet 3 of 3



DELANEY CREEK WATERSHED

Computed Water Surface Profile

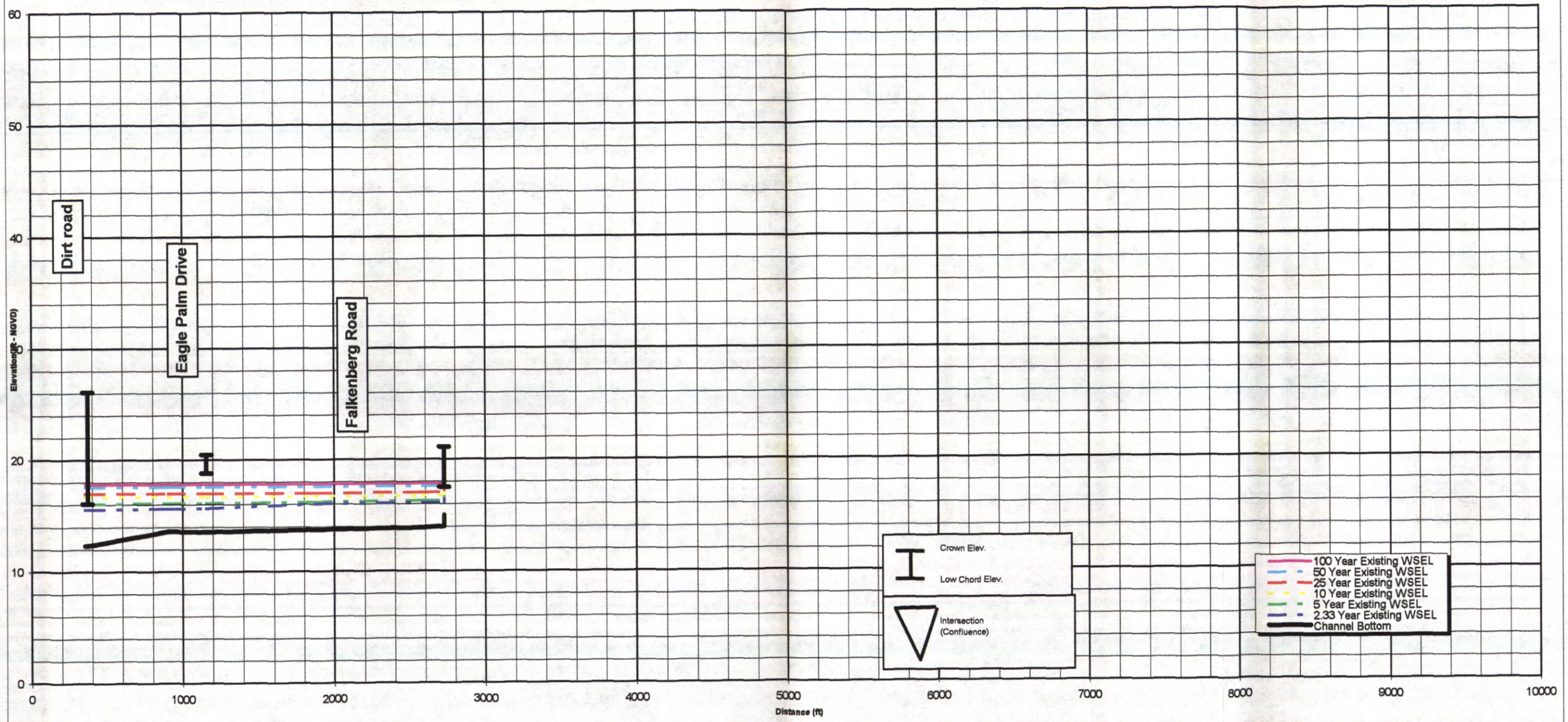
July 2000

Exhibit 6.4d

Existing Condition Profile

Archie Creek Sub-watershed- Tributary "A"

Sheet 1 of



DELANEY CREEK AREA WATERSHED

Computed Water Surface Profile

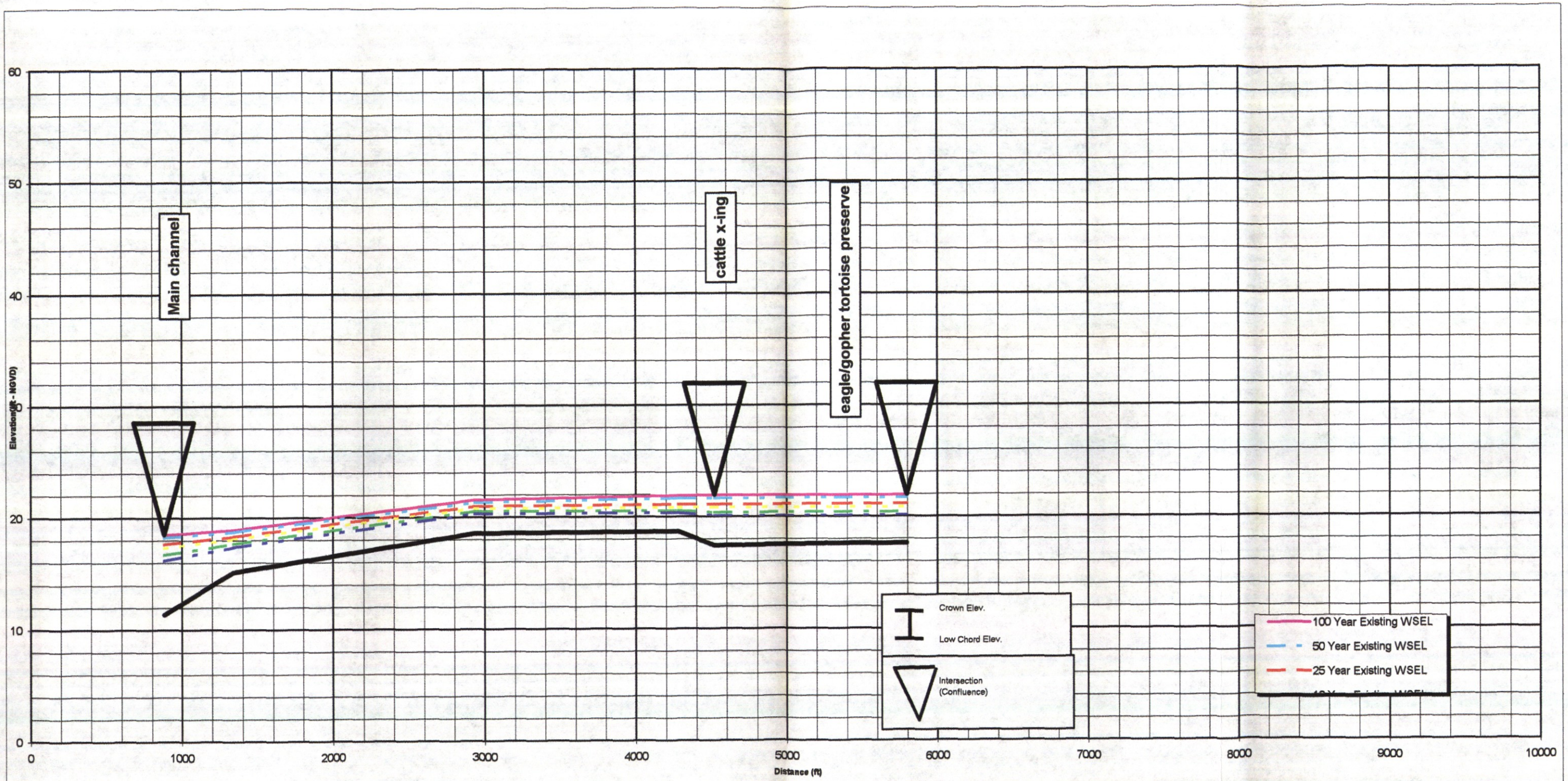
October 2000

Exhibit 6-4e

Existing Condition Profile

Archie Creek Sub-watershed/ Tributary "B"

Sheet 1 of



DELANEY CREEK AREA WATERSHED

Computed Water Surface Profile

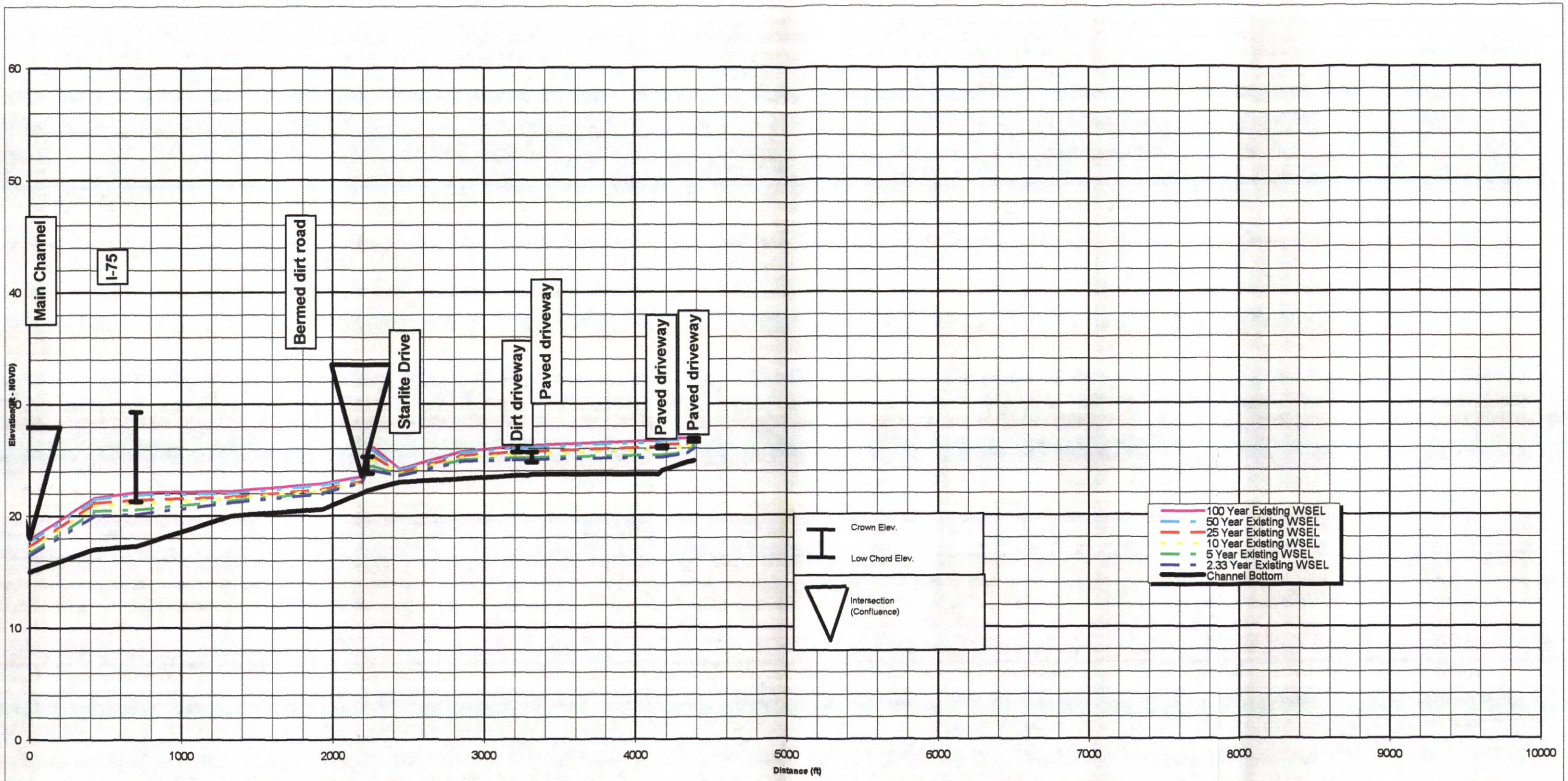
October 2000

Exhibit 6-4f

Existing Condition Profile

Archie Creek Sub-watershed/ Tributary "C"

Sheet 1 of



DELANEY CREEK AREA WATERSHED

Computed Water Surface Profile

September 2000

Exhibit 6-4g

Existing Condition Profile

Archie Creek Sub-watershed/ Tributary "F"

Sheet 1 of

Archie Creek Existing LOS

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Table 6.4

Archie Creek Area (Existing Conditions) Level of Service Analysis											Flood Level Designations				
		Landmark Elevations			Water Surface Elevations										
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr
9	280006	5.25	5.10	5.54	2.50	2.50	2.50	2.50	2.50	2.50	A	A	A	A	A
9	280007	6.05	6.50	7.00	2.91	3.11	3.32	3.41	3.57	3.63	A	A	A	A	A
9	280008	6.45	6.50	7.00	3.11	3.36	3.61	3.72	3.89	3.95	A	A	A	A	A
9	280010	6.75	7.20	8.20	3.32	3.61	3.89	4.01	4.19	4.26	A	A	A	A	A
9	280015	6.75	10.50	11.00	3.40	3.72	4.03	4.17	4.41	4.50	A	A	A	A	A
9	280020	6.75	11.00	12.00	3.64	3.98	4.29	4.43	4.67	4.76	A	A	A	A	A
9	280030	10.10	11.00	11.64	3.74	4.09	4.48	4.65	4.91	5.01	A	A	A	A	A
9	280040	11.55	12.10	12.60	4.25	4.91	5.64	5.95	6.46	6.66	A	A	A	A	A
9	280050	11.25	11.80	12.30	4.38	5.16	6.01	6.37	6.94	7.16	A	A	A	A	A
8,9	280055	13.30	14.50	14.59	4.40	5.17	6.03	6.38	6.96	7.18	A	A	A	A	A
8,9	280060	11.95	12.50	13.00	4.43	5.20	6.05	6.40	6.98	7.20	A	A	A	A	A
8	280065	17.35	17.60	18.10	5.05	5.73	6.56	6.93	7.54	7.78	A	A	A	A	A
15	280066	7.45	7.70	8.20	1.40	1.49	1.63	1.72	1.90	1.99	A	A	A	A	A
16	280067	17.35	17.60	18.10	1.31	1.38	1.48	1.55	1.69	1.76	A	A	A	A	A
16	280068	15.05	15.30	14.80	1.28	1.34	1.44	1.50	1.62	1.69	A	A	A	A	A
16	280069	12.55	12.80	13.30	1.10	1.12	1.15	1.17	1.22	1.24	A	A	A	A	A
16	280070	15.05	15.30	15.80	2.59	2.94	3.47	3.82	4.52	4.87	A	A	A	A	A
16	280071	17.75	18.00	18.50	1.34	1.42	1.53	1.61	1.76	1.83	A	A	A	A	A
17/18	280072	25.50	26.00	27.00	1.11	1.13	1.17	1.19	1.24	1.26	A	A	A	A	A
9,16	280075	16.85	1000.00	999.50	5.91	6.54	7.33	7.69	8.33	8.61	A	A	A	A	A
15	280080	6.25	999.50	1000.00	3.00	3.51	4.28	4.79	5.82	6.34	A	A	A	A	A
8,15	280085	13.75	14.00	1000.50	7.03	7.61	8.35	8.71	9.31	9.53	A	A	A	A	A
15,16	280086	8.55	999.50	1000.00	7.24	7.83	8.57	8.93	9.54	9.77	A	A	B	B	B
15	280088	9.45	10.60	9.80	7.77	8.38	9.12	9.48	10.12	10.38	A	A	A	B	D
15	280089	12.25	12.90	13.40	8.26	9.19	10.16	10.60	11.36	11.84	A	A	A	A	A
16	280100	10.85	11.10	1000.00	8.77	8.83	8.91	8.97	9.31	9.54	A	A	A	A	A
15	280105	9.85	11.30	29.60	7.24	7.83	8.57	8.93	9.54	9.78	A	A	A	A	A
15	280110	13.55	999.50	1000.00	9.10	9.10	9.10	9.15	9.32	9.54	A	A	A	A	A
15	280115	10.25	11.00	1000.00	7.32	7.90	8.62	8.97	9.58	9.82	A	A	A	A	A
15	280120	13.05	12.50	13.00	7.70	8.20	8.82	9.14	9.74	9.98	A	A	A	A	A
15	280128	10.55	12.30	13.39	7.91	8.38	8.94	9.24	9.82	10.05	A	A	A	A	A
15	280140	999.25	999.50	1000.00	10.94	11.37	11.91	12.24	12.82	13.07	E	E	E	E	E
15	280143	999.25	999.50	1000.00	11.17	11.53	12.01	12.33	12.90	13.15	E	E	E	E	E
15	280145	13.45	999.50	1000.00	11.19	11.55	12.02	12.34	12.91	13.15	A	A	A	A	A
21	280150	12.25	13.30	1000.50	12.24	12.78	13.36	13.62	14.02	14.21	A	B	C	C	C
21	280155	999.25	999.50	999.00	15.35	15.49	15.68	15.80	16.01	16.11	E	E	E	E	E
21	280160	18.27	999.50	1000.00	15.83	16.02	16.27	16.42	16.69	16.81	A	A	A	A	A

Archie Creek Existing LOS

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Table 6.4

Archie Creek Area (Existing Conditions) Level of Service Analysis											Flood Level Designations				
		Landmark Elevations			Water Surface Elevations										
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr
15	280300	14.25	999.50	13.50	8.47	9.35	10.28	10.71	11.46	11.95	A	A	A	A	A
23	280305	12.25	999.50	14.00	8.56	9.42	10.35	10.79	11.62	12.18	A	A	A	A	A
22	280310	13.65	999.50	1000.00	10.24	10.31	10.43	10.82	11.63	12.18	A	A	A	A	A
22	280312	999.25	999.50	1000.00	17.71	17.87	18.08	18.21	18.45	18.57	E	E	E	E	E
22	280313	999.25	999.50	1000.00	18.00	18.00	18.16	18.29	18.53	18.65	E	E	E	E	E
22	280314	999.25	999.50	1000.00	18.50	18.50	18.50	18.50	18.56	18.68	E	E	E	E	E
22	280315	14.75	999.50	15.00	11.32	11.55	11.87	12.03	12.28	12.40	A	A	A	A	A
22	280317	999.25	999.50	1000.00	17.56	17.69	17.85	17.96	18.15	18.25	E	E	E	E	E
22	280320	14.55	999.50	16.00	13.11	13.48	13.80	13.97	14.25	14.37	A	A	A	A	A
22	280325	14.85	999.50	1000.00	13.64	13.90	14.18	14.34	14.59	14.71	A	A	A	A	A
22	280330	15.25	999.50	1000.00	13.75	13.99	14.27	14.42	14.67	14.79	A	A	A	A	A
22	280333	999.25	999.50	1000.00	18.74	18.89	19.10	19.24	19.48	19.61	E	E	E	E	E
16,22	280335	15.65	18.10	1000.00	15.24	15.62	16.03	16.27	16.69	16.87	A	A	B	B	B
22	280340	999.25	999.50	22.00	18.90	19.08	19.36	19.54	19.70	19.76	A	A	A	A	A
21	280350	14.05	999.50	1000.00	10.91	11.31	11.90	12.25	13.15	13.56	A	A	A	A	A
22	280357	999.25	999.50	1000.00	9.88	10.94	12.27	13.13	14.65	15.21	E	E	E	E	E
21	280360	13.15	999.50	18.60	9.88	10.94	12.27	13.13	14.65	15.21	A	A	A	A	B
21	280365	12.55	999.50	15.50	10.07	10.35	10.77	11.80	13.12	13.48	A	A	A	A	B
21	280370	14.05	999.50	1000.00	10.93	11.65	12.58	13.13	14.63	15.19	A	A	A	A	B
21	280373	16.65	999.50	1000.00	20.50	20.50	20.50	20.50	20.51	20.56	B	B	B	B	B
21	280375	999.25	999.50	1000.00	12.16	12.57	13.19	13.62	14.73	15.30	E	E	E	E	E
21	280380	999.25	999.50	1000.00	14.91	15.40	15.97	16.25	16.77	17.01	E	E	E	E	E
21	280385	999.25	999.50	1000.00	15.58	16.10	16.70	17.01	17.56	17.82	E	E	E	E	E
22	280390	999.25	999.50	1000.00	16.23	16.74	17.34	17.67	18.27	18.52	E	E	E	E	E
22	280392	999.25	999.50	1000.00	16.46	16.99	17.60	17.93	18.50	18.74	E	E	E	E	E
22	280394	999.25	999.50	1000.00	16.84	17.36	17.96	18.28	18.84	19.07	E	E	E	E	E
22	280397	17.15	999.50	1000.00	17.13	17.67	18.32	18.66	19.26	19.50	A	B	B	B	B
22	280398	26.25	999.50	1000.00	17.32	17.81	18.45	18.78	19.38	19.62	A	A	A	A	A
21	280400	16.68	999.50	21.50	15.59	16.11	16.71	17.02	17.57	17.82	A	A	B	B	B
21	280405	999.25	999.50	1000.00	15.60	16.12	16.71	17.02	17.57	17.82	E	E	E	E	E
21	280410	999.25	999.50	1000.00	18.68	18.76	18.87	18.93	19.06	19.12	E	E	E	E	E
21	280415	21.55	999.50	1000.00	15.67	16.14	16.72	17.02	17.57	17.83	A	A	A	A	A
21	280420	22.25	999.50	1000.00	16.64	16.66	16.72	17.02	17.57	17.83	A	A	A	A	A
21	280425	21.25	999.50	1000.00	16.03	16.23	16.72	17.02	17.57	17.83	A	A	A	A	A
21	280430	21.25	999.50	1000.00	16.15	16.32	16.76	17.06	17.62	17.86	A	A	A	A	A
21	280435	999.25	999.50	1000.00	19.01	19.21	19.49	19.65	19.96	20.09	E	E	E	E	E
22,21	280440	999.25	999.50	1000.00	19.24	19.41	19.66	19.82	20.13	20.27	E	E	E	E	E
27	280445	28.85	999.50	1000.00	20.01	20.12	20.27	20.37	20.56	20.65	A	A	A	A	A

Archie Creek Existing LOS

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Table 6.4

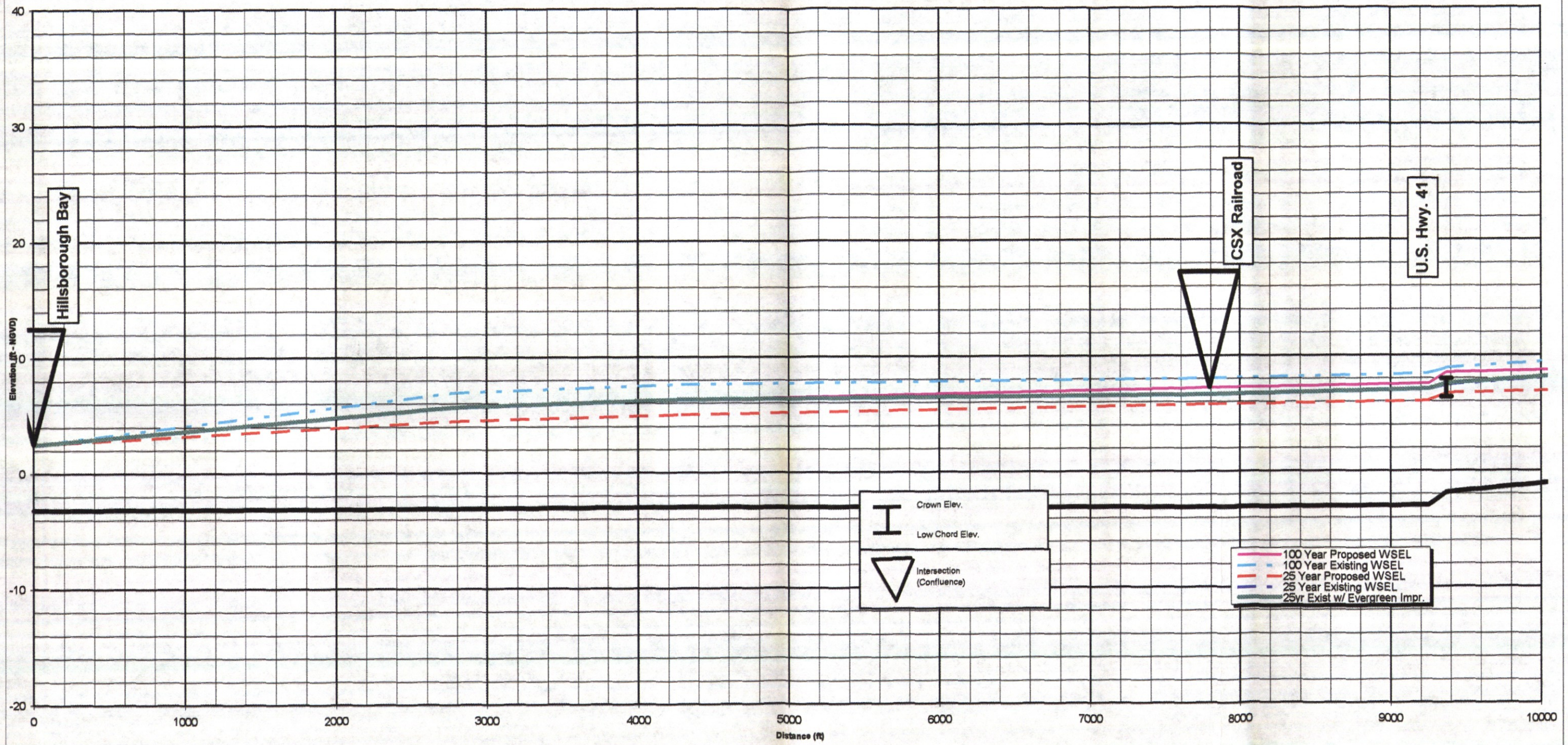
Archie Creek Area (Existing Conditions) Level of Service Analysis											Flood Level Designations				
		Landmark Elevations			Water Surface Elevations										
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr
22	280500	999.25	999.50	1000.00	17.42	17.72	18.13	18.36	18.77	18.96	E	E	E	E	E
22	280515	999.25	999.50	1000.00	20.35	20.57	20.84	21.01	21.33	21.57	E	E	E	E	E
22	280520	999.25	999.50	1000.00	20.36	20.57	20.85	21.12	21.66	21.91	E	E	E	E	E
22	280525	999.25	999.50	1000.00	20.11	20.41	20.86	21.14	21.68	21.94	E	E	E	E	E
22	280530	999.25	999.50	1000.00	20.11	20.42	20.87	21.16	21.70	21.95	E	E	E	E	E
22	280535	999.25	999.50	1000.00	20.12	20.42	20.87	21.16	21.71	21.96	E	E	E	E	E
28	290000	28.25	999.50	1000.00	17.38	17.89	18.59	18.96	19.66	19.99	A	A	A	A	A
28	290003	23.95	999.50	1000.00	17.47	17.97	18.67	19.05	19.75	20.08	A	A	A	A	A
28	290010	22.65	999.50	1000.00	17.80	18.32	19.14	19.68	20.66	21.01	A	A	A	A	A
28	290015	999.25	22.50	24.00	23.40	23.40	23.40	23.40	23.40	23.41	C	C	C	C	C
28	290020	999.25	999.50	1000.00	23.60	23.60	23.61	23.67	23.78	23.84	E	E	E	E	E
28	290025	22.75	999.50	24.40	21.71	22.02	22.41	22.62	22.95	23.08	A	A	A	A	B
28	290030	999.25	999.50	1000.00	21.77	22.12	22.52	22.73	23.05	23.19	E	E	E	E	E
28	290035	26.05	999.50	25.00	26.00	26.00	26.00	26.02	26.13	26.18	D	D	D	D	D
34	290038	24.25	999.50	26.00	22.06	23.01	24.56	25.51	26.82	27.35	A	A	B	B	D
34	290045	24.65	999.50	28.00	24.30	24.66	25.27	25.76	26.98	27.49	A	B	B	B	B
34	290055	25.25	999.50	25.00	25.23	25.68	26.23	26.57	27.27	27.74	D	D	D	D	D
28	290100	22.85	999.50	23.00	19.87	20.14	20.47	20.66	21.01	21.16	A	A	A	A	A
28	290105	22.75	999.50	24.00	21.67	21.93	22.27	22.46	22.79	22.94	A	A	A	A	B
28	290110	28.25	999.50	1000.00	20.60	20.72	20.93	21.05	21.28	21.38	A	A	A	A	A
28	290115	28.25	999.50	1000.00	22.10	22.14	22.35	22.48	22.72	22.82	A	A	A	A	A
27,28	290200	23.75	999.50	24.00	21.40	21.72	22.19	22.49	23.04	23.31	A	A	A	A	A
27	290225	24.35	999.50	1000.00	24.09	24.18	24.29	24.35	24.45	24.50	A	A	A	B	B
27	290235	25.85	999.50	1000.00	24.91	25.01	25.14	25.22	25.36	25.43	A	A	A	A	A
27	290250	24.25	999.50	1000.00	22.43	22.57	22.77	22.90	23.16	23.36	A	A	A	A	A
28	290305	28.25	999.50	29.00	23.17	23.61	24.27	24.71	25.68	26.18	A	A	A	A	A
28	290306	24.25	999.50	25.00	23.53	23.89	24.39	24.70	25.28	25.56	A	A	B	B	D
34	290310	25.25	999.50	25.00	27.46	27.57	27.72	27.82	27.99	28.08	D	D	D	D	D
33	290315	999.25	999.50	1000.00	26.00	26.10	26.24	26.33	26.50	26.58	E	E	E	E	E
33	290320	39.25	999.50	37.00	27.00	27.02	27.14	27.21	27.35	27.42	A	A	A	A	A
33	290325	41.65	999.50	43.00	26.25	26.43	26.89	27.30	27.93	28.16	A	A	A	A	A
27	290330	999.25	999.50	32.00	24.64	25.71	26.87	27.28	27.91	28.15	A	A	A	A	A
27	290340	28.65	999.50	32.00	26.25	26.47	26.89	27.28	27.92	28.15	A	A	A	A	A
27	290350	999.25	999.50	33.00	27.99	28.15	28.40	28.57	28.89	29.05	A	A	A	A	A
27/33	290360	35.35	36.50	37.10	27.47	27.71	28.02	28.20	28.51	28.65	A	A	A	A	A
33	290370	37.65	37.50	39.00	27.64	27.88	28.19	28.37	28.67	28.81	A	A	A	A	A
21	290500	28.75	999.50	1000.00	16.44	16.66	17.02	17.26	17.72	17.94	A	A	A	A	A
27	290570	28.45	999.50	1000.00	20.08	20.48	20.93	21.18	21.52	21.64	A	A	A	A	A
27	290572	29.55	999.50	1000.00	25.50	25.50	25.54	25.60	25.71	25.77	A	A	A	A	A
27	290575	28.55	999.50	1000.00	20.16	20.58	21.13	21.45	21.92	22.14	A	A	A	A	A

Archie Creek Existing LOS

9/14/00

Table 6.4

Archie Creek Area (Existing Conditions) Level of Service Analysis											Flood Level Designations				
		Landmark Elevations			Water Surface Elevations										
Story Board	Subbasin	Road	Site	Struct	2.33-yr	5-yr	10-yr	25-yr	50-YR	100-yr	2.33-yr	5-yr	10-yr	25-yr	50-yr
27	290580	16.95	18.50	1000.00	21.23	21.40	21.62	21.74	22.05	22.25	C	C	C	C	C
27	290585	24.05	999.50	1000.00	22.34	22.51	22.73	22.86	23.10	23.22	A	A	A	A	A
27	290587	28.45	999.50	1000.00	26.50	26.50	26.50	26.50	26.50	26.50	A	A	A	A	A
27	290588	25.25	999.50	999.00	27.50	27.50	27.50	27.50	27.50	27.50	B	B	B	B	B
27	290590	26.05	999.50	999.00	21.97	22.11	22.29	22.39	22.76	22.93	A	A	A	A	A
27	290594	26.55	999.50	1000.00	24.07	24.47	25.04	25.40	25.91	26.12	A	A	A	A	A
27	290595	29.45	999.50	31.00	24.08	24.47	25.04	25.40	25.91	26.12	A	A	A	A	A
27	290605	26.25	999.50	29.00	23.60	23.80	24.09	24.29	24.68	24.88	A	A	A	A	A
27	290610	26.25	999.50	29.20	23.60	23.80	24.09	24.29	24.68	24.87	A	A	A	A	A
27	290612	25.65	999.50	27.00	24.84	24.99	25.21	25.37	25.63	25.73	A	A	A	A	A
27	290616	999.25	999.50	30.00	25.02	25.20	25.50	25.73	26.09	26.24	A	A	A	A	A
27	290617	25.65	999.50	29.20	25.03	25.21	25.53	25.77	26.16	26.32	A	A	A	B	B
27	290620	999.25	999.50	29.00	25.22	25.43	25.91	26.17	26.57	26.74	A	A	A	A	A



DELANEY CREEK AREA

Computed Water Surface Profile

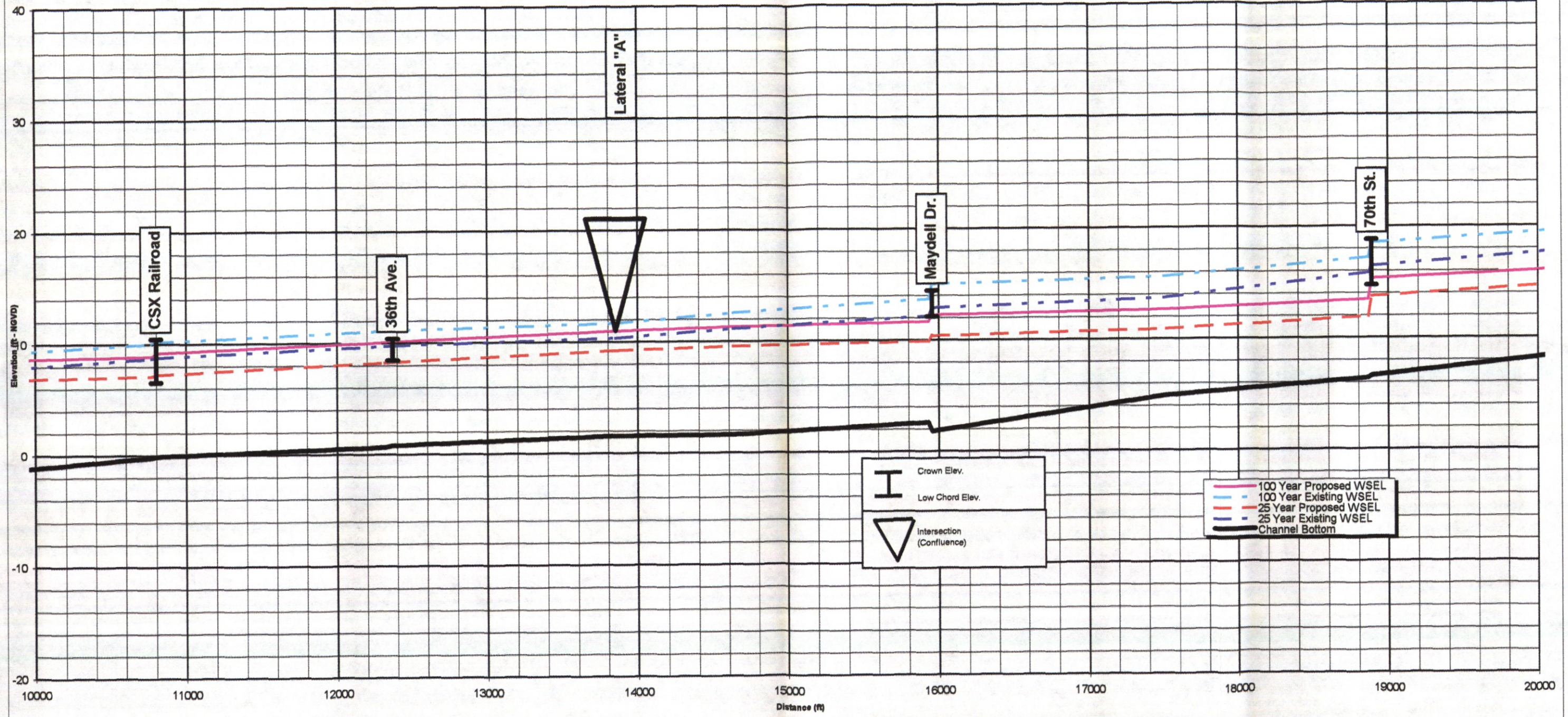
September 2000

Exhibit 13-1a

Existing vs Proposed Condition Model

Delaney Creek Sub-watershed/ Main Channel

Sheet 1 of 6



DELANEY CREEK AREA

Computed Water Surface Profile

September 2000

Exhibit 13-1b

Existing vs Proposed Condition Model

Delaney Creek Sub-watershed/ Main Channel