

INDIVIDUAL HYDROLOGIC & HYDRAULIC (IHHA) ASSESSMENT REPORT

Site Name/Facility: Murphy Canyon Channels

Master Program Map No.: 58 & 58a (Murphy Canyon Channels)

Date: June 14, 2013

Civil Engineer: Matt Moore
(name, company, phone number): URS Corporation
858-812-9292



Registered Civil Engineer Number & Expiration Date
(place stamp here):

***Instructions:** This form must be completed for each target facility following the completion of the Individual Maintenance Plan (IMP) report form and prior to any work being conducted in the facility. Attach additional sheets if needed.

EXISTING CONDITIONS

The City of San Diego (City) has developed the Master Storm Water System Maintenance Program (MMP; Master Maintenance Program) to optimize its business processes and environmental protection practices related to channel operation and maintenance activities. The Master Maintenance Program is intended to integrate operation and maintenance planning, implementation and assessment activities with its water quality protection programs. This document provides a summary of the Individual Hydrologic and Hydraulic Assessment (IHHA) activities conducted within the Murphy Canyon Channels in order to comply with the MMP's Programmatic Environmental Impact Report (PEIR) (City of San Diego 2011b). See Figure 1 for the vicinity map.

The purpose of this report is to assess if the maintenance described in the City's MMP is needed based on a hydrologic and hydraulic assessment. Each drainage facility was assigned a reach number, as shown on Figure 2, for the analysis. As-built data found on these channels provided some information on the channel dimensions; however, little information was available on the hydrologic and hydraulic design of the channels. The hydrologic estimations for the channels were based on the Federal Management Agency (FEMA) Flood Insurance Studies (FIS) for San Diego County report that is further discussed in the Hydrologic information section.

The original channel dimensions were extracted from the as-builts for Reaches 1 and 2 and the Maintained Condition – Sediment removed condition is considered the hydraulic design capacity for these channels.

Based on this IHHA assessment, Reaches 1 and 2 do not currently have capacity to convey their original design flows. In the current condition, Reaches 1 and 2 do not completely contain the 2-year storm event flows between their banks. Reaches 3 and 4

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currently have capacity to convey their original design flows and no maintenance is recommended at this time. It is recommended that the vegetation, sediment and other debris is removed from Reaches 1 and 2 and that Reach 1 be excavated to its original design depth and width, including up to 7 feet of sediment removal.
Description of creek/channel (limits of reach, surrounding land use and area, creek/channel geometry and vegetative condition):
<p>The proposed work would take place within a portion of the Murphy Canyon Channels, between the Qualcomm Stadium parking lot on the west and Interstate 15 on the east, and north of Interstate 8. The site is within the San Diego Hydrologic Unit within the City of San Diego. The Murphy Canyon Channels (Maps 58 and 58a) is broken into four reaches for the purposes of this analysis (see Figure 2). Reaches 1 and 2 are included on MMP map 58 and Reaches 3 and 4 are included on MMP map 58a (City of San Diego 2011a). Based on the current IHHA results, the City is proposing to perform maintenance activities in Reaches 1 and a portion of 2 by removal of trash, debris, vegetation and accumulated sediment. The northern portion of Murphy Canyon consists of Reaches 3 and 4 (Map 58a) which will not be maintained this year.</p> <p>Reaches 1 and 2 and the adjacent stadium parking lot area are within the FEMA Special Flood Hazard Areas Subject to Inundation by the 1-percent Annual Chance Flood (100-year floodplain) designated Zone A. Reaches 3 and 4 and the adjacent area is within the FEMA Special Flood Hazard Areas Subject to Inundation by the 1-percent Annual Chance Flood (100-year floodplain) designated Zone AE. Reaches 1, 2 and 3 do not contain flooding due to a 100-year storm event however, Reach 4 does contain the 100-year storm event flows.</p> <p><u>Reaches 1 & 2:</u></p> <p>Reaches 1 and 2 are a combination of earthen with rip-rap sides (Reach 1) and concrete (Reach 2) trapezoidal channel types that parallels I-15 to the east and Qualcomm Stadium and Mission Valley Terminal (MVT) to the west. The Qualcomm parking lot has a history of flooding issues as most recently experienced in the December 2010 storm event.</p> <p>Reach 1 has a length of approximately 1,662 feet from the downstream end of the concrete channel to the property line located approximately 40 feet south of the Stadium Road bridge. Access, loading, and staging areas for this channel maintenance reach include Access and Loading Areas 1A, 1B, 1C & 1D, and a Staging Area. Maintenance in Reach 1 will occur using a bulldozer or similar type equipment to excavate accumulated sediment, vegetation and other debris from the earthen channel bottom to the excavator located at the access and loading points designated on the maintenance plans. The excavator, or similar equipment, will be stationed at the access points to load the accumulated material from the channel into waiting dump trucks. The dump trucks will transport the accumulated materials to the temporary staging area before disposal of the materials at an appropriate disposal facility. No subsurface disturbance is expected</p>

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at the access or staging areas associated with Reach 1 as they are 100% concrete-lined or asphalt paved.

The City proposes to maintain a portion of Reach 2 that extends from 110 feet north of San Diego Mission Road to 96 feet south of San Diego Mission Road for a length of approximately 206 feet. Maintenance in this segment of Reach 2 will occur using a skid steer or similar type equipment to remove accumulated sediment, vegetation and other debris from the concrete channel bottom to the excavator located at the access and loading points designated on the maintenance plans. The excavator, or similar equipment, will scoop the accumulated material into waiting dump trucks. The dump trucks will then dispose of the accumulated materials at an appropriate disposal facility subsurface disturbance associated with this activity or these areas. Access and staging areas for this channel maintenance reach include Access and Loading Area 1D, and a Staging Area. Reach 2 and its associated access and staging areas are 100% cement lined or asphalt paved and no subsurface disturbance is expected with this activity or these areas. The upstream portion of the Reach 2 is on Caltrans right-of-way and will not be maintained at this time.

A site visit was conducted in March 2013 to evaluate the current channel conditions from a hydrologic and hydraulic perspective. Due to high vegetation density, the current conditions of Reach 1 were not able to be thoroughly assessed during the project site visit because of difficult access and visibility. In addition, topography, limited recent survey data, as-builts, and aerial photos were evaluated to supplement the observations and data gathered during the site visit. These indirect methods were relied upon to make an assessment of the current extent and types of vegetation that exist along Reach 1 in the less accessible areas. The sources utilized included MMP documents, ESRI ArcGIS World Aerial imagery, and the Dudek biology staff familiar with the site to assist in the assessment. Both Reaches 1 and 2 are heavily vegetated except at the bridge crossings. The sediment deposition amount for the analysis was estimated based on the site visit, visual observations and as-built information. Based on this information, Reach 1 was estimated to have 1 to 3 feet of sediment deposition and Reach 2 had approximately 1 foot of sediment deposition in the hydraulic model.

Reaches 3 & 4:

Reaches 3 and 4 are the upstream continuation of the Murphy Canyon Channels north of the southern box culvert. These reaches are bounded by industrial and golf facilities to the west and Murphy Canyon Road to the east.

During the site visit in March 2013, the conditions of Reaches 3 and 4 were observed. Reach 3 is approximately 610 feet of concrete channel with little vegetation in the concrete lining but is vegetated along the banks above the concrete lining. Reach 4 is an earthen channel that is approximately 1,530 feet in length and is densely vegetated with mature trees and shrubs. The City holds a drainage easement covering approximately 220 feet immediately south of the northern box culvert in Reach 4. Based on field observations and discussions with Dudek biology staff, Reach 4 is considered to be in its ultimate vegetated condition. The sediment deposition observed in Reaches 3 and 4 are

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considered minimal in the earthen channels and not present in the concrete portion. There will be no channel maintenance within these reaches.

Hydrologic information (source of hydrologic information, summary of flow rates and return frequencies):

Limited resources were available on the hydrologic information for the Murphy Canyon channels. The major reference used for the hydrologic analysis was the FEMA FIS report for the San Diego County and Incorporated Areas. Table 1 lists the peak discharges used in the IHHA based on the FIS report. The peak discharges for the 5-year and 2-year storm events were extrapolated using a log-log graph.

Table 1. Hydrologic Data Summary

Channel	Watershed Area (mi ²)	Storm Event					
		2-Year (cfs)	5-Year (cfs)	10-Year (cfs)	25-Year (cfs)	50-Year (cfs)	100-Year (cfs)
58A	10.1	300	680	1,100	1,700	2,400	3,000
58-1 & 58-2	12.1	510	1,050	1,500	2,000	2,700	3,500

Hydraulic analyses (description of hydraulic models created for project):

The United States Army Corps of Engineers Hydrologic Engineering Center's River Analysis System (HEC-RAS) software was used for the hydraulic analysis of Reach 1 through 4. The HEC-RAS hydraulic model performs one-dimensional steady flow river hydraulics calculations and is the model used by FEMA to establish water surface elevation profiles and floodplain limits.

As part of a previous IHHA study prepared by Rick Engineering, HEC-RAS models for Reaches 1 and 2 were prepared and URS obtained these models through the City. The models were used as the base model for the HEC-RAS development of Reaches 1 and 2 in this IHHA. The Rick Engineering models were validated, and then modified and augmented with recent site data to reflect current conditions. The development of the Reaches 3 and 4 models and modifications of Reach 1 and 2 models were based on 1999 2-foot contour interval topography from SanGIS. The HEC-RAS model cross sections were created or modified using the topography and then were adjusted using the field measurements and data collected during the site visit. It is not typical for a 2-foot contour interval topographic map to reflect all of the subtle channel details and grade breaks since during the generation of the data, tall, dense vegetation block the channel dimensions and other details from being detected. Therefore, some of the sections were manually adjusted to reflect the observed field conditions.

The Manning's Roughness Coefficient values used within the channel hydraulic models were based on largely on field observations as well as vegetation data provided by the City of San Diego and the ESRI ArcGIS World Aerial imagery. The values used in the

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previous study for Murphy Canyon channel were used as guidance. The Manning's Roughness Coefficients (n-values) range from 0.016 to 0.20.

The steady flow boundary conditions of the Reach 3 and 4 hydraulic models were based on normal depth computations at the upstream side and a known water surface elevation was used for the downstream boundary condition at the entrance of the culvert for Reach 3. The known water surface elevation for each of the storm events at Reach 3 was calculated using Federal Highway Administration (FHA) HY-8 software. The culvert dimensions were obtained from the As-Builts and a rating table was estimated.

The steady flow boundary conditions of the hydraulic models for Reach 1 and 2 were based on normal depth computations at the upstream end and known water surface elevation was used for the downstream boundary condition. The known water surface elevation was obtained from the 2010 model prepared by Rick Engineering.

Current Vegetated Condition:

The HEC-RAS models developed for the current vegetated condition reflect the field conditions based on the site visit in April 2013 and the additional available data discussed in the existing conditions section.

Reach 1 and 2:

Sediment deposition of 1 to 3 feet was assumed in Reach 1 for the hydraulic analysis, however actual sediment depths may vary as high as 6 to 7 feet in one location based on subsequent field information. Approximately 1 foot of sediment was assumed for Reach 2 based on the field observations. The Manning's Roughness Coefficients (n-value) assigned to the Reach 1 and 2 channel bottoms varied between 0.08 to 0.17 based on the vegetation type and density. The n-value assumed for the Reach 1 side slopes varied from 0.07 to 0.15, while an n-value of 0.018 was assumed for the Reach 2 concrete side slopes.

Reach 3 & 4:

For the current condition, it was assumed Reach 3 and 4 had only minimal sediment deposition. The bed material in the earthen channel was predominantly composed of large cobbles and exposed rock. Reach 3 appeared to have little to no sediment deposition. The n-values assigned varied from 0.06 - 0.10 for the channel bottom of Reach 4 and the n-value for the side slope ranged from 0.12 – 0.15. Reach 3 was assigned an n-value of 0.016-0.018 based on the vegetation observed along the length of the channel.

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Ultimate Vegetated Condition:
<p>The channel hydraulics for the “Ultimate Vegetated Condition” for Reach 1 through 3 are similar to the “Current Vegetation Condition” except that the n-values were increased to reflect a maximum vegetation carrying capacity and range from 0.15 to 0.17 for the channel bottom. The n-value assumed for the Reach 1 side slopes increased to a range of 0.05 to 0.17 while the n-value of 0.05 was assumed for the Reach 2 concrete side slopes. The geometry and sediment deposition levels remained the same as in the Current Vegetated Condition. It was assumed, based on information provided by Dudek and the site visit that Reach 4 is currently at its ultimate vegetated state.</p>
Maintained Condition – No sediment removed:
<p><u>Reach 1 and 2:</u></p> <p>For Reach 1, it was assumed that the vegetation that currently exists in the earthen bottom channel was trimmed to just above the bottom of the channel bed and that mature trees along the edge of the channel bottom remained at 50 foot intervals. It was also assumed some vegetation trimming would occur on the side slopes as well. The n-value assumed for the Reach 1 channel bottom varies between 0.024 and 0.035.</p> <p>For Reach 2, it was assumed that the sediment deposition and vegetation are completely removed from the channel bed. It was also assumed that no maintenance would be performed on the concrete channel upstream of Reach 2 in Caltrans right-of-way. The n-value used for Reach 2 was 0.016.</p> <p><u>Reach 3 & 4:</u></p> <p>For Reach 3, it was assumed that the sediment deposition and vegetation were completely removed from the channel bed. The Reach 4 hydraulic model was adjusted assuming the vegetation that currently exists in the channel bed is trimmed down to an extent just above the bottom of the channel bed. An n-value of 0.016 was assumed for Reach 3, and an n-value that varies from 0.045 to 0.055 was assumed for Reach 4.</p>
Maintained Condition – Sediment removed (if applicable):
<p><u>Reach 1 and 2:</u></p> <p>In this condition, the “Maintained Condition – No Sediment Removed” was used as the base model; however, the model was modified for Reach 1 to reflect the original design conditions by removing the sediment deposition. No changes were made to Reach 2 since it was assumed that the sediment would be removed with the vegetation in the previous model.</p>

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<p><u>Reach 3 & 4:</u></p> <p>This condition is not applicable to Reach 3 and 4 since only minimal sediment deposition was observed at the time of the field visit.</p>
MAINTENANCE IMPACTS
<p>Hydraulics Results (Describe capacity of channel for each condition):</p>
<p>Current Vegetated Condition:</p>
<p><u>Reach 1 and 2:</u></p> <p>The hydraulic analyses results show that Reach 1 and 2 do not have the capacity to convey the high frequency storm event, the 2-year storm event in which the berm along the right bank may be overtopped.</p> <p><u>Reach 3 & 4:</u></p> <p>The hydraulic analysis results show that Reach 3 has the capacity to convey the 10-year storm event, and along some segments, the capacity exceeds the 10-year storm event flows. Reach 4 has reached its ultimate vegetation growth conditions, according to the information provided by Dudek staff, and the hydraulic study shows that it can contain the 100-year storm event.</p> <p>Note: See attached HEC-RAS model profile</p>
<p>Ultimate Vegetated Condition:</p>
<p><u>Reach 1 and 2:</u></p> <p>The hydraulic analyses results show that Reach 1 and 2 do not have the capacity to convey the 2-year storm event flows as the berm along the right bank is overtopped in the ultimate vegetated condition. The results show increased capacity is needed as additional areas along the berm are overtopped in this condition when compared to the Current Vegetated Condition.</p> <p><u>Reach 3 & 4:</u></p> <p>In Reach 3, the channel contains the 10-year storm event however the amount of freeboard in the channel is reduced from approximately 4 feet to less than 0.5 foot at the lowest point in the berm. Reach 4 has reached its ultimate vegetated condition and contains the 100-year storm flows in the channel.</p> <p>Note: See attached HEC-RAS model profile</p>

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MAINTENANCE IMPACTS
<p data-bbox="284 304 928 340">Maintained Condition – No Sediment removed:</p> <p data-bbox="284 382 488 417"><u>Reach 1 and 2:</u></p> <p data-bbox="284 436 1435 722">For the Maintained Condition – No sediment removed, Reach 1 increased capacity to maintain the 2-year storm event flows within its banks. In most sections, Reach 1 has capacity to contain the 5-year storm event however several low spots along the right berm do not contain the flows. If the berm were repaired to its original condition, the flows from the 5-year event would be contained. For Reach 2, sediment and vegetation are assumed to be removed in this condition and the HEC-RAS results show that the 20-year storm would be contained. The 50-year storm event can be contained in this reach with little to no freeboard.</p> <p data-bbox="284 743 464 779"><u>Reach 3 & 4:</u></p> <p data-bbox="284 798 1435 974">The hydraulic analyses results show that under the Maintained Condition – No Sediment removed condition that Reach 3 can contain the 10-year storm event flows, and that along those sections with higher banks, it can contain larger storm flows. The results also show that Reach 4 contains the 100-year storm event flows while reducing the water surface elevations by at least 1 foot.</p> <p data-bbox="284 1100 849 1136">Note: See attached HEC-RAS model profile</p>
<p data-bbox="284 1165 883 1201">Maintained Condition – Sediment removed:</p> <p data-bbox="284 1243 464 1278"><u>Reach 1 & 2:</u></p> <p data-bbox="284 1297 1435 1436">Reach 1 is able to contain a maximum of the 5-year storm event due to a low point in the west bank. If the low spot was raised, this reach would be able to contain the 10-year storm event flows. As in the Maintained Condition – No sediment removed, Reach 2 can contain up to the 50-year storm event with little to no freeboard.</p> <p data-bbox="284 1457 464 1493"><u>Reach 3 & 4:</u></p> <p data-bbox="284 1512 1435 1650">This condition is not applicable to Reaches 3 and 4, as there was minimal sediment deposition observed in the channel during the field reconnaissance visit. Therefore, the results for this condition are assumed to be the same as those for the Maintained Condition – No sediment removed.</p> <p data-bbox="284 1776 849 1812">Note: See attached HEC-RAS model profile</p>

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MAINTENANCE IMPACTS
Areas within channel that can be avoided (this section can be completed upon completion of Individual Biological Assessment Form):
The hydraulic analyses results show that the vegetation in Reach 4 can remain in its current condition, as the channel can contain the 100-year storm flow. Additionally, Reach 4 appears to have reached its maximum vegetation carrying capacity, which equals the assumed ultimate vegetated condition. Therefore, maintenance is not recommended and it is recommended that Reach 4 remain in its current condition.
<u>Would the velocity of storm water during a “bank-full” storm event exceed the velocities identified for unlined channels per Table 1-104.108 of the City’s Design Manual? If so, describe the appropriate form of erosion control (e.g., check dam or comparable mechanism). Is a downstream check dam or comparably mechanism required?</u>
Table 1-104.10A only applies to the earthen channels. The average velocity within Reach 1 during a bank-full event does not exceed the velocities identified in the table. Additional erosion control measures, such as check dams, are not necessary for these channels since channel erosion does not appear to be an issue at these locations. Therefore, MMP Protocols WQ-9 and WQ-10 would not be applicable.

MITIGATION
Conclusion/Recommendations (Describe the limits of recommended maintenance, degree to which native vegetation within the facility can be retained, and capacity of maintained channel):
<ul style="list-style-type: none">• <u>Reach 1</u> – This reach is overtopped by the 2-year storm event. By implementing the Maintained Condition – Sediment removed option, the capacity increased from the 2-year storm event to the 5-year storm event. Therefore, it is recommended that the “Maintained Condition – Sediment removed” option be implemented.• <u>Reach 2</u> – This reach is also overtopped by the 2-year storm event. By implementing the Maintained Condition – Sediment removed option, the capacity increased to the 50-year storm event. Therefore, it is recommended that the “Maintained Condition – Sediment removed” option be implemented.• <u>Reach 3</u> - Currently there is some minor vegetation in the main channel; however, the impacts are minor. Based on the hydraulic analysis results, it is recommended that the “No Maintenance” option be implemented.• <u>Reach 4</u> – This reach contains the 100-year storm event flows and the channel’s vegetation carrying capacity is at a maximum. Therefore, “No Maintenance” is recommended for this reach at this time.

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ADDITIONAL COMMENTS OR RECOMMENDATIONS

The Recirculated Program Environmental Impact Report (PEIR) for the Master Maintenance Program lists four alternatives that would reduce the need for regular maintenance of the storm water facilities. The list of those alternatives is summarized below followed by a brief discussion as to how they apply to Reaches 1 through 4. The feasibility of these alternatives is based solely on the hydrologic and hydraulic assessment conducted for Reaches 1 through 4 as part of this IHHA. Additional studies may be necessary to fully assess the feasibility of these alternatives.

- Raising the channel banks by constructing walls or berms along the top of the channels – raising the channel banks along Reach 1 through 3 may be a technically feasible alternative that could increase the capacity of the channels. Raising the channel banks in Reach 1 to allow the sediment and vegetation to remain however, would be a localized solution that will likely cause flooding impacts upstream by raising the water surface elevation and negatively impact upstream properties. Also, the existing storm drainpipe systems that discharge into the channels will likely be blocked by the build up of sediment and vegetation and may cause additional flooding impacts to the surrounding areas.
- Diverting storm water in pipes around constrained segments –
 - For Reach 1, it may be technically feasible to bypass the channel with an underground storm drain system to divert runoff around the obstructed channel segments. However, it should be noted that diversion of runoff has the potential to dry out the wetlands and therefore have a greater impact on the wetlands than the channel maintenance as proposed. The sustainability of the wetlands without the channel flows would need to be studied further for feasibility as well.
 - This alternative appears to be impractical in Reach 2 because of the limited corridor area available between I-15 and MVT. Numerous utilities are located in this corridor including sewer and gas main lines that will likely be cost prohibitive to relocate.
- Widening channels to accommodate vegetation –
 - For Reach 1, this alternative may be technically feasible to expand in to the Qualcomm Stadium parking lot. Constraints may come from the need to relocate other utilities and the width of the channel needed. Also, the existing storm drainpipe systems that discharge into the channels will likely be blocked by the build up of sediment and vegetation and may cause additional flooding impacts.
 - Because of the physical limitations of widening the channel with the sewer and gas mains, as well as other possible utilities, located in the corridor between I-15 and MVT, this alternative is likely infeasible for Reach 2.

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- Off-site runoff reduction – The City’s LID program, while outside the scope of the Master Maintenance Program, may reduce the need or frequency for future channel maintenance as it is implemented over time. While the City does not expect to see appreciable reductions in maintenance needs over the term of the current MMP, any reductions in maintenance needs resulting from the City’s LID program would be captured by the annual hydrology studies, and channel maintenance activities would be adjusted accordingly. Additionally, in flood control analysis, LID BMP features, such as impermeable area reduction, redirecting runoff to pervious areas, etc., are usually considered negligible. LID BMP design is based on the 85th percentile rainfall event which is a considerably lower precipitation amount than the flood control design standard requirements of 10-, 50- or 100-year storm return events.

ATTACHMENT 1 – SITE PHOTOS

SITE PHOTOS

These photographs were taken during a site visit that was conducted on March 26th, 2013. See the Hydraulic Workmap for the photograph numbers, locations, and orientation. Photograph numbers 1 through 14 pertain to the Murphy Canyon 58, while Photograph numbers 15 through 32 pertain to the Murphy Canyon Channel 58A.



1. Murphy Canyon Channel 58 - Upstream limit of study. Outlet for box culvert.



2. Murphy Canyon Channel 58 - Looking downstream of box culvert outlet towards Friar Road bridge on ramp.



3. Murphy Canyon Channel 58 - Concrete channel sediment deposition under San Diego Mission Road Bridge



4. Murphy Canyon Channel 58 - Vegetation along the right bank.



5. Murphy Canyon Channel 58 – High water mark as evidenced by debris trapped in the chain link fencing.



6. Murphy Canyon Channel 58 - Vegetation in the channel and banks near San Diego Mission Road



7. Murphy Canyon Channel 58 - Vegetation in the channel near San Diego Mission Road



8. Murphy Canyon Channel 58 - Side walk along the channel near San Diego Mission Road Bridge



9. Murphy Canyon Channel 58 - Right overbank area



10. Murphy Canyon Channel 58 – Berm breach on right overbank.



11. Murphy Canyon Channel 58 - Natural channel near the downstream end of the study; just downstream of the Stadium Road Bridge



12. Murphy Canyon Channel 58 - Channel looking upstream from the Stadium Road Bridge.



13. Murphy Canyon Channel 58 – Heavily vegetated channel bottom near the downstream end of the study.



14. Murphy Canyon Channel 58 – Looking east towards the channel and I-15.



15. Murphy Canyon Channel 58A – Looking upstream near the confluence of Channel 58A and 58B. Concrete channel with very little vegetation and no sediment. Channel 58B overgrown.



16. Murphy Canyon Channel 58A – Looking downstream towards the channel at the downstream study reach at the concrete section.



17. Murphy Canyon Channel 58A – Looking west towards the concrete channel bottom. Channel bottom.



18. Murphy Canyon Channel 58A – Looking downstream from the access road bridge. Channel with little vegetation.



19. Murphy Canyon Channel 58A – Looking downstream from the Murphy Canyon Road Bridge crossing



20. Murphy Canyon Channel 58A – Looking downstream towards access road bridge near the upstream limit of concrete channel lining.



21. Murphy Canyon Channel 58A – Storm drain outlet to the channel bottom. Upstream limit of concrete lining



22. Murphy Canyon Channel 58A – Facing west towards the channel. Highly vegetated section of the reach with earthen channel.



23. Murphy Canyon Channel 58A – Looking west towards the channel bottom. Vegetated with native rock visible in the streambed.



24. Murphy Canyon Channel 58A – Looking west towards the channel bottom. Vegetated with native rock visible in the streambed.



25. Murphy Canyon Channel 58A – Looking west towards the channel bottom. Vegetated with native rock visible in the streambed.



26. Murphy Canyon Channel 58A – Looking west towards the right overbank. Thick vegetation visible along the overbanks area.



27. Murphy Canyon Channel 58A – Facing west from the left overbanks. Vegetation in the channel and overbanks area.



28. Murphy Canyon Channel 58A – Facing west towards the golf course. Highly vegetated overbanks.



29. Murphy Canyon Channel 58A – Facing west towards the golf course. Highly vegetated channel and overbanks.



30. Murphy Canyon Channel 58A – Facing west towards the channel bottom. Native rock along the channel bottom. Very little to no sediment deposit at the channel bottom.



31. Murphy Canyon Channel 58A – Facing west at the upstream section of the reach. High vegetation visible along the right overbanks.



32. Murphy Canyon Channel 58A – Looking downstream at the upstream section of the reach just downstream of the culvert outlet. Channel bottom highly vegetated.

ATTACHMENT 2 – FIGURES

FIGURE 1. VICINITY MAP

Path: P:\WORK\URS_San_Diego\27679954_Murphy Canyon IHH\5.0_Technical\5.9_GIS\mxd\Figures\Figure1v10_PSR.mxd, corey.jablonski, 11/4/2013, 10:10:42 AM



SOURCES: USA Topo Map(National Geographic Society 2011); Counties, Roads,Cities (Esri, 2013); Project Boundary (URS 2013)

URS

0.5 0 0.5 1 Miles

SCALE: 1" = 1 mile (1: 63,630)
SCALE CORRECT WHEN PRINTED AT 8.5x11

VICINITY MAP
MURPHY CANYON CHANNEL (Map 58 & 58a)
CITY OF SAN DIEGO

CREATED BY: TB

DATE: 11/4/2013

FIG. NO:

PM: MM

PROJ. NO: 27679954.14400

1

FIGURE 2. MURPHY CANYON CHANNEL REACH MAP

Path: G:\gis\projects\1577\2767905\map_docs\mxd\Murphy_Canyon_Full_Overview_cleaned.mxd, paul_moreno, 11/5/2013, 8:56:35 AM



H&H Work Area

Creeks

Reach

1

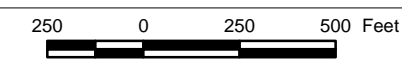
2

3

4



SOURCES:
Impact Areas, Channel Survey,
Map Extents (City of San Diego, 2012).
Roads (SanGIS, 2012).
Aerial (Aerials Express, 2011).



SCALE CORRECT WHEN PRINTED AT 11X17

CITY OF SAN DIEGO
CHANNEL IMPACT AREAS
MURPHY CANYON CHANNEL
MASTER STORM WATER MAINTENANCE PROGRAM

CREATED BY: PM		DATE: 11/5/2013	FIG. NO: 2
PM: BE	PROJ. NO: 27679051.10000		

FIGURE 3. MURPHY CANYON CHANNEL 58 - HYDRAULIC MAP

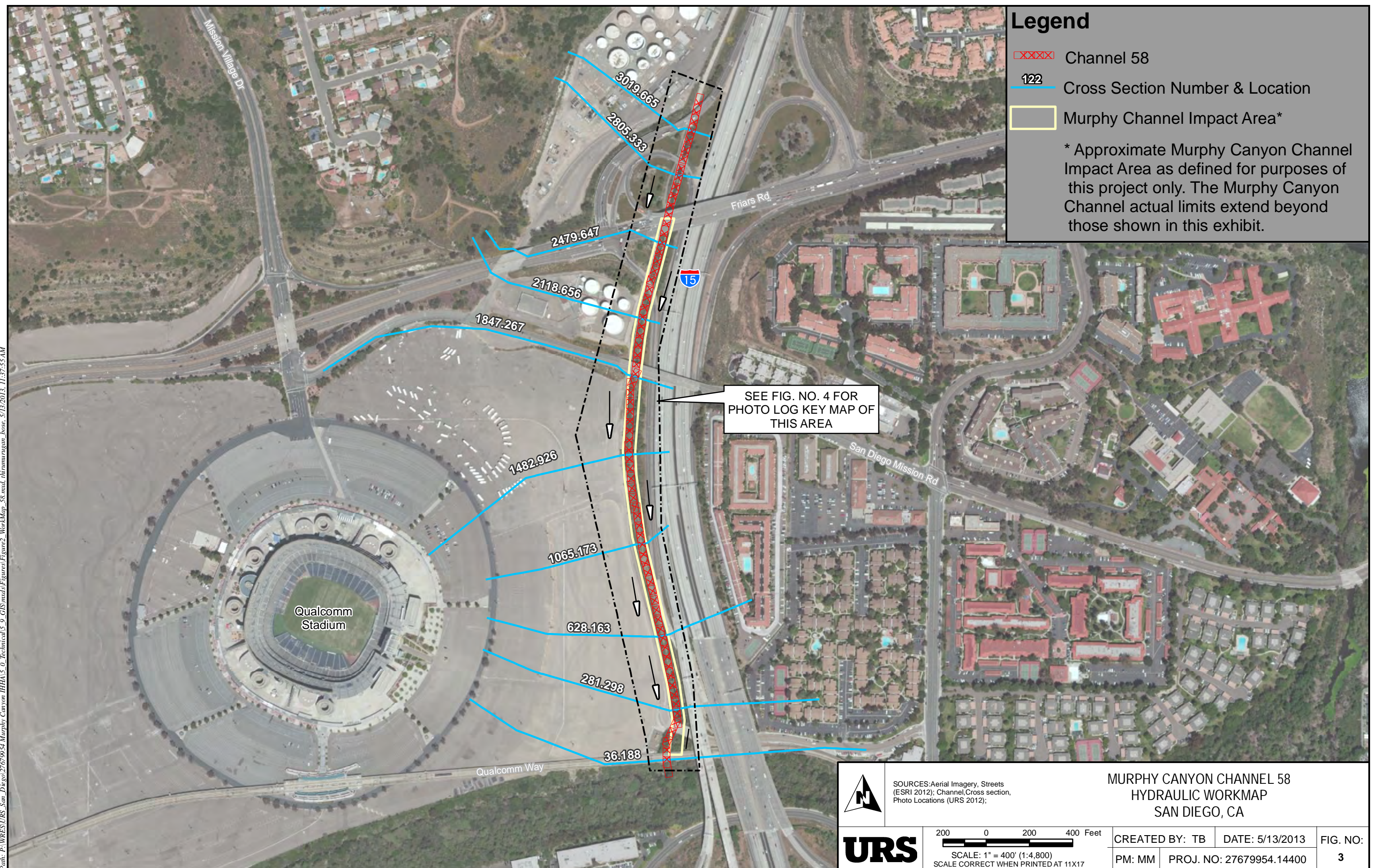


FIGURE 4. MURPHY CANYON CHANNEL 58A - HYDRAULIC MAP

Padi: P:\WRES\URS_Sm_Digo\27679954_Murphy_Canyon_HHA\5.0_Technical\5.9_GIS\mxd\Figures\Figure3_WorkMap_58.mxd, thummapan_box, 5/13/2013, 11:46:30 AM

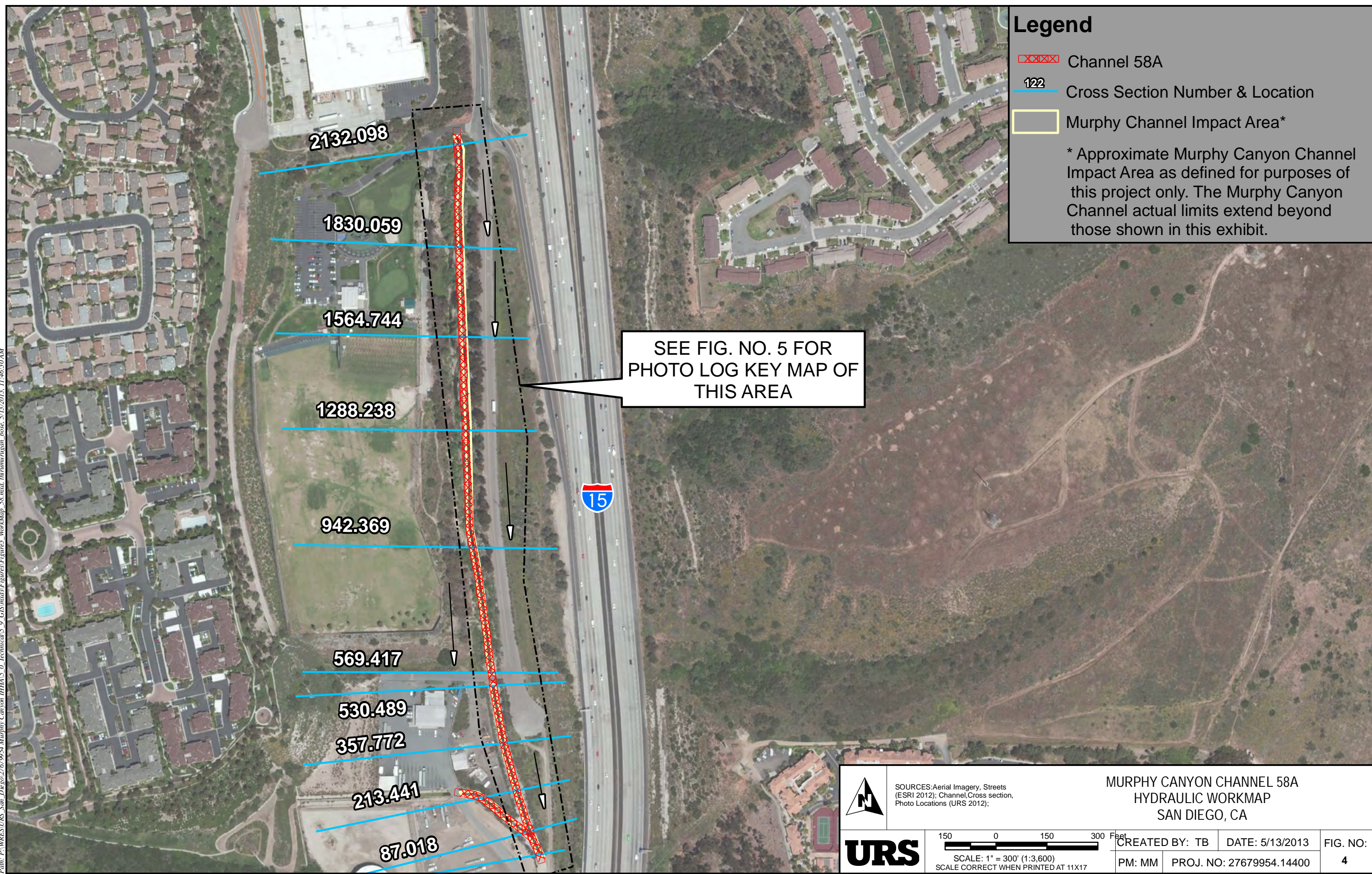


FIGURE 5. MURPHY CANYON CHANNEL 58 – PHOTO LOG KEY MAP

P:\P\WRES\URS_San_Diego\27679954_Murphy_Canyon_IHHA\5.0_Technical\5.9_GIS\maps\Figures\Figure4_WorkMap_58.mxd, U:\murphy\map_box, 5/13/2013, 11:52:49 AM

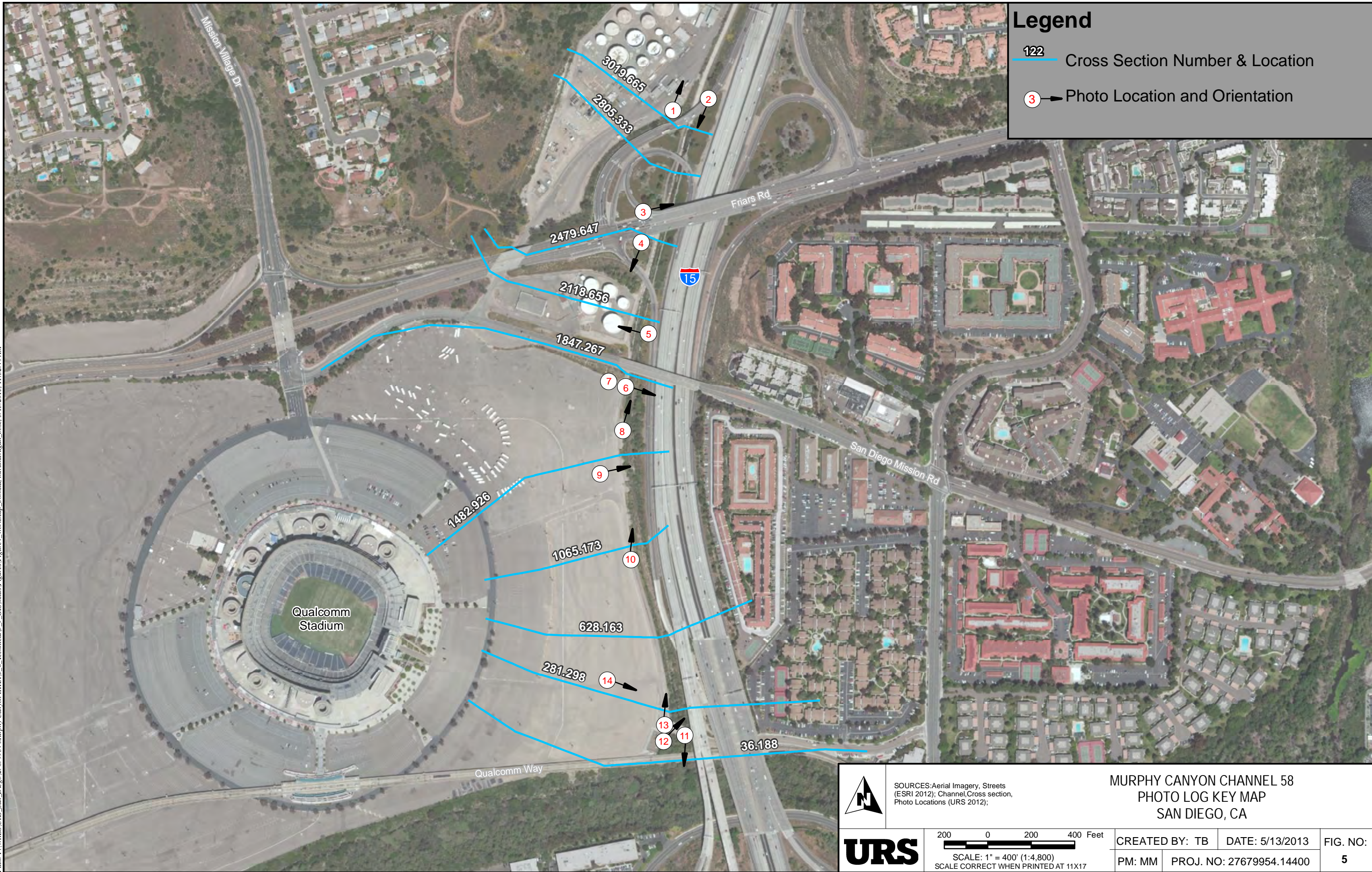


FIGURE 6. MURPHY CANYON CHANNEL 58A – PHOTO LOG KEY MAP

Path: P:\WRES\URS_San_Diego\27679954_Murphy_Canyon_BHHA\5.0_Technical\5.9_GIS\maps\Figures\Figure5_WorkMap_58.mxd, thummapan_box, 5/13/2013, 11:53:56 AM



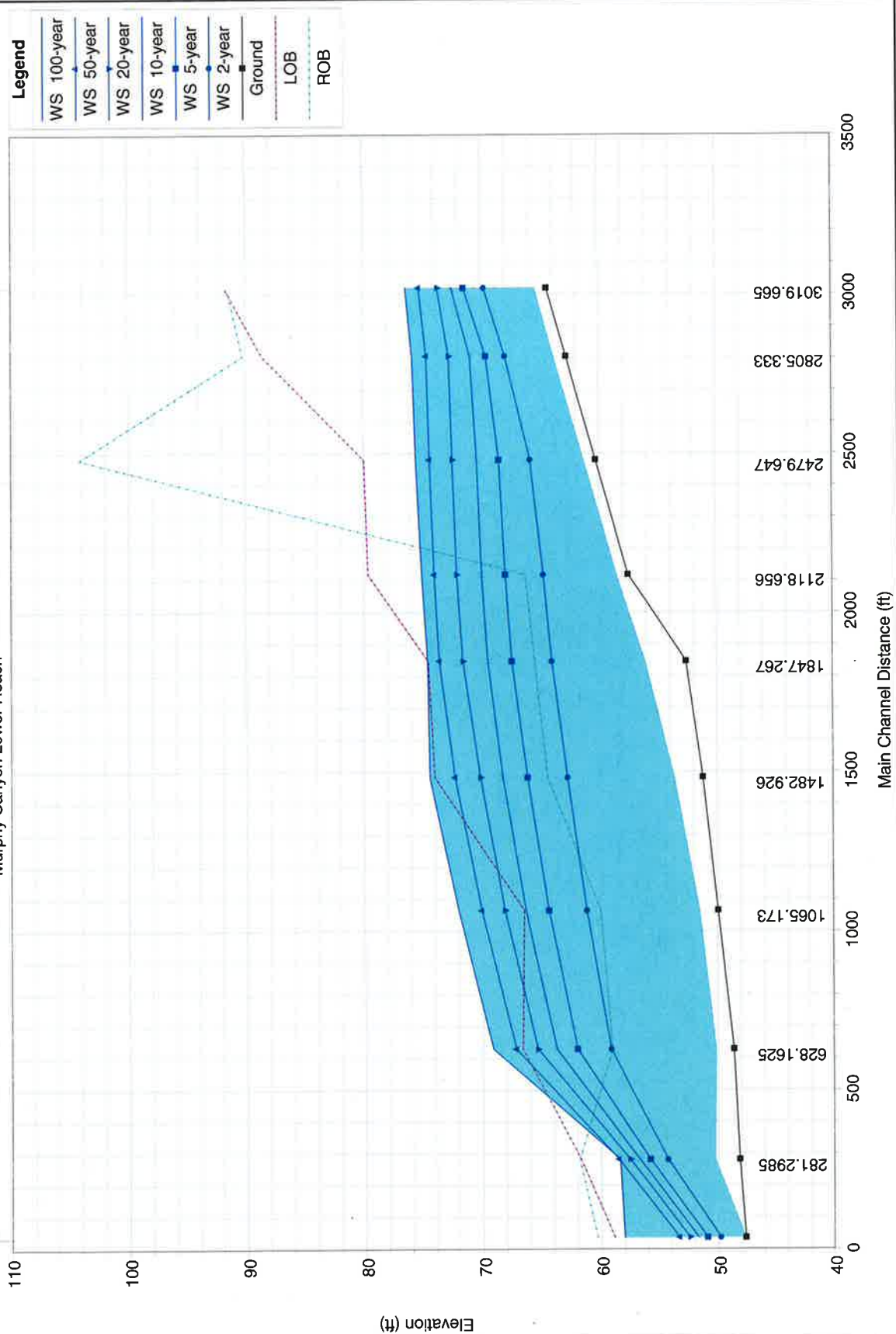
ATTACHMENT 3 – HYDRAULIC PROFILES AND DETAILED RESULTS

HYDRAULIC PROFILES FOR CURRENT VEGETATED CONDITION MODEL

Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

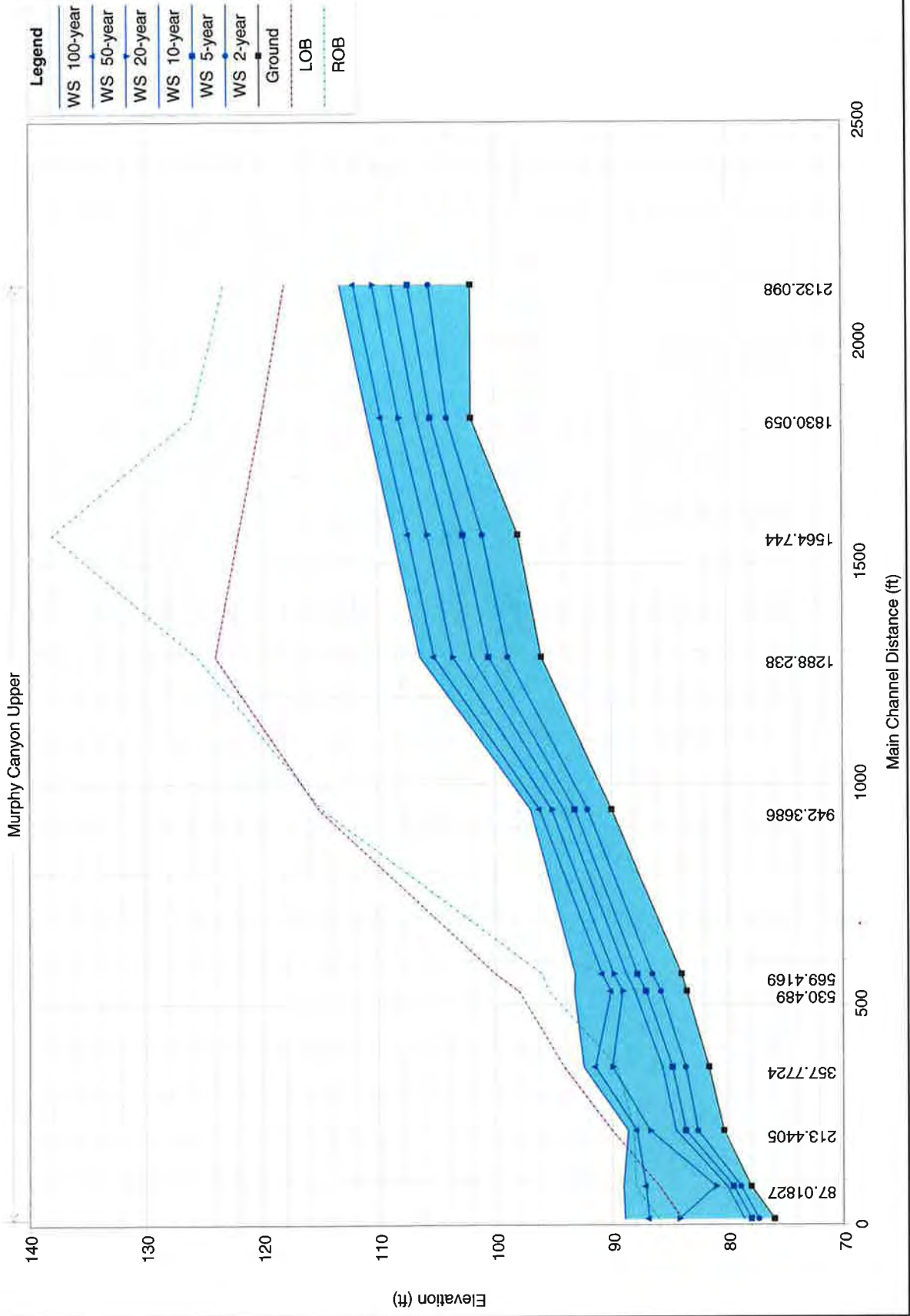
Geom: Actual Vegetated Condition Flow: Murphy

Murphy Canyon Lower Reach



Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

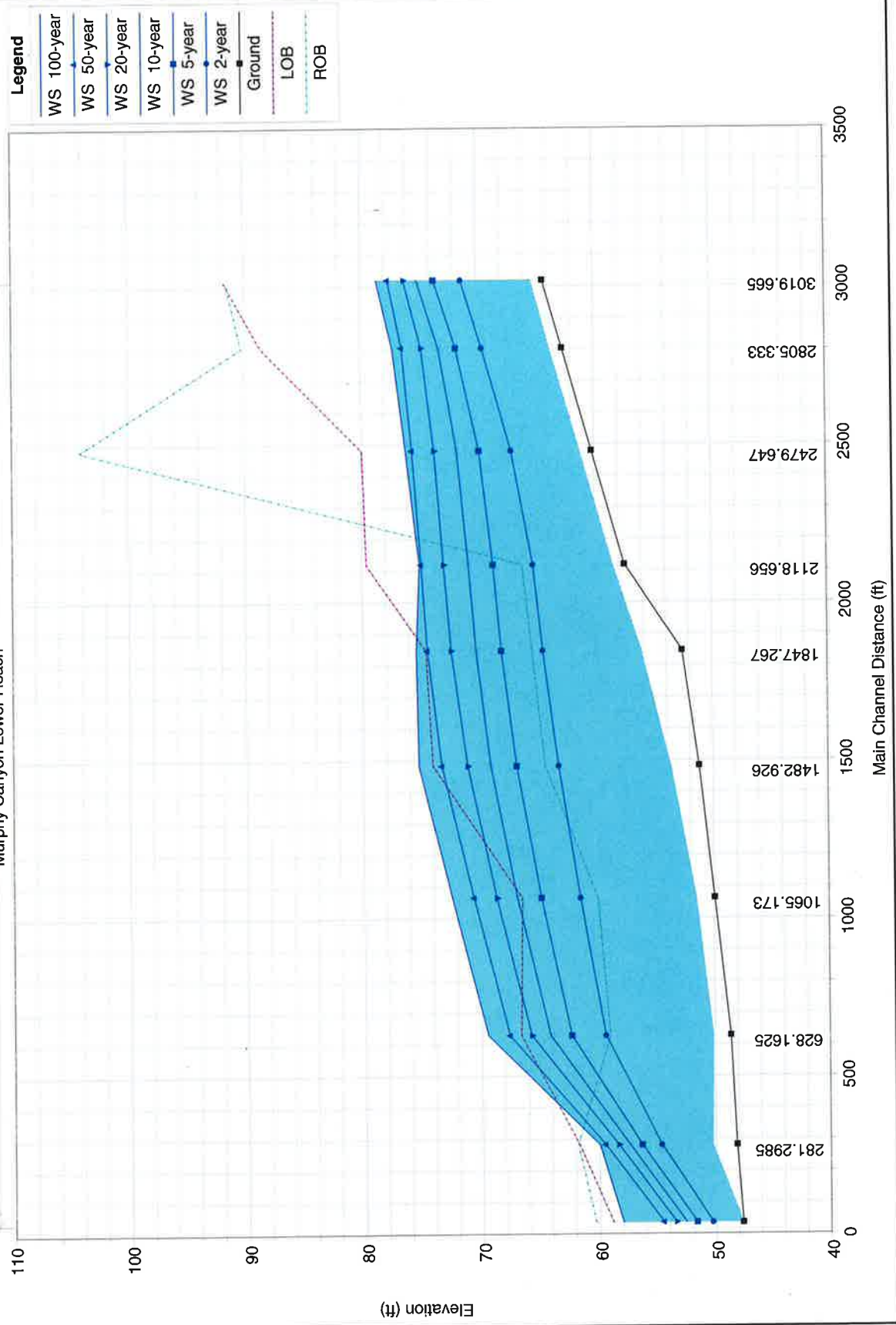


HYDRAULIC PROFILES FOR ULTIMATE VEGETATED CONDITION MODEL

Murphy Canyon - Reach 58 Plan: Fully Vegetated Condition 4/18/2013 12:36:35 PM

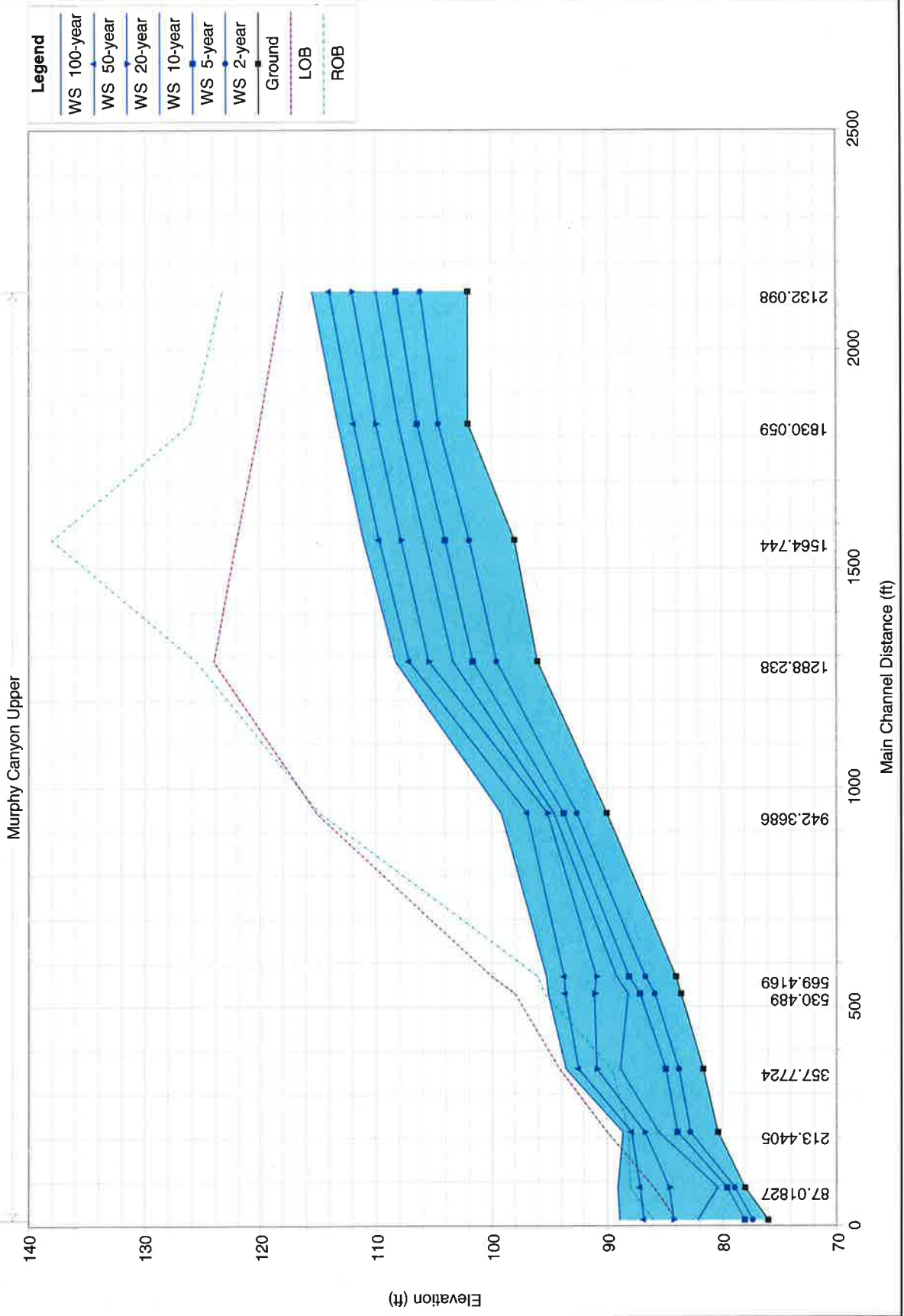
Geom: Fully Vegetated Condition Flow: Murphy

Murphy Canyon Lower Reach



Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

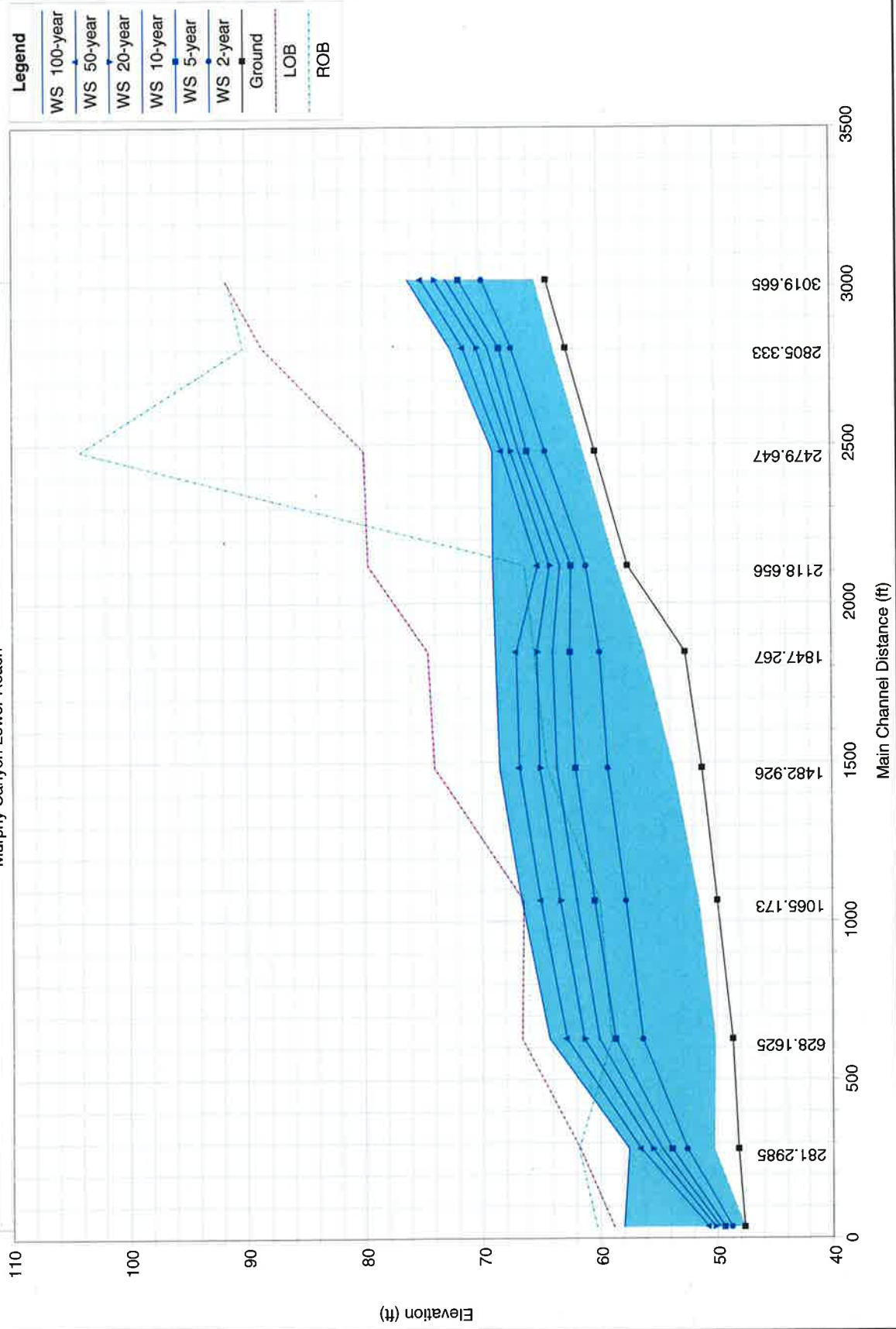


**HYDRAULIC PROFILES FOR MAINTAINED CONDITION MODEL
(NO SEDIMENT REMOVED)**

Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

Geom: Maintained bank to bank Flow: Murphy

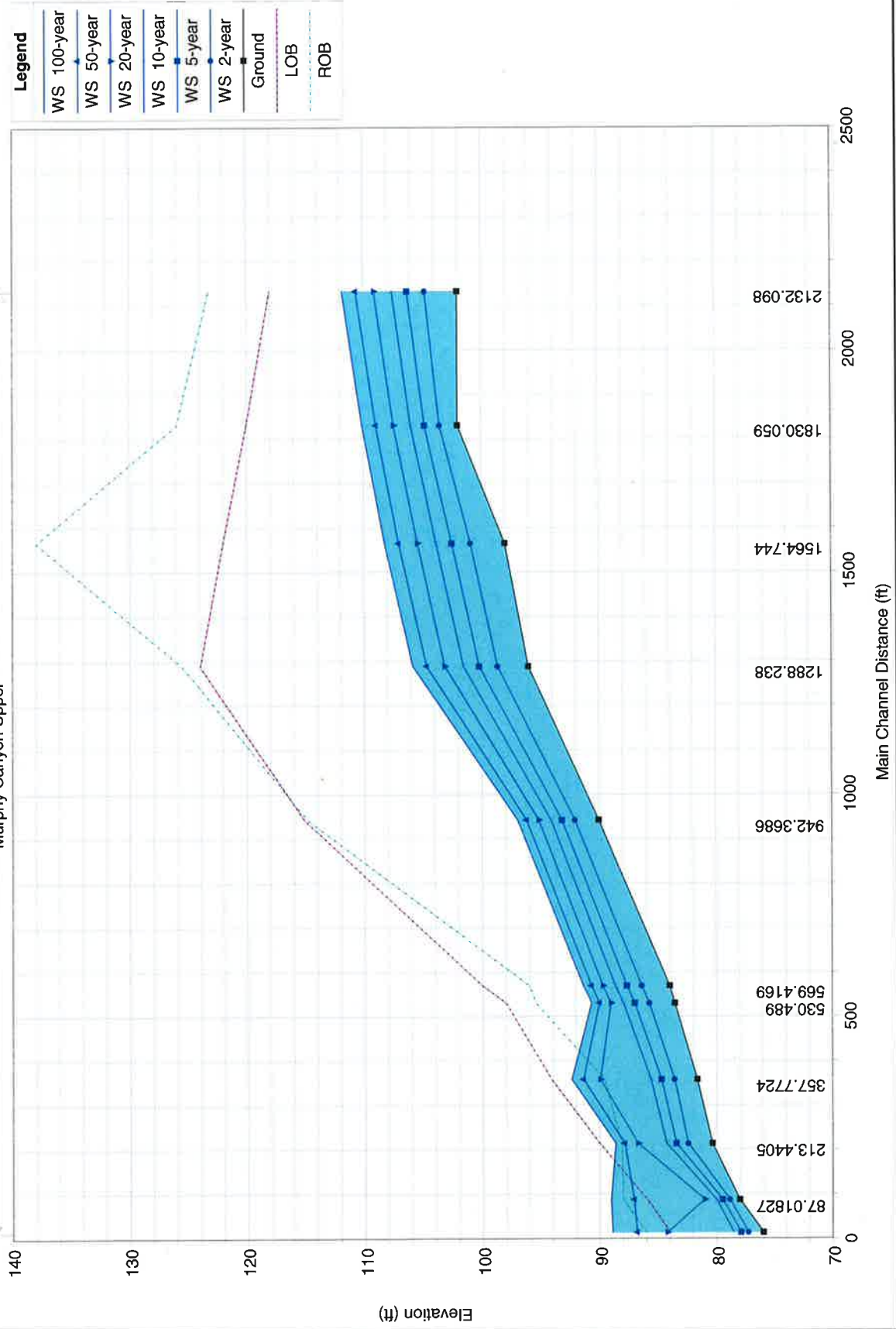
Murphy Canyon Lower Reach



Murphy Canyon - Reach 58A Plan: URS Maintained Vegetation Removed 4/17/2013 1:33:55 PM

Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

Murphy Canyon Upper

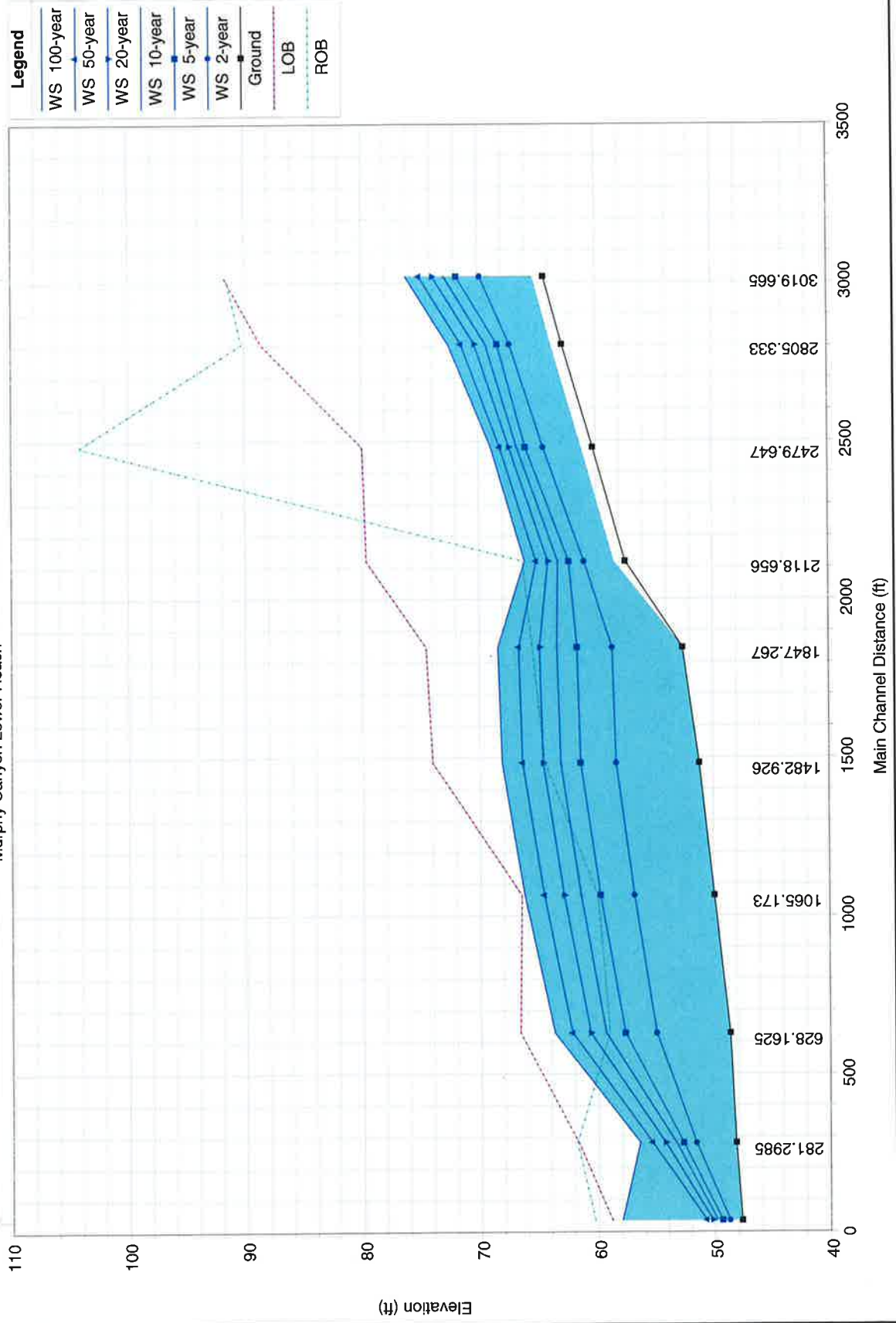


**HYDRAULIC PROFILES FOR MAINTAINED CONDITION MODEL
(SEDIMENT REMOVED)**

Murphy Canyon - Reach 58	Plan: Maintained Condition	Sediment Removed	4/18/2013 12:38:45 PM
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Geom:	Maintained	Condition	Sediment	Removed	Flow:	Murphy

Murphy Canyon Lower Reach



DETAILED HYDRAULIC RESULTS FOR CURRENT VEGETATED CONDITION MODEL

HEC-RAS Plan: Actual Condition River: Murphy Canyon Reach: Lower Reach

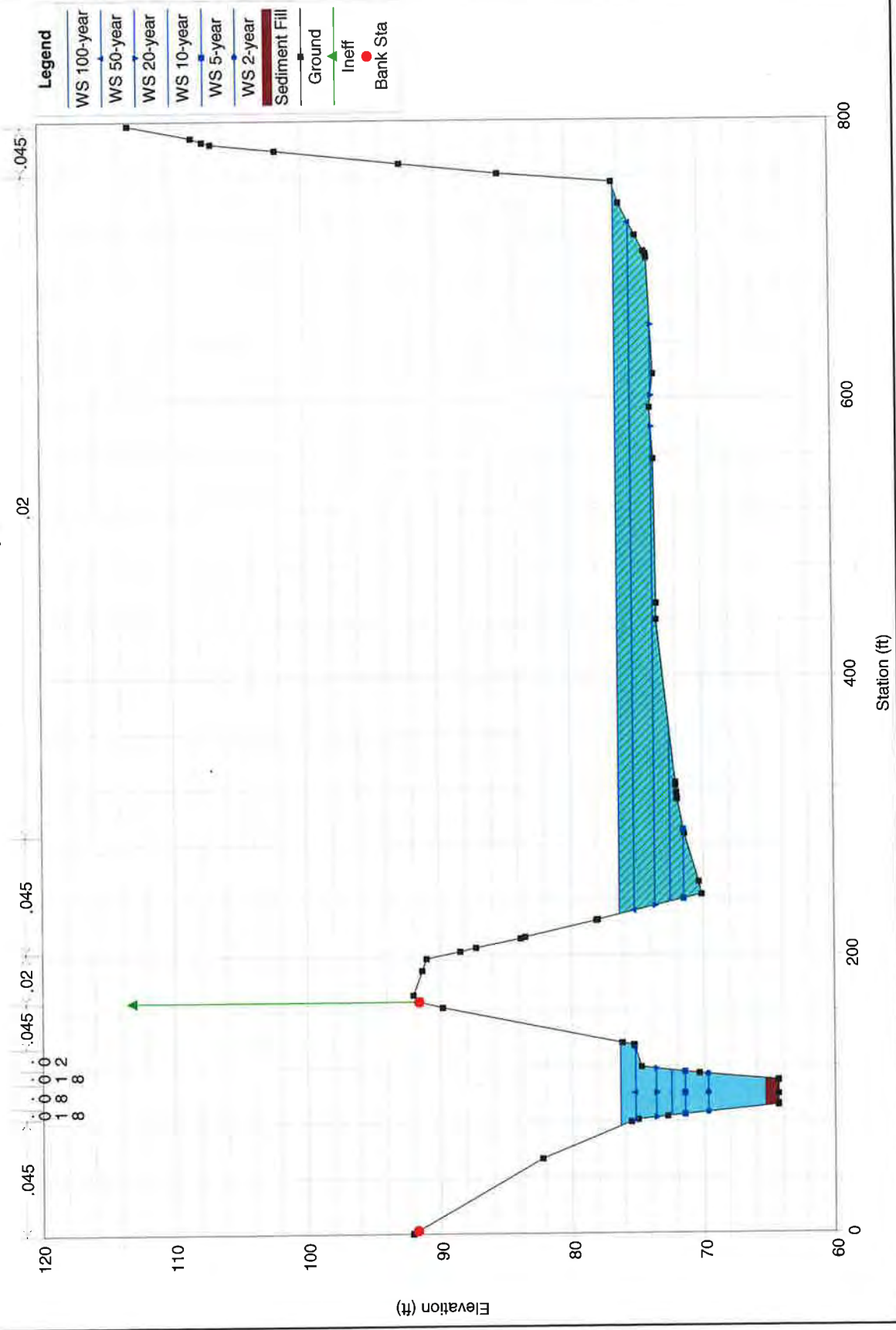
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Lower Reach	3019.665	100-year	3500.00	65.35	76.34	74.05	77.89	0.009295	9.99	350.50	581.93	0.73
Lower Reach	3019.665	50-year	2700.00	65.35	75.22	72.81	76.60	0.009155	9.44	286.14	546.01	0.71
Lower Reach	3019.665	20-year	2000.00	65.35	73.64	71.58	74.87	0.009346	8.89	224.94	429.91	0.62
Lower Reach	3019.665	10-year	1500.00	65.35	72.46	70.56	73.48	0.009625	8.12	184.78	156.66	0.60
Lower Reach	3019.665	5-year	1050.00	65.35	71.44	69.53	72.18	0.008763	6.89	152.46	80.44	0.54
Lower Reach	3019.665	2-year	510.00	65.35	69.68	67.99	70.07	0.007686	5.01	101.70	27.26	0.46
Lower Reach	2805.333	100-year	3500.00	63.79	75.81		76.67	0.002872	7.43	471.33	470.80	0.53
Lower Reach	2805.333	50-year	2700.00	63.79	74.59		75.38	0.003005	7.10	380.22	456.38	0.55
Lower Reach	2805.333	20-year	2000.00	63.79	72.69		73.58	0.003683	7.56	264.40	216.22	0.55
Lower Reach	2805.333	10-year	1500.00	63.79	70.89		71.87	0.005942	7.95	188.56	178.10	0.64
Lower Reach	2805.333	5-year	1050.00	63.79	69.52		70.41	0.007625	7.56	138.88	96.85	0.66
Lower Reach	2805.333	2-year	510.00	63.79	67.90		68.42	0.007631	5.78	88.22	37.64	0.58
Lower Reach	2479.647	100-year	3500.00	61.23	75.53		75.97	0.001171	5.32	657.56	141.26	0.33
Lower Reach	2479.647	50-year	2700.00	61.23	74.35		74.71	0.001043	4.80	562.18	130.56	0.32
Lower Reach	2479.647	20-year	2000.00	61.23	72.43		72.78	0.001205	4.77	419.31	112.10	0.34
Lower Reach	2479.647	10-year	1500.00	61.23	70.34		70.76	0.001698	5.21	288.01	83.90	0.39
Lower Reach	2479.647	5-year	1050.00	61.23	68.46		68.90	0.002681	5.31	197.66	67.59	0.44
Lower Reach	2479.647	2-year	510.00	61.23	65.80		66.23	0.005860	5.23	97.50	31.66	0.53
Lower Reach	2118.656	100-year	3500.00	58.49	75.06		75.52	0.001316	5.47	639.80	634.26	0.29
Lower Reach	2118.656	50-year	2700.00	58.49	73.99		74.33	0.001038	4.66	579.85	630.44	0.25
Lower Reach	2118.656	20-year	2000.00	58.49	72.09		72.36	0.000995	4.18	477.96	623.62	0.24
Lower Reach	2118.656	10-year	1500.00	58.49	69.96		70.21	0.001168	4.04	371.68	613.45	0.26
Lower Reach	2118.656	5-year	1050.00	58.49	67.95		68.17	0.001337	3.76	279.20	232.14	0.26
Lower Reach	2118.656	2-year	510.00	58.49	64.73		64.91	0.002258	3.43	148.74	35.21	0.29
Lower Reach	1847.267	100-year	3500.00	56.08	74.60	64.90	74.91	0.003767	4.46	785.13	1423.51	0.28
Lower Reach	1847.267	50-year	2700.00	56.08	73.59	63.57	73.82	0.003573	3.92	688.62	1297.01	0.25
Lower Reach	1847.267	20-year	2000.00	56.08	71.61	62.25	71.84	0.004852	3.82	523.00	1094.61	0.26
Lower Reach	1847.267	10-year	1500.00	56.08	69.47	61.17	69.69	0.003495	3.72	402.86	863.58	0.22
Lower Reach	1847.267	5-year	1050.00	56.08	67.43	60.09	67.60	0.003529	3.29	319.14	677.54	0.20
Lower Reach	1847.267	2-year	510.00	56.08	64.05	58.59	64.14	0.003422	2.50	203.96	53.29	0.17
Lower Reach	1482.926	100-year	3500.00	53.63	74.44		74.59	0.003915	3.12	1123.09	1192.81	0.17
Lower Reach	1482.926	50-year	2700.00	53.63	72.31		72.44	0.003884	2.89	934.60	1060.82	0.15
Lower Reach	1482.926	20-year	2000.00	53.63	70.13		70.23	0.003830	2.61	766.77	969.27	0.14
Lower Reach	1482.926	10-year	1500.00	53.63	68.23		68.31	0.003856	2.38	631.57	921.98	0.14
Lower Reach	1482.926	5-year	1050.00	53.63	66.13		66.20	0.003994	2.13	493.37	867.55	0.13

HEC-RAS Plan: Actual Condition River: Murphy Canyon Reach: Lower Reach (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Lower Reach	1482.926	2-year	510.00	53.63	62.73		62.77	0.004035	1.73	295.56	778.67	0.13
Lower Reach	1065.173	100-year	3500.00	51.52	72.05		72.62	0.005529	3.17	1033.90	816.14	0.14
Lower Reach	1065.173	50-year	2700.00	51.52	70.06		70.51	0.005377	2.94	873.91	778.94	0.14
Lower Reach	1065.173	20-year	2000.00	51.52	68.10		68.39	0.005044	2.64	739.00	774.72	0.14
Lower Reach	1065.173	10-year	1500.00	51.52	66.33		66.52	0.004730	2.35	624.88	768.14	0.13
Lower Reach	1065.173	5-year	1050.00	51.52	64.36		64.47	0.004306	2.05	505.27	725.63	0.12
Lower Reach	1065.173	2-year	510.00	51.52	61.13		61.17	0.003657	1.55	328.15	639.97	0.11
Lower Reach	628.1625	100-year	3500.00	50.12	69.13		69.39	0.009685	4.08	858.81	1060.62	0.20
Lower Reach	628.1625	50-year	2700.00	50.12	67.19		67.40	0.009343	3.70	730.08	1008.55	0.20
Lower Reach	628.1625	20-year	2000.00	50.12	65.34		65.51	0.008663	3.27	611.07	880.49	0.18
Lower Reach	628.1625	10-year	1500.00	50.12	63.73		63.86	0.008005	2.91	515.97	819.76	0.17
Lower Reach	628.1625	5-year	1050.00	50.12	61.97		62.06	0.007253	2.50	419.93	765.05	0.16
Lower Reach	628.1625	2-year	510.00	50.12	59.10		59.15	0.005998	1.84	277.46	688.97	0.13
Lower Reach	281.2985	100-year	3500.00	50.25	58.37		60.29	0.189608	11.10	315.39	789.96	0.82
Lower Reach	281.2985	50-year	2700.00	50.25	58.48	56.54	59.58	0.107245	8.40	321.51	801.97	0.62
Lower Reach	281.2985	20-year	2000.00	50.25	57.53	55.54	58.38	0.093295	7.40	270.12	723.98	0.57
Lower Reach	281.2985	10-year	1500.00	50.25	56.71	54.73	57.38	0.081321	6.55	229.03	698.09	0.53
Lower Reach	281.2985	5-year	1050.00	50.25	55.81	53.87	56.30	0.068616	5.61	187.13	612.33	0.48
Lower Reach	281.2985	2-year	510.00	50.25	54.31	52.57	54.57	0.048857	4.09	124.68	373.06	0.40
Lower Reach	36.18799	100-year	3500.00	47.65	58.00	50.66	58.09	0.002055	2.35	1490.84	839.43	0.14
Lower Reach	36.18799	50-year	2700.00	47.65	53.35	50.20	53.56	0.010002	3.59	751.25	538.50	0.28
Lower Reach	36.18799	20-year	2000.00	47.65	52.45	49.74	52.61	0.010002	3.24	617.73	491.02	0.28
Lower Reach	36.18799	10-year	1500.00	47.65	51.71	49.38	51.84	0.010007	2.93	512.36	450.11	0.27
Lower Reach	36.18799	5-year	1050.00	47.65	50.94	49.02	51.04	0.010006	2.58	407.38	239.06	0.26
Lower Reach	36.18799	2-year	510.00	47.65	49.80	48.50	49.86	0.010006	1.98	257.89	127.09	0.24

Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

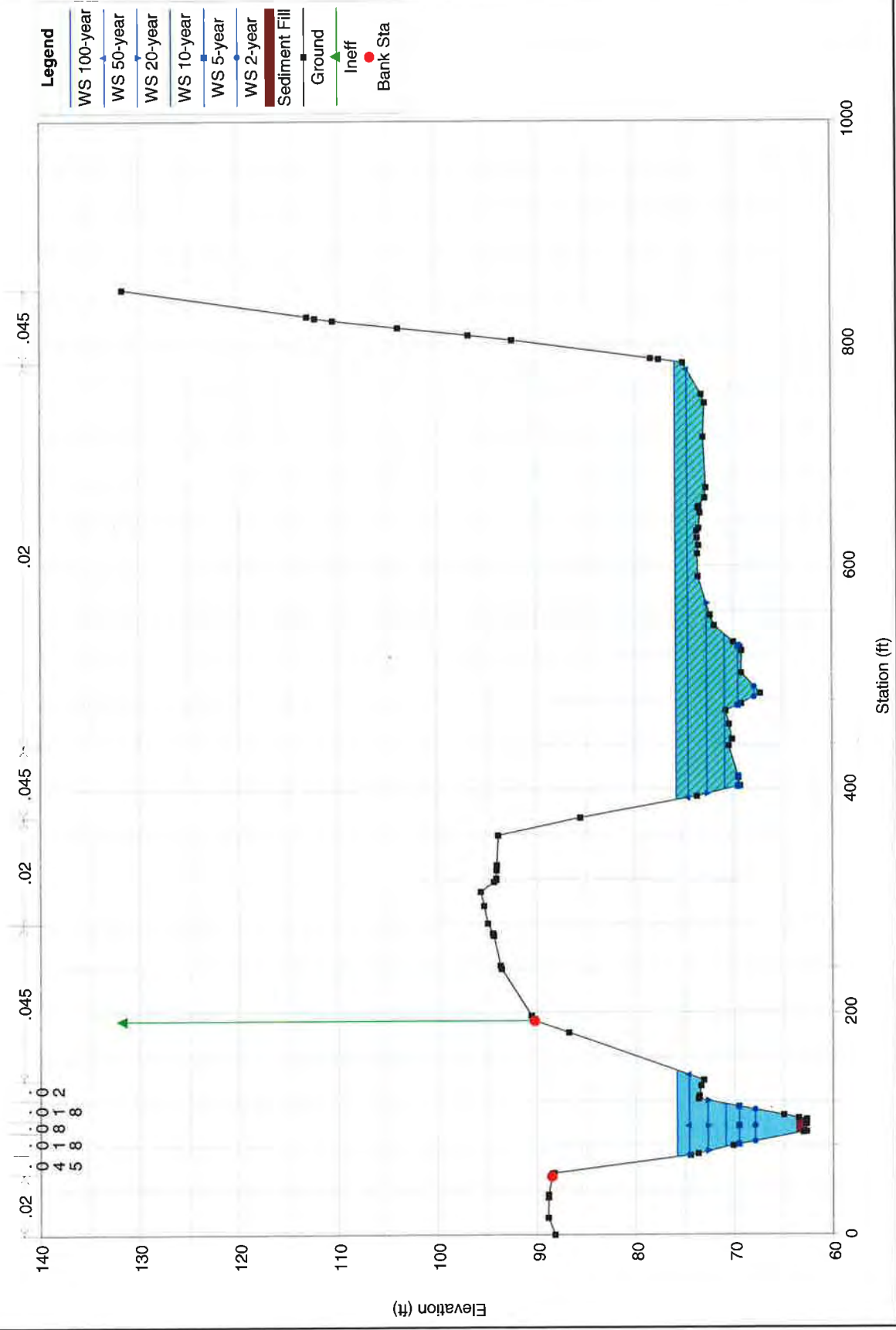
Geom: Actual Vegetated Condition Flow: Murphy
RS = 3019.665 U.S. Limit of Analysis



Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

Geom: Actual Vegetated Condition Flow: Murphy

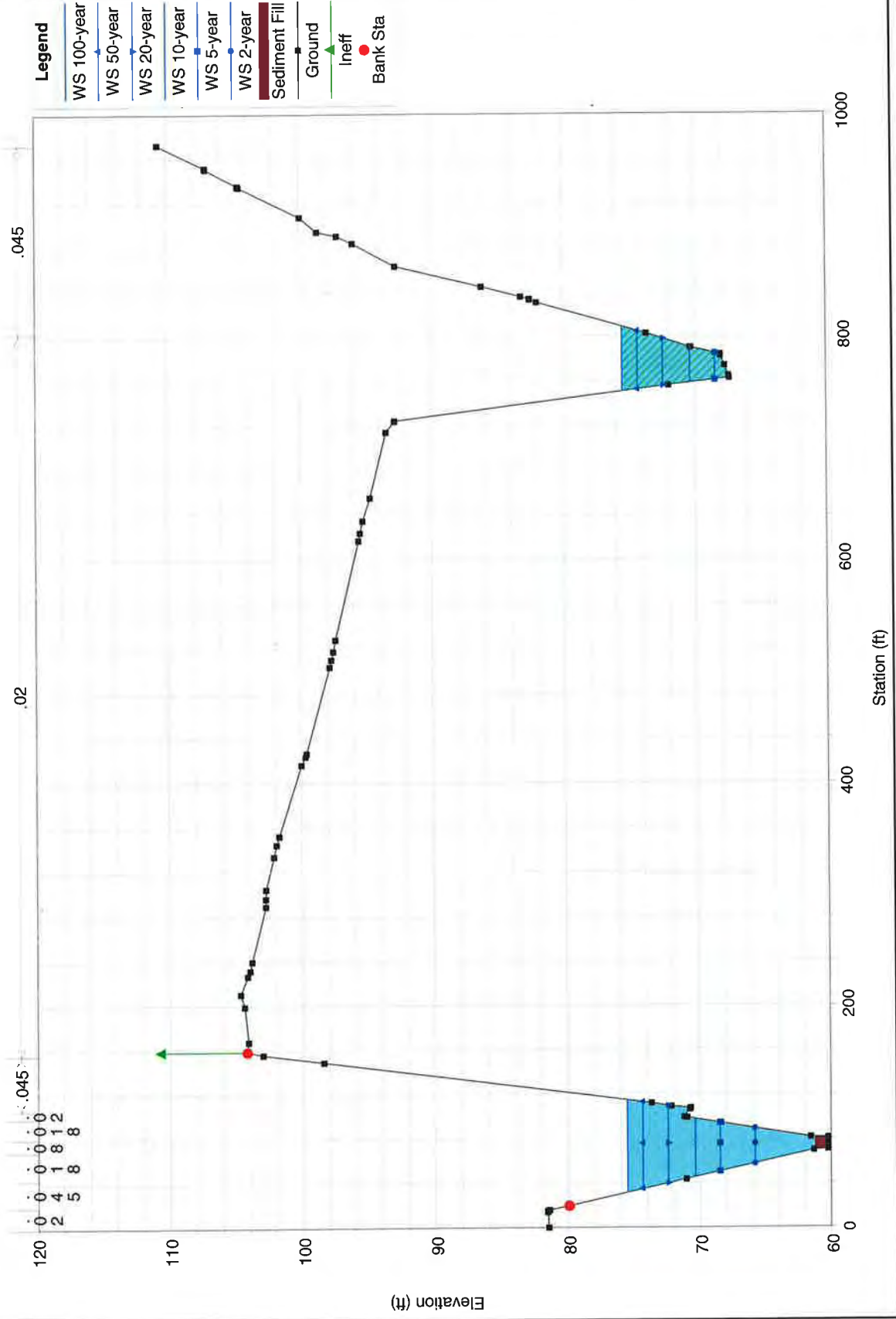
RS = 2805.333



Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

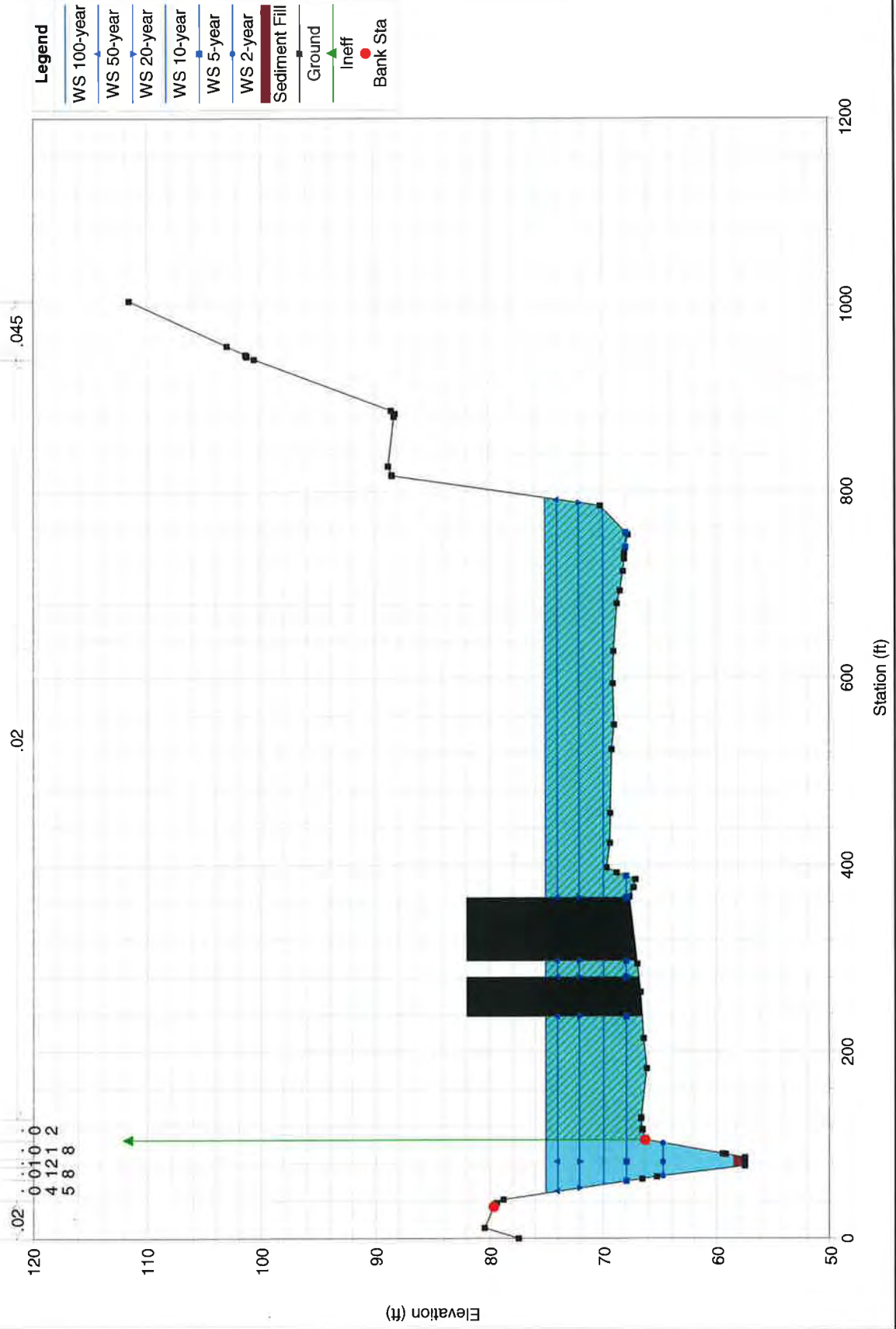
Geom: Actual Vegetated Condition Flow: Murphy

RS = 2479.647 d/s of Friars Road



Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

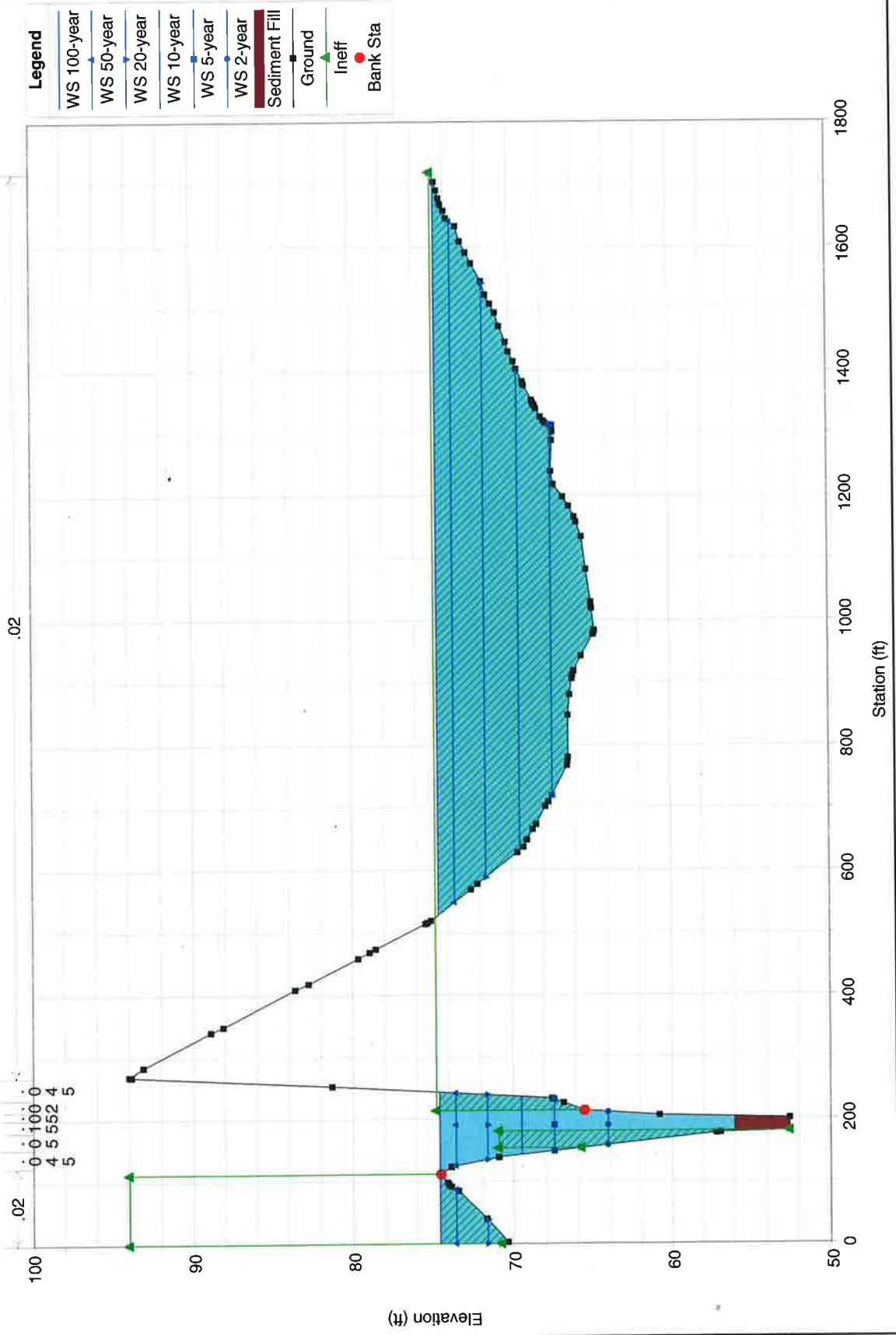
Geom: Actual Vegetated Condition Flow: Murphy
RS = 2118.656 adjacent to tank farm - Southern Pacific Pipe Lines Partnership



Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

Geom: Actual Vegetated Condition Flow: Murphy

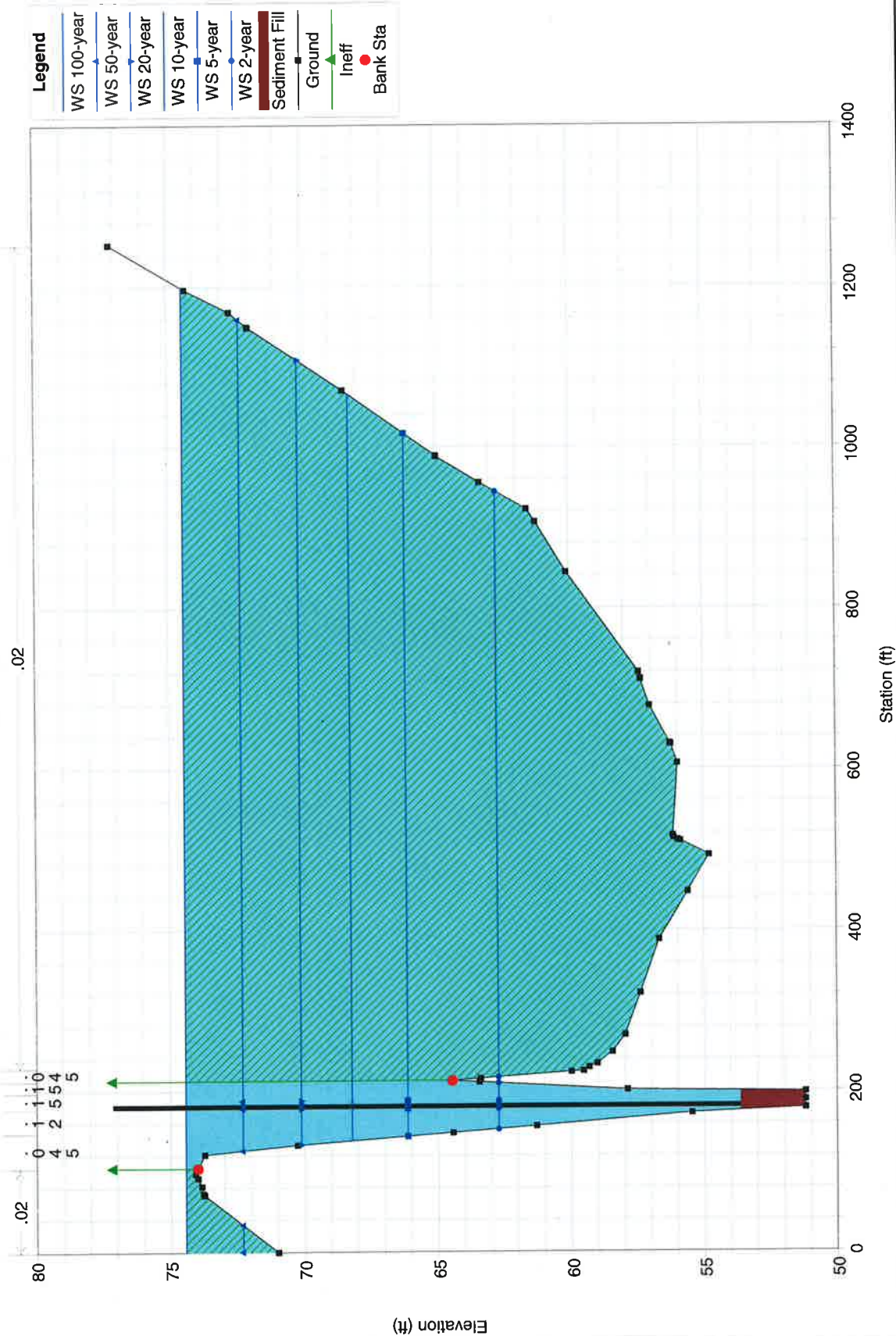
RS = 1847.267 u/s end of Qualcomm parking lot - conc channel ends approximatel



Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

Geom: Actual Vegetated Condition Flow: Murphy

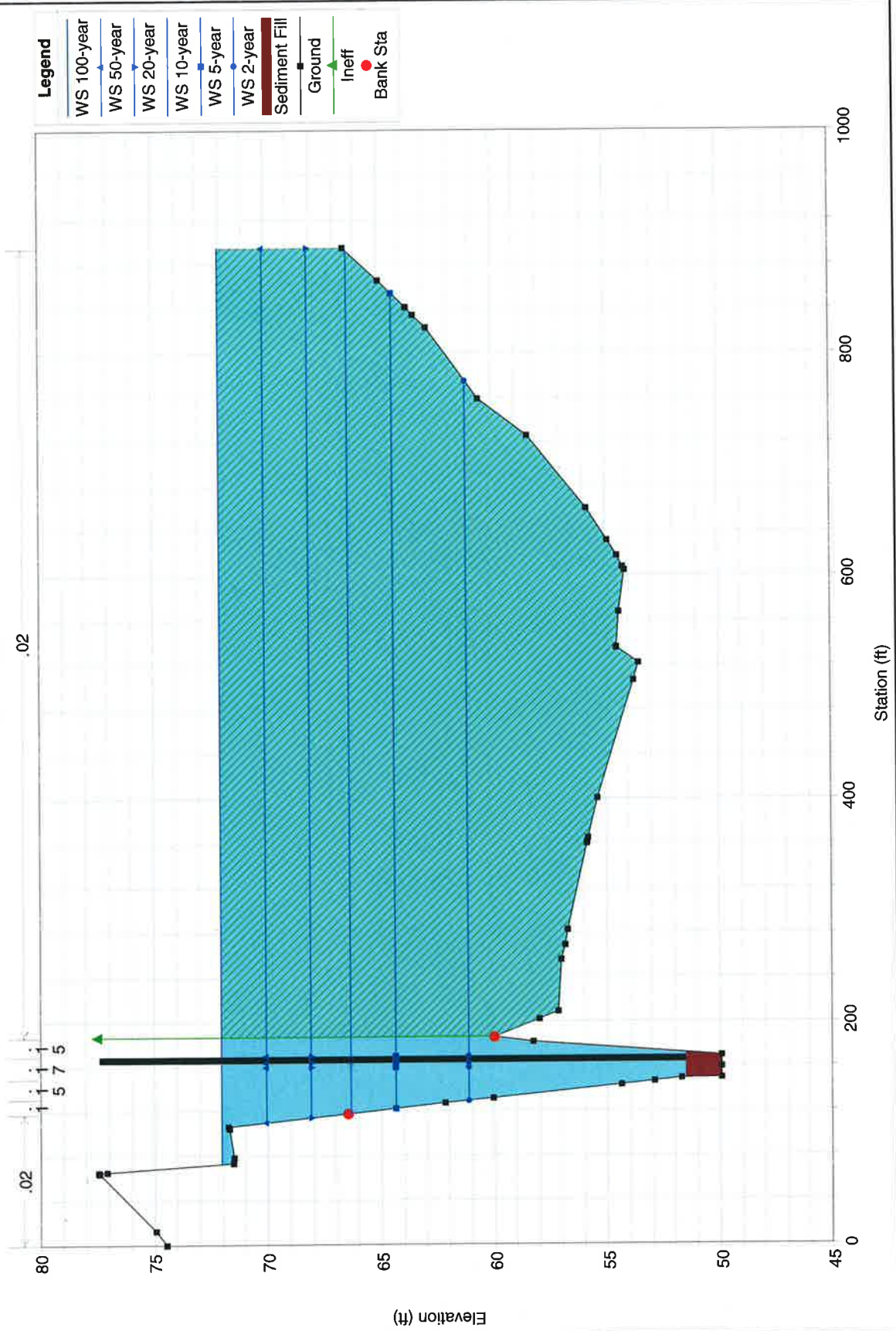
RS = 1482.926



Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

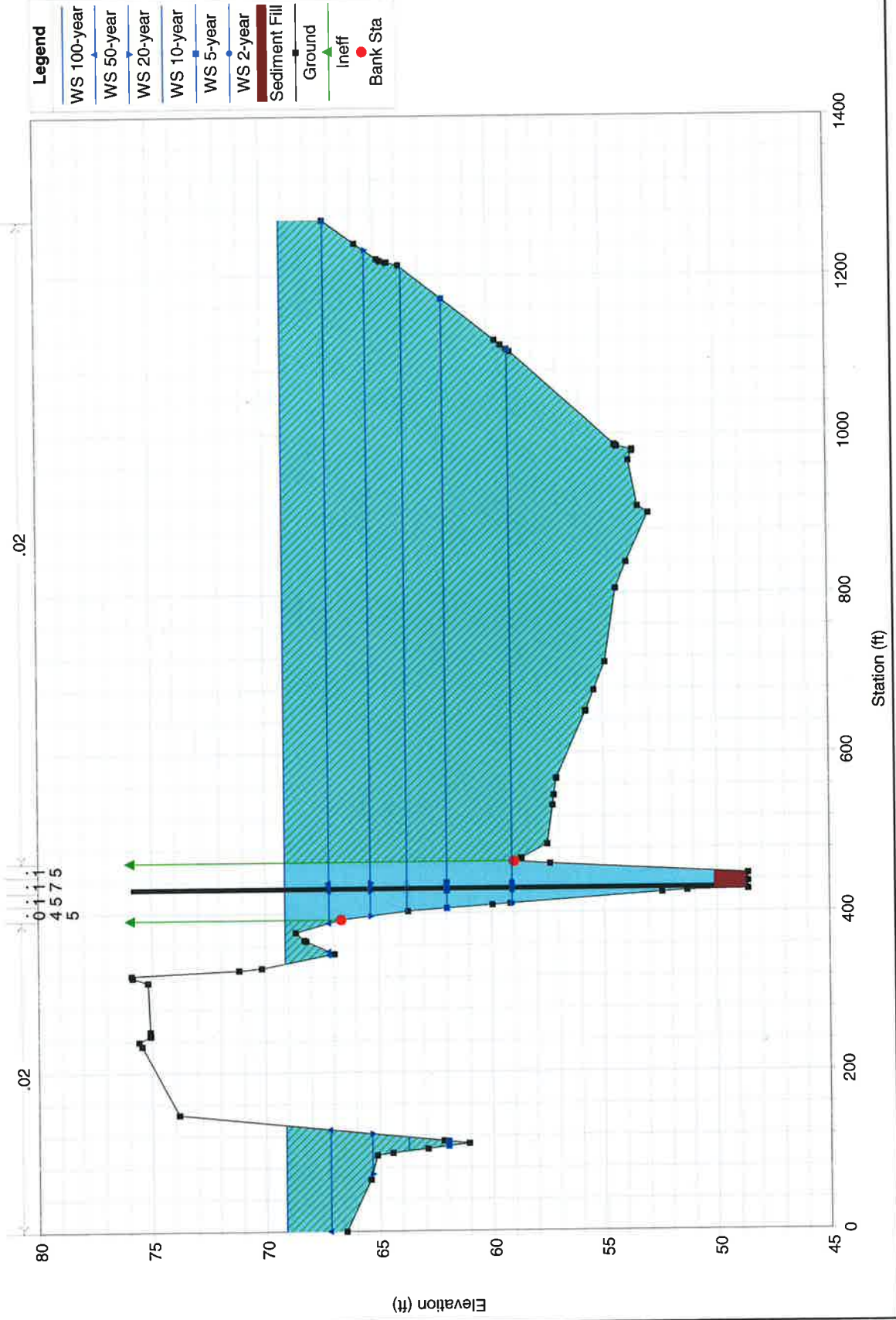
Geom: Actual Vegetated Condition Flow: Murphy

RS = 1065.173



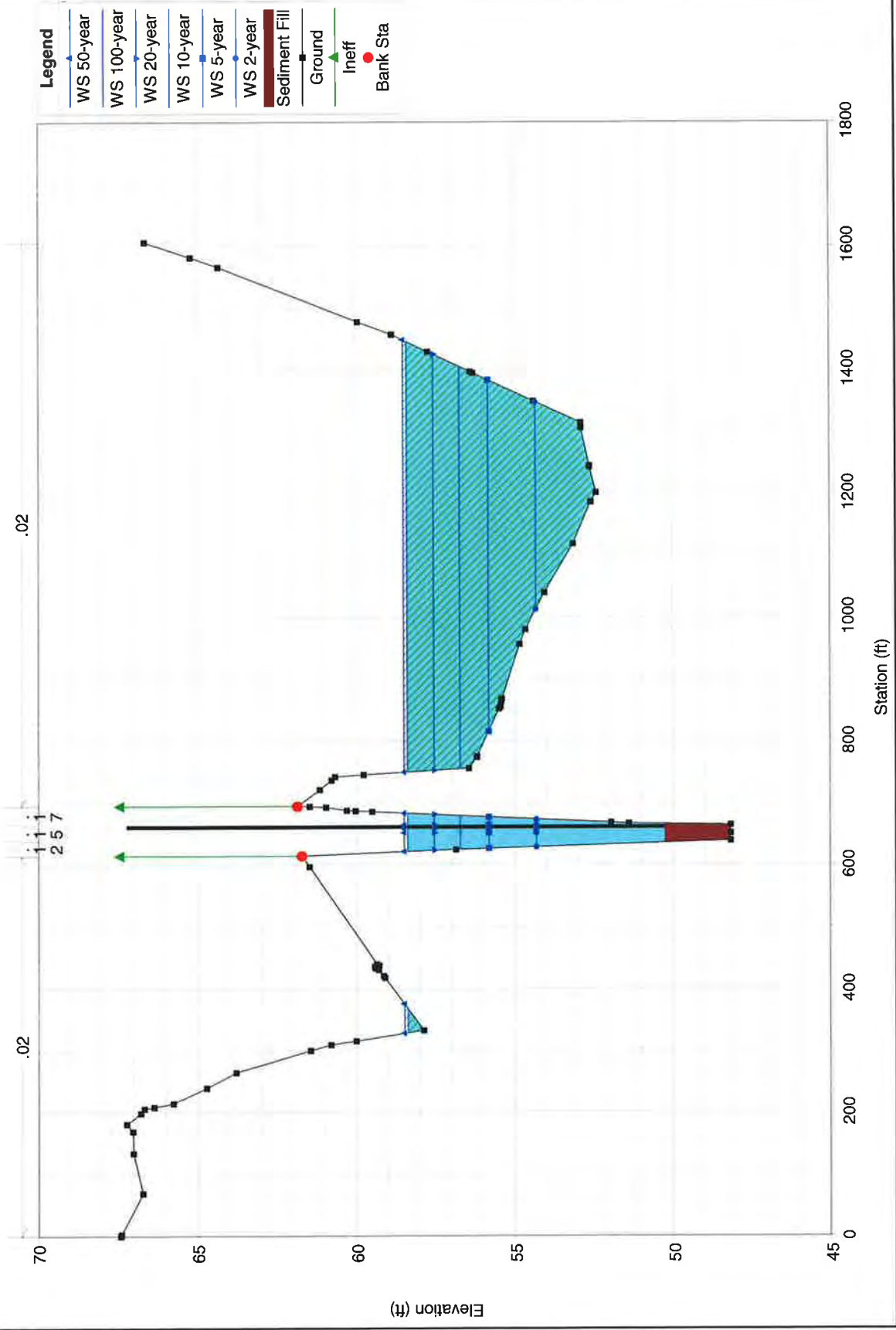
Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

Geom: Actual Vegetated Condition Flow: Murphy
RS = 628.1625 d/s end of Qualcomm parking - u/s of bridge crossings



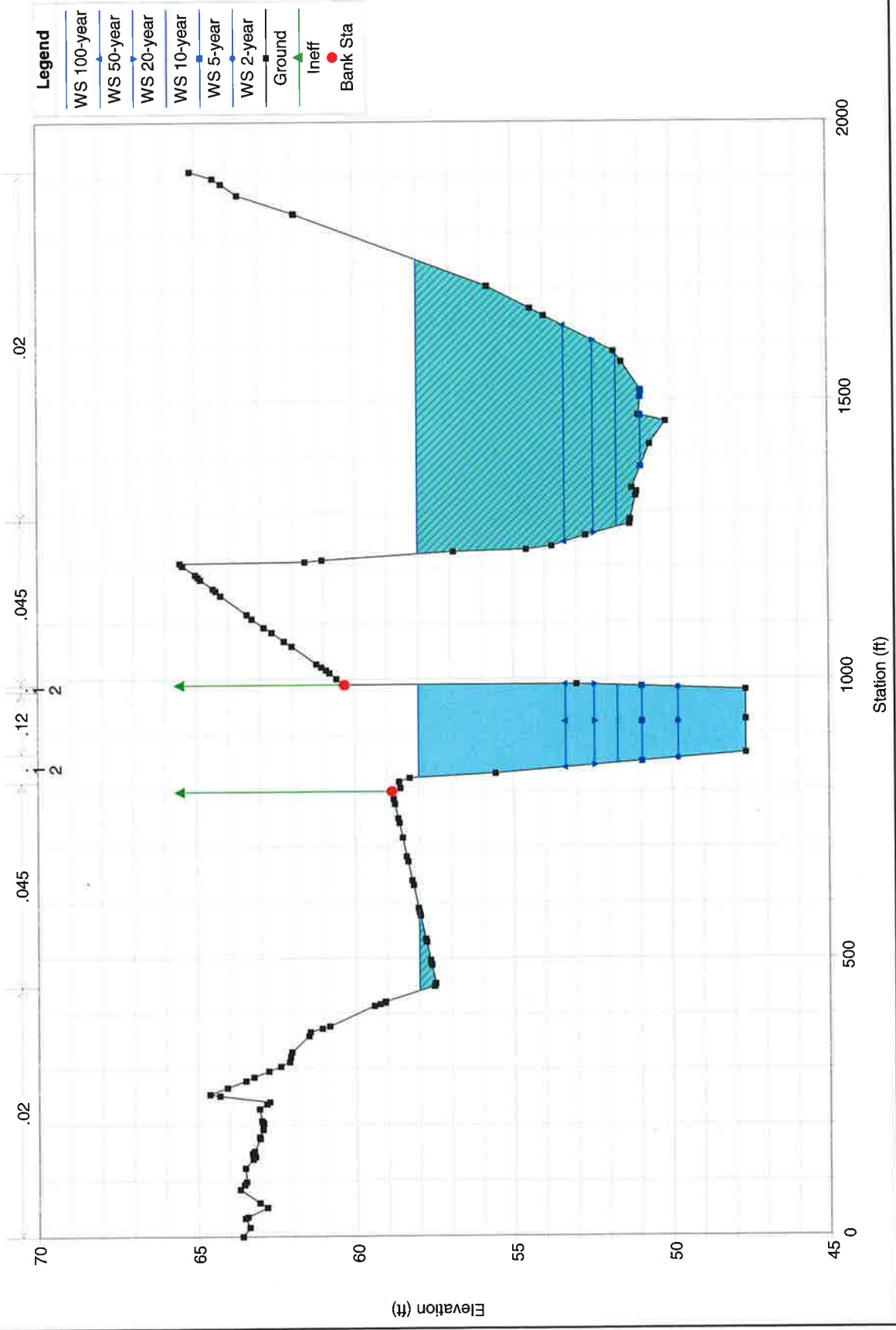
Murphy Canyon - Reach 58 Plan: Actual Vegetated Condition 5/6/2013 3:02:22 PM

Geom: Actual Vegetated Condition Flow: Murphy
RS = 281.2985



h 58 Plan: Actual Vegetated Condition

RS = 36.18799



HEC-RAS Plan: Actual Vegetated River: Murphy Canyon Reach: Upper

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper	2132.098	100-year	3000.00	102.00	113.24	106.55	113.51	0.007122	4.18	717.36	76.12	0.24
Upper	2132.098	50-year	2400.00	102.00	112.03	105.94	112.26	0.006579	3.83	627.23	73.44	0.23
Upper	2132.098	20-year	1700.00	102.00	110.42	105.15	110.59	0.005771	3.32	511.93	69.99	0.22
Upper	2132.098	10-year	1100.00	102.00	108.78	104.37	108.89	0.004823	2.75	399.68	66.42	0.20
Upper	2132.098	5-year	680.00	102.00	107.34	103.73	107.42	0.003924	2.22	306.51	63.31	0.18
Upper	2132.098	2-year	300.00	102.00	105.58	103.01	105.62	0.002721	1.51	198.54	59.47	0.15
Upper	1830.059	100-year	3000.00	102.00	110.87		111.19	0.008238	4.53	662.09	91.08	0.30
Upper	1830.059	50-year	2400.00	102.00	109.70		109.99	0.008600	4.30	557.94	86.87	0.30
Upper	1830.059	20-year	1700.00	102.00	108.18		108.42	0.009164	3.96	429.70	81.17	0.30
Upper	1830.059	10-year	1100.00	102.00	106.68		106.87	0.009812	3.52	312.10	75.54	0.31
Upper	1830.059	5-year	680.00	102.00	105.46		105.61	0.010240	3.05	223.18	70.95	0.30
Upper	1830.059	2-year	300.00	102.00	104.05		104.13	0.011422	2.37	126.57	65.63	0.30
Upper	1564.744	100-year	3000.00	98.00	108.65		108.99	0.008366	4.69	639.85	82.30	0.30
Upper	1564.744	50-year	2400.00	98.00	107.40		107.71	0.008587	4.44	540.18	77.91	0.30
Upper	1564.744	20-year	1700.00	98.00	105.76		106.02	0.008940	4.08	417.03	72.09	0.30
Upper	1564.744	10-year	1100.00	98.00	104.11		104.31	0.009485	3.64	302.44	66.57	0.30
Upper	1564.744	5-year	680.00	98.00	102.71		102.87	0.010359	3.20	212.68	62.30	0.30
Upper	1564.744	2-year	300.00	98.00	101.05		101.16	0.011097	2.59	115.81	52.00	0.31
Upper	1288.238	100-year	3000.00	96.00	106.41		106.80	0.007438	5.06	592.78	67.93	0.30
Upper	1288.238	50-year	2400.00	96.00	105.20		105.54	0.007184	4.69	512.01	65.82	0.30
Upper	1288.238	20-year	1700.00	96.00	103.59		103.86	0.006848	4.16	408.67	63.00	0.29
Upper	1288.238	10-year	1100.00	96.00	101.96		102.16	0.006516	3.57	307.97	60.10	0.28
Upper	1288.238	5-year	680.00	96.00	100.54		100.69	0.006223	3.02	225.17	57.05	0.27
Upper	1288.238	2-year	300.00	96.00	98.88		98.96	0.005929	2.25	133.20	53.68	0.25
Upper	942.3686	100-year	3000.00	90.00	96.97	96.97	99.48	0.179762	12.73	235.67	47.02	1.00
Upper	942.3686	50-year	2400.00	90.00	96.19	96.19	98.42	0.182515	12.00	199.94	44.70	1.00
Upper	942.3686	20-year	1700.00	90.00	95.15	95.15	97.01	0.188379	10.96	155.11	41.59	1.00
Upper	942.3686	10-year	1100.00	90.00	94.10	94.10	95.57	0.196963	9.73	113.02	38.44	1.00
Upper	942.3686	5-year	680.00	90.00	93.16	93.16	94.32	0.209659	8.64	78.69	34.50	1.01
Upper	942.3686	2-year	300.00	90.00	92.06	92.06	92.80	0.229773	6.92	43.36	29.71	1.01
Upper	569.4169	100-year	3000.00	84.00	93.16	92.31	94.93	0.002852	10.68	280.90	382.44	0.80
Upper	569.4169	50-year	2400.00	84.00	90.83	91.51	93.88	0.003939	14.00	171.37	290.17	1.22
Upper	569.4169	20-year	1700.00	84.00	89.85	90.38	92.41	0.003983	12.86	132.23	162.25	1.20

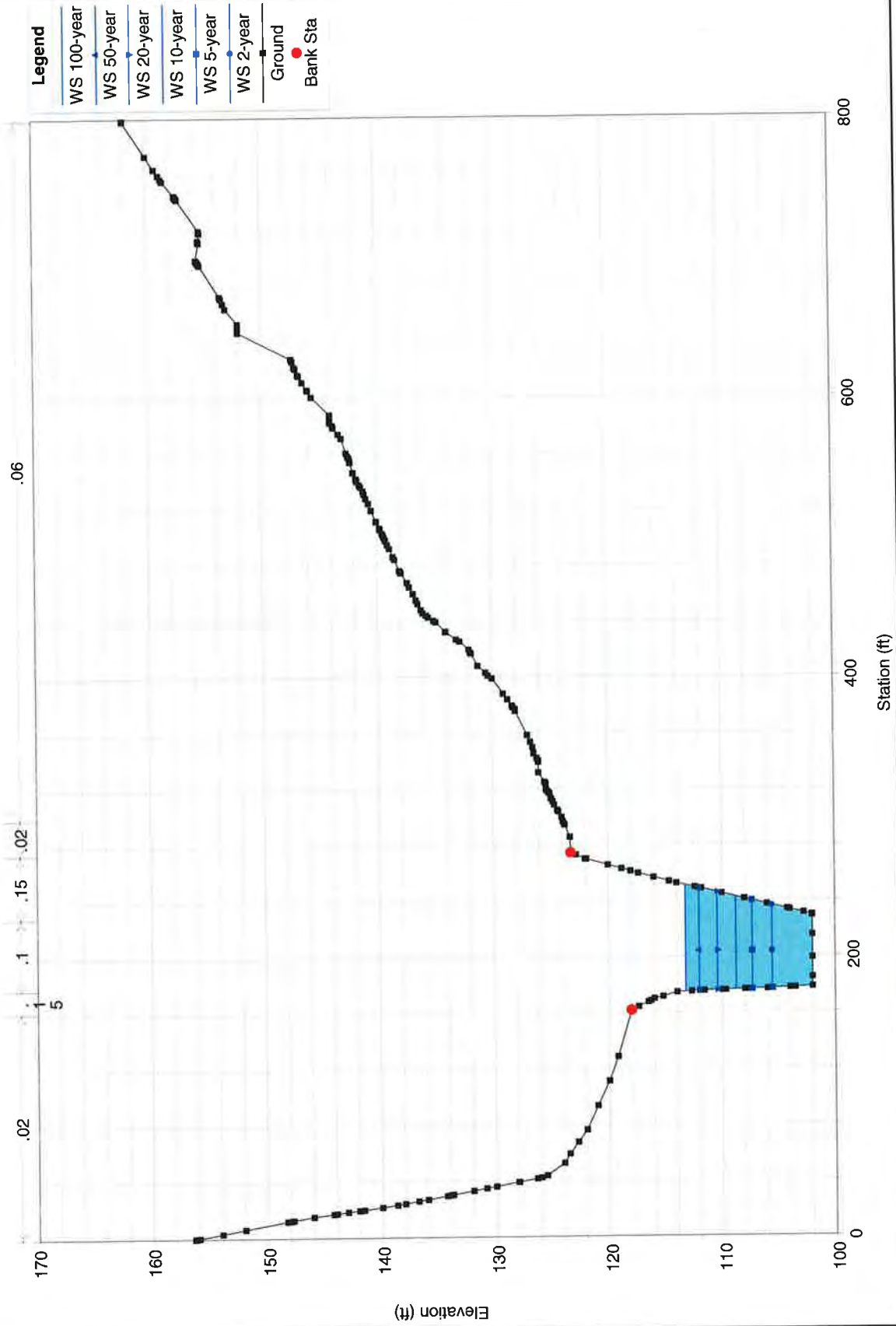
HEC-RAS Plan: Actual Vegetated River: Murphy Canyon Reach: Upper (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper	569.4169	10-year	1100.00	84.00	88.77	89.17	90.85	0.004084	11.57	95.05	118.63	1.18
Upper	569.4169	5-year	680.00	84.00	87.78	88.07	89.43	0.004234	10.32	65.92	26.89	1.16
Upper	569.4169	2-year	300.00	84.00	86.50	86.67	87.60	0.004497	8.42	35.64	20.50	1.13
Upper	530.489	100-year	3000.00	83.57	93.22	91.88	94.71	0.004193	9.81	305.80	400.85	0.71
Upper	530.489	50-year	2400.00	83.57	90.08	91.09	93.66	0.004728	15.19	157.97	331.18	1.36
Upper	530.489	20-year	1700.00	83.57	89.09	89.96	92.19	0.004928	14.13	120.34	56.24	1.35
Upper	530.489	10-year	1100.00	83.57	88.02	88.74	90.62	0.005264	12.94	85.02	36.76	1.36
Upper	530.489	5-year	680.00	83.57	87.04	87.65	89.18	0.005699	11.75	57.89	25.35	1.37
Upper	530.489	2-year	300.00	83.57	85.78	86.23	87.35	0.006833	10.06	29.82	19.03	1.42
Upper	357.7724	100-year	3000.00	81.65	92.43	89.96	93.51	0.010334	8.32	360.42	496.18	0.55
Upper	357.7724	50-year	2400.00	81.65	91.43	89.18	92.36	0.009948	7.73	310.27	486.98	0.55
Upper	357.7724	20-year	1700.00	81.65	89.98	88.05	90.77	0.010250	7.10	239.36	433.22	0.56
Upper	357.7724	10-year	1100.00	81.65	85.67	86.84	89.27	0.010358	15.23	72.21	28.03	1.67
Upper	357.7724	5-year	680.00	81.65	84.78	85.74	87.75	0.011236	13.83	49.15	23.51	1.69
Upper	357.7724	2-year	300.00	81.65	83.66	84.33	85.72	0.012579	11.53	26.02	17.94	1.69
Upper	213.4405	100-year	3000.00	80.37	88.63	88.63	91.12	0.026079	12.66	237.07	337.30	1.00
Upper	213.4405	50-year	2400.00	80.37	87.87	87.87	90.08	0.024911	11.93	201.16	274.64	1.00
Upper	213.4405	20-year	1700.00	80.37	86.74	86.74	88.66	0.019716	11.11	153.00	216.73	1.00
Upper	213.4405	10-year	1100.00	80.37	84.49	85.54	87.77	0.009116	14.51	75.79	65.34	1.58
Upper	213.4405	5-year	680.00	80.37	83.65	84.44	86.17	0.009013	12.73	53.40	54.04	1.52
Upper	213.4405	2-year	300.00	80.37	82.61	83.03	84.11	0.008169	9.84	30.48	42.10	1.38
Upper	87.01827	100-year	3000.00	78.01	89.05	84.40	89.51	0.001429	5.52	610.80	586.29	0.34
Upper	87.01827	50-year	2400.00	78.01	87.08	83.67	87.62	0.002140	5.92	411.41	241.85	0.41
Upper	87.01827	20-year	1700.00	78.01	81.05	82.67	86.34	0.012803	18.46	92.09	38.47	2.10
Upper	87.01827	10-year	1100.00	78.01	80.09	81.64	85.81	0.021861	19.20	57.29	33.97	2.61
Upper	87.01827	5-year	680.00	78.01	79.54	80.76	84.17	0.025311	17.28	39.36	30.63	2.69
Upper	87.01827	2-year	300.00	78.01	78.89	79.70	82.09	0.033462	14.37	20.88	26.55	2.86
Upper	13.30883	100-year	3000.00	76.00	88.92	83.67	89.41	0.001018	5.86	540.44	595.27	0.32
Upper	13.30883	50-year	2400.00	76.00	86.81	82.71	87.47	0.001794	6.69	377.48	319.38	0.41
Upper	13.30883	20-year	1700.00	76.00	84.23	81.47	85.09	0.001385	7.43	229.23	37.31	0.51
Upper	13.30883	10-year	1100.00	76.00	78.60	80.23	84.33	0.018438	19.21	57.26	27.17	2.33
Upper	13.30883	5-year	680.00	76.00	77.96	79.20	82.40	0.021378	16.90	40.23	26.44	2.41
Upper	13.30883	2-year	300.00	76.00	77.32	78.03	79.85	0.023171	12.74	23.54	25.72	2.35

Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

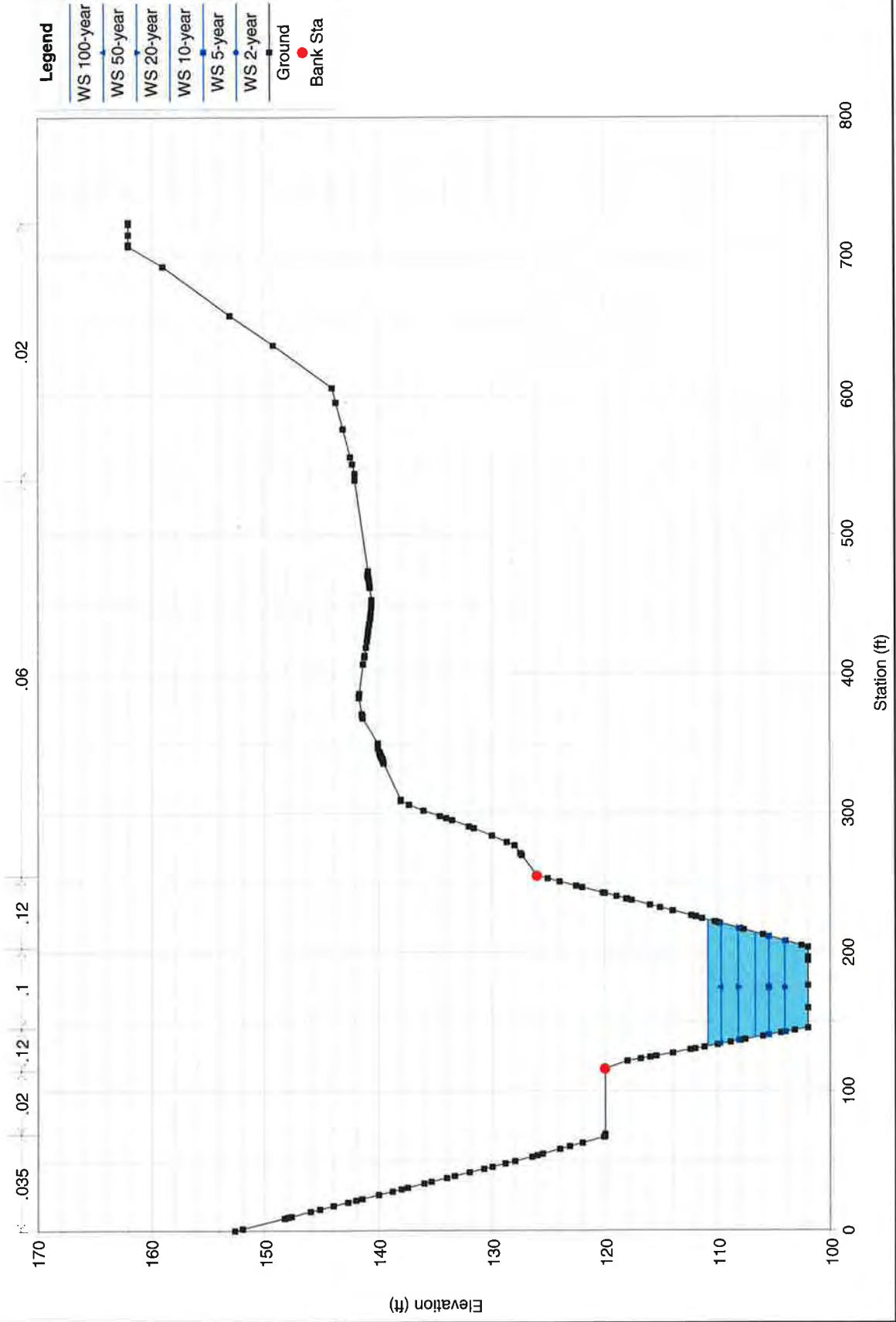
RS = 2132.098



Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

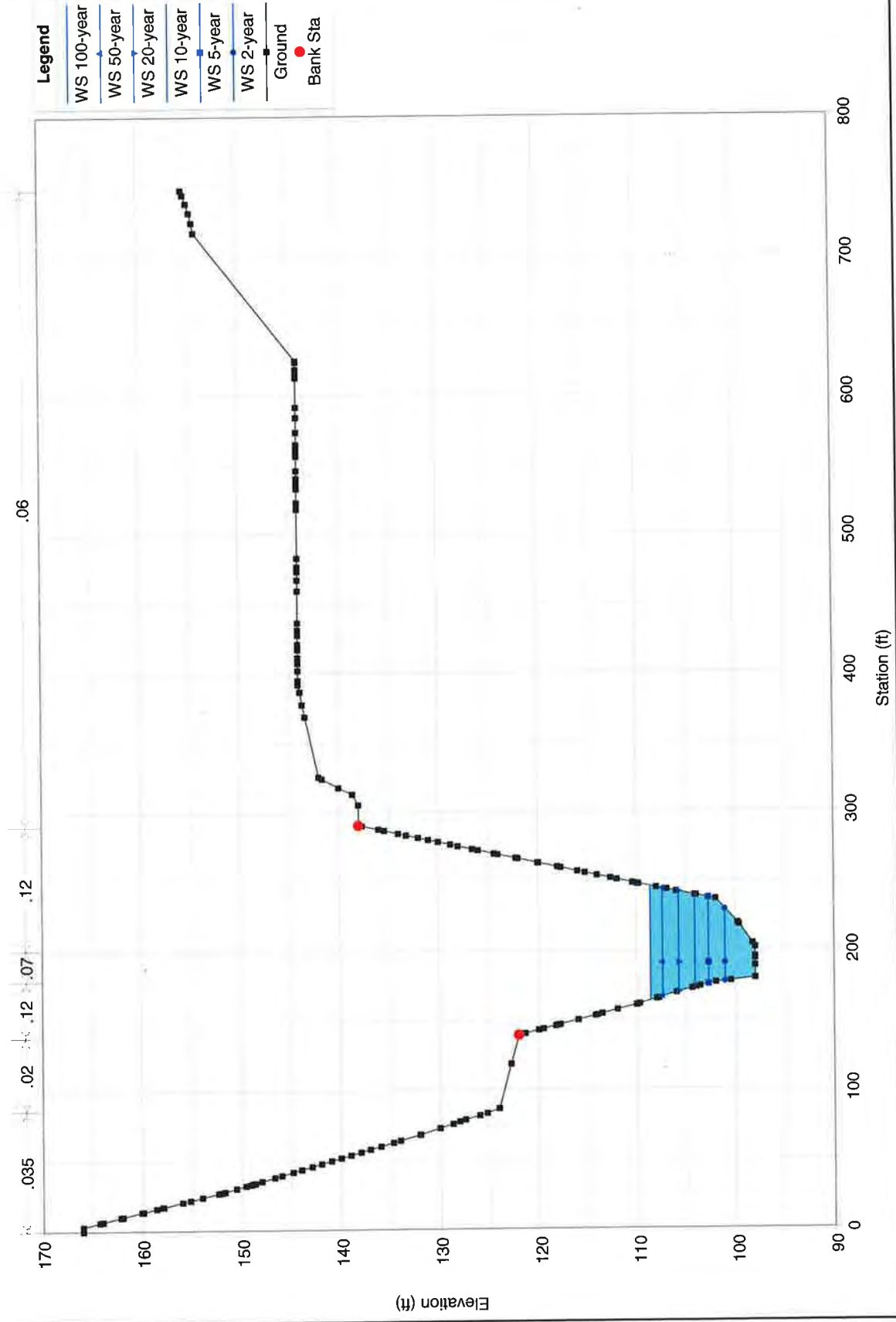
Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

RS = 1830.059



Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

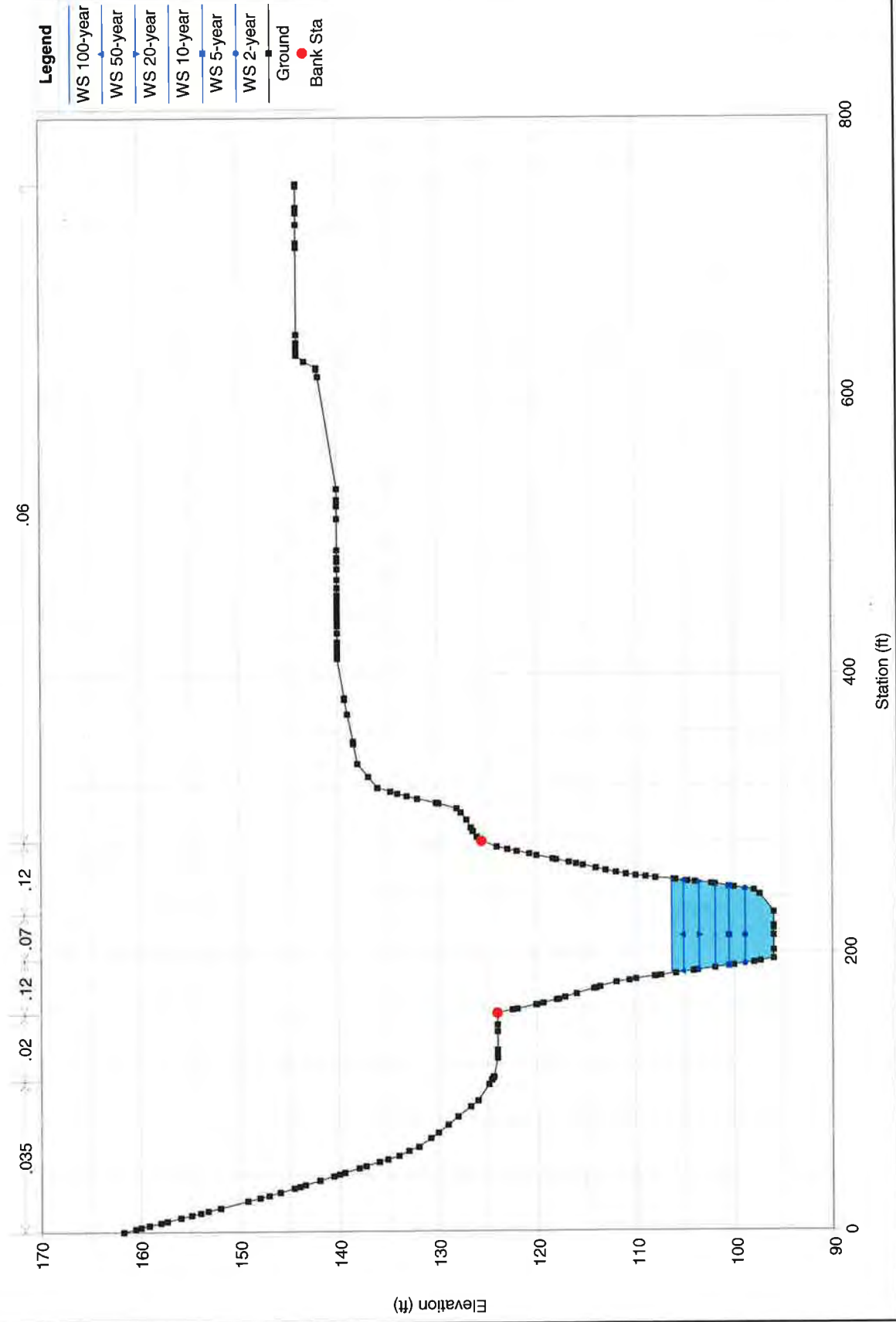
Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper
RS = 1564.744



Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

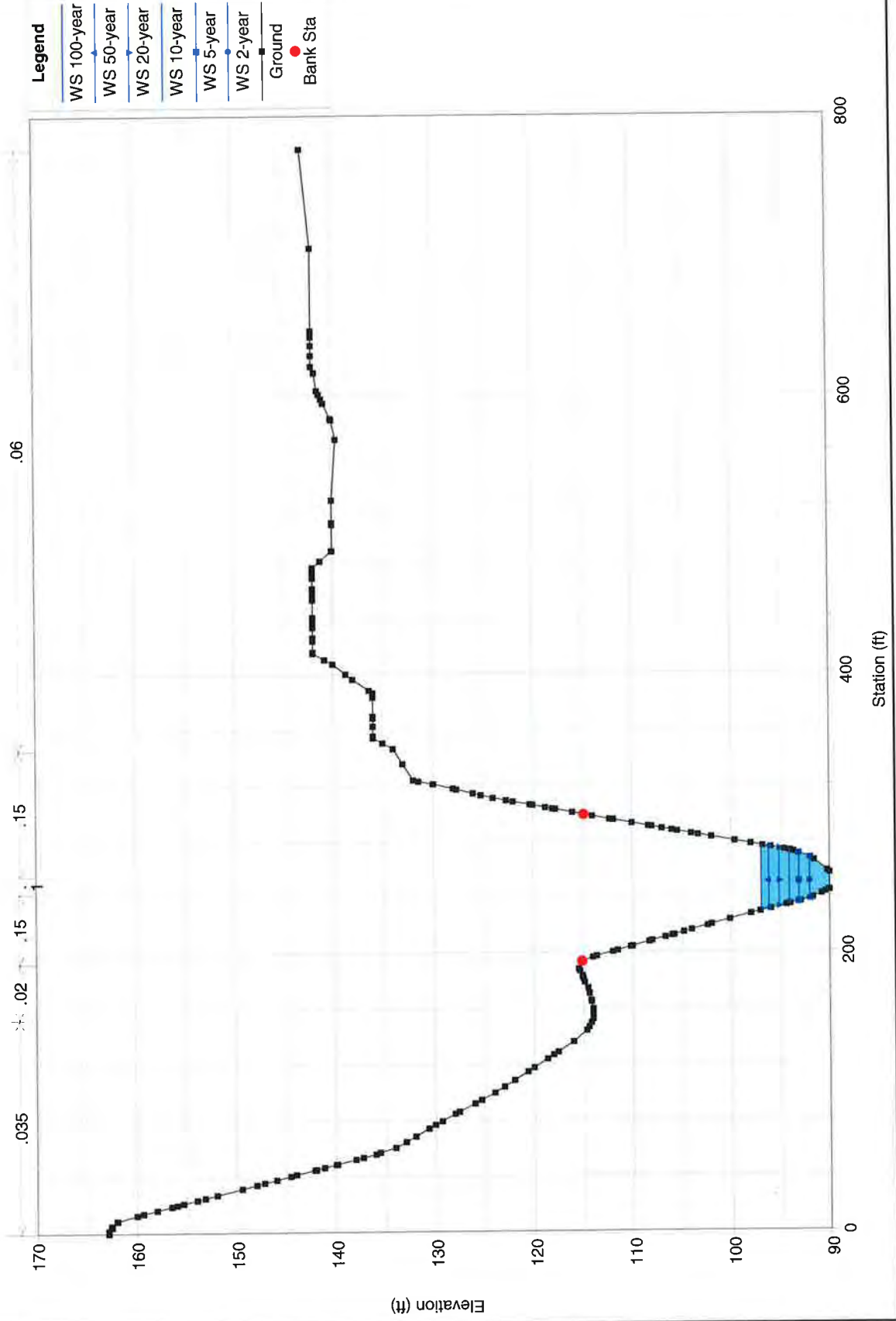
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Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

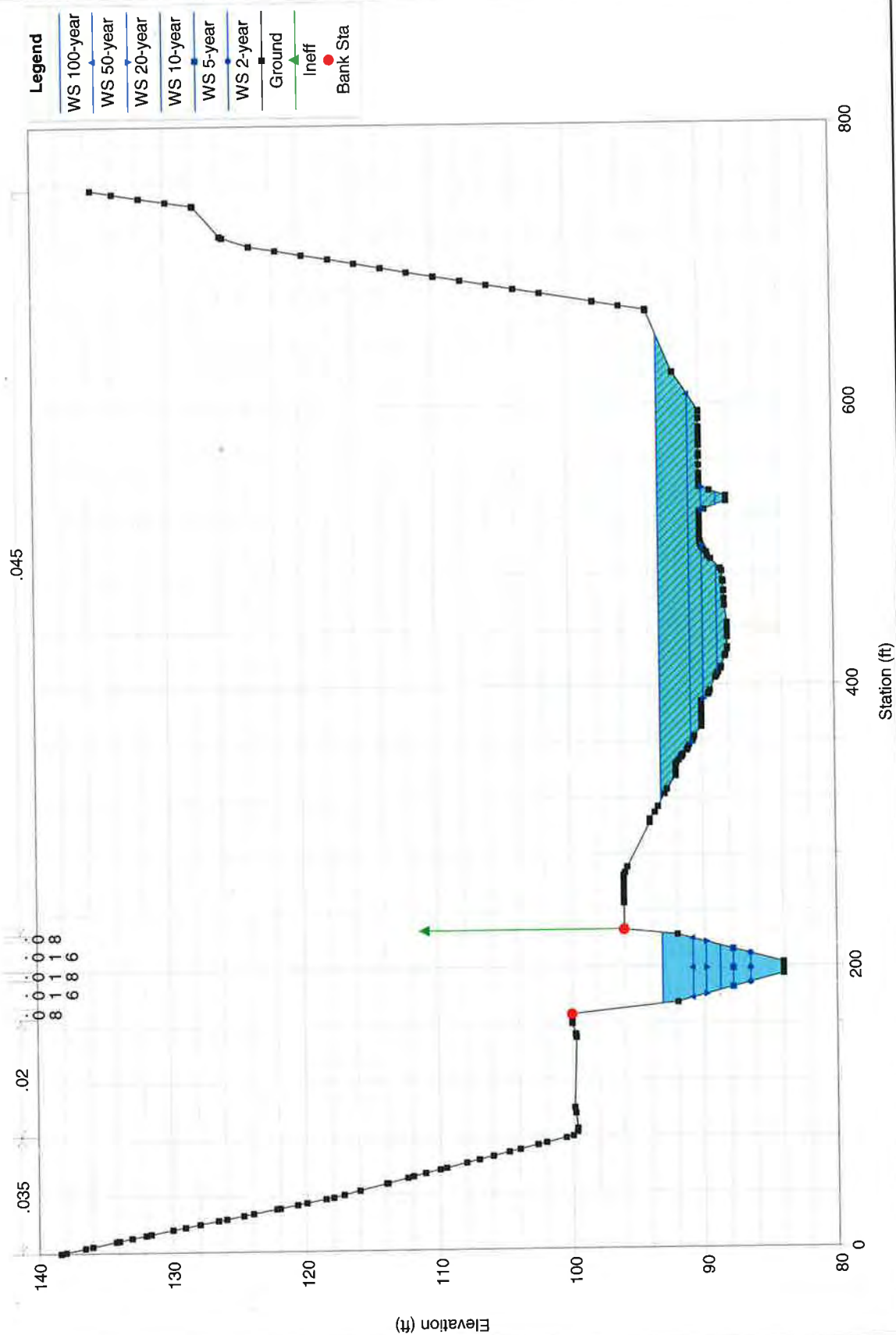
Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

RS = 942.3686



4/17/2013 1:11:30 PM

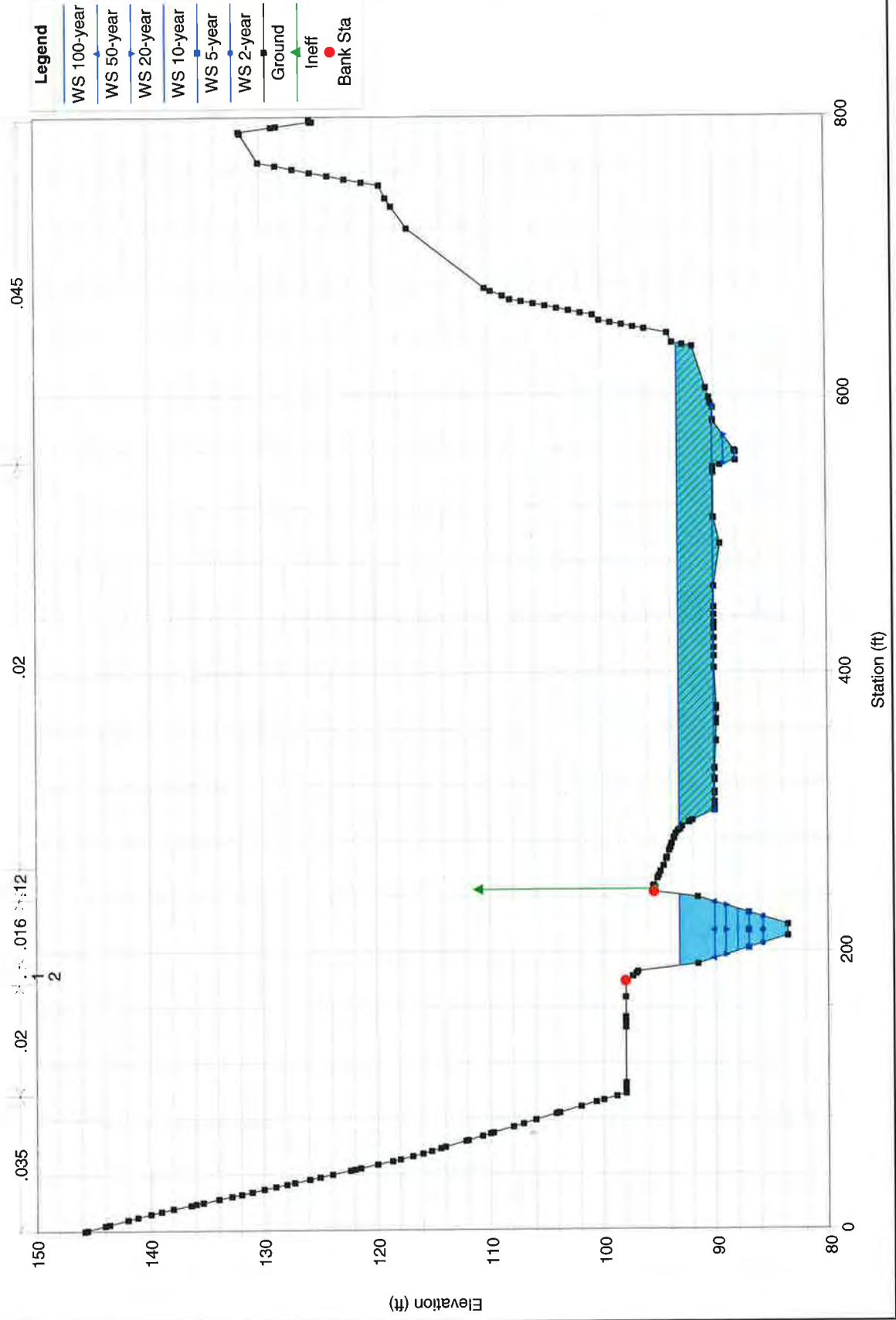
Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

$$RS = 569.4169$$


Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

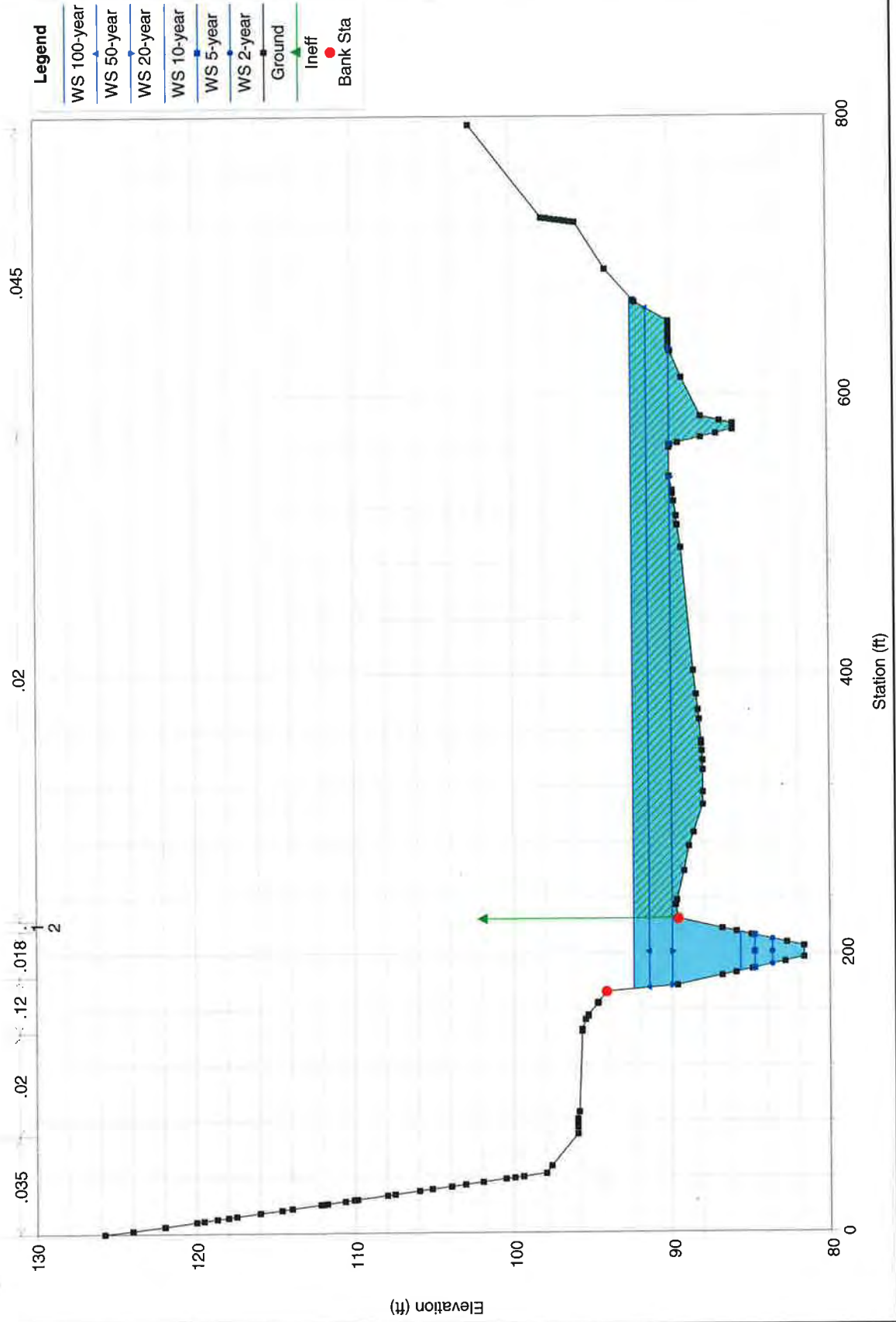
RS = 530.489



Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

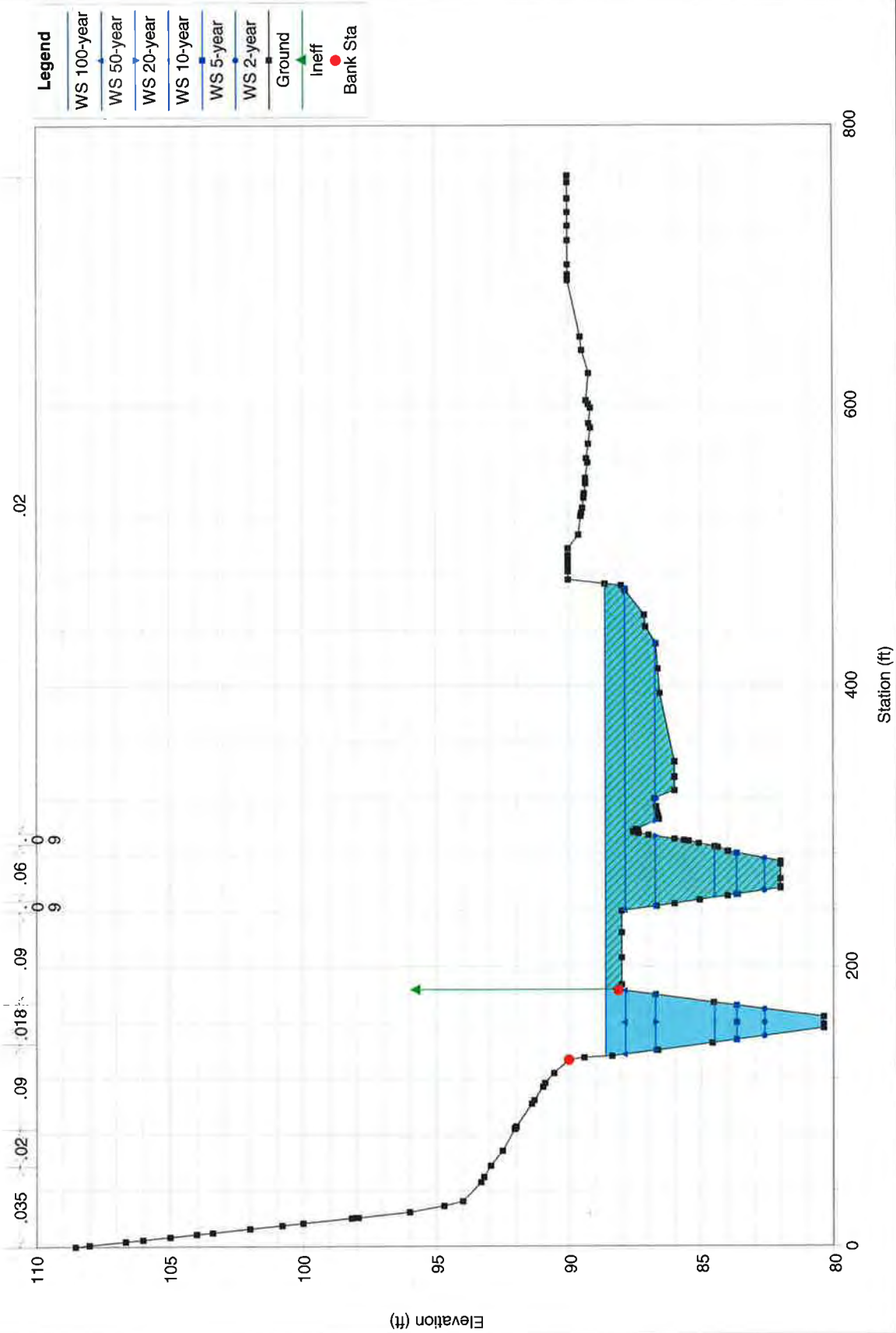
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4/17/2013 1:11:30 PM

Flow: Murphy Canyon Upper

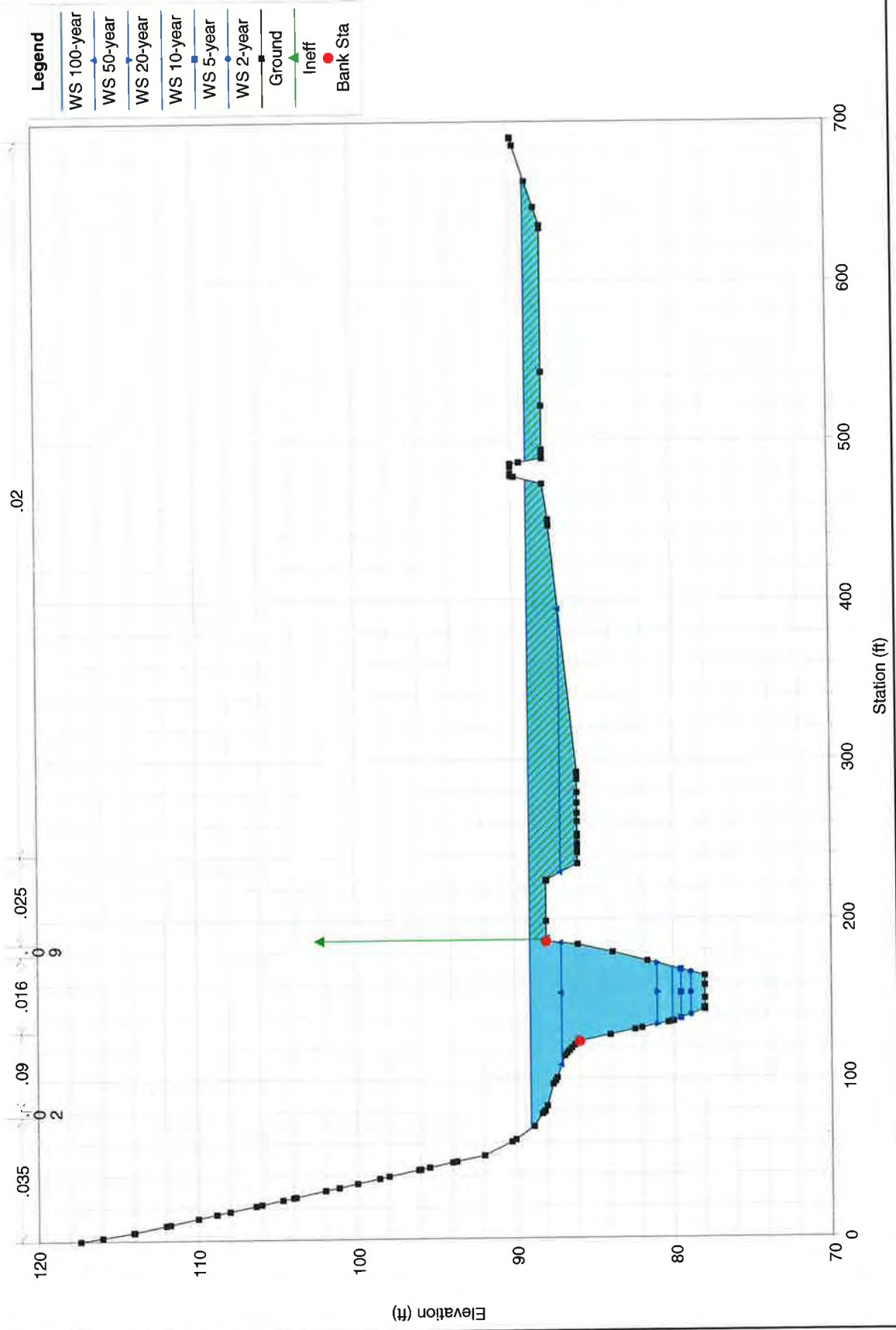
RS = 213.4405



Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

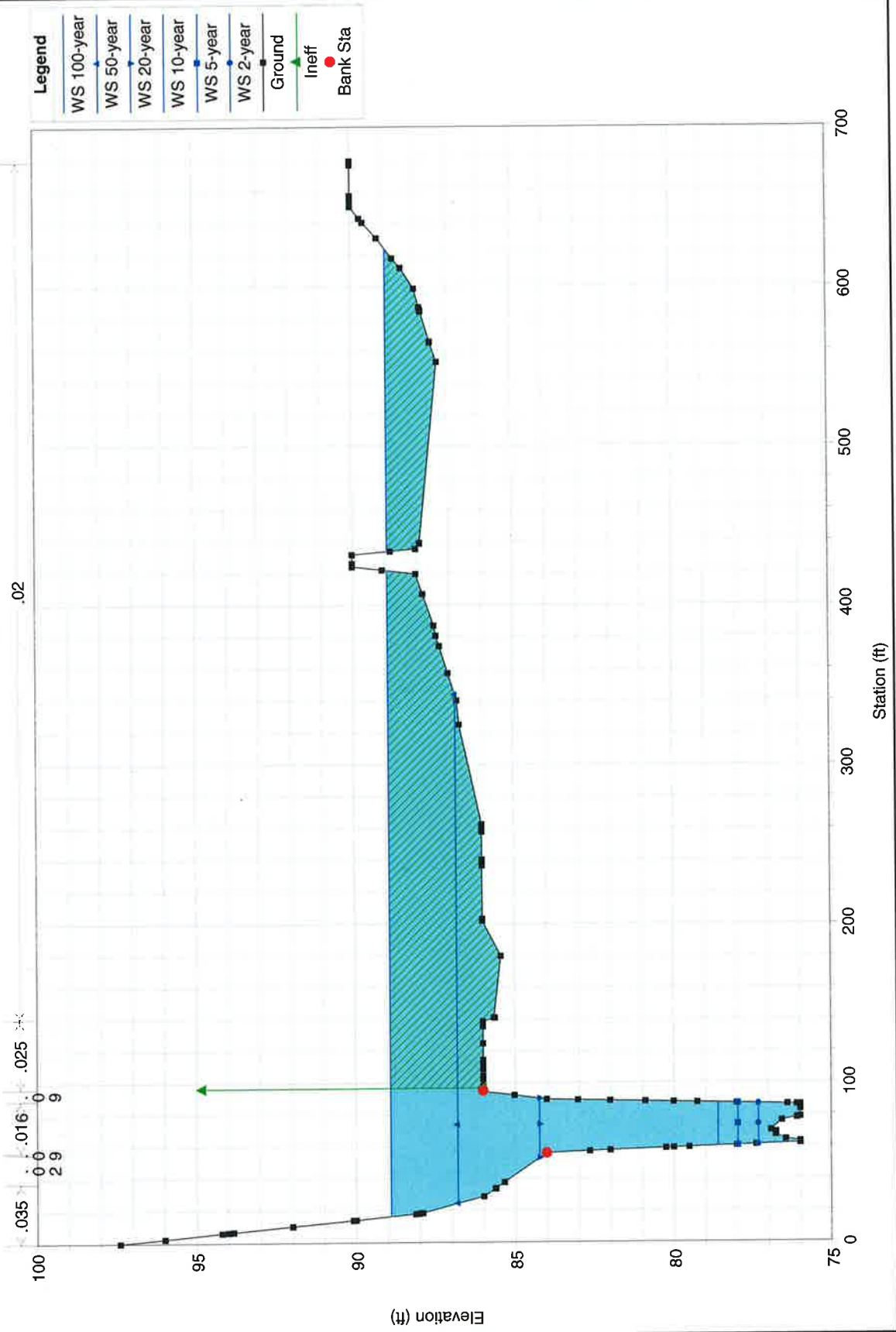
RS = 87.01827



Murphy Canyon - Reach 58A Plan: URS Actual Vegetated Condition 4/17/2013 1:11:30 PM

Geom: URS Actual Vegetated Condition Flow: Murphy Canyon Upper

RS = 13.30883



DETAILED HYDRAULIC RESULTS FOR ULTIMATE VEGETATED CONDITION MODEL

HEC-RAS Plan: Fully Vegetated River: Murphy Canyon Reach: Lower Reach

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Lower Reach	3019.665	100-year	3500.00	65.35	78.58	74.05	79.34	0.010228	7.00	499.95	606.07	0.47
Lower Reach	3019.665	50-year	2700.00	65.35	77.61	72.81	78.22	0.009448	6.25	431.76	597.33	0.44
Lower Reach	3019.665	20-year	2000.00	65.35	76.25	71.58	76.77	0.010210	5.80	344.73	578.31	0.43
Lower Reach	3019.665	10-year	1500.00	65.35	75.11	70.56	75.55	0.010555	5.34	280.73	540.33	0.39
Lower Reach	3019.665	5-year	1050.00	65.35	73.65	69.53	73.99	0.010045	4.66	225.25	433.75	0.32
Lower Reach	3019.665	2-year	510.00	65.35	71.32	67.99	71.50	0.008735	3.43	148.77	74.98	0.27
Lower Reach	2805.333	100-year	3500.00	63.79	77.26		77.81	0.004902	5.95	588.48	481.27	0.40
Lower Reach	2805.333	50-year	2700.00	63.79	76.46		76.87	0.004188	5.17	522.15	475.44	0.36
Lower Reach	2805.333	20-year	2000.00	63.79	74.77		75.17	0.005471	5.09	392.84	460.06	0.39
Lower Reach	2805.333	10-year	1500.00	63.79	73.30		73.70	0.007113	5.12	293.15	342.95	0.38
Lower Reach	2805.333	5-year	1050.00	63.79	71.80		72.13	0.007528	4.66	225.33	190.37	0.36
Lower Reach	2805.333	2-year	510.00	63.79	69.56		69.77	0.007490	3.64	140.28	98.71	0.32
Lower Reach	2479.647	100-year	3500.00	61.23	76.18		76.56	0.002888	4.91	712.27	147.12	0.30
Lower Reach	2479.647	50-year	2700.00	61.23	75.63		75.88	0.002111	4.06	665.22	142.09	0.25
Lower Reach	2479.647	20-year	2000.00	61.23	73.71		73.95	0.002544	3.90	512.81	124.75	0.26
Lower Reach	2479.647	10-year	1500.00	61.23	71.77		72.02	0.003725	4.01	374.52	106.03	0.30
Lower Reach	2479.647	5-year	1050.00	61.23	69.87		70.12	0.005045	3.98	263.95	79.78	0.31
Lower Reach	2479.647	2-year	510.00	61.23	67.11		67.31	0.007604	3.57	142.80	37.59	0.32
Lower Reach	2118.656	100-year	3500.00	58.49	75.06		75.52	0.002779	5.47	639.81	634.26	0.29
Lower Reach	2118.656	50-year	2700.00	58.49	74.91		75.19	0.001724	4.28	631.16	633.72	0.23
Lower Reach	2118.656	20-year	2000.00	58.49	72.98		73.21	0.001667	3.81	525.03	626.82	0.21
Lower Reach	2118.656	10-year	1500.00	58.49	70.86		71.06	0.001933	3.61	415.76	619.22	0.22
Lower Reach	2118.656	5-year	1050.00	58.49	68.76		68.93	0.002248	3.33	315.44	315.58	0.22
Lower Reach	2118.656	2-year	510.00	58.49	65.34		65.48	0.003554	2.98	170.93	37.47	0.25
Lower Reach	1847.267	100-year	3500.00	56.08	75.38	64.90	75.38	0.000002	0.12	9200.41	1449.05	0.01
Lower Reach	1847.267	50-year	2700.00	56.08	74.42	63.57	74.61	0.002440	3.52	766.35	1398.95	0.22
Lower Reach	1847.267	20-year	2000.00	56.08	72.40	62.25	72.58	0.003320	3.41	586.52	1175.30	0.23
Lower Reach	1847.267	10-year	1500.00	56.08	70.26	61.17	70.44	0.002695	3.42	438.15	935.28	0.20
Lower Reach	1847.267	5-year	1050.00	56.08	68.10	60.09	68.25	0.002761	3.04	345.34	729.81	0.18
Lower Reach	1847.267	2-year	510.00	56.08	64.54	58.59	64.63	0.002708	2.32	219.52	55.51	0.16
Lower Reach	1482.926	100-year	3500.00	53.63	75.24		75.37	0.004817	2.90	1204.95	1208.50	0.15
Lower Reach	1482.926	50-year	2700.00	53.63	73.27		73.39	0.004711	2.66	1014.34	1108.90	0.13
Lower Reach	1482.926	20-year	2000.00	53.63	71.04		71.13	0.004605	2.39	835.35	993.87	0.13
Lower Reach	1482.926	10-year	1500.00	53.63	69.08		69.15	0.004577	2.17	691.08	943.33	0.12
Lower Reach	1482.926	5-year	1050.00	53.63	66.87		66.93	0.004726	1.94	540.61	886.66	0.12

HEC-RAS Plan: Fully Vegetated River: Murphy Canyon Reach: Lower Reach (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Lower Reach	1482.926	2-year	510.00	53.63	63.27		63.31	0.004962	1.57	323.88	792.49	0.11
Lower Reach	1065.173	100-year	3500.00	51.52	72.46		73.13	0.005699	2.88	1078.74	816.72	0.13
Lower Reach	1065.173	50-year	2700.00	51.52	70.60		71.15	0.005862	2.75	912.12	780.09	0.13
Lower Reach	1065.173	20-year	2000.00	51.52	68.65		69.00	0.005548	2.49	775.63	775.89	0.13
Lower Reach	1065.173	10-year	1500.00	51.52	66.87		67.10	0.005207	2.22	658.78	772.07	0.12
Lower Reach	1065.173	5-year	1050.00	51.52	64.83		64.96	0.004669	1.93	533.23	736.09	0.11
Lower Reach	1065.173	2-year	510.00	51.52	61.47		61.50	0.003790	1.47	345.54	650.07	0.10
Lower Reach	628.1625	100-year	3500.00	50.12	69.46		69.71	0.010425	3.97	880.77	1063.41	0.19
Lower Reach	628.1625	50-year	2700.00	50.12	67.60		67.80	0.009709	3.56	757.67	1020.99	0.19
Lower Reach	628.1625	20-year	2000.00	50.12	65.74		65.90	0.008964	3.14	636.04	918.04	0.17
Lower Reach	628.1625	10-year	1500.00	50.12	64.12		64.24	0.008269	2.79	537.84	827.76	0.16
Lower Reach	628.1625	5-year	1050.00	50.12	62.31		62.40	0.007464	2.40	438.34	775.90	0.15
Lower Reach	628.1625	2-year	510.00	50.12	59.37		59.42	0.006149	1.76	290.42	695.56	0.13
Lower Reach	281.2985	100-year	3500.00	50.25	59.98		61.11	0.113092	8.52	410.64	968.21	0.59
Lower Reach	281.2985	50-year	2700.00	50.25	59.47		60.26	0.083119	7.12	379.08	912.46	0.50
Lower Reach	281.2985	20-year	2000.00	50.25	58.35		58.98	0.075173	6.37	314.05	787.31	0.47
Lower Reach	281.2985	10-year	1500.00	50.25	57.40		57.90	0.067651	5.70	263.20	719.74	0.44
Lower Reach	281.2985	5-year	1050.00	50.25	56.36		56.74	0.059139	4.95	212.14	681.93	0.41
Lower Reach	281.2985	2-year	510.00	50.25	54.67		54.88	0.044468	3.68	138.77	419.57	0.35
Lower Reach	36.18799	100-year	3500.00	47.65	58.00	50.66	58.09	0.003886	2.35	1490.84	839.43	0.14
Lower Reach	36.18799	50-year	2700.00	47.65	54.52	50.20	54.65	0.010012	2.91	928.26	591.00	0.21
Lower Reach	36.18799	20-year	2000.00	47.65	53.44	49.74	53.55	0.010008	2.62	764.70	543.15	0.20
Lower Reach	36.18799	10-year	1500.00	47.65	52.57	49.38	52.65	0.010009	2.36	634.99	497.03	0.20
Lower Reach	36.18799	5-year	1050.00	47.65	51.65	49.02	51.72	0.010010	2.08	504.53	444.61	0.19
Lower Reach	36.18799	2-year	510.00	47.65	50.27	48.50	50.31	0.010003	1.60	319.03	141.94	0.18

Murphy Canyon - Reach 58

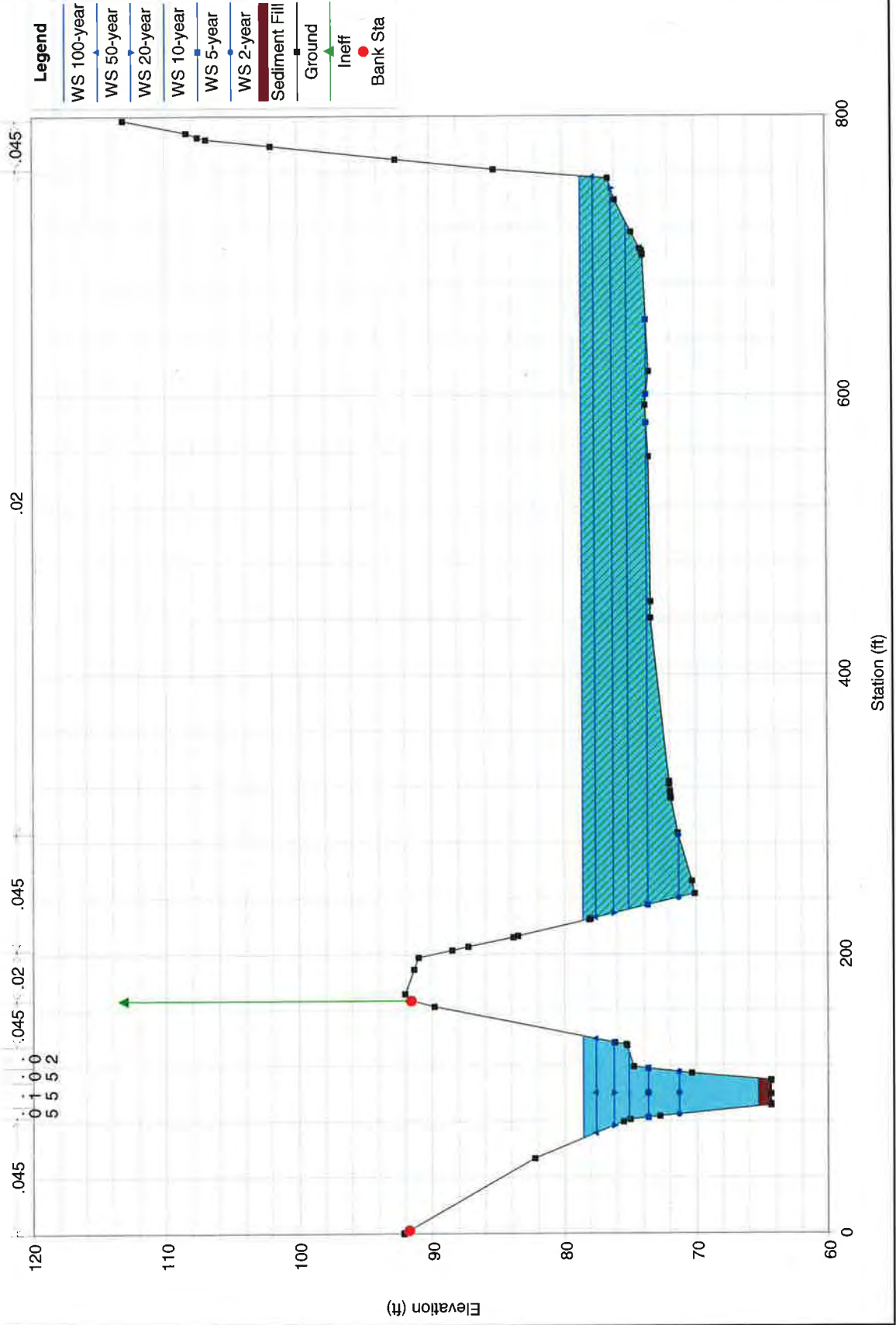
Plan: Fully Vegetated Condition

4/18/2013 12:36:35 PM

Geom: Fully Vegetated Condition

Flow: Murphy

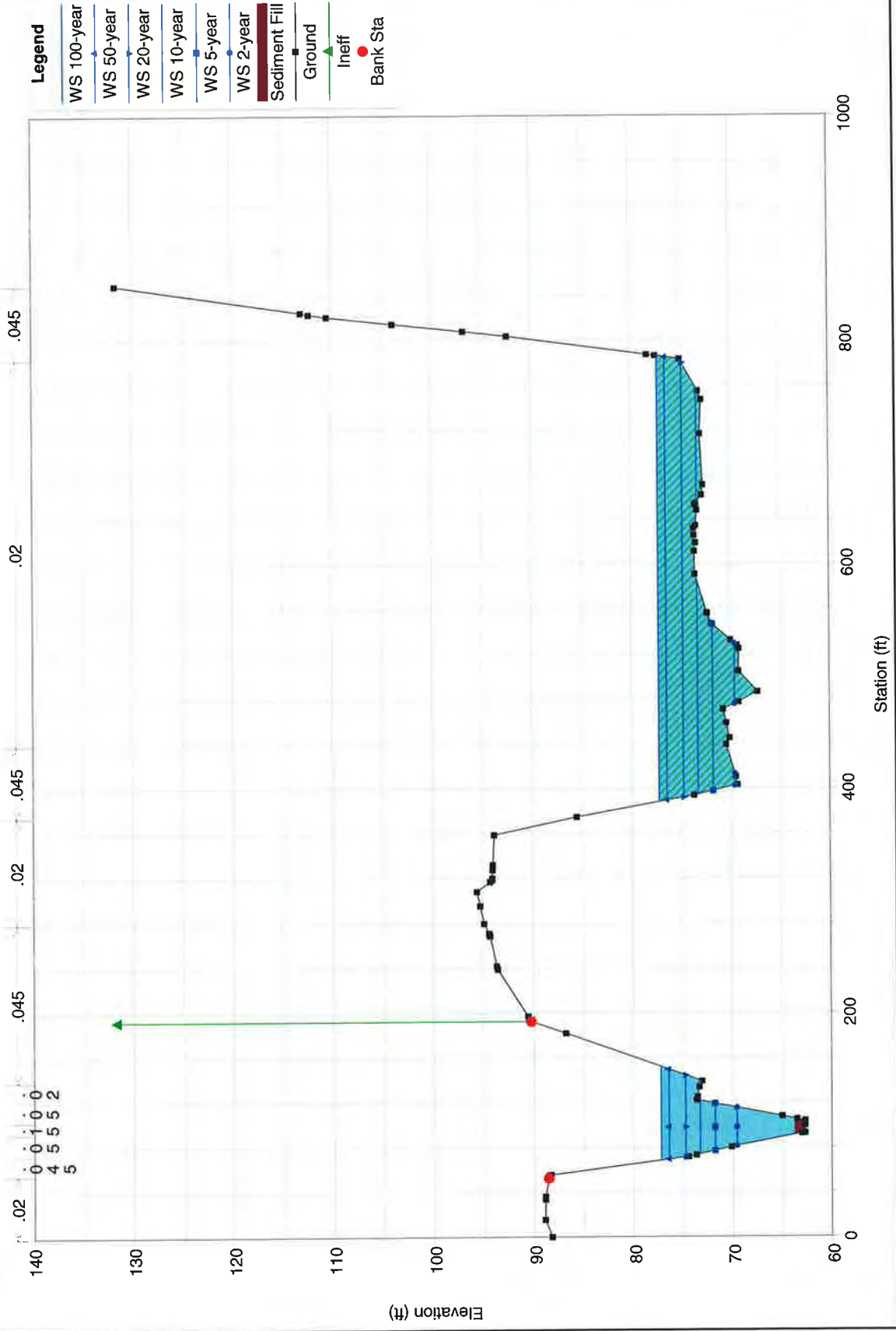
RS = 3019.665



Murphy Canyon - Reach 58 Plan: Fully Vegetated Condition 4/18/2013 12:36:35 PM

Geom: Fully Vegetated Condition Flow: Murphy

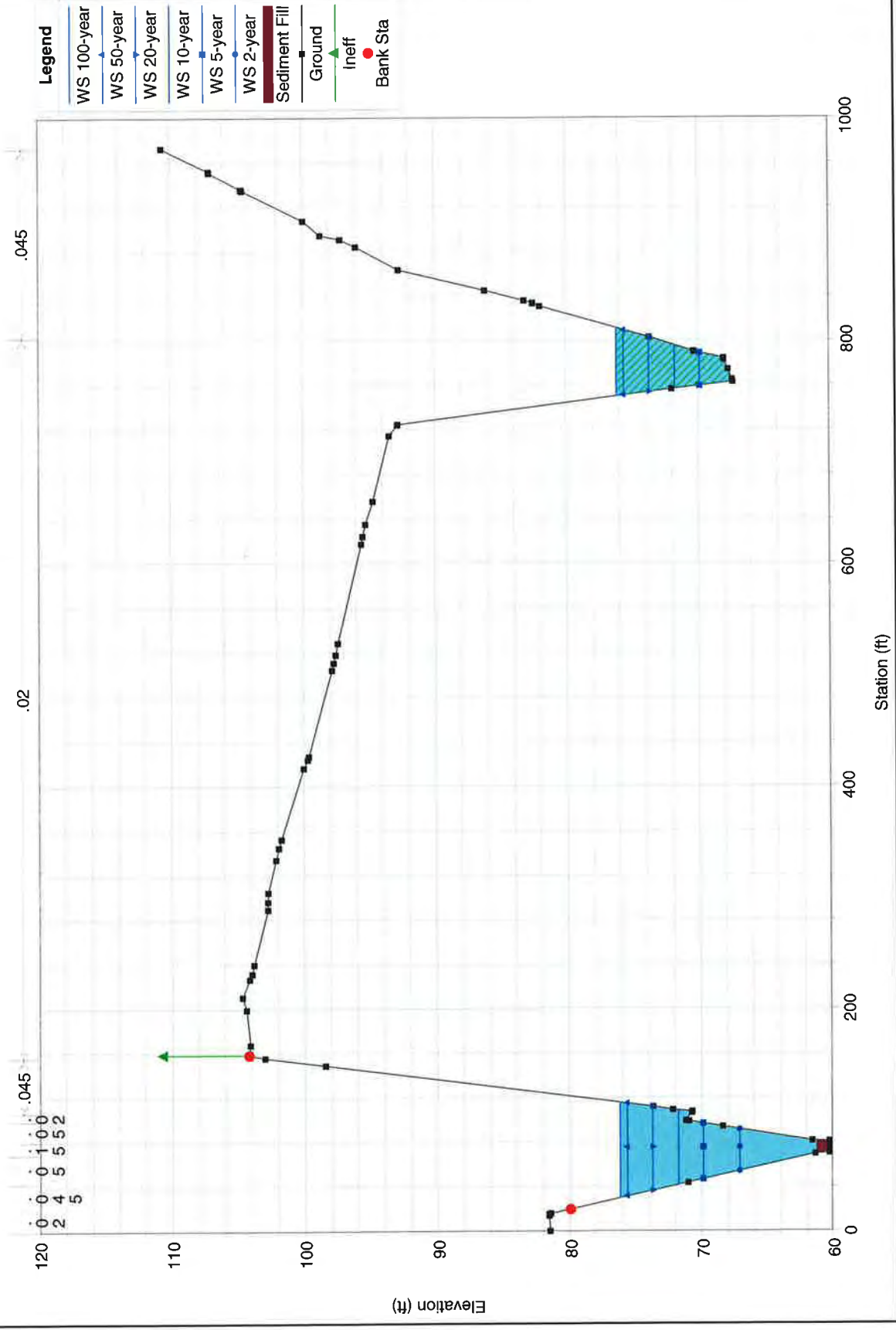
RS = 2805.333



Murphy Canyon - Reach 58 Plan: Fully Vegetated Condition 4/18/2013 12:36:35 PM

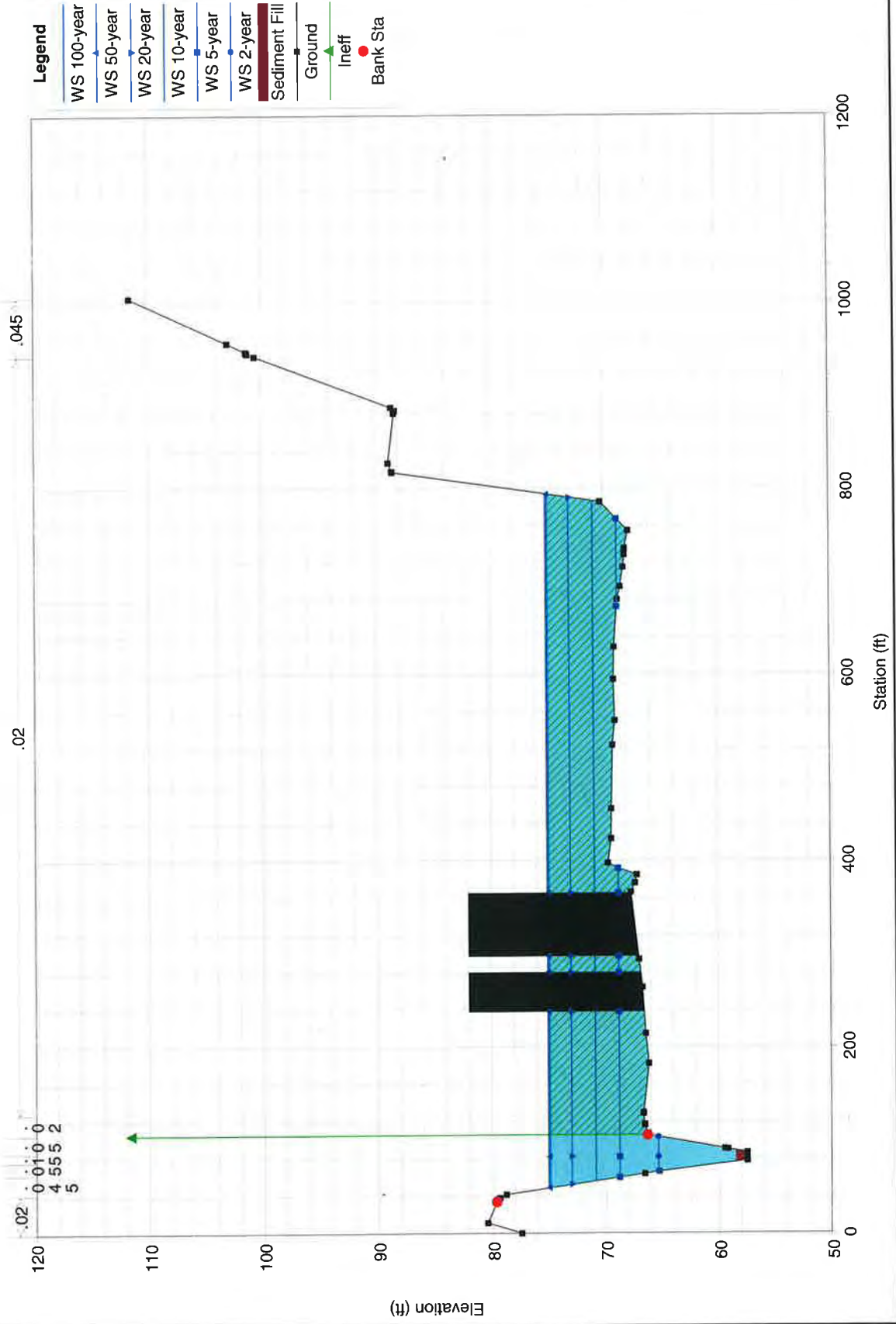
Geom: Fully Vegetated Condition Flow: Murphy

RS = 2479.647 d/s of Friars Road



Murphy Canyon - Reach 58 Plan: Fully Vegetated Condition 4/18/2013 12:36:35 PM

Geom: Fully Vegetated Condition Flow: Murphy
RS = 2118.656 adjacent to tank farm - Southern Pacific Pipe Lines Partnership

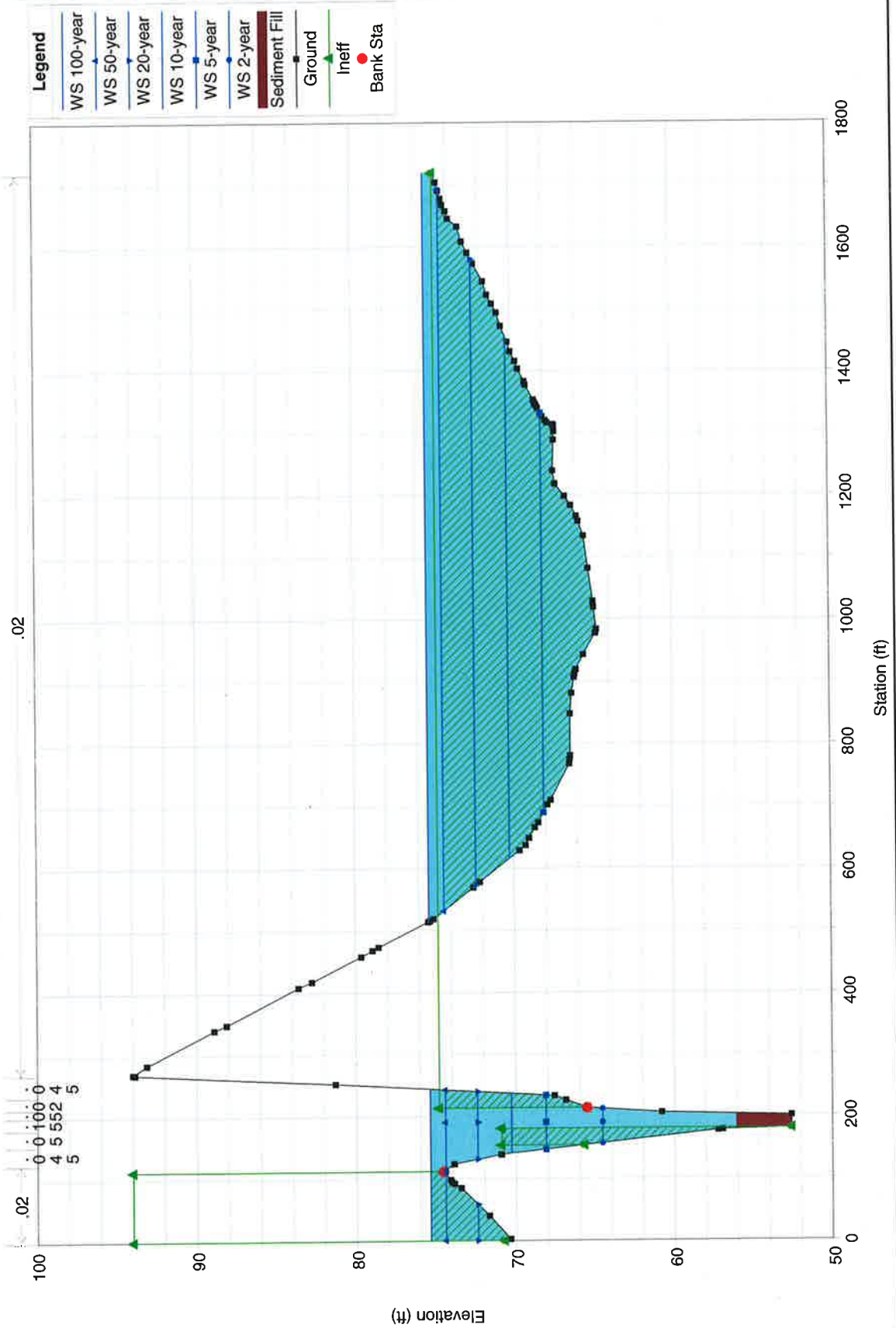


Murphy Canyon - Reach 58
Plan: Fully Vegetated Condition
4/18/2013 12:36:35 PM

Geom: Fully Vegetated Condition Flow: Murphy

Geom: Fully Vegetated Condition

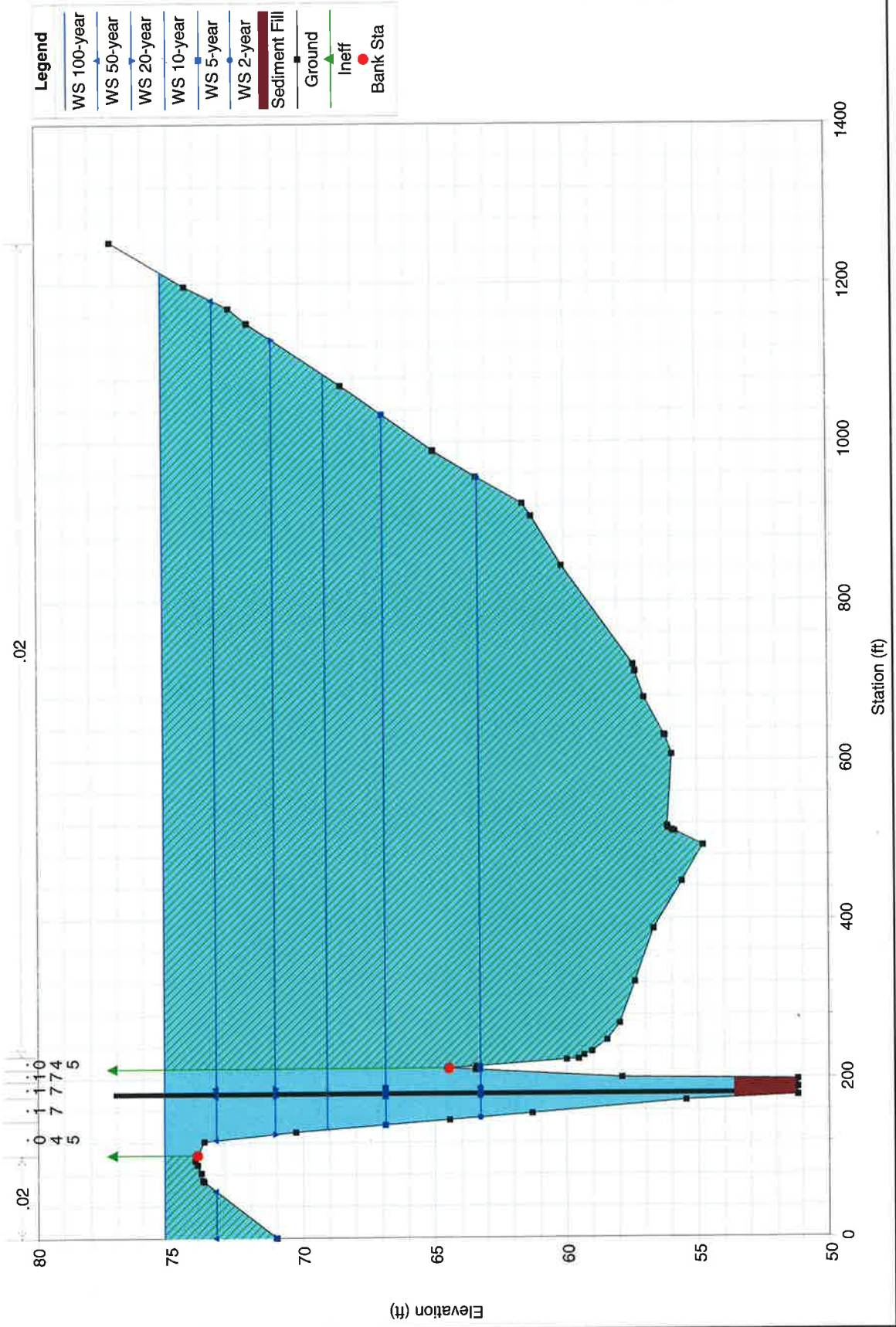
RS = 1847.267 u/s end of Qualcomm parking lot - conc channel ends approximately



Murphy Canyon - Reach 58 Plan: Fully Vegetated Condition 4/18/2013 12:36:35 PM

Geom: Fully Vegetated Condition Flow: Murphy

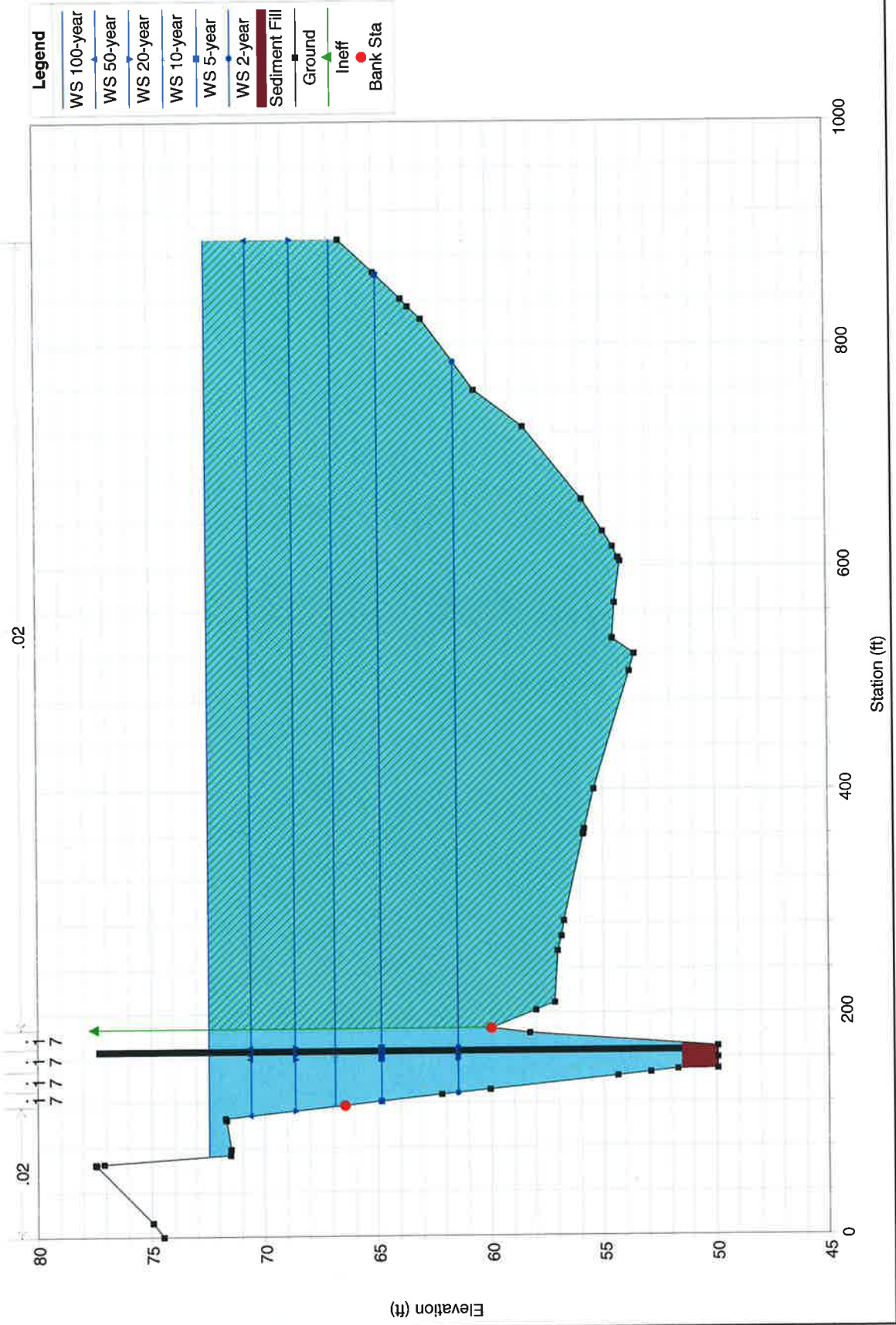
RS = 1482.926



Murphy Canyon - Reach 58 Plan: Fully Vegetated Condition 4/18/2013 12:36:35 PM

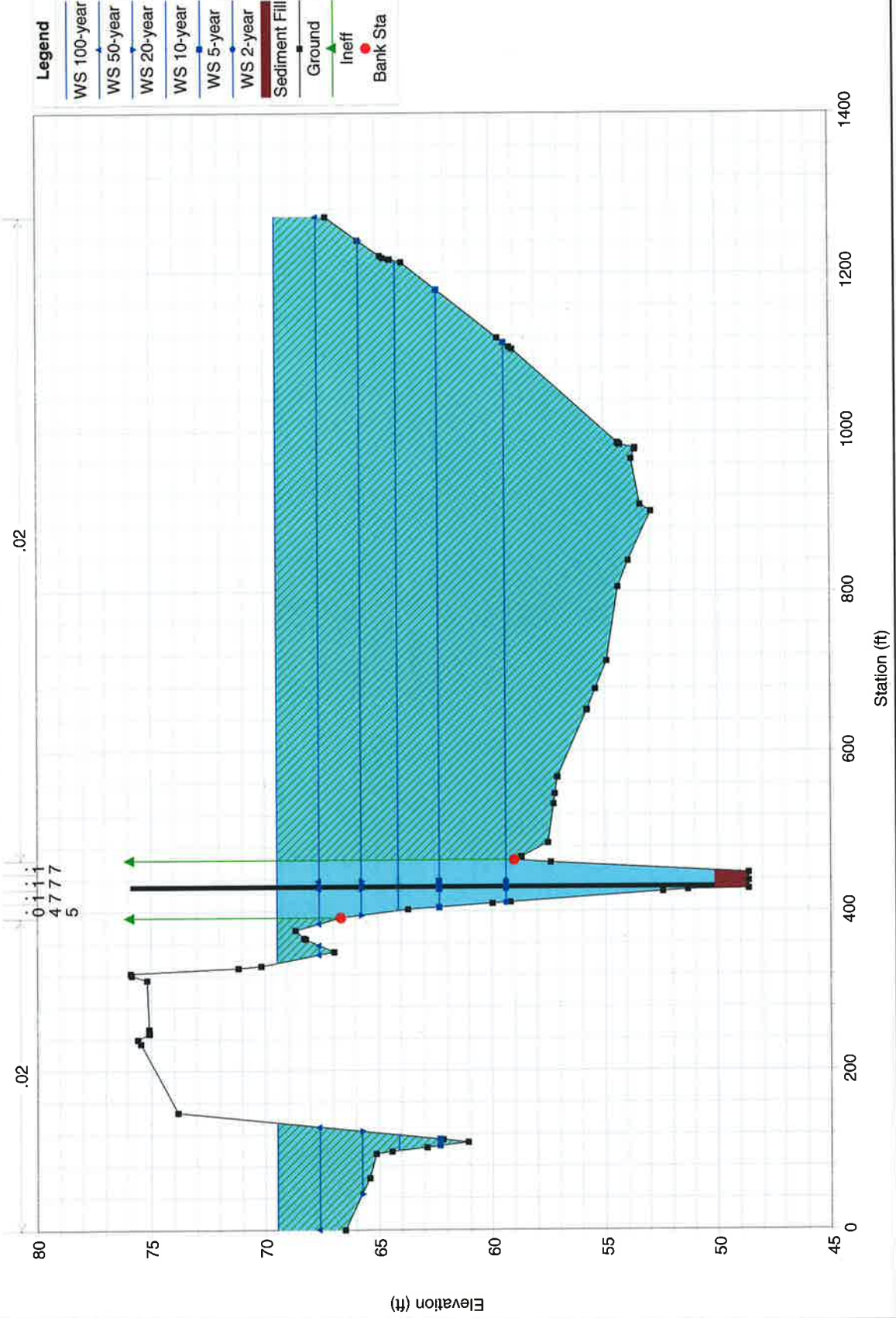
Geom: Fully Vegetated Condition Flow: Murphy

RS = 1065.173



Murphy Canyon - Reach 58 Plan: Fully Vegetated Condition 4/18/2013 12:36:35 PM

Geom: Fully Vegetated Condition Flow: Murphy
 RS = 628.1625 d/s end of Qualcomm parking - u/s of bridge crossings



Murphy Canyon - Reach 58

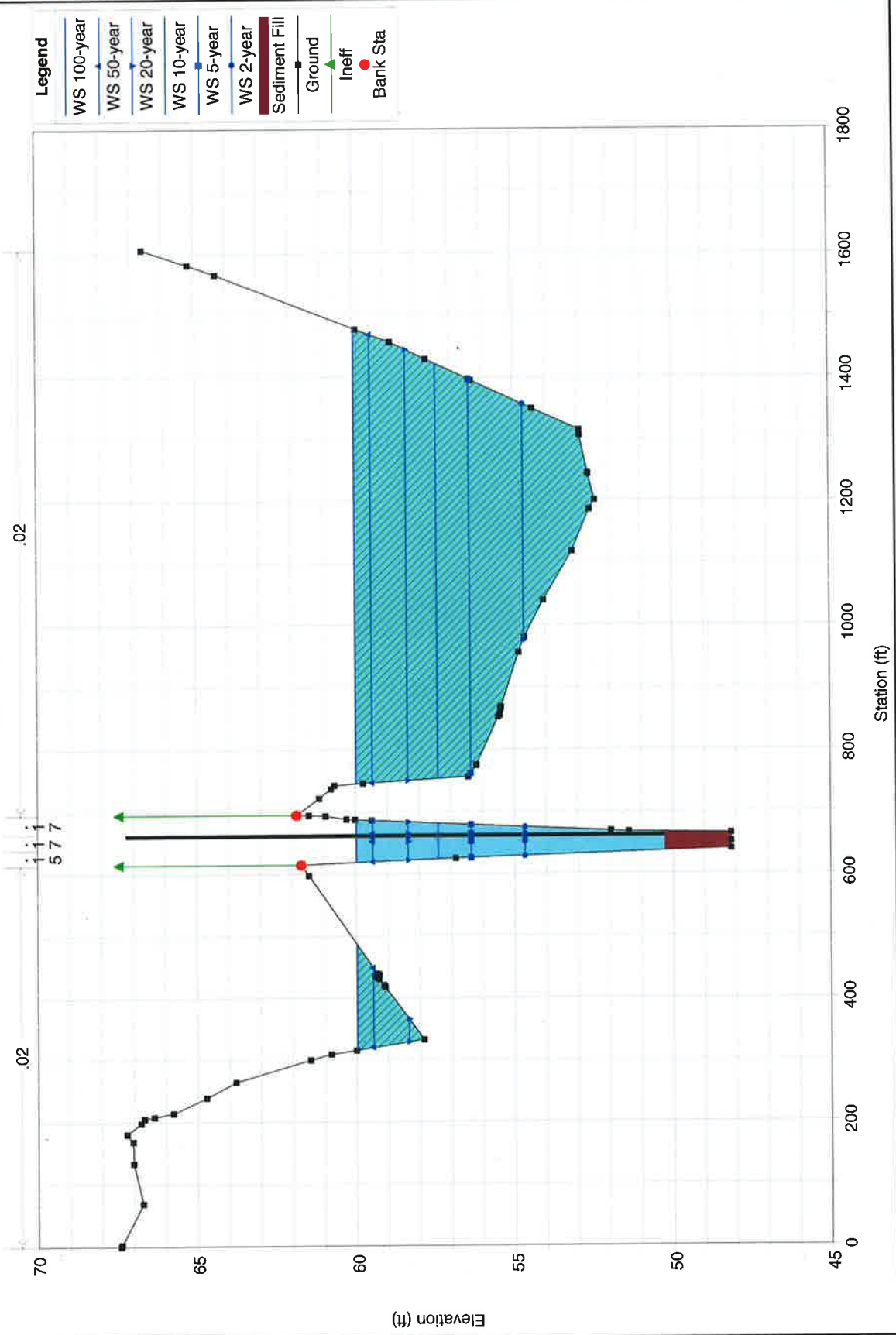
Plan: Fully Vegetated Condition

Geom: Fully Vegetated Condition

Flow: Murphy

RS = 281.2985

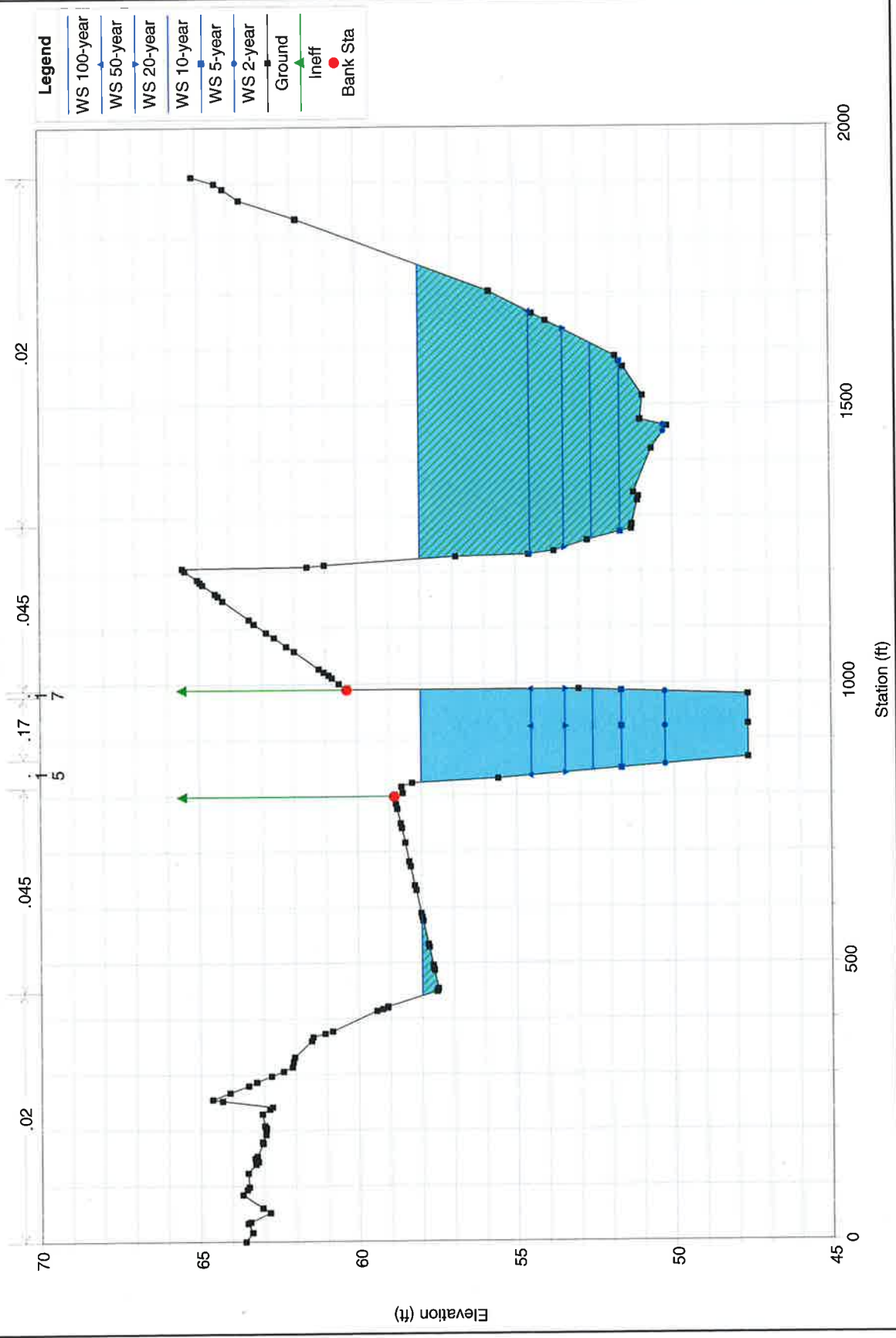
4/18/2013 12:36:35 PM



Murphy Canyon - Reach 58 Plan: Fully Vegetated Condition 4/18/2013 12:36:35 PM

Geom: Fully Vegetated Condition Flow: Murphy

RS = 36.18799



HEC-RAS Plan: Ultimate Veg River: Murphy Canyon Reach: Upper

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper	2132.098	100-year	3000.00	102.00	115.46	106.57	115.64	0.007158	3.35	894.82	84.35	0.18
Upper	2132.098	50-year	2400.00	102.00	113.96	105.94	114.11	0.006472	3.10	773.23	77.71	0.17
Upper	2132.098	20-year	1700.00	102.00	111.98	105.15	112.10	0.005826	2.73	623.61	73.33	0.16
Upper	2132.098	10-year	1100.00	102.00	109.93	104.37	110.01	0.005082	2.30	477.34	68.91	0.15
Upper	2132.098	5-year	680.00	102.00	108.17	103.73	108.22	0.004289	1.89	359.70	65.10	0.14
Upper	2132.098	2-year	300.00	102.00	106.08	103.01	106.11	0.003092	1.31	228.34	60.57	0.12
Upper	1830.059	100-year	3000.00	102.00	113.23		113.41	0.007607	3.38	886.85	99.58	0.20
Upper	1830.059	50-year	2400.00	102.00	111.84		112.00	0.007589	3.19	751.71	94.57	0.20
Upper	1830.059	20-year	1700.00	102.00	109.94		110.08	0.007739	2.94	578.88	87.74	0.20
Upper	1830.059	10-year	1100.00	102.00	107.97		108.08	0.008175	2.66	413.41	80.42	0.21
Upper	1830.059	5-year	680.00	102.00	106.35		106.44	0.008650	2.36	287.76	74.32	0.21
Upper	1830.059	2-year	300.00	102.00	104.54		104.59	0.009420	1.88	159.27	67.46	0.22
Upper	1564.744	100-year	3000.00	98.00	111.01		111.21	0.009022	3.55	844.54	90.42	0.20
Upper	1564.744	50-year	2400.00	98.00	109.65		109.82	0.008862	3.31	724.24	85.85	0.20
Upper	1564.744	20-year	1700.00	98.00	107.75		107.89	0.008780	2.99	567.70	79.16	0.20
Upper	1564.744	10-year	1100.00	98.00	105.68		105.79	0.009150	2.67	411.54	71.84	0.20
Upper	1564.744	5-year	680.00	98.00	103.94		104.03	0.009532	2.33	291.72	66.04	0.20
Upper	1564.744	2-year	300.00	98.00	101.91		101.96	0.010528	1.83	163.65	59.35	0.19
Upper	1288.238	100-year	3000.00	96.00	108.27		108.54	0.010359	4.15	722.29	71.18	0.23
Upper	1288.238	50-year	2400.00	96.00	107.08		107.30	0.009332	3.76	639.15	69.10	0.22
Upper	1288.238	20-year	1700.00	96.00	105.38		105.54	0.008223	3.25	523.80	66.14	0.20
Upper	1288.238	10-year	1100.00	96.00	103.30		103.43	0.008018	2.82	390.50	62.49	0.20
Upper	1288.238	5-year	680.00	96.00	101.60		101.69	0.007578	2.37	286.77	59.33	0.19
Upper	1288.238	2-year	300.00	96.00	99.55		99.60	0.007104	1.77	169.65	55.00	0.18
Upper	942.3686	100-year	3000.00	90.00	99.17		100.34	0.095124	8.65	346.94	53.80	0.60
Upper	942.3686	50-year	2400.00	90.00	96.92		98.56	0.183928	10.28	233.37	46.88	0.81
Upper	942.3686	20-year	1700.00	90.00	95.15	95.15	97.01	0.297027	10.96	155.05	41.59	1.00
Upper	942.3686	10-year	1100.00	90.00	94.60		95.67	0.194861	8.28	132.85	39.96	0.80
Upper	942.3686	5-year	680.00	90.00	93.75		94.47	0.170946	6.81	99.82	37.06	0.73
Upper	942.3686	2-year	300.00	90.00	92.60		92.99	0.143592	4.99	60.18	32.08	0.64
Upper	569.4169	100-year	3000.00	84.00	95.26	92.31	96.17	0.003973	7.67	391.20	444.00	0.50
Upper	569.4169	50-year	2400.00	84.00	93.72	91.51	94.65	0.003168	7.76	309.45	405.02	0.56
Upper	569.4169	20-year	1700.00	84.00	90.92	90.38	92.38	0.002822	9.72	174.88	292.62	0.85

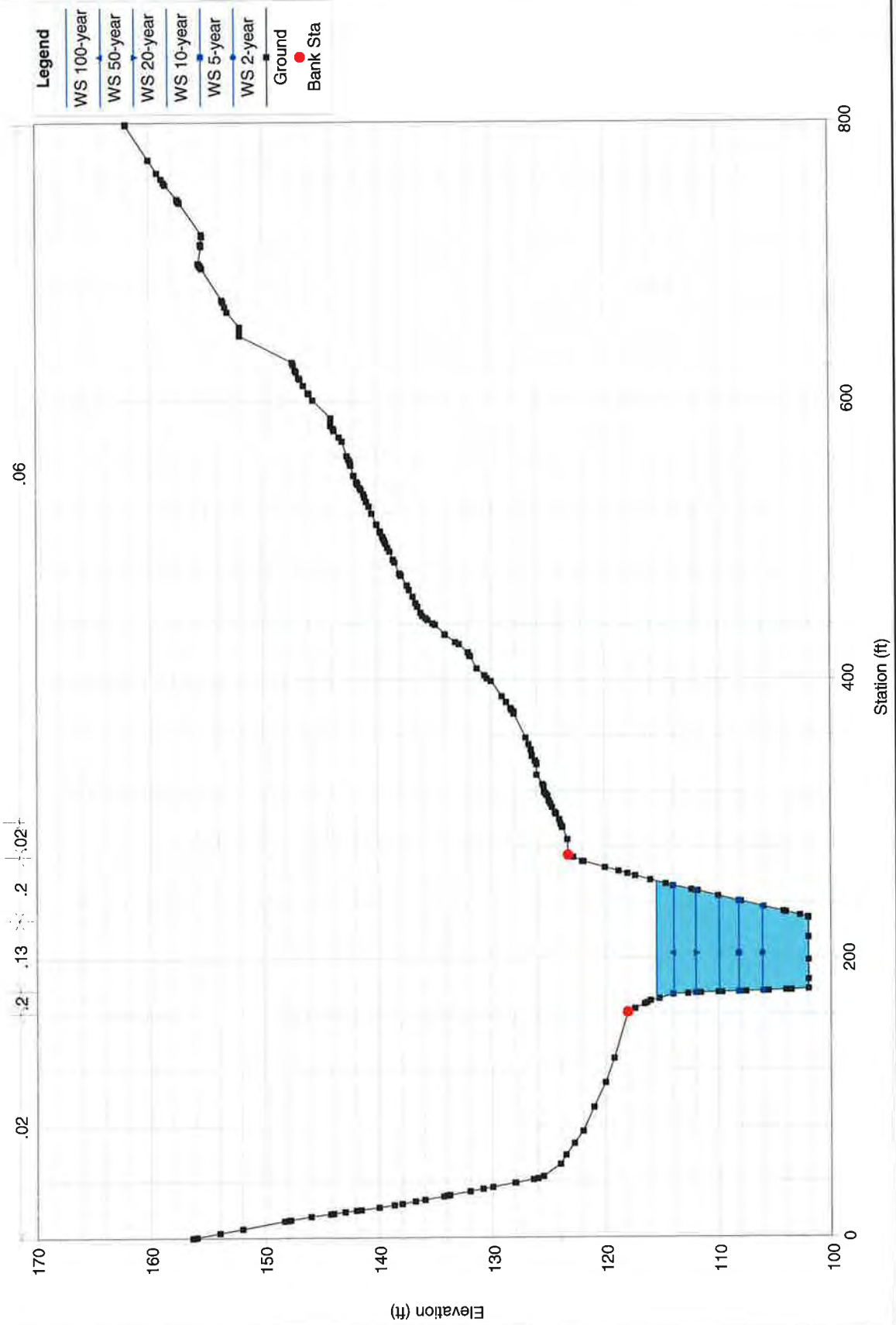
HEC-RAS Plan: Ultimate Veg River: Murphy Canyon Reach: Upper (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper	569.4169	10-year	1100.00	84.00	89.18	89.18	90.78	0.004274	10.15	108.37	135.42	1.00
Upper	569.4169	5-year	680.00	84.00	88.07	88.07	89.38	0.004560	9.18	74.09	58.87	1.00
Upper	569.4169	2-year	300.00	84.00	86.67	86.67	87.58	0.005061	7.67	39.10	21.33	1.00
Upper	530.489	100-year	3000.00	83.57	95.11	91.87	95.95	0.006994	7.38	406.28	447.67	0.48
Upper	530.489	50-year	2400.00	83.57	93.63	91.09	94.47	0.005089	7.33	327.29	407.56	0.52
Upper	530.489	20-year	1700.00	83.57	91.09	89.96	92.19	0.001565	8.44	201.41	364.33	0.71
Upper	530.489	10-year	1100.00	83.57	88.16	88.74	90.51	0.005809	12.30	89.44	39.05	1.28
Upper	530.489	5-year	680.00	83.57	87.14	87.65	89.11	0.006406	11.25	60.47	25.86	1.30
Upper	530.489	2-year	300.00	83.57	85.84	86.23	87.29	0.007677	9.64	31.14	19.37	1.34
Upper	357.7724	100-year	3000.00	81.65	93.59	89.96	94.40	0.011780	7.12	420.31	512.16	0.44
Upper	357.7724	50-year	2400.00	81.65	92.49	89.18	93.17	0.011116	6.59	363.56	497.03	0.43
Upper	357.7724	20-year	1700.00	81.65	90.90	88.05	91.46	0.010891	5.98	284.32	483.06	0.44
Upper	357.7724	10-year	1100.00	81.65	88.85	86.84	89.39	0.011083	5.89	186.63	239.52	0.50
Upper	357.7724	5-year	680.00	81.65	84.89	85.74	87.56	0.011977	13.11	51.87	24.08	1.57
Upper	357.7724	2-year	300.00	81.65	83.76	84.33	85.56	0.012853	10.77	27.85	18.44	1.54
Upper	213.4405	100-year	3000.00	80.37	88.63	88.63	91.12	0.051609	12.66	237.07	337.30	1.00
Upper	213.4405	50-year	2400.00	80.37	87.87	87.87	90.08	0.048992	11.93	201.16	274.64	1.00
Upper	213.4405	20-year	1700.00	80.37	86.74	86.74	88.66	0.037819	11.11	153.00	216.73	1.00
Upper	213.4405	10-year	1100.00	80.37	85.54	85.54	87.13	0.021146	10.13	108.60	77.53	1.00
Upper	213.4405	5-year	680.00	80.37	83.88	84.44	85.94	0.008469	11.52	59.03	56.58	1.34
Upper	213.4405	2-year	300.00	80.37	82.78	83.03	84.00	0.007503	8.84	33.92	44.10	1.20
Upper	87.01827	100-year	3000.00	78.01	89.08	84.40	89.53	0.002700	5.48	614.92	587.73	0.33
Upper	87.01827	50-year	2400.00	78.01	87.14	83.67	87.67	0.004003	5.87	415.75	249.05	0.40
Upper	87.01827	20-year	1700.00	78.01	84.59	82.67	85.27	0.004089	6.60	257.57	54.76	0.54
Upper	87.01827	10-year	1100.00	78.01	80.39	81.64	84.50	0.016928	16.29	67.54	35.37	2.08
Upper	87.01827	5-year	680.00	78.01	79.58	80.76	83.91	0.028933	16.70	40.73	30.91	2.56
Upper	87.01827	2-year	300.00	78.01	78.91	79.70	81.97	0.039539	14.05	21.35	26.66	2.77
Upper	13.30883	100-year	3000.00	76.00	88.92	83.67	89.41	0.001018	5.86	540.44	595.27	0.32
Upper	13.30883	50-year	2400.00	76.00	86.81	82.71	87.47	0.001794	6.69	377.48	319.38	0.41
Upper	13.30883	20-year	1700.00	76.00	84.23	81.47	85.09	0.001385	7.43	229.23	37.31	0.51
Upper	13.30883	10-year	1100.00	76.00	82.12	80.23	82.85	0.000823	6.87	160.12	31.31	0.54
Upper	13.30883	5-year	680.00	76.00	78.03	79.20	82.13	0.018900	16.26	41.83	26.51	2.28
Upper	13.30883	2-year	300.00	76.00	77.36	78.03	79.70	0.020621	12.29	24.41	25.76	2.23

Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

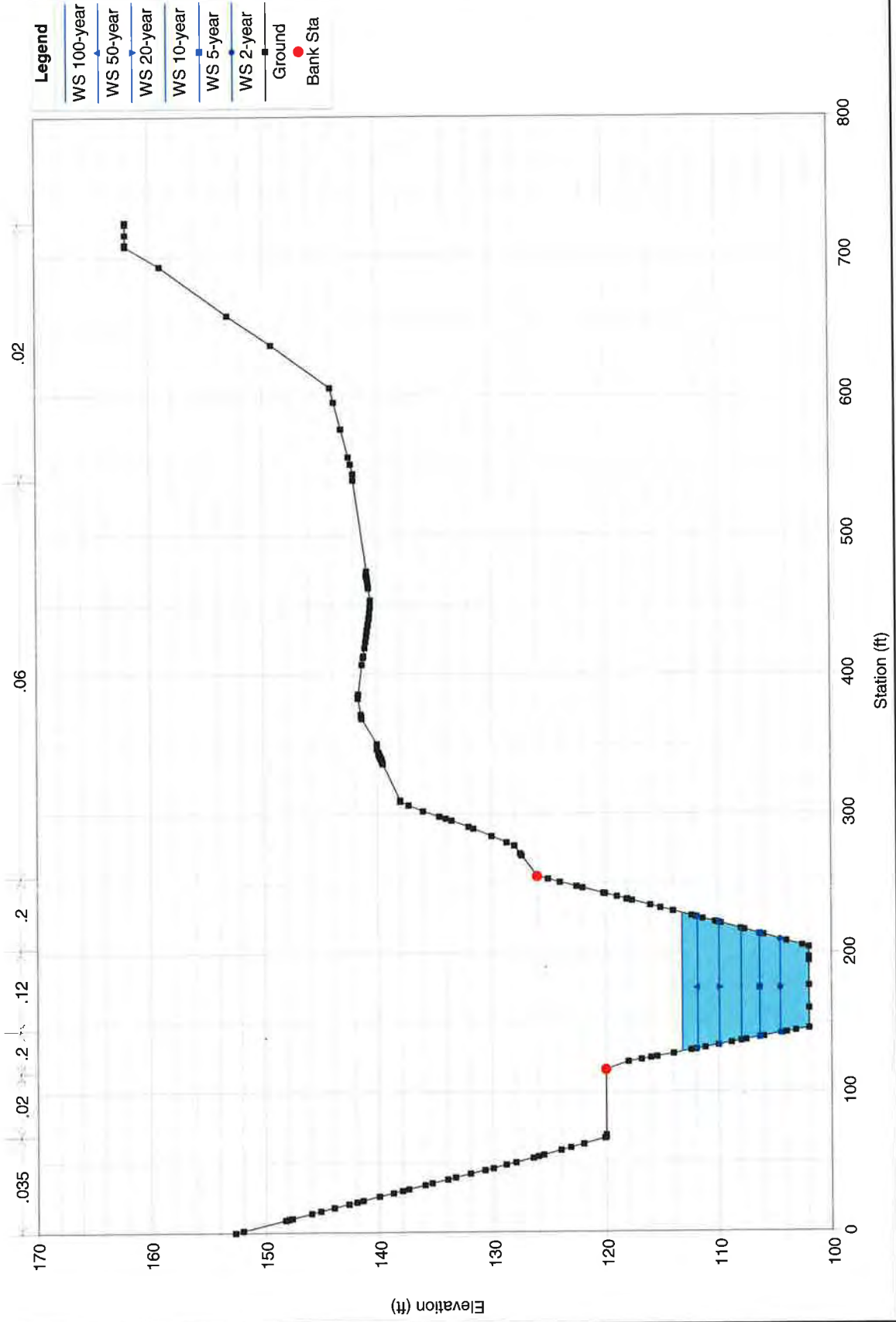
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Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

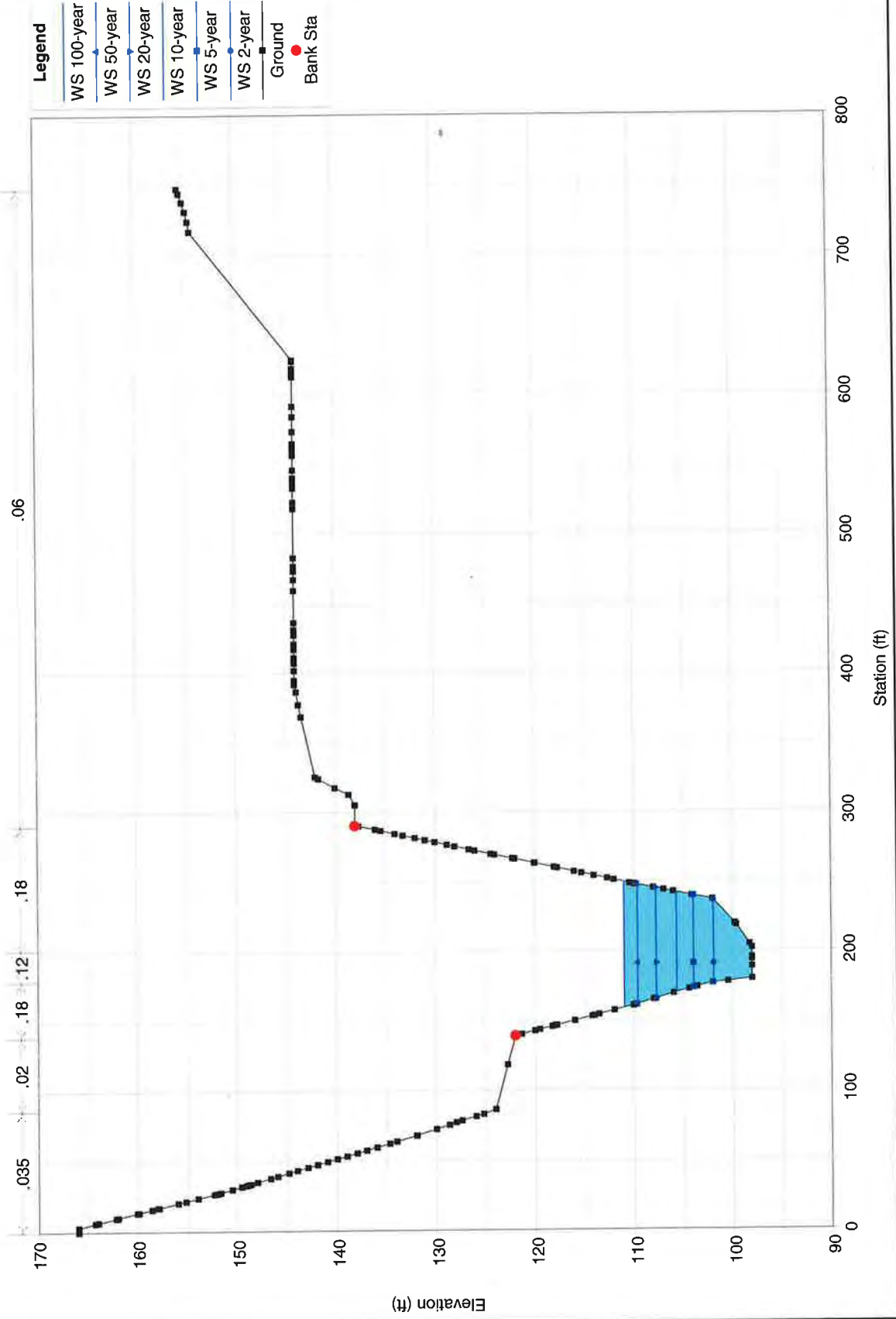
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Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

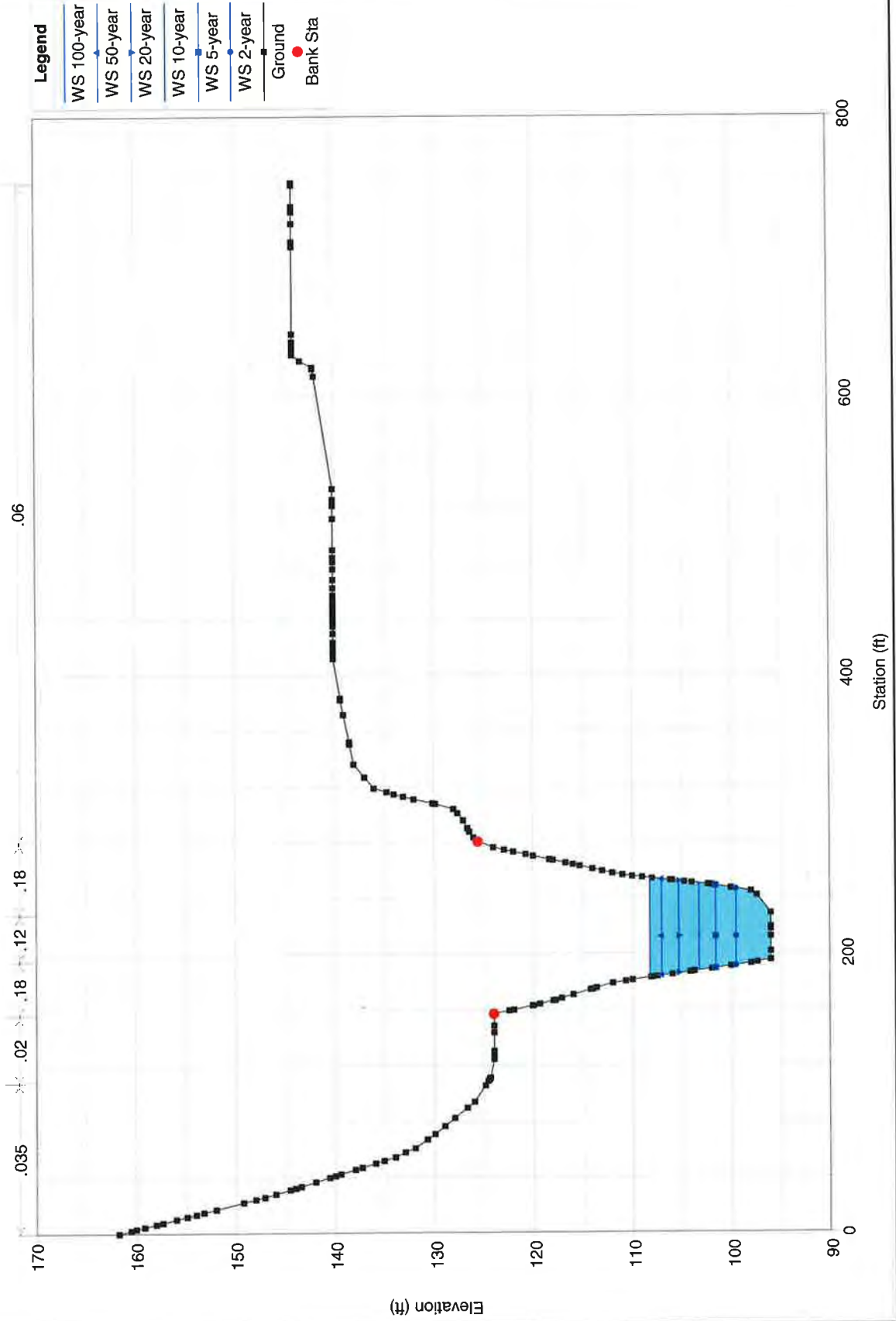
RS = 1564.744



Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

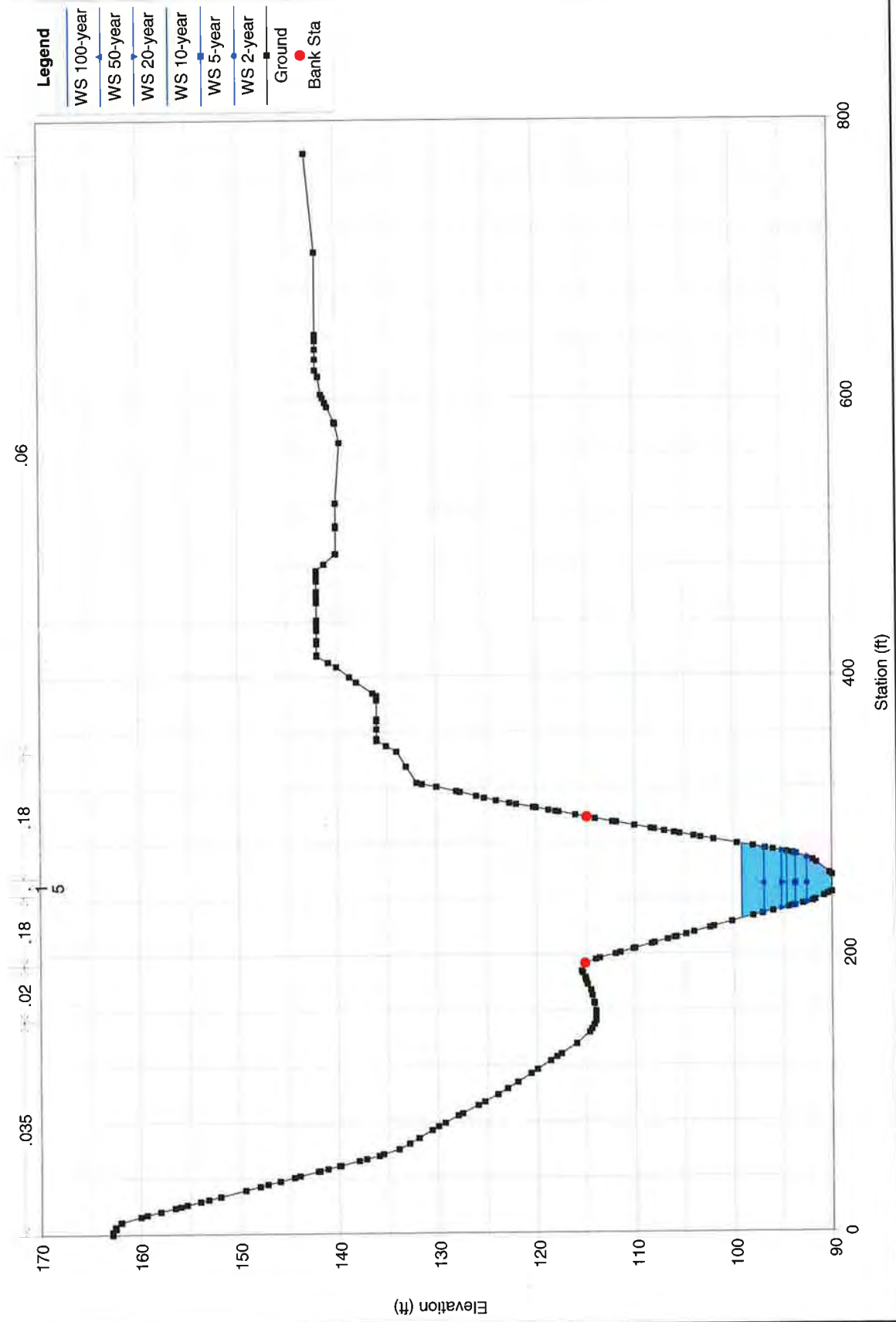
Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

RS = 1288.238



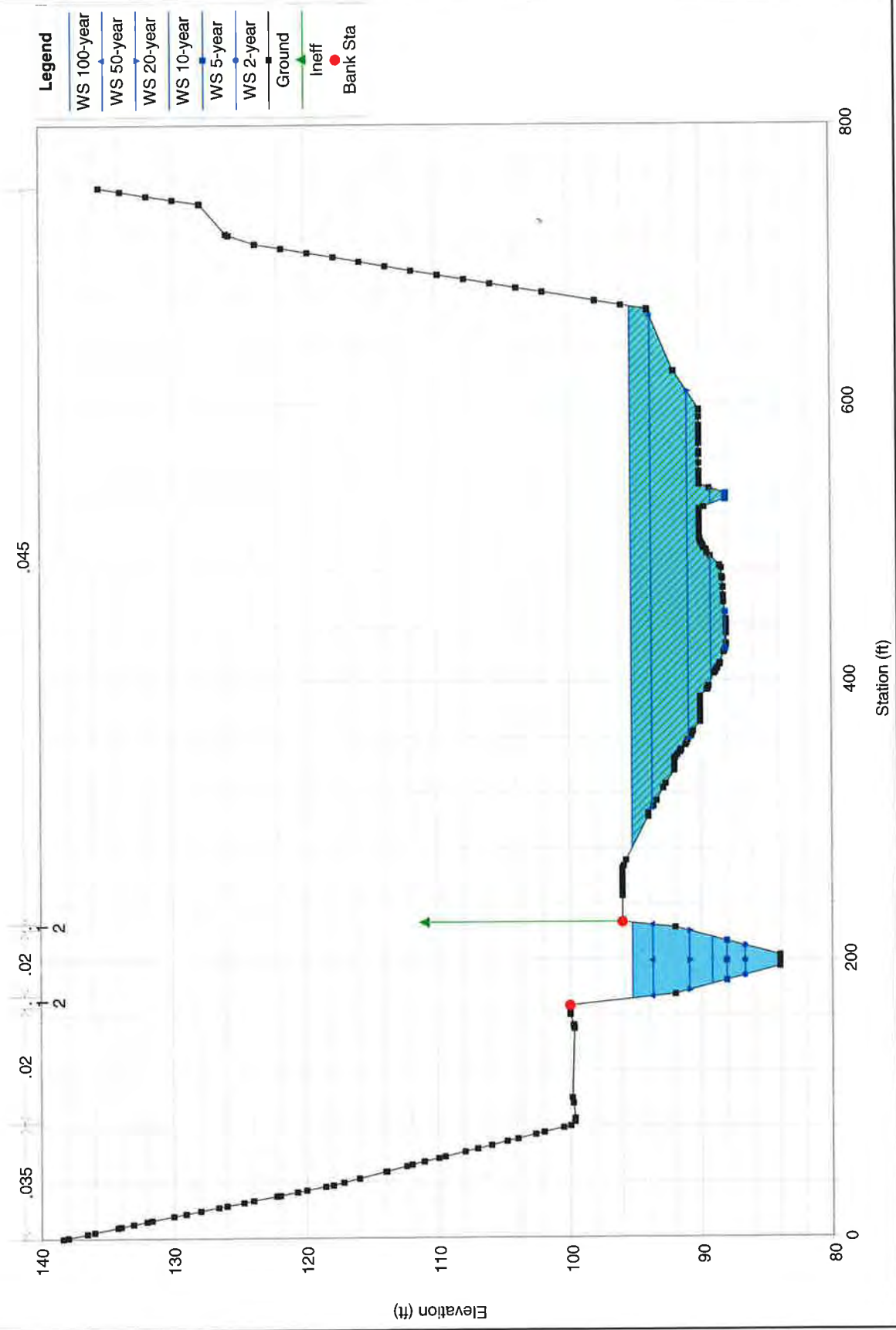
Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper
RS = 942.3686



Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

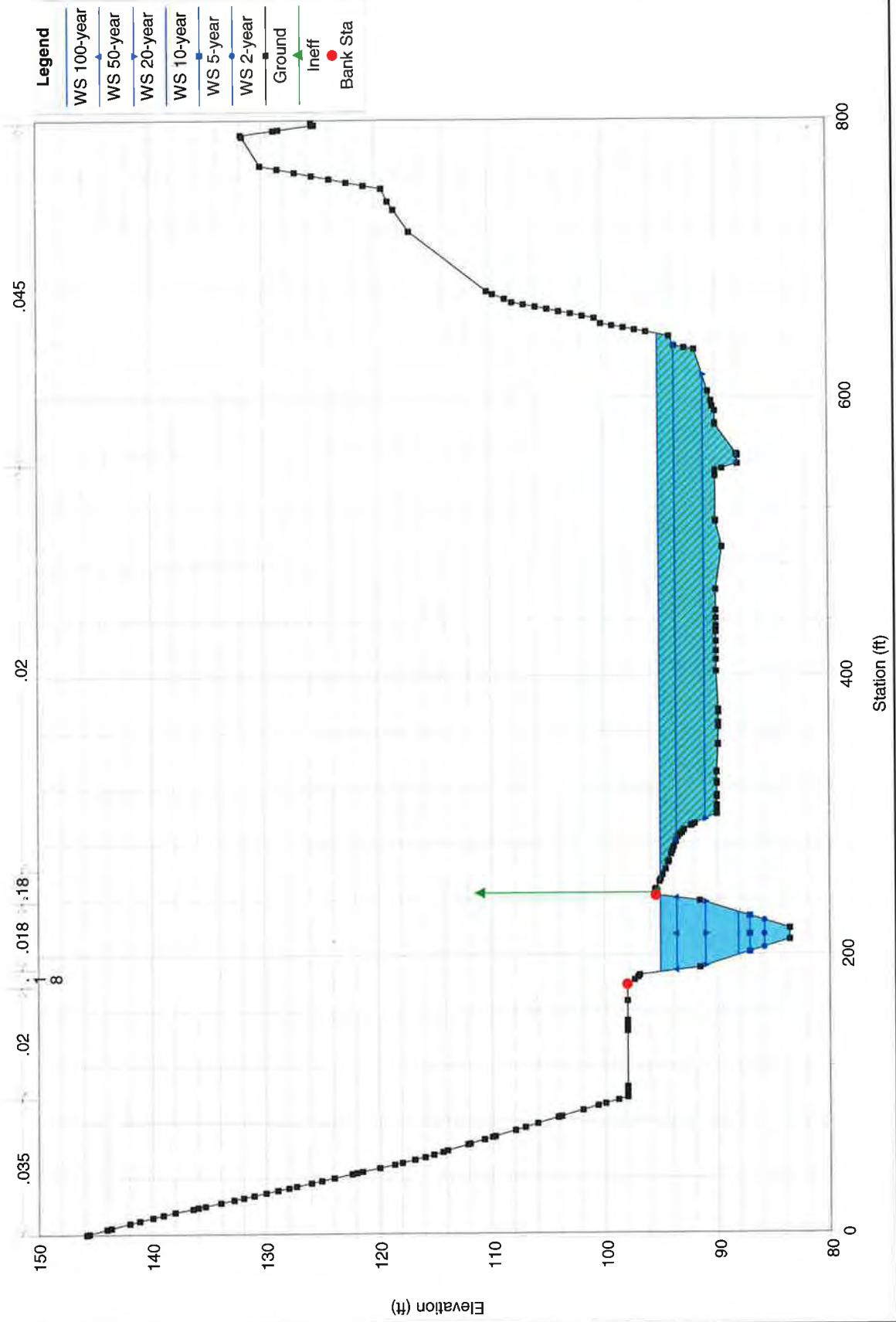
Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper
RS = 569.4169



Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

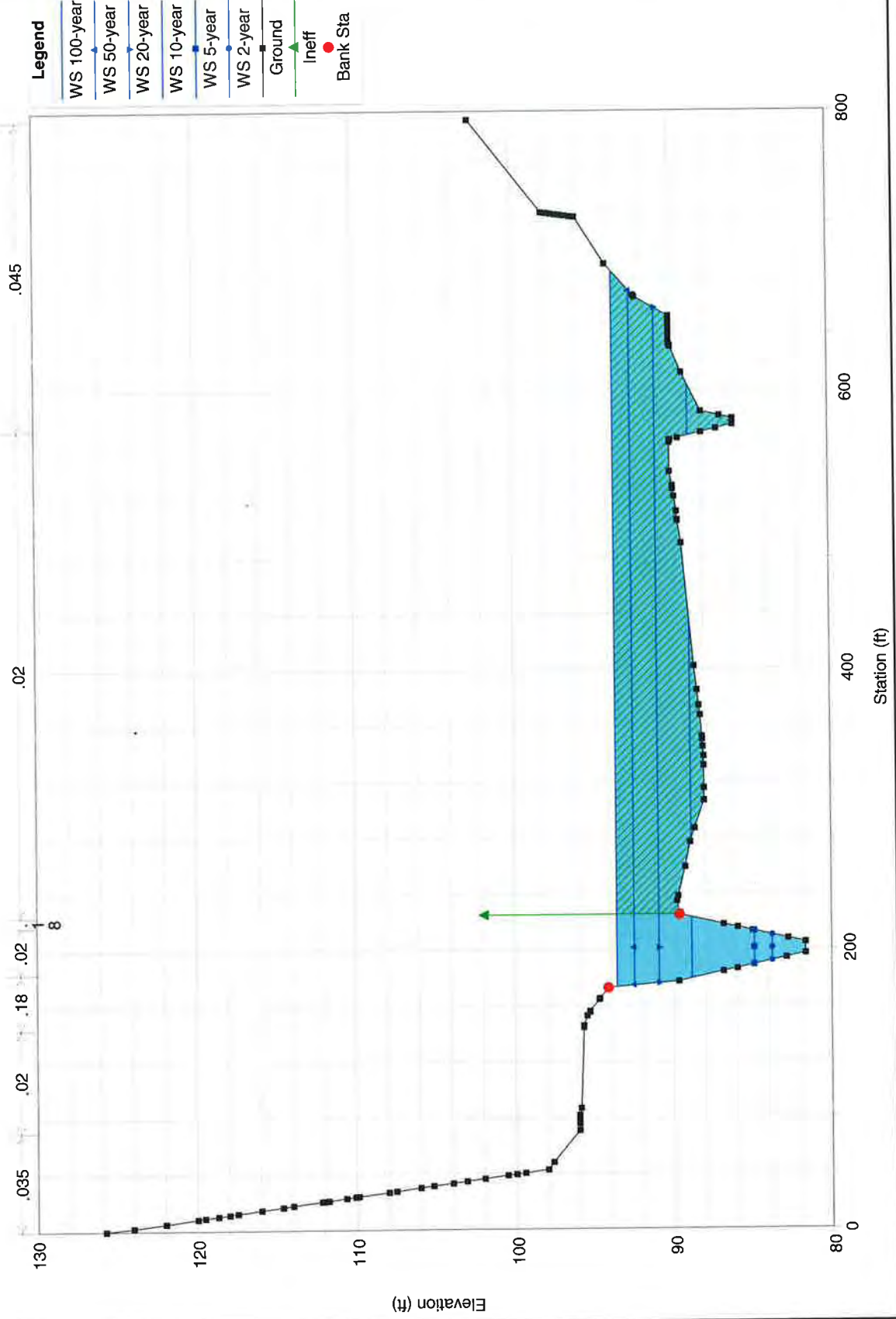
RS = 530.489



Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

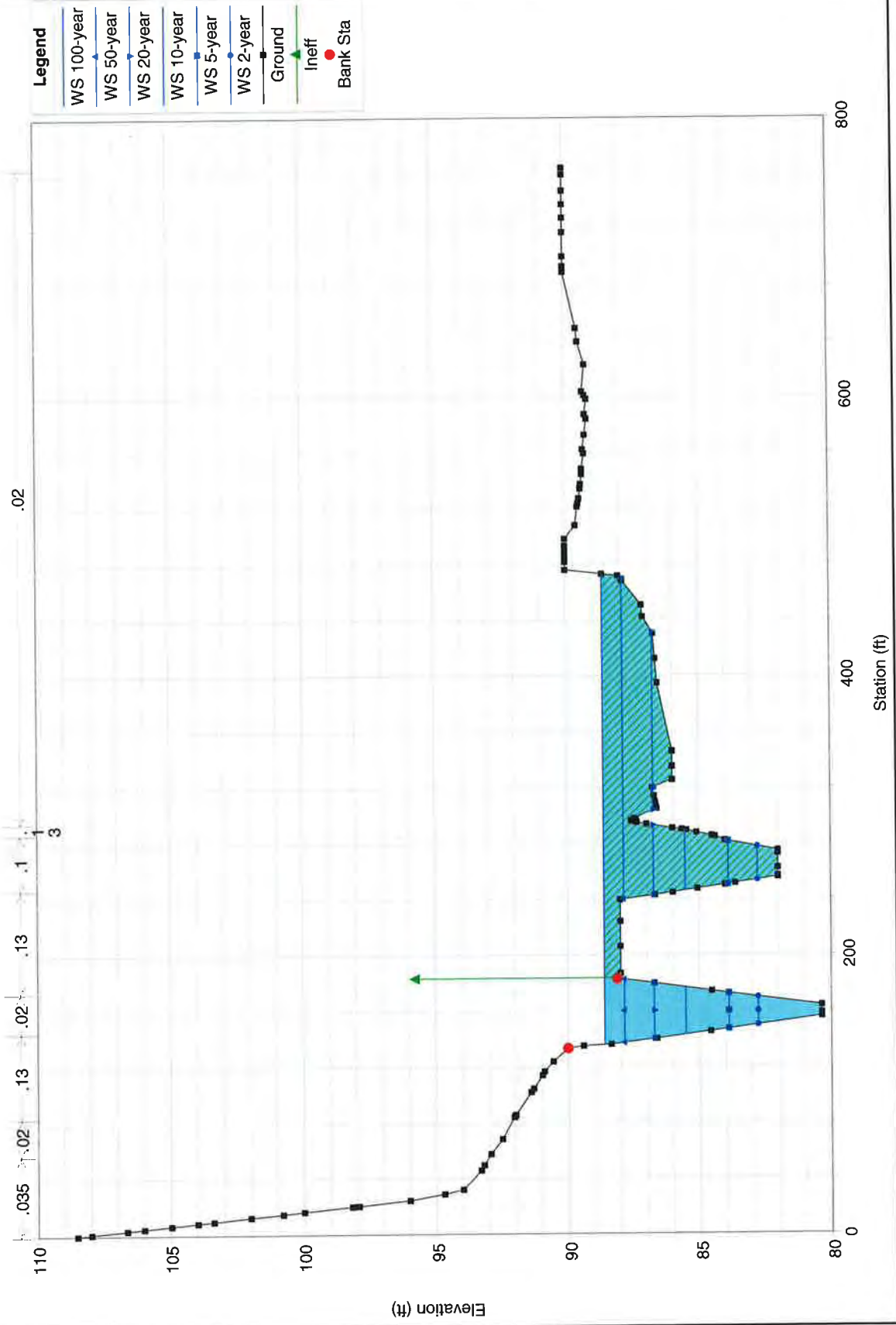
RS = 357.7724



Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

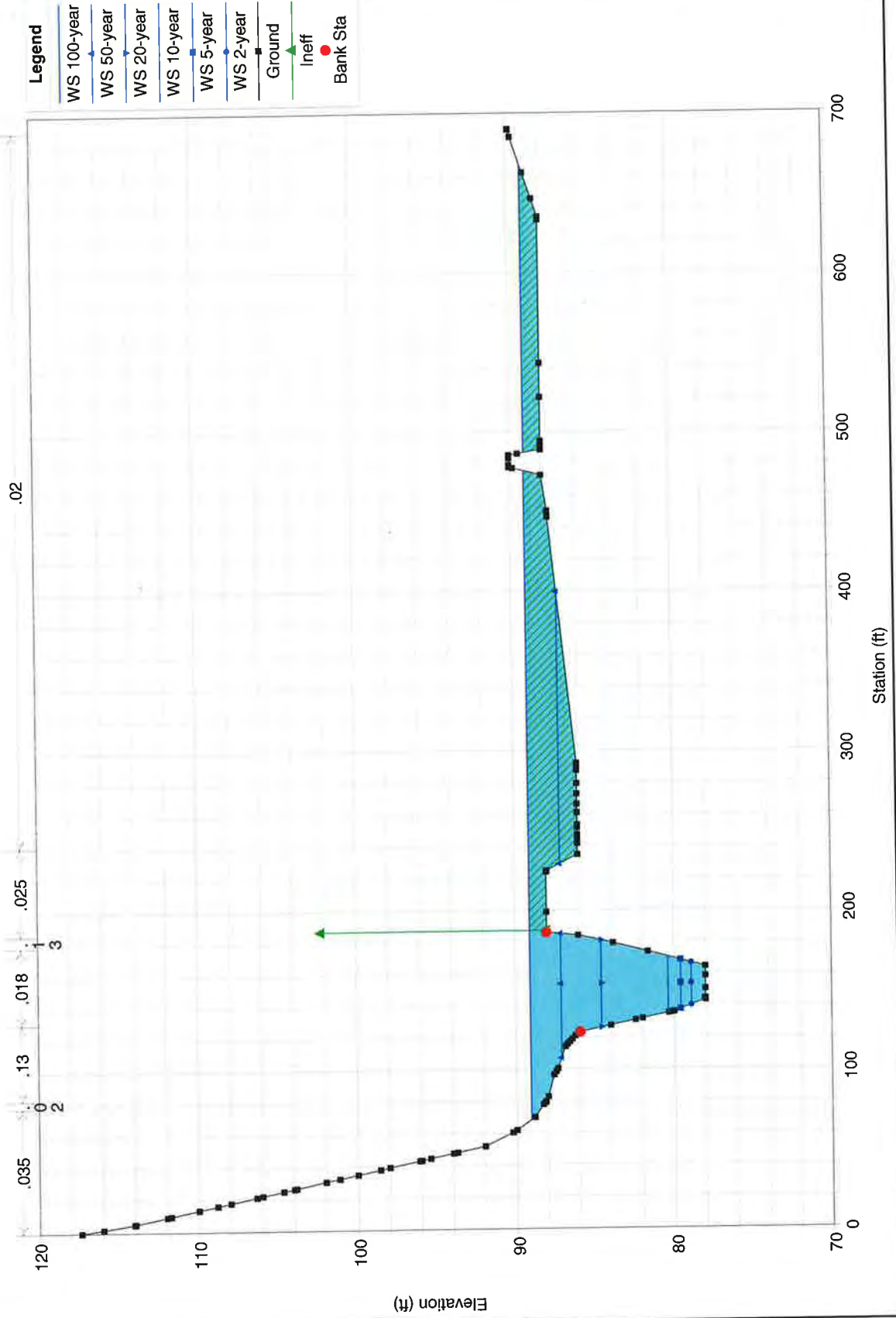
RS = 213.4405



Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

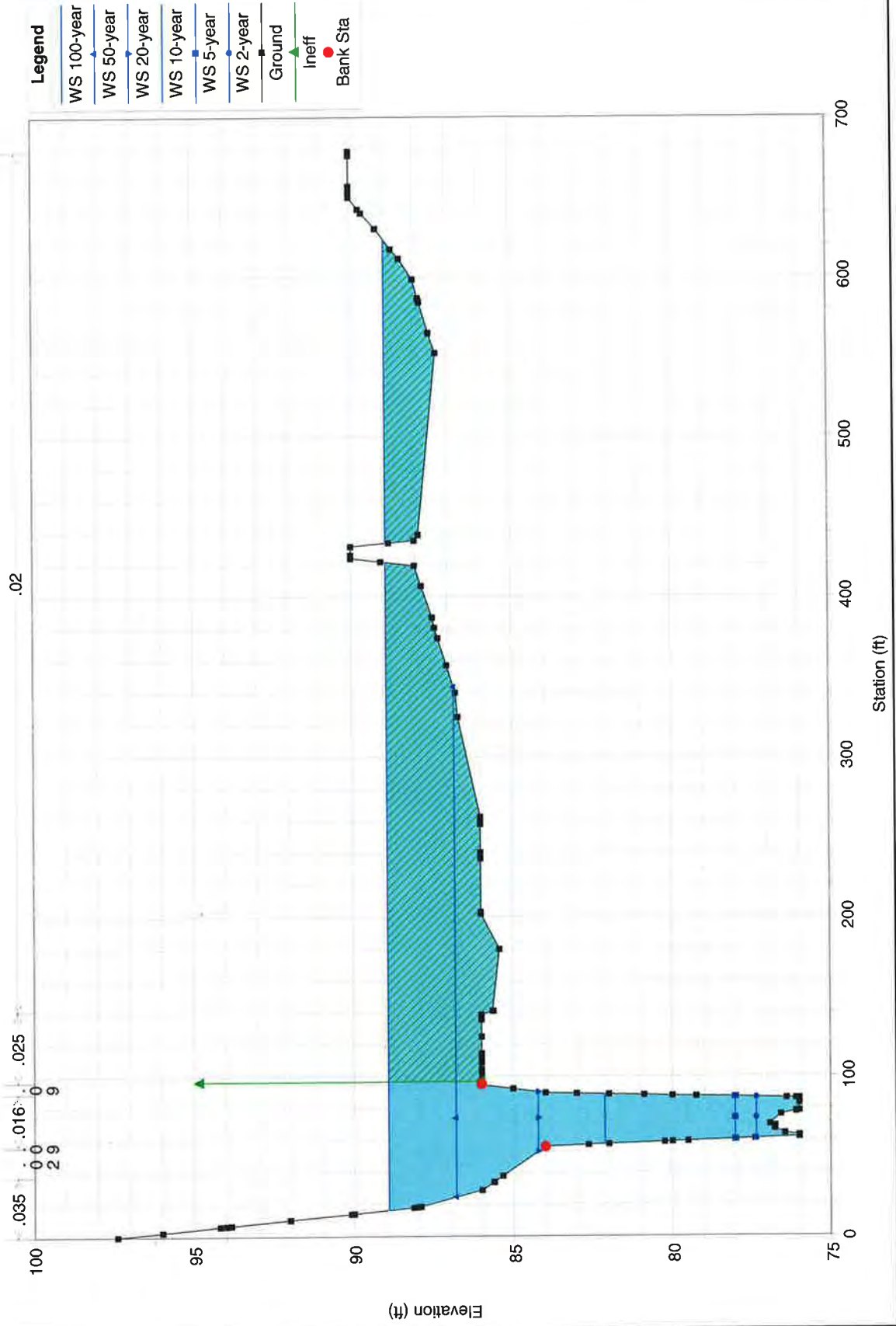
RS = 87.01827



Murphy Canyon - Reach 58A Plan: URS Ultimate Vegetate Condition 4/17/2013 1:36:51 PM

Geom: URS Ultimate Vegetated Condition Flow: Murphy Canyon Upper

RS = 13.30883



**DETAILED HYDRAULIC RESULTS FOR MAINTAINED CONDITION MODEL
(NO SEDIMENT REMOVED)**

HEC-RAS Plan: Maintained b River: Murphy Canyon Reach: Lower Reach

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Lower Reach	3019.665	100-year	3500.00	65.35	76.15	74.05	77.81	0.009889	10.32	339.14	574.75	0.76
Lower Reach	3019.665	50-year	2700.00	65.35	74.98	72.81	76.48	0.009556	9.83	274.57	533.42	0.70
Lower Reach	3019.665	20-year	2000.00	65.35	73.85	71.58	75.00	0.008262	8.61	232.22	493.07	0.59
Lower Reach	3019.665	10-year	1500.00	65.35	72.88	70.56	73.76	0.007457	7.55	198.58	193.96	0.55
Lower Reach	3019.665	5-year	1050.00	65.35	71.80	69.52	72.44	0.006792	6.41	163.78	99.27	0.49
Lower Reach	3019.665	2-year	510.00	65.35	69.80	67.99	70.17	0.006801	4.86	105.03	27.47	0.44
Lower Reach	2805.333	100-year	3500.00	63.79	72.54	72.54	75.40	0.011507	13.58	257.66	211.09	1.00
Lower Reach	2805.333	50-year	2700.00	63.79	71.43	71.43	73.99	0.013022	12.86	209.99	185.38	1.00
Lower Reach	2805.333	20-year	2000.00	63.79	70.28	70.28	72.55	0.015141	12.08	165.54	141.76	1.00
Lower Reach	2805.333	10-year	1500.00	63.79	69.34	69.34	71.32	0.017249	11.31	132.62	85.19	1.00
Lower Reach	2805.333	5-year	1050.00	63.79	68.35	68.33	70.02	0.019985	10.36	101.36	45.72	0.99
Lower Reach	2805.333	2-year	510.00	63.79	67.30		68.09	0.014257	7.09	71.90	26.95	0.76
Lower Reach	2479.647	100-year	3500.00	61.23	68.95	69.96	72.90	0.005111	15.94	219.59	71.81	1.28
Lower Reach	2479.647	50-year	2700.00	61.23	68.18	68.91	71.47	0.004891	14.57	185.33	65.12	1.23
Lower Reach	2479.647	20-year	2000.00	61.23	67.39	67.85	70.03	0.004572	13.04	153.38	39.84	1.16
Lower Reach	2479.647	10-year	1500.00	61.23	66.72	66.96	68.84	0.004261	11.69	128.33	35.81	1.09
Lower Reach	2479.647	5-year	1050.00	61.23	66.00	66.00	67.59	0.003804	10.10	103.95	32.57	1.00
Lower Reach	2479.647	2-year	510.00	61.23	64.46	64.46	65.62	0.004580	8.63	59.10	25.58	1.00
Lower Reach	2118.656	100-year	3500.00	58.49	68.95	67.38	70.76	0.001976	10.80	324.14	349.63	0.72
Lower Reach	2118.656	50-year	2700.00	58.49	65.13	66.35	69.39	0.006163	16.57	162.96	36.66	1.38
Lower Reach	2118.656	20-year	2000.00	58.49	64.12	65.21	67.92	0.006730	15.66	127.71	32.96	1.40
Lower Reach	2118.656	10-year	1500.00	58.49	63.25	64.27	66.70	0.007464	14.91	100.63	29.82	1.43
Lower Reach	2118.656	5-year	1050.00	58.49	62.31	63.26	65.43	0.008853	14.19	74.01	26.36	1.49
Lower Reach	2118.656	2-year	510.00	58.49	61.03	61.66	63.17	0.009961	11.74	43.44	21.72	1.46
Lower Reach	1847.267	100-year	3500.00	56.08	68.76	64.90	70.13	0.001693	9.41	372.12	793.31	0.56
Lower Reach	1847.267	50-year	2700.00	56.08	66.99	63.57	68.23	0.001354	8.92	302.66	545.62	0.55
Lower Reach	1847.267	20-year	2000.00	56.08	65.24	62.25	66.30	0.001057	8.27	241.95	190.34	0.54
Lower Reach	1847.267	10-year	1500.00	56.08	63.88	61.17	64.77	0.001065	7.54	198.99	52.57	0.52
Lower Reach	1847.267	5-year	1050.00	56.08	62.41	60.09	63.12	0.001095	6.75	155.63	45.98	0.51
Lower Reach	1847.267	2-year	510.00	56.08	59.90	58.59	60.40	0.001421	5.67	89.93	35.70	0.52
Lower Reach	1482.926	100-year	3500.00	53.63	68.45		68.91	0.004521	5.41	647.08	927.79	0.31
Lower Reach	1482.926	50-year	2700.00	53.63	66.75		67.15	0.004602	5.07	532.83	883.55	0.31
Lower Reach	1482.926	20-year	2000.00	53.63	65.03		65.37	0.004746	4.71	425.08	838.87	0.31
Lower Reach	1482.926	10-year	1500.00	53.63	63.57		63.87	0.004813	4.41	340.50	800.75	0.31
Lower Reach	1482.926	5-year	1050.00	53.63	62.00		62.25	0.004723	4.05	259.19	759.92	0.31

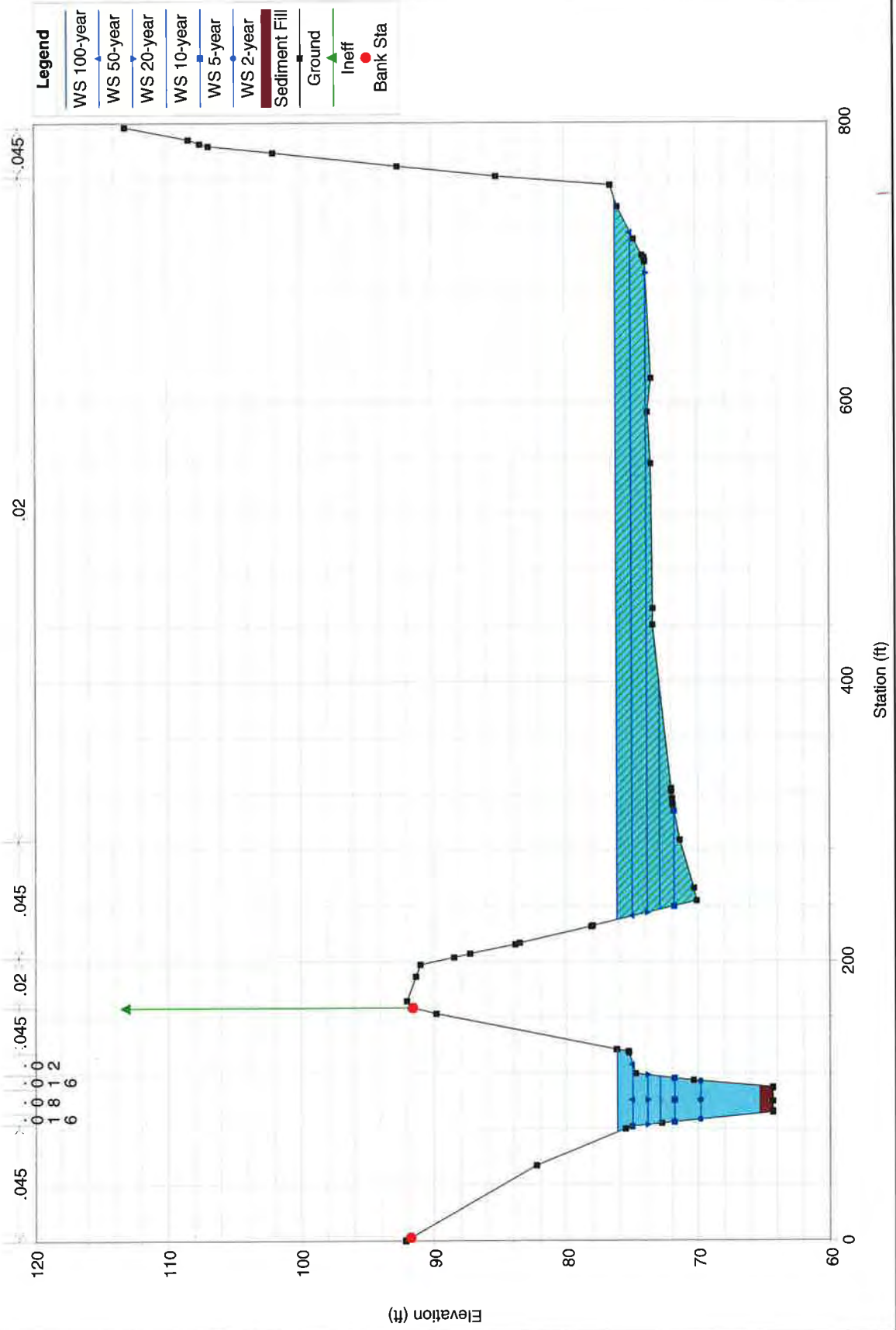
HEC-RAS Plan: Maintained b River: Murphy Canyon Reach: Lower Reach (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Lower Reach	1482.926	2-year	510.00	53.63	59.24		59.44	0.004861	3.55	143.59	609.46	0.31
Lower Reach	1065.173	100-year	3500.00	51.52	66.63		67.12	0.004031	5.40	643.55	771.56	0.30
Lower Reach	1065.173	50-year	2700.00	51.52	64.99		65.39	0.003841	4.95	542.81	739.59	0.29
Lower Reach	1065.173	20-year	2000.00	51.52	63.33		63.64	0.003613	4.47	446.09	702.02	0.28
Lower Reach	1065.173	10-year	1500.00	51.52	61.92		62.18	0.003432	4.06	369.33	663.69	0.27
Lower Reach	1065.173	5-year	1050.00	51.52	60.40		60.60	0.003285	3.61	291.29	619.96	0.26
Lower Reach	1065.173	2-year	510.00	51.52	57.73		57.87	0.002930	2.96	172.23	543.38	0.25
Lower Reach	628.1625	100-year	3500.00	50.12	64.29	58.69	64.92	0.006353	6.39	547.82	830.59	0.37
Lower Reach	628.1625	50-year	2700.00	50.12	62.82		63.34	0.005810	5.80	465.39	791.53	0.35
Lower Reach	628.1625	20-year	2000.00	50.12	61.32		61.74	0.005314	5.18	386.39	744.83	0.33
Lower Reach	628.1625	10-year	1500.00	50.12	60.05		60.39	0.004910	4.64	323.12	712.05	0.32
Lower Reach	628.1625	5-year	1050.00	50.12	58.68		58.94	0.004452	4.07	258.20	673.56	0.30
Lower Reach	628.1625	2-year	510.00	50.12	56.33		56.48	0.003429	3.16	161.64	456.80	0.27
Lower Reach	281.2985	100-year	3500.00	50.25	57.54	57.54	60.14	0.042617	12.94	270.42	724.17	1.00
Lower Reach	281.2985	50-year	2700.00	50.25	56.54	56.54	58.86	0.042318	12.22	220.90	692.81	1.00
Lower Reach	281.2985	20-year	2000.00	50.25	55.54	55.54	57.56	0.042080	11.41	175.26	574.74	1.00
Lower Reach	281.2985	10-year	1500.00	50.25	54.73	54.73	56.48	0.041378	10.63	141.14	429.06	1.00
Lower Reach	281.2985	5-year	1050.00	50.25	53.87	53.87	55.33	0.040536	9.72	108.08	319.51	1.00
Lower Reach	281.2985	2-year	510.00	50.25	52.57	52.57	53.57	0.038953	8.03	63.49	78.79	1.00
Lower Reach	36.18799	100-year	3500.00	47.65	58.00	50.66	58.09	0.000339	2.35	1490.84	839.43	0.14
Lower Reach	36.18799	50-year	2700.00	47.65	50.72	50.20	51.51	0.010008	7.15	377.67	191.04	0.75
Lower Reach	36.18799	20-year	2000.00	47.65	50.19	49.74	50.84	0.010018	6.50	307.60	133.01	0.74
Lower Reach	36.18799	10-year	1500.00	47.65	49.76	49.38	50.31	0.010002	5.91	253.64	126.87	0.74
Lower Reach	36.18799	5-year	1050.00	47.65	49.34	49.02	49.77	0.010007	5.24	200.26	124.08	0.73
Lower Reach	36.18799	2-year	510.00	47.65	48.73	48.50	48.98	0.010003	4.06	125.50	120.06	0.70

Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

Geom: Maintained bank to bank Flow: Murphy

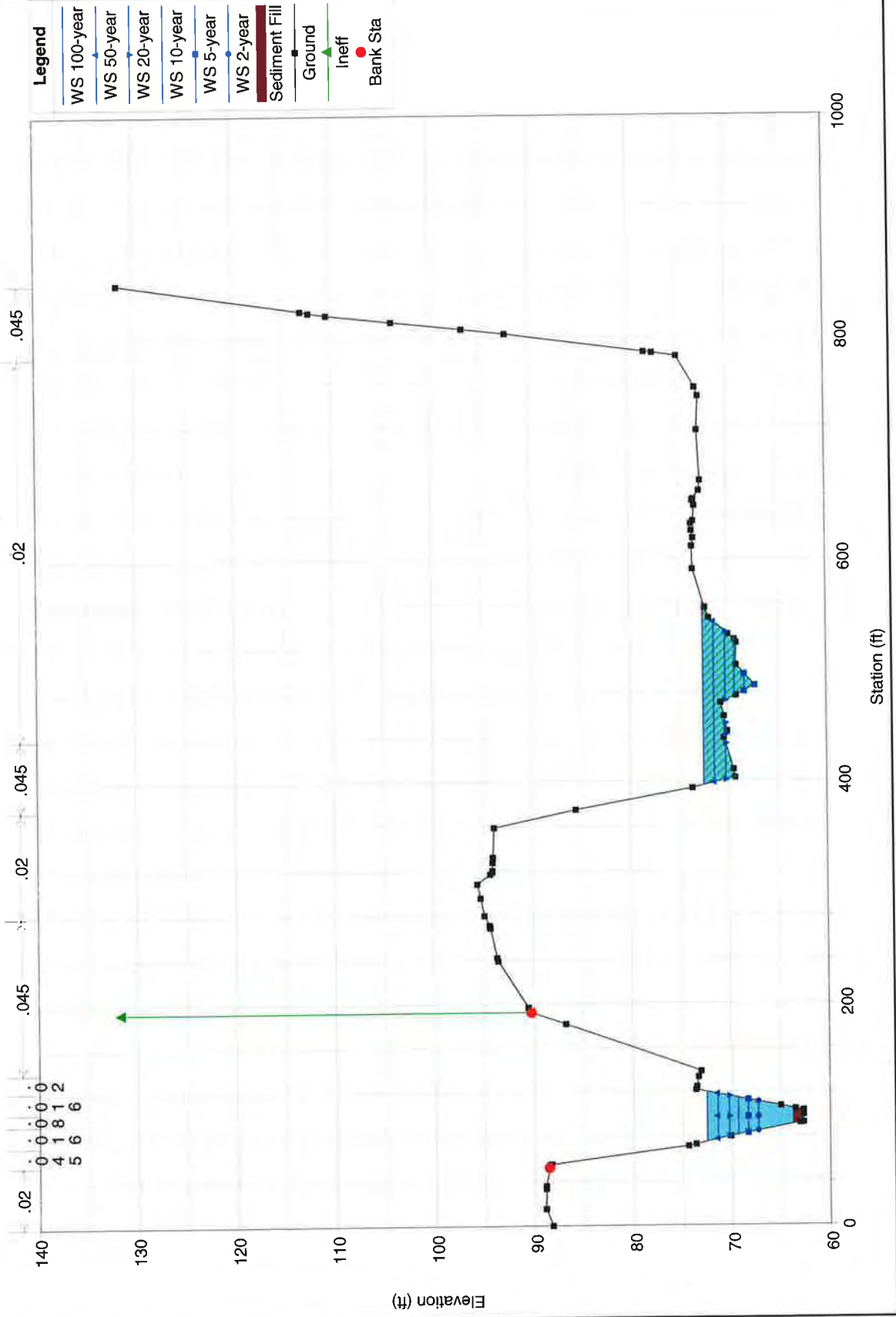
RS = 3019.665



Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

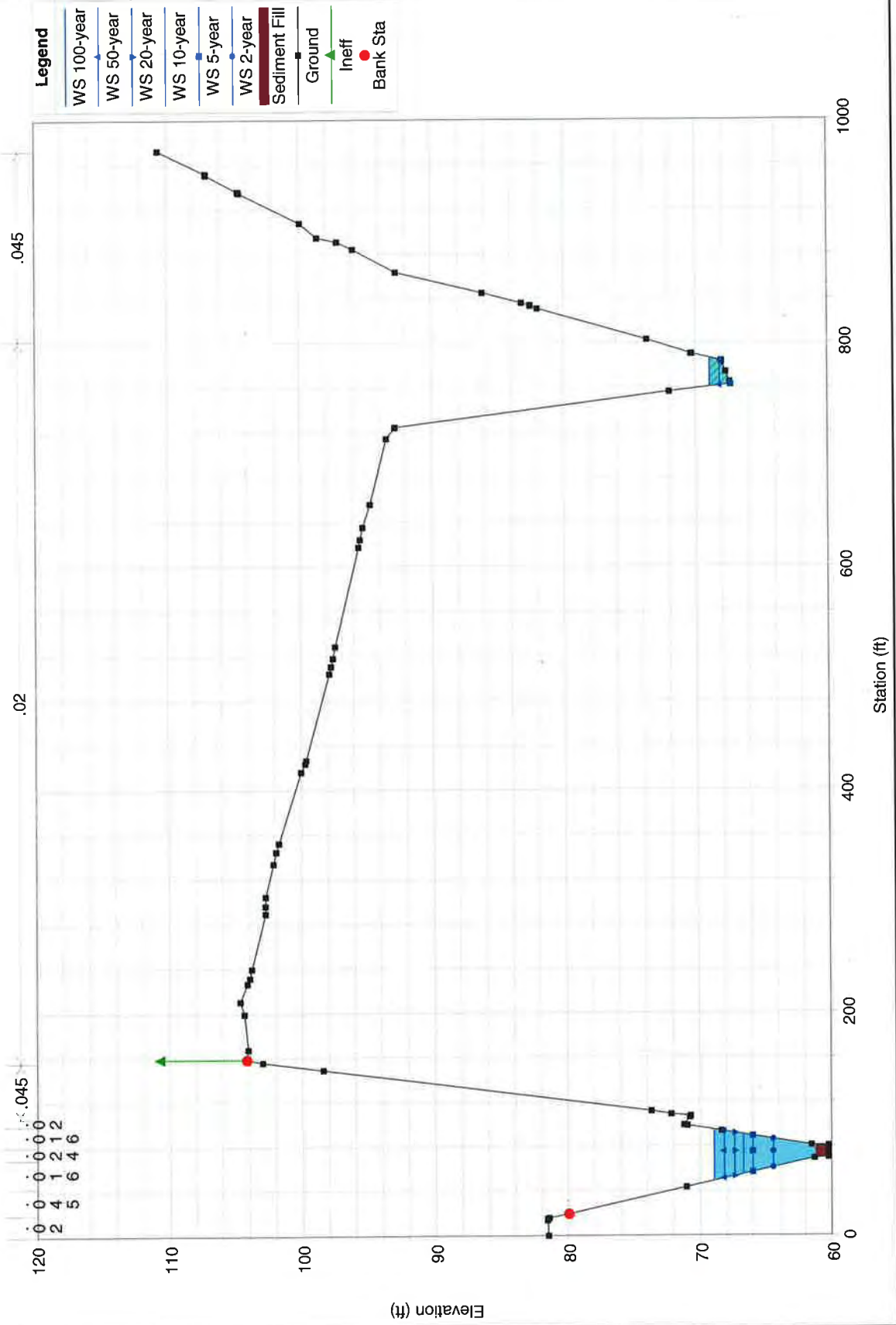
Geom: Maintained bank to bank Flow: Murphy

RS = 2805.333



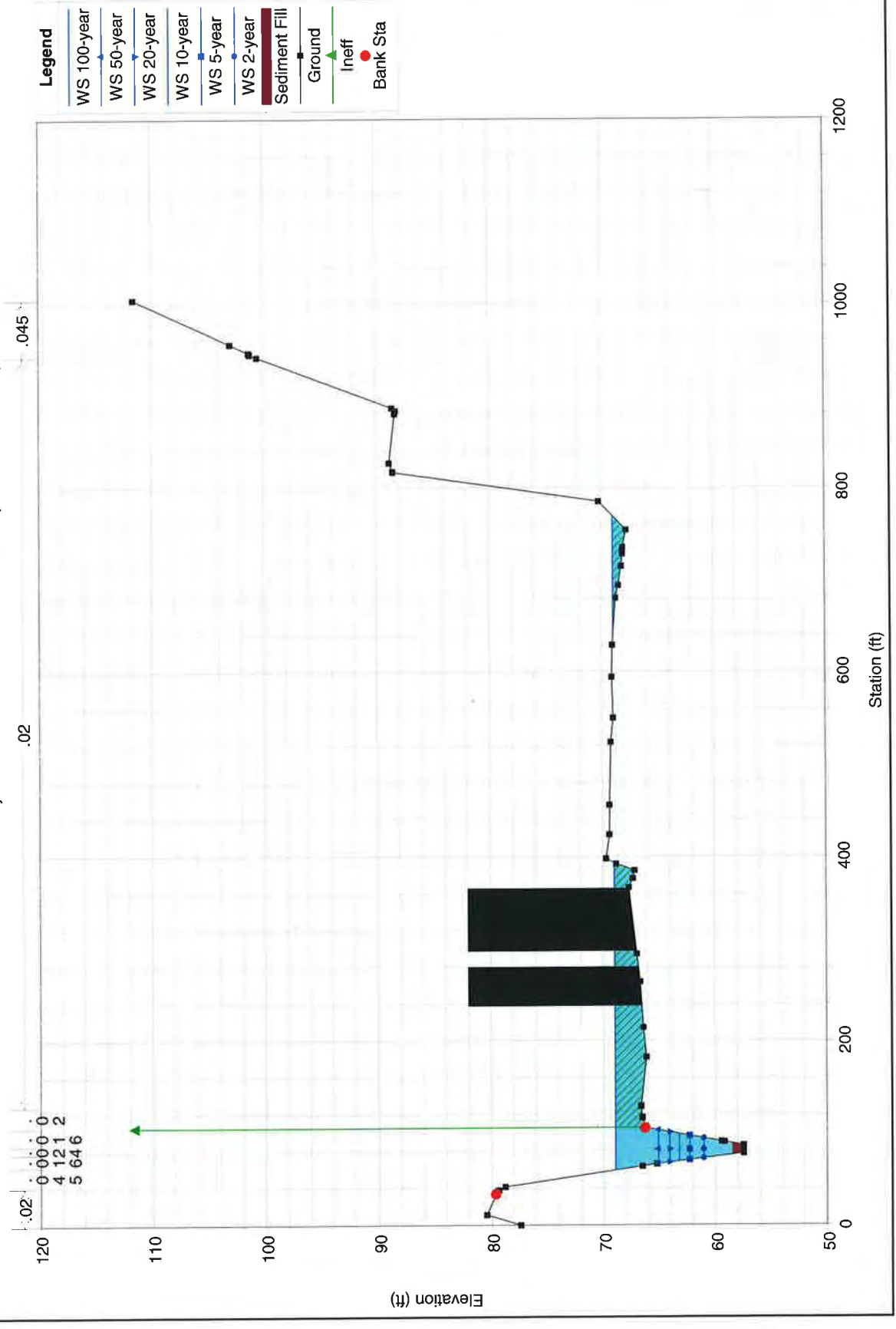
Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

Geom: Maintained bank to bank Flow: Murphy
 RS = 2479.647 d/s of Friars Road



Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

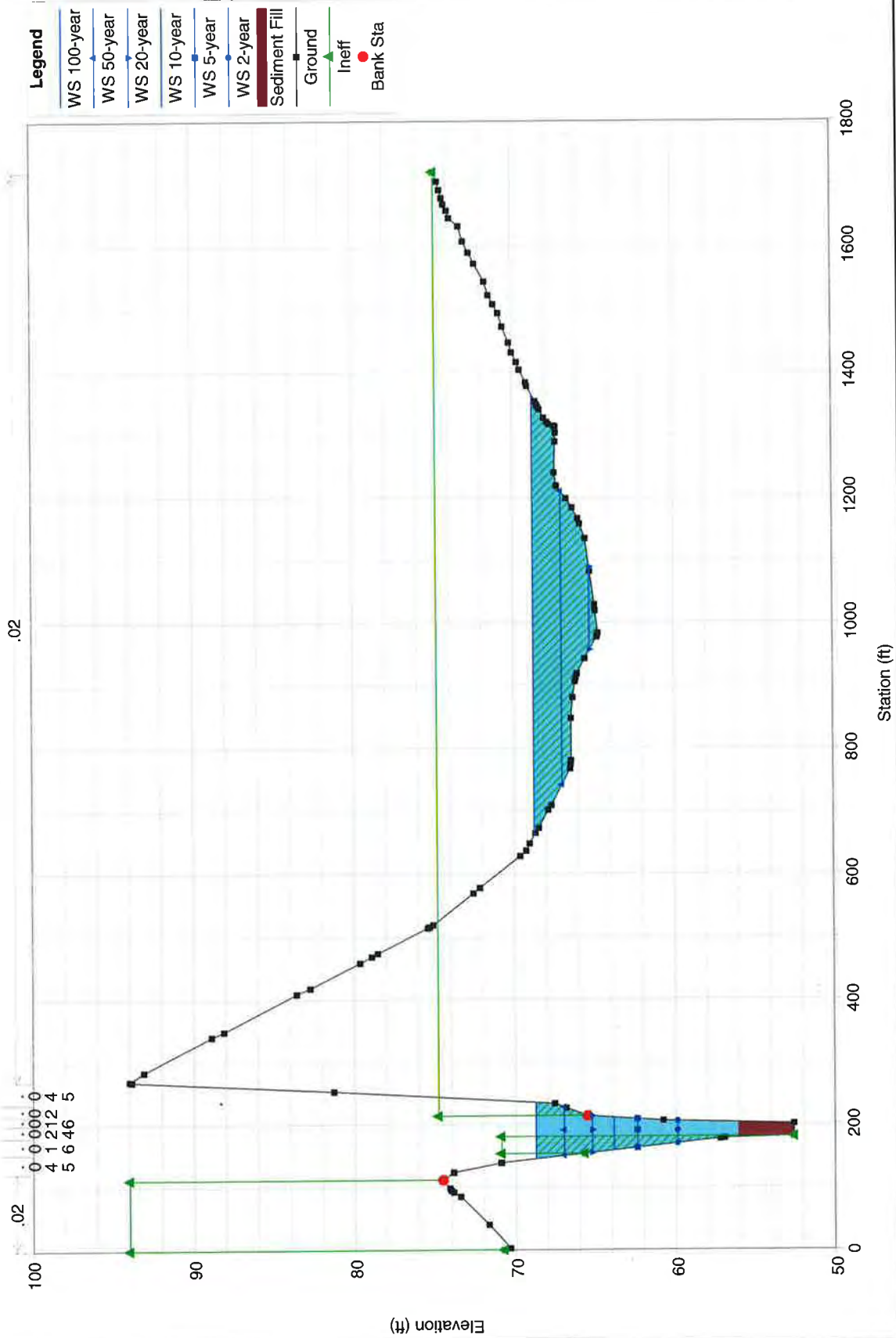
Geom: Maintained bank to bank Flow: Murphy
 RS = 2118.656 adjacent to tank farm - Southern Pacific Pipe Lines Partnership



Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

Geom: Maintained bank to bank Flow: Murphy

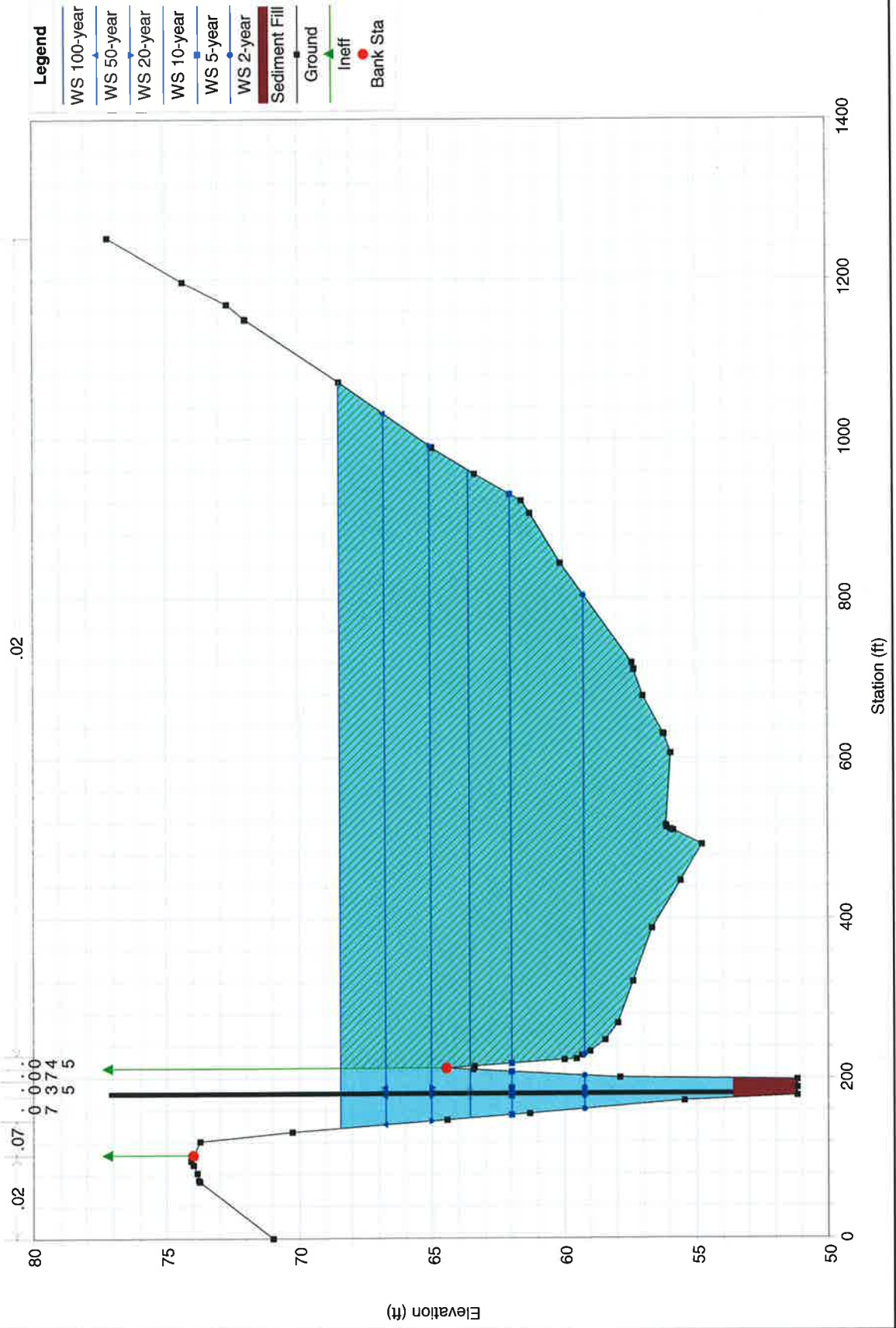
RS = 1847.267 u/s end of Qualcomm parking lot - conc channel ends approximatel



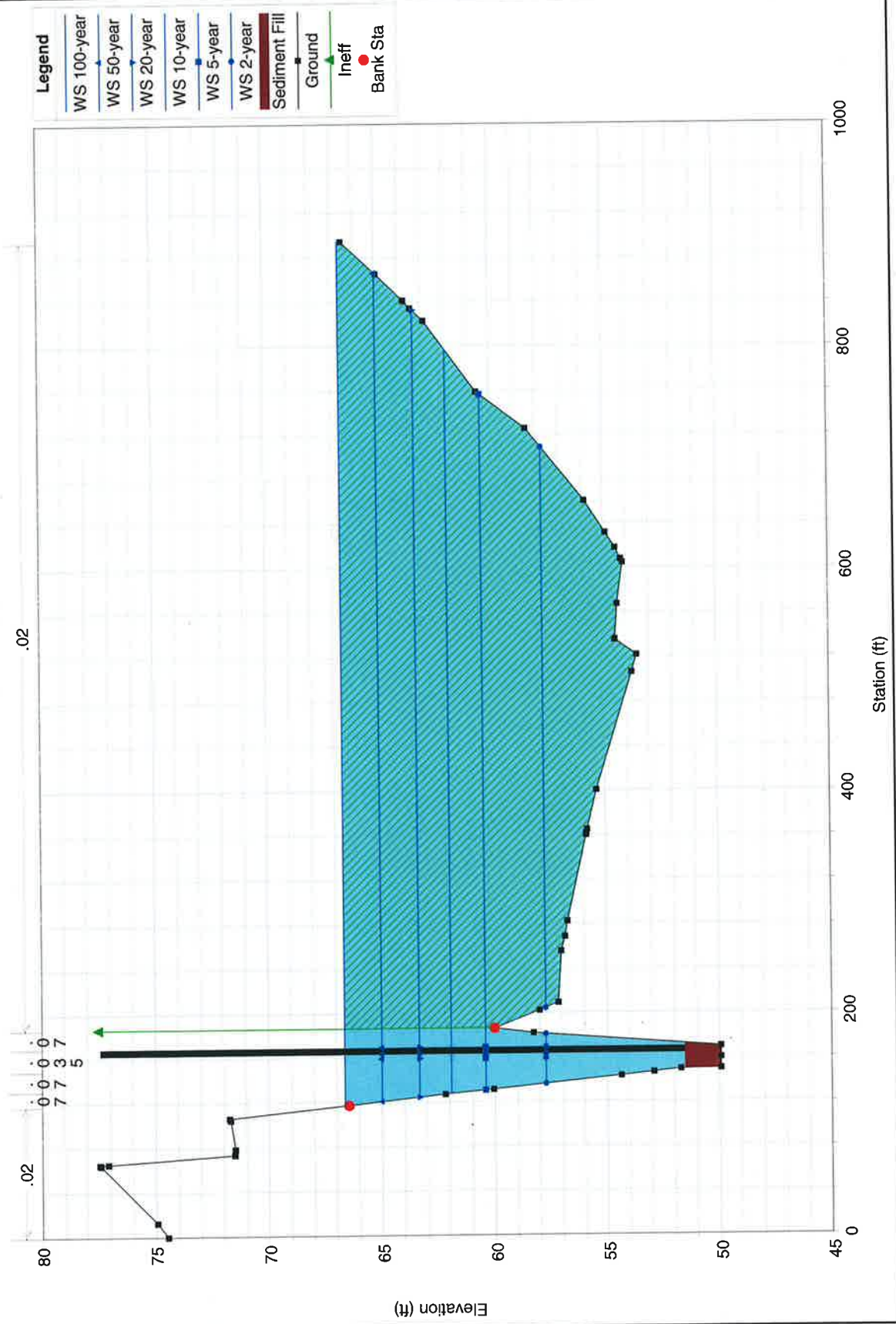
Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

Geom: Maintained bank to bank Flow: Murphy

RS = 1482.926

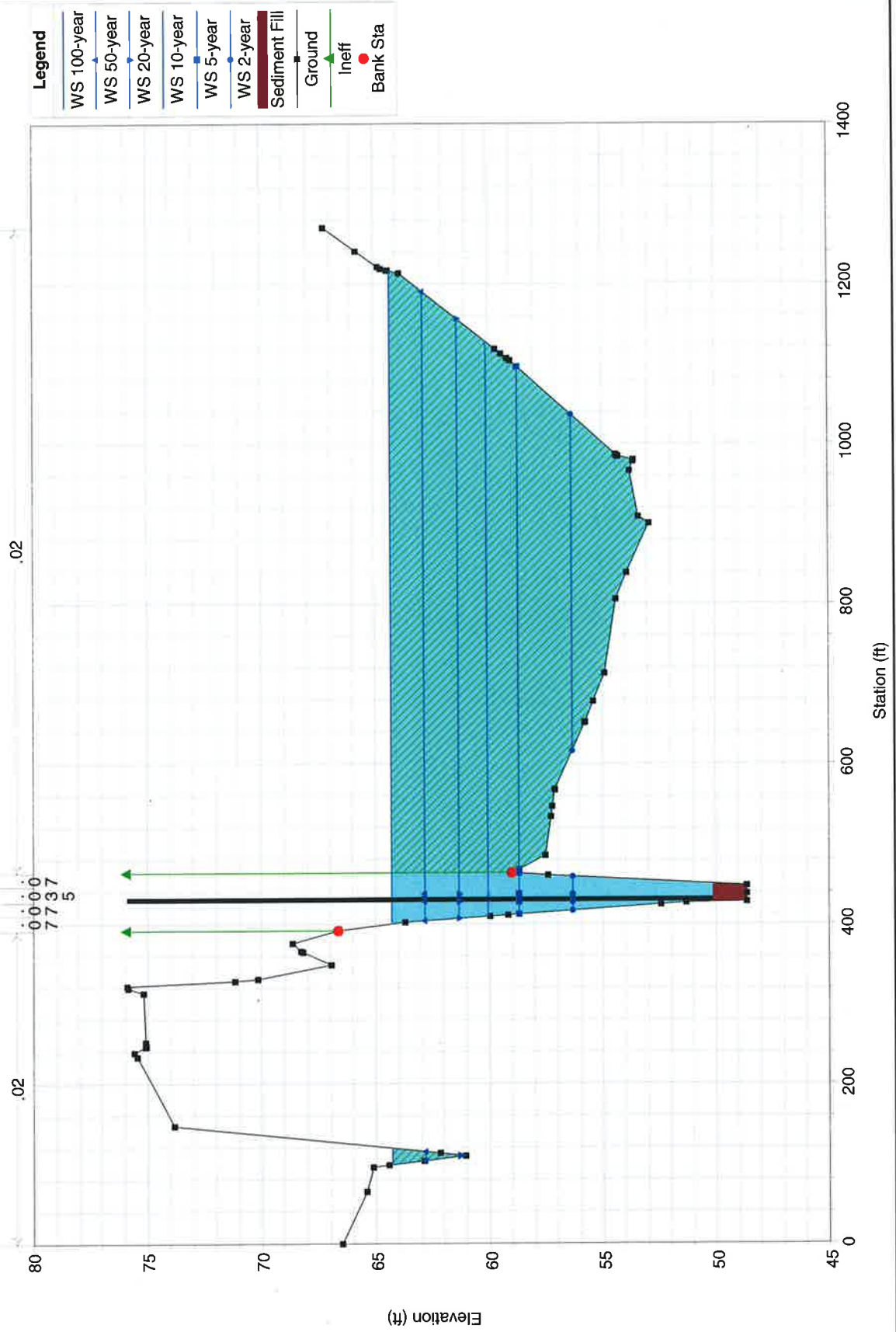


RS = 1065.173



Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

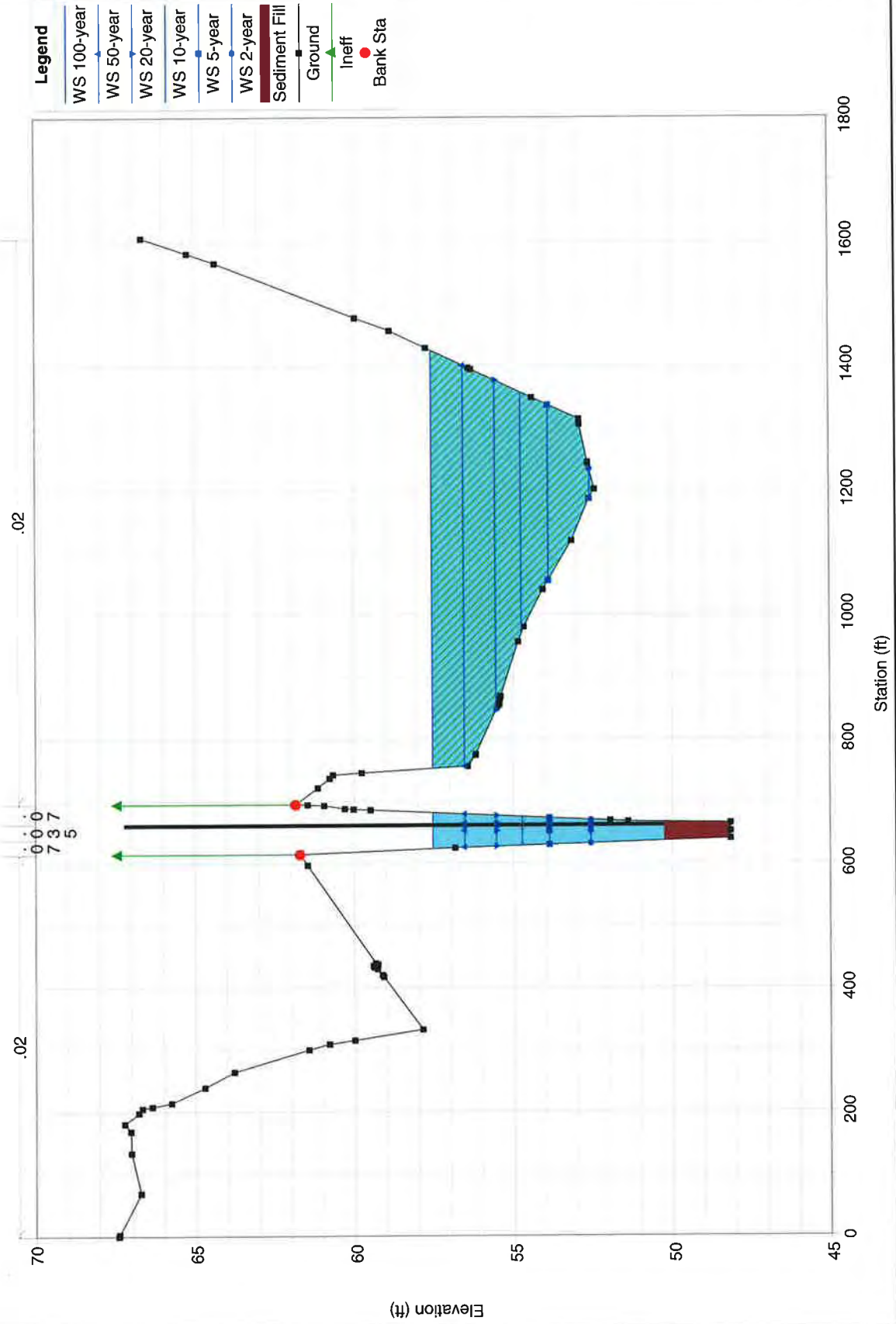
Geom: Maintained bank to bank Flow: Murphy
 RS = 628.1625 d/s end of Qualcomm parking - u/s of bridge crossings



Murphy Canyon - Reach 58	Plan: Maintained bank to bank	4/18/2013 12:37:37 PM
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Geom: Maintained bank to bank Flow: Murphy

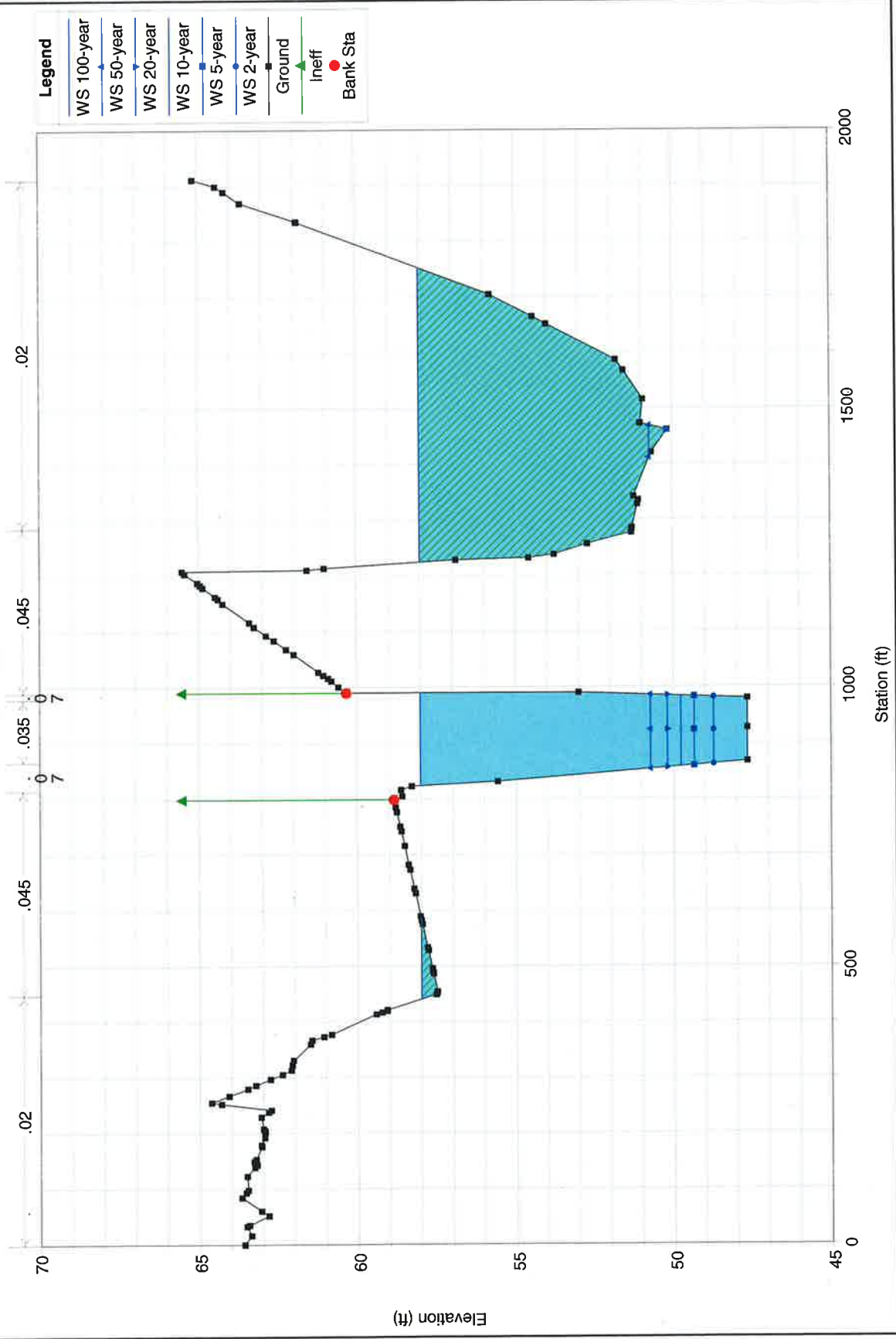
RS = 281.2985



Murphy Canyon - Reach 58 Plan: Maintained bank to bank 4/18/2013 12:37:37 PM

Geom: Maintained bank to bank Flow: Murphy

RS = 36.18799



HEC-RAS Plan: Maint'd-VegRemov River: Murphy Canyon Reach: Upper

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper	2132.098	100-year	3000.00	102.00	111.79	106.55	112.17	0.005272	4.92	609.95	72.96	0.30
Upper	2132.098	50-year	2400.00	102.00	110.61	105.94	110.94	0.004898	4.57	525.32	70.40	0.29
Upper	2132.098	20-year	1700.00	102.00	109.07	105.15	109.32	0.004342	4.06	419.08	67.05	0.29
Upper	2132.098	10-year	1100.00	102.00	107.53	104.37	107.71	0.003673	3.45	318.41	63.71	0.27
Upper	2132.098	5-year	680.00	102.00	106.24	103.73	106.37	0.002997	2.85	238.32	60.93	0.25
Upper	2132.098	2-year	300.00	102.00	104.75	103.01	104.81	0.002047	2.00	149.81	57.60	0.22
Upper	1830.059	100-year	3000.00	102.00	110.10		110.50	0.005825	5.06	592.46	88.30	0.34
Upper	1830.059	50-year	2400.00	102.00	108.93		109.30	0.005987	4.88	492.12	83.98	0.36
Upper	1830.059	20-year	1700.00	102.00	107.42		107.75	0.006292	4.60	369.50	78.36	0.37
Upper	1830.059	10-year	1100.00	102.00	105.96		106.24	0.006699	4.25	258.92	72.83	0.40
Upper	1830.059	5-year	680.00	102.00	104.79		105.02	0.007187	3.85	176.71	68.43	0.42
Upper	1830.059	2-year	300.00	102.00	103.51		103.68	0.008883	3.26	92.06	63.65	0.48
Upper	1564.744	100-year	3000.00	98.00	108.21		108.60	0.008960	4.96	604.62	80.77	0.32
Upper	1564.744	50-year	2400.00	98.00	107.00		107.35	0.009194	4.71	509.54	76.49	0.32
Upper	1564.744	20-year	1700.00	98.00	105.42		105.71	0.009578	4.33	392.45	70.95	0.32
Upper	1564.744	10-year	1100.00	98.00	103.83		104.06	0.010140	3.87	284.10	65.70	0.33
Upper	1564.744	5-year	680.00	98.00	102.51		102.69	0.010986	3.40	199.88	61.67	0.33
Upper	1564.744	2-year	300.00	98.00	100.91		101.03	0.011116	2.76	108.66	50.81	0.33
Upper	1288.238	100-year	3000.00	96.00	105.84		106.29	0.007737	5.41	554.34	66.94	0.33
Upper	1288.238	50-year	2400.00	96.00	104.66		105.06	0.007492	5.03	477.11	64.88	0.33
Upper	1288.238	20-year	1700.00	96.00	103.11		103.43	0.007178	4.49	378.72	62.15	0.32
Upper	1288.238	10-year	1100.00	96.00	101.54		101.78	0.006875	3.89	283.14	59.20	0.31
Upper	1288.238	5-year	680.00	96.00	100.20		100.37	0.006620	3.31	205.44	56.29	0.31
Upper	1288.238	2-year	300.00	96.00	98.64		98.73	0.006425	2.50	120.14	53.20	0.29
Upper	942.3686	100-year	3000.00	90.00	96.97	96.97	99.48	0.103617	12.73	235.67	47.02	1.00
Upper	942.3686	50-year	2400.00	90.00	96.19	96.19	98.42	0.104439	12.00	199.94	44.70	1.00
Upper	942.3686	20-year	1700.00	90.00	95.15	95.15	97.01	0.106562	10.96	155.10	41.59	1.00
Upper	942.3686	10-year	1100.00	90.00	94.10	94.10	95.57	0.109822	9.73	113.02	38.44	1.00
Upper	942.3686	5-year	680.00	90.00	93.16	93.16	94.32	0.114422	8.64	78.69	34.50	1.01
Upper	942.3686	2-year	300.00	90.00	92.06	92.06	92.80	0.120871	6.92	43.36	29.71	1.01
Upper	569.4169	100-year	3000.00	84.00	91.39	92.31	95.04	0.004176	15.35	195.43	308.11	1.30
Upper	569.4169	50-year	2400.00	84.00	90.68	91.51	93.96	0.004204	14.54	165.04	285.55	1.28
Upper	569.4169	20-year	1700.00	84.00	89.70	90.38	92.49	0.004278	13.40	126.83	156.06	1.27

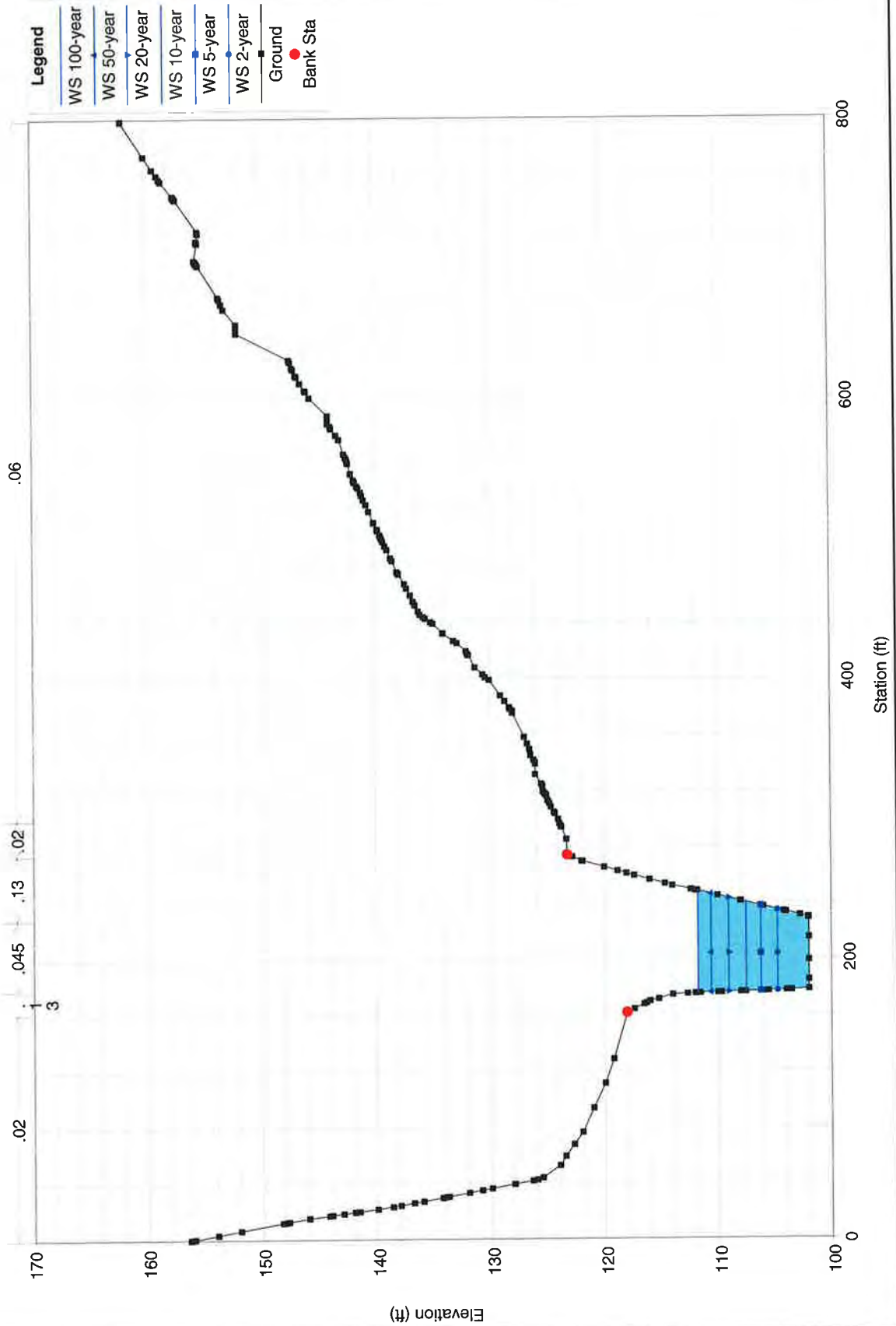
HEC-RAS Plan: Maint'd-VegRemov River: Murphy Canyon Reach: Upper (Continued)

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Upper	569.4169	10-year	1100.00	84.00	88.63	89.18	90.92	0.004418	12.13	90.71	113.46	1.25
Upper	569.4169	5-year	680.00	84.00	87.66	88.07	89.48	0.004592	10.85	62.68	26.28	1.24
Upper	569.4169	2-year	300.00	84.00	86.40	86.67	87.64	0.004956	8.95	33.50	19.98	1.22
Upper	530.489	100-year	3000.00	83.57	90.69	91.87	94.83	0.004924	16.32	183.77	43.61	1.40
Upper	530.489	50-year	2400.00	83.57	89.99	91.08	93.74	0.005022	15.54	154.46	40.11	1.40
Upper	530.489	20-year	1700.00	83.57	89.01	89.96	92.26	0.005254	14.47	117.50	35.20	1.40
Upper	530.489	10-year	1100.00	83.57	87.94	88.75	90.68	0.005644	13.28	82.85	29.87	1.41
Upper	530.489	5-year	680.00	83.57	86.98	87.65	89.24	0.006105	12.05	56.44	25.07	1.41
Upper	530.489	2-year	300.00	83.57	85.75	86.23	87.38	0.007193	10.25	29.27	18.89	1.45
Upper	357.7724	100-year	3000.00	81.65	92.38	89.96	93.47	0.010285	8.37	358.22	495.58	0.55
Upper	357.7724	50-year	2400.00	81.65	91.39	89.18	92.33	0.009909	7.79	308.14	486.66	0.55
Upper	357.7724	20-year	1700.00	81.65	89.93	88.05	90.73	0.010273	7.17	237.00	428.48	0.57
Upper	357.7724	10-year	1100.00	81.65	85.61	86.84	89.39	0.008714	15.59	70.56	27.73	1.72
Upper	357.7724	5-year	680.00	81.65	84.72	85.74	87.85	0.009514	14.19	47.92	23.25	1.74
Upper	357.7724	2-year	300.00	81.65	83.61	84.33	85.81	0.010846	11.90	25.21	17.71	1.76
Upper	213.4405	100-year	3000.00	80.37	88.63	88.63	91.12	0.025410	12.66	237.07	337.30	1.00
Upper	213.4405	50-year	2400.00	80.37	87.87	87.87	90.08	0.024197	11.93	201.16	274.64	1.00
Upper	213.4405	20-year	1700.00	80.37	86.74	86.74	88.66	0.018920	11.11	153.00	216.73	1.00
Upper	213.4405	10-year	1100.00	80.37	84.30	85.54	88.11	0.008878	15.68	70.16	62.65	1.74
Upper	213.4405	5-year	680.00	80.37	83.46	84.44	86.47	0.009082	13.92	48.84	51.88	1.70
Upper	213.4405	2-year	300.00	80.37	82.44	83.03	84.31	0.008768	11.00	27.29	40.17	1.59
Upper	87.01827	100-year	3000.00	78.01	89.05	84.40	89.51	0.001398	5.52	610.68	586.24	0.34
Upper	87.01827	50-year	2400.00	78.01	87.08	83.67	87.62	0.002090	5.92	411.21	241.52	0.41
Upper	87.01827	20-year	1700.00	78.01	81.02	82.67	86.46	0.011720	18.72	90.82	38.32	2.14
Upper	87.01827	10-year	1100.00	78.01	80.03	81.64	86.21	0.021559	19.95	55.14	33.67	2.75
Upper	87.01827	5-year	680.00	78.01	79.49	80.76	84.49	0.024904	17.95	37.89	30.32	2.83
Upper	87.01827	2-year	300.00	78.01	78.87	79.70	82.26	0.032027	14.77	20.31	26.42	2.97
Upper	13.30883	100-year	3000.00	76.00	88.92	83.67	89.42	0.000989	5.88	540.44	595.27	0.32
Upper	13.30883	50-year	2400.00	76.00	86.81	82.71	87.47	0.001738	6.70	377.48	319.38	0.41
Upper	13.30883	20-year	1700.00	76.00	84.23	81.47	85.09	0.001288	7.43	229.23	37.31	0.51
Upper	13.30883	10-year	1100.00	76.00	78.52	80.23	84.73	0.018386	20.01	54.99	27.07	2.47
Upper	13.30883	5-year	680.00	76.00	77.90	79.20	82.72	0.021460	17.62	38.59	26.37	2.57
Upper	13.30883	2-year	300.00	76.00	77.28	78.03	80.06	0.023787	13.37	22.44	25.68	2.52

Murphy Canyon - Reach 58A Plan: URS Maintained Vegetation Removed 4/17/2013 1:33:55 PM

Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

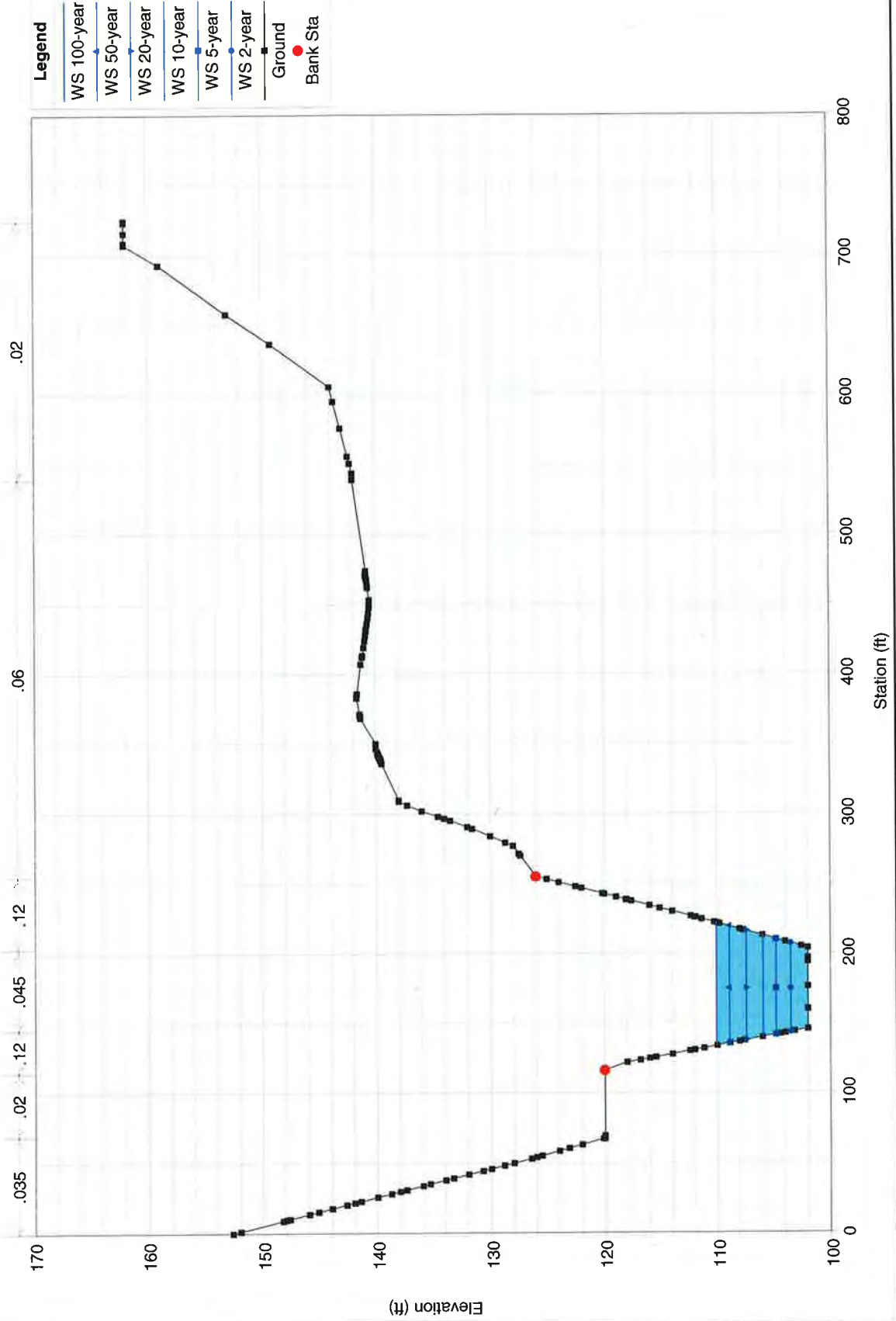
RS = 2132.098



Murphy Canyon - Reach 58A Plan: URS Maintained Vegetation Removed 4/17/2013 1:33:55 PM

Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

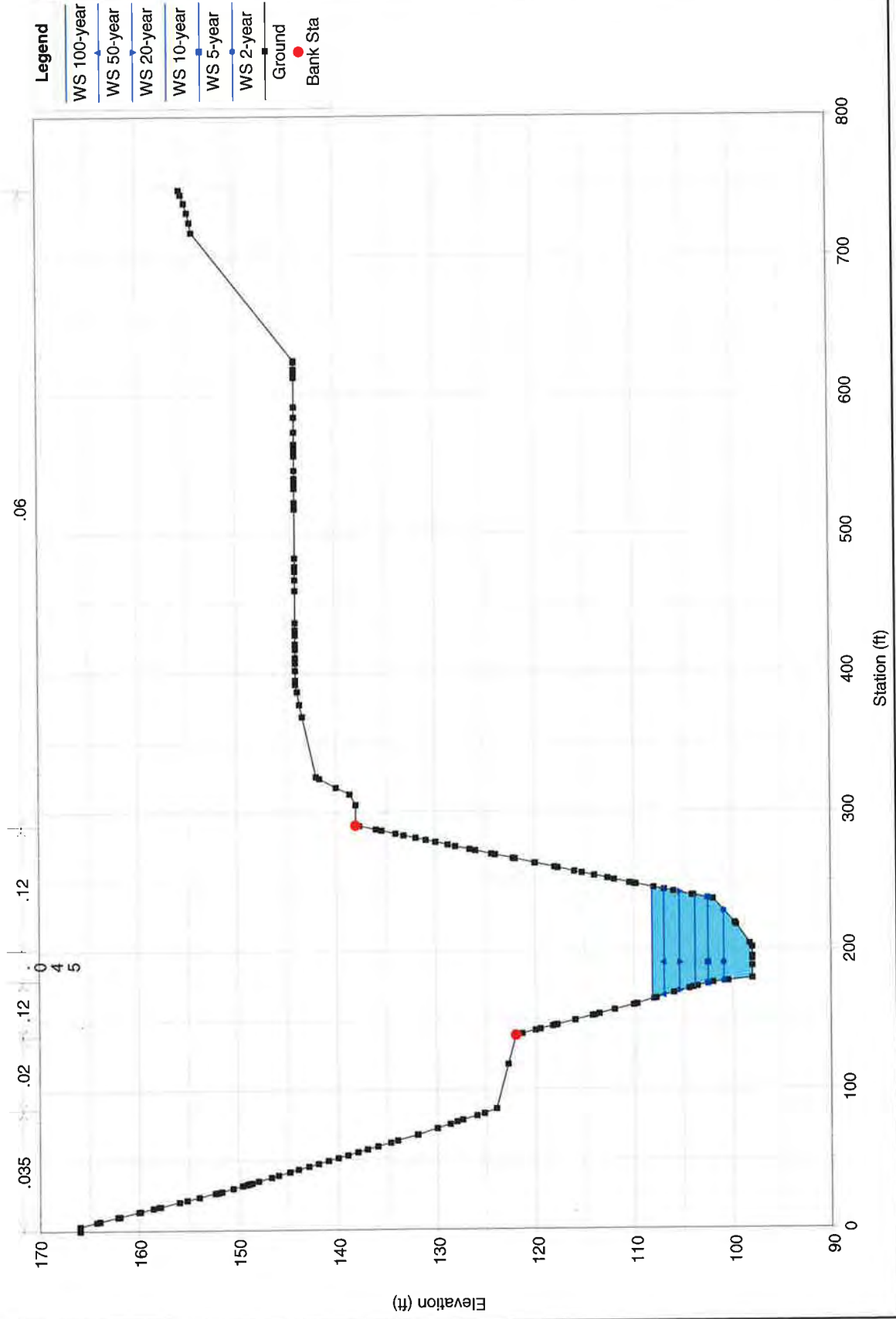
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Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

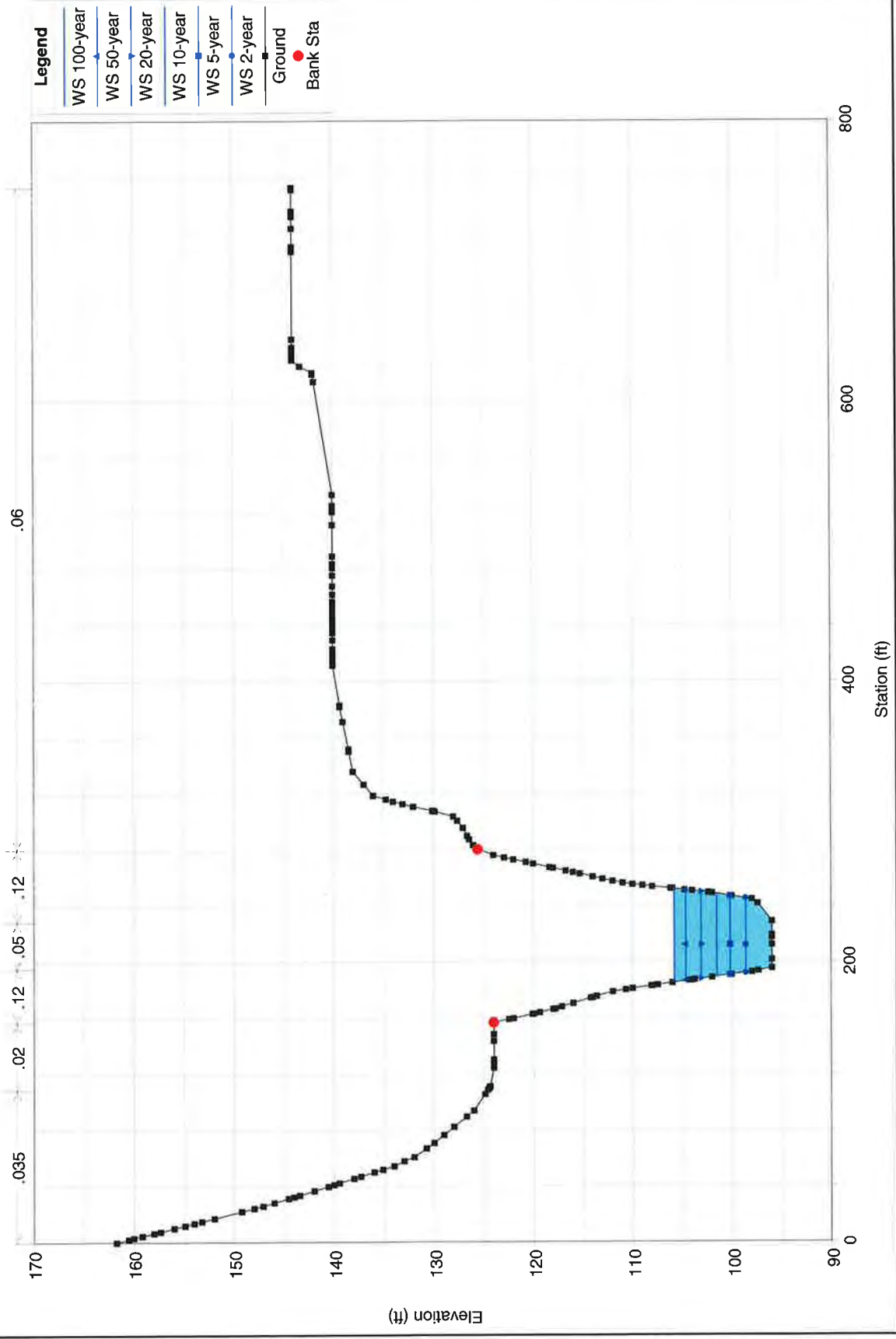
RS = 1564.744



Murphy Canyon - Reach 58A Plan: URS Maintained Vegetation Removed 4/17/2013 1:33:55 PM

Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

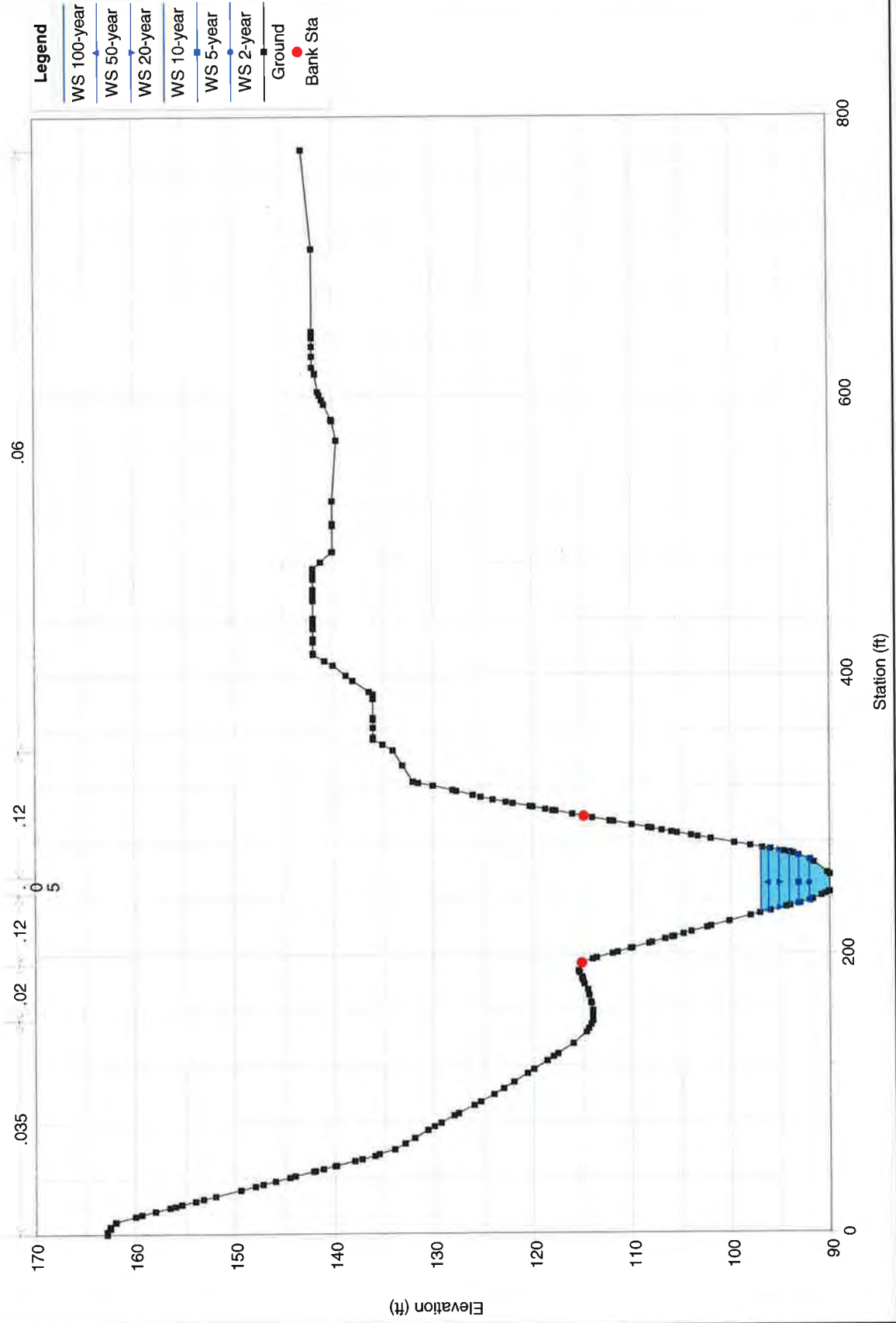
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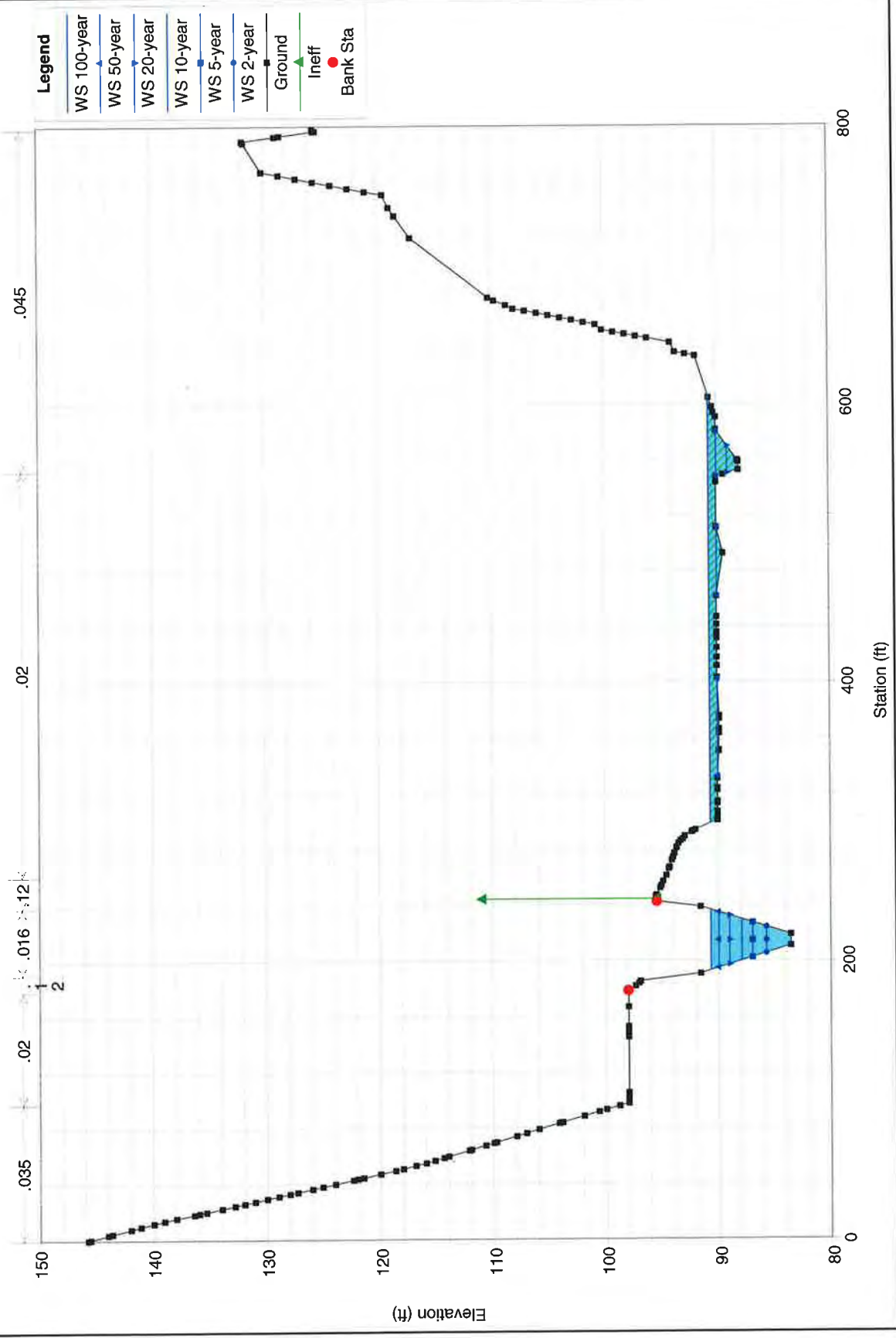
Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

RS = 942.3686



Murphy Canyon - Reach 58A Plan: URS Maintained Vegetation Removed 4/17/2013 1:33:55 PM

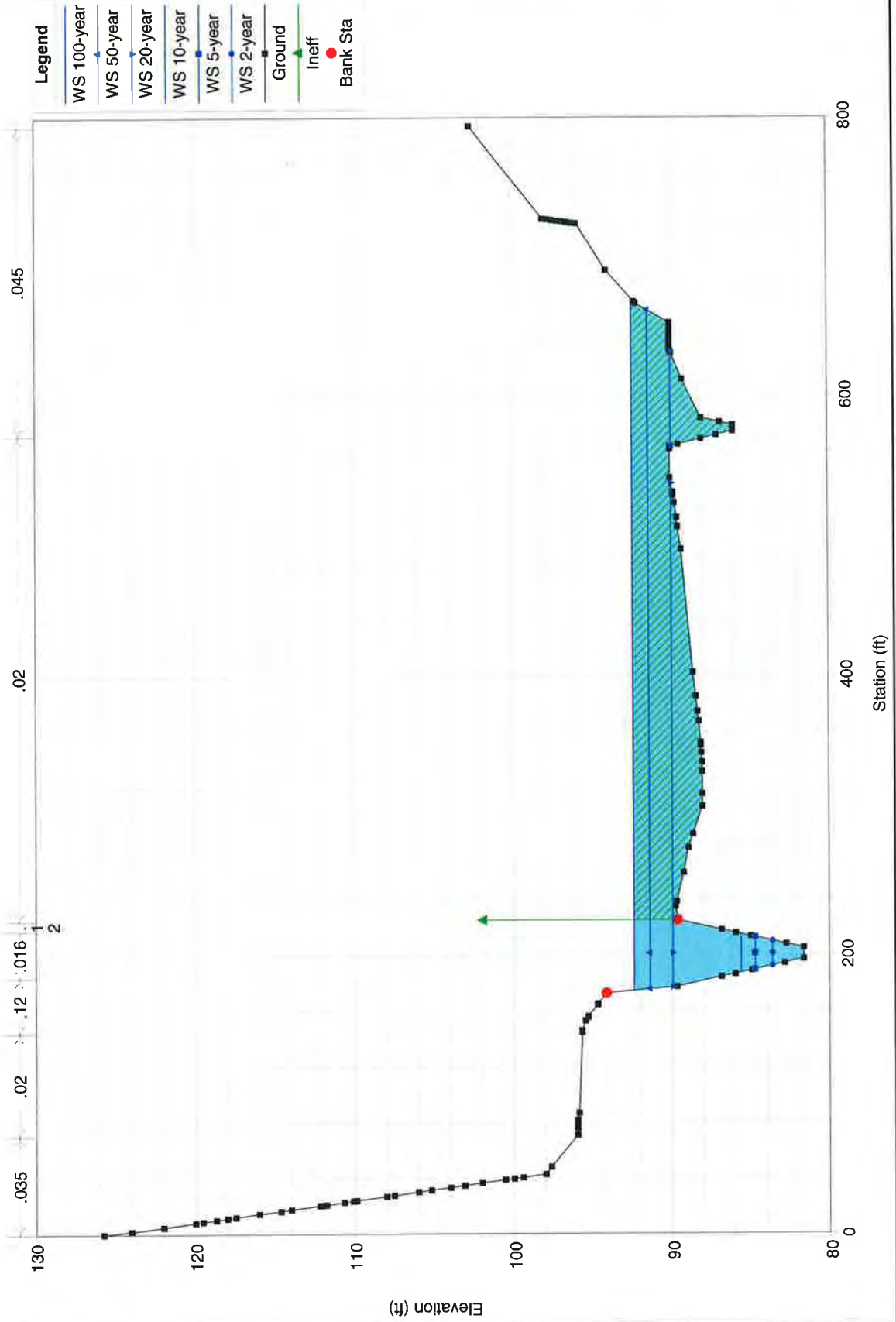
Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper
RS = 530.489



Murphy Canyon - Reach 58A Plan: URS Maintained Vegetation Removed 4/17/2013 1:33:55 PM

Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

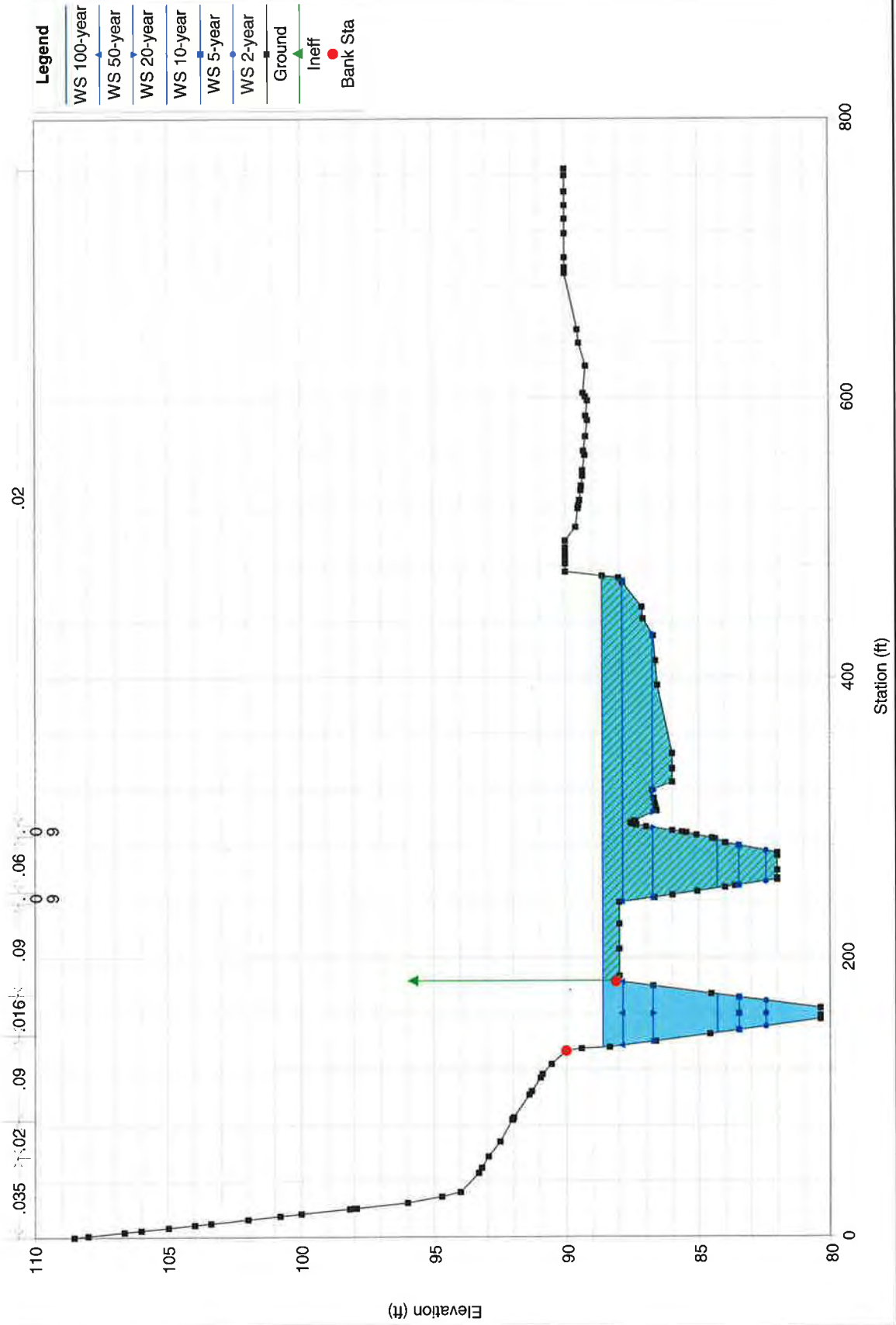
RS = 357.7724



4/17/2013 1:33:55 PM

Flow: Murphy Canyon Upper

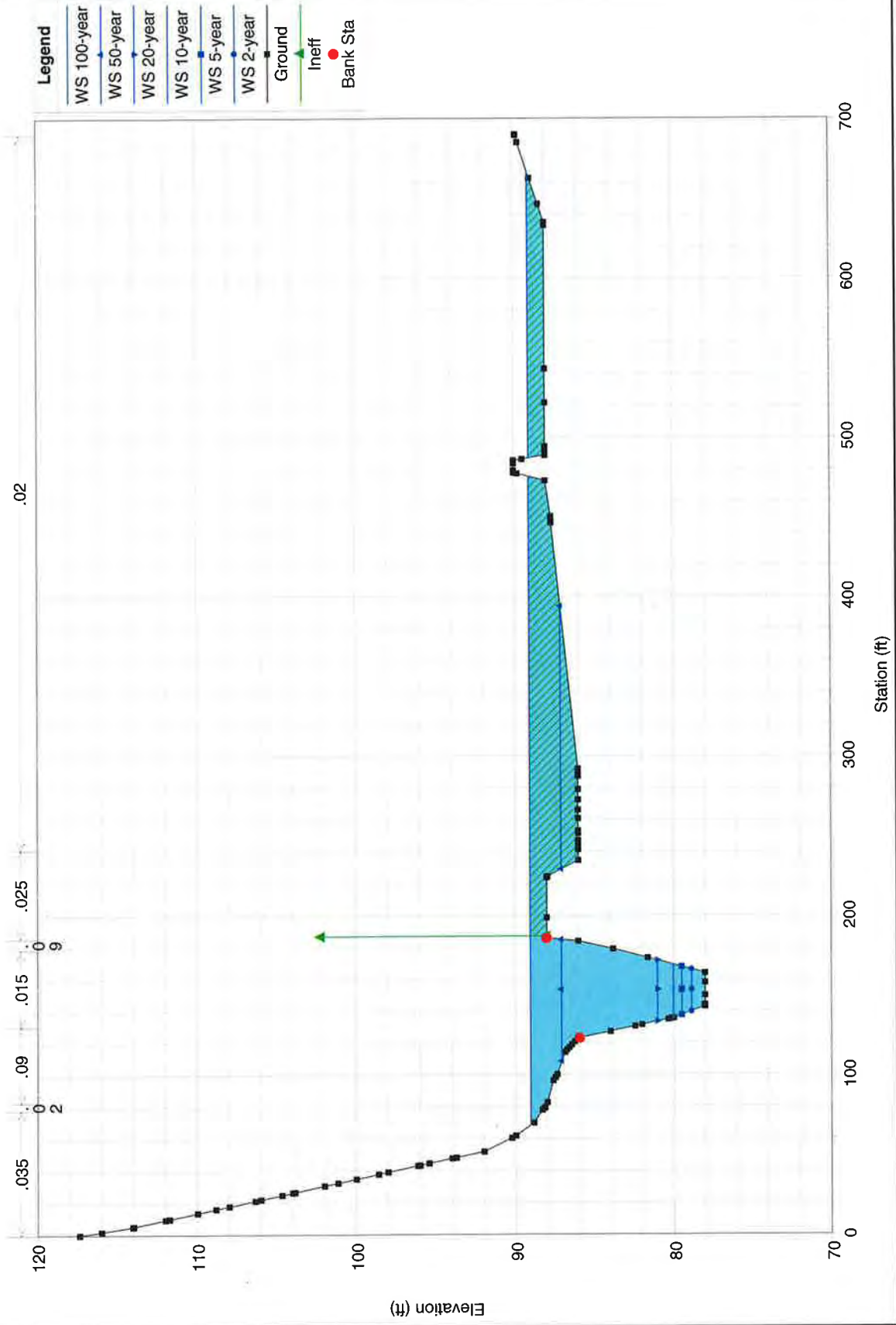
RS = 213.4405



Murphy Canyon - Reach 58A Plan: URS Maintained Vegetation Removed 4/17/2013 1:33:55 PM

Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

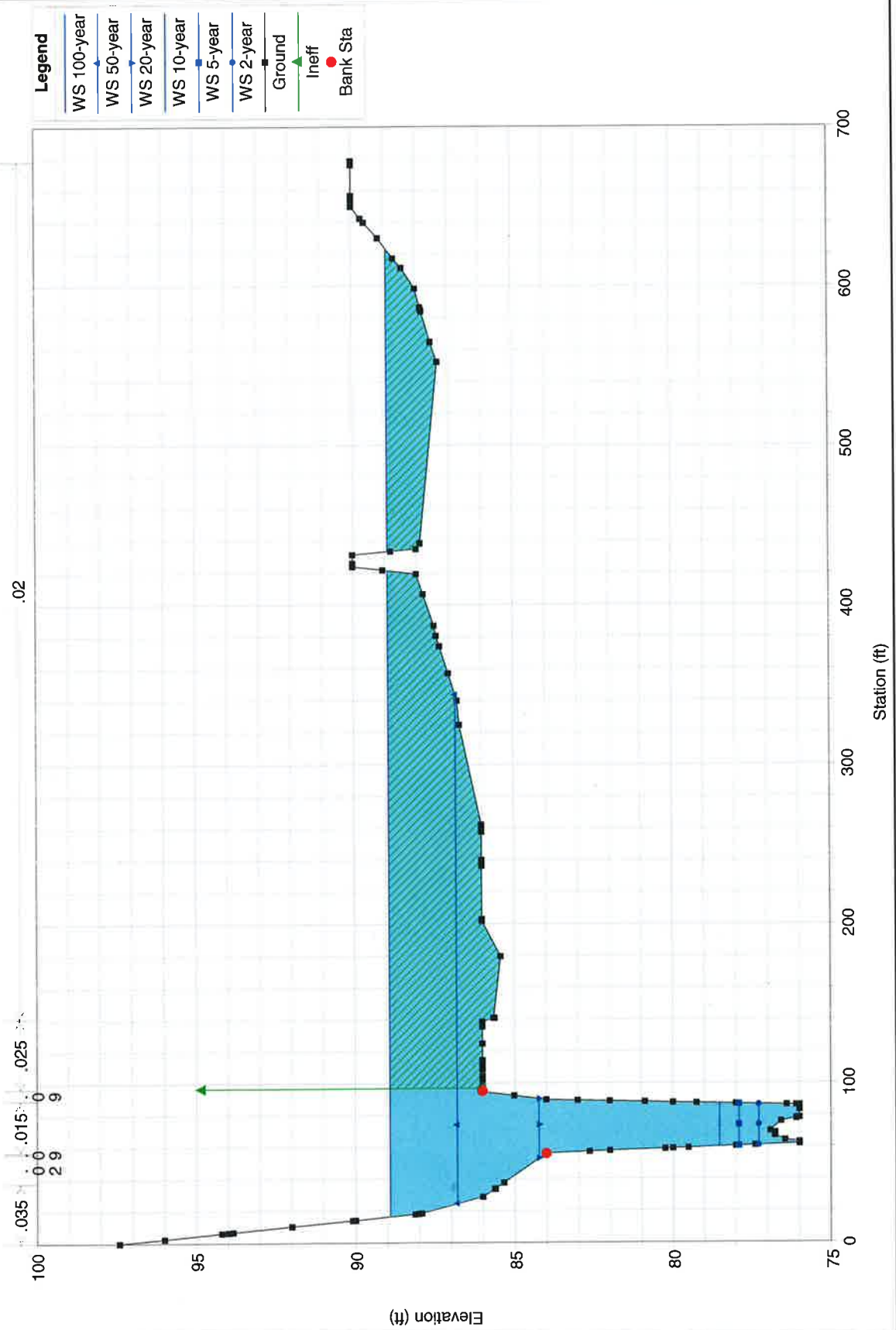
RS = 87.01827



Murphy Canyon - Reach 58A Plan: URS Maintained Vegetation Removed 4/17/2013 1:33:55 PM

Geom: URS Maintained Vegetation Removed Flow: Murphy Canyon Upper

RS = 13.30883



**DETAILED HYDRAULIC RESULTS FOR MAINTAINED CONDITION MODEL
(SEDIMENT REMOVED)**

HEC-RAS Plan: Sediment Removed River: Murphy Canyon Reach: Lower Reach

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Lower Reach	3019.665	100-year	3500.00	65.35	76.15	74.05	77.81	0.009898	10.32	339.05	574.76	0.76
Lower Reach	3019.665	50-year	2700.00	65.35	74.98	72.81	76.48	0.009566	9.84	274.48	533.43	0.70
Lower Reach	3019.665	20-year	2000.00	65.35	73.85	71.58	75.00	0.008270	8.61	232.16	493.21	0.60
Lower Reach	3019.665	10-year	1500.00	65.35	72.88	70.56	73.76	0.007465	7.56	198.51	194.04	0.55
Lower Reach	3019.665	5-year	1050.00	65.35	71.82	69.53	72.45	0.006756	6.40	164.05	99.86	0.49
Lower Reach	3019.665	2-year	510.00	65.35	69.82	68.00	70.18	0.006750	4.84	105.27	27.49	0.44
Lower Reach	2805.333	100-year	3500.00	63.79	72.54	72.54	75.40	0.011507	13.58	257.66	211.09	1.00
Lower Reach	2805.333	50-year	2700.00	63.79	71.43	71.43	73.99	0.013022	12.86	209.99	185.38	1.00
Lower Reach	2805.333	20-year	2000.00	63.79	70.28	70.28	72.55	0.015141	12.08	165.54	141.76	1.00
Lower Reach	2805.333	10-year	1500.00	63.79	69.34	69.34	71.32	0.017249	11.31	132.62	85.19	1.00
Lower Reach	2805.333	5-year	1050.00	63.79	68.33	68.33	70.02	0.020345	10.42	100.80	45.38	1.00
Lower Reach	2805.333	2-year	510.00	63.79	67.28		68.07	0.014746	7.17	71.15	26.44	0.77
Lower Reach	2479.647	100-year	3500.00	61.23	68.94	69.96	72.90	0.005069	15.98	218.99	71.70	1.29
Lower Reach	2479.647	50-year	2700.00	61.23	68.16	68.91	71.48	0.004856	14.62	184.69	64.99	1.23
Lower Reach	2479.647	20-year	2000.00	61.23	67.37	67.85	70.04	0.004548	13.10	152.68	39.14	1.16
Lower Reach	2479.647	10-year	1500.00	61.23	66.70	66.96	68.84	0.004226	11.74	127.82	35.74	1.09
Lower Reach	2479.647	5-year	1050.00	61.23	65.99	66.00	67.59	0.003775	10.15	103.47	32.51	1.00
Lower Reach	2479.647	2-year	510.00	61.23	64.46	64.46	65.62	0.004465	8.63	59.10	25.58	1.00
Lower Reach	2118.656	100-year	3500.00	58.49	66.09	67.38	70.85	0.005879	17.51	199.85	40.44	1.39
Lower Reach	2118.656	50-year	2700.00	58.49	65.11	66.35	69.40	0.006222	16.63	162.40	36.60	1.39
Lower Reach	2118.656	20-year	2000.00	58.49	64.11	65.21	67.93	0.006771	15.69	127.44	32.93	1.41
Lower Reach	2118.656	10-year	1500.00	58.49	63.25	64.27	66.71	0.007508	14.94	100.42	29.79	1.43
Lower Reach	2118.656	5-year	1050.00	58.49	62.30	63.26	65.44	0.008897	14.21	73.89	26.34	1.50
Lower Reach	2118.656	2-year	510.00	58.49	61.02	61.66	63.19	0.010156	11.82	43.15	21.67	1.48
Lower Reach	1847.267	100-year	3500.00	52.60	68.41	61.52	68.88	0.000390	5.47	640.43	760.82	0.31
Lower Reach	1847.267	50-year	2700.00	52.60	66.63	60.28	67.05	0.000337	5.15	524.02	511.45	0.31
Lower Reach	1847.267	20-year	2000.00	52.60	64.85	59.04	65.21	0.000311	4.80	416.55	97.54	0.31
Lower Reach	1847.267	10-year	1500.00	52.60	63.35	57.96	63.66	0.000316	4.46	336.05	50.16	0.30
Lower Reach	1847.267	5-year	1050.00	52.60	61.65	56.81	61.91	0.000322	4.08	257.60	42.61	0.29
Lower Reach	1847.267	2-year	510.00	52.60	58.65	55.25	58.84	0.000366	3.46	147.36	31.41	0.28
Lower Reach	1482.926	100-year	3500.00	51.19	68.10		68.53	0.004453	5.28	662.37	918.60	0.30
Lower Reach	1482.926	50-year	2700.00	51.19	66.36		66.73	0.004495	4.93	547.27	873.35	0.30
Lower Reach	1482.926	20-year	2000.00	51.19	64.59		64.91	0.004584	4.56	438.44	827.96	0.30
Lower Reach	1482.926	10-year	1500.00	51.19	63.08		63.36	0.004472	4.24	353.53	787.65	0.29
Lower Reach	1482.926	5-year	1050.00	51.19	61.38		61.62	0.004300	3.89	270.11	738.65	0.28

HEC-RAS Plan: Sediment Removed River: Murphy Canyon Reach: Lower Reach (Continued)

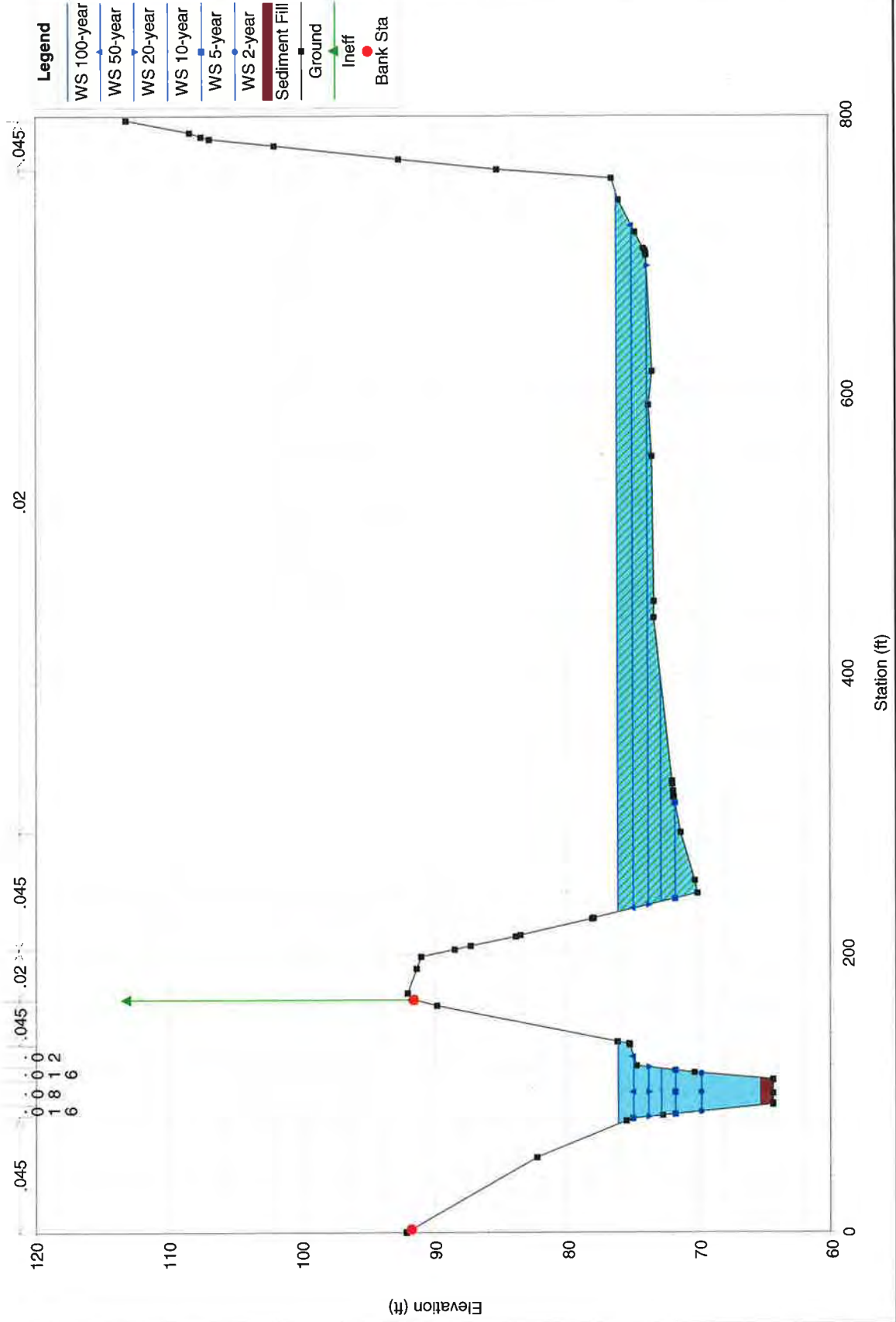
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Lower Reach	1482.926	2-year	510.00	51.19	58.35		58.52	0.003915	3.33	153.27	541.94	0.27
Lower Reach	1065.173	100-year	3500.00	49.94	66.22		66.70	0.004264	5.42	641.69	765.60	0.30
Lower Reach	1065.173	50-year	2700.00	49.94	64.55		64.95	0.004053	4.97	540.73	729.84	0.29
Lower Reach	1065.173	20-year	2000.00	49.94	62.84		63.16	0.003840	4.50	443.52	691.57	0.28
Lower Reach	1065.173	10-year	1500.00	49.94	61.40		61.66	0.003678	4.09	366.48	648.16	0.27
Lower Reach	1065.173	5-year	1050.00	49.94	59.73		59.95	0.003691	3.71	282.79	605.72	0.27
Lower Reach	1065.173	2-year	510.00	49.94	56.84		56.99	0.003398	3.12	163.25	453.25	0.26
Lower Reach	628.1625	100-year	3500.00	48.63	63.70	58.07	64.36	0.006859	6.52	537.01	818.64	0.37
Lower Reach	628.1625	50-year	2700.00	48.63	62.18		62.73	0.006438	5.94	454.48	771.90	0.36
Lower Reach	628.1625	20-year	2000.00	48.63	60.63		61.08	0.006016	5.34	374.68	726.29	0.34
Lower Reach	628.1625	10-year	1500.00	48.63	59.31		59.68	0.005717	4.83	310.51	694.08	0.33
Lower Reach	628.1625	5-year	1050.00	48.63	57.68		57.98	0.005559	4.42	237.43	629.03	0.33
Lower Reach	628.1625	2-year	510.00	48.63	54.99		55.20	0.005037	3.68	138.45	327.70	0.31
Lower Reach	281.2985	100-year	3500.00	48.16	56.46	56.46	59.23	0.044803	13.36	262.01	690.23	1.00
Lower Reach	281.2985	50-year	2700.00	48.16	55.38	55.38	57.87	0.044299	12.65	213.46	547.89	1.00
Lower Reach	281.2985	20-year	2000.00	48.16	54.27	54.27	56.46	0.043564	11.88	168.32	368.45	1.00
Lower Reach	281.2985	10-year	1500.00	48.16	53.35	53.35	55.28	0.042233	11.15	134.54	260.39	1.00
Lower Reach	281.2985	5-year	1050.00	48.16	52.71	52.35	54.05	0.031414	9.28	113.11	128.19	0.87
Lower Reach	281.2985	2-year	510.00	48.16	51.60		52.23	0.016943	6.39	79.77	27.72	0.66
Lower Reach	36.18799	100-year	3500.00	47.65	58.00	50.66	58.09	0.000339	2.35	1490.84	839.43	0.14
Lower Reach	36.18799	50-year	2700.00	47.65	50.72	50.20	51.51	0.010008	7.15	377.67	191.04	0.75
Lower Reach	36.18799	20-year	2000.00	47.65	50.19	49.74	50.84	0.010018	6.50	307.60	133.01	0.74
Lower Reach	36.18799	10-year	1500.00	47.65	49.76	49.38	50.31	0.010002	5.91	253.64	126.87	0.74
Lower Reach	36.18799	5-year	1050.00	47.65	49.34	49.02	49.77	0.010007	5.24	200.26	124.08	0.73
Lower Reach	36.18799	2-year	510.00	47.65	48.73	48.50	48.98	0.010003	4.06	125.50	120.06	0.70

Murphy Canyon - Reach 58

Plan: Maintained Condition Sediment Removed
Geom: Maintained Condition-Sediment Removed Flow: Murphy

4/18/2013 12:38:45 PM

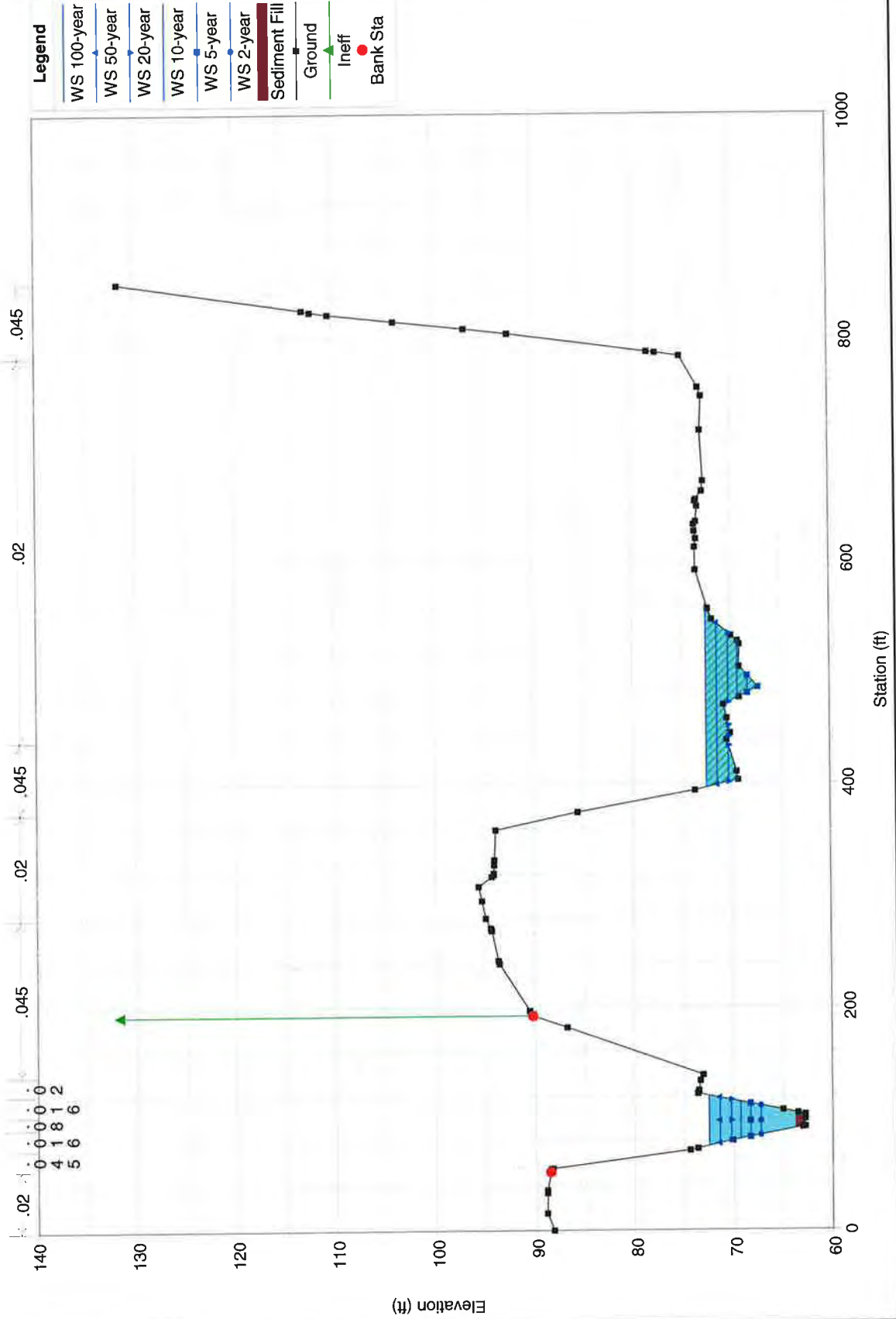
RS = 3019.665



Murphy Canyon - Reach 58 Plan: Maintained Condition Sediment Removed 4/18/2013 12:38:45 PM

Geom: Maintained Condition-Sediment Removed Flow: Murphy

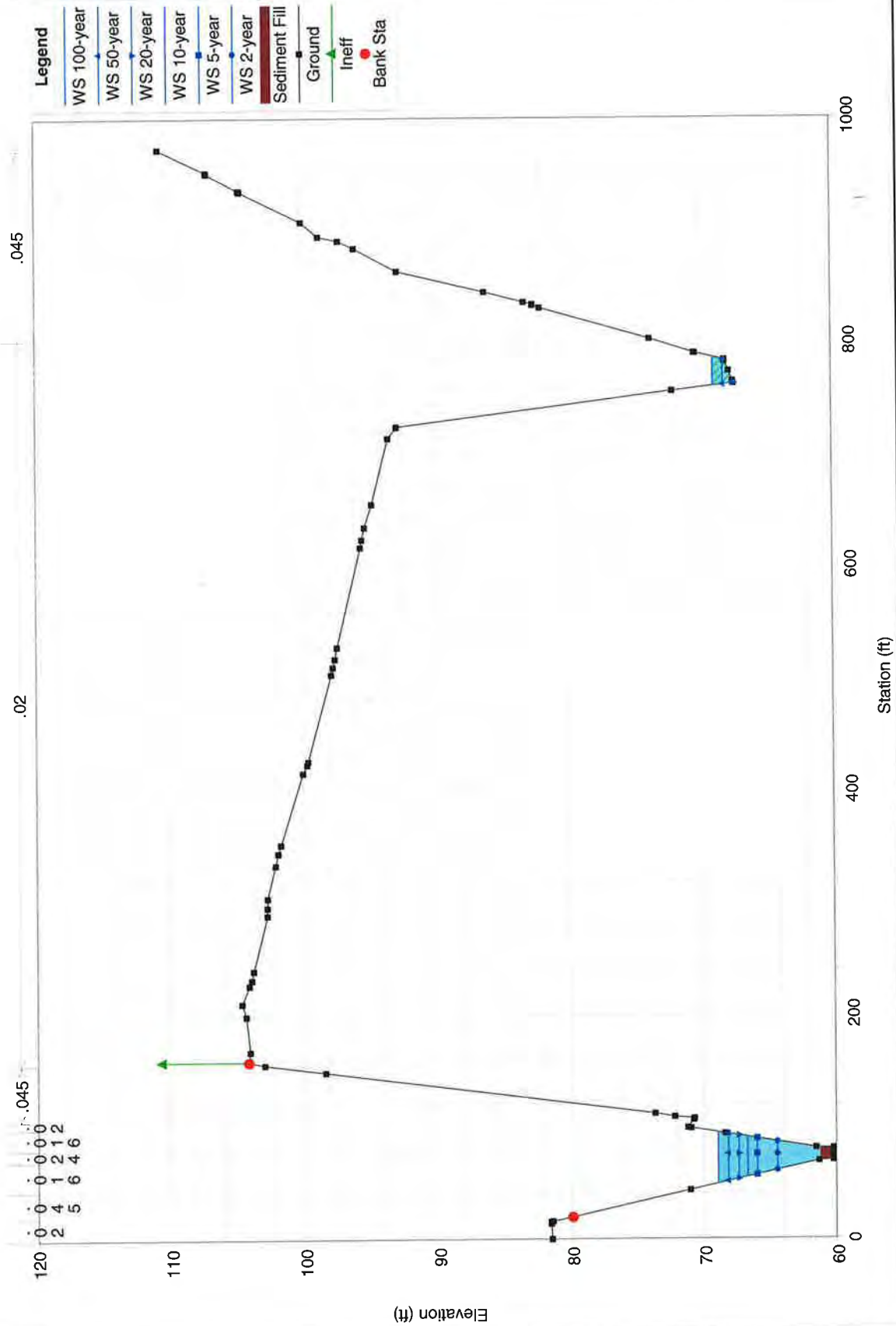
RS = 2805.333



Murphy Canyon - Reach 58 Plan: Maintained Condition Sediment Removed 4/18/2013 12:38:45 PM

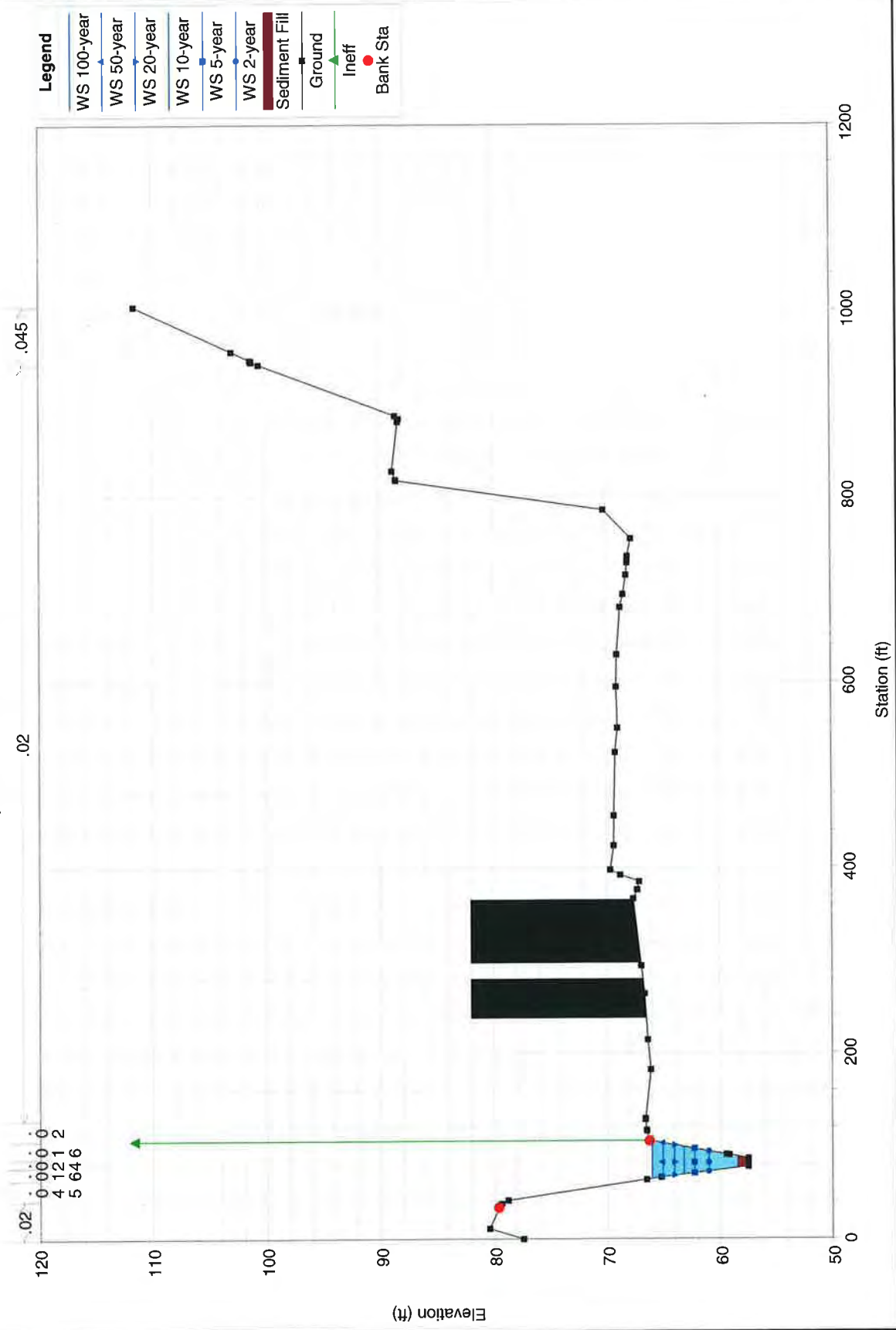
Geom: Maintained Condition-Sediment Removed Flow: Murphy

RS = 2479.647 d/s of Friars Road



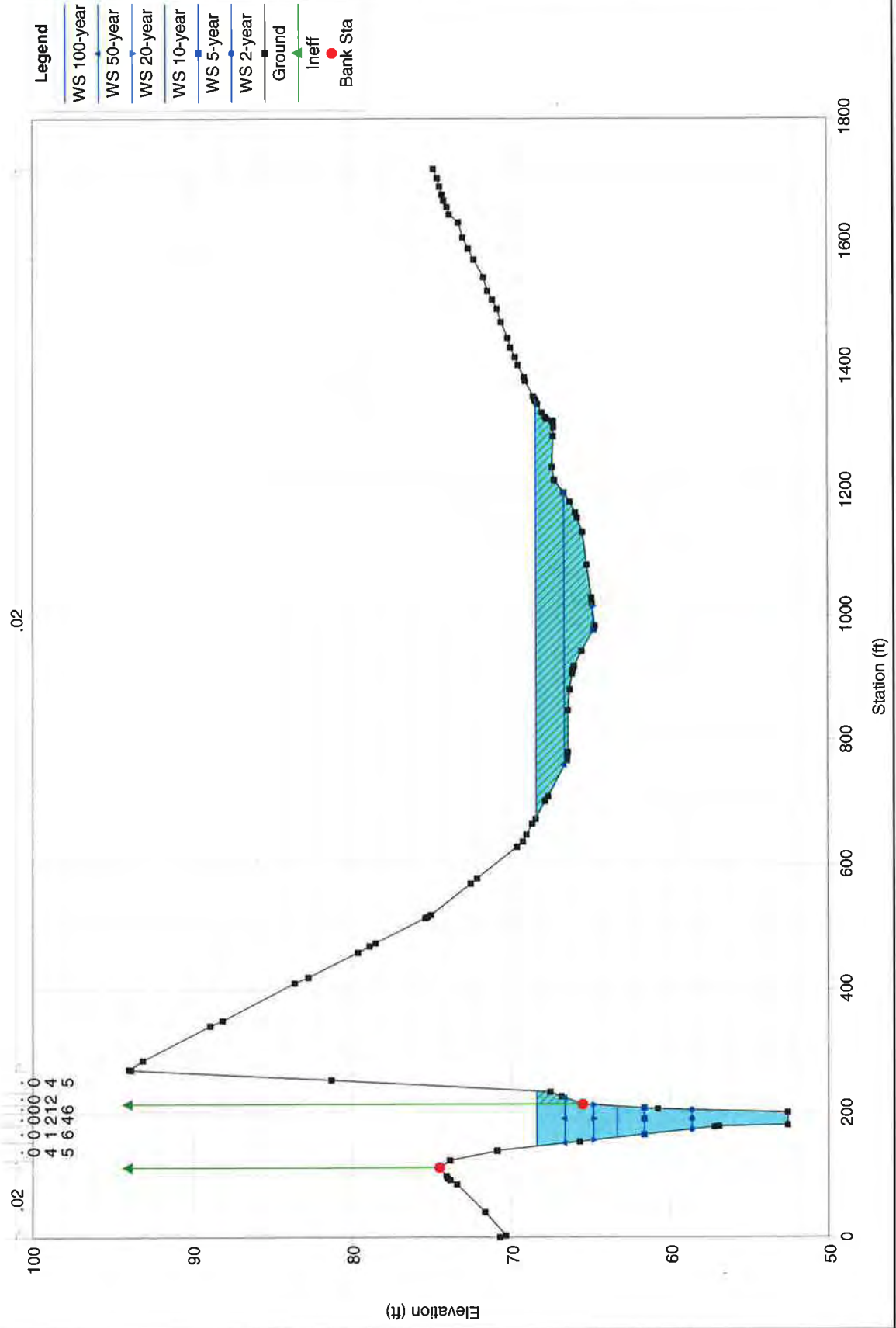
Murphy Canyon - Reach 58 Plan: Maintained Condition Sediment Removed 4/18/2013 12:38:45 PM

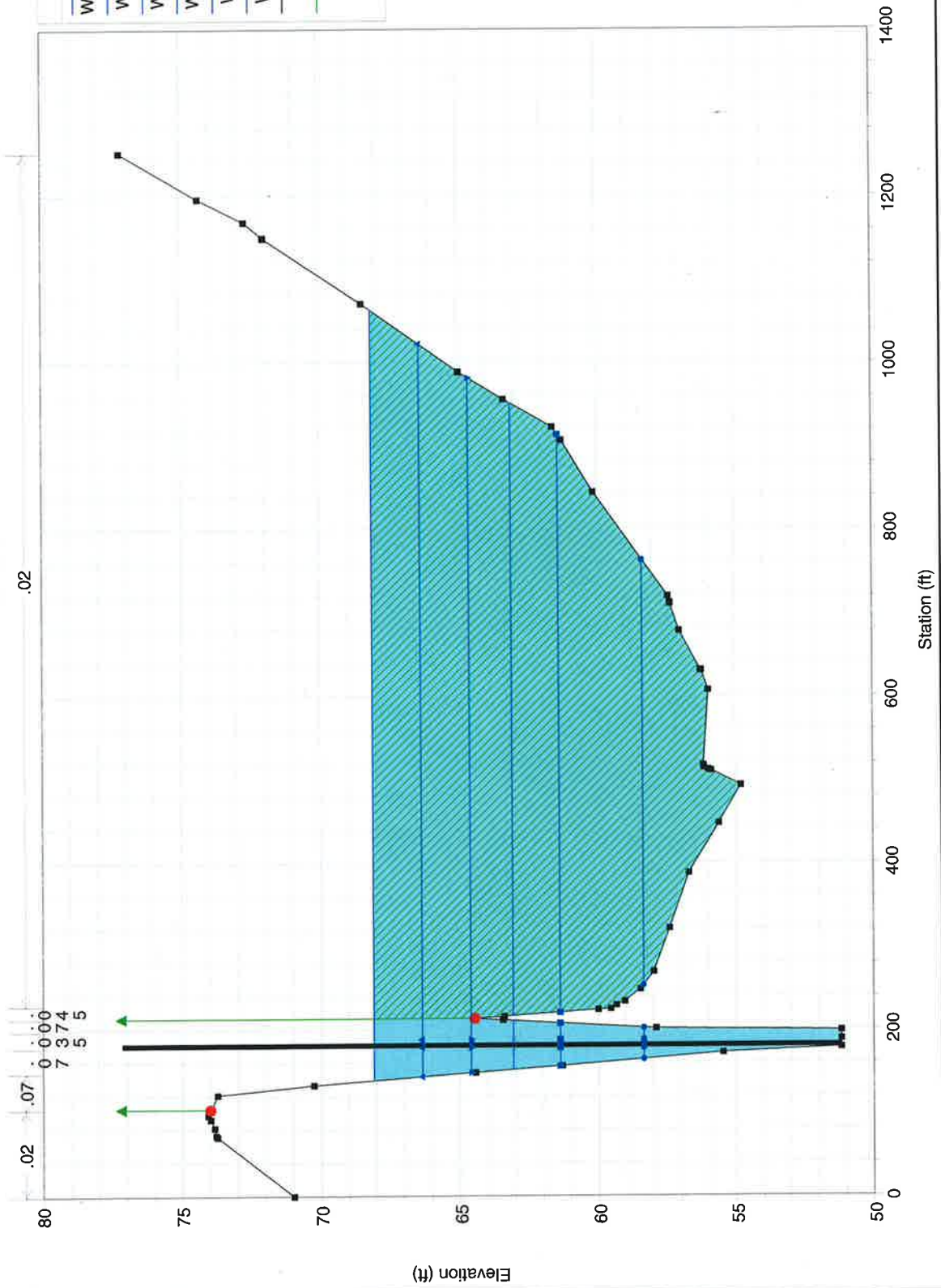
Geom: Maintained Condition-Sediment Removed Flow: Murphy
 RS = 2118.656 adjacent to tank farm - Southern Pacific Pipe Lines Partnership



Murphy Canyon - Reach 58	Plan: Maintained Condition	Sediment Removed	4/18/2013 12:38:45 PM
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Geom: Maintained Condition-Sediment Removed Flow: Murphy
RS = 1847.267 u/s end of Qualcomm parking lot - conc channel ends approximatel

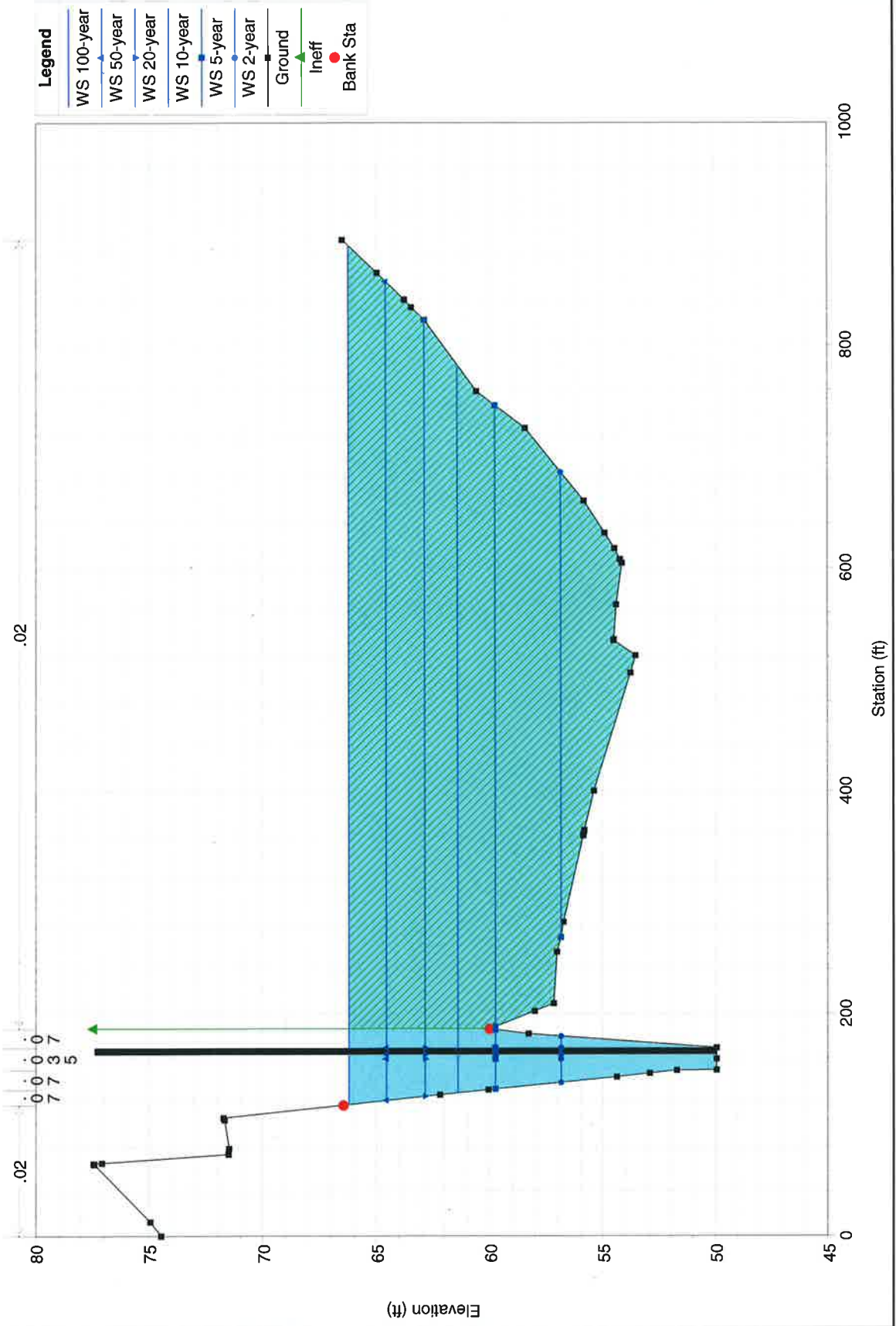




Murphy Canyon - Reach 58	Plan: Maintained Condition Sediment Removed	4/18/2013 12:38:45 PM
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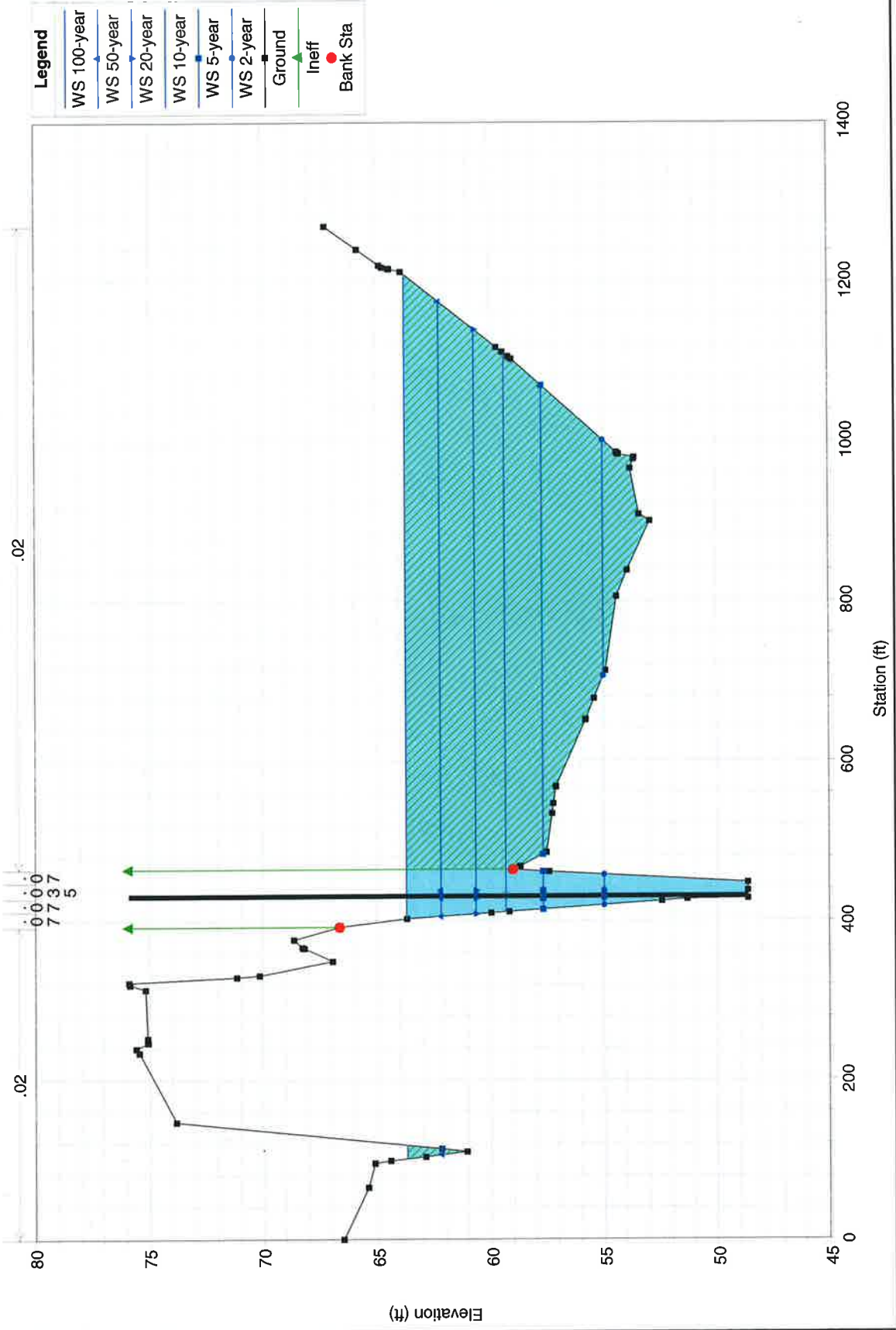
Geom: Maintained	Condition-Sediment	Removed	Flow: Murphy
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RS = 1065.173



Murphy Canyon - Reach 58 Plan: Maintained Condition Sediment Removed 4/18/2013 12:38:45 PM

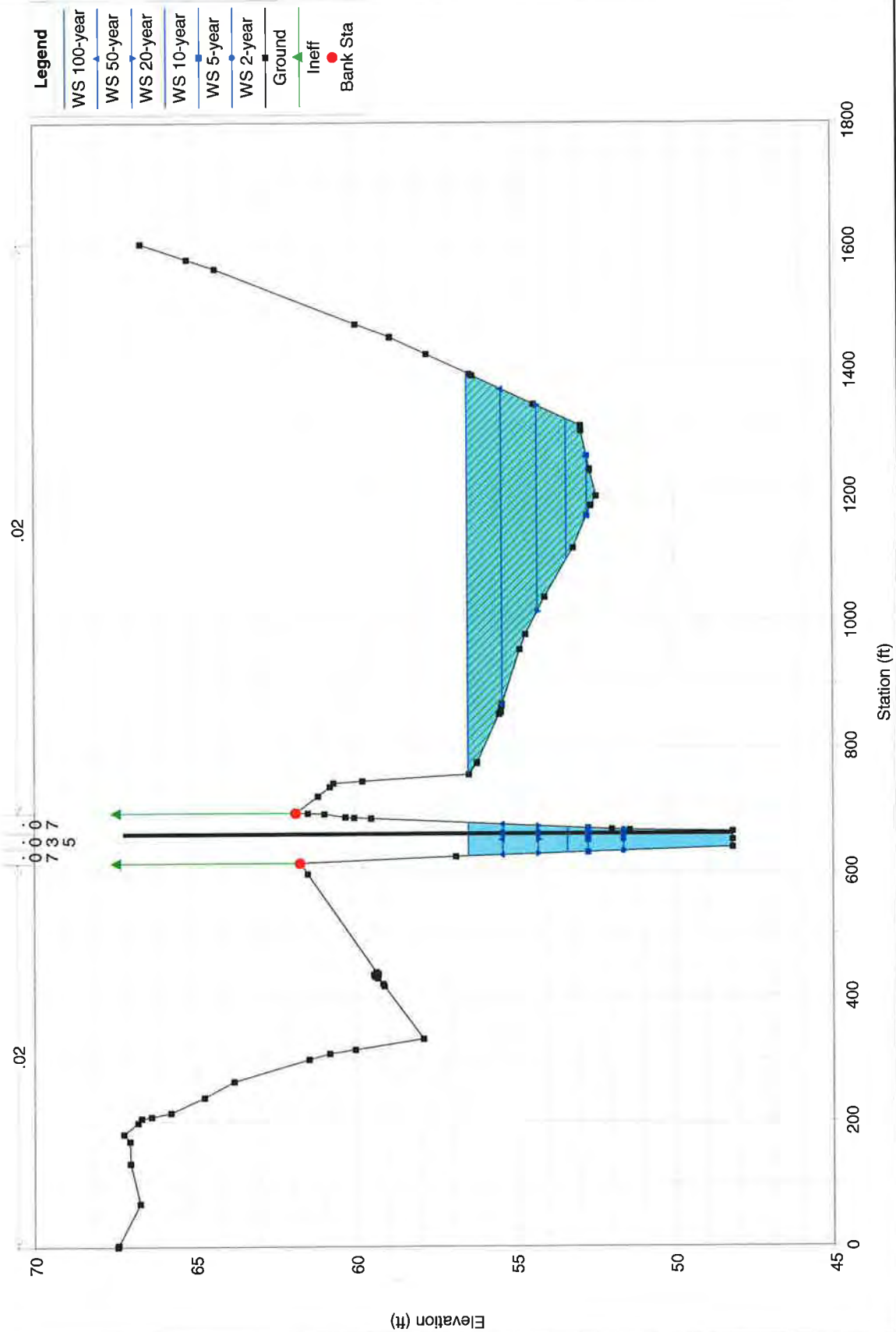
Geom: Maintained Condition-Sediment Removed Flow: Murphy
RS = 628.1625 d/s end of Qualcomm parking - u/s of bridge crossings



Murphy Canyon - Reach 58 Plan: Maintained Condition Sediment Removed 4/18/2013 12:38:45 PM

Geom:	Maintained	Condition	Sediment	Removed	Flow:	Murphy

RS = 281.2985



Murphy Canyon - Reach 58 Plan: Maintained Condition Sediment Removed 4/18/2013 12:38:45 PM

Geom: Maintained Condition-Sediment Removed Flow: Murphy

RS = 36.18799

