



**US Army Corps
of Engineers** ®
Fort Worth District

Public Notice

Applicant: Union Pacific Railroad

Project No.: SWF-2013-00502

Date: December 18, 2013

The purpose of this public notice is to inform you of a proposal for work in which you might be interested. It is also to solicit your comments and information to better enable us to make a reasonable decision on factors affecting the public interest. We hope you will participate in this process.

Regulatory Program

Since its early history, the U.S. Army Corps of Engineers has played an important role in the development of the nation's water resources. Originally, this involved construction of harbor fortifications and coastal defenses. Later duties included the improvement of waterways to provide avenues of commerce. An important part of our mission today is the protection of the nation's waterways through the administration of the U.S. Army Corps of Engineers Regulatory Program.

Section 10

The U.S. Army Corps of Engineers is directed by Congress under Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) to regulate *all work or structures in or affecting the course, condition or capacity of navigable waters of the United States*. The intent of this law is to protect the navigable capacity of waters important to interstate commerce.

Section 404

The U.S. Army Corps of Engineers is directed by Congress under Section 404 of the Clean Water Act (33 USC 1344) to regulate the *discharge of dredged and fill material into all waters of the United States, including wetlands*. The intent of the law is to protect the nation's waters from the indiscriminate discharge of material capable of causing pollution and to restore and maintain their chemical, physical and biological integrity.

Contact

Name: Mr. Eric Dephouse, Project Manager

Phone Number: 817-886-1820

JOINT PUBLIC NOTICE

U.S. ARMY CORPS OF ENGINEERS, FORT WORTH DISTRICT

AND

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

SUBJECT: Application for a Department of the Army Permit under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899, and for water quality certification under Section 401 of the CWA to discharge dredged or fill material into waters of the United States and conduct activities in, or affecting, navigable waters of the United States (U.S.) associated with the stabilization of the east bank of the Brazos River in Robertson County, Texas.

APPLICANT: Union Pacific Railroad
1400 Douglas Street, STOP 0910
Omaha, Nebraska 68179-0910

APPLICATION NUMBER: SWF-2013-00502

DATE ISSUED: December 18, 2013

LOCATION: The project site is located 6,000 feet north of the rail line and Black Bridge Road (Farm Road 979) intersection in Robertson County, Texas. More specifically, the proposed bank stabilization area is located west of the active mainline (based on the U.S. Geological Survey (USGS) North American Datum of 1983 coordinates for the approximate center point of the proposed project) at Latitude 30.997493° North, Longitude 96.742856° West. The site is mapped on the Calvert, TX 7.5-minute USGS quadrangle map. The site is located in the Brazos River Watershed - USGS Hydrologic Unit 12070101.

OTHER AGENCY AUTHORIZATIONS: State Water Quality Certification

PROJECT DESCRIPTION: UPRR proposes to discharge approximately 29,000 cubic yards of rock riprap and 72,000 cubic yards of dredged and fill material into approximately six (6) acres of waters of the U.S. in conjunction with the stabilization of the Brazos River east bank. Total impacts to waters of the U.S. would include six (6) acres of open water. The proposed stabilization effort would be along approximately 2,700 feet of the eastern bank of the Brazos River.

The Brazos River has an actively migrating channel along its course. Within the project area and in the past 50 years, the river has moved more than 800 feet in an easterly direction. More recently, it has migrated more than 320 feet in the last 18 years. The on-going migration of the Brazos River has caused UPRR to evaluate a half mile stretch of its existing mainline track due

to the close proximity of the river to the mainline. UPRR determined that since channel migration would continue in its easterly direction, and the track is already within the failure zone of the streambank, there is a dire need to halt the migration. It is noted that in 2012 UPRR shifted the existing mainline track 20-30 ft within its right-of-way, to be further from the migrating river. However, the shifted mainline track is still within the failure zone of the streambank. During a recent flood event, approximately 8-10 feet of land between the river and the existing track sloughed off. This is an on-going problem in the project area.

The purpose of the proposed work is to protect UPRR infrastructure from the continued migration of the Brazos River.

UPRR proposes to discharge approximately 29,000 cubic yards of rock riprap material into 6.07 acres of waters of the U.S. in conjunction with the construction of the proposed bank stabilization project. The proposed stabilization would be approximately 2,700 feet along the east bank of the Brazos River (Impact Map, Figure 5).

ALTERNATIVE SITE LOCATIONS AND ALTERNATIVE LAYOUTS: The UPRR evaluated four different alternatives for the proposed bank stabilization project: (1) No-Build Alternative, (2) Shift Track To The East, (3) Construct Bendway Weir System, Stabilize Slopes, and Halt Channel Migration (Applicant's Preferred Alternative), and (4) Baffle Dikes/Longitudinal Dike and Improve East Bank.

All of the listed alternatives, except the no-build alternative, consider the improvement of the east bank slope. There is no way around the fact that work must be done to halt the channel migration and stabilize the river channel's east bank slope. All viable alternatives would require impacts within the open water portion of the Brazos River, and the more practical alternatives push the flowline of the river away from the bank, promoting vegetative growth to enhance slope stability.

Alternative 1: No-Build Alternative. This alternative would result in no impacts to waters of the U.S. and does not have a construction cost. However, this alternative does not address the problem posed by the on-going migration of the Brazos River toward the UPRR mainline track. Stabilization of this failing riverbank is required in order to meet the safety and on-going operations of UPRR's existing rail line. The vertical banks are not stable or conducive to vegetative growth and would continue to slough off during storm events. The sloughing would eventually reach the mainline track. Overall, this alternative is not a viable option for UPRR and does not meet the purpose and need.

Alternative 2: Shift Track. This alternative would require shifting the track approximately 400 feet east of its current position. Shifting the track would require the acquisition of land from a landowner that is already losing land due to the migration of the channel, and the additional land needed would likely render the entire cattle operation non-functional. Shifting the track would also impact wetlands in the area. There are several cattle ponds and delineated wetlands that would likely be affected by the track shift. These impacts would require mitigation through an approved mitigation bank within the watershed.

Additionally, shifting the track would result in geotechnical and structural concerns, as the relocation would result in settlement within former oxbows or old drainages. These areas would require further excavation and soil amendments to provide a suitable material on which to construct a new track. Shifting the track would also require six curves within a five mile segment. While not unique, it is undesirable since many of these would be reverse curves, leading to increased maintenance due to rail wear, gage creep, uneven loadings on subsoil, and of course resulting in lower train speed in the area.

Table 1 provides a summary of various impacts associated with Alternative 2 and the corresponding estimate of construction cost. Alternative 2 would likely result in greater impacts to wetlands, but would avoid impacts to open water. Avoiding the impacts to open water would likely be a temporary avoidance measure, as the river continues to migrate to the east and shows no signs of stopping on its own. The on-going migration of the Brazos River means that water quality as a result of erosion and sedimentation would continue to be a problem in the project vicinity. Furthermore, the slope stability issue would need to be addressed; this alternative only delays the immediate need. Finally, this alternative would require additional curves along the mainline track which would pose increased frequency and cost of maintenance as well as reduction of train speed. Therefore, this alternative is being eliminated from further consideration.

Alternative 3 (Applicant's Preferred Alternative): Construct Bendway Weir System, Stabilize Slopes, and Halt Channel Migration. Alternative 3 allows for the track to remain in its current location, stabilize the east bank slope, and halt the Brazos River channel migration and shift the channel thalweg back to its former location in the late 1990's/early 2000's. The construction of the bendway weir system and slope improvement would act as a first level deterrent for bank erosion, thus protecting the bank slopes, allowing for vegetation to establish.

Construction of the bendway weir system would allow sediment to settle out between the weirs due to the slower water movement. Sediment would build up, and eventually vegetation would start to establish, further protecting the slopes leading up to the UPRR mainline. In addition to the stabilization that would occur, the sediments settling out would improve the overall water quality downgradient of the project area. Currently, the Brazos River exhibits high turbidity in the project vicinity. The proposed project would reintroduce the Brazos River channel location that existed in the late 1990's/early 2000's. This shift would protect the mainline track and stabilize the river channel's slope, which is the purpose of the project.

Construction of the bendway weir system would not impact wetlands, but would impact approximately 2,700 linear feet of open water (Brazos River). A new channel would be dredged within the existing sandbar west of the proposed bendway weir system (see impact map, Figure 5). Portions of the sandbar would be maintained within the weir system and would assist in the herbaceous vegetation (wetland) establishment. Thus, it is likely this alternative would lead to the development of wetlands within the river system, further improving water quality downgradient of the weir system.

Table 1 summarizes the impacts associated with the alternatives explored for the project, and demonstrates that Alternative 3 meets the project purpose and need, is practicable, and is reasonable from a cost standpoint. This alternative would provide a long-term stable slope, would improve water quality downstream, and would be environmentally beneficial. The immediate impacts would include shifting 2,700 linear feet of river channel approximately 400 feet to the west and discharging dredged and fill material into 6.07 acres of open water for the slope stabilization.

Alternative 4: Baffle Dikes/Longitudinal Dike and Improve East Bank. Alternative 4 is similar to Alternative 3 in that the track would remain in its current location, bank slopes would be stabilized, and the channel shifted back to a previous location. Sediment would settle out between the longitudinal dike and the baffle dikes, promoting vegetative growth, further stabilizing the bank and the respective slope. Construction of the baffle dikes and longitudinal weir would not impact wetlands, but would impact 2,700 linear feet of open water (Brazos River). A new channel would be dredged within the existing sandbar west of the proposed longitudinal dike, similar to that shown in Figure 5. Fill impacts associated with this alternative would be equivalent to 16 acres of open water filled/taken out of the direct connection within the channel. Water quality would not show significant improvement, but the reduction of sloughing banks would make for a slight improvement in the downgradient quality. Based on the impacts to the open water, this alternative was removed from further consideration.

Table 1: Alternatives Summary

	Meets Purpose and Need	Wetland Impacts (Acres)	Open Water Impacts (Linear Feet)	Open Water Impacts (Acres)	Practicable	
					Costs (Millions)	Logistics
Alternative 1: No Build	N	0	0	0	0	Yes
Alternative 2: Shift track	Y*	>0.1	0	0.00	\$6.0 -\$7.5	Yes
Alternative 3: Construct Bendway Weir system and improve east bank slope (Preferred)	Y	0	2,700	6.07	\$3.5	Yes
Alternative 4: Baffle Dikes/ Longitudinal Dike and improve east bank slope	Y	0	2,700	16.04	\$4.0	Yes

*Temporarily, since continued channel migration will eventually reach the shifted track.

COMPENSATORY MITIGATION: The project would not result in the loss of linear footage of the Brazos River. In addition, the project would result in the addition of structure and creation of slackwater areas, resulting in improved biodiversity for aquatic species. Therefore, compensatory mitigation is not proposed.

PUBLIC INTEREST REVIEW FACTORS: This application will be reviewed in accordance with 33 CFR 320-332, the Regulatory Program of the U. S. Army Corps of Engineers (USACE), and other pertinent laws, regulations, and executive orders. Our evaluation will also follow the guidelines published by the U. S. Environmental Protection Agency pursuant to Section 404 (b)(1) of the CWA. The decision whether to issue a permit will be based on an evaluation of the probable impact, including cumulative impact, of the proposed activity on the public interest. That decision will reflect the national concerns for both protection and utilization of important resources. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered, including its cumulative effects. Among the factors addressed are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and, in general, the needs and welfare of the people.

The USACE is soliciting comments from the public; federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the USACE in determining whether to issue, issue with modifications, or conditions, or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

STATE WATER QUALITY CERTIFICATION: This project would result in a direct impact of greater than three acres of waters of the state or 1,500 linear feet of streams (or a combination of the two is above the threshold), and as such would not fulfill Tier I criteria for the project. Therefore, Texas Commission on Environmental Quality (TCEQ) certification is required. Concurrent with USACE processing of this Department of the Army application, the TCEQ is reviewing this application under Section 401 of the Clean Water Act, and Title 30, Texas Administrative Code Section 279.1-13 to determine if the work would comply with State water quality standards. By virtue of an agreement between the USACE and the TCEQ, this public notice is also issued for the purpose of advising all known interested persons that there is pending before the TCEQ a decision on water quality certification under such act. **Any comments concerning this application may be submitted to the Texas Commission on Environmental Quality, 401 Coordinator, MSC-150, P.O. Box 13087, Austin, Texas 78711-**

3087. The public comment period extends 30 days from the date of publication of this notice. A copy of the public notice with a description of the work is made available for review in the TCEQ's Austin Office. The TCEQ may conduct a public meeting to consider all comments concerning water quality if requested in writing. A request for a public meeting must contain the following information: the name, mailing address, application number, or other recognizable reference to the application; a brief description of the interest of the requestor, or of persons represented by the requestor; and a brief description of how the application, if granted, would adversely affect such interest.

ENDANGERED AND THREATENED SPECIES: The USACE has reviewed the U.S. Fish and Wildlife Service's latest published version of endangered and threatened species to determine if any may occur in the project area. The proposed project would be located in Robertson County, where the whooping crane (*Grus americana*), Houston toad (*Bufo houstonensis*), large-fruited sand-verbena (*Abronia macrocarpa*), and Navasota ladies'-tresses (*Spiranthes parksii*), are known to occur or may occur as migrants. The whooping crane (*Grus americana*), Houston toad (*Bufo houstonensis*), large-fruited sand-verbena (*Abronia macrocarpa*), and Navasota ladies'-tresses (*Spiranthes parksii*) are endangered species. Our initial review indicates that the proposed work would have no effect on federally-listed endangered or threatened species.

NATIONAL REGISTER OF HISTORIC PLACES: The area of the proposed stabilization will has never been surveyed for the presence of historic or prehistoric cultural resources. There are no known sites eligible or potentially eligible for the National Register of Historic Places (NRHP) in the vicinity of the project. The Brazos River is known for deeply buried cultural resources. Based on that possibility, a survey of the area has been requested. If historic or prehistoric sites are identified, they will be assessed for their eligibility to the NRHP and a treatment plan developed to avoid or minimize potential impacts.

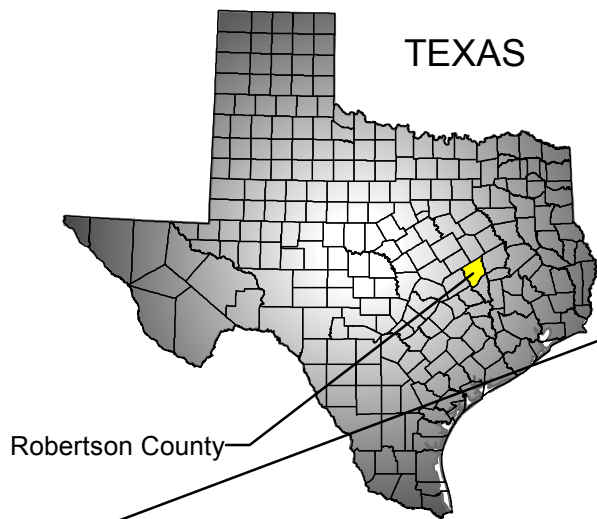
FLOODPLAIN MANAGEMENT: The USACE is sending a copy of this public notice to the local floodplain administrator. In accordance with 44 CFR part 60 (Flood Plain Management Regulations Criteria for Land Management and Use), the floodplain administrators of participating communities are required to review all proposed development to determine if a floodplain development permit is required and maintain records of such review.

SOLICITATION OF COMMENTS: The public notice is being distributed to all known interested persons in order to assist in developing fact upon which a decision by the USACE may be based. For accuracy and completeness of the record, all data in support of or in opposition to the proposed work should be submitted in writing setting forth sufficient detail to furnish a clear understanding of the reasons for support or opposition.

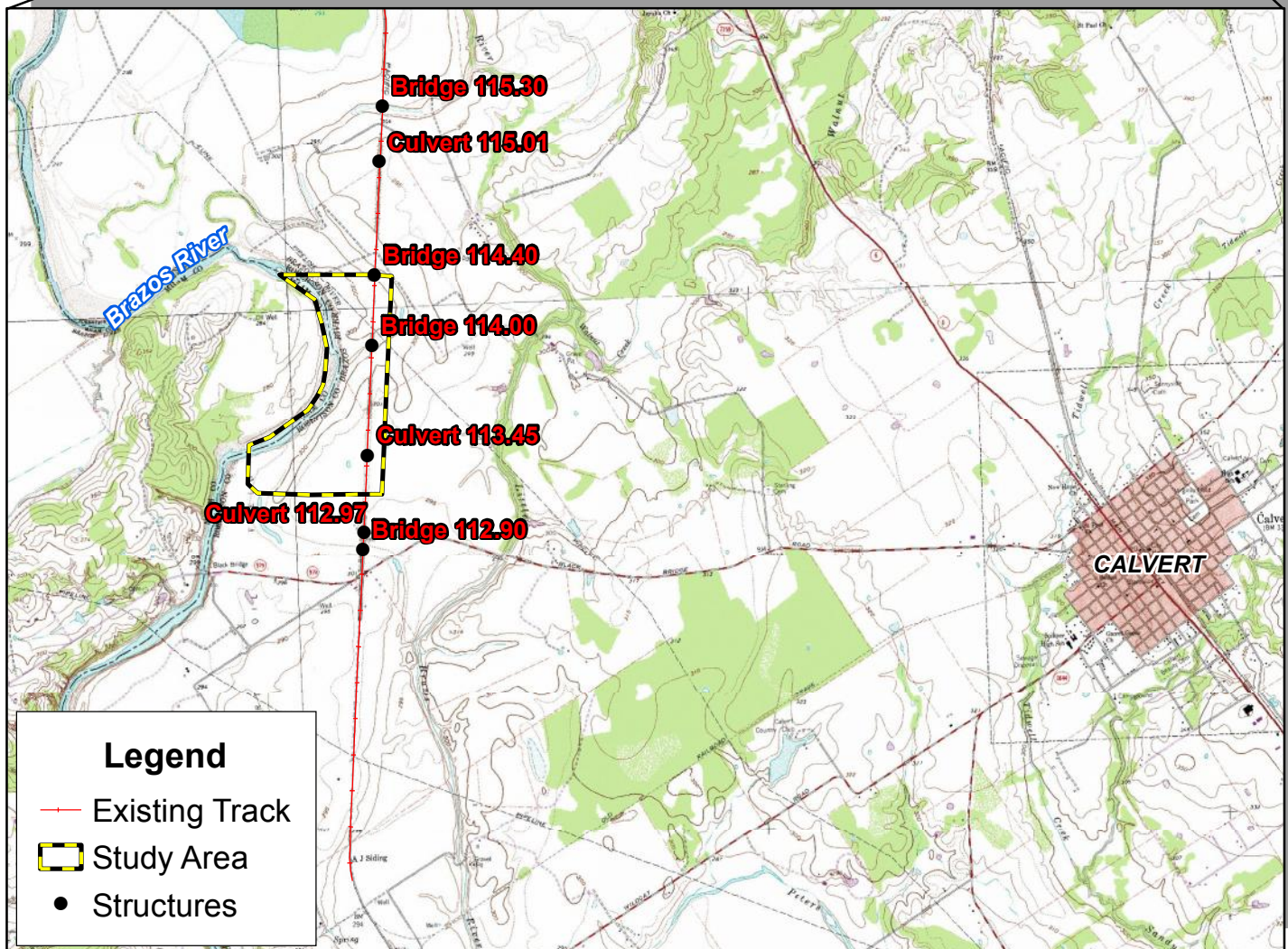
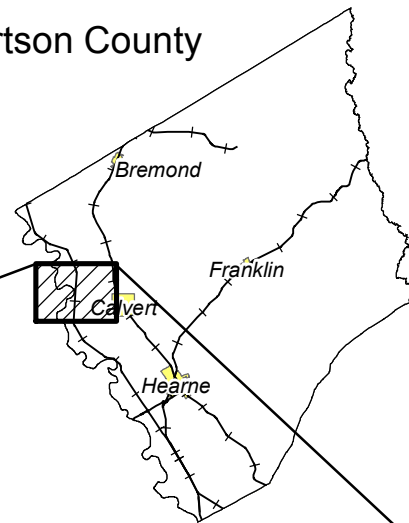
PUBLIC HEARING: Prior to the close of the comment period any person may make a written request for a public hearing setting forth the particular reasons for the request. The District Engineer will determine whether the issues raised are substantial and should be considered in his permit decision. If a public hearing is warranted, all known interested persons will be notified of the time, date, and location.

CLOSE OF COMMENT PERIOD: All comments pertaining to this Public Notice must reach this office on or before January 6, 2014, which is the close of the comment period. Extensions of the comment period may be granted for valid reasons provided a written request is received by the limiting date. If no comments are received by that date, it will be considered that there are no objections. Comments and requests for additional information should be submitted to ; Regulatory Branch, CESWF-PER-R; U. S. Army Corps of Engineers; Post Office Box 17300; Fort Worth, Texas 76102-0300. You may visit the Regulatory Branch in Room 3A37 of the Federal Building at 819 Taylor Street in Fort Worth between 8:00 A.M. and 3:30 P.M., Monday through Friday. Telephone inquiries should be directed to (817) 886-1820. Please note that names and addresses of those who submit comments in response to this public notice may be made publicly available.

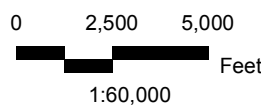
**DISTRICT ENGINEER
FORT WORTH DISTRICT
CORPS OF ENGINEERS**



Robertson County

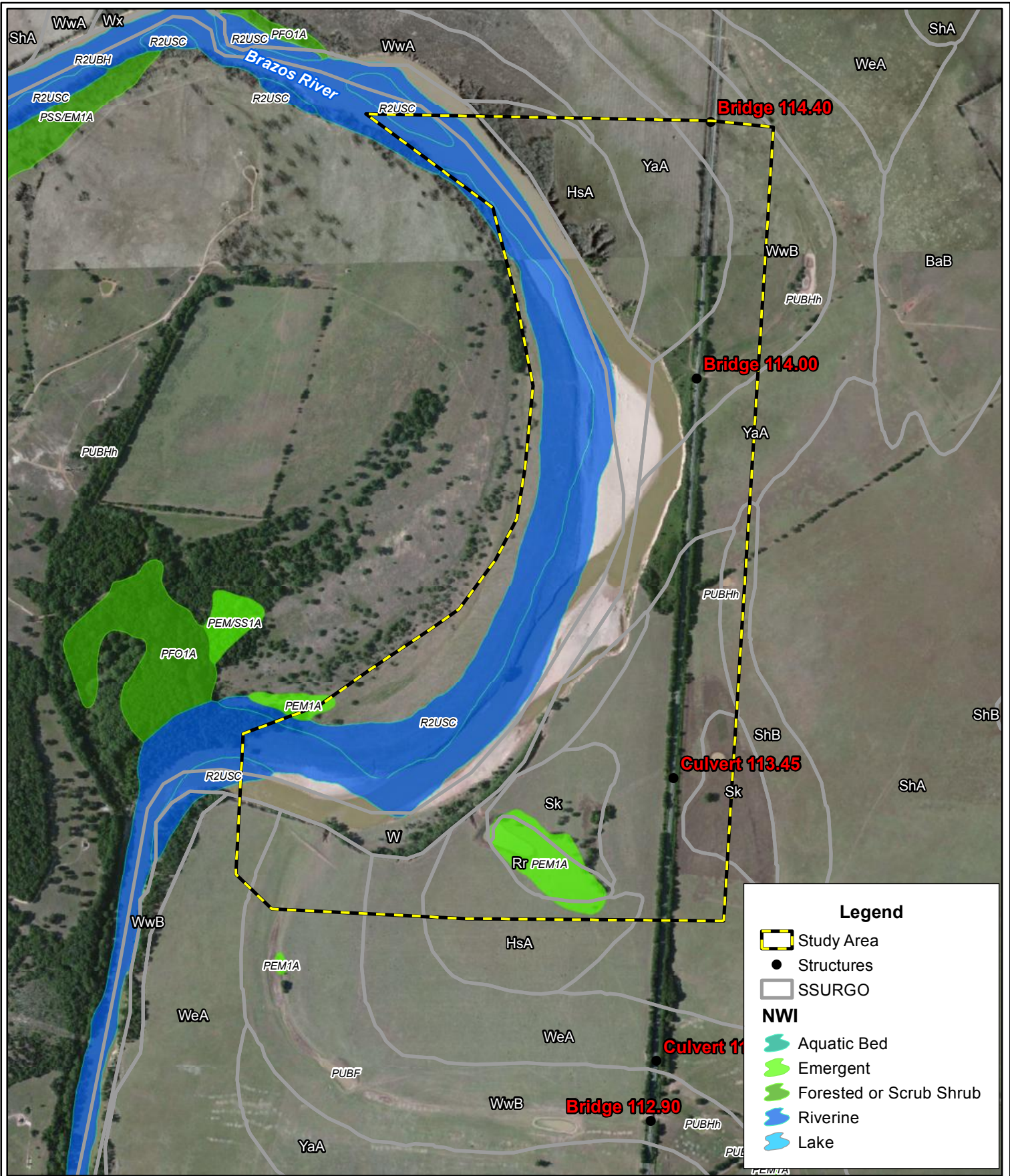


Data Source: USGS 7.5 Minute Topographic Map, Robertson County Mosaic



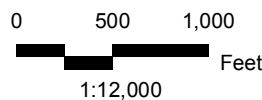
Brazos River Bridge
 Fort Worth Subdivision
 OLSSON Project No. 012-1723
 Robertson County, Texas
 Location Map

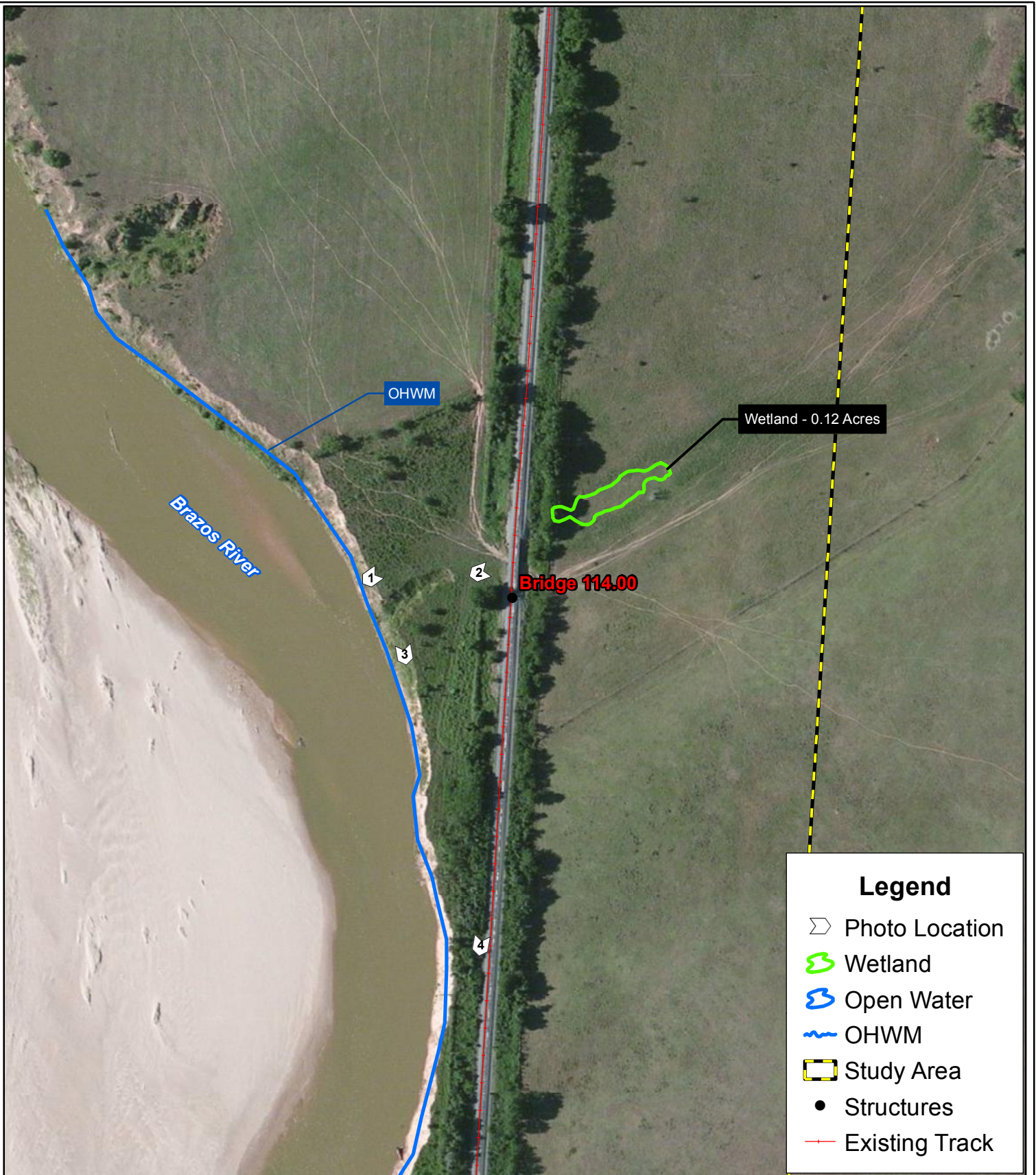
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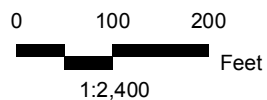
Data Source: (c) 2012 Microsoft Corporation and its data suppliers, National Wetlands Inventory, Soil Survey Geographic (SSURGO) database for Robertson County, Texas

Brazos River Bridge
 Fort Worth Subdivision
 OLSSON Project No. 012-1723
 Robertson County, Texas
 Soils & NWI Map





Data Source: (c) 2012 Microsoft Corporation and its data suppliers



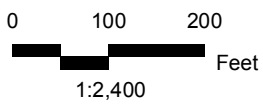
Brazos River Bridge
 Fort Worth Subdivision
 OLSSON Project No. 012-1723
 Robertson County, Texas
 Delineation Map



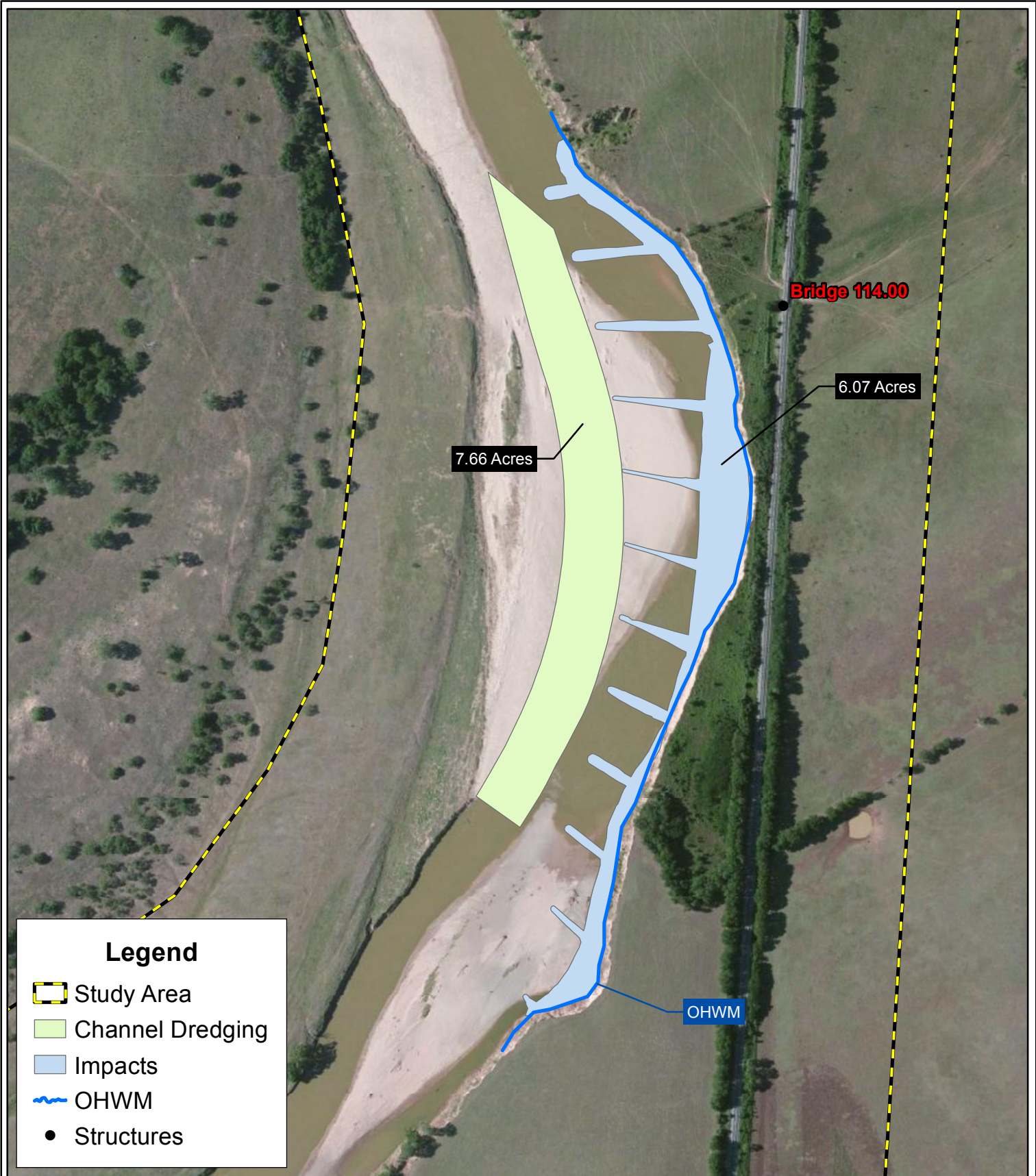
Legend

- ⤵ Photo Location
- Wetland
- Open Water
- OHWM
- Study Area
- Structures
- Existing Track






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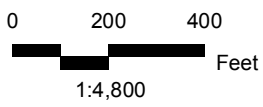
Brazos River Bridge
 Fort Worth Subdivision
 OLSSON Project No. 012-1723
 Robertson County, Texas
 Delineation Map



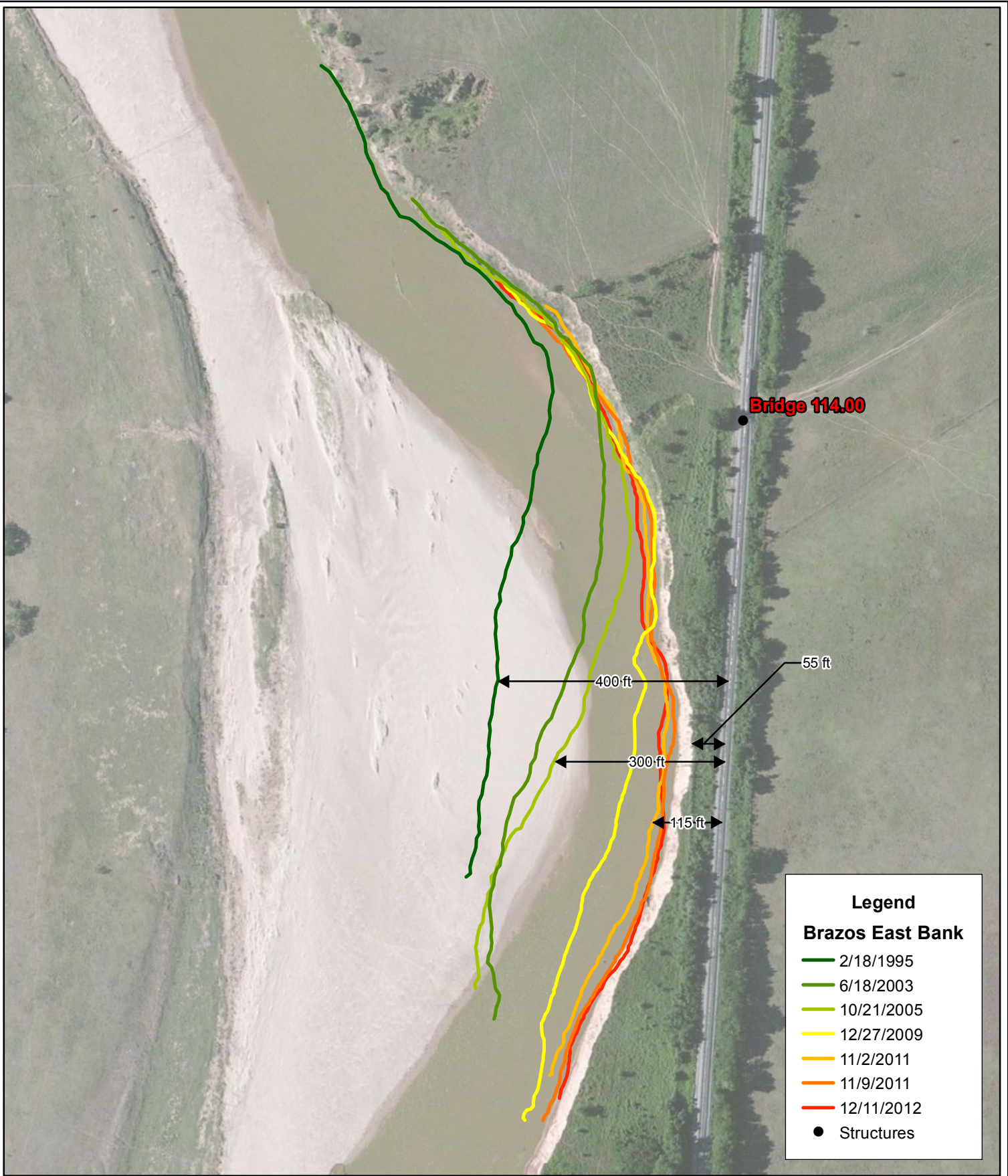
Legend

-  Study Area
-  Channel Dredging
-  Impacts
-  OHWM
-  Structures

Data Source: (c) 2012 Microsoft Corporation and its data suppliers



Brazos River Bridge
 Fort Worth Subdivision
 OLSSON Project No. 012-1723
 Robertson County, Texas
 Impact Map

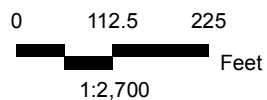


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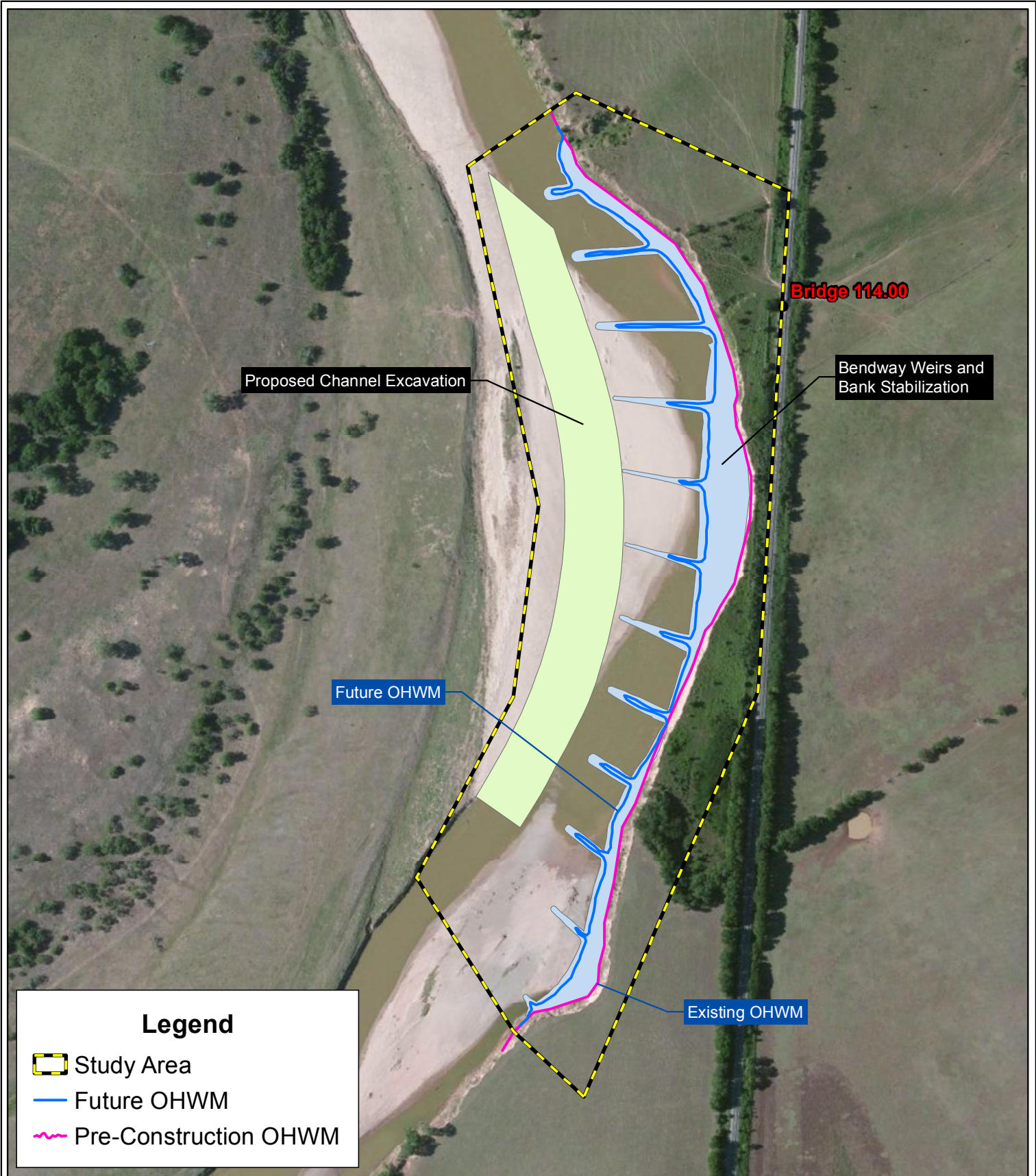
Brazos East Bank

- 2/18/1995
- 6/18/2003
- 10/21/2005
- 12/27/2009
- 11/2/2011
- 11/9/2011
- 12/11/2012
- Structures

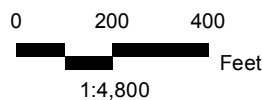
Data Source: (c) 2012 Microsoft Corporation and its data suppliers



Brazos River Bridge
 Fort Worth Subdivision
 OLSSON Project No. 012-1723
 Robertson County, Texas
 Bank Migration Map



Data Source: (c) 2012 Microsoft Corporation and its data suppliers



UPRR Brazos River Bank Stabilization
Fort Worth Subdivision
OLSSON Project No. 012-1723
Robertson County, Texas

Future OHWM Map

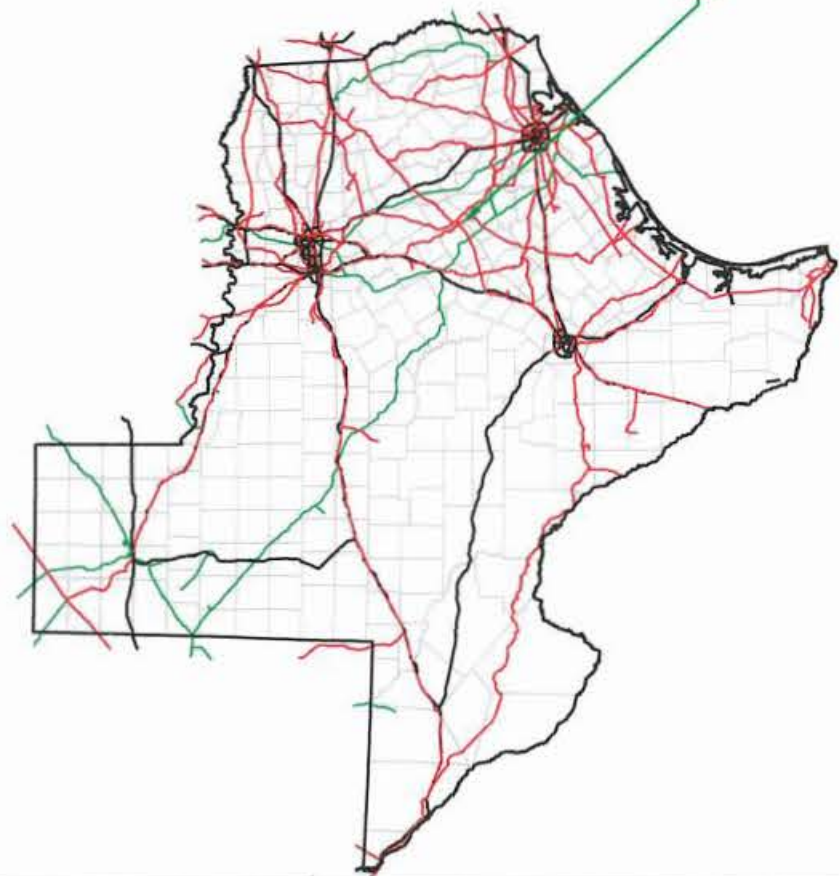
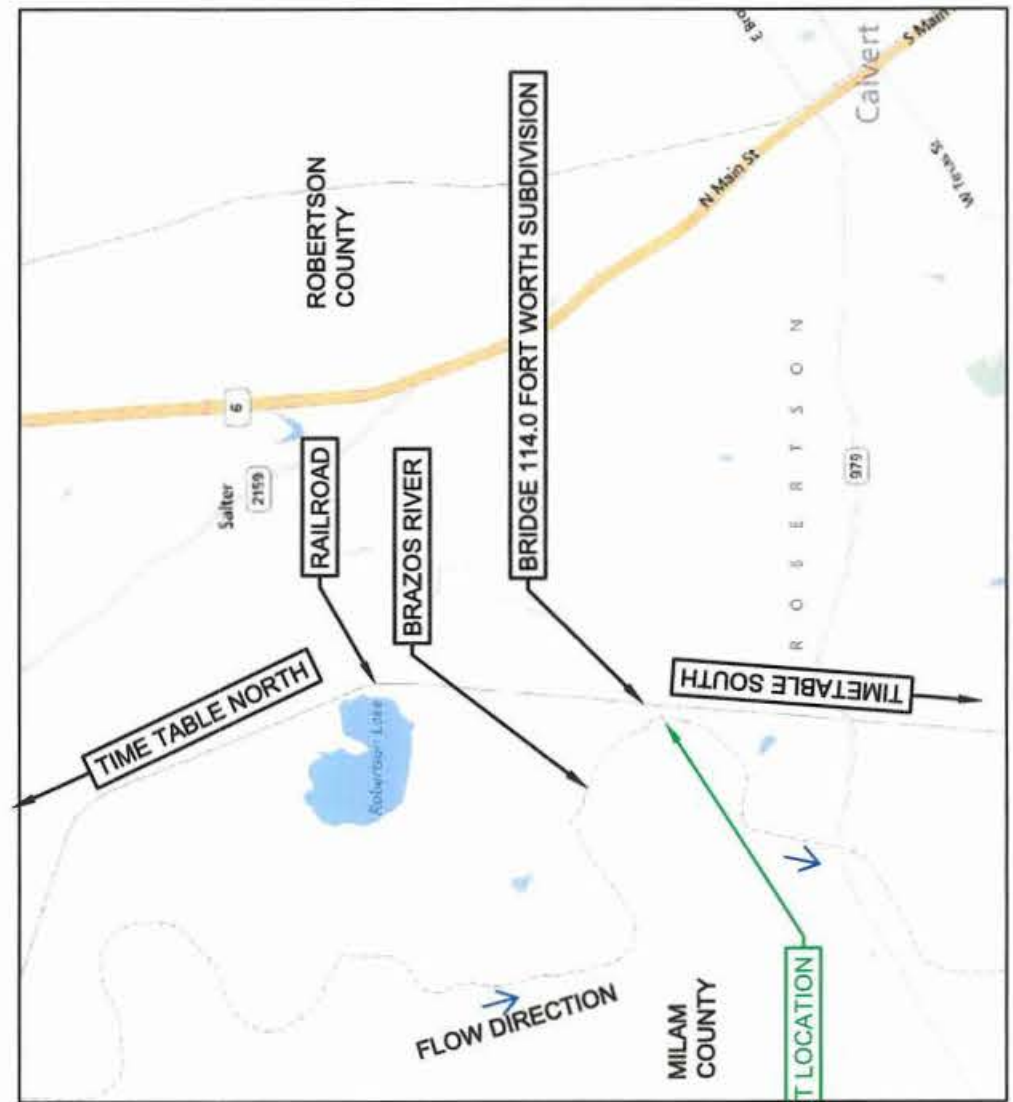


ENGINEERING DESIGN/CONSTRUCTION

WORK ORDER:
PROJECT NUMBER:
18012
81565

LAST REVISED
11/6/2013

CALVERT, TEXAS FORT WORTH SUBDIVISION MP 113.4 TO MP 114.4 CONSTRUCT BANK STABILIZATION



Project Location Map

State of Texas

MOLSSON
ASSOCIATES

1111 LAMAR BLVD, SUITE 111
LAWSON, TEXAS 75753-4004
TEL: 409-242-0211
FAX: 409-242-0210
www.molssonassociates.com

GENERAL NOTES

- The Contractor shall be responsible for field location of existing underground utilities prior to beginning greening activities.
- Contractor shall be responsible for coordinating with all utility agencies.
- Contractor shall protect in place (by any means necessary) all existing utilities to remain unless otherwise specified herein, contractor shall be responsible for the complete repair at his expense, for any damage to existing utilities, structures, or other facilities that are damaged or destroyed in place. All existing pipelines to be abandoned in place shall be cement slurry filled and capped at least 3'-0" below top of proposed subgrade.
- Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, and pipelines not located prior to construction shall be brought to the attention of the engineer for determination of appropriate action such as removal or treatment in a manner judged suitable to the engineer.
- Contractor shall coordinate location of all proposed utilities with UPRR to assure accuracy of utility connections and compliance with local codes.
- The Contractor shall not change or deviate from the plans without first obtaining written approval from the Owner or Owner's representative.
- All work and materials shall be subject to inspection and approval by the Owner or the Owner's representative.
- Any estimates of quantities are for informational purposes only. Contractor and subcontractor shall be responsible for determining all quantities. Contractor shall provide all work and materials as shown on plans.
- The Contractor is responsible for protection of all property corners. Any property corners disturbed or damaged by grading activities shall be reset by a professional land surveyor licensed in the state of Texas, at the contractor's expense.
- Contractor shall provide all work and materials as shown on plans.
- It is the Contractor's responsibility to correct any damage to underground utilities or facilities, which is caused by his operations.
- The Contractor shall field verify all horizontal and vertical lines and grades of existing utilities prior to the construction of improvements. The contractor shall notify the engineer immediately upon discovery of a discrepancy between the contract drawing and actual field conditions.
- Individual rock riprap shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering.
- No stone should be longer than 3.5 times its thickness.
- Stones should be well graded but with only a limited amount of material less than half the median stone size.
- Construction machinery should be kept on a firm, clear surface.
- Bulk specific gravity (pcf) should not be less than 2.5 as determined by ASTM C127.
- Weighted average loss in five cycles of soundness testing according to Federal Specification SS-R-406, Method 203.01 shall be not more than 20 percent when sodium sulphate is used or 25 percent when magnesium sulfate is used.
- Remove all sharp or protruding objects from subgrade surface.
- Place riprap at the locations and to the depths indicated on the drawings.
- Construct riprap to the full course thickness in one operation and in such a manner as to avoid significant displacement of the underlying materials.
- Place riprap such that material in place is reasonably homogeneous with larger stone uniformly distributed, firmly in contact one to another with smaller stone and spalls filling voids between larger fragments.
- Place riprap in a manner to prevent damage to structures.
- Place riprap by hand where necessary to prevent damage to permanent works. Smaller stones shall not be a substitute for larger ones, and flat slabs that are within the length to thickness tolerance shall be laid on edge.
- Install filter fabric at elevation and alignment indicated. See plans for layout and details.
- Overlap adjacent geotextile sections 2-5 inches and install stakes or staples as recommended by manufacturer.
- Contractors shall notify Service Alert, (800) 642-2444 and UPRR Filer Optics Hotline (800) 338-9183, 48 hours prior to any excavation. The USA Authorization Numbers shall be kept at the job site.
- No work whatsoever shall be commenced without first notifying the UPRR Engineer.

DESIGN CRITERIA

HEC-23 Bridge Scour and Stream Instability Countermeasures
Design of Rock Chute by Rollason, Rice, Ydstave, ASAE, 1998

SURVEY NOTES

- Railroad stationing for project profiles and alignments is based on stations established for chord definition spiraled curves at the centerline of the existing UPRR Main Line unless otherwise noted.
- The contractor is responsible for the preservation of all survey control monuments. In the event monuments are damaged or destroyed by the contractor, the Engineer will replace the monument solely at the contractor's expense.

	DATUM
HORIZONTAL	MODIFIED STATE PLANE
VERTICAL	NAVD 88

PROJECT CONTACTS

CONTACT	PHONE NUMBER	UPRR
KEVIN HICKS	402.544.6550	General Director-Design
CHRISTOPHER JOHNSON	402.544.4823	Manager Special Projects-Structures Design
CALEB DOUGLAS	402.544.3581	Manager Special Projects-Civil Geotechnical
DARYOUGH RAZAVIAN	402.458.5913	Project Design Manager
PAUL PINO	402.544.3582	Information Technology - Fiber
JOHN VAN GELDER	402.544.8532	Real Estate - Utilities

PHONE NUMBER	GENERAL
(800) 338-9183	UPRR CALL BEFORE YOU DIG
(888) 258-0808	CALL BEFORE YOU DIG (NATIONAL DIRECTORY)
(888) 877-7267	UPRR Response Management Communications Center (RMCC)

PHASING NOTES

- CONSTRUCTION ACCESS ROUTES AND CONSTRUCTION PLATFORMS SHALL BE CONSTRUCTED TO PROVIDE THE CONTRACTOR WITH NECESSARY ACCESS TO THE SITE.
- SEDIMENT AND EROSION CONTROL BMPs SHOULD BE INSTALLED PRIOR TO DISTURBING EXISTING SOIL.
- CONSTRUCTION ENTRANCE/EXIT RAMPs SHOULD BE CONSTRUCTED TO PROVIDE ACCESS FOR DELIVERY AND PLACEMENT OF EARTH AND ROCK MATERIALS.
- EXCAVATE TEMPORARY LOW FLOW CHANNEL STARTING AT STATION 0+00 OF THE LOW FLOW ALIGNMENT AND EXCAVATING UPSTREAM TO STA 19+83. CHANNEL BASEFLOW SHOULD BE DIVERTED TO THE LOW FLOW CHANNEL DURING CONSTRUCTION.
- CONSTRUCT BENTWAY WEIR, EAST STREAM EMBANKMENT, AND OTHER ITEMS SHOWN ON PLANS.
- AFTER EMBANKMENT AND BENTWAY WEIRS ARE CONSTRUCTED, FINAL MEASURES SHOULD BE INSTALLED ON THE CONSTRUCTION HAUL ROAD ADJACENT TO THE STREAM BANK WHILE EXITING THE CONSTRUCTION ACCESS. FINAL MEASURES INCLUDE INSTALLATION OF TURF REINFORCEMENT MAT, WILLOW STAKES, AND RIPRAP NETS.
- REMOVAL OF IN-STREAM SEDIMENT AND EROSION CONTROL BMPs. ALL OTHER BMPs SHALL REMAIN UNTIL VEGETATION IS ESTABLISHED AS SHOWN ON THE SEDIMENT AND EROSION CONTROL PLAN SHEETS.


EMBANKMENT CONSTRUCTION NOTES

- EMBANKMENT FILL SHOULD UTILIZE SUITABLE ON-SITE MATERIALS APPROVED BY GEOTECHNICAL ENGINEER FOR THE CROSS SECTION OF THE EMBANKMENT. OPENED AND EXPOSED AREAS SHOULD BE PROTECTED BY RIPRAP TO CONSTRUCT A 3' CLAY SHELL COVERING THE COARSE GRAIN MATERIAL IN AREAS NOT PROTECTED BY ROCK RIPRAP.
- ALL STRUCTURAL FILL SHOULD CONSIST OF APPROVED MATERIALS, FREE OF ORGANIC MATTER AND DEBRIS (ORGANIC CONTENT LESS THAN 5 PERCENT) AND SHOULD NOT CONTAIN PARTICLE SIZES LARGER THAN 3 INCHES. ALL FILL MATERIALS SHOULD BE PROTECTED FROM WEATHERING AND PLASTICITY INDEX GREATER THAN 15. SAMPLES OF ALL FILL MATERIALS SHOULD BE SUBMITTED TO THE GEOTECHNICAL ENGINEER OF RECORD PRIOR TO USE ON THE SITE.
- FILL SHOULD BE PLACED IN 10 INCH LIFTS OF 6 INCH THICKNESS. COMPACTION OF EACH LAYER SHOULD BE CONDUCTED IN A SYSTEMATIC AND CONTINUOUS MANNER.
- IN SMALL EXCAVATIONS, SUCH AS AROUND DROP INLETS, COMPACTION EQUIPMENT SHOULD CONSIST OF VIBRATING PLATE COMPACTORS, WALK BEHIND SHEEPSFOOT OR JUMPING JACKS. COMPACTION LIFTS SHOULD BE REDUCED WITHIN AND AROUND SMALL EXCAVATIONS.
- ALL COHESIVE SOILS USED FOR STRUCTURAL FILL PLACED AT THIS SITE SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM D-698).
- COHESIONLESS SOILS USED FOR STRUCTURAL FILL SHALL BE COMPACTED TO 85% RELATIVE DENSITY AT MOISTURE AS NECESSARY TO OBTAIN COMPACTION (ASTM C-127).
- THE MOISTURE CONTENT OF SUITABLE COHESIVE FILL SOILS AT THE TIME OF PLACEMENT AND COMPACTION SHOULD BE WITHIN -1 TO +3 PERCENT OF THE OPTIMUM MOISTURE CONTENT FOR COHESIONLESS SANDS, SILTS AND CLAYS. IN AREAS WHERE MOISTURE ADJUSTMENT IS NECESSARY TO OBTAIN PROPER COMPACTION, ADJUSTMENT OF MOISTURE CONTENT MAY BE NECESSARY TO ALLOW COMPACTION IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
- EXPERIENCED PERSONNEL SHOULD OBSERVE FILL PLACEMENT OPERATIONS AND PERFORM FIELD DENSITY TESTS CONCURRENTLY TO INDICATE IF THE SPECIFIED COMPACTION IS BEING ACHIEVED.
- MEASURES TO CONTROL INFILTRATING WATER WILL BE NECESSARY WHEN WORKING WITHIN THE RIVER CHANNEL. CONSTRUCTION SHOULD BEGIN WITH THE EXCAVATION OF THE LOW FLOW CHANNEL. THIS WILL DIVERT THE MAJORITY OF THE WATER DURING THE CONSTRUCTION OF THE WEIR. DEPENDING ON THE TIME OF YEAR THAT CONSTRUCTION BEGINS, ADDITIONAL DEWATERING METHODS MAY BE NECESSARY.
- THE GRANULAR ON-SITE SOILS WILL BE SUSCEPTIBLE TO DEGRADATION UNDER CONSTRUCTION EQUIPMENT, ESPECIALLY WHEN EXPOSED TO HIGH MOISTURE LEVELS. EXCESSIVE RUTTING MAY OCCUR UNDER REPEATED TRAFFIC LOADS. NECESSARY PRECAUTIONS SHOULD BE MADE, INCLUDING USING LIGHTLY LOADED TRACK MOUNTED EQUIPMENT IN LIEU OF HEAVY RUBBER TIRED EQUIPMENT. CONSIDERATION SHOULD BE GIVEN TO BUILDING WORK PLATFORMS AND/OR CONSTRUCTION HAUL ROADS IN AREAS WHERE A LARGE AMOUNT OF TRAFFIC IS EXPECTED.


- The Contractor shall comply with all Federal, State, County, and City Laws and Ordinances and Regulations of the Department of Industrial Relations, OSHA, NPEDES and Industrial Accident Commission related to the safety and character of the work, equipment and labor personnel.
- Any existing conditions found to be a variance with these drawings must be immediately reported to the Engineer.
- Contractor shall maintain and clean to the satisfaction of the Engineer, all access and service roads used during construction.
- Contractor shall perform all construction in such a manner as to protect adjacent existing buildings, and other site elements which are to remain in service.
- No field changes will be permitted without direct written authorization from the UPRR Engineer or his representative.
- Contractor shall coordinate work which affects adjacent property owners. Any questions or agreements between adjacent property owners and contractor shall be made in writing. A copy of such agreement shall be provided to the UPRR Engineer or his representative.
- The contractor is responsible for preparing a Stormwater Pollution Prevention Plan (SWPPP) to comply with State regulations. Contractor shall comply with all STATE and CITY standard specifications for construction of public improvements requirements. CITY standard specifications shall prevail.
- Riprap: Class of riprap shall be specified by the engineer. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock, and distribution so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way to produce the least amount of void spaces. Riprap shall be solid, unfractured rock or concrete, bulky in shape with sharp angular edges. Individual rocks shall vary as shown:

Riprap Class	Average Weight per Stone (Lbs)	Dimension (Inches)	Item No.	Unit of Measure	Min. Layer Thickness	Typical Velocities
I	80 to 200	9 to 14	562-2764	Ton	1'-6"	6 - 8 fps
II	200 to 1,000	14 to 24	562-3430	Ton	2'-0"	8 - 12 fps
III	1,000 to 4,000	24 to 38	562-4086	Ton	3'-0"	> 12 fps
IV	>4,000	>38	562-4782	Ton	4'-0"	Special Cases

The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:
 Riprap Class I - No allowances are permitted
 Riprap Class II - 15% of Riprap Class I
 Riprap Class III - 15% of Riprap Class I and 15% of Riprap Class II
 Riprap Class IV - 15% of Riprap Class I, 15% of Riprap Class II, and 15% of Riprap Class III



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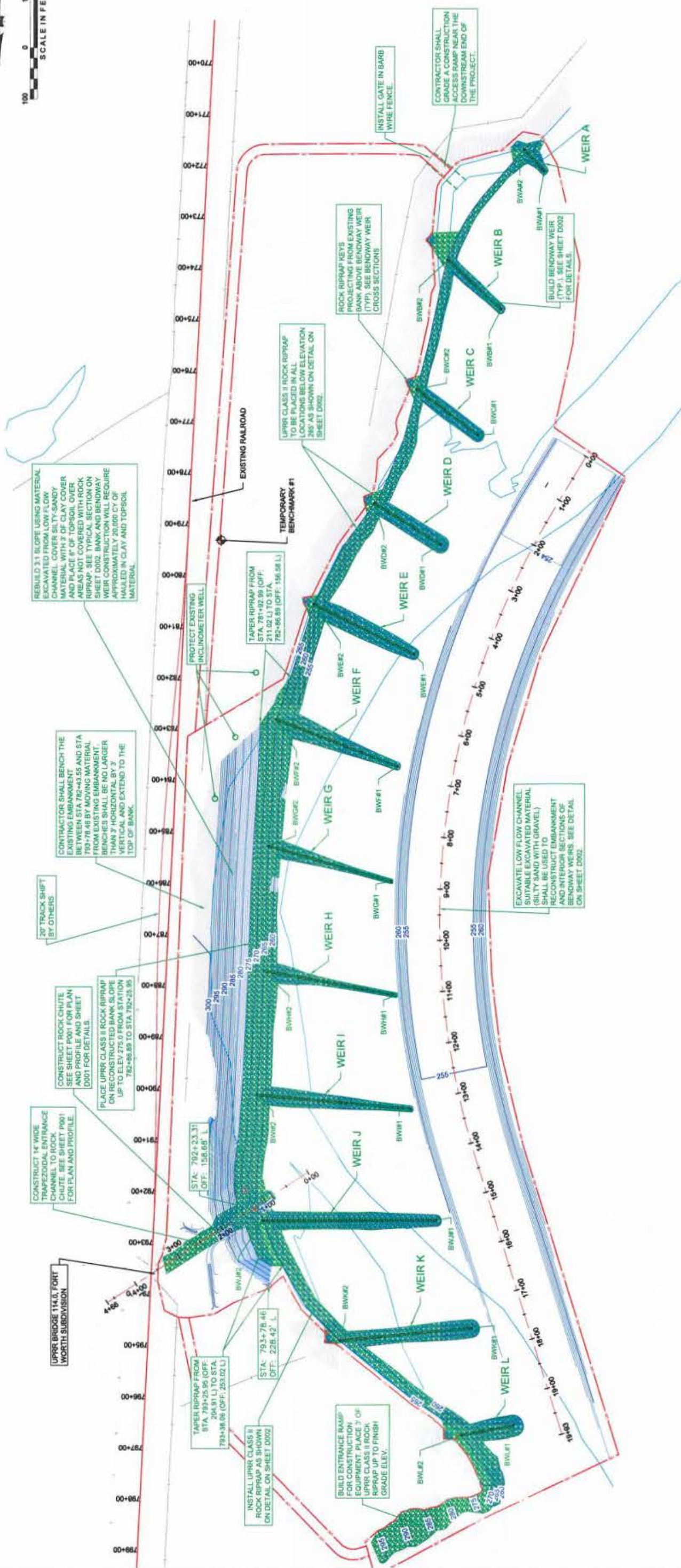


Office of Assistant Vice President
Engineering Design/Construction

BRAZOS RIVER BANK STABILIZATION - CALVERT, TX
MP 113.4 TO MP 114.4
FORT WORTH SUBDIVISION

DRAWN BY: CRU
CHECKED BY: EJS
DATE: 11.06.2013
SHEET NUMBER: 0003 of 005

UNION PACIFIC RAILROAD
LOCKPORT, LOUISIANA
SHEET TITLE: GENERAL NOTES AND PROJECT CONTACTS



BENCHMARK
 BM AT HEARNE, ROBERTSON COUNTY, AT THE INTERSECTION OF CEDAR AND THIRD STREETS, AT THE CITY POWER PLANT, IN THE SOUTHEAST CORNER OF THE POWER PLANT LOT, AND SET IN THE TOP OF A CONCRETE POST
 N: 10344500.2850
 E: 3421588.5130
 ELEV. = 297.98

LEGEND

- BW#1 WEIR, WEIR NAME, POINT #
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- FUTURE MINOR CONTOUR
- FUTURE MAJOR CONTOUR
- EXISTING GAS LINE
- EXISTING WIRE FENCE
- EXISTING EDGE OF WATER
- EXISTING CENTERLINE OF RAIL
- PROPOSED SIDING TRACK
- PROPOSED RAIL CENTERLINE
- LIMITS OF CONSTRUCTION

NOTE: PORTIONS OF WORK WILL BE BELOW NORMAL WATER LEVEL OF RIVER. BERMING/DEWATERING/DIVERSION WILL BE REQUIRED OF THE CONTRACTOR IN ORDER TO COMPLETE WORK.

LOW FLOW ALIGNMENT TABLE

STATION	LENGTH	BEARING	NORTHING	EASTING	ARC LENGTH	RADIUS	DELTA
0+00	111.71'	N31°28'07"E	10344338.08	3422878.01			
1+11.71			10344433.39	3420954.27			
14+31.73			10345704.22	3421090.85	1320.07'	1548.56'	48°50'23"
19+93.46			10346240.23	3420922.83			

BENDWAY WEIR END POINT COORDINATES TABLE

WEIR	NORTHING	EASTING
BW#1	10343779.74	3420958.72
BW#2	10343737.27	3420997.18
BW#3	10344050.07	3421042.82
BW#4	10343954.53	3421147.27
BW#5	10344295.58	3421087.13
BW#6	10344205.09	3421208.98
BW#7	10344508.95	3421180.21
BW#8	10344428.09	3421289.16
BW#9	10344722.23	3421211.82
BW#10	10344625.05	3421407.08
BW#11	10344842.33	3421244.02
BW#12	10344851.02	3421440.11

EXISTING RAILROAD STATIONING

STATION	NORTHING	EASTING
789+00.00	10342488.4840	3421548.8290
779+89.88	10344294.2360	3421839.3340
781+00.17	10344663.9320	3421859.2260
793+00.04	10345862.3510	3421718.3210
795+00.19	10346062.2390	3421728.1280
802+00.08	10346761.3000	3421762.5010
815+00.05	10346059.8990	3421828.6030

UNION PACIFIC RAILROAD

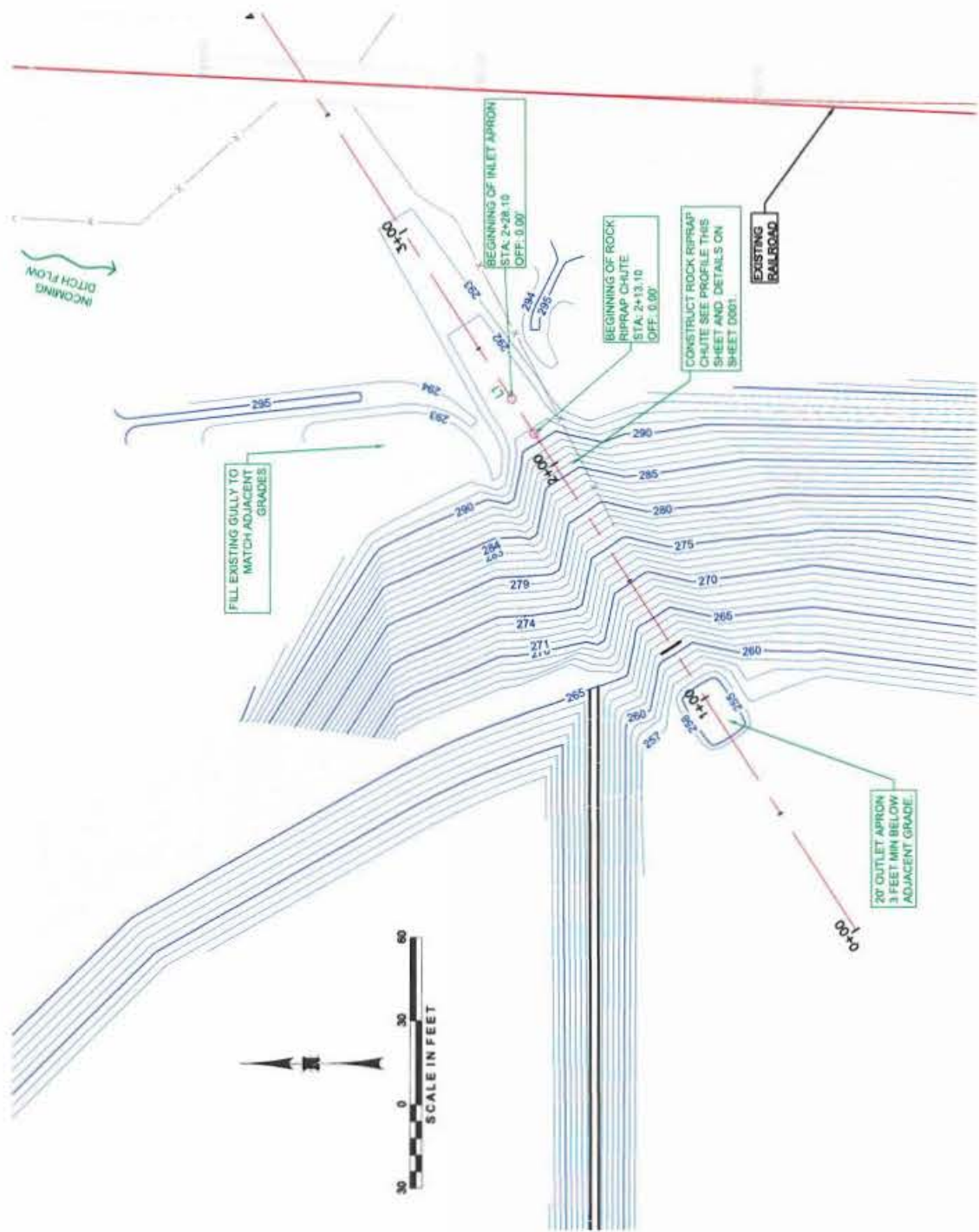
Office of Assistant Vice President
 Engineering Design/Construction

LOCATIONS TO BE DESIGNED: BRAZOS RIVER BANK STABILIZATION - CALVERT, TX
 MP 113.4 TO MP 114.4
 FORT WORTH SUBDIVISION
 GENERAL LAYOUT PLAN

DRAWN BY: CRI
 CHECKED BY: EJS
 DATE: 11.08.2013
 SHEET NUMBER: 0005 of 005

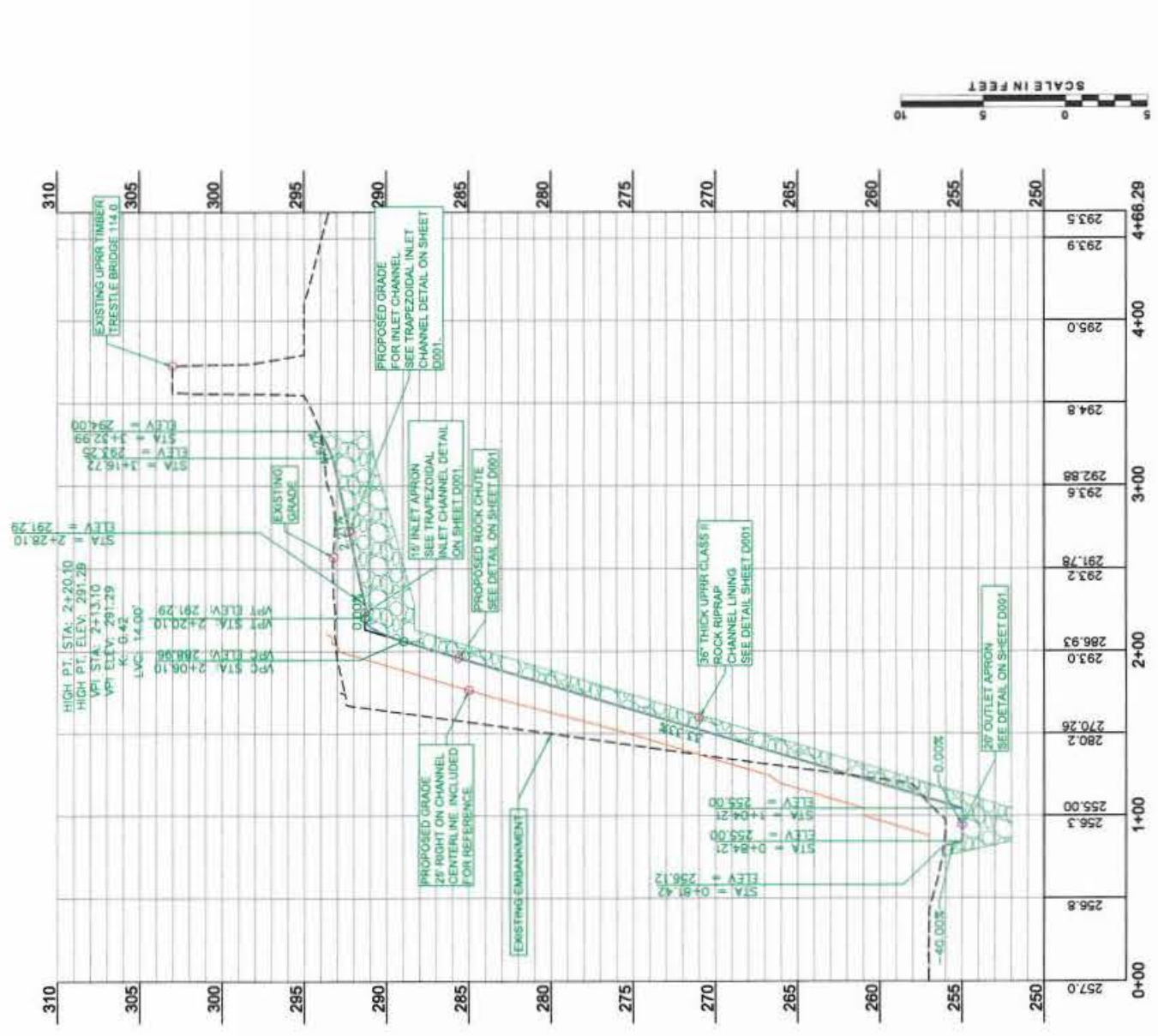
MOLSSON ASSOCIATES

UNION PACIFIC RAILROAD




ROCK CHUTE PLAN VIEW
NOT TO SCALE


ROCK CHUTE ALIGNMENT					
NO.	STATION	NORTHING	EASTING	LENGTH	LINE/CHORD BEARING
L1	0+00.00 4+66.29	10345730.1914 10345963.9416	3421418.3365 3421608.5352	466.29'	N57°01'51"E



ROCK CHUTE PROFILE



1111 LAMAR BLVD, SUITE 111
DALLAS, TX 75201-1028
TEL: 469.474.8711
FAX: 469.474.1116
www.molssonassociates.com



UNION PACIFIC RAILROAD

LOCATION DESCRIPTION: BRAZOS RIVER BANK STABILIZATION - CALVERT, TX
MP 113.4 TO MP 114.4
FORT WORTH SUBDIVISION

Office of Assistant Vice President
Engineering Design/Construction

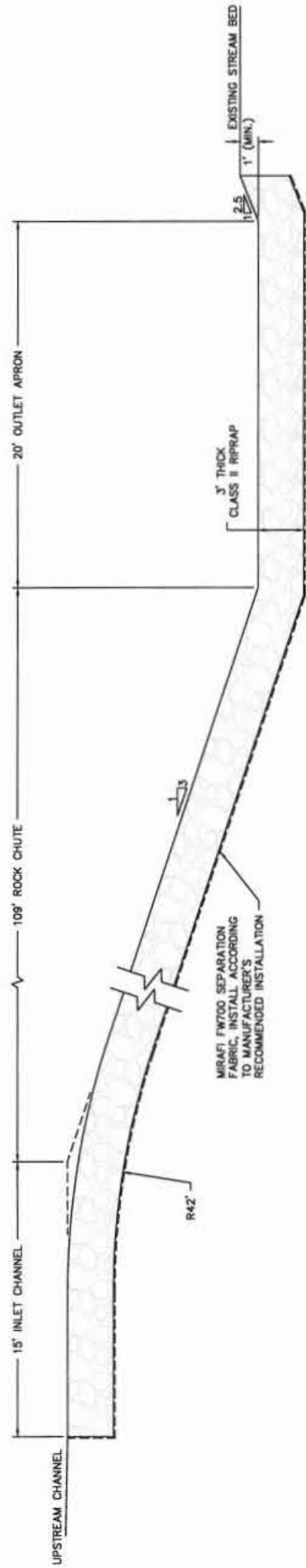
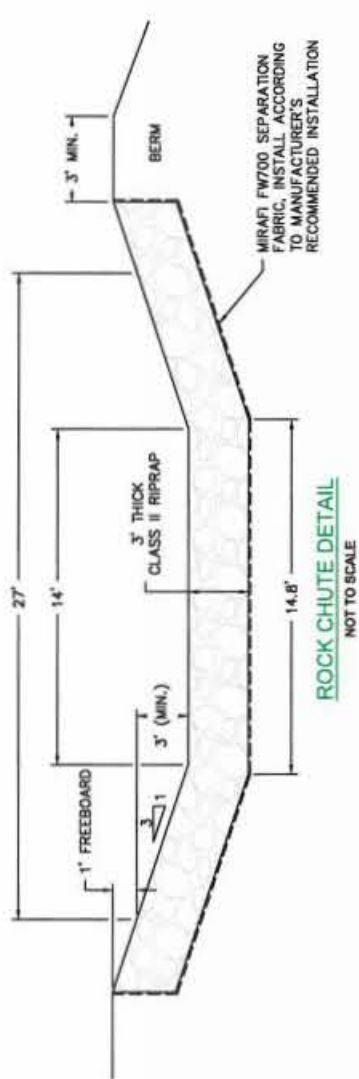
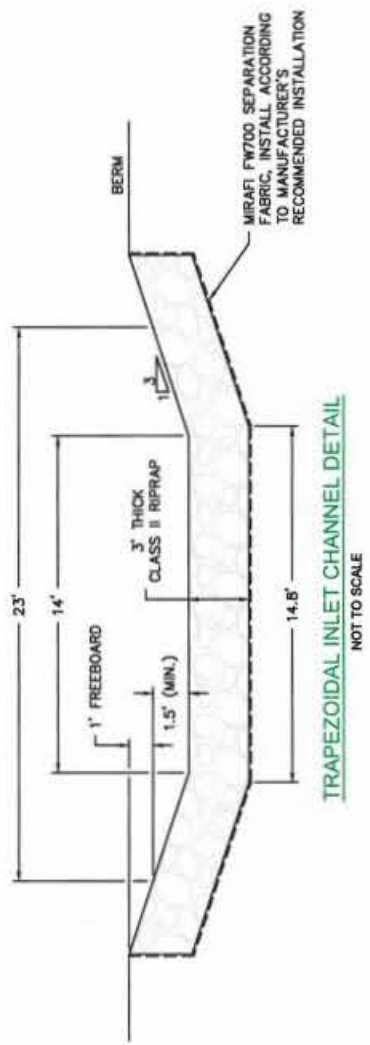
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CHECKED BY: EJS

DATE: 11.06.2013

SHEET NUMBER: P001 of 001

SHEET TITLE: ROCK CHUTE PLAN AND PROFILE

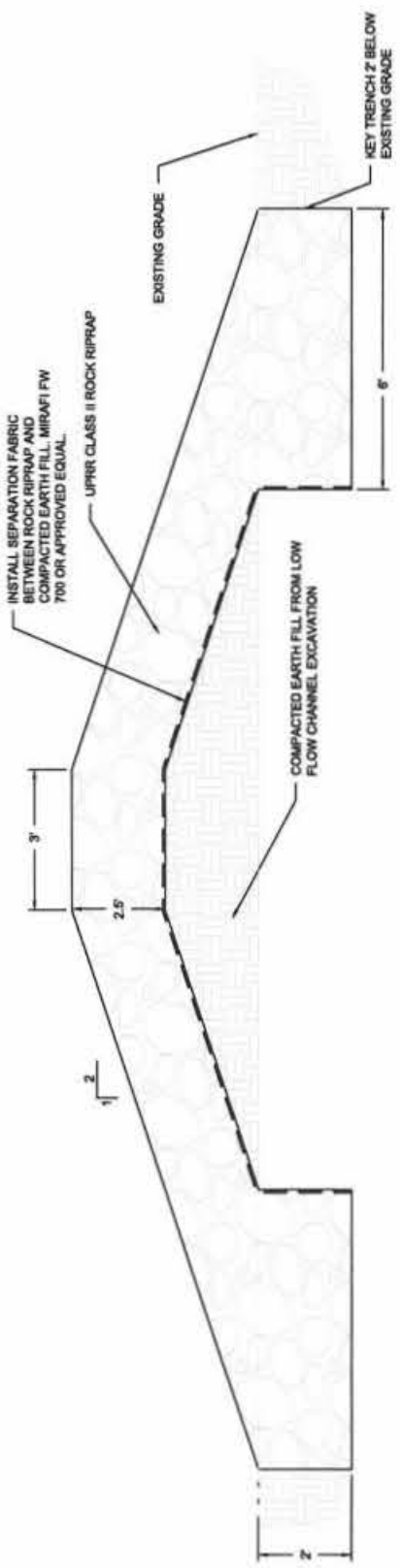


 1111 Lamar Blvd., Suite 111 Houston, TX 77060-1111 282.462.4747 714.462.4747 www.molssonassociates.com			DRAWN BY: CRL CHECKED BY: EJS DATE: 11.09.2013 SHEET NUMBER: 0001 of 002	Office of Assistant Vice President Engineering Design/Construction BRAZOS RIVER BANK STABILIZATION - CALVERT, TX MP 113.4 TO MP 114.4 FORT WORTH SUBDIVISION DETAILS
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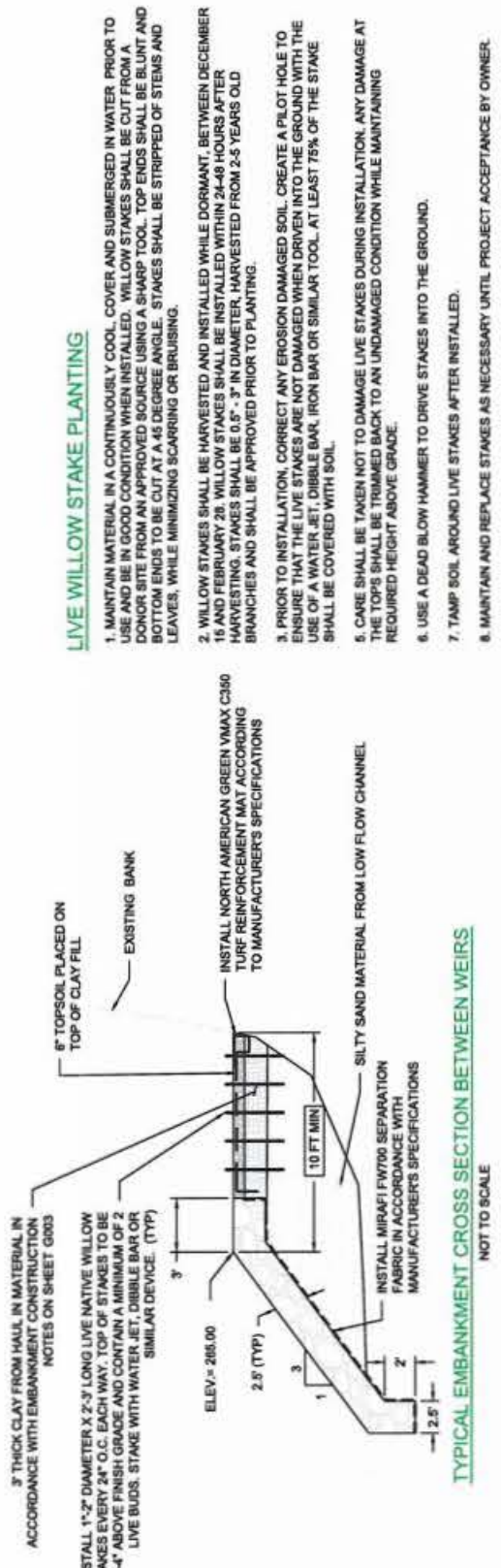
TEMPORARY VEGETATION REQUIREMENTS

- TOPSOIL REQUIREMENTS:**
 PERMANENT AND TEMPORARY SEEDING -
 LOOSEN COMPACTED SOILS TO A DEPTH OF 4 INCHES. IF RAINFALL CAUSES THE SURFACE TO BECOME SEALED OR CRUSTED, LOOSEN IT JUST PRIOR TO SEEDING. SLOPES STEEPER THAN 3:1 GRADE SHOULD BE GROOVED OR FURROWED ON THE CONTOUR BEFORE SEEDING. A GOOD SEEDBED IS WELL PULVERIZED, LOOSE, AND UNIFORM.
 PERMANENT SEEDING -
 A MINIMUM OF 4 INCHES OF LOOSE TOPSOIL SHOULD BE SPREAD ON AREAS TO BE SEEDED.
FERTILIZER REQUIREMENTS:
 USE A COMPLETE FERTILIZER CONTAINING NITROGEN, PHOSPHORIC ACID, AND POTASH NUTRIENTS. AT LEAST 50% OF THE NITROGEN COMPONENT MUST BE OF A SLOW-RELEASE FORMULATION SUCH AS UREA-BASED AND PLASTIC RESIN COATED FERTILIZERS. ENSURE THAT FERTILIZER IS IN AN ACCEPTABLE CONDITION FOR DISTRIBUTION IN CONTAINERS LABELED WITH THE ANALYSIS. DELIVER AND APPLY THE COMPLETE FERTILIZER UNIFORMLY AT A RATE EQUAL TO 100 LB OF NITROGEN PER ACRE.
SEED REQUIREMENTS:
 PERMANENT SEEDING -
 SEED SHALL BE PROVIDED FROM THE PREVIOUS SEASON'S CROP MEETING THE REQUIREMENTS OF THE TEXAS SEED LAW, INCLUDING THE TESTING AND LABELING OF PURE LIVE SEED (PLS = PURITY X GERMINATION). FURNISH SEED OF THE DESIGNATED SPECIES, IN LABELED UNOPENED BAGS OR CONTAINERS TO THE ENGINEER BEFORE PLANTING. USE WITHIN 12 MONTHS FROM THE DATE OF ANALYSIS.
 SEED MIX SHALL CONSIST OF 0.3 LB PLSIAC GREEN SPRANGLETOP, 1.5 LB PLSIAC BERMEIDA GRASS, 3.6 LB PLSIAC SEEDOATS GRAMA (HARBELL), 1.7 LB PLSIAC LITTLE BLUESTEM (TEXOKA), AND 1.0 LB PLSIAC ILLINOIS BUNDLEFLOWER.
 TEMPORARY SEEDING IN COOL SEASON - SEED MIX SHALL CONSIST OF 4.5 LBIAC TALL FESCUE, 24 LBIAC OATS, AND 34 LBIAC WHEAT.
 TEMPORARY WARM SEASON SEEDING - SEED MIX SHALL CONSIST OF 34 LBIAC OF FOXTAIL MILLET.
MULCH REQUIREMENTS:
 PERMANENT AND TEMPORARY SEEDING -
 WHEN SLOPES ARE FLATTER THAN 4:1, USE STRAW MULCH CONSISTING OF OAT, WHEAT OR RICE STRAW OR HAY MULCH OF EITHER BERMEIDA GRASS OR PRAIRIE GRASSES. USE STRAW OR HAY MULCH FREE OF JOHNSON GRASS AND OTHER NOXIOUS AND FOREIGN MATERIALS. KEEP THE MULCH DRY AND DO NOT USE MOLDED OR ROTTED MATERIAL. USE A TACKING AGENT APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS OR A CRIMPING METHOD ON ALL STRAW OR HAY MULCH OPERATIONS. APPLY STRAW MULCH AT 4000 LB PER ACRE OR APPLY HAY MULCH AT 3000 LB PER ACRE.
 WHEN SLOPES ARE GREATER THAN 4:1, USE CELLULOSE FIBER MULCH THAT ARE ON THE APPROVED LIST PUBLISHED BY TEXAS DOT "FIELD PERFORMANCE OF EROSION CONTROL PRODUCTS". APPLY AT A RATE OF 2000 LB PER ACRE.

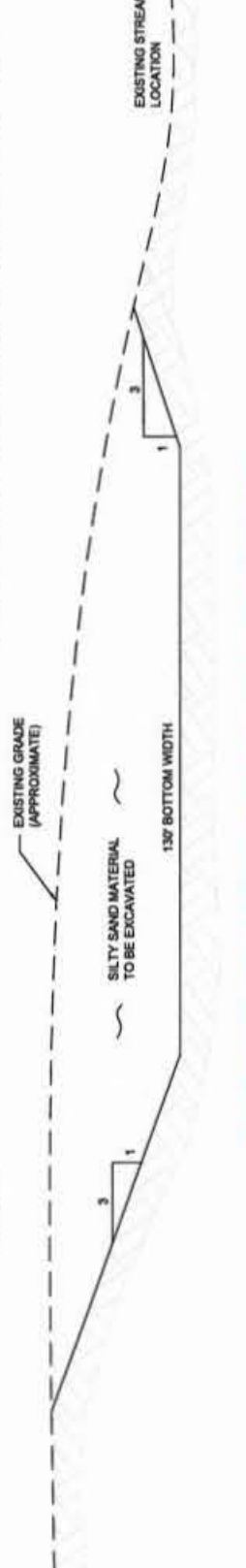
- DATES FOR SEEDING:**
 PERMANENT SEEDING - FEBRUARY 1 TO MAY 15
 TEMPORARY WARM SEASON SEEDING - MAY 1 TO AUGUST 31
 TEMPORARY COOL SEASON SEEDING - SEPTEMBER 1 TO NOVEMBER 30



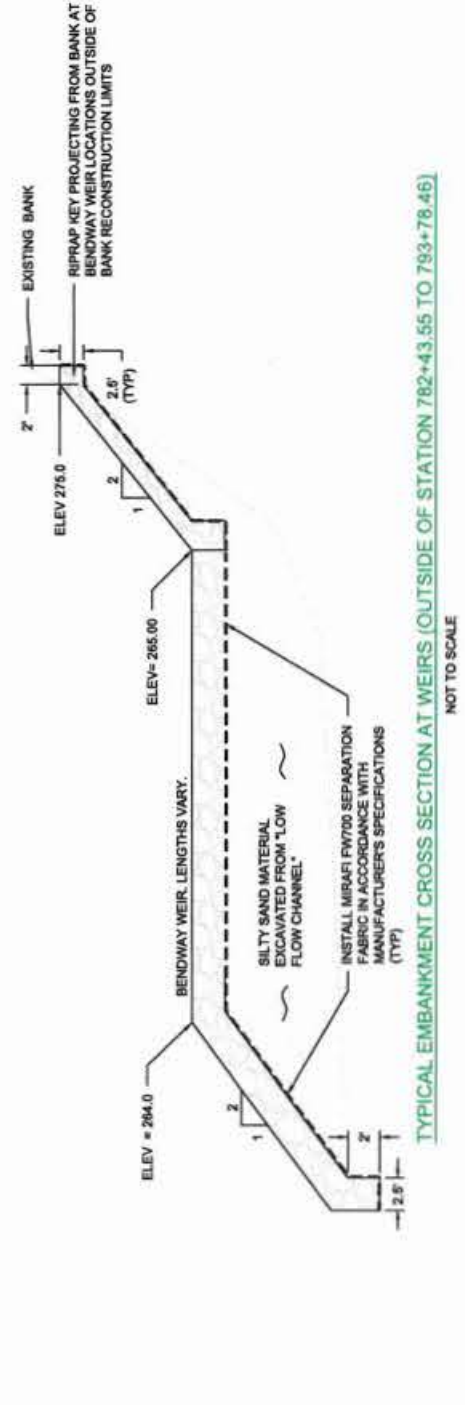
BENDWAY WEIR TRANSVERSE CROSS SECTION
 NOT TO SCALE



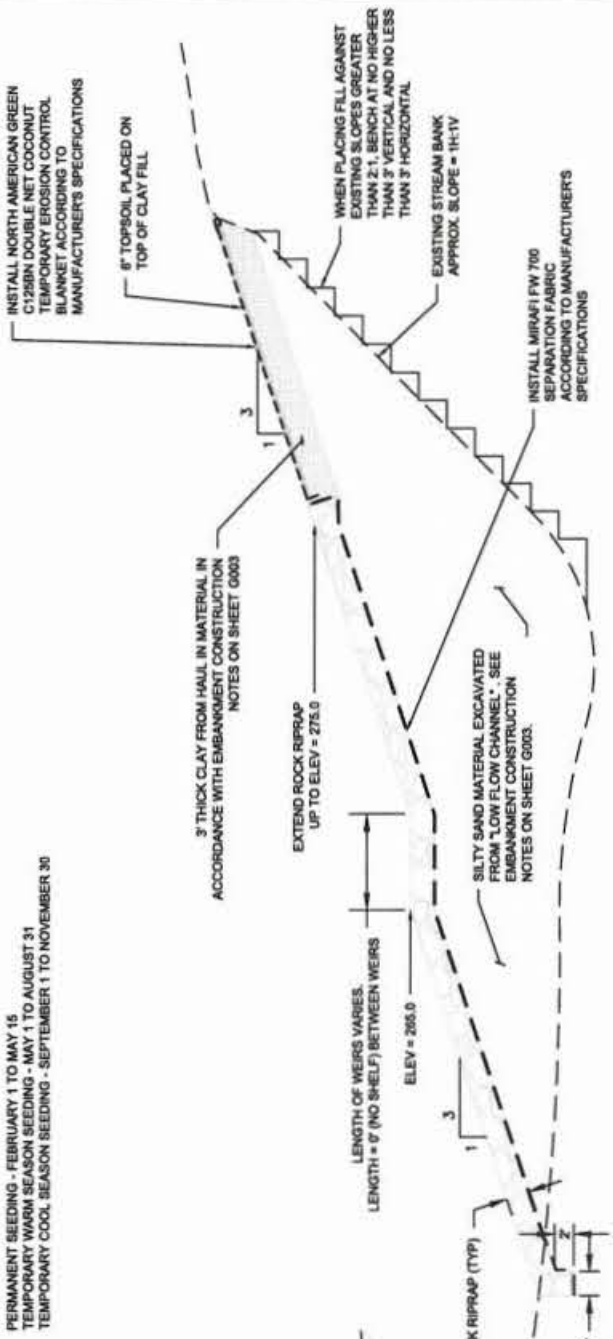
TYPICAL EMBANKMENT CROSS SECTION BETWEEN WEIRS
 NOT TO SCALE



TYPICAL LOW FLOW CHANNEL CROSS SECTION (LOOKING UPSTREAM)
 NOT TO SCALE



TYPICAL EMBANKMENT CROSS SECTION AT WEIRS (OUTSIDE OF STATION 782+43.55 TO 793+78.46)
 NOT TO SCALE



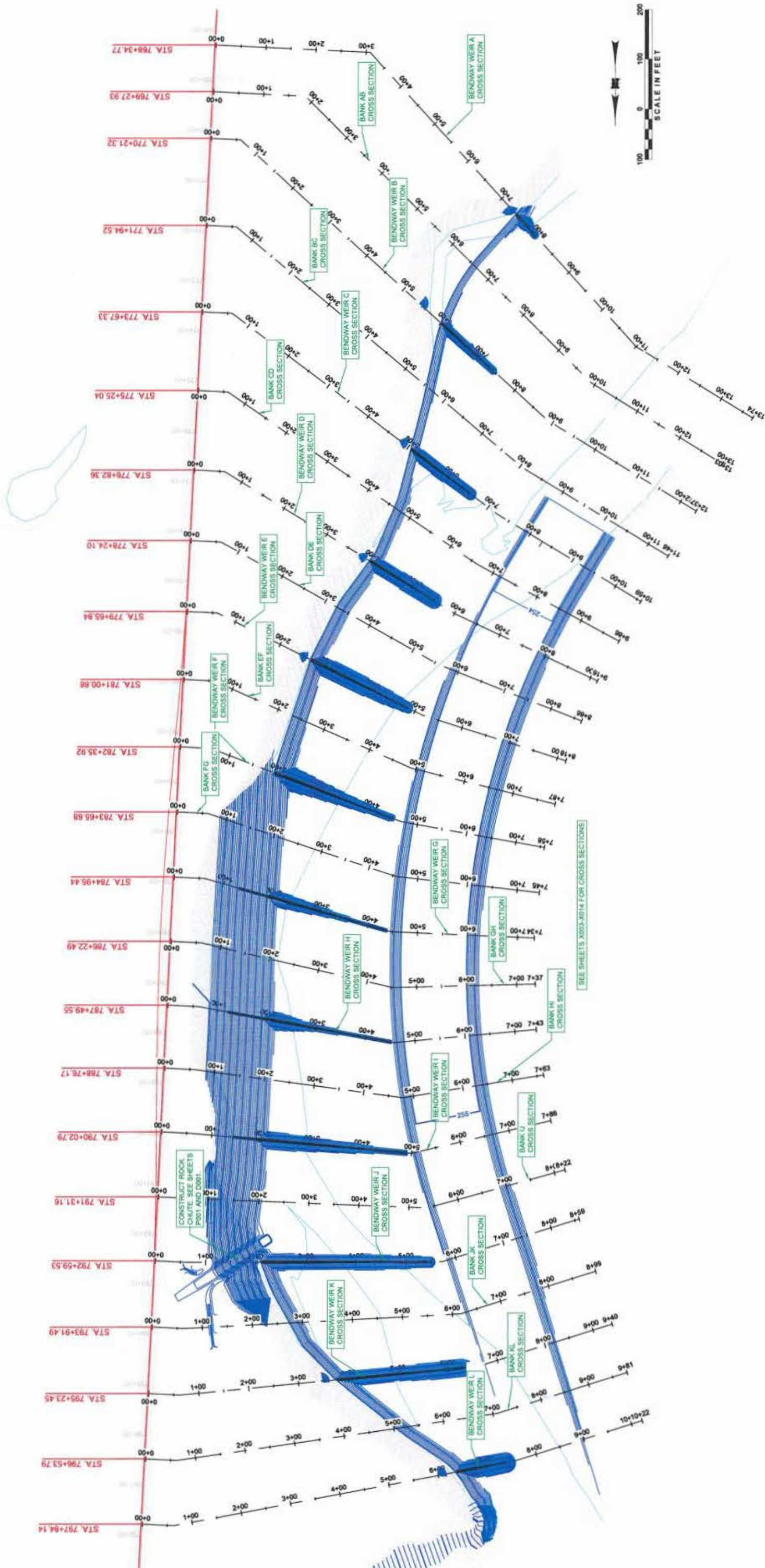
TYPICAL EMBANKMENT CROSS SECTION BETWEEN STATION 782+43.55 AND 793+78.46
 NOT TO SCALE

MOLSSON ASSOCIATES
 1111 LAMAR BLVD, SUITE 111
 DALLAS, TX 75241-1000
 TEL: 972.474.8100
 FAX: 972.474.8105
 WWW.MOLSSONASSOCIATES.COM

UNION PACIFIC RAILROAD
 LOCATION DESCRIPTION: BRAZOS RIVER BANK STABILIZATION - CALVERT, TX
 MP 113.4 TO MP 114.4
 FORT WORTH SUBDIVISION
 SEEDING AND BENDWAY DETAILS

DRAWN BY: CRL
 CHECKED BY: EJS
 DATE: 11.09.2013
 SHEET NUMBER: 0002 of 002

Office of Assistant Vice President
 Engineering Design/Construction



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Engineering Design/Construction

UNION PACIFIC RAILROAD

LOCATION DESCRIPTION: BRAZOS RIVER BANK STABILIZATION - CALVERT, TX
MP 113.4 TO MP 114.4
FORT WORTH SUBDIVISION

DRAWN BY: CRJ
CHECKED BY: EJS
DATE: 11.06.2013
SHEET NUMBER: X001 of 014
SHEET TITLE: CROSS SECTIONS PLAN

MOLSSON ASSOCIATES

1511 W. BRIDGE BLVD. SUITE 111
DALLAS, TX 75243
TEL: 972.447.4100
WWW.MOLSSONASSOCIATES.COM

RAIL STA. 788+34.77			
BENDWAY WEIR A CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	307.79	N87°10'49"W	3421986.2147
3+07.79	792.77	N42°09'45"W	3421788.7929
11+00.56	272.99	N68°33'53"W	3420756.6579
13+73.55			3420523.7386

RAIL STA. 770+21.32			
BENDWAY WEIR B CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	58.26	N87°10'49"W	3421605.5120
0+58.26	527.87	N47°39'16"W	3421547.3209
6+86.13	350.53	N68°33'53"W	3420936.9324
12+36.66			3420536.8482

RAIL STA. 773+67.33			
BENDWAY WEIR C CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	58.80	N87°10'49"W	3421622.7756
0+58.80	687.32	N62°55'03"W	3421563.8451
7+26.22	332.90	N68°33'53"W	3421031.5915
10+59.17			3420747.4938

RAIL STA. 778+82.38			
BENDWAY WEIR D CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	59.48	N87°10'49"W	3421579.0447
0+59.48	543.79	N69°13'50"W	3421163.7324
6+03.27	312.30	N64°52'37"W	3420833.9730

RAIL STA. 779+65.64			
BENDWAY WEIR E CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	59.87	N87°10'49"W	3421592.6488
0+59.87	458.79	N67°32'37"W	3421183.8944
5+18.77	301.27	N72°11'01"W	3420896.8759

RAIL STA. 783+35.82			
BENDWAY WEIR F CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	60.37	N87°10'49"W	3421665.9116
0+60.37	408.23	N68°51'24"W	3421605.6102
4+68.60	291.38	N79°44'38"W	3421226.7275
7+57.99			3420940.0003

RAIL STA. 784+95.44			
BENDWAY WEIR G CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	60.70	N87°10'49"W	3421678.6833
0+60.70	385.98	N74°10'11"W	3421618.0948
4+46.66	268.87	N87°24'21"W	3421246.7427
7+13.53			3420960.1681

RAIL STA. 787+49.55			
BENDWAY WEIR H CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	81.02	N87°10'49"W	3421691.2084
0+81.02	397.49	N79°28'58"W	3421630.2987
4+80.52	284.53	S84°50'01"W	3421239.4440
7+43.04			3420968.0713

RAIL STA. 790+92.79			
BENDWAY WEIR I CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	81.34	N87°10'49"W	3421703.6809
0+81.34	439.38	N84°47'45"W	3421642.4131
5+00.72	285.13	S77°00'25"W	3421204.8478
7+85.84			3420927.0227

RAIL STA. 792+99.53			
BENDWAY WEIR J CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	81.67	N87°10'49"W	3421716.3257
0+81.67	511.05	S88°53'28"W	3421684.7343
6+72.72	286.42	S72°35'44"W	3421143.8916
9+59.14			3420970.3790

RAIL STA. 795+23.45			
BENDWAY WEIR K CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	81.95	N87°10'49"W	3421729.2700
0+81.95	598.17	S84°35'29"W	3421687.3998
6+81.11	279.22	S72°35'44"W	3421070.9019
9+40.33			3420804.4700

RAIL STA. 797+94.14			
BENDWAY WEIR L CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	82.24	N87°11'09"W	3421742.0735
0+82.24	884.84	S79°16'33"W	3421679.9106
7+07.08	285.00	S72°35'44"W	3420987.2064
10+22.08			3420744.3390

RAIL STA. 789+27.93			
BANK AB CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	183.03	N87°10'49"W	3421600.8076
1+83.03	809.41	N44°59'32"W	3421418.0669
9+82.43	310.97	N68°33'53"W	3420648.2962
13+03.43			3420360.9453

RAIL STA. 771+94.52			
BANK BC CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	58.58	N87°10'49"W	3421614.1438
0+58.58	746.80	N49°59'32"W	3421555.6350
8+05.38	340.98	N68°33'53"W	3420983.7969
11+48.38			3420692.8229

RAIL STA. 775+25.64			
BANK CD CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	59.19	N87°10'49"W	3421630.6158
0+59.19	604.91	N65°18'10"W	3421571.4940
6+04.10	322.14	N81°37'11"W	3421074.1909
9+86.24			3420780.7334

RAIL STA. 778+24.19			
BANK DE CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	59.73	N87°10'49"W	3421645.5023
0+59.73	496.76	N60°39'21"W	3421585.8487
5+59.48	306.16	N69°27'52"W	3421150.2134
8+05.65			3420865.4244

RAIL STA. 781+02.86			
BANK EF CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	60.17	N87°10'49"W	3421659.2302
0+60.17	431.05	N65°02'40"W	3421598.1295
4+91.22	295.68	N75°54'01"W	3421206.2109
7+86.90			3420916.4380

RAIL STA. 793+65.86			
BANK FG CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	60.54	N87°10'49"W	3421672.3025
0+60.54	398.67	N71°28'42"W	3421611.8376
4+56.21	288.48	N83°32'40"W	3421236.7351
7+44.69			3420950.0942

RAIL STA. 786+22.49			
BANK GH CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	60.86	N87°10'49"W	3421684.9508
0+60.86	391.31	N78°51'50"W	3421624.1823
4+52.17	285.04	N88°43'17"W	3421243.0934
7+37.21			3420968.1197

RAIL STA. 788+76.17			
BANK HI CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	81.18	N87°10'49"W	3421687.4448
0+81.18	417.89	N82°16'20"W	3421638.3364
4+79.17	284.16	S80°54'58"W	3421222.1459
7+63.33			3420941.5470

RAIL STA. 791+31.18			
BANK IJ CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	81.50	N87°10'49"W	3421710.0033
0+81.50	474.71	N87°39'10"W	3421648.5737
5+36.21	285.96	S74°47'48"W	3421174.2647
8+21.77			3420888.7008

RAIL STA. 793+91.49			
BANK JK CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	81.81	N87°10'49"W	3421722.7978
0+81.81	554.52	S87°01'51"W	3421661.0871
6+81.33	282.62	S72°35'44"W	3421107.2917
9+68.14			3420837.4245

RAIL STA. 796+93.79			
BANK KL CROSS SECTION ALIGNMENT TABLE			
STATION	LENGTH	BEARING	EASTING
0+00	62.99	N87°10'49"W	3421735.8718
0+62.99	648.31	S81°44'13"W	3421673.6552
7+08.40	272.11	S72°35'44"W	3421034.0541
9+80.51			3420774.4045



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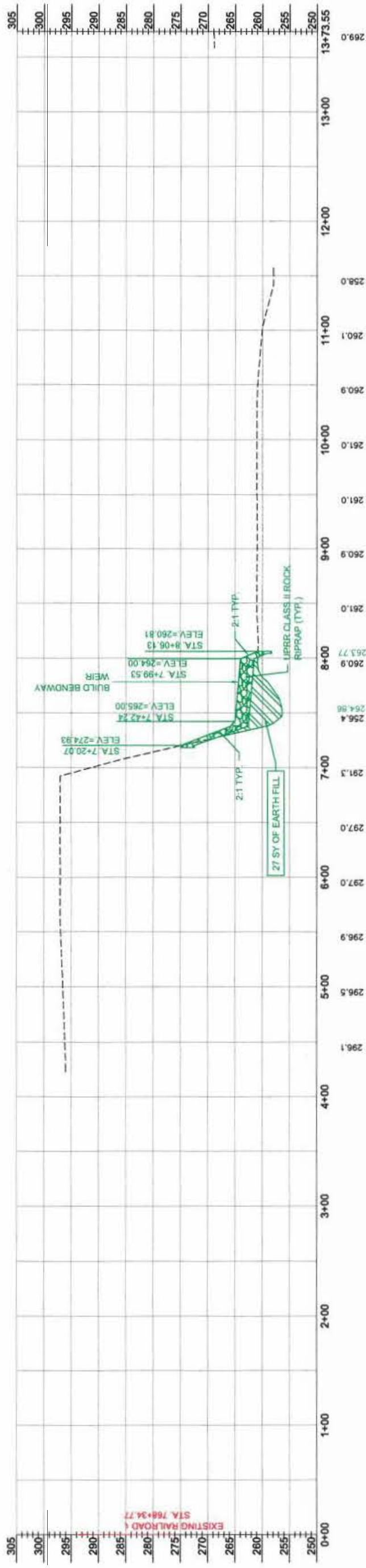
1111 Lamar Blvd, Suite 111
 Dallas, TX 75201-1605
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 FAX: 462.114.1516
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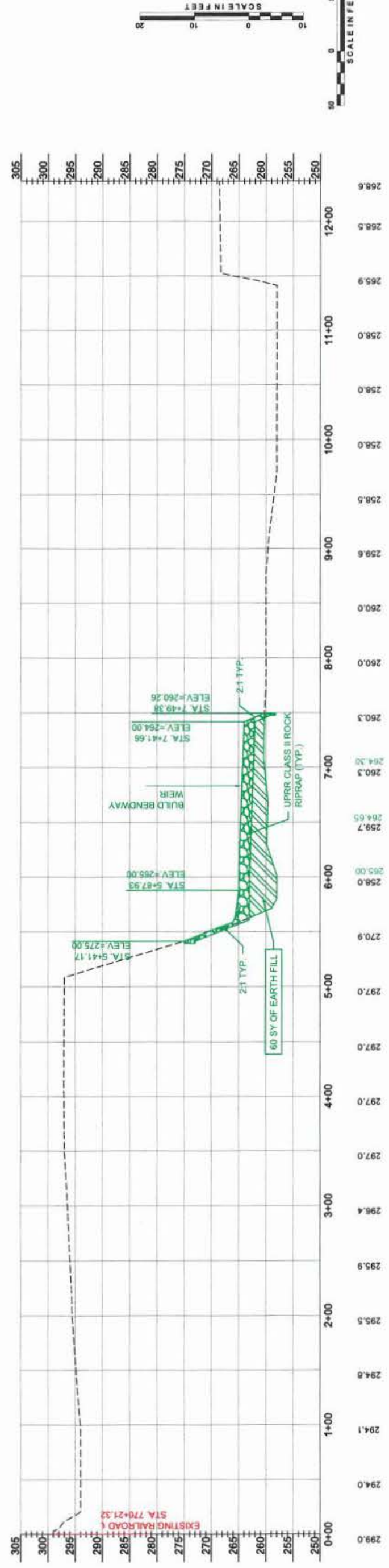
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 MP 113.4 TO MP 114.4
 FORT WORTH SUBDIVISION

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 DATE: 11.06.2013
 SHEET NUMBER: X002 of 014
 SHEET TITLE: CROSS SECTIONS ALIGNMENT TABLES




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RAIL STA. 768+34.77




BENDWAY WEIR B CROSS SECTION
RAIL STA. 770+21.32





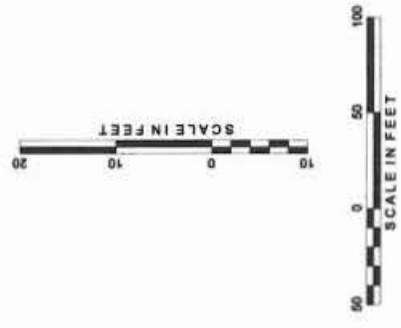
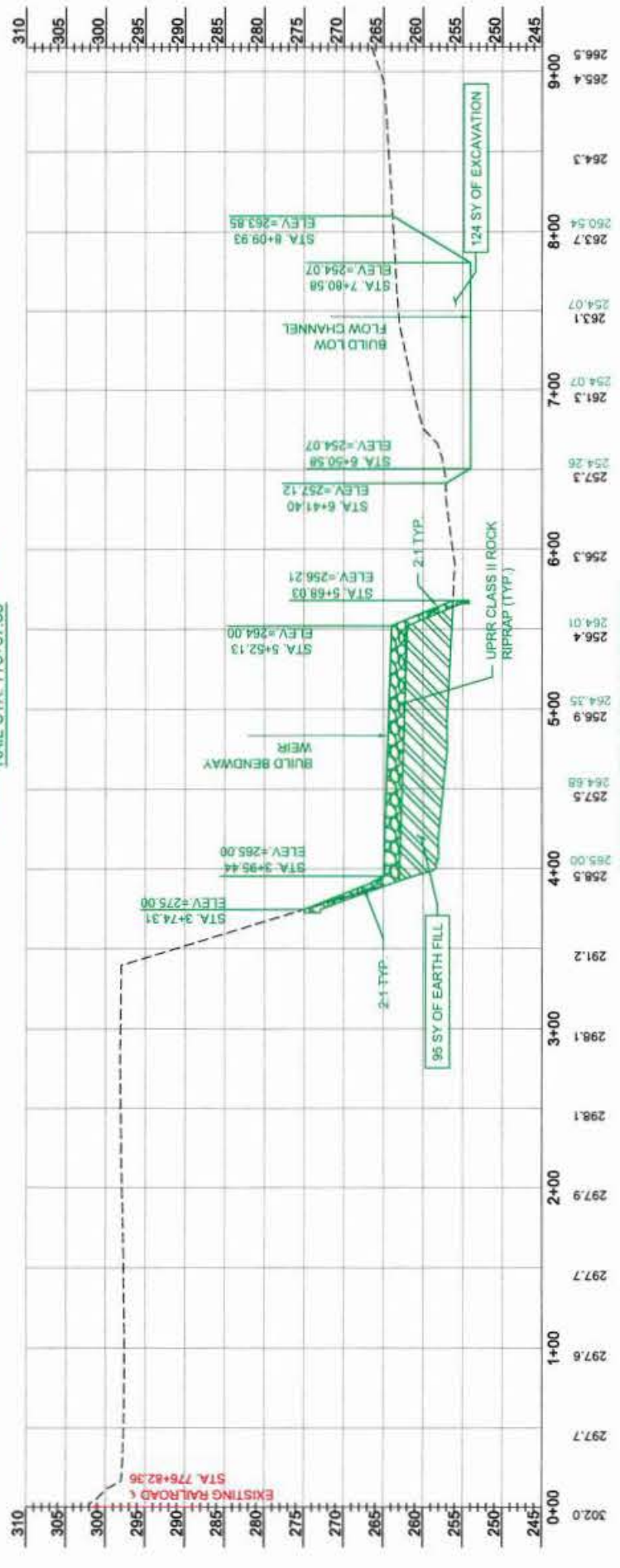
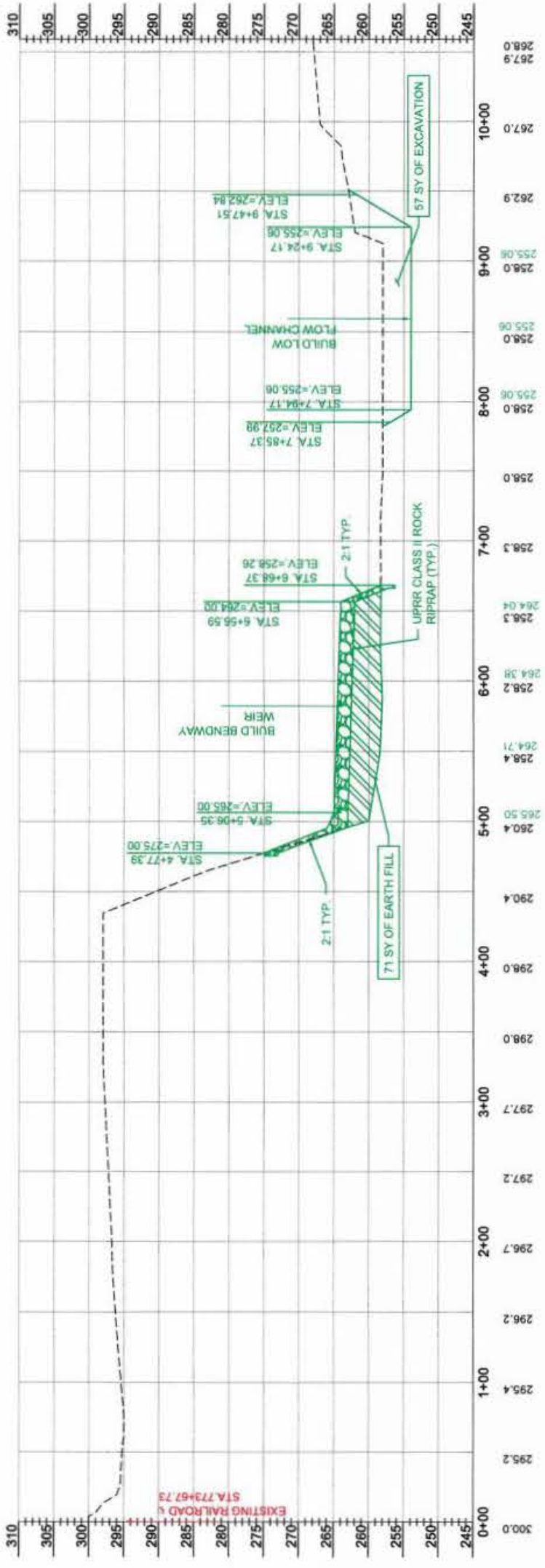
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DALLAS, TEXAS 75242
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FAX: 469.474.9172
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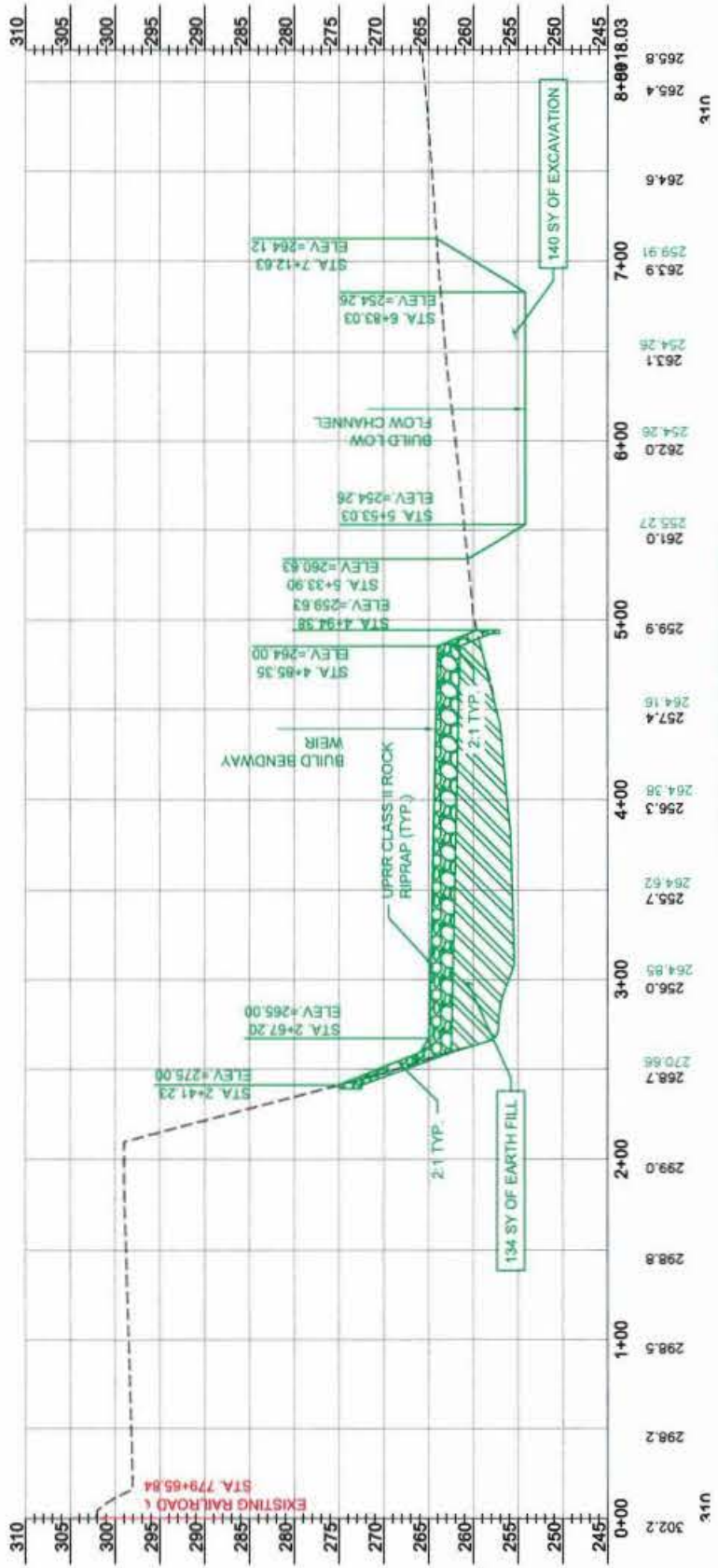


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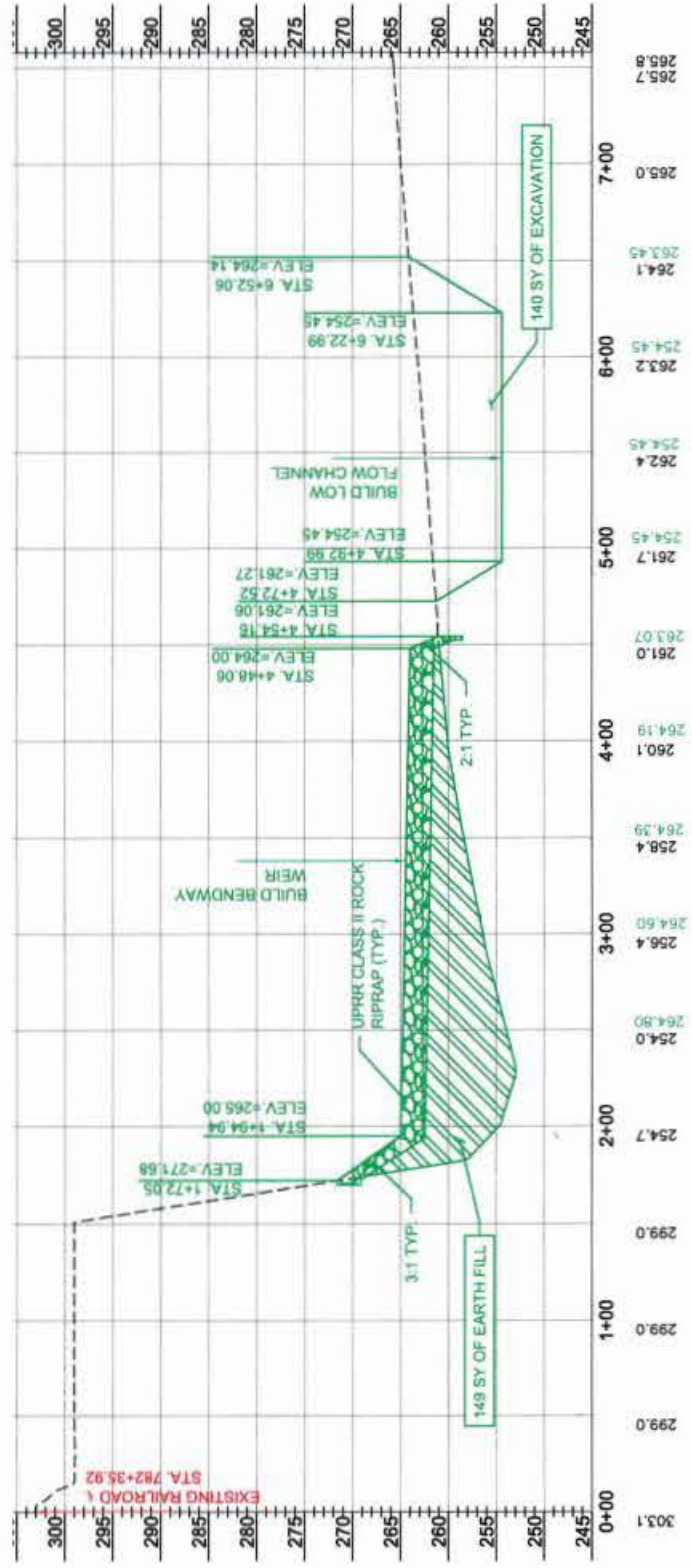
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FORT WORTH SUBDIVISION

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SHEET TITLE: CROSS SECTIONS





BENDWAY WEIR E CROSS SECTION
RAIL STA. 779+65.84



BENDWAY WEIR F CROSS SECTION
RAIL STA. 782+35.92



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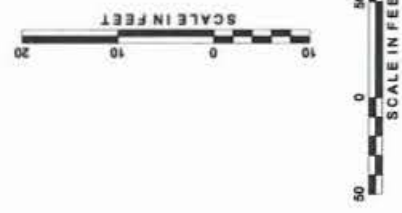
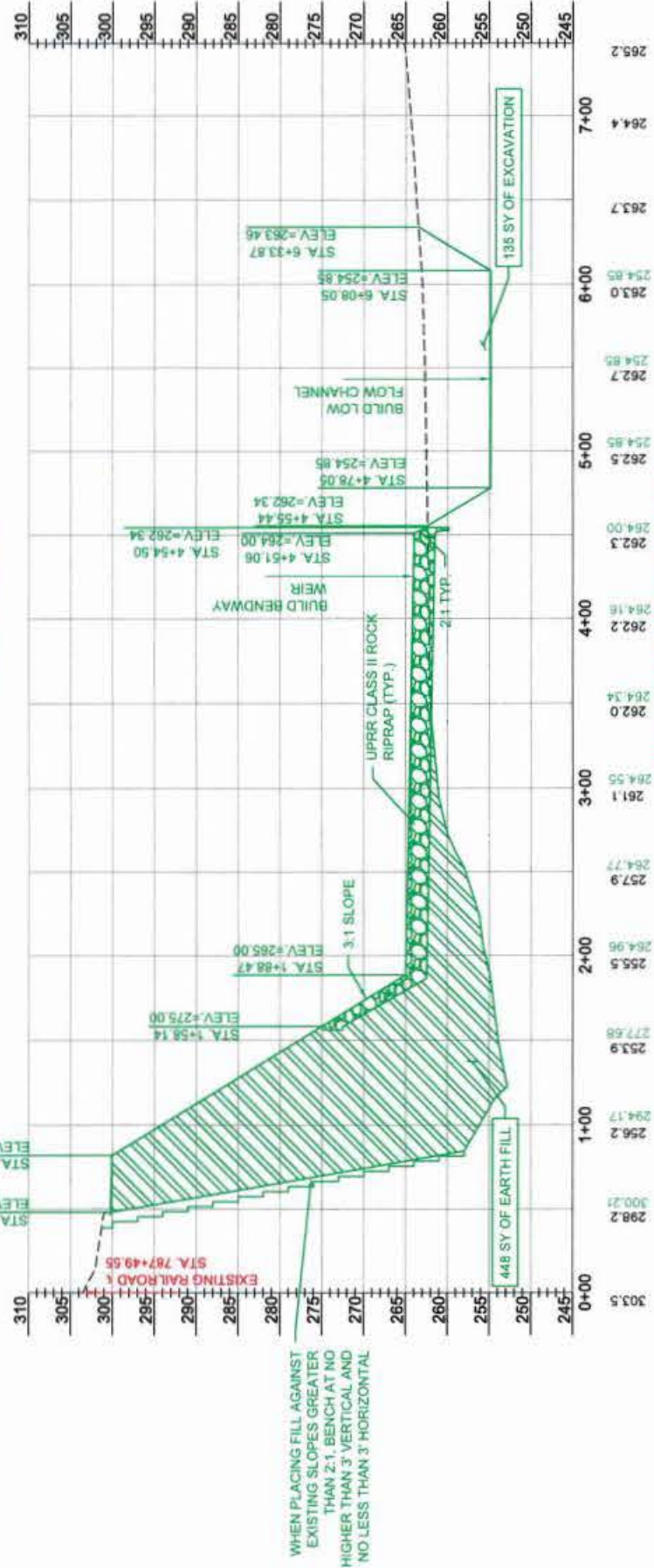
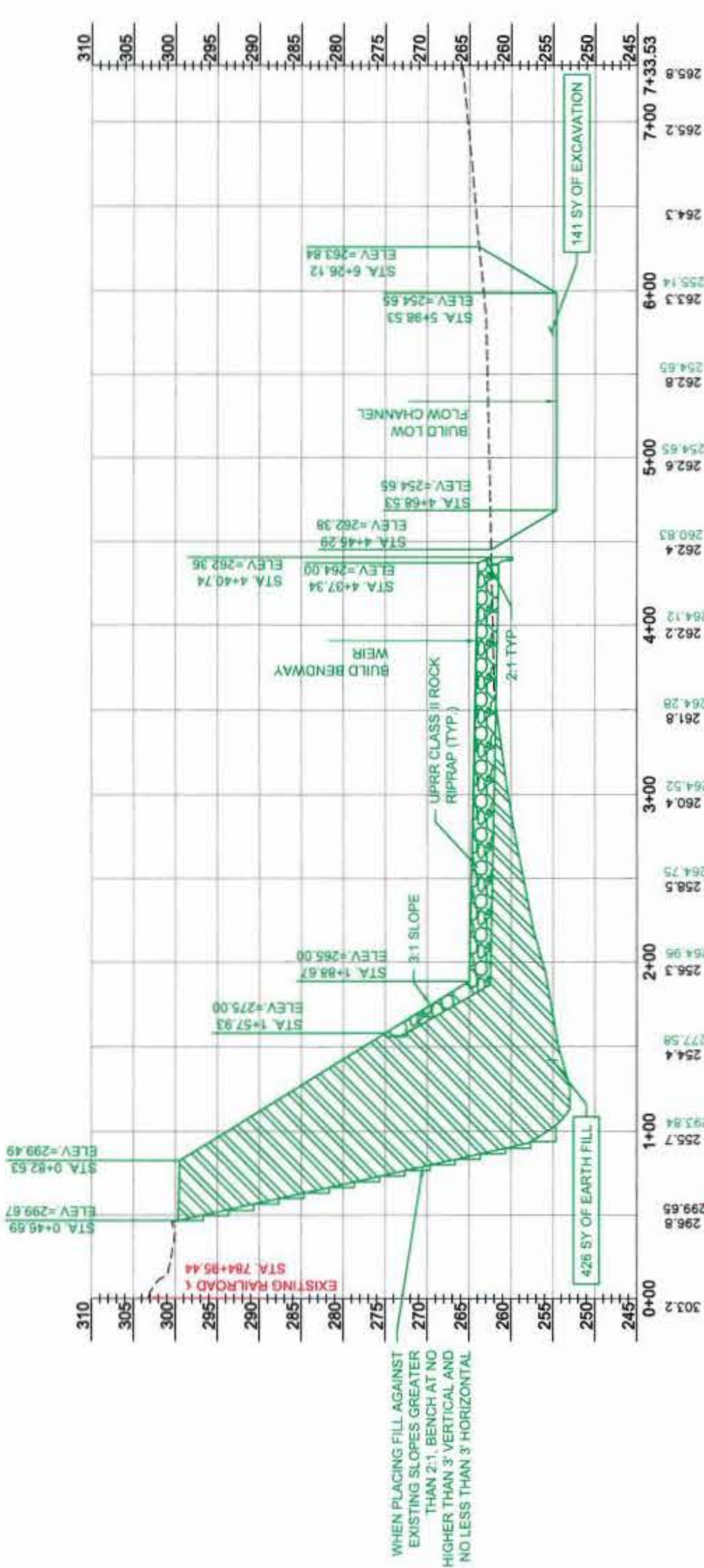
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FORT WORTH SUBDIVISION

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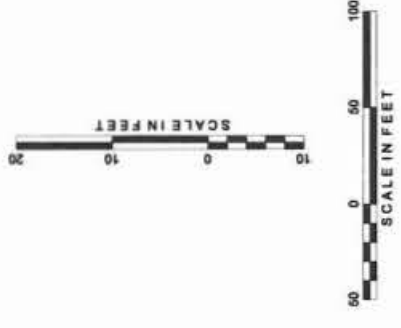
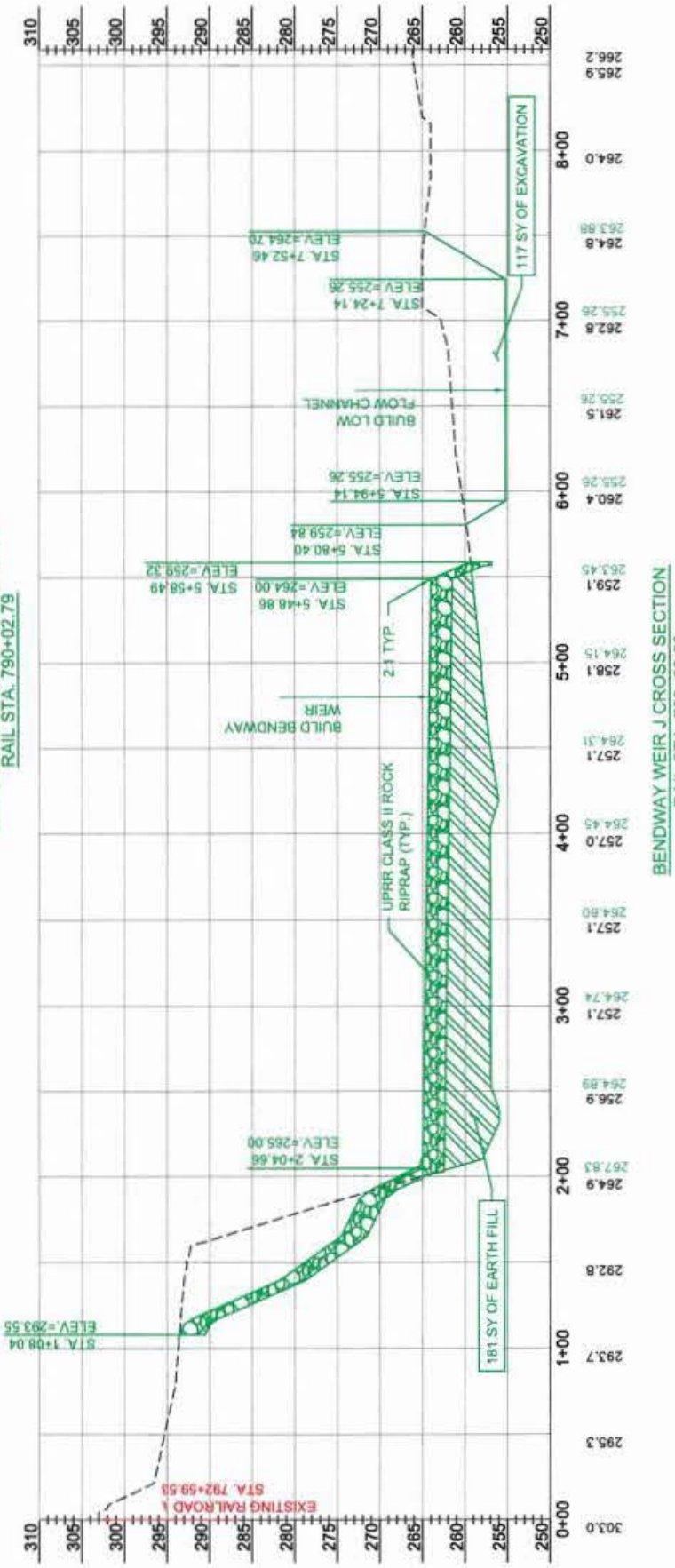
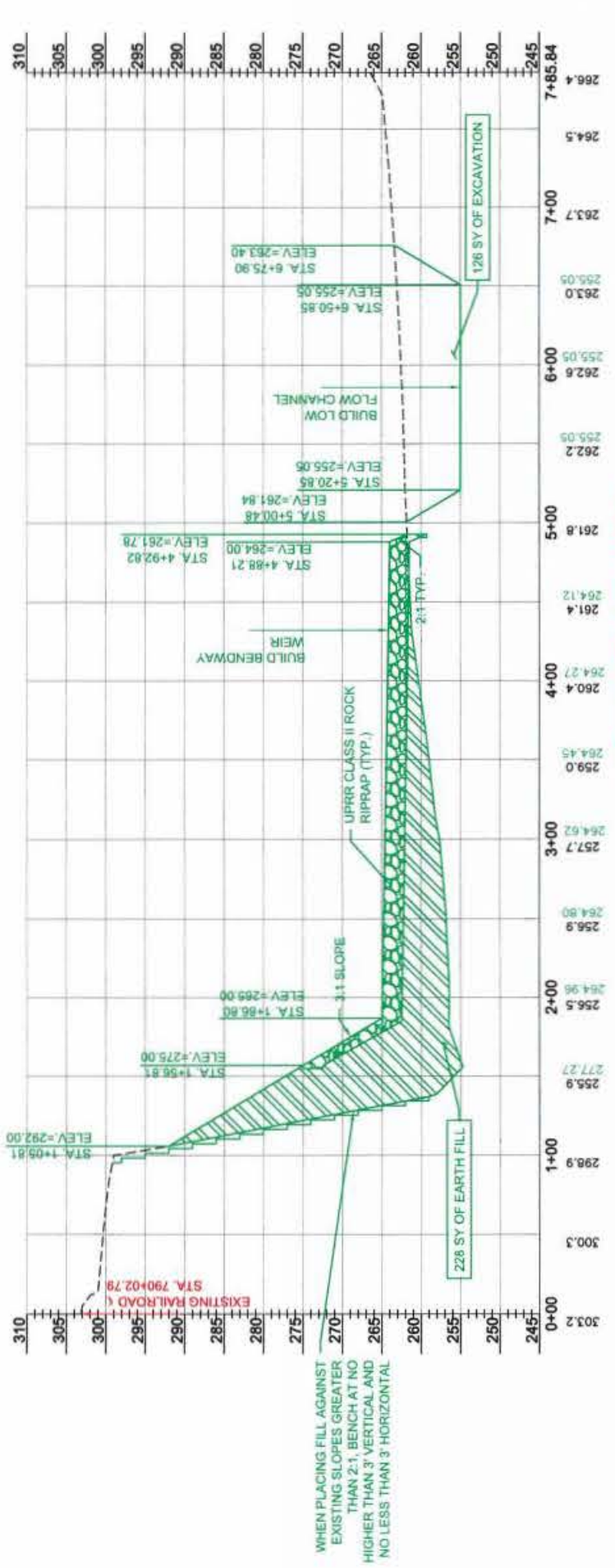
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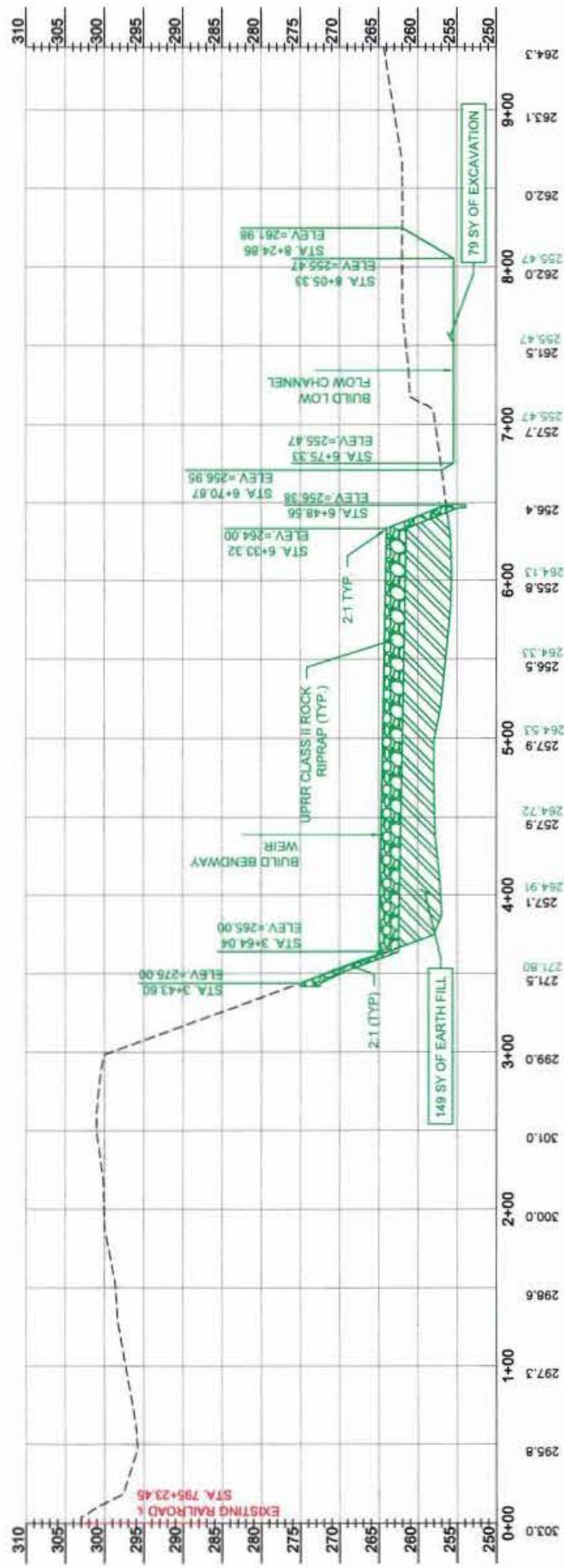
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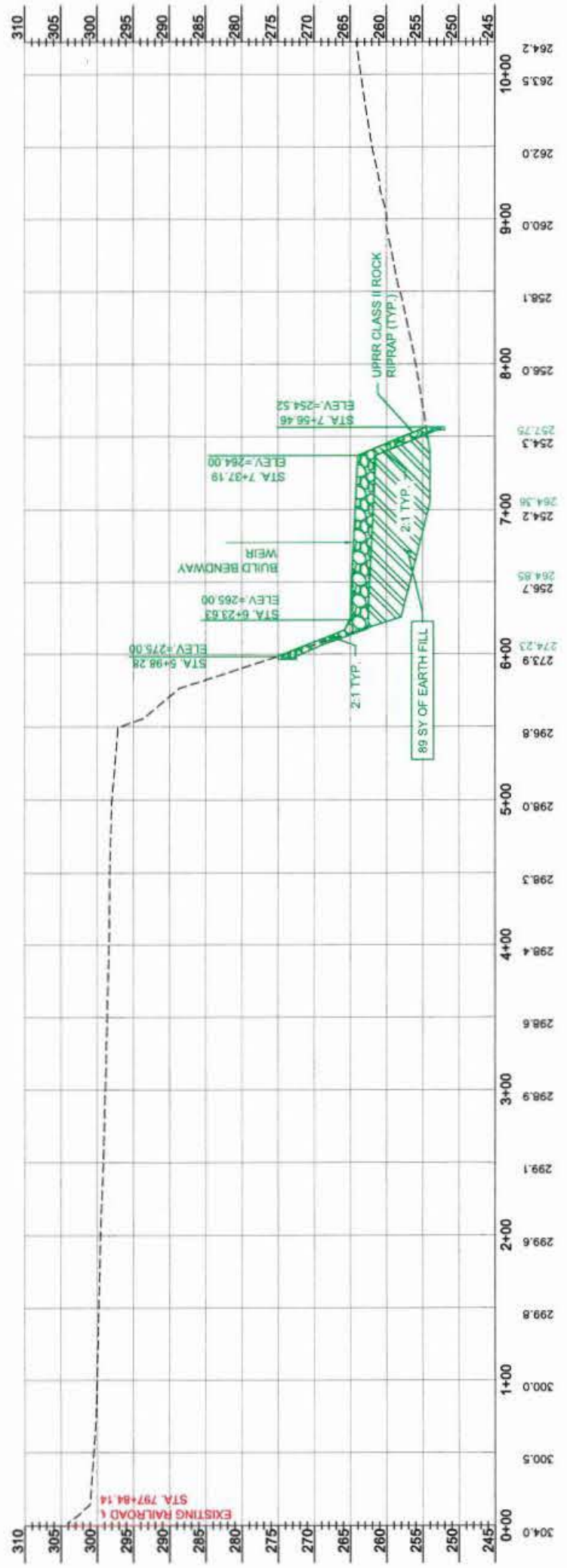
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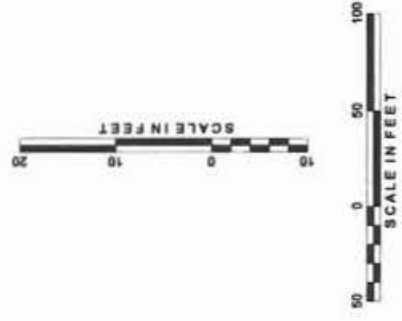
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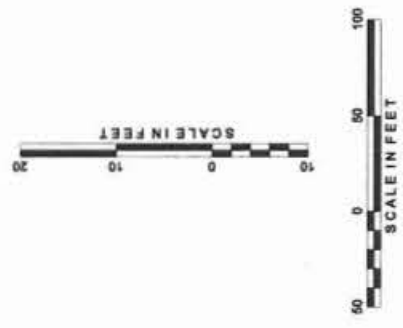
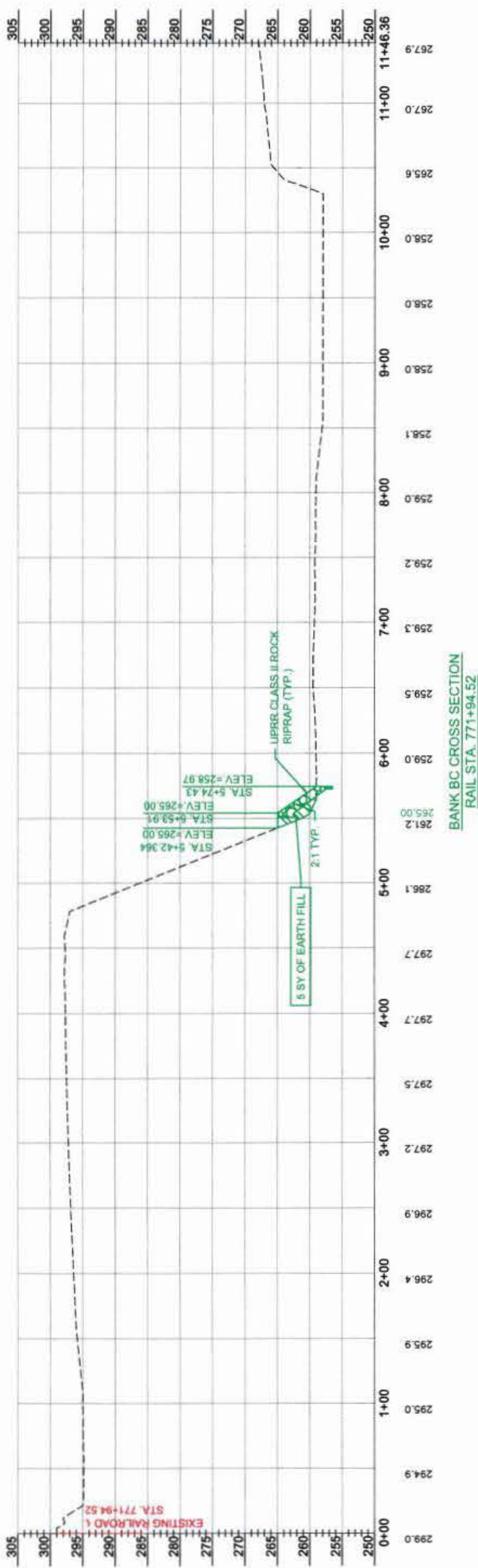
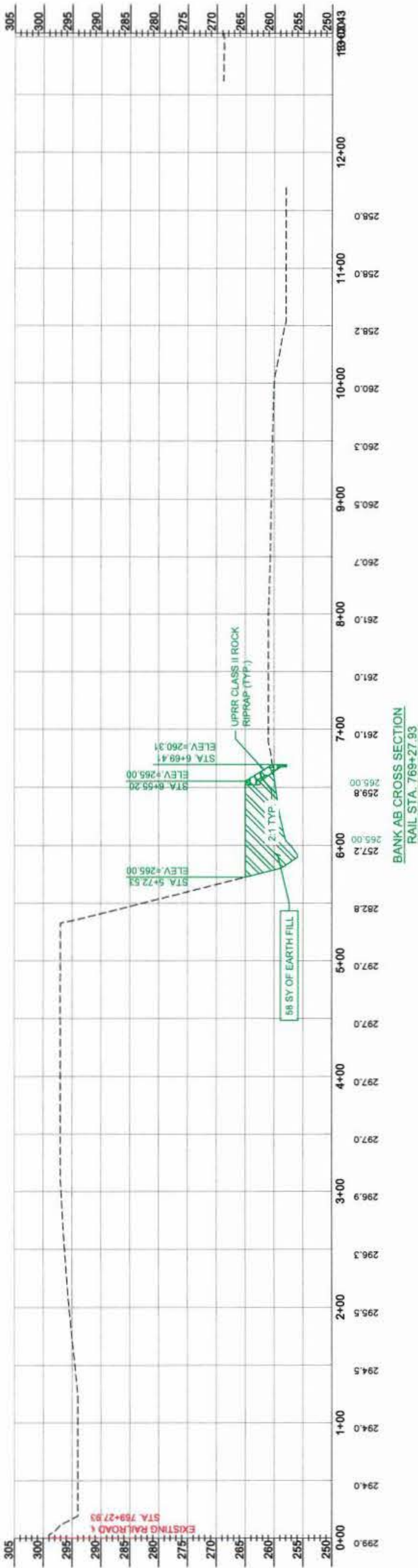
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RAIL STA. 795+23.45



BENDWAY WEIR L CROSS SECTION
RAIL STA. 797+84.14



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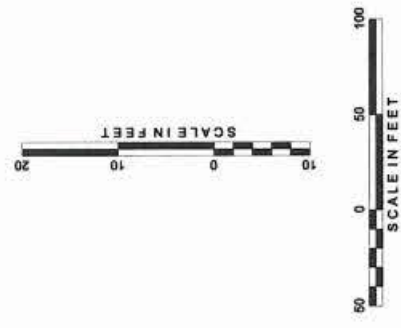
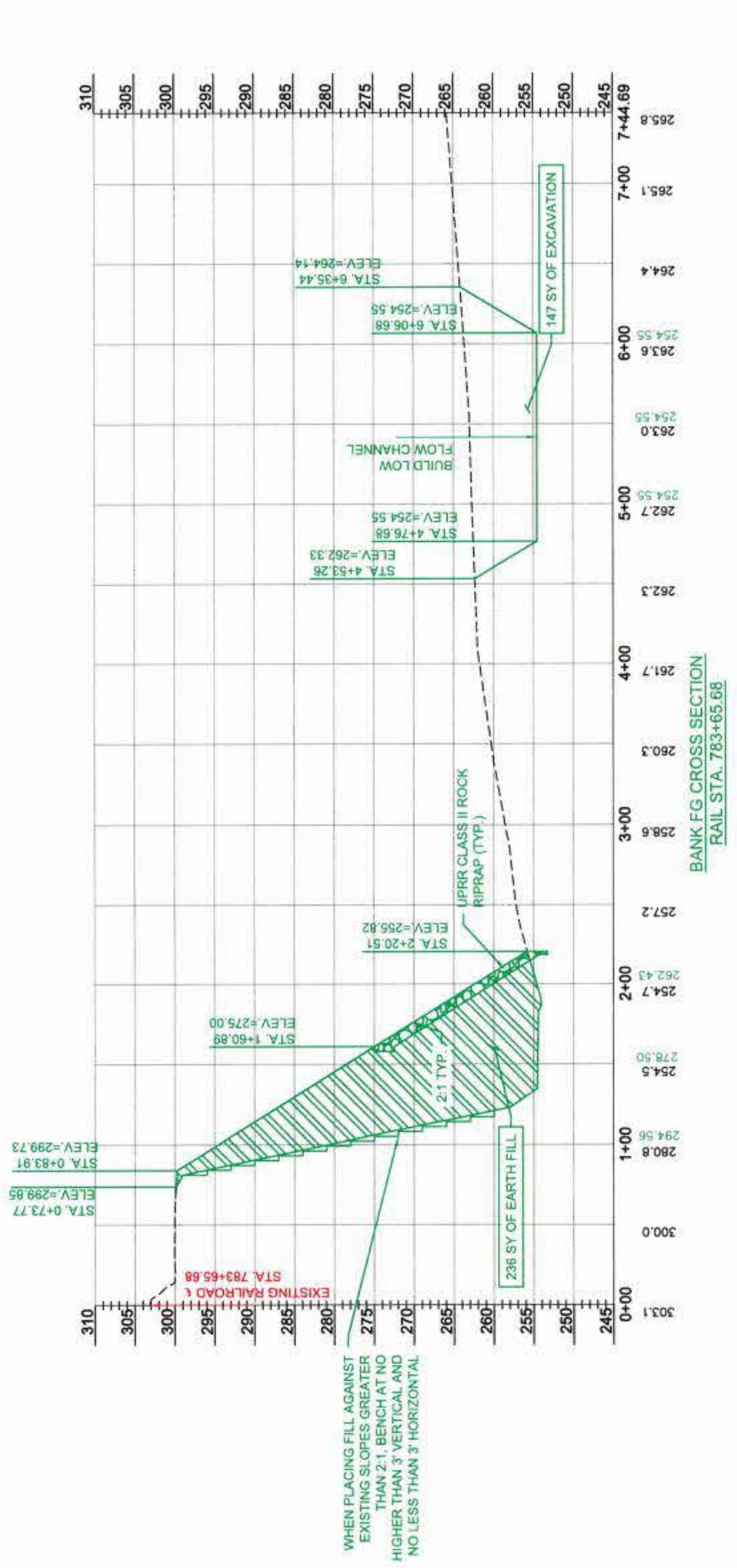
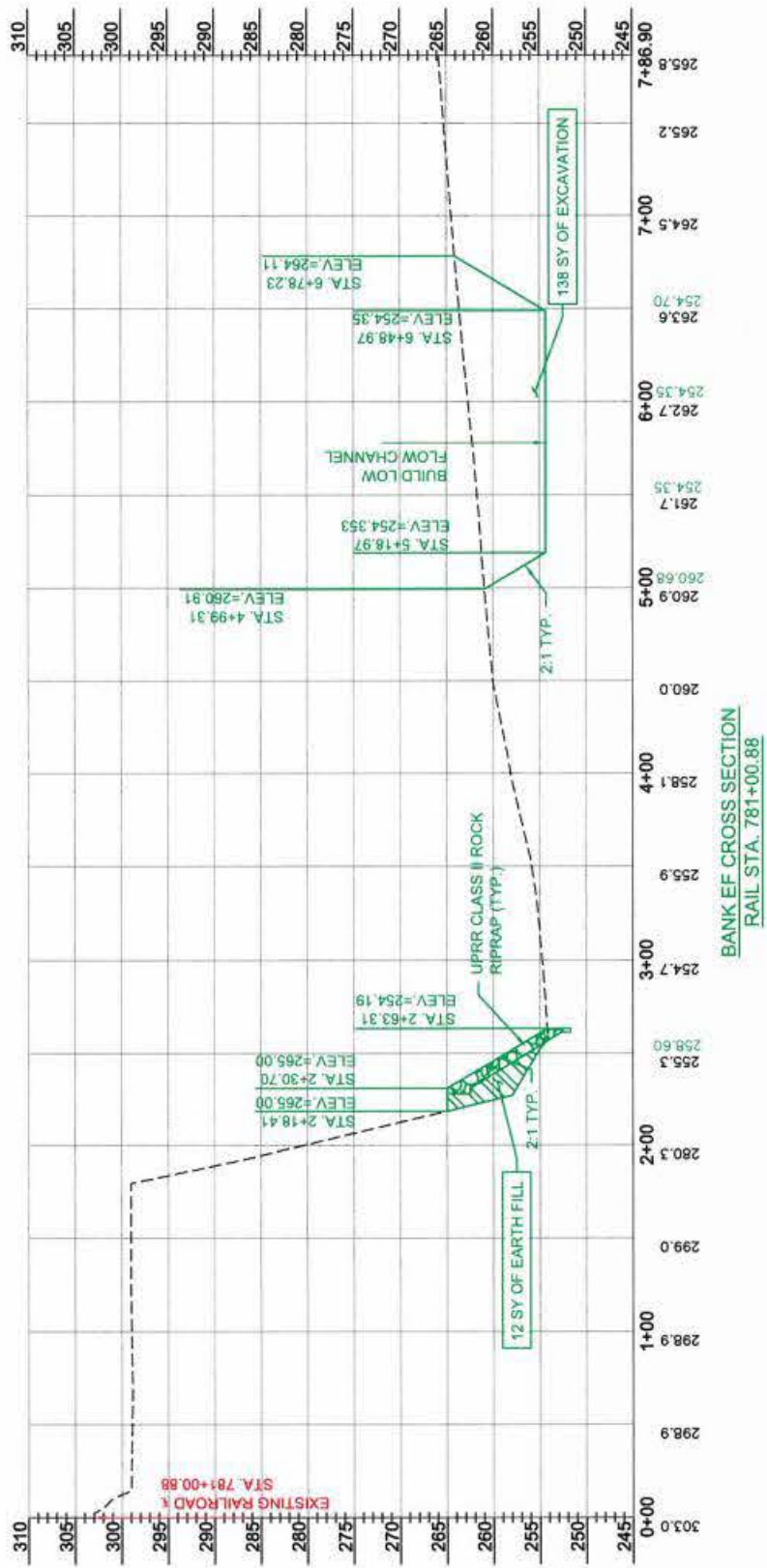
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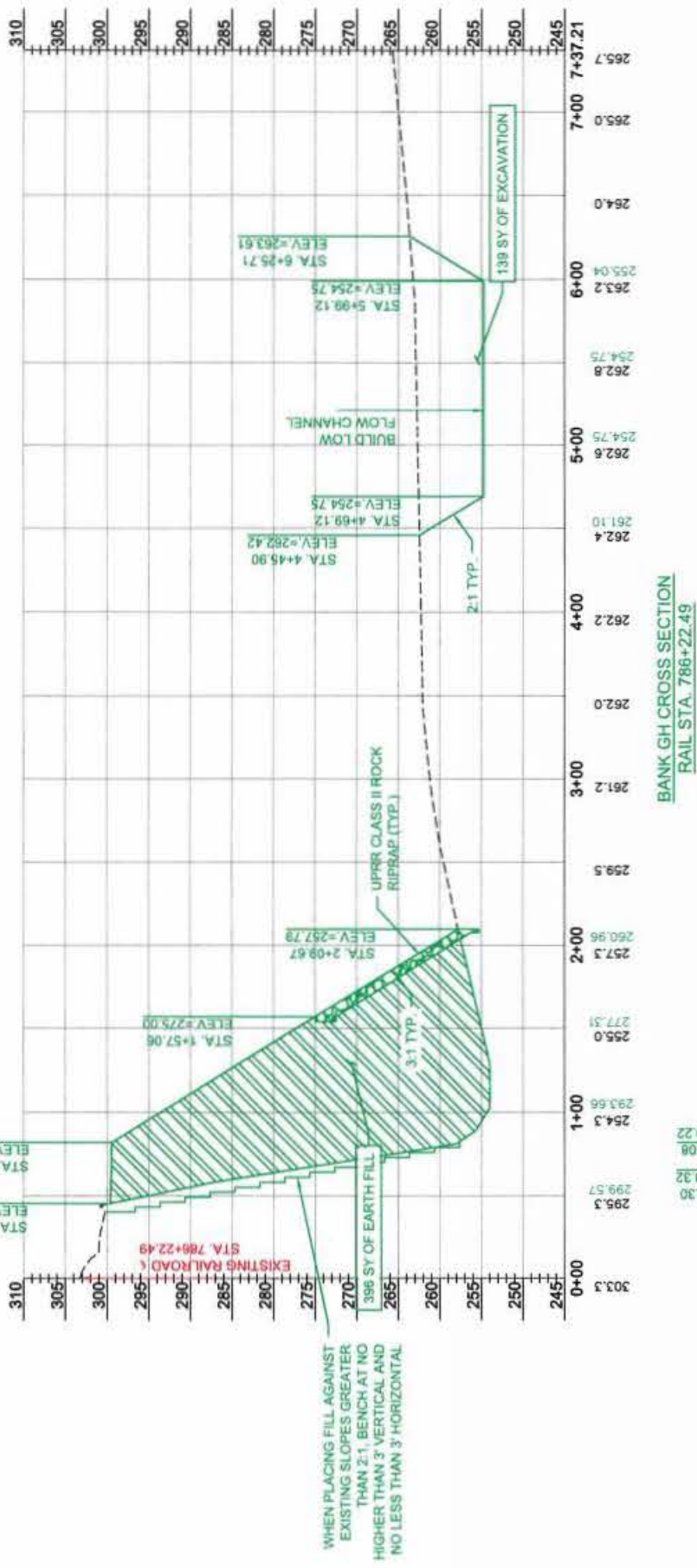
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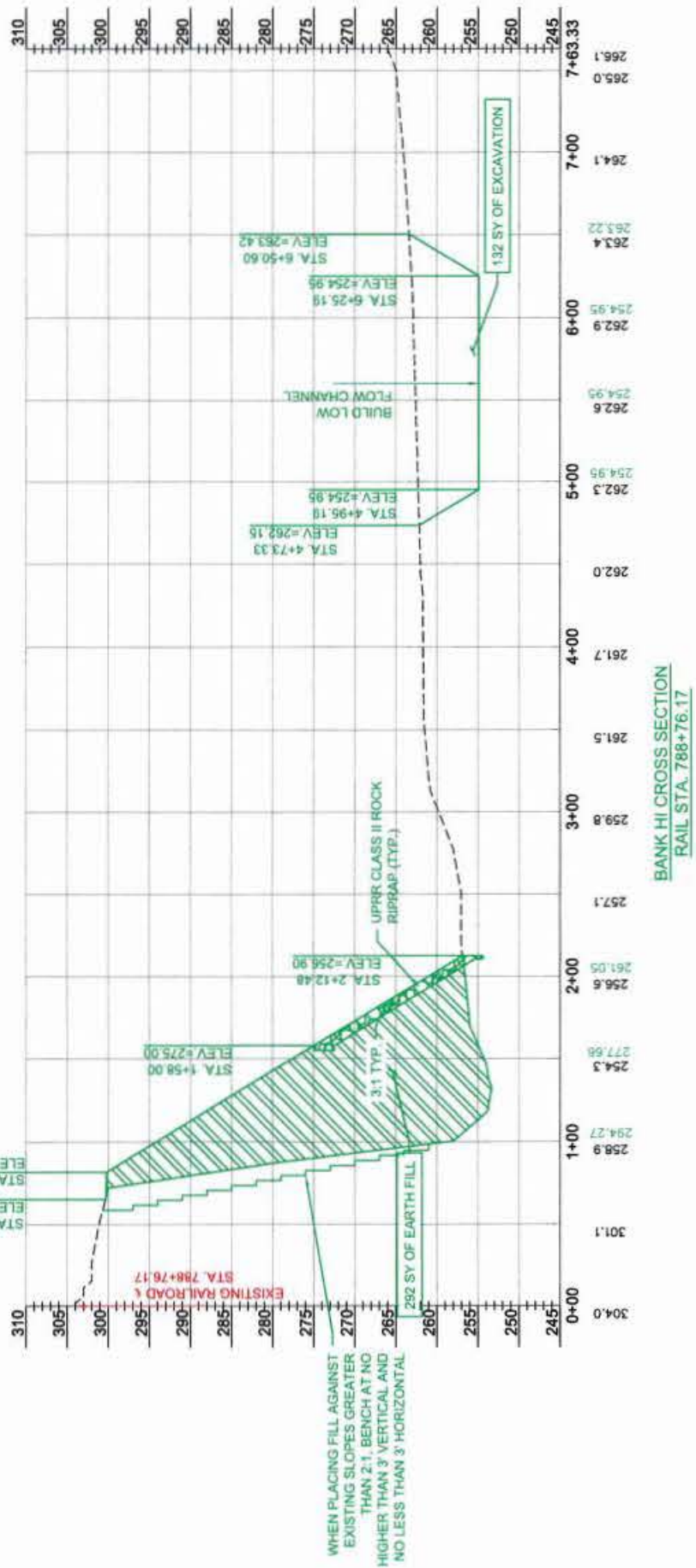
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FORT WORTH SUBDIVISION

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DATE: 11.06.2013

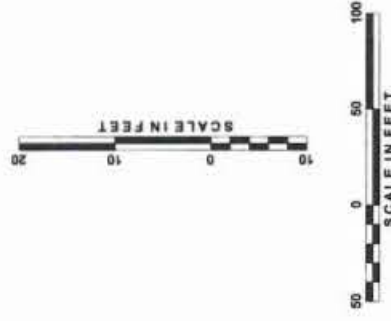
SHEET NUMBER: X011 of 014
SHEET TITLE: CROSS SECTIONS




BANK GH CROSS SECTION
RAIL STA. 786+22.49



BANK HI CROSS SECTION
RAIL STA. 788+76.17





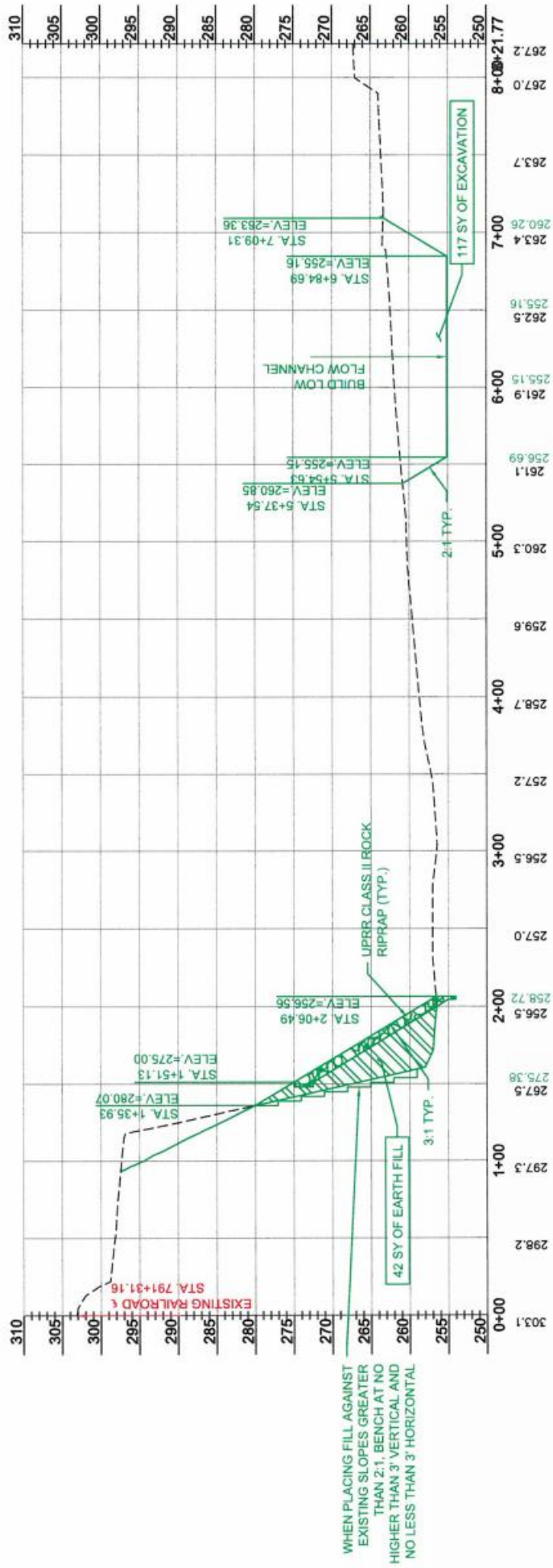
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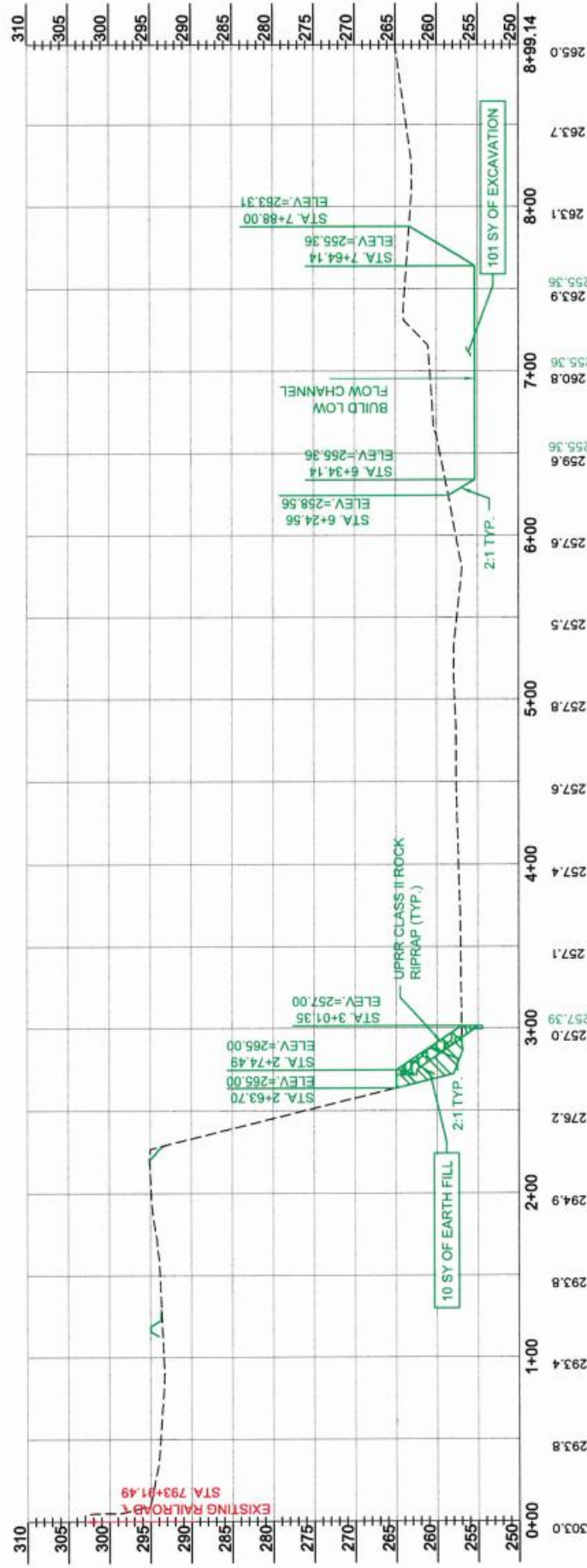
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WHEN PLACING FILL AGAINST EXISTING SLOPES GREATER THAN 2:1, BENCH AT NO HIGHER THAN 3' VERTICAL AND NO LESS THAN 3' HORIZONTAL

BANK IJ CROSS SECTION
RAIL STA. 791+31.16




BANK JK CROSS SECTION
RAIL STA. 793+91.49





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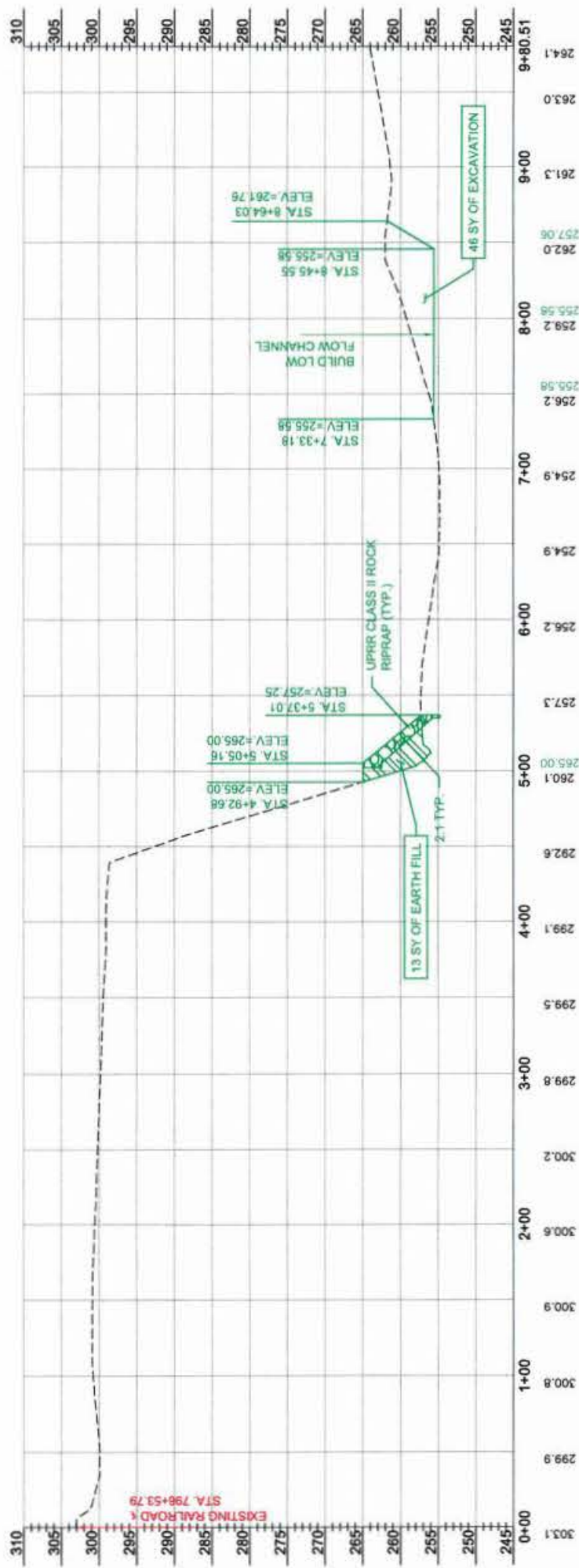


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BANK KL CROSS SECTION
RAIL STA. 796+53.79

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