FINAL
ENVIRONMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT:

CHANNEL MAINTENANCE ALTERNATIVES AT THURMAN I and II ARROYOS IN HATCH, NM, RIO GRANDE CANALIZATION PROJECT

Prepared by:

United States Section, International Boundary and Water Commission

El Paso, Texas

December 6, 2017

COVER SHEET

FINAL Environmental Assessment and Finding of No Significant Impact

Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, NM, Rio Grande Canalization Project

Lead Agency: United States Section, International Boundary and Water Commission

Preferred alternative: Sediment Basins at Thurman I and II Arroyos

Report Designation: Final Environmental Assessment (EA)

Abstract: The USIBWC is considering constructing sediment control projects at Thurman I and II, two ephemeral tributaries of the Rio Grande, located within a portion of the Rio Grande Canalization Project protective levee system in Hatch, Doña Ana County, New Mexico. The USIBWC has the statutory authority to maintain the Rio Grande (Act of June 4, 1936, 49 Stat. 1463, Public Law No. 648 and 22 United States Code 277). USIBWC commissioned a study in 2015 that recommended sediment control structures be built on Thurman I and II arroyos, among others, to trap sediment and assist in the maintenance of the Rio Grande.

The purpose is to construct sediment control structures on Thurman I and II arroyos with the following objectives:

1) Control the inflow of sediment into the Rio Grande mainstem
2) Conduct a pilot study for channel maintenance alternatives
3) Be accessible for maintenance and require little operational costs.

This Environmental Assessment evaluates potential environmental impacts of the No Action Alternative and two alternatives. The *Alternative A: No Action – Routine Sediment Excavation* does not call for any construction but would require continued routine sediment excavation at the confluence of the arroyos and the Rio Grande. *Alternative B: Mesh-Based Sediment Traps* proposes to construct mesh and rebar sediment traps where each mesh would trap progressively smaller sediment particles. *Alternative C: Sediment Basins* is the Preferred Alternative, and calls for the construction of a sediment basin at each arroyo with a concrete end wall. Permits would be required from the U.S. Army Corps of Engineers for dredge and fill of Waters of the United States, per the Clean Water Act Sections 404 and 401.

Potential impacts on natural, cultural, and other resources were evaluated. Mitigation has been proposed for permits for construction. A Finding of No Significant Impact has been prepared for the Preferred Alternative based on a review of the facts and analyses contained in the Environmental Assessment.

FINAL FINDING OF NO SIGNIFICANT IMPACT

Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, NM, Rio Grande Canalization Project

I. LEAD AGENCY: United States Section, International Boundary and Water Commission, United States and Mexico (USIBWC)

II. BACKGROUND

The Rio Grande Canalization Project (RGCP) was authorized by the Act of June 4, 1936, 49 Stat. 1463, Public Law No. 648 to facilitate compliance with the Convention concluded with Mexico on May 21, 1906, (TS 455), providing for the equitable division of waters of the Rio Grande, and to properly regulate and control the water supply for use in the two countries. The Act authorized the construction, operation, and maintenance of the project in accordance with the plan in the Engineering Report of December 14, 1935. The RGCP consists of a narrow river corridor that extends 105.4 miles along the Rio Grande, from below Percha Dam in Sierra County, New Mexico to American Dam in El Paso, Texas. A levee system for flood control extends 57 miles over the west side and 74 miles over the east side of the Rio Grande.

Sediment inflows impact various aspects of the RGCP, including preventing effective operation of dam infrastructure, decreasing the flood conveyance capacity of the RGCP, increasing flood risk to adjoining communities, threatening levee infrastructure, and decreasing the conveyance efficiency of irrigation water along the RGCP to downstream U.S. and Mexico users. The USIBWC has authorization (22 U.S.C 277) to operate and maintain any projects or works provided for in a treaty entered into with Mexico. USIBWC must maintain the RGCP channel as stipulated in 22 U.S.C 277b, which states that the USIBWC may make improvements to the RGCP, and that "such improvements may include all such works as may be needed to stabilize the Rio Grande" between Percha and American Dam.

In June 2009, the USIBWC signed the *Record of Decision for River Management Alternatives for the RGCP* (ROD), based on a 2004 Environmental Impact Statement. The ROD committed the USIBWC to continuing to implement its mission of flood control and water deliveries while implementing environmental measures in the long-term management of the river corridor, as well as updating the River Management Plan and conducting studies and investigations to evaluate channel maintenance activities. In October 2015, USIBWC contractors concluded the *Channel Maintenance Alternatives (CMAs) and Sediment Transport Study for the RGCP* (2015 CMA Study). This 2015 CMA Study analyzed sediment transport and sediment plugs in nine locations throughout the RGCP. In December 2016, USIBWC finalized the River Management Plan (RMP), including Part 4 Channel

Maintenance Plan (USIBWC 2016). The final RMP incorporated results of the 2015 CMA Study. One such recommendation is a conceptual project to construct sediment traps on several arroyos that contribute large amounts of sediment to the RGCP, including Thurman I and II arroyos. USIBWC chose to move forward with the sediment trap concept, using Thurman I and II arroyos as a pilot study for sediment control.

The need is to address sediment input into the Rio Grande, where it causes issues for flood capacity, delivery efficiencies, operations of infrastructure, and levee integrity.

The purpose of this project is to construct sediment control structures on Thurman I and II arroyos with the following objectives:

1) Control the inflow of sediment into the Rio Grande mainstem,
2) Conduct a pilot study for channel maintenance alternatives, and
3) Be accessible for maintenance and require little operational costs.

III. ALTERNATIVE ACTIONS CONSIDERED

The accompanying *Final Environmental Assessment: Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, NM, Rio Grande Canalization Project* (Thurman EA), dated December 1, 2017, evaluated potential environmental impacts of the No Action Alternative and two alternatives. The *Alternative A: No Action – Routine Sediment Excavation* does not call for any construction but would require continued routine sediment excavation at the confluence of the arroyos and the Rio Grande. *Alternative B: Mesh-Based Sediment Traps* proposes to construct mesh and rebar sediment traps where each mesh would trap progressively smaller sediment particles. *Alternative C: Sediment Basins* is the Preferred Alternative, and calls for the construction of a sediment basin with a concrete end wall at each arroyo.

IV. NEPA REGULATORY BACKGROUND

Pursuant to National Environmental Policy Act (NEPA) guidance (40 CFR 1500-1508), the President's Council on Environmental Quality issued regulations for NEPA implementation which included provisions for both the content and procedural aspects of the required NEPA documentation. The Thurman EA, which evaluated the No Action and two alternatives that meet the purpose and need, supports this Finding of No Significant Impact.

V. SUMMARY OF ENVIRONMENTAL CONSEQUENCES OF THE NO ACTION ALTERNATIVE AND ALTNERATIVE B

The No Action Alternative – Routine Sediment Excavation would require sediment excavation of the sediment that has accumulated in the river channel and the vegetation that has started growing on the sediment bar/islands. No mitigation is anticipated for this action which is covered under USIBWC's 2017 Biological Opinion and is part of USIBWC's 2016 River Management Plan. No other environmental impacts are anticipated.

The Alternative B: Mesh-Based Sediment Traps would have similar impacts from the sediment excavation of the river and vegetated sediment bars/islands, in addition to excavation of some of the floodplain. There would be some temporary impacts on noise and air pollution from construction, but these are expected to be minor. No other impacts are anticipated.

VI. SUMMARY OF ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

The Alternative C would have similar impacts from the sediment excavation of the river and vegetated sediment bars/islands, in addition to excavation of some of the floodplain. There would be some temporary impacts on noise and air pollution from construction, but these are expected to be minor. The local groundwater levels may be impacted due to the change in hydrology of the arroyo from a fast-moving ephemeral stream to a ponded stream. USIBWC would mitigate for impacts to vegetation and changes in hydrology by creating new riparian habitat, enhancing existing habitat, and creating and protecting an embayment area.

Biological Resources

No wetlands would be impacted, since no wetlands were identified in the floodplain in this stretch. Excavation of sediment basins would not impact any vegetation in the floodplain since this area is currently mowed. The proposed endwall location would be slightly upstream of the mouth of the arroyo and would minimize excavation of native vegetation. Wildlife is not anticipated to be directly impacted. This alternative also proposed to remove up to 1.71 acres of vegetation that is growing in the sandbar within the channel; effects are covered under the 2017 Biological Opinion. USIBWC would mitigate for the project, and the sediment basins could create suitable and moist conditions for riparian vegetation along the banks of the sediment basins, as proposed in the preliminary mitigation.

In addition, whenever possible, work would be planned to occur outside of the bird nesting season. If work continues into the bird breeding season the areas proposed for disturbance would be surveyed and avoidance measures followed in order to prevent the inadvertent destruction of nests or eggs.

Cultural Resources

USIBWC has extensively surveyed the RGCP for cultural resources. No cultural resources were documented in the project area. Construction from the Preferred Alternative is not expected to adversely affect known archaeological or historical resources. USIBWC would follow standard procedure and best management practices to stop construction work if any cultural resources were found during construction and conduct cultural investigations.

Water Resources

Regarding flood control, beneficial impacts are anticipated from the construction of sediment basins, which would hold sediment and prevent it from entering the river, thereby potentially reducing flood capacity and reducing impacts to levees on the opposite bank from the arroyos due to erosive forces. The sediment basin is easier to maintain than Alternative B, but will still require maintenance every several years and a placement site for accumulated sediment.

No impacts to water quality are anticipated. Construction in the Rio Grande channel would likely occur outside of irrigation season when there is little or no water in the river channel. Construction contractors would be required to have a Stormwater Pollution Prevention Plan in place. Avoidance measures and best management practices would be implemented to avoid impacts to water quality. Implementation of BMP's would reduce or eliminate erosion and downstream sedimentation and the consequential effects to water quality. Construction would follow stormwater protection permits and water quality certification requirements issued by state agencies.

Although dewatering may be required during construction of the endwalls, the impacts on local groundwater levels from dewatering are anticipated to be negligible. After construction, the sediment basins could create minor changes in local groundwater levels by ponding; this local variability would positively impact proposed mitigation areas by creating more suitable conditions.

The construction of the sediment basins requires rip rap and an endwall. USIBWC would obtain appropriate permits for 0.66 acres of fill of Waters of the U.S., and USIBWC has drafted a preliminary mitigation plan for a total of 2.1 acres, which would require review and approval of the U.S. Army Corps of Engineers.

Environmental Justice

Regarding environmental justice, no adverse impacts are anticipated. The construction of the sediment basins does not disproportionately target or affect populations of low-income or minority residents.

VII. MITIGATION AND BEST MANAGEMENT PRACTICES

USIBWC anticipates applying for an individual permit under the Clean Water Act Section 401/404 from the U.S. Army Corps of Engineers for the construction of the sediment basins. The permit would include a compensatory mitigation plan, which proposes to mitigate 2.1 acres.

The three types of mitigation USIBWC proposes are as follows:

1. Establish onsite riparian areas along each new sediment basin banks by planting native willows. The sediment basins will create moister and more feasible conditions for riparian habitat than are currently present along the stream banks by slowing and pooling water.
2. Enhance existing riparian habitat along the embayment and river banks by removing nonnative vegetation such as saltcedar and planting native willows and cottonwoods.
3. Protect the embayment created after the endwall in constructed as an aquatic habitat pool on the riverside of the endwall.

Best management practices during and after construction would include standard USIBWC measures to protect soil, vegetation, wildlife, cultural resources, water resources, and air

quality as well as to address noise pollution and trash, waste, and hazardous materials. Examples include the use of sediment barriers and soil wetting to minimize erosion and dust; to protect wildlife, construction activities would be scheduled to occur, to the extent possible, outside the March to August bird migratory season.

VIII. DECISION

Based on my review of the facts and analyses contained in the Thurman EA, I conclude that implementation of the Preferred Alternative to construct sediment basins at Thurman I and II arroyos in Hatch, NM the Rio Grande Canalization Project, would not significantly affect the quality of the human environment under the meaning of Section 102 (2) of the National Environmental Policy Act of 1969, as amended. Accordingly, requirements of the National Environmental Policy Act and regulations promulgated by the Council on Environmental Quality are fulfilled, and an environmental impact statement is not required.

Edward Drusina, P.E.
Commissioner
International Boundary and Water
Commission, United States Section

12/22/2017
Date

Final Environmental Assessment:
Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, NM, Rio Grande Canalization Project

Prepared By:

United States Section, International Boundary and Water Commission
United States and Mexico

December 6, 2017

Contents

ACRONYMS AND ABBREVIATIONS

APE	Area of potential effect
BNSF	Burlington Northern Santa Fe Railroad
CFR	Code of Federal Regulations
CEQ	Commission on Environmental Quality
CY	Cubic yard
EA	Environmental Assessment
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FEM	Field Environmental Monitor
FEMA	Federal Emergency Management Agency
MBTA	Migratory Bird Treaty Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMED	New Mexico Environment Department
NMDGF	New Mexico Department of Game and Fish
NMHPD	New Mexico Historic Preservation Division
RGCP	Rio Grande Canalization Project
ROD	Record of Decision
SEA	Supplemental Environmental Assessment
SHPO	State Historical Preservation Officer
T&E	threatened and endangered
U.S.	United States
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USIBWC	International Boundary and Water Commission, United States Section
WOUS	Waters of the United States

SECTION 1 BACKGROUND, AND PURPOSE OF/NEED FOR ACTION

1.1 SUMMARY OF PURPOSE AND NEED

Sediment input into the Rio Grande impacts flood control and water delivery infrastructure such as levees and dams. The purpose of the action analyzed in this Environmental Assessment (EA) is to:

1) Address and control sediment inflow from Thurman I and II arroyos (Figures 1-2 and 1-3) into the Rio Grande main stem,
2) Conduct a pilot study for channel maintenance alternatives that could be replicated in other areas, and
3) Facilitate maintenance of the Rio Grande sediment input and minimize operational costs within the Rio Grande Canalization Project.

The Purpose and Need is discussed further in Section 1.6 after several sections of background information related to the project.

1.2 BACKGROUND OF THE RIO GRANDE CANALIZATION PROJECT

The Rio Grande Canalization Project (RGCP) consists of a narrow river corridor that extends 105.4 miles along the Rio Grande, from below Percha Dam in Sierra County, New Mexico to American Dam in El Paso, Texas (Figure 1-1). A levee system for flood control extends 57 miles over the west side and 74 miles over the east side of the Rio Grande (USIBWC 2004b).

The RGCP was authorized by the Act of June 4, 1936, 49 Stat. 1463, Public Law No. 648 to a) facilitate compliance with the Convention concluded with Mexico on May 21, 1906 (TS 455) providing for the equitable division of waters of the Rio Grande, and b) properly regulate and control the water supply for use in the two countries. The Act authorized the International Boundary and Water Commission, United States Section (USIBWC) to construct, operate, and maintain the RGCP in accordance with the plan in the Engineering Report of December 14, 1935, which covers the following engineering works to implement the 1906 Convention:

1) construction of American Dam and Canal,
2) the acquisition of the right of way for the river channel and adjoining floodways,
3) improvement of the alignment and efficiency of the river channel conveyance of deliveries to Mexico, pursuant to the 1906 Convention, as well as conveyance of deliveries to the United States Bureau of Reclamation (USBR) Rio Grande Project in the Mesilla and Rincon valleys of New Mexico and the El Paso valley of Texas,
4) protection against a flow equal to the largest flood of record in this reach (USIBWC 1994; IBC 1935), specifically “a channel designed to carry the ordinary flows of the river, and a flood channel, to be defined by adequate and proper levees, designed to carry the estimated maximum flood flows”(IBC 1935), and
5) operation and maintenance of the RGCP, specifically “in order to prevent meandering of the controlled flow, it is proposed to perform the excavation by suction dredges, discharges the

excavated material in such areas" (IBC 1935).

1.3 SEDIMENT ACCUMULATION IN RGCP

Sediment inflows impact various aspects of the RGCP. For example, sediment deposits:

- decrease the flood conveyance capacity of the RGCP and increase flood risk to adjoining communities (USACE 1996; USIBWC 2004b; USIBWC 2015);
- decrease the conveyance efficiency of irrigation water along the RGCP to downstream U.S. stakeholders such as the Elephant Butte Irrigation District (EBID) and El Paso County Water Improvement District No. 1 (EPCWID No. 1), and Mexico (Riada 2009; USIBWC 2015);
- may be responsible for increased seepage of irrigation water released from the upstream Caballo reservoir into the underlying aquifer resulting in decreased surface flow available downstream, particularly in drier years (USIBWC 2013);
- create sediment blockage of irrigation return flows which increases landside ground water table elevations, resulting in increased salinity for farming operations;
- threaten floodplain and levee infrastructure (such as on the opposite banks from incoming arroyos, where sediment deposits at arroyo mouths cause the river's flowpath to change around sediment deposits, eroding the opposite bank and potentially threatening the integrity of the levee opposite the arroyo via underseepage and erosion) (USIBWC 2016);
- create islands which exacerbate the above issues (Riada 2009); and
- accumulate at flood control and water delivery infrastructure, such as Mesilla and American Dams, preventing efficient and effective operation of the infrastructure (USIBWC 2004b).

1.4 CHANNEL MAINTENANCE OF THE RGCP

The USIBWC has authorization (22 U.S.C 277) to operate and maintain any projects or works provided for in a treaty entered into with Mexico. USIBWC must maintain the RGCP channel as stipulated in 22 U.S.C 277b, which states that the USIBWC may make improvements to the RGCP, and that "such improvements may include all such works as may be needed to stabilize the Rio Grande" between Percha and American Dam.

Since the RGCP was completed in the 1940s, the USIBWC has conducted channel maintenance activities as part of its statutory requirements to ensure efficient deliveries and to contain and convey flood flows. The USIBWC's routine channel maintenance activities conducted in the RGCP prior to 2009 included dredging or excavating along the RGCP to control sediment below dam structures; stabilizing banks; removing obstructions such as debris, sediment plugs, or gravel deposits; and maintaining arroyos that act as flood conveyance. The volumes of sediment removed from the channel and tributaries each year has varied widely. Prior to 1990, between 40,000 and 450,000 cubic yards (CY) of sediment were removed from the main channel each year to maintain normal and flood flow capacities (USIBWC 2000). Quantities after 1990 also varied highly, but ranged from 20,000 to 235,000 CY.

In 2004, the USIBWC published the final *Environmental Impact Statement (EIS) for River Management Alternatives for the Rio Grande Canalization Project* in August 2004 (USIBWC 2004b), which evaluated options for long-term management of the river corridor, including habitat restoration, vegetation management, channel maintenance, and flood control improvements. The Record of Decision (ROD) was signed in June 2009 by USIBWC Commissioner Bill Ruth. (USIBWC 2009). The ROD committed the USIBWC to continuing to implement its mission of flood control and water deliveries while implementing environmental measures in the long-term management of the river corridor. The 2009 ROD required the USIBWC to improve river management by updating the river management plan; establishing a data collection and evaluation program for channel maintenance; updating and evaluating river cross section data every four to five years and updating hydraulic models; conducting studies and investigations to evaluate channel maintenance activities and levee protection; investigate the overall necessity of channel dredging through monitoring and modeling; implementing restoration sites in the floodplain; conducting in-channel enhancements at arroyos and an inset floodplain; and using adaptive management strategies.

From 2009 to 2013, after the signing of the ROD, USIBWC stopped almost all channel maintenance with the exception of sediment excavation at the gates of American Dam. Lack of channel maintenance and low flows caused by drought conditions led to numerous sediment plugs and issues that required the USIBWC's attention. In December of 2013, USIBWC drafted a preliminary working draft of this Channel Maintenance Plan. Per the ROD, the USIBWC worked with irrigation districts and stakeholders on the channel maintenance plan from 2013 to 2016, during which time USIBWC used the preliminary working draft for channel maintenance implementation. In December 2016, USIBWC finalized the River Management Plan, including Part 4 Channel Maintenance Plan (USIBWC 2016). The final plan incorporated results of studies discussed in the next section.

1.5 PREVIOUS STUDIES FOR CHANNEL MAINTENANCE

In 1996, the USACE conducted a detailed hydrologic, hydraulic and sediment analysis of the RGCP. This study included HEC-1 modeling for the approximately 900-square mile drainage area. A HEC-2 hydraulic model computed water surface profiles. Using the Modified Universal Soil Loss Equation (MUSLE) to estimate the wash load and the HEC-6 sediment transport model for the bed load, the total sediment load was obtained for 20 arroyo basins along the RGCP for the 2-, 5-, 10-, 25-, 50- and 100-year storm events and the average annual storm (USACE 1996).

In 2003, Parsons created a HEC-RAS model for the Environmental Impact Statement (Parsons 2004b). In October 2005, the report study Upper Rio Grande Water Operations Model FLO-2D Model Development Below Caballo Dam (URGWOM) was prepared for the USIBWC and USACE using FLO-2D Model Development (USACE 2005). This model evaluated and updated the 1996 HEC-1 model as well as the 2003 Parsons HEC-RAS model. The 100-year floodplains were mapped based on FLO-2D simulations. This 2005 study also evaluated the 1996 sediment studies and recommended adjustment factors.

A 2009 study (Riada Engineering, Inc. 2009) determined that channel maintenance activities to

remove individual sediment plugs and islands have minimal impact on the flood maximum water surface elevations and irrigation in terms of volume and arrival of the irrigation releases. In addition, the study found that the lifespan of such expensive maintenance activities is relatively short (ranging from months to 1.7 years). However, the same study also stated that the cumulative effect of the formation of islands and sediment plugs in the channel can be more pronounced than the impact of individual islands and plugs. In response to a general 100-year storm over the entire basin where all of the arroyos create sediment plugs simultaneously in the channel, the maximum flood water surface can increase up to two feet in specific locations. The same study also showed that flood water surface elevations could increase up to two feet in specific locations as a result of sediment buildup (Riada Engineering, Inc. 2009).

Similarly, the 2007 USACE study stated that "the profile and sediment continuity data suggest that there may be more hydraulic capacity in the RGCP than was initially designed, and extensive removal of sediment from the river may, therefore, not be necessary to maintain conveyance capacity, at least in portions of the reach" (USACE 2007, p 6.18).

Similarly, the 2007 USACE study stated that "the profile and sediment continuity data suggest that there may be more hydraulic capacity in the RGCP than was initially designed, and extensive removal of sediment from the river may, therefore, not be necessary to maintain conveyance capacity, at least in portions of the reach" (USACE 2007, p 6.18).

It must be noted that previous studies have assumed a dynamic equilibrium of sediment inflow and outflow along the RGCP. However, individual storm events can bring in more sediment from the tributary arroyos that, in the absence of efficient transport downstream and removal, will accumulate within the RGCP. Under flooding conditions, the resulting water surface elevation increase will compromise levee freeboard and increase the risk of flooding to adjoining communities. USIBWC verified this in 2013 using HEC-RAS modeling at the Montoya Drain outfall location.

The USACE 2007 report also indicated that sediment delivery events "have significant local impacts on the mainstem Rio Grande, primarily in the portions of the RGCP upstream from Selden Canyon" where channel blockage occurs by coarse-grains tributary fans, causing upstream backwater, overbank flows, and flow conveyance losses. In addition, the sediment may damage existing bank protection or lead to lateral migration of the river, both causing "potential threats to the integrity of the levee system or other channel margin infrastructure such as bridges and siphons" (USACE 2007, p 6.9).

In 2009, the USACE analyzed the restoration potential at 30 restorations sites using the 2007 model (USACE 2009). The study included a sediment continuity analysis to evaluate the potential for aggradation and degradation for reservoir operations. A cumulative effects analysis was performed to evaluate the effects of all proposed restoration activities on water surface elevations, flood wave attenuation and timing, channel stability and other factors (Unnikrishna 2012). In 2013, URS developed a smaller 50-foot grid FLO-2D model for eleven (11) arroyos contributing from the east in the Vinton Bridge to Borderland Bridge reach. Arroyo flows were calculated using a HEC-HMS model. The results were used to design approximately six (6) miles of levee improvement projects

in the Canutillo, Texas area (URS 2013).

In 2013, Tetra Tech completed a Preliminary Water Budget Study that determined the extent to which the amount of Rio Grande Project water would be available for diversion to US irrigators and for delivery to Mexico under different release scenarios compared to the actual 2012 release. Hypothetical normal release (end March to mid September) and delayed release (end May to mid September) scenarios were explored (USIBWC 2013). Part of this work was to update the 2007 FLO-2D and HEC-RAS models to estimate the 2012 seepage.

Under irrigation flow conditions, hydraulic modeling studies have indicated increased seepage in the ongoing drought years as compared to the previous normal flow years (USIBWC 2013). Seepage will increase further with the accumulation of sediment in the main channel, reducing the efficiency of irrigation water deliveries during a time of water shortage.

Therefore, accumulation of sediment has an adverse localized impact during both high flow and low flow conditions. The ROD contemplated addressing some channel maintenance issues with new approaches and adaptive management. Although the ROD listed the cessation of dredging as a channel restoration approach, it did not rule out dredging and pre-ROD maintenance activities altogether. The ROD listed channel management and maintenance activities, including dredging, island removal, arroyo realignment and arroyo mouth management, along with other more non-traditional activities such as bank destabilization.

From September 2014 to October 2015, USIBWC contractors conducted a *Channel Maintenance Alternatives (CMAs) and Sediment Transport Study for the RGCP* (henceforth referred to as the "2015 CMA Study" (USIBWC 2015).

The 2015 CMA Study is discussed in more detail in the following section.

1.6 2015 CHANNEL MAINTENANCE ALTERNATIVES AND SEDIMENT TRANSPORT STUDY

In September 2014, the USIBWC contracted Tetra Tech to undertake the Channel Maintenance Alternatives and Sediment Transport Study to evaluate sedimentation issues along the RGCP at nine representative problem locations, listed in Table 4-5. Objectives of the study included:

- Update the base HEC-RAS model with additional components such as the latest levee; information and changed site conditions, updated cross section survey data, and 2011 LIDAR data;
- Conduct additional hydraulic modeling to provide quantitative measures to support the stated goals of the ROD;
- Conduct sediment transport analyses to study sediment aggradation/degradation along the RGCP under normal operations and in response to storm events to obtain and understanding of required operations and maintenance consistent with the ROD;
- Analyze impacts of sediment plugs on water surface elevations at particular locations;

- Analyze impacts of channel maintenance, such as island removal and sediment excavation, and other representative site-specific characteristics such as an existing vortex weir, dams, islands, arroyos, and drains;
- Propose and analyze alternatives to sediment removal;
- Evaluate sediment removal and non-sediment removal channel maintenance options using a set of evaluation criteria; and
- Recommend the top scoring channel maintenance alternatives for implementation at each of the nine representative problem locations.

The 2015 CMA Study analyzed sediment transport and aggradation/degradation of the river, and the study concurred with the previous studies regarding predicted and observed aggradation and degradation patterns. The study did indicate that localized sediment buildup was an issue and that addressing the sedimentation would result in lower predicted water surface elevations (Tetra Tech 2015). Figure 4-2 compares the Pre-Canalization, 1943 design and 2004 thalweg profiles of the RGCP, as well as the changes in elevation between the Pre-Canalization and 1943 profiles (green line) and between the 1943 profile and the 2004 profile (red line). The study documented the following aggradation and degradation in the RGCP since 1943:

- From Percha Dam to the Hatch Siphon - historically degraded between 4 and 6 feet
- From the Hatch Siphon to the head of Selden Canyon - Immediately downstream of the Hatch Siphon, the channel has historically degraded about 10 feet. For the remainder of the upper part of the subreach, the degradation reduces from about 6 feet in the upstream end to about 1 foot upstream of the Rincon Siphon. Downstream of the Rincon Siphon, there has been about 9 feet of degradation, but the degradation diminishes in the downstream direction to about 2 feet. Upstream of Bignell Arroyo there has been about 2 feet of aggradation
- From the head of Selden Canyon to Leasburg Diversion Dam - There are no comparative thalweg data for this subreach, but under low-flow conditions the bed of the channel is braided and appears to be mildly aggradational.
- From Picacho Bridge to the Mesilla Diversion Dam - 2 to 3 feet of historical degradation
- from the Mesilla Diversion Dam to the Vinton Bridge - up to 8 feet of historical degradation downstream of the Mesilla Diversion Dam, but the amount of degradation diminishes in the downstream direction to about 1 foot
- from the Vinton Bridge to the American Diversion Dam - up to 2 feet of aggradation

Results from the study are documented in the October 2015 final report (Tetra Tech 2015) and provide a suite of alternatives to reduce or minimize sediment issues. The report identified the most efficient, sustainable, and environmentally beneficial alternatives, both sediment removal and non-removal. The study evaluated five channel maintenance alternatives (CMAs) at each of the nine problem locations, including three classified as sediment removal alternatives (short, long, and localized excavation scenarios) and two that were classified as non-sediment removal alternatives and varied by problem location. The study included field reconnaissance, cross section surveying,

steady-state hydraulic modeling of the existing conditions and with CMAs, sediment transport modeling of the problem locations, and evaluation of CMAs.
Non-sediment removal CMAs considered under the study included:

- Vortex weir
- Arroyo sediment traps
- Island destabilization/ vegetation removal
- Siphon modifications
- Low-elevation spur dikes
- Dam gate automation
- Sluiceway and check structures
- Rip rap

Alternatives were evaluated using the following criteria:

- reduction in water-surface elevation along the modeled reach,
- reduced levee freeboard encroachments,
- groundwater benefits, which include the benefit of increased groundwater levels in the vicinity of restoration sites as well as reduced groundwater levels elsewhere, particularly at drains,
- reduction in aggradation and downstream sediment loading,
- improved irrigation drain return flows,
- durability of the alternative,
- restoration benefits, in addition to benefits associated with increased groundwater levels, and
- additional site-specific benefits.

The costs and consequences considered in assessing the alternatives included:

- annualized total cost of the alternative based on the up-front construction cost and projected O&M costs,
- increases to water-surface elevation along the modeled reach,
- levee freeboard encroachments,
- groundwater consequences, which include the consequence of decreased groundwater levels in the vicinity of restoration sites as well as increased groundwater levels elsewhere,
- increases to aggradation and downstream sediment loading,
- increased bank erosion potential,
- restoration consequences, in addition to those consequences associated with increased groundwater levels, and
- additional site-specific consequences.

Table 1-1 Problem Areas evaluated in the 2015 CMA study				
Problem Location		Representation	River Mile Range (miles upstream of American Dam)	Length (miles)
1.	Tierra Blanca Creek to Sibley Arroyo	Vortex Weir	97.8 - 100.1	2.3
2.	Salem Bridge to Placitas Arroyo	Arroyos and Islands	84.4 - 88.2	3.8
3.	Rincon Siphon A Restoration Site to Rincon Siphon	Restoration Sites and Siphon	82 - 82.8	0.8
4.	Rincon Arroyo to Bignell Arroyo	Arroyos and Islands	75.5 - 79	3.5
5.	Rock Canyon to 1.4 mi below Rincon/Tonuco Drain Confluence	Drain and Mouth of Selden Canyon	68.9 - 71.8	2.9
6.	Picacho Drain to below Mesilla Dam	Drain, Canals, and Dam	38.8 - 41.2	2.4
7.	East Drain to below Vinton Bridge	Drain and Arroyo	14.8 - 16.6	1.8
8.	Upstream of Country Club Bridge to NeMexas Siphon	No Inputs, Bridge, Populated Area, Levee Encroachments	7.1 - 8.6	1.5
9.	Montoya Drain to American Dam	Drain, Dam	0 - 2.7	2.7

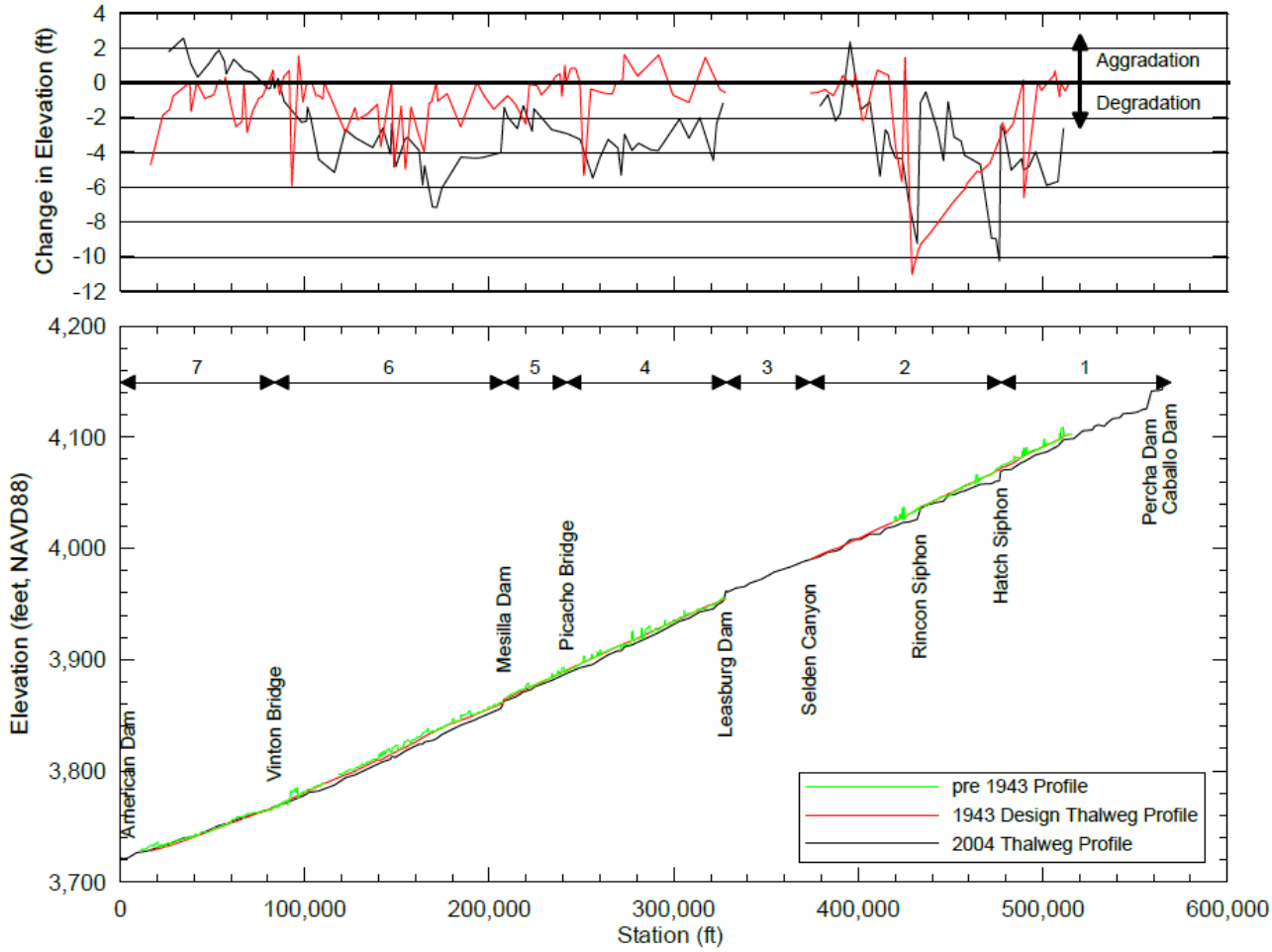

Figure 1-1. Pre-Canalization, 1943 design and 2004 thalweg profiles of the RGCP. (From 2015 CMA Study Fig 2)

1.7 PURPOSE AND NEED

The 2015 CMA Study recommended arroyo sediment traps be constructed on a number of arroyos in the north part of the RGCP (Tierra Blanca, Sibley, Placitas, Garcia, Canutillo area) as a means to control the sediment input and an alternative to excavating sediment from the main channel of the river. USIBWC evaluated the conceptual plans for proposed sediment traps and based on a number of factors, including small scale and feasibility, USIBWC selected the Thurman I and II Arroyos to implement pilot projects for channel maintenance alternatives. Out of the recommended arroyo traps, Thurman I and II arroyos generated the smallest sediment yield (3,194 cubic yards (CY) (USACE 2007; USIBWC 2015)). Construction was deemed feasible because these were within USIBWC property, were not impacted by future USIBWC levee improvement projects, and preliminary review showed no anticipated impacts to endangered species. The USIBWC prepared this EA to analyze environmental impacts for these pilot projects at Thurman I and II Arroyos.

The purpose of the action is to:

4) Address and control sediment inflow from Thurman I and II arroyos into the Rio Grande main stem,
5) Conduct a pilot study for channel maintenance alternatives that could be replicated in other areas, and
6) Facilitate maintenance of the Rio Grande sediment input and minimize operational costs.

1.8 PROJECT AREA

The Project Area covered under this EA is the immediate vicinity of Thurman I and II Arroyos in Hatch, New Mexico. Figure 1-2 shows the vicinity, and Figure 1-3 shows the Project Area.

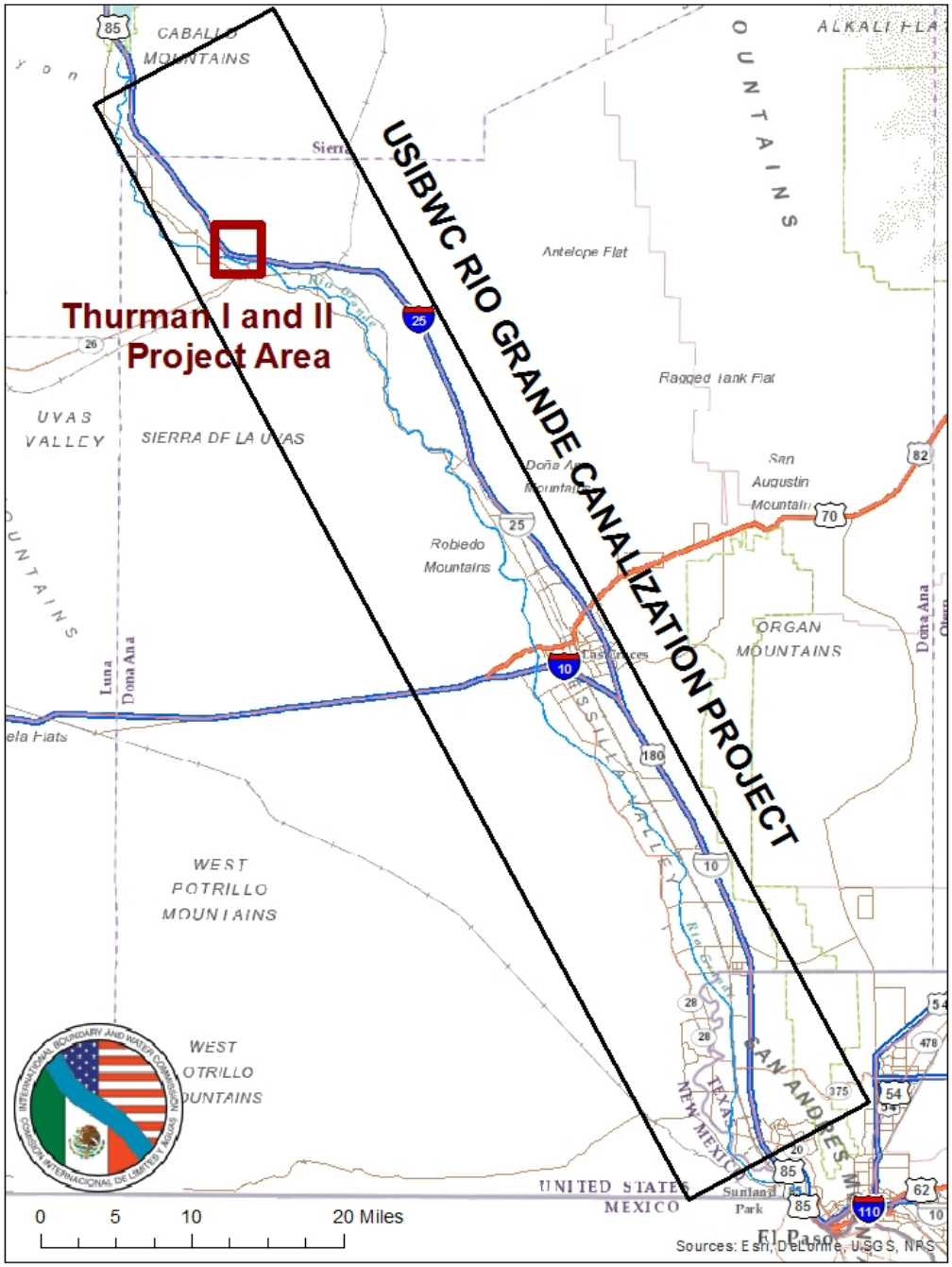

Figure 1-2 Vicinity Map of the Rio Grande Canalization Project and the Thurman I and II Project Area

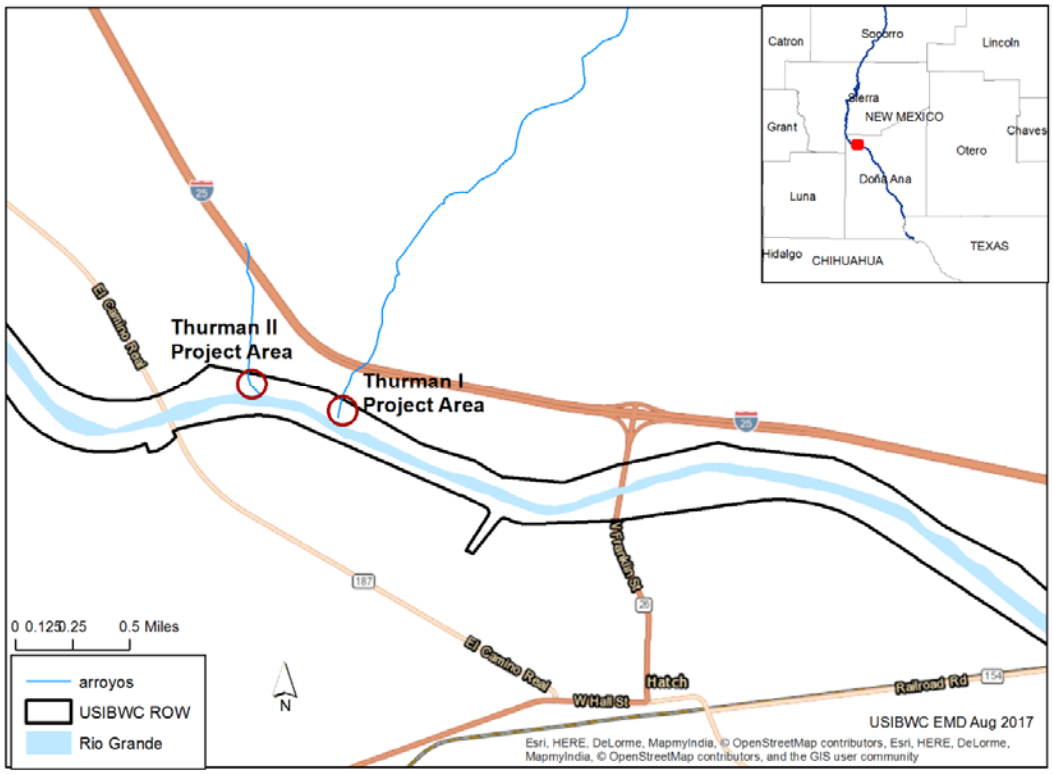

Figure 1-3 Local Vicinity Map of the Rio Grande Canalization Project and the Thurman I and II Project Area

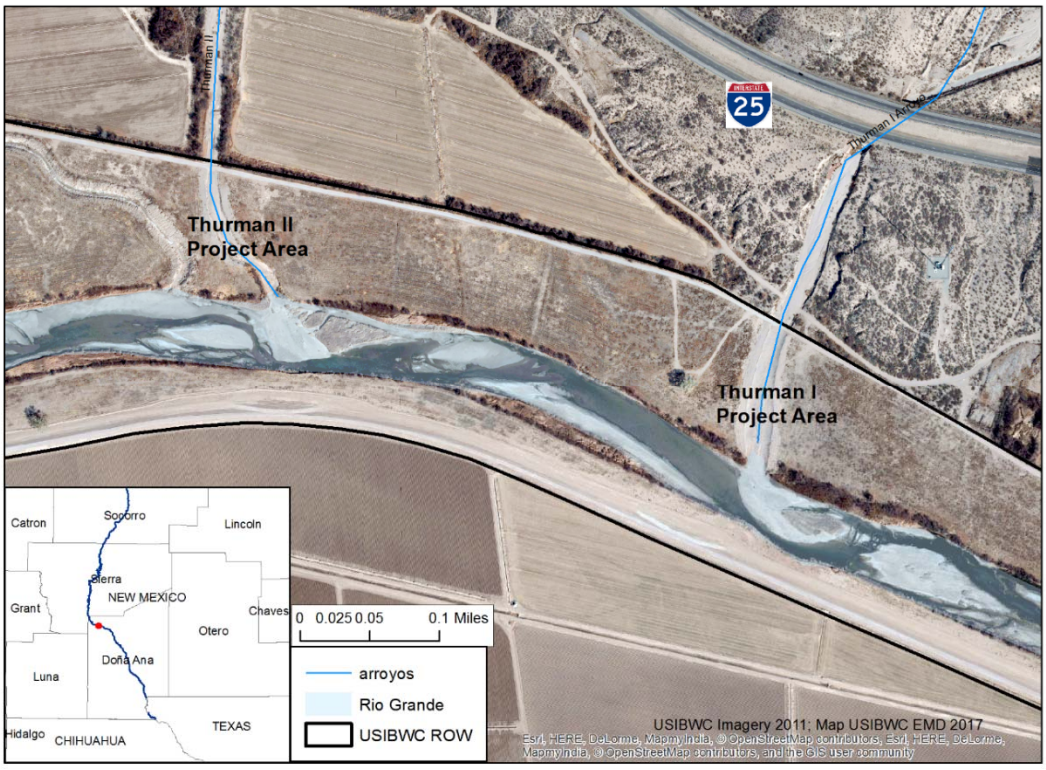

Figure 1-4. Project Area of Thurman I and II Arroyos.

1.9 SCOPE OF THE ENVIRONMENTAL REVIEW

Federal agencies are required to take into consideration the environmental consequences of proposed and alternative actions in the decision-making process under the National Environmental Policy Act (NEPA) of 1969, as amended. The USIBWC regulations for implementing NEPA are specified in *Operational Procedures for Implementing Section 102 of the National Environmental Policy Act of 1969, Other Laws Pertaining to Specifics Aspects of the Environment and Applicable Executive Orders* (46 FR 44083, September 2, 1981). These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action.

This EA identifies and evaluates the potential environmental consequences that may result from implementation of three alternatives:

1. Alternative A: No Action – Routine Sediment Excavation
2. Alternative B: Mesh-Based Sediment Traps
3. Alternative C: Sediment Basins – Preferred Alternative.

The following resource areas are analyzed for potential environmental consequences:

- biological resources (vegetation and habitat, wildlife, and threatened and endangered species),
- cultural resources,
- water resources (flood control, water quality, groundwater, and waters of the U.S.),
- community resources (environmental justice and recreation), and
- environmental health (air quality and noise pollution).

Analyses of environmental resources for the affected environment and environmental consequences are based on a potential impact corridor in Hatch, NM. Analyses of environmental consequences also include potential indirect impacts to the river corridor and the region depending on the resource and its relationship to the preferred alternative and the no action alternative.

SECTION 2 DESCRIPTION OF PROPOSED ALTERNATIVES

2.1 SUMMARY OF ALTERNATIVES EVALUATED

This EA evaluates three alternatives, which are discussed below and summarized in Table 2-1:

1. Alternative A: No Action – Routine Sediment Excavation
2. Alternative B: Mesh-Based Sediment Traps
3. Alternative C: Sediment Basins – Preferred Alternative.

Table 2-1. Summary of Alternatives Evaluated in this EA

Name	Description	Advantages	Disadvantages	Cost
Alternative A: No Action – Routine Sediment Excavation	• Status quo • No construction and no land acquisition • Continue routine sediment excavation at the confluences of arroyos and Rio Grande	• No construction or acquisition cost	• Incurs costs for routine sediment excavation • Coordination required with USACE for excavation work within Waters of the U.S.	$389,200[1]
Alternative B: Mesh-Based Sediment Traps	• Construct a series of mesh and rebar traps that catch coarsest material in upstream trap and progressively finer material downstream • Debris rack at the upstream entrance to capture floating debris • Lowest trap would have an embayment that could prove habitat benefits	• Allows arroyo flows to continue • Potential for habitat benefits at embayment	• Mesh and rebar may not withstand forces from large rocks in arroyo flows • Permit from USACE required for work within Waters of the U.S. • Requires excavation of the arroyo to create the capacity to store the required volume of sediment during tributary flooding events	$721,108[2]
Alternative C: Sediment Basins	• Construct a sediment basin by deepening and widening each arroyo channel • Construct concrete end wall • Place scour protection at the upstream and downstream ends of the endwall	• Allows high arroyo flow to continue • Efficient sediment trapping • Easy to maintain • Resists scour potential	• Permit from USACE required for work within Waters of the U.S. • Initial excavation volume • Initial construction cost • Requires excavation of the arroyo to create the capacity to store the required volume of sediment during tributary flooding events	$2.7 million[3]

1 – Total annualized cost for Long Excavation of Problem Area 2 from USIBWC 2015

2 – Total Construction Costs for Problem Area 2 from USIBWC 2015 (includes costs for trap on Placitas Arroyo). However, this is only a partial cost. Alternative B Mesh Based Traps, were not designed to capture all material. This would allow for the fine material to find its way to the Rio Grande. Therefore, a partial/full cost of Alternative A No Action would still need to be added to Alternative B.

3 –Draft Opinion of Probable Cost dated May 2017 (USIBWC 2017)

2.2 ALTERNATIVE A: NO ACTION – ROUTINE SEDIMENT EXCAVATION

Under Alternative A, the No Action Alternative – Routine Sediment Excavation, USIBWC would continue routine sediment excavation at the confluences of the arroyos and the Rio Grande. This Alternative, which does not call for any construction, maintains the status quo, as documented in the 2016 River Management Plan (USIBWC 2016), which states that at the Thurman arroyos USIBWC will "Relocate sediment material from the arroyo mouth to the opposite river bank to prevent further erosion. Place rip-rap along riverbank." USIBWC anticipates removing an estimated 8,340 cubic yards (CY) from Thurman I and II Arroyos by 2019. In Fiscal Year 2007, the USIBWC removed 7,250 CY of sediment and placed 10,500 CY of rip rap.

Figure 2-1. Area of routine sediment excavation at Thurman I under Alternative B - No Action (modified from USIBWC 2017b)

Figure 2-2. Area of routine sediment excavation at Thurman II under Alternative B - No Action (modified from USIBWC 2017b)

2.3 ALTERNATIVE B: MESH-BASED SEDIMENT TRAPS

In October 2015, Tetra Tech completed the final report, *Channel Maintenance Alternatives and Sediment Transport Study for the Rio Grande Canalization Project* (USIBWC 2015), which recommended a conceptual project to construct arroyo sediment traps that would alleviate sediment accumulation at the mouth of arroyos in the Rio Grande by reducing coarse-grained sediment supply into the river. The sediment traps are designed to have a trapping volume that exceeds the average annual bed-load yield from the tributaries. The Alternative B: Mesh-Based Sediment Traps includes:

- Construction of a series of mesh and rebar traps that catch coarsest material in the upstream trap and progressively finer material toward the mouth
- Installation of a debris rack at the upstream entrance to capture floating debris
- An embayment area at the lowest trap that could prove habitat benefits
- Excavation into the floodplain to obtain the required volume.

Alternative B includes the sediment excavation in the No Action and also would install a series of trapping features constructed with rebar and wire screens with progressively finer mesh openings in the downstream direction. Conceptual drawings of the traps are shown in Figures 2-3 through 2-6. The lowest trap was designed as an embayment. Although each screen would require periodic excavation to remove material from the sediment traps, the sediment trap would reduce dredging and channel excavation required in the main channel of the Rio Grande. A debris rack (Figure 2-7)

would be placed at the upstream entrance to the trap to capture floating debris that could affect the performance of the trapping features.

Five mesh fences would be required at both traps with mesh openings ranging from 2 inches to 1 foot due to the relatively coarse sediment that these tributaries deliver. The fence screens would be constructed by driving 3-inch angle iron “fence posts” to a depth of 3 feet with a spacing of 12 feet, and depending on the location extend between 3 to 4 feet above the floor of the trap. Angle iron buttressing supports would be required for the fence posts to stabilize the structure. The screens would be constructed by welding #4 rebar (0.5-inch diameter) or 1/8-inch solid-core, galvanized iron wire mesh to the fence posts. Rebar screen fences would be used for mesh openings of 6 inches and larger and wire fences would be used for openings of 4 inches and smaller.

The traps for Thurman I and Thurman II Arroyos would require some excavation into the arroyo banks to obtain the desired width. (To avoid hauling and disposal costs, spoil material from the excavations could be used to create a berms that would increase the volume of the traps.) Traps for both arroyos would require access roads stemming from the existing levee road. Periodic maintenance would be required to empty out the accumulated material from the traps. The trap for Thurman II Arroyo has a surface area of about 1 acre, average depth of 3 feet and volume of about 2.9 acre-feet (about 1.5 times the total average annual sediment yield and about 4 times the average annual bed-load yield). The trap for Thurman I Arroyo has a surface area of about 1.4 acres, average depth of 3 feet and volume of about 4.1 acre-feet (about 1.5 times the total average annual sediment yield and about 4 times the average annual bed-load yield). Table 2-1 lists a summary of mean annual tributary total sediment yield and mean annual tributary bed-load yield for the tributaries. Also shown are the corresponding water discharges and dates of the annual events that were assumed for purposes of the sediment-transport modeling (USIBWC 2015). Table 2-2 lists the dimensions and sediment trapped.

No maintenance would be required in the excavated embayments since the mostly fine material deposited in this portion of the trap would likely be flushed by the eddy that would tend to occur in the embayments (USIBWC 2015). This embayment of finer sediment may provide habitat benefits as a lower velocity, off-channel refuge area with vegetative cover. However because the Mesh Based Traps were not designed to capture all material, this alternative would allow for the fine material to find its way to the Rio Grande, and some may still deposit into sand bars/islands in the channel outside of the embayment area and could require channel maintenance within the Rio Grande.

Table 2-1. Sediment Yields in Study Modeling						
Watershed Name	Station (ft)	Basin Drainage Area (mi2)	Mean Annual Sediment Yield (ac-ft)	Mean Annual Bed Load Yield (ac-ft)	Assumed Corresponding Flow (cfs)	Assumed Date of Loading
Thurman II Arroyo	4545+00	6.0	1.98	0.69	210	7/31
Thurman I Arroyo	4526+50	3.4	1.12	0.39	120	7/31

Table 2-2. Sediment Trap Conceptual Designs						
Tributary Name	Station (ft)	Surface Area (acres)	Average Depth (ft)	Trap Volume (ac-ft)	Percent of Annual Total Yield Trapped	Percent of Annual Bed-load Trapped
Thurman II Arroyo	4545+00	1.0	3	2.9	148%	424%
Thurman I Arroyo	4526+50	1.4	3	4.1	364%	1041%

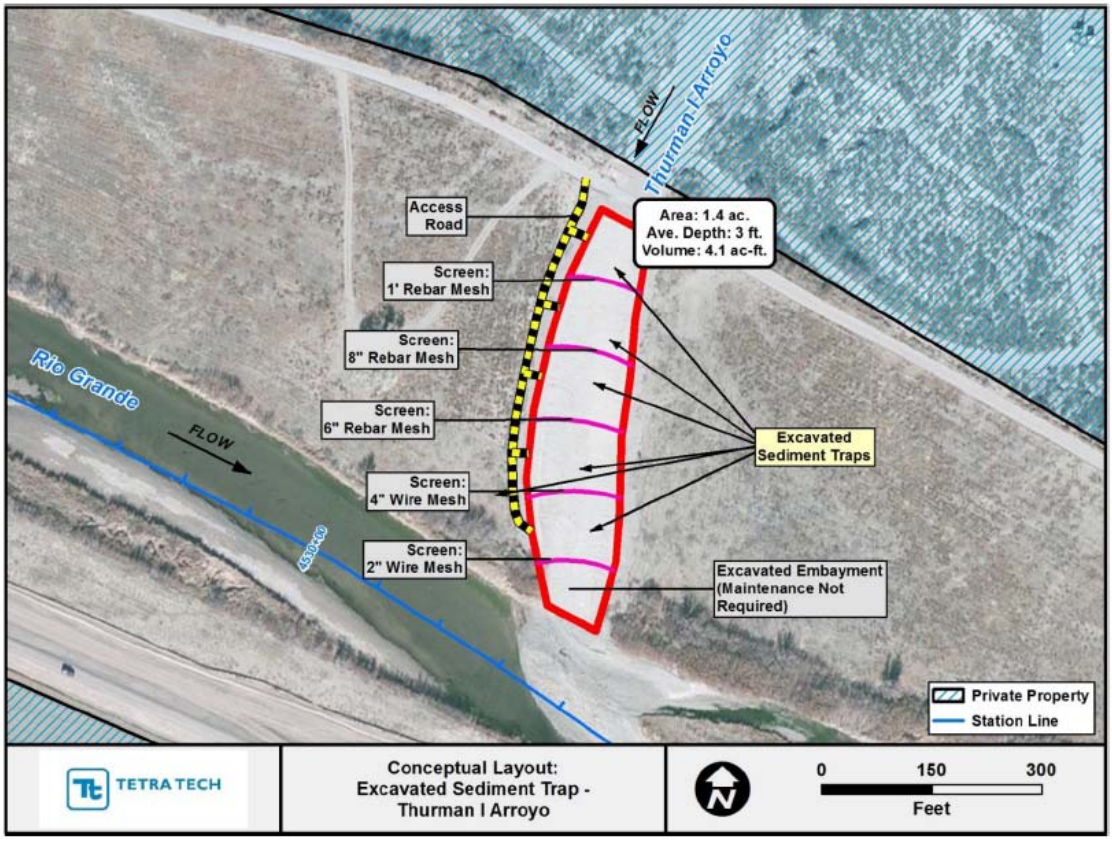

Figure 2-3 – Conceptual layout of sediment trap for Thurman I Arroyo (USIBWC 2015)

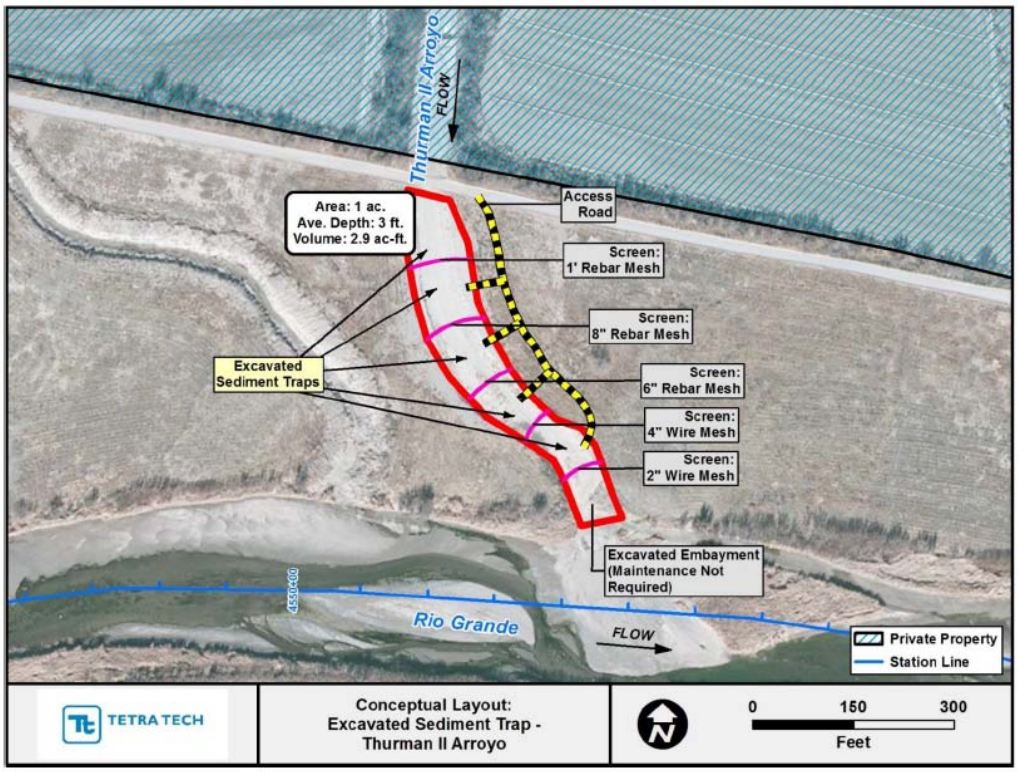

Figure 2-4 – Conceptual layout of sediment trap for Thurman II Arroyo (USIBWC 2015)

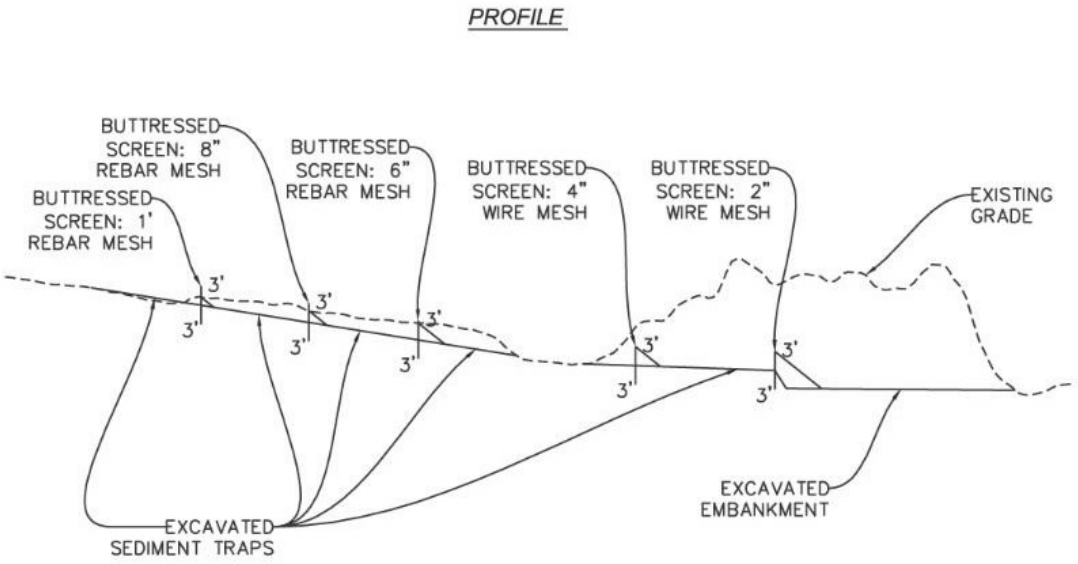

Figure 2-5 – Example of conceptual profile plan view drawing showing the layout of a typical arroyo sediment trap/habitat feature. (Adapted from USIBWC 2015)

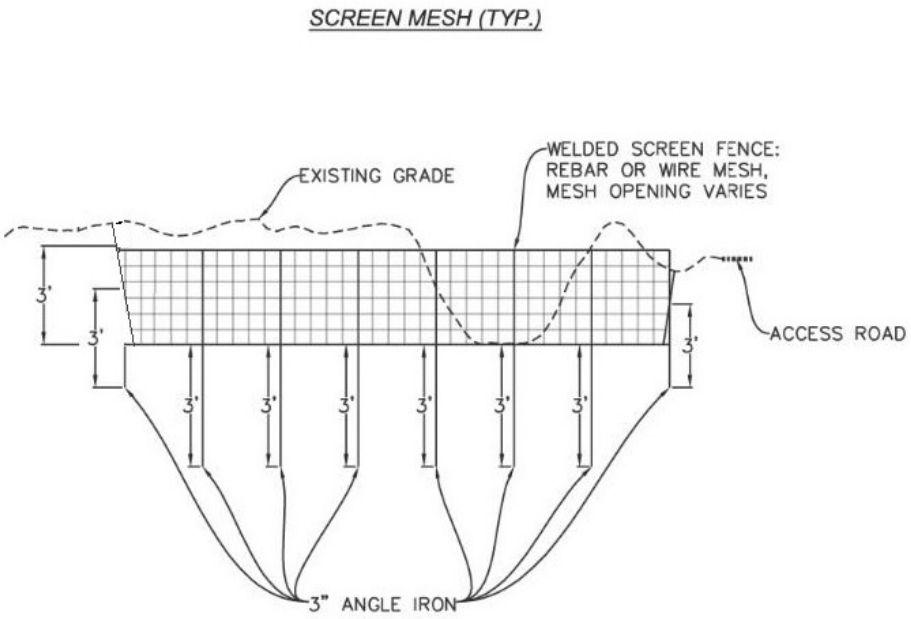

Figure 2-6 – Example of conceptual plan view drawing showing the screen mesh a typical arroyo sediment trap/habitat feature. (Adapted from USIBWC 2015)

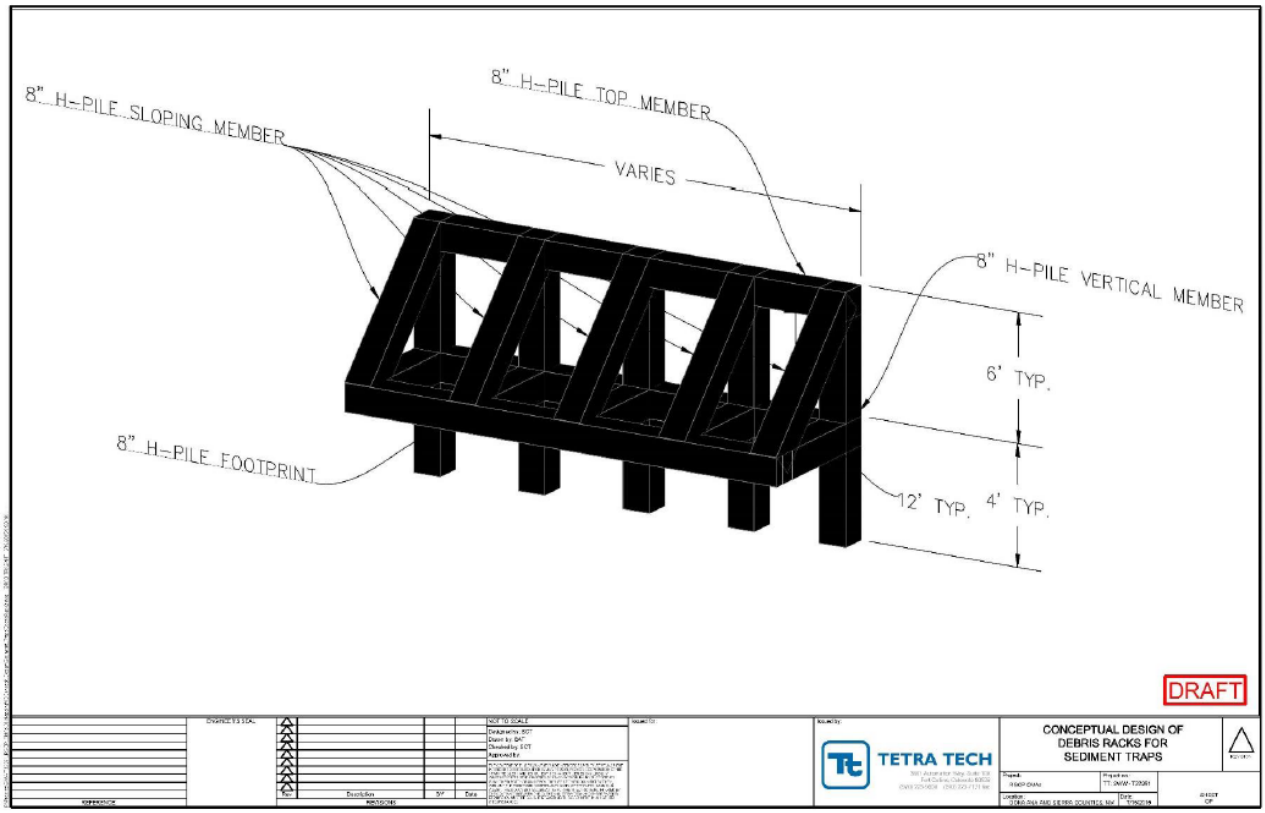

Figure 2-7 – Conceptual 3D rendering of the debris racks for the sediment traps

2.4 ALTERNATIVE C: SEDIMENT BASINS – PREFERRED ALTERNATIVE

Extensive hydrologic and hydraulic analysis (USIBWC 2017b) concluded that a sediment trap system consisting of a basin-based trap would likely have superior performance to that of a mesh-based trap for both Thurman I and II Arroyos. This conclusion was based on predicted sediment trapping efficiency, structural design considerations, ease of maintenance, and scour potential.

Alternative C: Sediment Basins includes the sediment excavation in the No Action and also calls for deepening and widening the arroyo channels to construct a basin for sediment collection (Figures 2-8 and 2-9). The basins would be designed to provide sufficient time for sediment to settle out of arroyo flows and to be deposited at the bottom of the channel. The basins would be sloped towards the river so that the larger size sediments are deposited at the beginning of the basins, and progressively finer particles are deposited further downstream. The downstream termination of the basins would be accomplished by constructing a reinforced-concrete retaining wall ("basin end wall") near the confluence with the Rio Grande (Figure 2-7). The end wall would be approximately 4.4 to 5.7 feet above the basin finish elevation to provide freeboard for the 100-year storm flows in the arroyo. The end wall would serve as an overflow weir when higher flows occur, or when significant volumes of sediment have already been collected in the basins that permit less stormwater storage. Scour protection would be provided on both the upstream and downstream sides of the end wall (USIBWC 2017a).

The existing arroyo channels would be over-excavated to provide increased flow capacity and remove accumulated sediments. The channel bottom for Thurman I Arroyo would be excavated to approximately 1 to 2.5 feet below existing grade, and for Thurman II Arroyo, to approximately 2 to 4 feet below existing grade. The cross-section of the channel would be widened to a maximum bottom width of 150 feet for each arroyo, with permanent excavation slopes inclined at 3H:1V to maintain long-term stable slopes. Maximum channel slope heights would be approximately 9.5 and 7 feet for Thurman I and II Arroyos, respectively. Excavated channel lengths of Thurman I and II Arroyos would be 375 and 400 feet, respectively.

Channel slopes and bottom would be protected from erosion from both conveyance flows and surface water sheet flow related to precipitation events. Alternative C calls for 30-inch thick riprap as the most feasible erosion protection alternative for the endwall, and a 12-inch thick gabion mattress at the upstream end of the basins.

Due to the potential for channel scour/undermining and the desire to minimize excavation depths due to shallow groundwater elevations, shallow foundations were not preferred for this project. Alternative C calls for drilled pier foundations. If proposed construction occurs during the non-irrigation season, dewatering controls may be needed along approximately the downstream 1/3 of the channel alignment (USIBWC 2017a).

Based on mean annual sediment yields of 1.12 acre-feet for Thurman I Arroyo and 1.98 acre-feet for Thurman II Arroyo, and only allowing the basins to fill to 75% capacity before cleaning, the maintenance interval for the Thurman I Arroyo basin is estimated to be 3.5 years, and 2.0 years for the Thurman II Arroyo basin.

The design contractors compared the engineering parameters for both Alternative C Sediment Basins and Alternative B Mesh-Based Sediment Traps, and documented that Alternative C would be more efficient than the conceptual project outlined in Alternative B (USIBWC 2017b). The analysis determined that a sediment basin would be an improved design because it would:

- Have less potential for scour at piling locations during flood events
- Not have screens that could be damaged by debris impact (from large cobbles or boulders present in the arroyo flows)
- Not limit flow capacity with screens, and
- Be easier to maintain because no screens would be present to clean with large equipment.

Because of this analysis, USIBWC has identified Alternative C Sediment Basins as the Preferred Alternative.

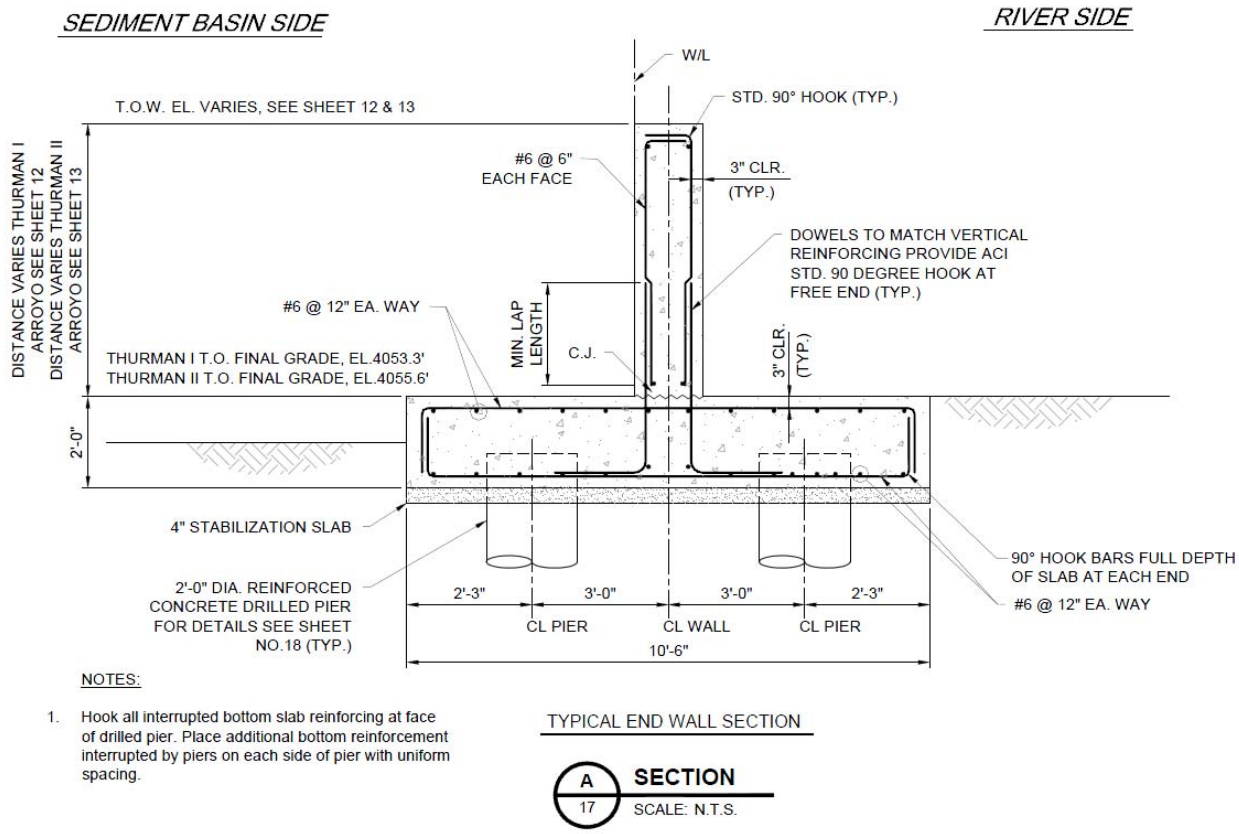

Figure 2-7 – Drawing of End Wall for Sediment Basin (from USIBWC 2017b)

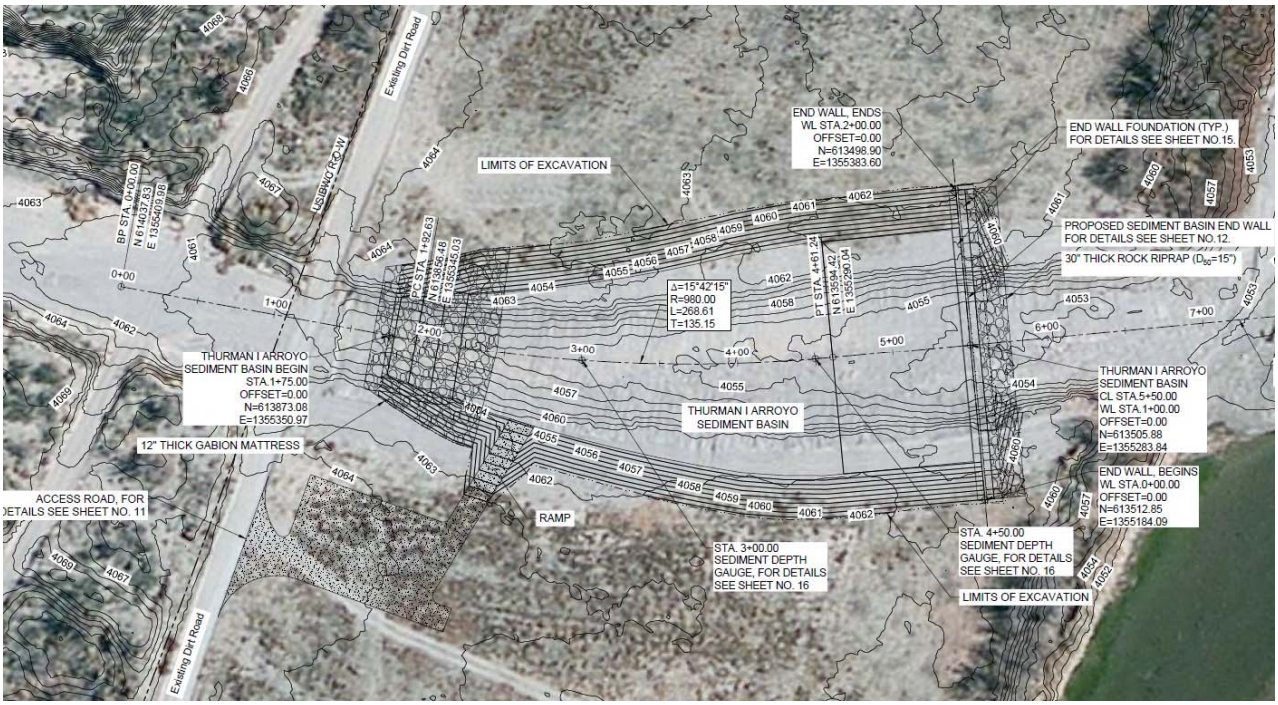

Figure 2-7 – Draft Plan for Thurman I Sediment Basin (from USIBWC 2017b)

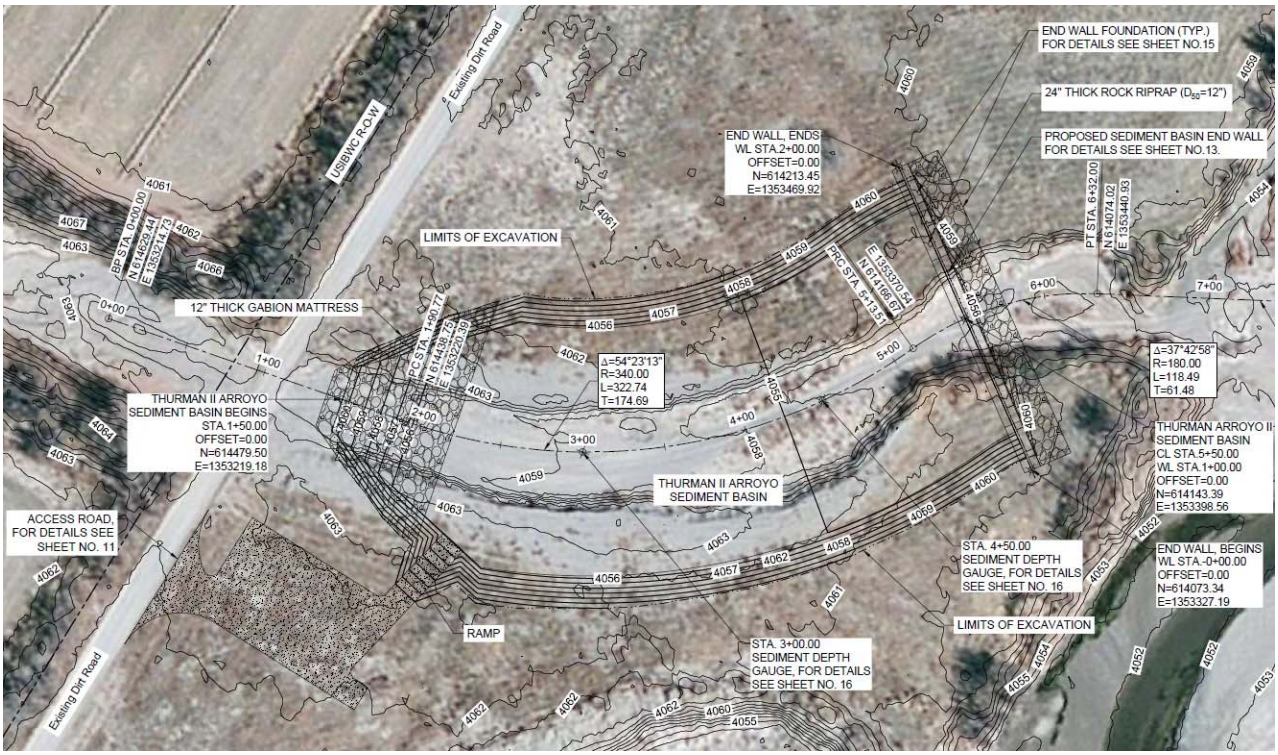

Figure 2-9 – Draft Plan for Thurman II Sediment Basin (from USIBWC 2017b)

2.5 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES

Environmental impacts of the three alternatives are summarized below and in Table 2-4. Environmental impacts are discussed in detail in Section 3.

Alternative A: No Action – Routine Sediment Excavation

The No Action Alternative – Routine Sediment Excavation would require sediment excavation of the sediment that has accumulated in the river channel and the vegetation that has started growing on the sediment bar/islands. No mitigation is anticipated for this action which is covered under the 2017 Biological Opinion (USFWS 2017) and is part of USIBWC's River Management Plan (USIBWC 2016). No other impacts are anticipated.

Alterative B: Mesh-Based Sediment Traps

The Alternative B: Mesh-Based Sediment Traps would have similar impacts from the sediment excavation of the river and vegetated sediment bars/islands, in addition to excavation of some of the floodplain. There would be some temporary impacts on noise and air pollution from construction, but these are expected to be minor. No other impacts are anticipated.

Alternative C: Sediment Basins - Preferred Alternative

The Alternative C: Sediment Basins would have similar impacts from the sediment excavation of the river and vegetated sediment bars/islands, in addition to excavation of some of the floodplain. There would be some temporary impacts on noise and air pollution from construction, but these are expected to be minor. The local groundwater levels may be impacted due to the change in hydrology of the arroyo from a fast-moving ephemeral stream to a ponded stream. USIBWC would mitigate for impacts to vegetation and changes in hydrology by creating new riparian habitat, enhancing existing habitat, and creating and protecting an embayment area.

Table 2-4 Summary of Environmental Resources Affected by the Alternatives				
ENVIRONMENTAL RESOURCE	**EFFECTS OF ALTERNATIVE A: NO ACTION – ROUTINE SEDIMENT EXCAVATION**	**EFFECTS OF ALTERATIVE B: MESH-BASED SEDIMENT TRAPS**	**EFFECTS OF ALTERNATIVE C: SEDIMENT BASINS - PREFERRED ALTERNATIVE**	**Section in this EA**
Biological Resources				
A. Vegetation and Habitat	Moderate	Moderate	Moderate	3.1.1
B. Wildlife	Minor	Minor	Moderate	3.1.2
C. Threatened and Endangered Species	Minor	Minor	Minor	3.1.3
Cultural Resources				
A. Archaeological and Historic Resources	Negligible	Negligible	Negligible	3.2
Water Resources				
A. Flood Control	Minor; Positive	Minor; Positive	Minor; Positive	3.3.1
B. Water Quality	Negligible	Negligible	Negligible	3.3.2
C. Groundwater	Negligible	Minor	Moderate; Beneficial for Mitigation	3.3.3
D. Waters of the US	Minor	Minor	Moderate; Mitigated	3.3.4
Community Resources				
Environmental Justice	Negligible	Negligible	Negligible	3.4

SECTION 3 CURRENT CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

This section describes resources in the potential area of influence of the project. The consequences of the three alternatives are discussed immediately after the description of each resource component. Appendix B shows photos of reconnaissance visits from February and July 2016.

3.1 BIOLOGICAL RESOURCES

3.1.1 Vegetation and Wetlands

The RGCP is located in the northern Trans-Pecos region of the Chihuahuan Desert. This region includes all sections of the Chihuahuan Desert in the U.S. and the northernmost sections of the desert of Mexico, which is historically a mosaic of grasslands and desert shrublands (McMahan 1984). Climatic conditions throughout the study area are classified as semi-arid continental, characterized by fairly hot summers, mild winters, and short temperate spring and fall seasons. Precipitation averages 7.7 inches per year (Parsons 2001). In the Project Area, the levee and floodplain grasses are mowed regularly to ensure suitable design flood features and to prevent degradation of the structural integrity of the levees (USIBWC 2007; USIBWC 2016).

USIBWC has evaluated the existing habitat in the project area in several studies (USIBWC 2011c; USIBWC 2017) as well as field surveys in February and July of 2016. The USIBWC determined there are no wetlands in the project area. The floodplain is managed by the USIBWC for flood flow containment by mowing vegetation annually. The floodplain area surrounding Thurman I and II arroyos is designated as a Mow Zone (USIBWC 2016); therefore, the floodplain does not possess natural habitat, and any temporary vegetation in the floodplain is primarily invasive species and weeds. Limited riparian vegetation is mostly located along the lower portion of the arroyos at the confluence with the Rio Grande, and along the banks of the Rio Grande, and the existing vegetation is mixed native and nonnative. Vegetation is characterized primarily by coyote willow (*Salix exigua*), mule fat (*Baccharis viminea*), and saltcedar (*tamarix*).

From July 2015 high resolution imagery acquired by USIBWC from Digital Globe, USIBWC estimated that there are approximately 0.52 acres of vegetated sandbar inside the Rio Grande immediately downstream of Thurman I and 1.19 acres downstream of Thurman II.

Anticipated Effects: Alternative A: No Action – Routine Sediment Excavation

Sediment excavation of the channel will remove up to 1.71 acres of vegetation that is growing in the channel sandbar.

Anticipated Effects: Alterative B: Mesh-Based Sediment Traps

No wetlands would be impacted, since no wetlands were identified in the floodplain in this stretch. Excavation of a sediment trap would not impact any vegetation in the floodplain since this area is currently mowed. The proposed mesh traps would be upstream of the mouth of the arroyo, and this alternative proposed an embayment which would minimize excavation of native vegetation.

This alternative also proposed to remove up to 1.71 acres of vegetation that is growing in the sandbar within the channel.

Alternative C: Sediment Basins - Preferred Alternative
No wetlands would be impacted, since no wetlands were identified in the floodplain in this stretch. Excavation of sediment basins would not impact any vegetation in the floodplain since this area is currently mowed. The proposed endwall location would be slightly upstream of the mouth of the arroyo and would minimize excavation of native vegetation. Additionally, this alternative also proposed to remove up to 1.71 acres of vegetation that is growing in the sandbar within the channel.

3.1.2 Wildlife

Typical wildlife that could inhabit the RGCP include black-tailed jackrabbit, desert cottontail, cotton rat, ground squirrels, mourning dove, meadowlark, kestrel, red-tail hawk, skunks, burrowing owls, several species of waterfowl, and other non-game animals (USIBWC 2007).

Habitat could potentially be utilized by migratory birds (USIBWC 2004a; USIBWC 2007). The Rio Grande is a major migratory flyway for numerous bird species, particularly waterfowl, shore birds, and those associated with riparian habitats. USIBWC must comply with the Migratory Bird Treaty Act (MBTA). The MBTA protects migratory birds, their parts, nests, and eggs thereof during their nesting season. The U.S. Fish and Wildlife Service (USFWS) has determined that the nesting season for the region including the RGCP area is March 1 through August 31.

Anticipated Effects: No Action Alternative
Wildlife will not be directly impacted. Up to 1.71 acres of vegetation that is growing in the channel in the sandbar depositing by the arroyo will be removed. Work would only be conducted during the winter months during the non-breeding season.

Anticipated Effects: Alterative B: Mesh-Based Sediment Traps
Wildlife will not be directly impacted. Excavation of the arroyo trap would not impact any vegetation in the floodplain since this area is currently mowed. The proposed mesh trap locations would be upstream of the mouth of the arroyo and would minimize removal of native vegetation.

Alternative C: Sediment Basins - Preferred Alternative
Wildlife will not be directly impacted. Excavation of sediment basins would not impact any vegetation in the floodplain since this area is currently mowed. The proposed endwall location would be slightly upstream of the mouth of the arroyo and would minimize removal of native vegetation. Some vegetation in the channel will have to be removed with sediment excavation. USIBWC would mitigate for the project, and the sediment basins could create suitable and moist conditions for riparian vegetation along the banks of the sediment basins, as proposed in the preliminary mitigation.

In addition, whenever possible, work would be planned to occur outside of the bird nesting

season. If work continues into the bird breeding season the areas proposed for disturbance would be surveyed and avoidance measures followed in order to prevent the inadvertent destruction of nests or eggs.

3.1.3 Threatened and Endangered Species

USIBWC is required to evaluate impacts to threatened and endangered (T&E) species per the Endangered Species Act of 1973, as amended. The USIBWC has conducted several biological surveys along the RGCP (Parsons 2001; USIBWC 2004a; USIBWC 2011; USIBWC 2017). Of the 14 species listed as endangered, threatened, candidate, proposed, or experimental nonessential population, four have been documented or have the potential to occur in the RGCP and are listed in Table 3-1 (USIBWC 2017). Species classified as "unlikely to occur" were not included in this EA but are described in more detail in the previous studies. Threatened and endangered species potentially occurring in El Paso County, Texas are available in the *Updated Biological Assessment for Long-Term River Management of the Rio Grande Canalization Project*, Appendix B (USIBWC 2017).

The project area is not identified as a nesting area for the flycatcher, the yellow-billed cuckoo, or any other endangered species. There is no critical habitat designation in the project area (USIBWC 2017). There is suitable breeding or migratory habitat for the flycatcher and the cuckoo in the immediate vicinity of Hatch, NM. Flycatcher territories have been observed in 2013 and previous years about 0.25 miles upstream of Thurman II, and in 2015 about 0.5 mile downstream of Thurman I. However, no cuckoos or flycatchers have been observed in 0.5-mile immediate vicinity since 2015, nor does the immediate project area provide suitable breeding or migratory habitat for the flycatcher or the cuckoo (USIBWC 2011; USBR 2013a; USBR 2013b; USBR 2013c; USBR 2017; USIBWC 2017).

In 2017, USIBWC consulted with the USFWS on the potential impacts to T&E species as a result of channel maintenance activities documented in USIBWC's River Management Plan for RGCP (USIBWC 2016), and USIBWC has been issued an updated Biological Opinion for the actions (USFWS 2017). The updated Biological Opinion allows the USIBWC to remove some vegetation within the channel that is suitable for the flycatcher as long as USIBWC continues to implement riparian habitat restoration and follows other requirements and recommendations (USFWS 2017).

Table 3-1. Federally listed species Known to Occur in the RGCP (USIBWC 2017)

Common Name (*Species Name*)	Status	County where listing Applies	Range or Habitat Requirements	Potential for Occurrence in RGCP	Potential timeframe for Occurrence
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	E	Sierra and Doña Ana Counties, El Paso County	Associated with moist riparian areas throughout the year. Documented on some RGCP restoration sites.	Known to occur	Breeding resident during summer; migrates to tropics
Northern Aplomado falcon (*Falco*	E and ENEP	Sierra and Doña Ana Counties, El Paso County	Documented at Mesilla Valley Bosque State Park in 2010. Associated with open grassland or savannah with scattered trees or	Known to occur	Nests spring to summer. Non-migratory

femoralis septentrionalis)			shrubs. Experimental population in NM.		
Least tern (*Sterna antillarum*)	E	Sierra and Doña Ana Counties	Migratory species occurring in North America during the breeding season, when it is associated with water (e.g. lakes, reservoirs, rivers) Documented in the RGCP including at Mesilla	Known to occur	Possible breeding resident summer
Yellow-billed Cuckoo (*Coccyzus americanus*)	T	Sierra and Doña Ana Counties, El Paso County	Western subspecies nests preferentially in large patches of moist cottonwood-willow woodland, where it prefers high canopy closure for nesting. Documented on some proposed RGCP restoration sites	Known to occur	Breeding resident summer

E = Endangered T=Threatened ENEP=Experimental, Non-essential Population

Anticipated Effects: No Action Alternative

No adverse impacts to T&E species are anticipated. No work would be conducted within the floodplain. Some vegetation will be removed from the sandbars/islands at the mouth of the arroyos; effects are covered under the 2017 Biological Opinion (USFWS 2017). USIBWC anticipates implementing all requirements and recommendations from the 2017 Opinion.

Anticipated Effects: Alternative B: Mesh-Based Sediment Traps

No adverse impacts to T&E species are anticipated. Only minimal vegetation on the floodplain would be impacted. Some vegetation will be removed from the sandbars/islands at the mouth of the arroyos; effects are covered under the 2017 Opinion (USFWS 2017). USIBWC anticipates implementing all requirements and recommendations from the 2017 Biological Opinion. Most vegetation at the mouth of the arroyo would be left alone as part of the embayment.

Anticipated Effects: Alternative C: Sediment Basins - Preferred Alternative

No adverse impacts to T&E species are anticipated. Only minimal vegetation on the floodplain would be impacted. Some vegetation will be removed from the sandbars/islands at the mouth of the arroyos; effects are covered under the 2017 Opinion (USFWS 2017). USIBWC anticipates implementing all requirements and recommendations from the 2017 Biological Opinion. Most vegetation at the mouth of the arroyo would be left alone as part of the embayment.

3.2 CULTURAL RESOURCES

The USIBWC has conducted intensive and extensive archeological evaluations for cultural resources in the RGCP, including evaluations for levee construction and habitat restoration projects (USIBWC 2001, USIBWC 2005, USIBWC 2009b, USIBWC 2009c, USIBWC 2011a, USIBWC 2011b). Extensive archaeological and architectural investigations of the RGCP were completed in advance of major RGCP flood control improvements, including proposed new

floodwalls and levee construction (USIBWC 2009b, USIBWC 2009c). In areas of high probability of cultural resources, intensive investigations were conducted for site-specific construction areas (USIBWC 2011b). In addition, USIBWC completed cultural resource surveys for lands designated as potential habitat restoration sites (USIBWC 2011a).

An integral part of the National Historic Preservation Act (NRHP) Section 106 process is the delineation of the area within which archaeological and architectural resources would be affected or are likely to be affected. The Area of Potential Effect (APE) as defined by 36 CFR 800.16(d) represents: the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties [*i.e.*, NRHP-eligible resources], if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.

In this area of investigation, no historic buildings or structures were identified in the immediate vicinity of the project area (USIBWC 2001; USIBWC 2009c; USIBWC 2011b; USIBWC site visit 2016). The Elephant Butte Irrigation District (EBID) was listed in the National Register of Historic Places (NRHP) as a Historic District in 1997. The period of significance for the EBID is 1906-1942. The district is listed in the NRHP under Criterion A for its association with agriculture and Criterion C for its engineering and design aspects. EBID's Garfield Drain is found in west of the project area.

The New Mexico Cultural Resources Information System (NMCRIS) database and previous USIBWC investigations of the project area were consulted for information about known archaeological sites that occurred in the project area. USIBWC cultural resources specialist conducted a site survey in February 2016 and found no cultural resources present in the vicinity. USIBWC completed a negative finding report for NMCRIS, Activity Number 135312.

Anticipated Effects: No Action Alternative
No effects to cultural resources. No work will be conducted within the floodplain**.**

Anticipated Effects: Alternative B: Mesh-Based Sediment Traps
No effects to cultural resources. No cultural resources were documented in the APE. The ground disturbance during construction of the sediment traps has the potential to unearth any undocumented buried sites or artifacts. USIBWC would follow standard procedure and best management practices to stop construction work if cultural resources were found during construction and conduct cultural investigations.

Anticipated Effects: Alternative C: Sediment Basins - Preferred Alternative
No effects to cultural resources. No cultural resources were documented in the APE. The ground disturbance during construction of the sediment basins has the potential to unearth any undocumented buried sites or artifacts. USIBWC would follow standard procedure and best management practices to stop construction work if cultural resources were found during construction and conduct cultural investigations.

3.3 WATER RESOURCES

3.3.1 Flood Control

The RGCP flood control system was designed to provide protection from the 100-year storm event, a storm of large magnitude with a very low probability of occurrence. The flood control levees extend for 57 miles along the west side of the RGCP and 74 miles on the east side, for a combined total of 131 miles. Naturally elevated bluffs and canyon walls contain flood flows along portions of the RGCP that do not have levees (i.e. Selden Canyon). The levees range in height and have slopes of about 3H:1V (horizontal to vertical) on the river side and 2.5H:1V on the land side. The levees have a gravel maintenance road along the top. The levees are positioned on average about 750 to 800 feet apart north of Mesilla Dam and 600 feet apart south of Mesilla Dam. The floodway between the levees is generally level or uniformly sloped toward the channel. The floodway contains mostly grasses, some shrubs, and widely scattered trees. The bank of the channel at the immediate edge of the floodway is typically vegetated with a narrow strip of brush and trees. Many levees in the RGCP were raised during recent levee reconstruction as evaluated in 2007 (USIBWC 2007). USIBWC is continuing to address several levee gaps throughout the RGCP.

Anticipated Effects: No Action Alternative

No impacts are anticipated. Sediment excavation in the in the Rio Grande channel would assist with meeting USIBWC's statutory requirements to maintain flood capacity for a design flood, and for protecting the levees on the opposite bank from the arroyos from erosion due to high erosive forces.

Anticipated Effects: Alternative B: Mesh-Based Sediment Traps

Beneficial impacts are anticipated from the construction of sediment traps, which would prevent sediment from entering the river, thereby potentially reducing flood capacity and impacts to levees on the opposite bank from the arroyos due to erosive forces. However, mesh-based sediment traps and debris racks must be regularly maintained in order to prevent buildup of debris and overflowing. The USIBWC will have to find a placement site for accumulated sediment removed from the sediment traps.

Anticipated Effects: Alternative C: Sediment Basins - Preferred Alternative

Beneficial impacts are anticipated from the construction of sediment basins, which would hold sediment and prevent it from entering the river, thereby potentially reducing flood capacity and impacts to levees on the opposite bank from the arroyos due to erosive forces. The sediment basin is easier to maintain than Alternative B, but will still require maintenance every several years and a placement site for accumulated sediment.

3.3.2 Water Quality

Water quality in the New Mexico portion of the RGCP is defined by New Mexico on the basis of individual reaches for which designated uses have been defined. As required by the Clean Water Act Section 303b, states regularly submit to the U.S. Environmental Protection Agency (USEPA) a surface water quality report that provides a summary for each reach, designated use attainment, and identifies any potential water quality concerns.

The State of New Mexico uses 8-Digit Hydrologic Unit Codes (HUCs) to define segments of watersheds. The Project Area is located within HUC 13030102 (El Paso-Las Cruces), in New Mexico Water Quality Standard Assessment Unit NM-2101, which extends from below Caballo Reservoir downstream to the international boundary with Mexico. State designated uses for the RGCP reach (NMAC 20.6.4.101) include: irrigation, marginal warmwater aquatic life, livestock watering, wildlife habitat, and primary contact (NMED 2013; NMAC 2013).

This stretch was first listed in 2006 as impaired for Not Supporting the primary contact use with high levels of E. coli bacteria. In June 2007, USEPA approved a Total Maximum Daily Load (TMDL) for bacteria within this stretch (USIBWC 2007; NMED 2013; NMED 2016). In the 2016-2018 surface water quality assessment, the HUC 13030102 El Paso was "Not Supporting" the designated use for primary contact (NMED 2013, 2016). Specifically, the Project Area for this EA is covered under Assessment Units NM-2101_10 Rio Grande from Leasburg Dam to one-mile below Percha Dam) which was impaired for bacteria (NMED 2016).

Anticipated Effects: No Action Alternative

No impacts are anticipated. Sediment excavation in the in the Rio Grande channel would likely occur outside of irrigation season when there is little or no water in the river channel. Avoidance measures and best management practices would be implemented to avoid impacts to water quality.

Anticipated Effects: Alternative B: Mesh-Based Sediment Traps

No impacts are anticipated. Construction in the Rio Grande channel would likely occur outside of irrigation season when there is little or no water in the river channel. Construction contractors would be required to have a Stormwater Pollution Prevention Plan in place. Avoidance measures and best management practices would be implemented to avoid impacts to water quality. Implementation of BMP's would reduce or eliminate erosion and downstream sedimentation and the consequential effects to water quality. Construction would follow stormwater protection permits and water quality certification requirements issued by EPA/NMED.

Anticipated Effects: Alternative C: Sediment Basins - Preferred Alternative

No impacts are anticipated. Construction in the Rio Grande channel would likely occur outside of irrigation season when there is little or no water in the river channel. Construction contractors would be required to have a Stormwater Pollution Prevention Plan in place. Avoidance measures and best management practices would be implemented to avoid impacts to water quality. Implementation of BMP's would reduce or eliminate erosion and downstream sedimentation and the consequential effects to water quality. Construction would follow stormwater protection permits and water quality certification requirements issued by EPA/NMED.

3.3.3 Groundwater

The Project Area is located in the Mesilla Basin. The chemical quality of the water in the shallower part of the aquifer is influenced by the quality of the water in the Rio Grande. The depth of fresh water varies in from 150 feet to as much as 1,400 feet below land surface. The water in

the shallower part of the aquifer is generally more mineralized than that in the deeper part. The aquifer receives recharge by infiltration of runoff around the basin margins, and from seepage from the Rio Grande, ephemeral streams, canals, and excess irrigation water. (USIBWC 2014).

USIBWC has installed a series of groundwater monitoring wells throughout the RGCP floodplain on USIBWC habitat restoration sites. USIBWC monitoring data from 2013 to 2017 from wells in Hatch north and south of the Project Area indicate shallow groundwater levels vary from approximately 3 feet to 14 feet below the surface.

Anticipated Effects: No Action Alternative
No impacts are anticipated. No dewatering would be required since there would be no construction. Sediment excavation in the river would not go be below the river's baseline and would therefore no impact groundwater.

Anticipated Effects: Alternative B: Mesh-Based Sediment Traps
Construction in the Rio Grande channel would likely occur outside of irrigation season when there is little or no water in the river channel. However, dewatering could be required for construction of the footings for the lowest mesh traps. USIBWC does not anticipate that dewatering would be required to an extent that would impact local groundwater levels.

Anticipated Effects: Alternative C: Sediment Basins - Preferred Alternative
Construction in the Rio Grande channel would likely occur outside of irrigation season when there is little or no water in the river channel. However, dewatering would be required for construction of the endwall deep footings. USIBWC does not anticipate that dewatering would be required to an extent that would impact local groundwater levels.

After construction, the sediment basins could create minor changes in local groundwater levels. Principally, water from the arroyos will slow down the flow of water and pond at the end wall, subsequently raising shallow groundwater levels in the immediate vicinity of the sediment trap. This local variability would positively impact proposed mitigation areas by creating more suitable conditions.

3.3.4 Waters of the United States

The USACE and USEPA regulations (33 CFR 323 and 40 CFR 230) authorize the USACE to require compensatory mitigation for unavoidable impacts to wetlands and other jurisdictional waters of the United States. Table 3-2 compares potential impacts to Waters of the U.S (WOUS) of the alternatives.

Anticipated Effects: Alternative A: No Action – Sediment Excavation
USIBWC will have to continue sediment excavation of the Rio Grande. The arroyo is eroding into the floodplain on the opposite bank where the floodplain is narrow, potentially threatening the levee. USIBWC's River Management Plan anticipates that 8,340 CY will have to be removed. USIBWC will conduct this work as excavation only, during low flow/dry season. Sediment will be hauled out of the floodplain. USIBWC

anticipates that there will not be adverse impacts to water quality due to work being conducted in the non-irrigation season.

Anticipated Effects: Alternative B: Mesh-Based Sediment Traps
The USIBWC has evaluated the potential impacts to WOUS below the ordinary high water mark (OHWM) and has determined that impacts to WOUS are minimal. USIBWC calculated impacts using a conservative footprint of 6 feet wide for each screen, 8 feet wide for the debris racks, and 16 feet wide for the access roads. Access roads will be constructed in the floodplain outside of the OHWM. Thurman I impacts are estimated at 0.074 acres and Thurman II impacts are estimated at 0.042 acres. Each arroyo project has impacts of less than 1/10th acre, and combined the two projects are 0.116 acres.

Anticipated Effects: Alternative C: Sediment Basins - Preferred Alternative
For Thurman I, the rip rap area is 0.28 acres and the end wall area is 0.049 acres, for a total of 0.33. This includes the rip rap in the newly excavated wider channel, not only the existing channel. Similarly, Thurman II rip rap would cover 0.28 acres and endwall 0.048 acres, for a total of 0.33 acres. If USACE determines that these are the only impacts, these would each fall within the 1/2 acre limits of NWP 43.

For Thurman I, the entire footprint of the newly excavated arroyo is 1.595 acres and for Thurman II it is 1.692 acres.

The USIBWC would apply for a Clean Water Act Section 404 permit from USACE. USIBWC would mitigate according to the USACE-approved compensatory mitigation plan, summarized in Section 4. Mitigation is proposed on a total of 2.1 acres and would include establishment of riparian habitat on the new banks of the sediment basin, enhancement of existing habitat along the banks and mouth of the arroyos, and establishment and protection of an embayment area on the riverside of the endwall.

Table 3-2. Comparison of Excavated Sediment and Impacts to WOUS

Alternative	Volume of Sediment Excavated from Rio Grande	Volume of Sediment Excavated from Arroyo	Fill of WOUS
Alternative A: No Action – Sediment Excavation	Thurman I & II: 8,340 CY	None	None
Alternative B: Mesh-Based Sediment Traps	Thurman I: 8,340 CY Thurman II: 30,160 CY	Not calculated	Not calculated
Alternative C: Sediment Basins - Preferred Alternative	Thurman I: 8,800 CY Thurman II: 24,500 CY	Thurman I: 10,814 CY Thurman II: 11,744 CY	Thurman I: 0.33 acres Thurman II: 0.33 acres

3.4 Environmental Justice

Executive Order 12898, Federal *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the President on February 11, 1994. The Executive Order requires a federal agency to make "…achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse

human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." As such, a preferred alternative must be evaluated to determine whether any adverse impacts are predominantly borne by a minority population and/or low-income population; or adverse impacts would be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or non-low income population.

Doña Ana County has approximately 65.7 percent Hispanic population and a total of 4.3 percent Black, American Indian/Alaskan, or Asian, based on 2010 U.S. Census Bureau data (USCB 2017a), and 25.7 percent is estimated to be at poverty income levels.

Anticipated Effects: Alternative A: No Action – Sediment Excavation
No effect. The sediment excavation does not target or affect disproportionately populations of low-income or minority residents.

Anticipated Effects: Alternative B: Mesh-Based Sediment Traps
No effect. The sediment trap construction does not target or affect disproportionately populations of low-income or minority residents.

Anticipated Effects: Alternative C: Sediment Basins - Preferred Alternative
No effect. The sediment basins construction does not target or affect disproportionately populations of low-income or minority residents.

3.5 OTHER FACTORS CONSIDERED AND ELIMINATED FROM ANALYSIS

USIBWC considered the following additional factors for possible environmental impacts:

1. Environmental health aspects including noise pollution, air pollution, hazardous agents and chemical exposures. USIBWC employs Best Management Practices under all construction contracts to eliminate or reduce impacts from temporary issues caused during construction. For example, for noise pollution, BMPs include working only during daytime. For air pollution, USIBWC does not anticipate that construction or sediment excavation will cause emission of toxic elements, and BMPS include dust abatement. USIBWC BMPs cover the storage and handling of any hazardous material by USIBWC contractors. Furthermore, the Project Area is sparsely populated. It is surrounded by agricultural fields and foothills, with very few buildings within a half-mile radius.
2. Community resources including recreation. USIBWC does not have any leases of property in this area for official recreation areas, and this area is prohibited from avian hunting due to its proximity to Hatch, NM. Pedestrian access is allowed and will not change as a result of this project. USIBWC has determined that this action will not impact community resources such as recreation.

USIBWC has determined these factors are insignificant for all alternatives and were eliminated from further analysis, per 40 CFR 1508.25.

3.6 CUMULATIVE IMPACTS

3.6.1 Addressing Sediment Input

USIBWC anticipates that cumulative impacts on the sediment input into the Rio Grande could be present from several projects.

The USIBWC's contractor analysis of channel maintenance alternatives outlined a number of possible projects that could be implemented to assist with channel maintenance required in the mainstem of the Rio Grande. Such projects include sediment traps/basins on other arroyos, spur dikes, modified vortex weirs, etc. Implementation of such projects could impact the volume of sediment that is being deposited into the Rio Grande.

In addition, USIBWC and other federal agencies are meeting to discuss possibilities of working together on control of sediment input into the Rio Grande, through a Federal Workgroup of the Rio Grande Canalization Project Sediment Control Initiative. No construction is in the works.

The South Central New Mexico Stormwater Coalition has a Rincon Watershed Committee that is working with New Mexico Water Resources Institute and New Mexico State University to evaluate the Rincon Watershed, including sediment input, runoff, erosion, vegetation cover, soils, and more. This research may result in recommended on-the-ground projects to increase infiltration and decrease erosion, thereby potentially reducing the amount of sediment entering the Rio Grande from this watershed, which produces the most sediment into the Rio Grande from any other tributary without sediment control structures.

The U.S. Army Corps of Engineers (Corps), Albuquerque District, has completed the draft Detailed Project Report with an Integrated Environmental Assessment (DPREA) for the Section 205 Small Flood Risk Management Project in Hatch, New Mexico. The purpose of this project is to reduce flood damages and life safety risk within the project area in the Village of Hatch. The proposed action is to construct an earthen embankment dam that would be located upstream of the Village of Hatch, adjacent to the Spring Canyon Arroyo. Borrow material for the dam would be obtained from the area directly behind the proposed dam. The outlet works would drain water from the retention basin in the Colorado Drain. The inlet channel, which would bring water from the Spring Canyon channel to the dam, would be excavated and lined with roller compacted cement, soil cement and riprap. The proposed project is designed to detain the 0.2 percent chance exceedance event from the Spring Canyon Watershed and release the stored water in a controlled manner over approximately 96 hours or less. The proposed construction period would be approximately ten to fourteen months and would be expected to start in late 2018. The project sponsor is the Doña Ana County Flood Commission (USACE 2017b).

3.6.2 Other Projects

USIBWC does not anticipate that other projects would have cumulative impacts. Below is a description of ongoing projects in the region.

The USIBWC is participating in a collaborative effort with project stakeholders: EBID, USFWS,

Reclamation, and others to implement environmental enhancements that are currently being implemented following the issuance of the 2009 Record of Decision for the RGCP (USIBWC 2009). The ROD requires the agency to implement a variety of approaches to land management, including cessation of mowing in designated areas, elimination of grazing leases throughout the project, and habitat restoration activities such as salt cedar extraction, chemical treatment of salt cedar, installation of groundwater monitoring wells, possible construction of irrigation infrastructure, planting of native trees, channel maintenance, and possible construction of sediment control infrastructure. The 2009 ROD also required the USIBWC to prepare an updated River Management Plan for the RGCP. The River Management Plan was finalized in December of 2016.

USIBWC is working towards implementation of several flood control projects. The USIBWC re-aligned a portion of the Rio Grande in Vado, NM in 2016 in order to construct an east levee where the river was abutting the railroad. USIBWC received an Individual Permit from the USACE for this project, including on-site and off-site mitigation. The Canutillo Phase II project consists of new levees and floodwalls in the Vinton and Canutillo, Texas stretch. Further downstream, the USIBWC is considering flood control improvements in the Courchesne-NeMexas Reach, which extends from Mexico-Texas border at American Dam in El Paso, Texas upstream through the New Mexico-Texas Border at Courchesne Bridge to the Country Club area in Doña Ana County, NM. Those levee reaches include proposed floodwalls, new levees, and planned improvements of existing levees. Throughout the RGCP, USIBWC engineers are looking at possible levee gaps that could weaken the levee system. These areas also have levee design concerns that will require different alternatives to solve the engineering challenges in those areas.

In January 2017, the Bureau of Reclamation finalized a Record of Decision on the Continued Implementation of the 2008 Operating Agreement for the Rio Grande Project, New Mexico and Texas (USBR 2017a). This maintains the status quo operation of the Rio Grande Project from Elephant Butte Dam downstream to American Dam.

3.7 UNAVOIDABLE ADVERSE IMPACTS, AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

A commitment of resources is irreversible when its direct or indirect impacts limit the future availability of a resource. An irretrievable commitment refers to the use of consumption or resources that is neither renewable nor recoverable for later use by future generations. The commitment of resources refers primarily to the use of nonrenewable resources such as fossil fuels, water, labor, and electricity.

The Preferred Alternative would use fuels during construction and construction materials such as concrete and steel, and would alter the arroyo from ephemeral to ponding. Unavoidable adverse impacts include the minimal noise and air quality pollution that would be generated during the construction of the Preferred Alternative, but there would also be minimal noise and air quality pollution that would be generated by implementing the No Action and the Alternative B. None of the alternatives pose substantial unavoidable adverse impacts or irretrievable commitments of resources.

SECTION 4 MITIGATION MEASURES

4.1 MITIGATION PLAN

Although environmental impacts from implementing the Preferred Alternative are anticipated to be minimal, the construction of the endwall and rip rap in the Preferred Alternative would have some unavoidable impacts to riparian vegetation and jurisdictional waters of the United States. The USACE and USEPA regulations (33 CFR 320-331 and 40 CFR 230) authorize the USACE to require compensatory mitigation for unavoidable impacts to wetlands and other jurisdictional waters of the United States. USIBWC would apply for a Clean Water Act Section 404 permit from USACE for this project. The following proposed mitigation plan was prepared in accordance with the Section 404 guidelines as well as 33 CFR Parts 325 and 332, and 40 CFR Part 230.

Furthermore, the Commission on Environmental Quality (CEQ) has provided guidance on the use of mitigation and supports the use of mitigation to lead to a Finding of No Significant Impact (FONSI). Per 40 CFR 1508.20, as described in the CEQ Regulations, agencies can use mitigation to reduce environmental impacts in several ways. Mitigation may include:

- Avoiding an impact by not taking a certain action or parts of an action;
- Minimizing an impact by limiting the degree or magnitude of the action and its implementation;
- Rectifying an impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating an impact over time, through preservation and maintenance operations during the life of the action; and
- Compensating for an impact by replacing or providing substitute resources or environments.

USIBWC anticipates conducting this work under USACE Nationwide Permit 43 for Stormwater Management Facilities. The following plan is a preliminary draft of proposed mitigation based on the USACE South Pacific Division Regulatory Program Standard Operating Procedure for Determination of Mitigation Ratios (USACE 2017a). The USIBWC proposes to mitigate for the total impact of 0.66 acres in the project area caused by fill from construction of the endwall and rip rap. USIBWC proposes three types of mitigation for each sediment basin that would restore, enhance, and protect a total of 2.1 acres. Mitigation for both Thurman I and II are shown in Figures 4-1 and 4-2.

The three types of mitigation USIBWC proposes are as follows:

4. Establish onsite riparian areas along each new sediment basin banks by planting native willows. The sediment basins will create moister and more feasible conditions than currently present along the stream banks by pooling and slowing water.
5. Enhance existing riparian habitat along the embayment and river banks by removing nonnative vegetation such as saltcedar and planting native willows and cottonwoods.
6. Protect the embayment created after the endwall in constructed as an aquatic habitat pool.

Existing native willow trees on the impacted areas will be harvested prior to construction and

replanted on the mitigation sites. The mature willow trees lining the river channel will be harvested, stockpiled in water if necessary, and replanted along the mitigation sites. Species for harvesting will be principally coyote willows and baccharus/seep willow. Harvesting will preferably by done by taking the entire root ball using an excavator or similar machinery, but poles may also be harvested. Native trees will be planted at mitigation areas at a density of approximately 500 poles per acre.

Construction will likely be scheduled to occur in the dry season (non-irrigation season) from October to March. Construction and mitigation contractors will be required to share schedules, so that trees can be scheduled to be harvested prior to the beginning of the construction. They will be immediately replanted at the mitigation areas, or stored in water for a limited time prior to planting.

USIBWC will continue its No-Mow Zone along thirty-five feet of the river bank to allow the river's edge and embankment to recruit mesic and wetland vegetation similar to that present today including three square, coyote willow, mule fat, acacia, and other species. This vegetation will naturally recruit and establish on the near-shore embankment.

Mitigation operations will be performed in accordance with guidance as published in the USDA New Mexico Natural Resources Conservation Service and the New Mexico Association of Conservation Districts guide entitled, *"A Guide for Planning Riparian Treatments in New Mexico"* (USDA-NRCS 2007). USIBWC Contractors will apply certain restoration techniques to increase the percent cover of the plantings. Such techniques may include planting several poles per hole to increase survival rate and density, as well as lopping off the top of the poles at the ground level at random and scattered holes to promote leafout from the base of the pole in order to increase density and percent cover.

At all mitigation sites, USIBWC Contractors will also be required to water the planted poles with water trucks at least once in the first season after planting but prior to irrigation releases in order to promote root growth and plant vigor.

In addition, USIBWC will initiate a nonnative and invasive species control plan including herbicide spraying, cutting, and pulling as necessary on a biannual basis before and after the rainy season. Particular species among others to be controlled include salt cedar and common reed.

This mitigation plan accommodates environmental conditions in the river including low and highly variable rainfall, controlled and intermittent river flows, and vegetation cover that is usually controlled by land management practices of the USIBWC, including mowing and cutting. This onsite mitigation plan, using both plantings of harvested vegetation and natural recruitment of vegetation, will establish vegetative cover similar to that present but with more diversity of cover and structure over a larger area. In addition, this plan will provide as much as practicable onsite mitigation through the enhancement of a riparian habitat zone on the river.

The mitigation sites will be 30 to 35 feet wide as this has been determined to promote endangered flycatcher activity such as migration and foraging. These sites will enhance the much larger flycatcher habitat and breeding zones being developed for the 2009 ROD. Mitigation work

conducted under this SEA will complement upstream restoration work under the ROD (USIBWC 2009a).

Monitoring will occur for at least five years. The monitoring will consist of replacing dead pole plantings or harvested trees with new willow pole plantings, invasive species will be removed when identified, and USIBWC floodplain maintenance will avoid the mitigated riparian zones. Monitoring will also include assessment of embayment conditions.

Additionally, USIBWC would implement Best Management Practices (BMPs) that are standard for USIBWC construction projects to minimize impacts to soil, water, wildlife, and other resources. BMPs are documented in USIBWC's River Management Plan and include, but are not limited to: dust abatement during construction, doing construction work only during dry or low-flow conditions, avoiding impacts to nesting birds, servicing of heavy machinery outside of the floodplain, and reporting unearthed cultural resources and other natural resources during construction.

Details of the proposed monitoring plan are subject to change after public notice and concurrence from USACE for permitting requirements.

Figure 4-1 Draft Proposed Thurman I Mitigation

Figure 4-2 Draft Proposed Thurman II Mitigation

SECTION 5 PUBLIC INVOLVEMENT

5.1 AGENCY COORDINATION

This section discusses consultation and coordination that will occur during the preparation of this document. This includes contacts made during development of the proposed action, other alternatives considered, and preparation or distribution of the Draft EA. Formal and informal coordination will be conducted with the following agencies through notice of the Draft EA:

- New Mexico State Historic Preservation Office (SHPO)
- U.S. Fish and Wildlife Service (USFWS)
- United States Environmental Protection Agency (USEPA), Region 6
- U.S. Army Corps of Engineers (USACE)
- New Mexico Environmental Department (NMED)
- New Mexico Department of Game and Fish (NMGFD)

5.2 PUBLIC INFORMATION AND REVIEW

In accordance with NEPA, a 30-day review period of the Draft EA was provided via a Notice of Availability in the Federal Register from October 17, 2017 through November 20, 2017, posted on the USIBWC website located at www.ibwc.gov/EMD/EIS_EA_Public-comment.html, and a local mailing (Appendix C).

SECTION 6 LIST OF PREPARERS

Name	Agency/Title	Degree	Years of Experience	Role
Gilbert G. Anaya	USIBWC Environmental management Division Chief	M.S. Environmental Science	30	Reviewer
Elizabeth Verdecchia	USIBWC Natural Resources Specialist	M.A.G. Applied Geography; NEPA Graduate Certificate	17	Preparer
Derrick O'Hara	USIBWC Civil Engineer	M.A. and B.S. in Civil Engineering	7	Reviewer

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Appendix A Project Designs (PreFinal)

(From USIBWC 2017d)

UNITED STATES INTERNATIONAL BOUNDARY AND WATER COMMISSION

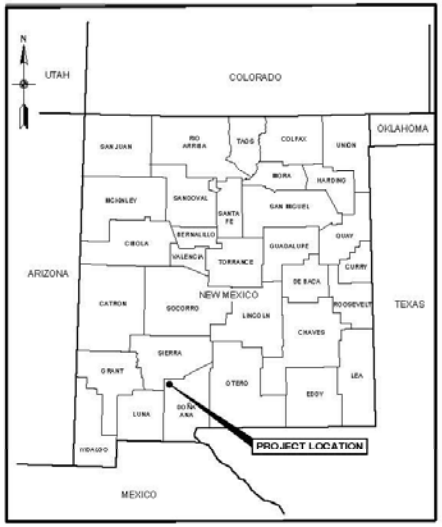
Construction of Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico

PRE-FINAL SUBMITTAL

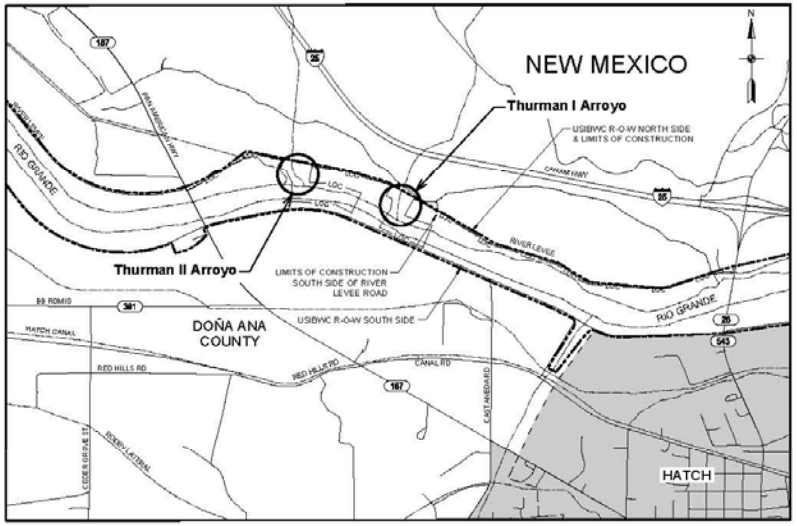
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION
4171 NORTH MESA, SUITE C-100
EL PASO, TEXAS 79902

URS
9400 AMBERGLEN BLVD
AUSTIN, TEXAS 78729
(512) 454-4797

CONTRACT NO: IBM15D0003
TASK ORDER NO: IBM16T0019



PROJECT VICINITY MAP
NOT TO SCALE



SURVEY CONTROL
Horizontal coordinates are referenced to New Mexico State Plane, Central Zone, North American Datum of 1983 (NAD 83). Vertical coordinates are referenced to North American Vertical Datum of 1988 (NAVD 88).

PROJECT LOCATION MAP
0 500 1,000 2,000
SCALE IN FEET

DRAWING INDEX

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2	LEGEND AND ABBREVIATIONS
3	GENERAL NOTES
4	EXISTING BORING PLAN
5	EXISTING BORING LOGS
6	THURMAN I ARROYO EXISTING SITE PLAN
7	THURMAN I ARROYO PLAN AND PROFILE
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9	THURMAN II ARROYO EXISTING SITE PLAN
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12	TYPICAL SECTIONS
13	THURMAN I AND II ARROYO ACCESS ROAD PLAN
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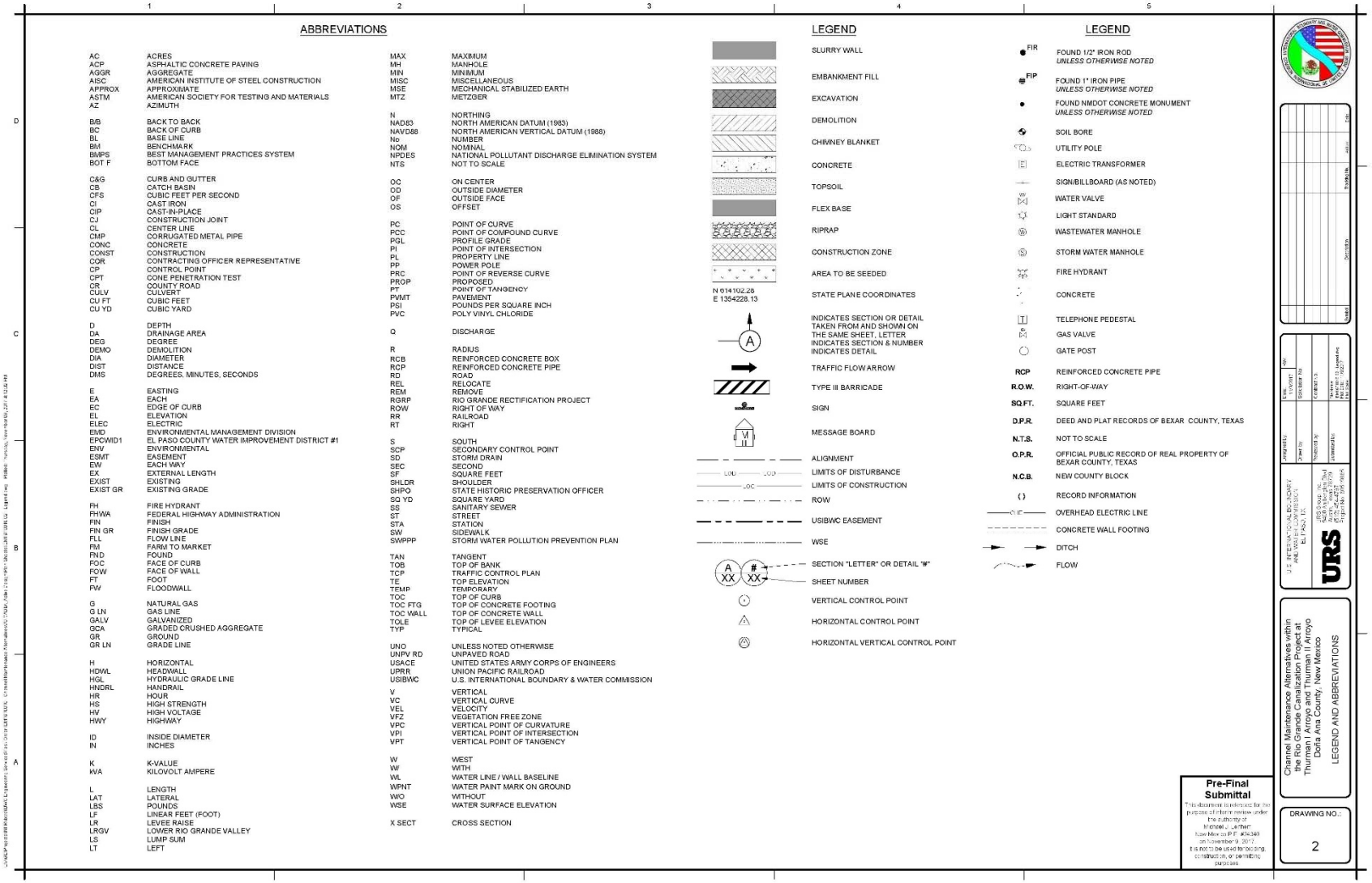
35	THURMAN II ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
36	THURMAN II ARROYO SEDIMENT REMOVAL CROSS-SECTIONS

Pre-Final Submittal
This document is released for the purpose of interim review under the authority of Michael J. Lenhart New Mexico P. E. #24340 on November 9, 2017. It is not to be used for bidding, construction, or permitting purposes.

DRAWING NO.: 1


ABBREVIATIONS
AC ACRES
ACP ASPHALTIC CONCRETE PAVING
AGGR AGGREGATE
AISC AMERICAN INSTITUTE OF STEEL CONSTRUCTION
APPROX APPROXIMATE
ASTM AMERICAN SOCIETY FOR TESTING AND MATERIALS
AZ AZIMUTH
B/B BACK TO BACK
BC BACK OF CURB
BL BASE LINE
BM BENCHMARK
BMPS BEST MANAGEMENT PRACTICES SYSTEM
BOT F BOTTOM FACE
C&G CURB AND GUTTER
CB CATCH BASIN
CFS CUBIC FEET PER SECOND
CI CAST IRON
CIP CAST-IN-PLACE
CJ CONSTRUCTION JOINT
CL CENTER LINE
CMP CORRUGATED METAL PIPE
CONC CONCRETE
CONST CONSTRUCTION
COR CONTRACTING OFFICER REPRESENTATIVE
CP CONTROL POINT
CPT CONE PENETRATION TEST
CR COUNTY ROAD
CULV CULVERT
CU FT CUBIC FEET
CU YD CUBIC YARD
D DEPTH
DA DRAINAGE AREA
DEG DEGREE
DEMO DEMOLITION
DIA DIAMETER
DIST DISTANCE
DMS DEGREES, MINUTES, SECONDS
E EASTING
EA EACH
EC EDGE OF CURB
EL ELEVATION
ELEC ELECTRIC
EMD ENVIRONMENTAL MANAGEMENT DIVISION
EPCWID1 EL PASO COUNTY WATER IMPROVEMENT DISTRICT #1
ENV ENVIRONMENTAL
ESMT EASEMENT
EW EACH WAY
EX EXTERNAL LENGTH
EXIST EXISTING
EXIST GR EXISTING GRADE
FH FIRE HYDRANT
FHWA FEDERAL HIGHWAY ADMINISTRATION
FIN FINISH
FIN GR FINISH GRADE
FLL FLOW LINE
FM FARM TO MARKET
FND FOUND
FOC FACE OF CURB
FOW FACE OF WALL
FT FOOT
FW FLOODWALL
G NATURAL GAS
G LN GAS LINE
GALV GALVANIZED
GCA GRADED CRUSHED AGGREGATE
GR GROUND
GR LN GRADE LINE
H HORIZONTAL
HDWL HEADWALL
HGL HYDRAULIC GRADE LINE
HNDRL HANDRAIL
HR HOUR
HS HIGH STRENGTH
HV HIGH VOLTAGE
HWY HIGHWAY
ID INSIDE DIAMETER
IN INCHES
K K-VALUE
kVA KILOVOLT AMPERE
L LENGTH
LAT LATERAL
LBS POUNDS
LF LINEAR FEET (FOOT)
LR LEVEE RAISE
LRGV LOWER RIO GRANDE VALLEY
LS LUMP SUM
LT LEFT
MAX MAXIMUM
MH MANHOLE
MIN MINIMUM
MISC MISCELLANEOUS
MSE MECHANICAL STABILIZED EARTH
MTZ METZGER
N NORTHING
NAD83 NORTH AMERICAN DATUM (1983)
NAVD88 NORTH AMERICAN VERTICAL DATUM (1988)
No NUMBER
NOM NOMINAL
NPDES NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
NTS NOT TO SCALE
OC ON CENTER
OD OUTSIDE DIAMETER
OF OUTSIDE FACE
OS OFFSET
PC POINT OF CURVE
PCC POINT OF COMPOUND CURVE
PGL PROFILE GRADE
PI POINT OF INTERSECTION
PL PROPERTY LINE
PP POWER POLE
PRC POINT OF REVERSE CURVE
PROP PROPOSED
PT POINT OF TANGENCY
PVMT PAVEMENT
PSI POUNDS PER SQUARE INCH
PVC POLY VINYL CHLORIDE
Q DISCHARGE
R RADIUS
RCB REINFORCED CONCRETE BOX
RCP REINFORCED CONCRETE PIPE
RD ROAD
REL RELOCATE
REM REMOVE
RGRP RIO GRANDE RECTIFICATION PROJECT
ROW RIGHT OF WAY
RR RAILROAD
RT RIGHT
S SOUTH
SCP SECONDARY CONTROL POINT
SD STORM DRAIN
SEC SECOND
SF SQUARE FEET
SHLDR SHOULDER
SHPO STATE HISTORIC PRESERVATION OFFICER
SQ YD SQUARE YARD
SS SANITARY SEWER
ST STREET
STA STATION
SW SIDEWALK
SWPPP STORM WATER POLLUTION PREVENTION PLAN
TAN TANGENT
TOB TOP OF BANK
TCP TRAFFIC CONTROL PLAN
TE TOP ELEVATION
TEMP TEMPORARY
TOC TOP OF CURB
TOC FTG TOP OF CONCRETE FOOTING
TOC WALL TOP OF CONCRETE WALL
TOLE TOP OF LEVEE ELEVATION
TYP TYPICAL
UNO UNLESS NOTED OTHERWISE
UNPV RD UNPAVED ROAD
USACE UNITED STATES ARMY CORPS OF ENGINEERS
UPRR UNION PACIFIC RAILROAD
USIBWC U.S. INTERNATIONAL BOUNDARY & WATER COMMISSION
V VERTICAL
VC VERTICAL CURVE
VEL VELOCITY
VFZ VEGETATION FREE ZONE
VPC VERTICAL POINT OF CURVATURE
VPI VERTICAL POINT OF INTERSECTION
VPT VERTICAL POINT OF TANGENCY
W WEST
W/ WITH
WL WATER LINE / WALL BASELINE
WPNT WATER PAINT MARK ON GROUND
W/O WITHOUT
WSE WATER SURFACE ELEVATION
X SECT CROSS SECTION
LEGEND
SLURRY WALL
EMBANKMENT FILL
EXCAVATION
DEMOLITION
CHIMNEY BLANKET
CONCRETE
TOPSOIL
FLEX BASE
RIPRAP
CONSTRUCTION ZONE
AREA TO BE SEEDED
N 614102.28
E 1354228.13
STATE PLANE COORDINATES
A
INDICATES SECTION OR DETAIL TAKEN FROM AND SHOWN ON THE SAME SHEET, LETTER INDICATES SECTION & NUMBER INDICATES DETAIL
TRAFFIC FLOW ARROW
TYPE III BARRICADE
SIGN
M
MESSAGE BOARD
ALIGNMENT
LOD
LIMITS OF DISTURBANCE
LOC
LIMITS OF CONSTRUCTION
ROW
USIBWC EASEMENT
WSE
A XX
XX
SECTION "LETTER" OR DETAIL "#"
SHEET NUMBER
VERTICAL CONTROL POINT
HORIZONTAL CONTROL POINT
HORIZONTAL VERTICAL CONTROL POINT
LEGEND
FIR
FOUND 1/2" IRON ROD
UNLESS OTHERWISE NOTED
FIP
FOUND 1" IRON PIPE
UNLESS OTHERWISE NOTED
FOUND NMDOT CONCRETE MONUMENT
UNLESS OTHERWISE NOTED
SOIL BORE
UTILITY POLE
E
ELECTRIC TRANSFORMER
SIGN/BILLBOARD (AS NOTED)
WATER VALVE
LIGHT STANDARD
WASTEWATER MANHOLE
STORM WATER MANHOLE
FIRE HYDRANT
CONCRETE
T
TELEPHONE PEDESTAL
GAS VALVE
GATE POST
RCP REINFORCED CONCRETE PIPE
R.O.W. RIGHT-OF-WAY
SQ.FT. SQUARE FEET
D.P.R. DEED AND PLAT RECORDS OF BEXAR COUNTY, TEXAS
N.T.S. NOT TO SCALE
O.P.R. OFFICIAL PUBLIC RECORD OF REAL PROPERTY OF BEXAR COUNTY, TEXAS
N.C.B. NEW COUNTY BLOCK
( ) RECORD INFORMATION
OHP
OVERHEAD ELECTRIC LINE
CONCRETE WALL FOOTING
DITCH
FLOW
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION
EL PASO, TX
URS
Pre-Final Submittal
This document is released for the purpose of interim review under the authority of Michael J. Lechner, New Mexico P.E. #14340 on November 9, 2017. It is not to be used for bidding, construction, or permitting purposes
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
LEGEND AND ABBREVIATIONS
DRAWING NO.:
2

General Notes:

1.0 Coordinate work activities, including access, with the USIBWC Contracting Officer's Representative (COR).

1.1 Contractor shall refer to technical Specifications Division 01-General Requirements, 01.57.00 "Temporary Controls for Work Areas", and 01.57.13 "Temporary Environmental Controls".

1.2 The contractor will not contact the New Mexico Historical Preservation Department (NPD), New Mexico Environmental Department (NMED), U.S. Fish and wildlife Service (USFWS), NEW MEXICO Parks and Wildlife Department (NMPWD or the Environmental Protection Agency (EPA) unless USIBWC environmental staff are present or have authorized the contractor to contact those entities.

1.3 All equipment that is used on government property must be fully operational and free of any oil or fluid leaks. Any leaks noted on equipment onsite shall be repaired immediately by the contractor. failure to do so will be cause for the government to reject the deficient equipments use onsite.

1.4 Contractor is responsible for condition of all completed contractual work until final acceptance of project is completed and contractor warranty is implemented by USIBWC.

1.5 Contractor is aware that other federal agencies / property owners / local agencies, may operate within project right of way. Contractor is responsible for securing any open excavations and other safety hazards at end of work shift every day.

1.6 The contractor is not allowed to use vegetative buffer as part of their SWPPP Controls.

1.7 The contractor shall maintain all erosion control as required per the applicable specification 01.57.13 Temporary Environmental Controls throughout construction and shall inspect erosion controls on a minimum weekly basis.

1.8 All work shall be done by a contractor having a valid, appropriate contractor's license issued by the State of New Mexico Regulation and Licensing Department.

1.9 All bid items are complete in place, including furnishing all materials, equipment, tools, supplies, incidentals, transportation and experienced personnel and superintendence required.

1.10 The contractor shall protect all adjacent property and existing and new improvements, and shall provide positive control of earth spillage, construction water and runoff water from the site.

1.11 The contractor shall limit all construction activities to within the USIBWC Right-of -Way and easements as noted on the contract drawings.

1.12 All fees and permits required for the work shall be obtained and paid by the contractor. No project extension will be allotted due to time required to obtain permits.

1.13 The contractor shall comply with all local, state, and federal regulations related to the safety of personnel and the public on the job site, including Applicable Occupational Safety and Health Administration Regulations, as well as USACE EM 385-1-1.

1.14 The contractor shall be responsible for site security at the staging and storage area during construction. Temporary fencing noted in the contractor's site security plan shall be installed and maintained by the contractor during the entire construction of the project.

1.15 During the course of all work on the project, the contractor shall assume sole and complete responsibility for all job site conditions including safety of all persons and security of all property. The contractor shall supervise and direct the work using the skills and attention utilized within the industry. The contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the work under this contract. This requirement shall apply continuously and not be limited to normal working hours. The contractor shall defend, indemnify and hold the USIBWC and the engineer harmless from any and all liability, real or alleged, in connection with the performance of the work on this project, excepting liability arising from the sole negligence of the USIBWC or engineer.

General Notes (cont):

1.16 If unanticipated conditions are encountered during the course of construction, the contractor shall immediately bring the condition to the attention of the USIBWC (COR).

1.17 A copy of these contract drawings shall be kept in an easily accessible location on the project site at all times during construction.

1.20 The contractor shall perform excavation in a safe condition. The contractor is solely responsible for shoring, sheeting, or other protective measures to prevent damage to adjacent properties, structures or utility facilities.

1.19 The USIBWC (COR) shall determine acceptability of the materials of construction as indicated in the applicable sections of the specifications. The contractor shall bear all costs of providing the burden of proof that non-conforming work is reasonable and adequately addresses the design purpose. The contractor shall bear all risk for continuing with non-conforming work in question until a determination regarding its acceptability is made by USIBWC (COR). The USIBWC (COR) may impose conditions for acceptance of non-conforming work. The contractor shall bear all costs for the fulfillment of the conditions imposed. All decisions regarding whether the work satisfies the design purpose, whether non-conforming work is reasonably acceptable, and the conditions for acceptance shall be at the sole discretion of the USIBWC (COR).

1.20 All trash, rubble, and debris encountered within the project limits shall be removed and disposed of offsite by the contractor at an approved location. The contractor shall pay all associated dumping fees.

1.21 Equipment and material not in use shall be located outside of the limits of the arroyo. The floodplain shall remain clear of any obstruction when the contractor isn't actively working in the area.

1.22 These contract drawings have been prepared based on a LIDAR Survey. The existing underground utilities shown are based on as-built information provided by the USIBWC. The best effort has been made to depict these utilities, but these locations shall be considered approximate. There may be additional underground utilities not shown on the contract drawings. It shall be the responsibility of the contractor to verify existence and location of all utilities including use of private utility locating service and potholing as necessary to confirm all utilities prior to construction per the applicable specification requirements.

1.23 Quantities shown on various "Quantity Summary Tables" herein shall be considered as informational only and shall not serve as the basis of the contractors bid. It is expressly understood and agreed that the quantities noted in these tables are not by virtue of submitting a bid, a part of the contract, and represent only an opinion by the engineer as to the quantities specific to that table. The quantity tables are included in the plans only for the convenience of bidders and their use is subject to all the conditions and limitations set forth in the contract documents relating to the examination of the contract documents and the submission of a bid. Specifically, submission of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, the character, quality, and scope of work to be performed, the quantities of materials to be furnished, and the requirements of the contract documents. The bidder is cautioned that it is his/her sole responsibility to make such independent investigation and examination as the bidder deems necessary in order to satisfy his/herself as to the conditions to be encountered in the performance of work and the quantities required to complete the work in accordance with the contract documents. The bidder shall take no advantage of any apparent error or omission in the plans, bid schedule items, estimated quantities noted in the schedule, specifications or other contract documents. In the event the bidder discovers an apparent error or omission or be in doubt as to their meaning, the bidder shall immediately notify the USIBWC, in writing, requesting a clarification or interpretation. Any clarification and or interpretation deemed appropriate by the USIBWC shall be issued to all prospective bidders in the form of an addendum. Any addendum so issued shall form a part of the contract documents.

1.24 Neither the USIBWC nor the engineer warrants or guarantees the results of any geotechnical or subsurface investigations as being representative of the site, beyond the actual location of the test specimen(s) and assumes no responsibility for the manner in which this information may be used or the conclusions reached in utilizing the information as provided in the contract documents. Further, the USIBWC and the engineer neither warrants or guarantees the conclusions reached, recommendations made or test results presented as part of the geotechnical or subsurface investigation as being representative of the entire site. It shall be the contractors sole responsibility to supplement any information provided with additional subsurface investigations and testing, at their sole expense in order to assure the information provided in the contract documents is representative of the conditions to be encountered within the limits of the project at the time of construction.

Survey Notes:

2.0 Existing topographic data shown on these plans was produced from a LiDAR survey performed in 2011.

2.1 This survey does not identify or delineate any surface or subsurface mineral rights, nor does it identify any rights to the surface resulting from said mineral rights.

2.2 Coordinates are based on North American Datum of 1983 (NAD83), New Mexico State Plane Coordinate System, Central Zone (FIPS 3002), Grid Coordinates.

2.3 Elevations shown herein are based on North American Vertical Datum of 1988 (NAVD 88) per the LiDAR data.

2.4 Utilities shown herein are based on field observations only.

Utility Coordination Notes:

3.0 A New Mexico 811 utility locate (Ticket #16OC310653) was requested for the subject property during design. At the time, the project area was found to be free of utilities. However, it will be the responsibility of the contractor to confirm that no utilities exist at the two sites.

3.1 Contractor shall contact New Mexico (811) 48 hours prior to beginning work at any location to ensure that the area is free of utilities within the work zone.

Contact information:
www.NM811.Org.
Phone: (505) 260-1165

Traffic Control Notes:

4.0 The contractor shall maintain traffic control for the project site in accordance with Specification Section 01.55.00 Vehicular Access and Parking.

Stormwater Pollution Prevention Plan (SWPPP) Notes:

5.0 The contractor shall perform SWPPP work in accordance with Specification Section 01.57.13 Temporary Environmental Controls.

Pre-Final Submittal

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U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION
EL PASO, TX

URS

Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico

GENERAL NOTES

DRAWING NO.: 3


N
0 100' 200' 400'
SCALE: 1" = 200'
LEGEND:
HT-74 EXISTING SOIL BORING
USIBWC R-O-W
HT-77
HT-76
HT-75
HT-74
HT-73
HT-72
HT-182
HT-183
HT-184
HT-185
HT-186
HT-181
THURMAN II ARROYO
THURMAN I ARROYO
RIO GRANDE
NOTES:
1. Boring locations are from the Final Technical Memorandum, Geotechnical Explorations of Levee System within the Rio Grande Canalization Project, Hatch-Tonaco Levee Segment prepared by SBI Infrastructure, Ltd. in association with Raba-Kistner Consultants, Inc. dated August 4, 2008.
2. See Sheet No. 5 for boring logs.
Pre-Final Submittal
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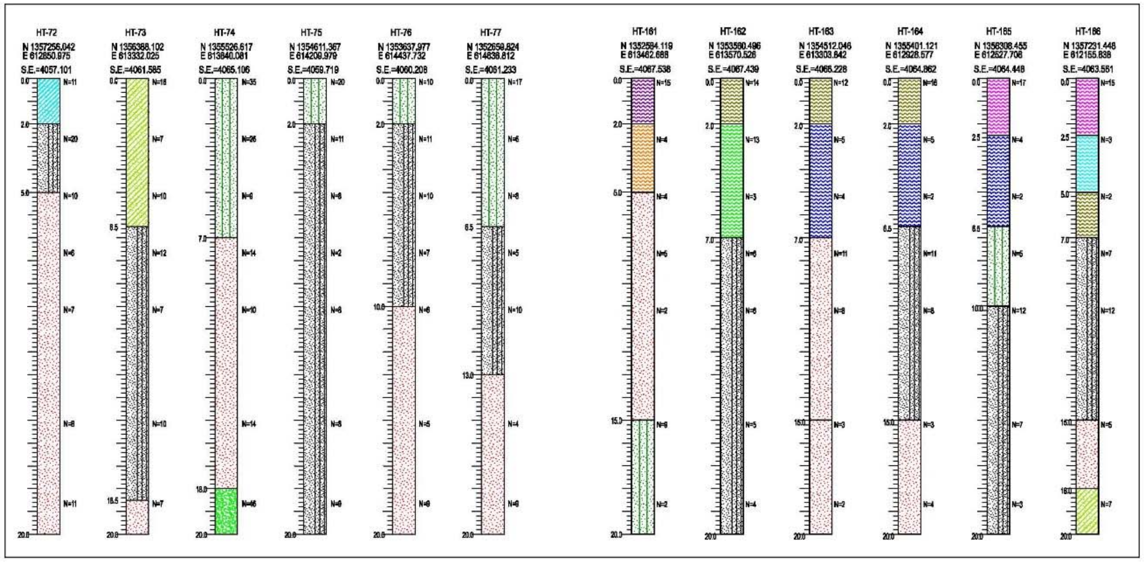
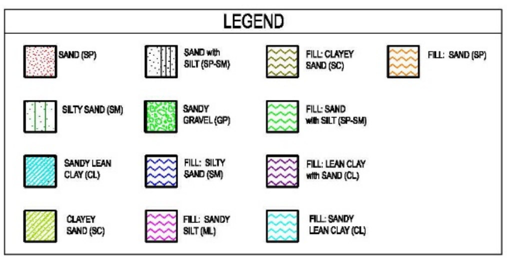
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION EL PASO, TX
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
EXISTING BORING PLAN
DRAWING NO.:
4





NOTES:

1. No site or project specific geotechnical field investigation or sampling was performed for this design.
2. Boring logs shown hereon are from the ***Final Technical Memorandum, Geotechnical Explorations of Levee System within the Rio Grande Canalization Project, Hatch-Tonuco Levee Segment*** prepared by S&B Infrastructure, Ltd. in association with Raba-Kistner Consultants, Inc. dated August 4, 2008.
3. The existing geotechnical borings available for review, as shown on this drawing only extend slightly below the bottom elevation of the proposed basin end walls. Consequently, unknown subsurface conditions exist below the proposed end walls.
4. Due to the lack of site-specific information, URS has made conservative assumptions of subsurface conditions to develop preliminary recommendations for drilled pier foundations. URS has conservatively assumed the subsurface conditions below the proposed basin end walls consist of loose, saturated sand with a unit weight of 100 pcf and effective friction angle of 28 degrees.
5. Although not a requirement of the contract, URS recommends these assumptions stated in Note 4 be validated prior to construction with additional deep geotechnical borings at each basin end wall location to: 1) ascertain if soil strengths are equal to or greater than those assumed for design; and 2) identify any challenging construction conditions that could result in unforeseen complications during construction. Such complications could include underground obstructions (boulders/cobbles), conditions leading to borehole instability such as excessive drilling fluid loss in permeable sands/gravels or dense layers that preclude temporary casing advancement, and presence of soils requiring different drilling methods (e.g., very soft versus very hard material).

Pre-Final Submittal

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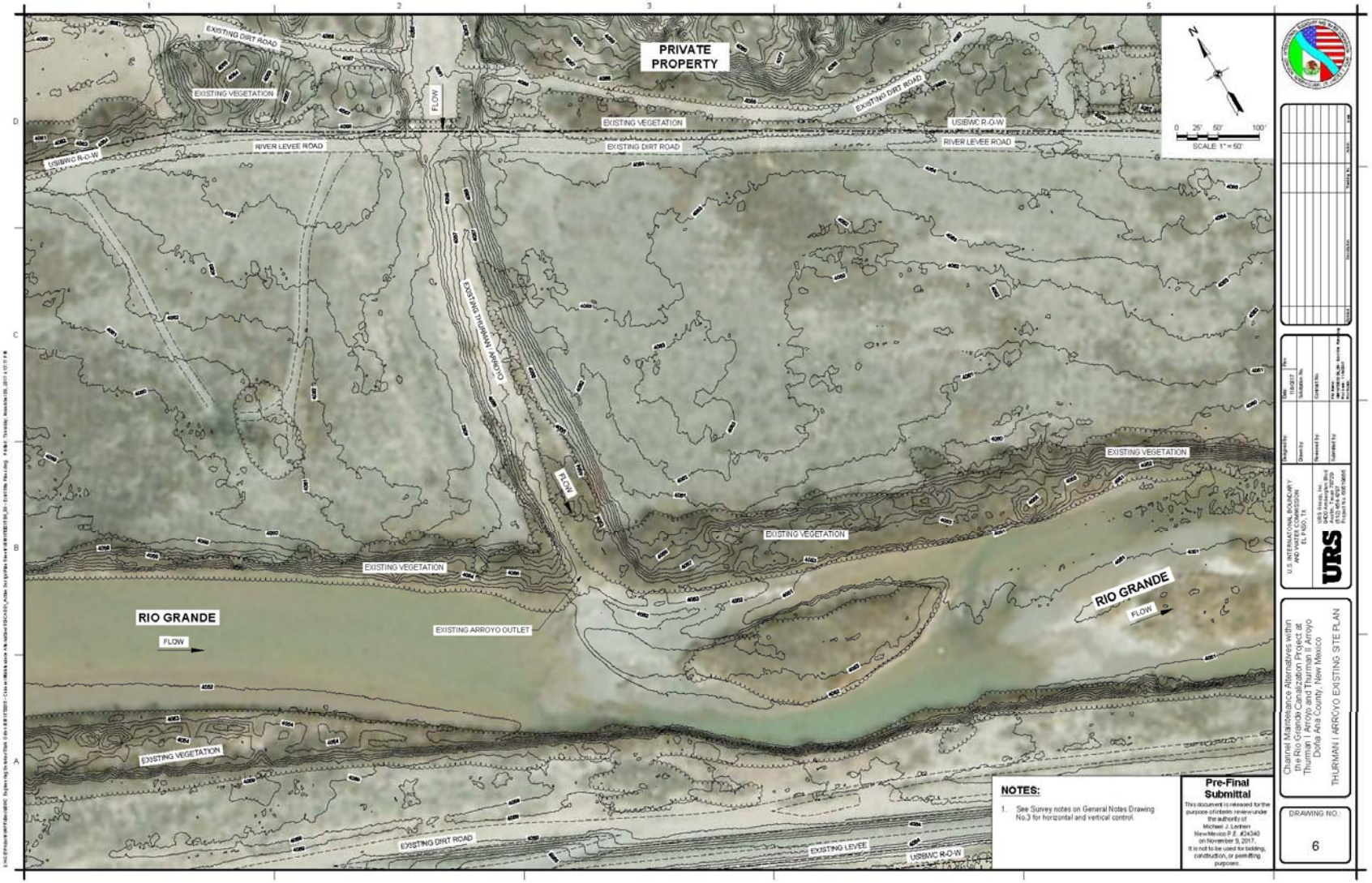
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION EL PASO, TX

URS

Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico

EXISTING BORING LOGS

DRAWING NO.: 5


PRIVATE PROPERTY
EXISTING DIRT ROAD
EXISTING VEGETATION
FLOW
USIBWC R-O-W
RIVER LEVEE ROAD
EXISTING THURMAN ARROYO
EXISTING ARROYO OUTLET
RIO GRANDE
EXISTING LEVEE
SCALE: 1" = 50'
NOTES:
1. See Survey notes on General Notes Drawing No.3 for horizontal and vertical control.
Pre-Final Submittal
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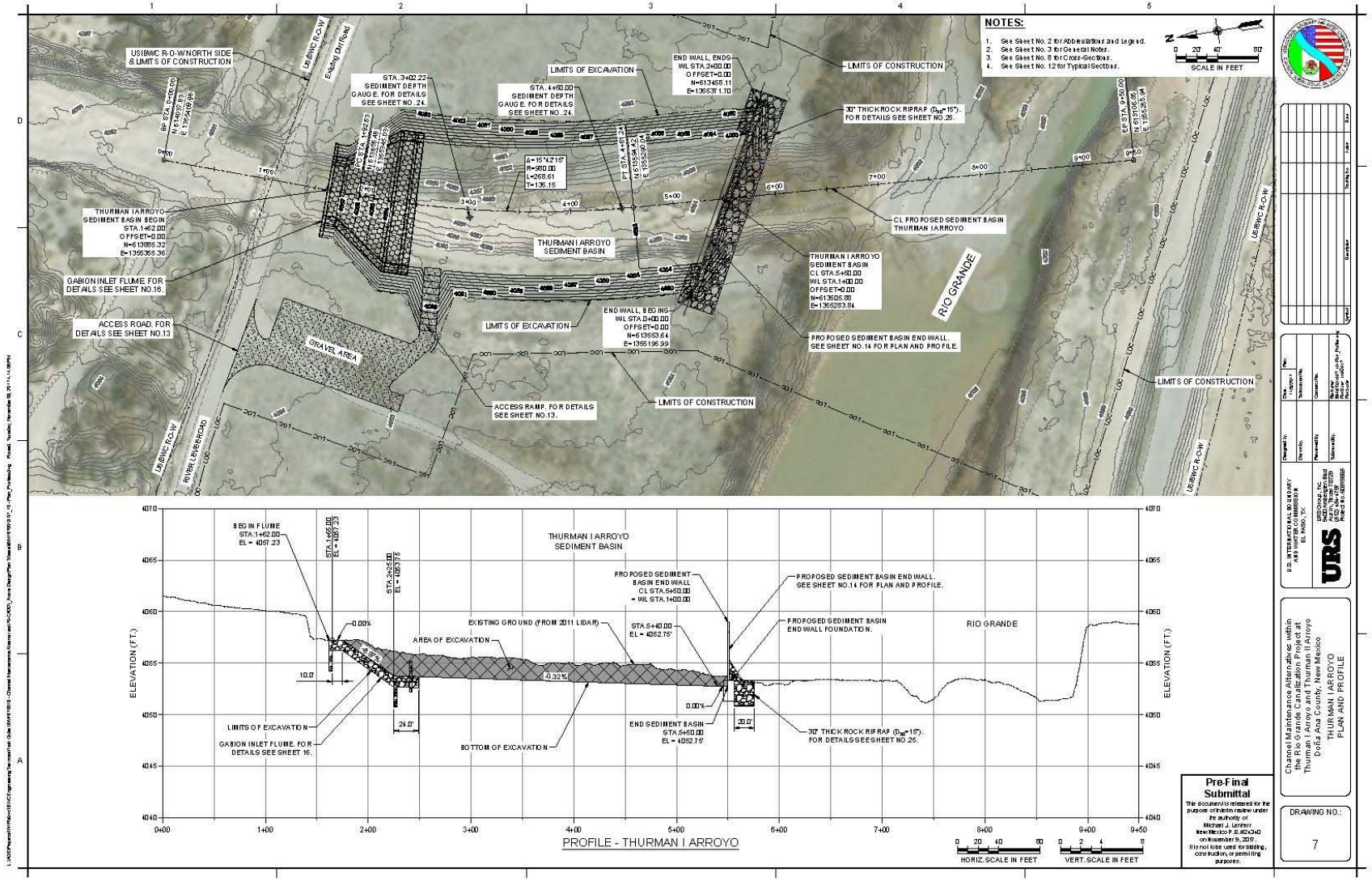
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION EL PASO, TX
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN I ARROYO EXISTING SITE PLAN
DRAWING NO.:
6


NOTES:
1. See Sheet No. 2 for Abbreviations and Legend.
2. See Sheet No. 3 for General Notes.
3. See Sheet No. 8 for Cross-Sections.
4. See Sheet No. 12 for Typical Sections.
SCALE IN FEET
USIBWC R-O-W/NORTH SIDE & LIMITS OF CONSTRUCTION
USIBWC R.O.W
Existing Dirt Road
LIMITS OF EXCAVATION
LIMITS OF CONSTRUCTION
END WALL ENDS WL STA.2+00.00 OFFSET=0.00 N=613458.11 E=1356391.10
STA. 3+02.22 SEDIMENT DEPTH GAUGE. FOR DETAILS SEE SHEET NO. 24.
STA. 4+50.00 SEDIMENT DEPTH GAUGE. FOR DETAILS SEE SHEET NO. 24.
30" THICK ROCK RIPRAP (D50=15"). FOR DETAILS SEE SHEET NO.25.
THURMAN I ARROYO SEDIMENT BASIN BEGIN STA.1+62.00 OFFSET=0.00 N=613885.32 E=1356355.36
GABION INLET FLUME FOR DETAILS SEE SHEET NO.16.
THURMAN I ARROYO SEDIMENT BASIN
CL PROPOSED SEDIMENT BASIN THURMAN I ARROYO
THURMAN I ARROYO SEDIMENT BASIN CL STA.5+60.00 WL STA.1+00.00 OFFSET=0.00 N=613606.88 E=1356283.84
RIO GRANDE
ACCESS ROAD. FOR DETAILS SEE SHEET NO.13
GRAVEL AREA
END WALL, BEGINS WL STA.0+00.00 OFFSET=0.00 N=613553.64 E=1355196.99
PROPOSED SEDIMENT BASIN END WALL. SEE SHEET NO.14 FOR PLAN AND PROFILE.
ACCESS RAMP. FOR DETAILS SEE SHEET NO.13.
RIVER LEVEE ROAD
THURMAN I ARROYO SEDIMENT BASIN
BEGIN FLUME STA.1+62.00 EL = 4057.23
STA.1+65.00 EL = 4057.23
STA.2+25.00 EL = 4053.75
PROPOSED SEDIMENT BASIN END WALL CL STA.5+60.00 = WL STA.1+00.00
PROPOSED SEDIMENT BASIN END WALL. SEE SHEET NO.14 FOR PLAN AND PROFILE.
EXISTING GROUND (FROM 2011 LIDAR)
STA.5+40.00 EL = 4052.75'
PROPOSED SEDIMENT BASIN END WALL FOUNDATION.
RIO GRANDE
AREA OF EXCAVATION
0.00%
0.32%
10.0'
24.0'
20.0'
LIMITS OF EXCAVATION
GABION INLET FLUME. FOR DETAILS SEE SHEET 16.
BOTTOM OF EXCAVATION
END SEDIMENT BASIN STA.5+60.00 EL = 4052.75'
30" THICK ROCK RIPRAP (D50=15"). FOR DETAILS SEE SHEET NO.25.
ELEVATION (FT.)
PROFILE - THURMAN I ARROYO
HORIZ. SCALE IN FEET
VERT. SCALE IN FEET
Pre-Final Submittal
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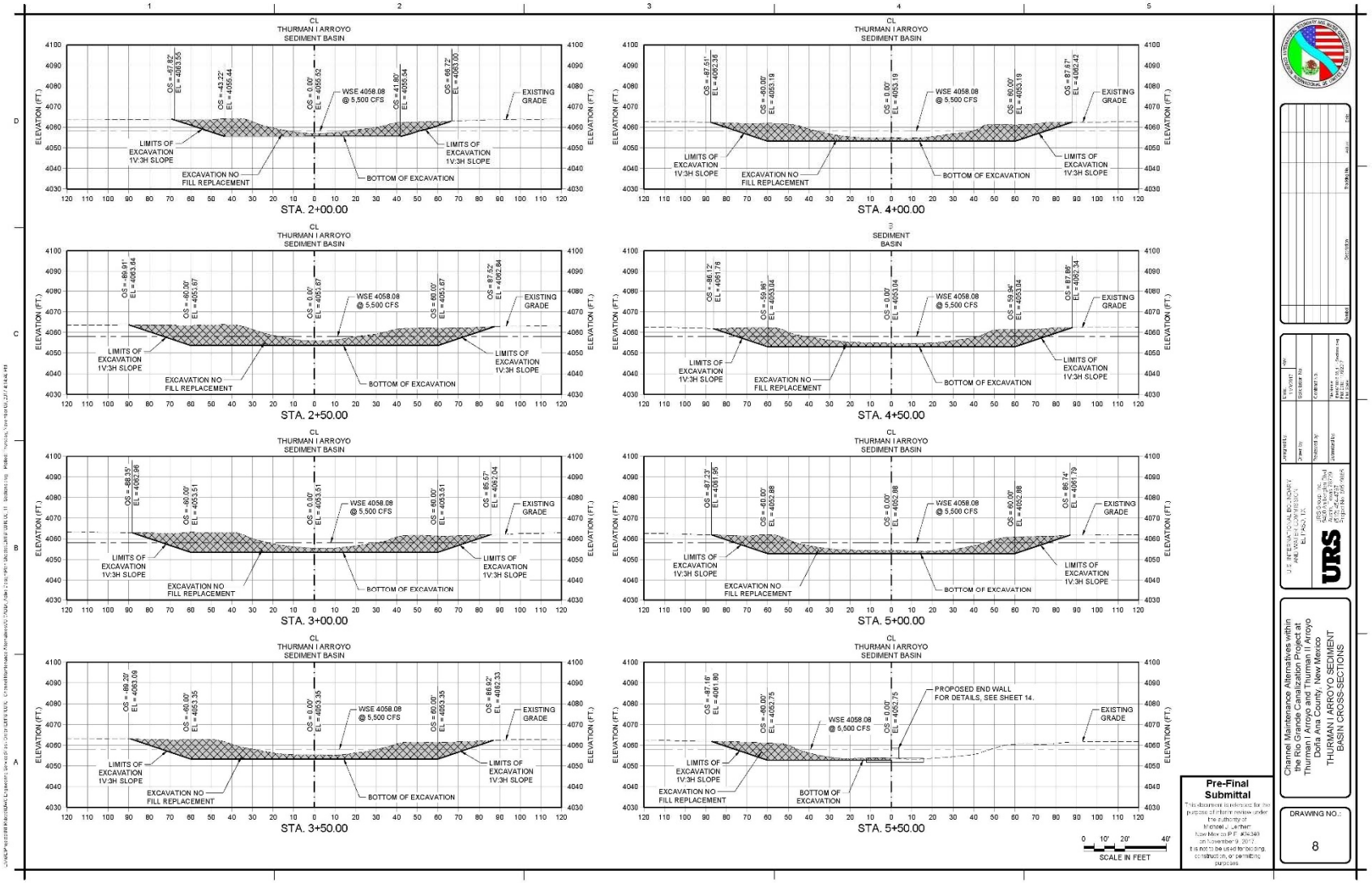
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION EL PASO, TX
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN I ARROYO PLAN AND PROFILE
DRAWING NO.:
7


CL
THURMAN I ARROYO
SEDIMENT BASIN
OS = 87.82'
EL = 4063.55
OS = 43.22'
EL = 4056.44
OS = 0.00'
EL = 4056.52
WSE 4058.08
@ 5,500 CFS
OS = 41.80'
EL = 4058.54
OS = 86.72'
EL = 4063.00
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF EXCAVATION
LIMITS OF
EXCAVATION
1V:3H SLOPE
ELEVATION (FT.)
STA. 2+00.00
OS = 87.51'
EL = 4062.36
OS = 60.00'
EL = 4053.19
OS = 0.00'
EL = 4053.19
WSE 4058.08
@ 5,500 CFS
OS = 60.00'
EL = 4053.19
OS = 87.67'
EL = 4062.42
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF EXCAVATION
LIMITS OF
EXCAVATION
1V:3H SLOPE
ELEVATION (FT.)
STA. 4+00.00
OS = 89.91'
EL = 4063.64
OS = 60.00'
EL = 4053.67
OS = 0.00'
EL = 4053.67
WSE 4058.08
@ 5,500 CFS
OS = 60.00'
EL = 4053.67
OS = 87.52'
EL = 4062.84
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF EXCAVATION
LIMITS OF
EXCAVATION
1V:3H SLOPE
ELEVATION (FT.)
STA. 2+50.00
OS = 86.12'
EL = 4061.76
OS = 59.96'
EL = 4053.04
OS = 0.00'
EL = 4053.04
WSE 4058.08
@ 5,500 CFS
OS = 59.94'
EL = 4053.04
OS = 87.86'
EL = 4062.34
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF EXCAVATION
LIMITS OF
EXCAVATION
1V:3H SLOPE
ELEVATION (FT.)
STA. 4+50.00
OS = 88.35'
EL = 4062.86
OS = 60.00'
EL = 4053.61
OS = 0.00'
EL = 4053.61
WSE 4058.08
@ 5,500 CFS
OS = 60.00'
EL = 4053.61
OS = 85.57'
EL = 4062.04
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF EXCAVATION
LIMITS OF
EXCAVATION
1V:3H SLOPE
ELEVATION (FT.)
STA. 3+00.00
OS = 87.23'
EL = 4061.95
OS = 60.00'
EL = 4052.88
OS = 0.00'
EL = 4052.88
WSE 4058.08
@ 5,500 CFS
OS = 60.00'
EL = 4052.88
OS = 86.74'
EL = 4061.79
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF EXCAVATION
LIMITS OF
EXCAVATION
1V:3H SLOPE
ELEVATION (FT.)
STA. 5+00.00
OS = 89.20'
EL = 4063.09
OS = 60.00'
EL = 4053.35
OS = 0.00'
EL = 4053.35
WSE 4058.08
@ 5,500 CFS
OS = 60.00'
EL = 4053.35
OS = 86.92'
EL = 4062.33
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF EXCAVATION
LIMITS OF
EXCAVATION
1V:3H SLOPE
ELEVATION (FT.)
STA. 3+50.00
OS = 87.16'
EL = 4061.80
OS = 60.00'
EL = 4052.75
OS = 0.00'
EL = 4052.75
PROPOSED END WALL
FOR DETAILS, SEE SHEET 14.
WSE 4058.08
@ 5,500 CFS
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF
EXCAVATION
ELEVATION (FT.)
STA. 5+50.00
0 10' 20' 40'
SCALE IN FEET
Pre-Final
Submittal
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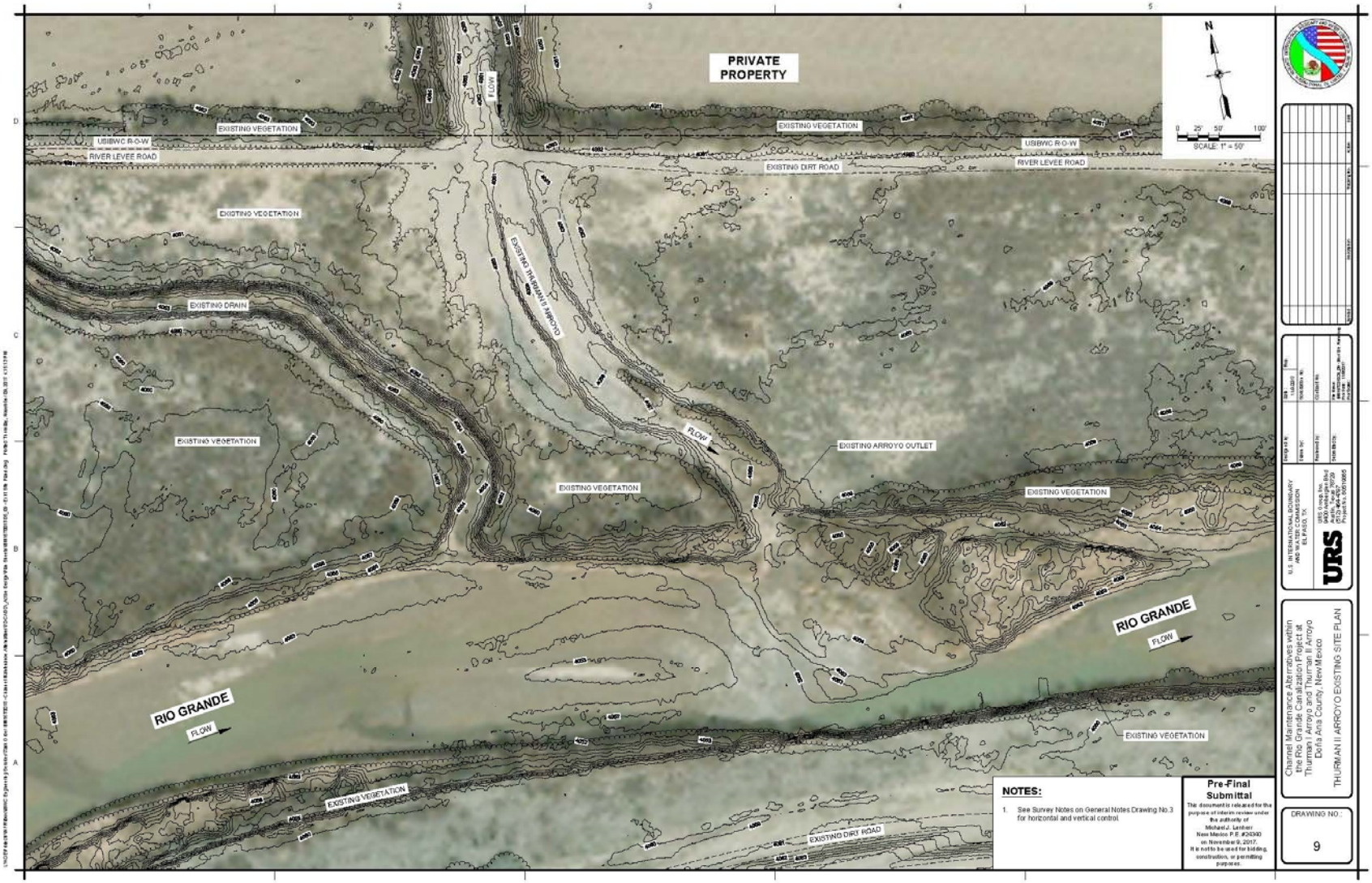
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION
EL PASO, TX
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
THURMAN I ARROYO SEDIMENT BASIN CROSS-SECTIONS
DRAWING NO.:
8


PRIVATE PROPERTY
EXISTING VEGETATION
USIBWC R-O-W
RIVER LEVEE ROAD
EXISTING DIRT ROAD
EXISTING DRAIN
EXISTING THURMAN II ARROYO
EXISTING ARROYO OUTLET
FLOW
RIO GRANDE
N
SCALE: 1" = 50'
NOTES:
1. See Survey Notes on General Notes Drawing No.3 for horizontal and vertical control.
Pre-Final Submittal
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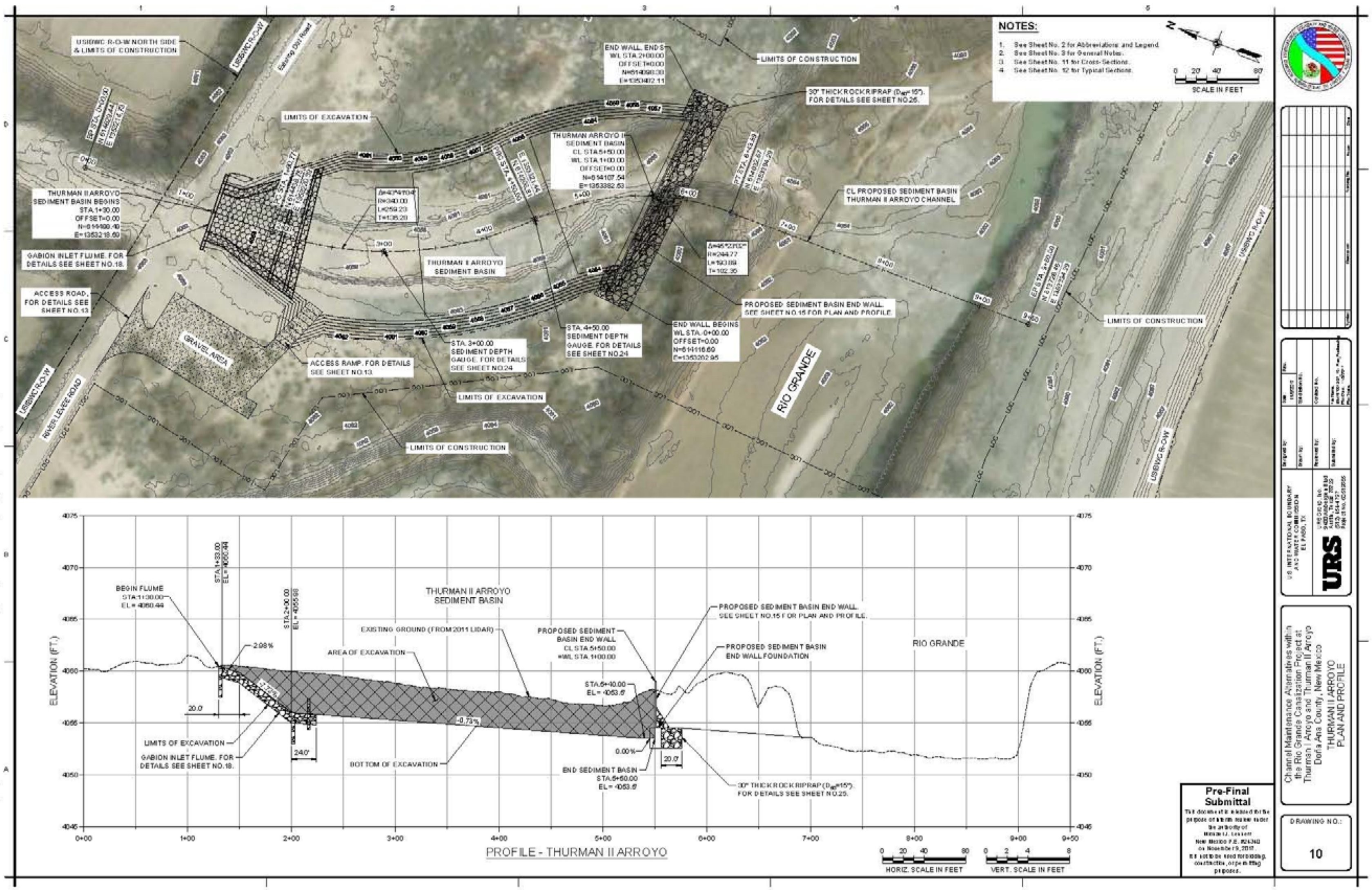
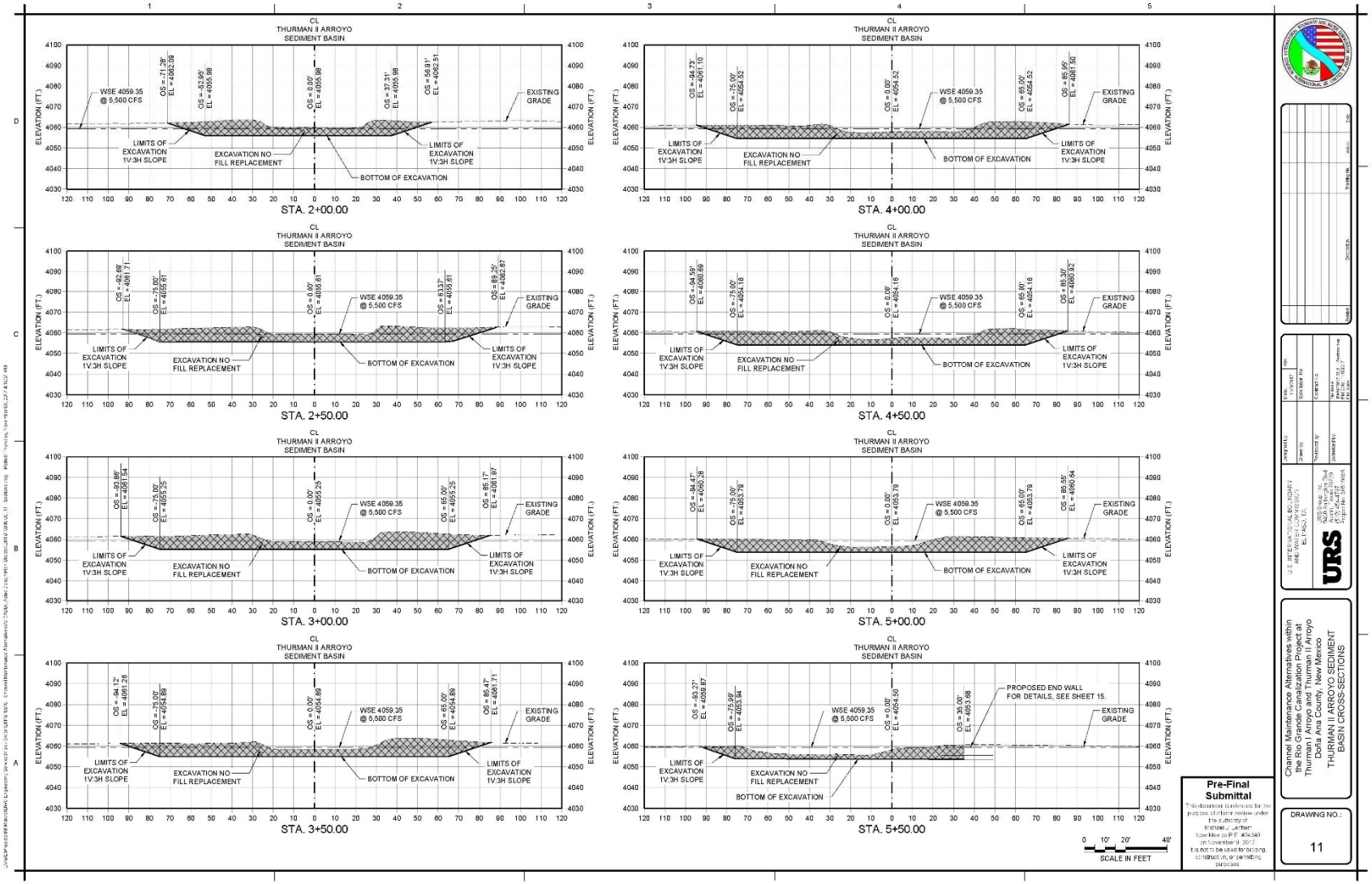
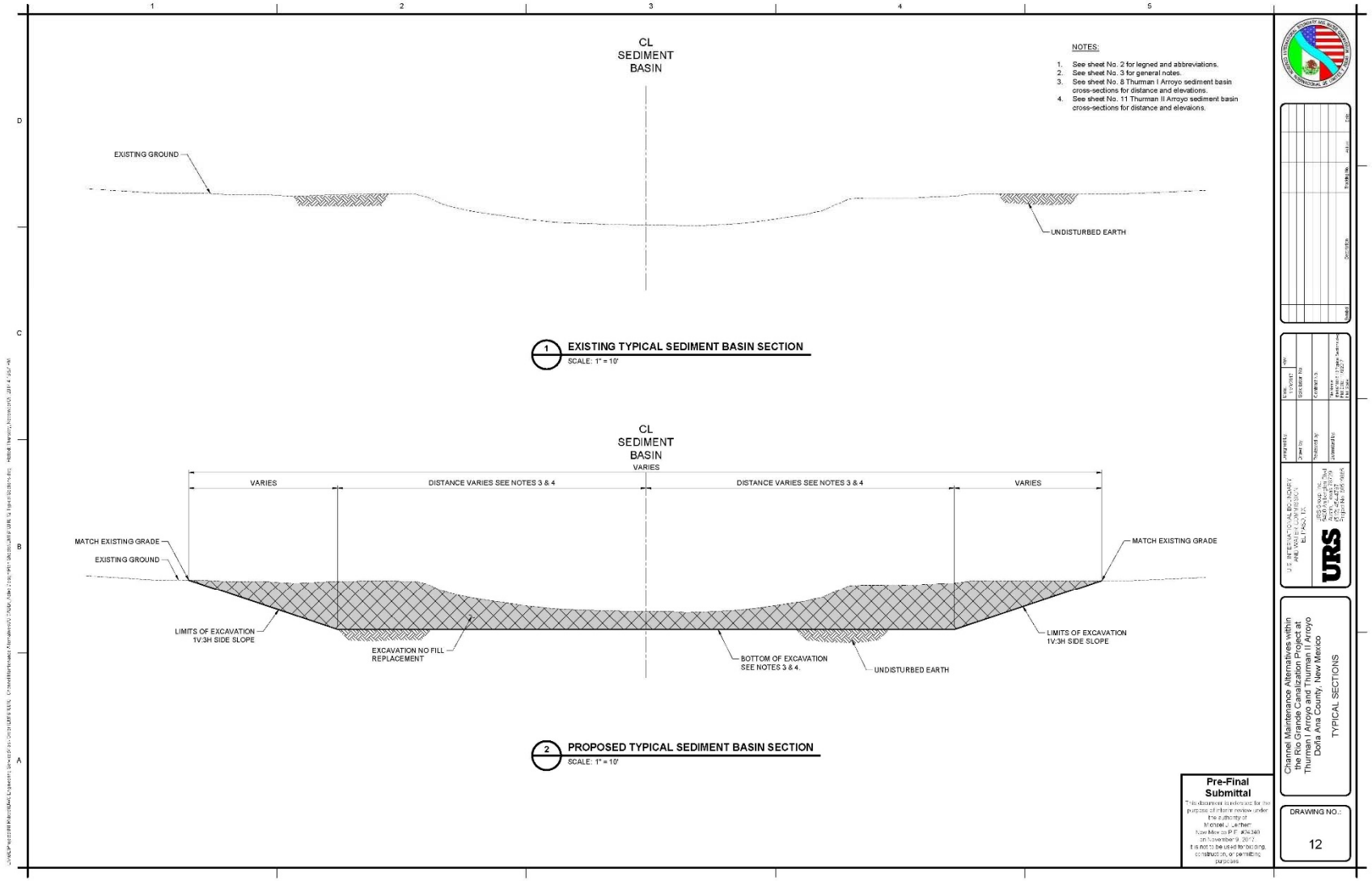
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION EL PASO, TX
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN II ARROYO EXISTING SITE PLAN
DRAWING NO.:
9


NOTES:
1. See Sheet No. 2 for Abbreviations and Legend.
2. See Sheet No. 3 for General Notes.
3. See Sheet No. 11 for Cross-Sections.
4. See Sheet No. 12 for Typical Sections.
SCALE IN FEET
USIBWC R-O-W NORTH SIDE & LIMITS OF CONSTRUCTION
LIMITS OF EXCAVATION
END WALL ENDS
LIMITS OF CONSTRUCTION
30" THICK ROCK RIPRAP. FOR DETAILS SEE SHEET NO.25.
THURMAN II ARROYO SEDIMENT BASIN BEGINS
GABION INLET FLUME. FOR DETAILS SEE SHEET NO.18.
ACCESS ROAD, FOR DETAILS SEE SHEET NO.13
GRAVEL AREA
THURMAN II ARROYO SEDIMENT BASIN
CL PROPOSED SEDIMENT BASIN THURMAN II ARROYO CHANNEL
PROPOSED SEDIMENT BASIN END WALL. SEE SHEET NO.15 FOR PLAN AND PROFILE.
ACCESS RAMP. FOR DETAILS SEE SHEET NO.13.
SEDIMENT DEPTH GAUGE. FOR DETAILS SEE SHEET NO.24
END WALL BEGINS
RIO GRANDE
RIVER LEVEE ROAD
USIBWC R-O-W
THURMAN II ARROYO SEDIMENT BASIN
BEGIN FLUME
EXISTING GROUND (FROM 2011 LIDAR)
AREA OF EXCAVATION
PROPOSED SEDIMENT BASIN END WALL
PROPOSED SEDIMENT BASIN END WALL FOUNDATION
RIO GRANDE
LIMITS OF EXCAVATION
GABION INLET FLUME. FOR DETAILS SEE SHEET NO.18.
BOTTOM OF EXCAVATION
END SEDIMENT BASIN
30" THICK ROCK RIPRAP. FOR DETAILS SEE SHEET NO.25.
ELEVATION (FT.)
PROFILE - THURMAN II ARROYO
HORIZ. SCALE IN FEET
VERT. SCALE IN FEET
Pre-Final Submittal
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
THURMAN II ARROYO PLAN AND PROFILE
DRAWING NO.:
10


CL
THURMAN II ARROYO
SEDIMENT BASIN
ELEVATION (FT.)
WSE 4059.35
@ 5,500 CFS
EXISTING
GRADE
LIMITS OF
EXCAVATION
1V:3H SLOPE
EXCAVATION NO
FILL REPLACEMENT
BOTTOM OF EXCAVATION
STA. 2+00.00
STA. 4+00.00
STA. 2+50.00
STA. 4+50.00
STA. 3+00.00
STA. 5+00.00
STA. 3+50.00
STA. 5+50.00
PROPOSED END WALL
FOR DETAILS, SEE SHEET 15.
SCALE IN FEET
Pre-Final
Submittal
Channel Maintenance Alternatives within
the Rio Grande Canalization Project at
Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
THURMAN II ARROYO SEDIMENT
BASIN CROSS-SECTIONS
DRAWING NO.:
11


CL
SEDIMENT
BASIN
NOTES:
1. See sheet No. 2 for legned and abbreviations.
2. See sheet No. 3 for general notes.
3. See sheet No. 8 Thurman I Arroyo sediment basin cross-sections for distance and elevations.
4. See sheet No. 11 Thurman II Arroyo sediment basin cross-sections for distance and elevaions.
EXISTING GROUND
UNDISTURBED EARTH
1 EXISTING TYPICAL SEDIMENT BASIN SECTION
SCALE: 1" = 10'
CL
SEDIMENT
BASIN
VARIES
VARIES
DISTANCE VARIES SEE NOTES 3 & 4
DISTANCE VARIES SEE NOTES 3 & 4
VARIES
MATCH EXISTING GRADE
EXISTING GROUND
MATCH EXISTING GRADE
LIMITS OF EXCAVATION
1V:3H SIDE SLOPE
EXCAVATION NO FILL
REPLACEMENT
BOTTOM OF EXCAVATION
SEE NOTES 3 & 4.
UNDISTURBED EARTH
LIMITS OF EXCAVATION
1V:3H SIDE SLOPE
2 PROPOSED TYPICAL SEDIMENT BASIN SECTION
SCALE: 1" = 10'
Pre-Final
Submittal
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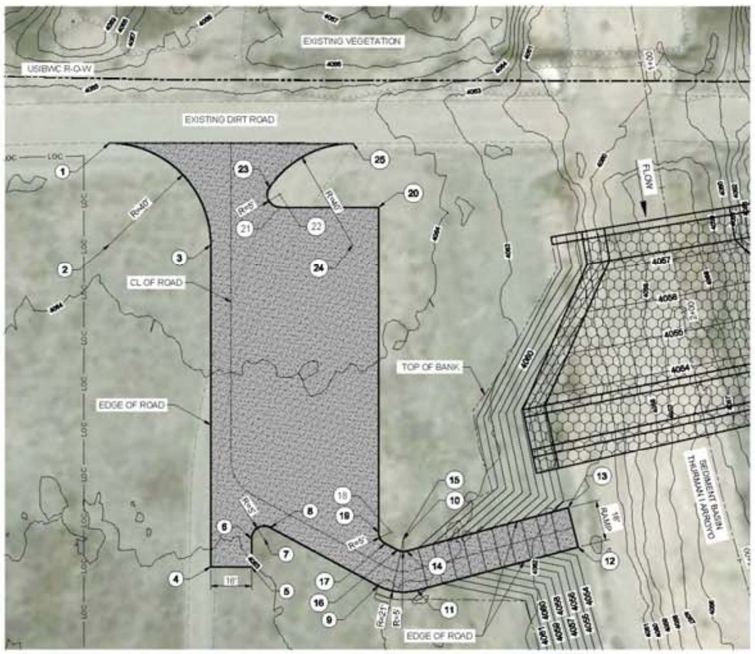
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION
EL PASO, TX
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
TYPICAL SECTIONS
DRAWING NO.:
12

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
1	614017.95	1355178.28	4064.61
2	613993.09	1355158.78	4064.19
3	613963.56	1355183.61	4064.40
4	613952.82	1355131.64	4062.77
5	613845.01	1355145.80	4062.93
6	613854.64	1355150.89	4063.26
7	613852.20	1355155.36	4063.34
8	613854.87	1355159.69	4063.51
9	613814.18	1355185.37	4063.00
10	613825.40	1355203.11	4063.14
11	613805.04	1355197.96	4062.93
12	613788.96	1355261.47	4053.58
13	613804.40	1355265.67	4053.63

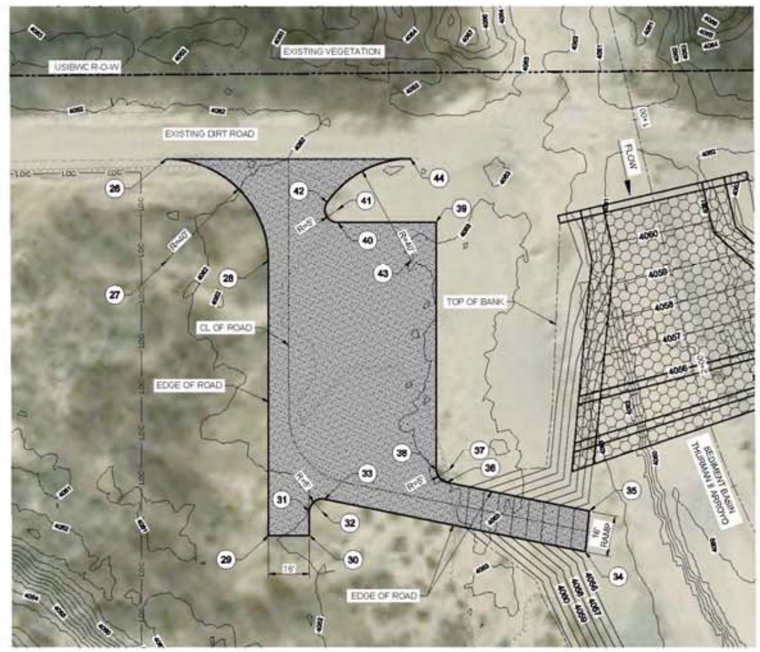
POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
14	613820.55	1355201.88	4063.15
15	613825.40	1355203.11	4063.14
16	613822.72	1355198.89	4063.14
17	613827.29	1355195.98	4063.18
18	613829.87	1355200.21	4063.21
19	613832.41	1355195.85	4063.22
20	613844.23	1355258.43	4064.33
21	613963.17	1355224.57	4064.25
22	613967.54	1355227.01	4064.28
23	613972.03	1355224.81	4064.30
24	613938.25	1355242.40	4064.42
25	613971.00	1355261.94	4064.33



1 THURMAN I ARROYO ACCESS ROAD PLAN
SCALE: 1" = 20'

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
26	614550.60	1353034.02	4061.55
27	614511.37	1353026.19	4061.82
28	614503.53	1353065.40	4062.26
29	614387.18	1353044.13	4061.82
30	614394.04	1353059.82	4062.20
31	614403.22	1353061.88	4062.03
32	614402.24	1353066.66	4062.11
33	614406.95	1353068.50	4062.13
34	614366.30	1353164.98	4055.76

POINT TABLE			
POINT #	NORTHING	EASTING	ELEVATION
35	614381.69	1353169.64	4055.81
36	614403.89	1353116.96	4062.99
37	614408.49	1353118.80	4063.10
38	614409.47	1353113.89	4063.08
39	614505.29	1353133.06	4062.87
40	614512.89	1353095.09	4062.61
41	614517.79	1353096.07	4062.66
42	614521.40	1353092.61	4062.52
43	614492.55	1353120.31	4062.99
44	614531.77	1353128.16	4062.57



2 THURMAN II ARROYO ACCESS ROAD PLAN
SCALE: 1" = 20'

Pre-Final Submittal

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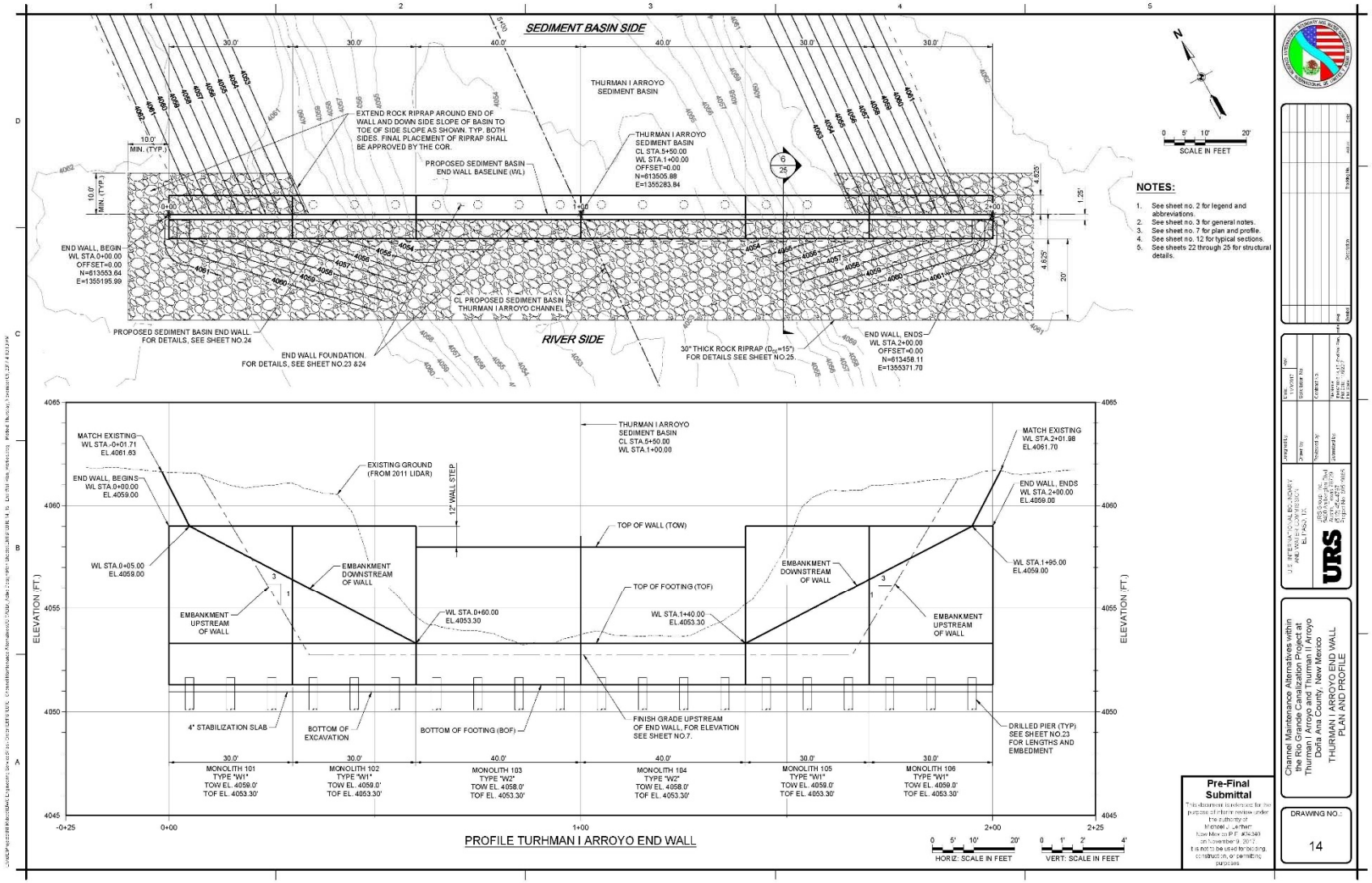
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico

THURMAN I AND II ARROYO ACCESS ROAD PLAN

DRAWING NO.

13


SEDIMENT BASIN SIDE
RIVER SIDE
THURMAN I ARROYO SEDIMENT BASIN
EXTEND ROCK RIPRAP AROUND END OF WALL AND DOWN SIDE SLOPE OF BASIN TO TOE OF SIDE SLOPE AS SHOWN. TYP. BOTH SIDES. FINAL PLACEMENT OF RIPRAP SHALL BE APPROVED BY THE COR.
PROPOSED SEDIMENT BASIN END WALL BASELINE (WL)
THURMAN I ARROYO SEDIMENT BASIN CL STA.5+50.00 WL STA.1+00.00 OFFSET=0.00 N=613505.88 E=1355283.84
END WALL, BEGIN WL STA.0+00.00 OFFSET=0.00 N=613553.64 E=1355195.99
CL PROPOSED SEDIMENT BASIN THURMAN I ARROYO CHANNEL
PROPOSED SEDIMENT BASIN END WALL FOR DETAILS, SEE SHEET NO.24
END WALL FOUNDATION. FOR DETAILS, SEE SHEET NO.23 &24
30" THICK ROCK RIPRAP (D_{50}=15") FOR DETAILS SEE SHEET NO.25.
END WALL, ENDS WL STA.2+00.00 OFFSET=0.00 N=613458.11 E=1355371.70
SCALE IN FEET
NOTES:
1. See sheet no. 2 for legend and abbreviations.
2. See sheet no. 3 for general notes.
3. See sheet no. 7 for plan and profile.
4. See sheet no. 12 for typical sections.
5. See sheets 22 through 25 for structural details.
MATCH EXISTING WL STA.-0+01.71 EL.4061.83
END WALL, BEGINS WL STA.0+00.00 EL.4059.00
EXISTING GROUND (FROM 2011 LIDAR)
12" WALL STEP
WL STA.0+05.00 EL.4059.00
EMBANKMENT DOWNSTREAM OF WALL
EMBANKMENT UPSTREAM OF WALL
WL STA.0+60.00 EL.4053.30
TOP OF WALL (TOW)
TOP OF FOOTING (TOF)
WL STA.1+40.00 EL.4053.30
MATCH EXISTING WL STA.2+01.98 EL.4061.70
END WALL, ENDS WL STA.2+00.00 EL.4059.00
WL STA.1+95.00 EL.4059.00
4" STABILIZATION SLAB
BOTTOM OF EXCAVATION
BOTTOM OF FOOTING (BOF)
FINISH GRADE UPSTREAM OF END WALL, FOR ELEVATION SEE SHEET NO.7.
DRILLED PIER (TYP) SEE SHEET NO.23 FOR LENGTHS AND EMBEDMENT
MONOLITH 101 TYPE "W1" TOW EL. 4059.0' TOF EL. 4053.30'
MONOLITH 102 TYPE "W1" TOW EL. 4059.0' TOF EL. 4053.30'
MONOLITH 103 TYPE "W2" TOW EL. 4058.0' TOF EL. 4053.30'
MONOLITH 104 TYPE "W2" TOW EL. 4058.0' TOF EL. 4053.30'
MONOLITH 105 TYPE "W1" TOW EL. 4059.0' TOF EL. 4053.30'
MONOLITH 106 TYPE "W1" TOW EL. 4059.0' TOF EL. 4053.30'
ELEVATION (FT.)
PROFILE TURHMAN I ARROYO END WALL
HORIZ: SCALE IN FEET
VERT: SCALE IN FEET
Pre-Final Submittal
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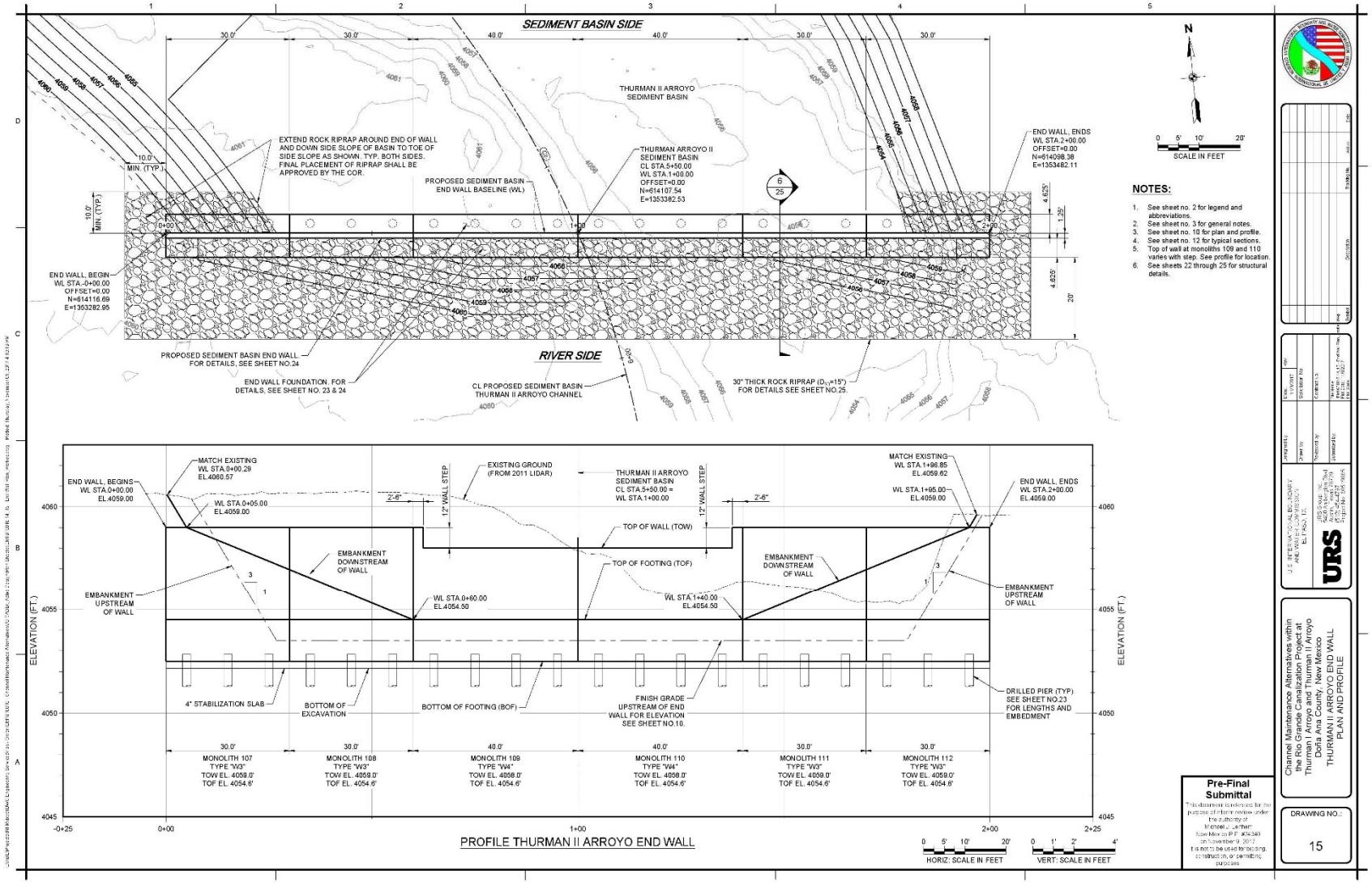
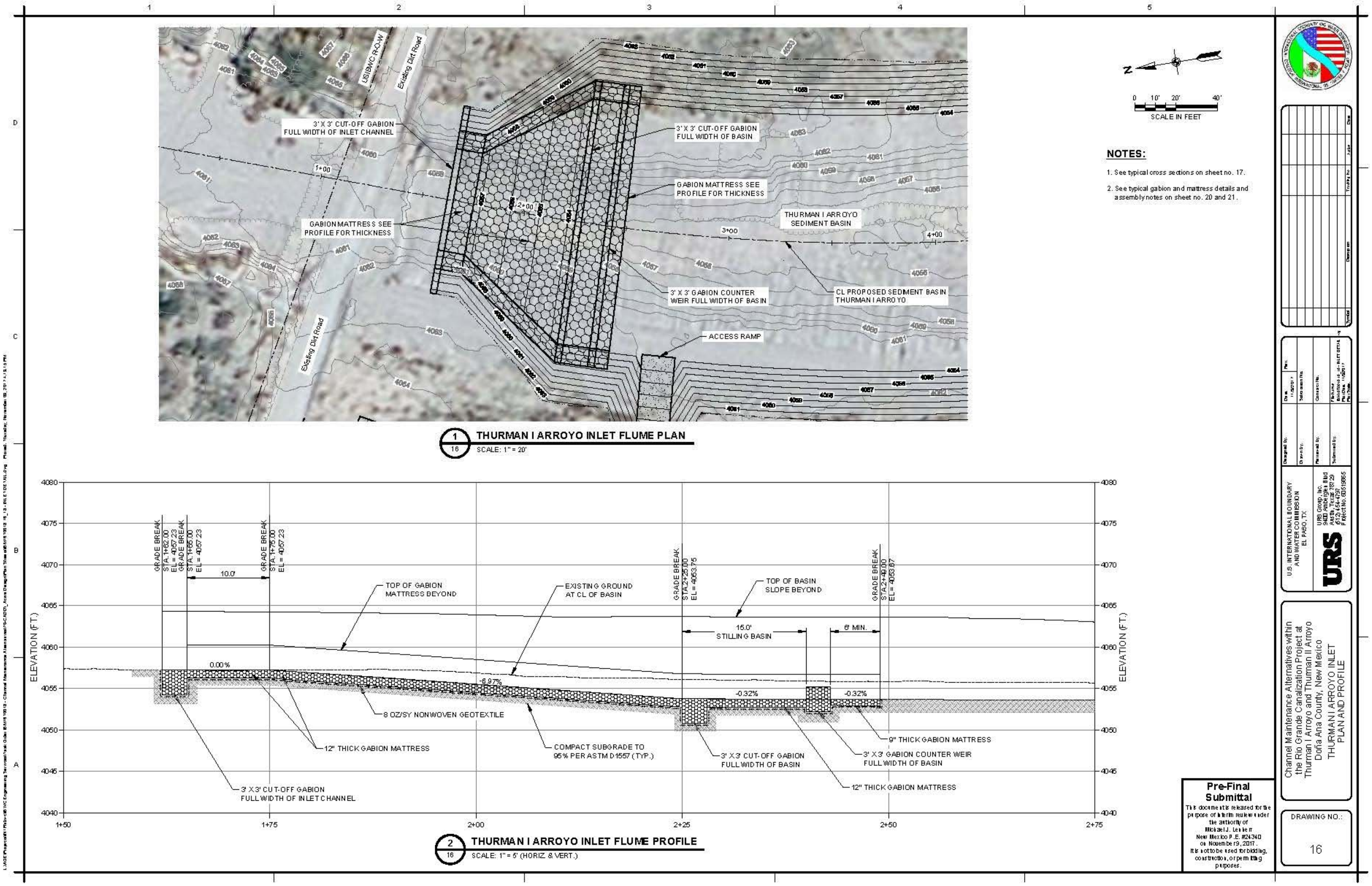
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN I ARROYO END WALL PLAN AND PROFILE
DRAWING NO.:
14


SEDIMENT BASIN SIDE
RIVER SIDE
THURMAN II ARROYO SEDIMENT BASIN
EXTEND ROCK RIPRAP AROUND END OF WALL AND DOWN SIDE SLOPE OF BASIN TO TOE OF SIDE SLOPE AS SHOWN. TYP. BOTH SIDES. FINAL PLACEMENT OF RIPRAP SHALL BE APPROVED BY THE COR.
PROPOSED SEDIMENT BASIN END WALL BASELINE (WL)
THURMAN ARROYO II SEDIMENT BASIN CL STA.5+50.00 WL STA.1+00.00 OFFSET=0.00 N=614107.54 E=1353382.53
END WALL, ENDS WL STA.2+00.00 OFFSET=0.00 N=614098.38 E=1353482.11
END WALL, BEGIN WL STA.-0+00.00 OFFSET=0.00 N=614116.69 E=1353282.95
PROPOSED SEDIMENT BASIN END WALL FOR DETAILS, SEE SHEET NO.24
END WALL FOUNDATION. FOR DETAILS, SEE SHEET NO. 23 & 24
CL PROPOSED SEDIMENT BASIN THURMAN II ARROYO CHANNEL
30" THICK ROCK RIPRAP (D_{50}=15") FOR DETAILS SEE SHEET NO.25.
SCALE IN FEET
NOTES:
1. See sheet no. 2 for legend and abbreviations.
2. See sheet no. 3 for general notes.
3. See sheet no. 10 for plan and profile.
4. See sheet no. 12 for typical sections.
5. Top of wall at monoliths 109 and 110 varies with step. See profile for location.
6. See sheets 22 through 25 for structural details.
MATCH EXISTING WL STA.0+00.29 EL.4060.57
END WALL, BEGINS WL STA.0+00.00 EL.4059.00
WL STA.0+05.00 EL.4059.00
EXISTING GROUND (FROM 2011 LIDAR)
THURMAN II ARROYO SEDIMENT BASIN CL STA.5+50.00 = WL STA.1+00.00
MATCH EXISTING WL STA.1+96.85 EL.4059.62
WL STA.1+95.00 EL.4059.00
END WALL, ENDS WL STA.2+00.00 EL.4059.00
TOP OF WALL (TOW)
TOP OF FOOTING (TOF)
EMBANKMENT DOWNSTREAM OF WALL
EMBANKMENT UPSTREAM OF WALL
WL STA.0+60.00 EL.4054.50
WL STA.1+40.00 EL.4054.50
4" STABILIZATION SLAB
BOTTOM OF EXCAVATION
BOTTOM OF FOOTING (BOF)
FINISH GRADE UPSTREAM OF END WALL FOR ELEVATION SEE SHEET NO.10.
DRILLED PIER (TYP) SEE SHEET NO.23 FOR LENGTHS AND EMBEDMENT
MONOLITH 107 TYPE "W3" TOW EL. 4059.0' TOF EL. 4054.6'
MONOLITH 108 TYPE "W3" TOW EL. 4059.0' TOF EL. 4054.6'
MONOLITH 109 TYPE "W4" TOW EL. 4058.0' TOF EL. 4054.6'
MONOLITH 110 TYPE "W4" TOW EL. 4058.0' TOF EL. 4054.6'
MONOLITH 111 TYPE "W3" TOW EL. 4059.0' TOF EL. 4054.6'
MONOLITH 112 TYPE "W3" TOW EL. 4059.0' TOF EL. 4054.6'
ELEVATION (FT.)
PROFILE THURMAN II ARROYO END WALL
HORIZ: SCALE IN FEET
VERT: SCALE IN FEET
Pre-Final Submittal
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN II ARROYO END WALL PLAN AND PROFILE
DRAWING NO.:
15



3' X 3' CUT-OFF GABION FULL WIDTH OF INLET CHANNEL
3' X 3' CUT-OFF GABION FULL WIDTH OF BASIN
GABION MATTRESS SEE PROFILE FOR THICKNESS
GABION MATTRESS SEE PROFILE FOR THICKNESS
THURMAN I ARROYO SEDIMENT BASIN
3' X 3' GABION COUNTER WEIR FULL WIDTH OF BASIN
CL PROPOSED SEDIMENT BASIN THURMAN I ARROYO
ACCESS RAMP
USIBWC R-O-W
Existing Dirt Road
Existing Dirt Road
SCALE IN FEET
NOTES:
1. See typical cross sections on sheet no. 17.
2. See typical gabion and mattress details and assembly notes on sheet no. 20 and 21.
1 THURMAN I ARROYO INLET FLUME PLAN
SCALE: 1" = 20'
ELEVATION (FT.)
GRADE BREAK STA 1+62.00 EL = 4057.23
GRADE BREAK STA 1+65.00 EL = 4057.23
GRADE BREAK STA 1+75.00 EL = 4057.23
GRADE BREAK STA 2+25.00 EL = 4053.75
GRADE BREAK STA 2+49.00 EL = 4053.67
10.0'
TOP OF GABION MATTRESS BEYOND
EXISTING GROUND AT CL OF BASIN
TOP OF BASIN SLOPE BEYOND
15.0' STILLING BASIN
6' MIN.
0.00%
-6.97%
-0.32%
-0.32%
8 OZ/SY NONWOVEN GEOTEXTILE
12" THICK GABION MATTRESS
COMPACT SUBGRADE TO 95% PER ASTM D1557 (TYP.)
3' X 3' CUT-OFF GABION FULL WIDTH OF BASIN
3' X 3' GABION COUNTER WEIR FULL WIDTH OF BASIN
9" THICK GABION MATTRESS
12" THICK GABION MATTRESS
3' X 3' CUT-OFF GABION FULL WIDTH OF INLET CHANNEL
2 THURMAN I ARROYO INLET FLUME PROFILE
SCALE: 1" = 5' (HORIZ. & VERT.)
Pre-Final Submittal
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION EL PASO, TX
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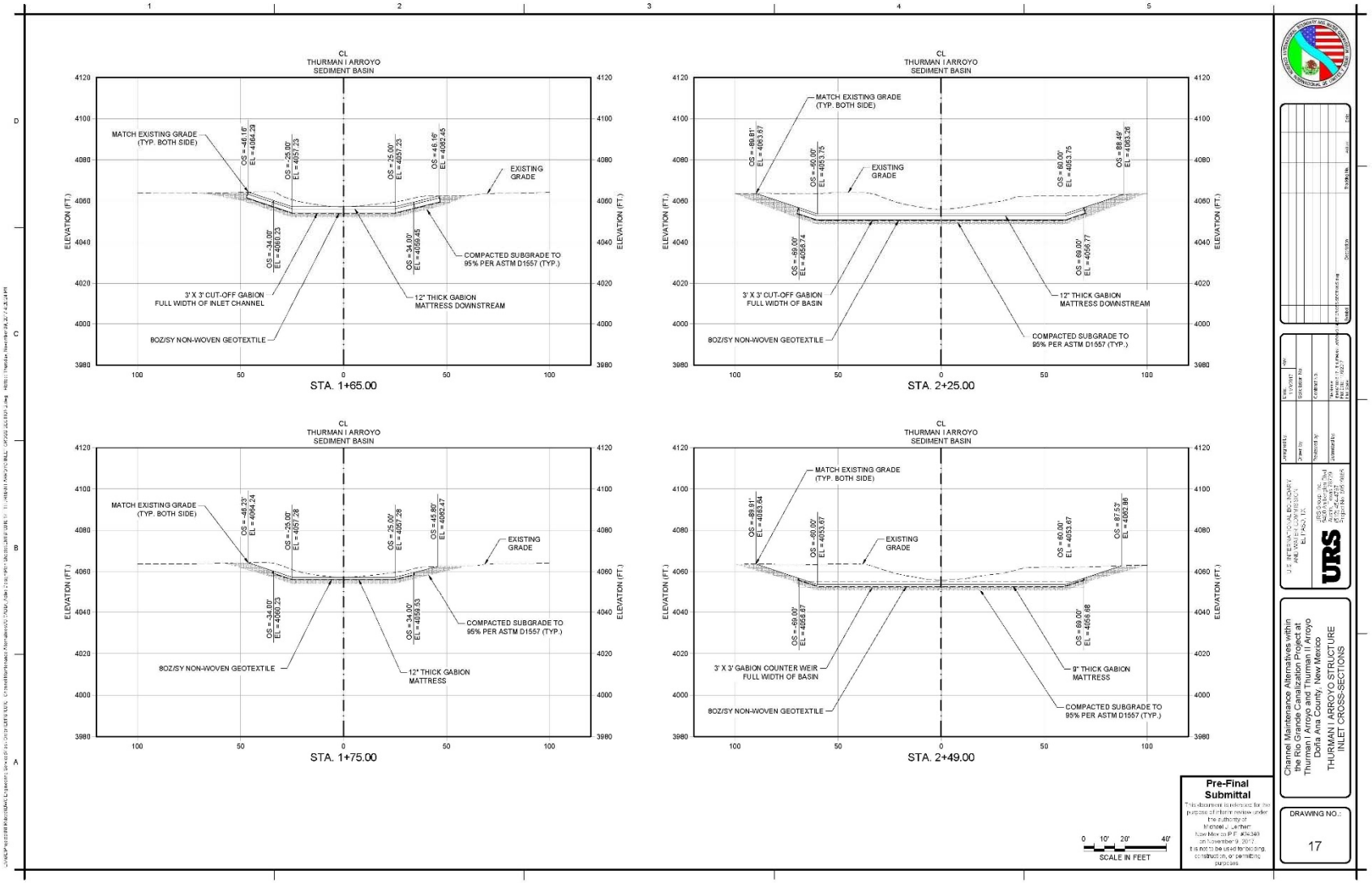
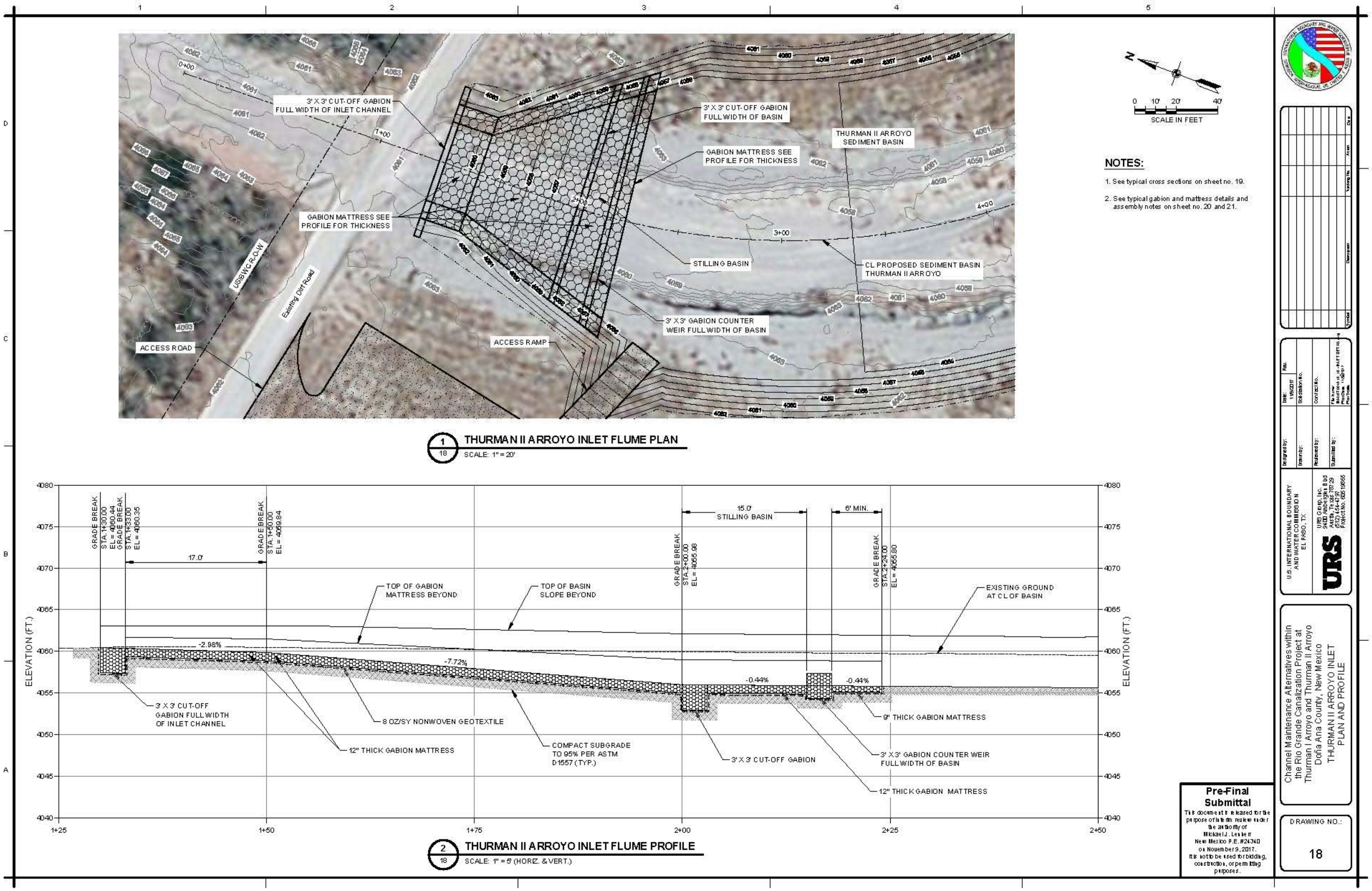
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN I ARROYO INLET PLAN AND PROFILE
DRAWING NO.: 16


CL
THURMAN I ARROYO
SEDIMENT BASIN
MATCH EXISTING GRADE (TYP. BOTH SIDE)
EXISTING GRADE
3' X 3' CUT-OFF GABION FULL WIDTH OF INLET CHANNEL
8OZ/SY NON-WOVEN GEOTEXTILE
12" THICK GABION MATTRESS DOWNSTREAM
COMPACTED SUBGRADE TO 95% PER ASTM D1557 (TYP.)
ELEVATION (FT.)
STA. 1+65.00
3' X 3' CUT-OFF GABION FULL WIDTH OF BASIN
STA. 2+25.00
12" THICK GABION MATTRESS
STA. 1+75.00
3' X 3' GABION COUNTER WEIR FULL WIDTH OF BASIN
9" THICK GABION MATTRESS
STA. 2+49.00
SCALE IN FEET
Pre-Final Submittal
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
THURMAN I ARROYO STRUCTURE INLET CROSS-SECTIONS
DRAWING NO.:
17


3' X 3' CUT-OFF GABION FULL WIDTH OF INLET CHANNEL
3' X 3' CUT-OFF GABION FULL WIDTH OF BASIN
GABION MATTRESS SEE PROFILE FOR THICKNESS
THURMAN II ARROYO SEDIMENT BASIN
STILLING BASIN
CL PROPOSED SEDIMENT BASIN THURMAN II ARROYO
3' X 3' GABION COUNTER WEIR FULL WIDTH OF BASIN
ACCESS RAMP
ACCESS ROAD
USIBWC R.O.W.
Existing Dirt Road
SCALE IN FEET
NOTES:
1. See typical cross sections on sheet no. 19.
2. See typical gabion and mattress details and assembly notes on sheet no. 20 and 21.
THURMAN II ARROYO INLET FLUME PLAN
SCALE: 1" = 20'
GRADE BREAK STA 1+30.00 EL= 4060.44
GRADE BREAK STA 1+33.00 EL= 4060.35
GRADE BREAK STA 1+50.00 EL= 4059.84
GRADE BREAK STA 2+00.00 EL= 4055.98
GRADE BREAK STA 2+24.00 EL= 4055.80
17.0'
15.0' STILLING BASIN
6' MIN.
TOP OF GABION MATTRESS BEYOND
TOP OF BASIN SLOPE BEYOND
EXISTING GROUND AT C.L OF BASIN
-2.98%
-7.72%
-0.44%
-0.44%
ELEVATION (FT.)
3' X 3' CUT-OFF GABION FULL WIDTH OF INLET CHANNEL
8 OZ/SY NONWOVEN GEOTEXTILE
12" THICK GABION MATTRESS
COMPACT SUBGRADE TO 95% PER ASTM D1557 (TYP.)
3' X 3' CUT-OFF GABION
9" THICK GABION MATTRESS
3' X 3' GABION COUNTER WEIR FULL WIDTH OF BASIN
12" THICK GABION MATTRESS
THURMAN II ARROYO INLET FLUME PROFILE
SCALE: 1" = 5' (HORZ. & VERT.)
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U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION EL PASO, TX
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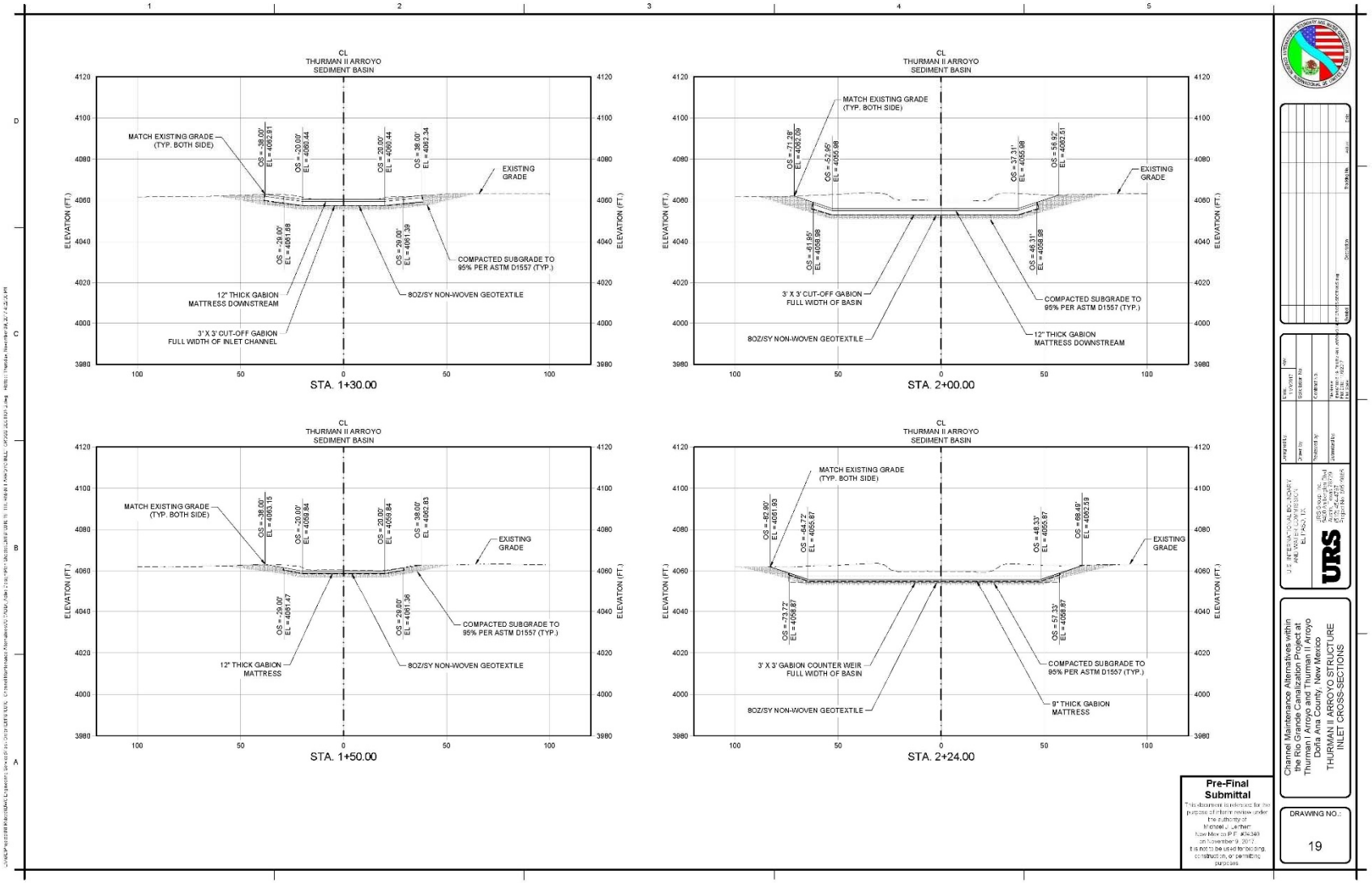
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN II ARROYO INLET PLAN AND PROFILE
DRAWING NO.:
18


CL
THURMAN II ARROYO
SEDIMENT BASIN
MATCH EXISTING GRADE (TYP. BOTH SIDE)
EXISTING GRADE
COMPACTED SUBGRADE TO 95% PER ASTM D1557 (TYP.)
12" THICK GABION MATTRESS DOWNSTREAM
8OZ/SY NON-WOVEN GEOTEXTILE
3' X 3' CUT-OFF GABION FULL WIDTH OF INLET CHANNEL
ELEVATION (FT.)
STA. 1+30.00
3' X 3' CUT-OFF GABION FULL WIDTH OF BASIN
12" THICK GABION MATTRESS DOWNSTREAM
STA. 2+00.00
12" THICK GABION MATTRESS
STA. 1+50.00
3' X 3' GABION COUNTER WEIR FULL WIDTH OF BASIN
9" THICK GABION MATTRESS
STA. 2+24.00
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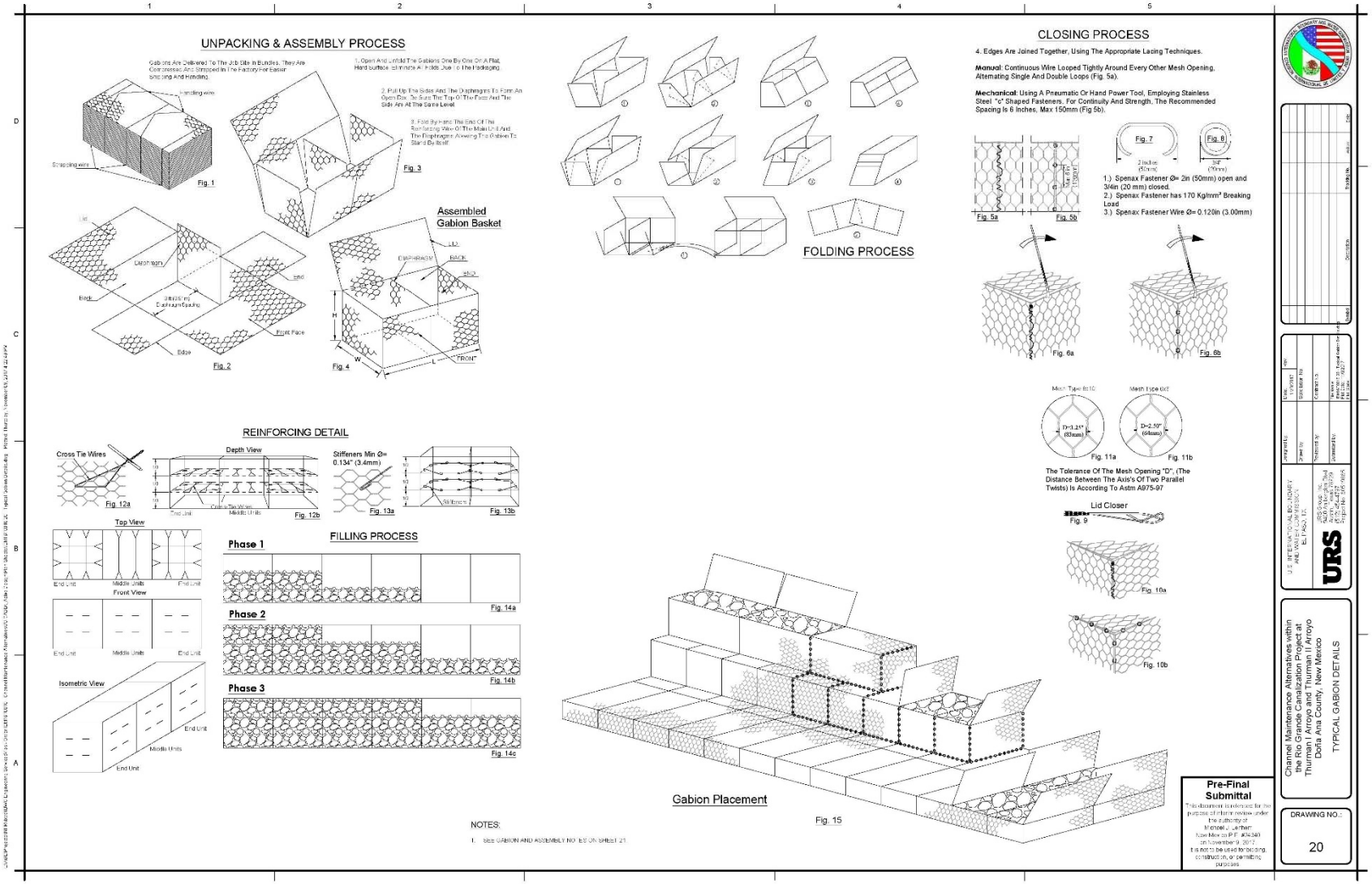
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN II ARROYO STRUCTURE INLET CROSS-SECTIONS
DRAWING NO.:
19


UNPACKING & ASSEMBLY PROCESS
Gabions Are Delivered To The Job Site In Bundles. They Are Compressed And Strapped In The Factory For Easier Stacking And Handling.
1. Open And Unfold The Gabions One By One On A Flat, Hard Surface. Eliminate Any Folds Due To The Packaging.
2. Pull Up The Sides And The Diaphragms To Form An Open Box. Be Sure The Top Of The Face And The Side Are At The Same Level.
3. Fold By Hand The End Of The Reinforcing Wire Of The Main Unit And The Diaphragm Allowing The Gabion To Stand By Itself.
Binding wire
Strapping wire
Fig. 1
Fig. 3
Assembled Gabion Basket
Lid
Diaphragm
End
Back
Stiffening Diaphragm/Spacing
Front Face
Edge
Fig. 2
LID
DIAPHRAGM
BACK
END
H
W
L
FRONT
Fig. 4
FOLDING PROCESS
CLOSING PROCESS
4. Edges Are Joined Together, Using The Appropriate Lacing Techniques.
Manual: Continuous Wire Looped Tightly Around Every Other Mesh Opening, Alternating Single And Double Loops (Fig. 5a).
Mechanical: Using A Pneumatic Or Hand Power Tool, Employing Stainless Steel "c" Shaped Fasteners. For Continuity And Strength. The Recommended Spacing Is 6 Inches, Max 150mm (Fig 5b).
Fig. 5a
Fig. 5b
Fig. 7
2 Inches (50mm)
Fig. 8
3/4" (20mm)
1.) Spenax Fastener Ø= 2in (50mm) open and 3/4in (20 mm) closed.
2.) Spenax Fastener has 170 Kg/mm² Breaking Load
3.) Spenax Fastener Wire Ø= 0.120in (3.00mm)
Fig. 6a
Fig. 6b
Mesh Type 8x10
D=1.24" (83mm)
Mesh Type 6x8
D=2.50" (64mm)
Fig. 11a
Fig. 11b
The Tolerance Of The Mesh Opening "D", (The Distance Between The Axis's Of Two Parallel Twists) Is According To Astm A975-97
Lid Closer
Fig. 9
Fig. 10a
Fig. 10b
REINFORCING DETAIL
Cross Tie Wires
Fig. 12a
Depth View
End Unit
Middle Units
Cross Tie Wires
Fig. 12b
Stiffeners Min Ø= 0.134" (3.4mm)
Fig. 13a
Stiffeners
Fig. 13b
FILLING PROCESS
Top View
End Unit
Middle Units
End Unit
Front View
End Unit
Middle Units
End Unit
Isometric View
End Unit
Middle Units
End Unit
Phase 1
Fig. 14a
Phase 2
Fig. 14b
Phase 3
Fig. 14c
Gabion Placement
Fig. 15
NOTES:
1. See GABION AND ASSEMBLY NOTES ON SHEET 21.
Pre-Final Submittal
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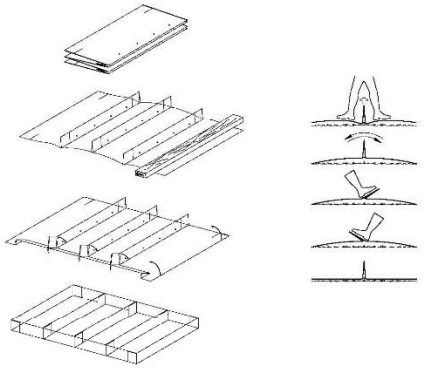
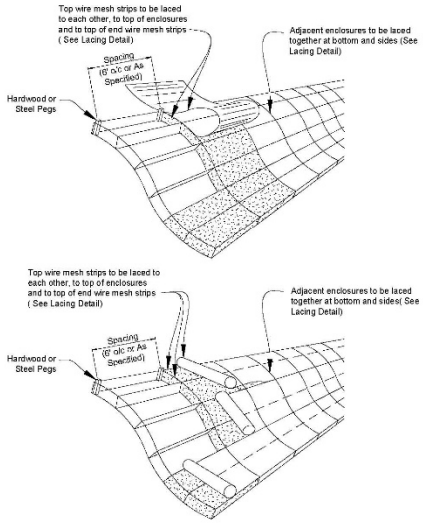
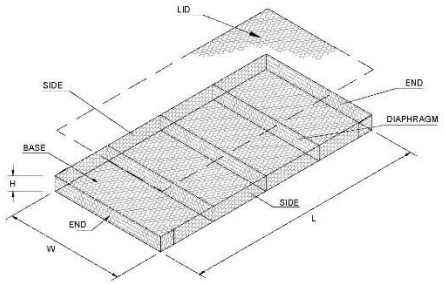
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
TYPICAL GABION DETAILS
DRAWING NO.:
20



GABION MATTRESS ASSEMBLY



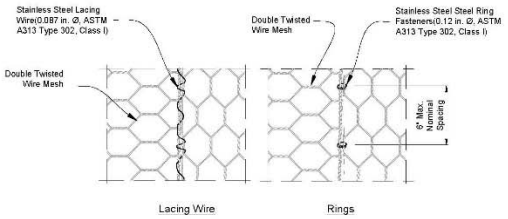
INSTALLATION AND FILLING



GABION MATTRESS

GABION MATTRESS INSTALLATION NOTES:

1. After Assembly, the mattresses are placed in their proper location and securely attached to adjacent units.
2. For structural integrity, all adjoining empty units should be connected by means of lacing wire or ring fasteners along all the edges of their contact surfaces.
3. Where mattresses are to placed on steep slopes, the mattress should be laid with the width perpendicular to the slope, except for very small ditches.
4. Mattress should be placed and securely attached while empty.
5. Mattresses can conform to bends up to a radius of 60-70 ft. without alteration, and placed to the required curvature for filling.
6. Mattresses may be cut to form curves or bevels.
7. Level off the fill 1" above the top of mesh to allow for settlement.
8. Install bracing wires vertically between the top and bottom mesh in areas where water will fall directly onto the mattresses.
9. Make sure the top edges of the diaphrams are exposed.
10. Lay the lid down, pull the edges of the panels to be connected together where necessary using an appropriate tool as a lid closer.
11. The lids shall be tightly laced along all edges, ends and diaphragms in the same manner as assembling.
12. Adjacent lids may be securely attached simultaneously.
13. Securely attached the lids to the ends of the mattresses and then securely attach them to the sides, and diaphragms, using alternate double and single loops, or steel wire ring fasteners.
14. In cases where number of adjacent bases are to be covered at one time, rolls of mesh can be used in place of individual unit size lids.
15. Number and placement of stakes shall be sufficient to hold mesh in place and prevent deformation during construction.
16. Stainless steel ring fasteners can be used instead of, or to complement, lacing wire.
17. Spacing of the rings shall not exceed 6 inches.
18. Geotextile shall be placed under entire length of mattress and Gabions.



LACING DETAILS

General Gabion Notes:

1. Rock may be placed mechanically throughout, provided care is taken to ensure that it is tightly packed with a minimum of voids. For exposed area, hand labor is essential to keep the mesh vertical, to prevent bulging, and to provide on attractive appearance.
2. Material used to fill the gabions shall be hard, double rock, shall be either angular rock or rounded river, meeting the size and quality requirements of spec. 31 36 00.
3. All gabion walls shall be placed on a foundation of suitable material. Suitable material shall be select fill or natural subgrade compacted to a min. of 95% ASTM d1557.
4. Gabions to be twisted woven wire mesh type 8x10. All wire (mesh, selvage, connecting lacing) shall meet the min. Requirements of spec. 31 36 00. All wire shall comply with ASTM A975-97, Style 1 coating. Mesh opening shall be 3.25 in. by 4.5 in.

Gabion Assembly Procedures:

1. Unpack and unfold the gabion flat on the ground. Stretch as much as possible, making sure all creases are in the correct position for forming the box. Stamp out all kinks and and folds. (see Figure 1).
2. Lift the side and end panels into a vertical position to form a rectangular box. Assemble gabions so they can be filled from the top when in position. The front panel extensions of selvage wires are bent and looped twice along the selvage wire of the top end panels. The end panel extensions of selvage wires are also looped twice along the selvage top of the front panel. Fasten the vertical edges with lacing wire, using the "2,1,2" lacing pattern. (see lacing detail) raise and lace the diaphragm panels the same way.
3. Before filling, each gabion should be tightly laced along each selvage wire to all adjacent gabions. Lace as many gabions together as possible before filling. Empty gabion units shall be set to line and grade as shown on the plans. A stretcher, block & tackle, come-along, ect. May be used to stretch the wire baskets and hold alignment during the filling process.
4. Internal connecting wires shall be installed in all outside cells and corners cells. (see Figures 3 & 4) 18" high gabions should require internal ties at 9" level 12" high gabions required no internal ties. Gabions should be filled to the depth of the first tie wire, then connecting wires are placed and looped around three meshes of the gabion wall. (see tie detail) this process is repeated at the next tie level.
5. When the gabions are completely filled, the lid is folded shut and laced to the ends, sides and diaphragms. (see lacing detail) lacing adjacent lids in one operation is acceptable, provided that the lacing pattern is strictly followed. To obtain correct alignment of the top selvage wires and to insure that the selvage wires meet closely without gaps, it may be required to use a lever bar or other special tools.
6. Subsequent tiers of gabions should be built in the same manner. Adjoining gabions are laced together at all adjoining selvage edges. Empty gabions stacked on filled gabions are laced to the filled gabions at front, side and back. (see Figure 5)

GABION MATERIAL SPECIFICATIONS:

1. Gabion and Mattress mesh to meet ASTM A975.
2. Gabions used shall be Zinc Coated.
3. Subgrade Compaction to 95% ASTM D698 / D1557
4. Gabion Fill to meet ASTM D6711:
   Rock Size: 4" to 8", D_{50} = 6"
   Rock Unit Weight: 157 pcf min.
   Voids: 30% max.

Pre-Final Submittal

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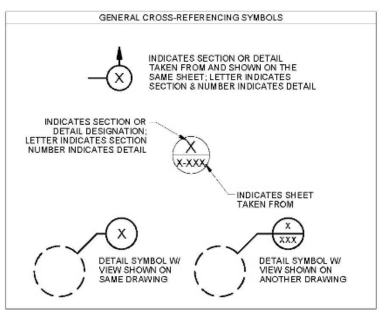
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico

TYPICAL GABION MATTRESS DETAILS & NOTES

DRAWING NO.: 21

STANDARD ABBREVIATIONS

ACI	AMERICAN CONCRETE INSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
APPROX.	APPROXIMATE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
@	AT
B/	BASE OF
B/L	BASELINE
BM	BENCH MARK
BOTT.	BOTTOM
BRG.	BEARING
BTWN.	BETWEEN
CIP	CAST-IN-PLACE
CJP	COMPLETE JOINT PENETRATION
C.J.	CONSTRUCTION JOINT
C/L	CENTERLINE
CLR.	CLEAR
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
C.R.S.	CORROSION RESISTANT STEEL
CY	CUBIC YARD
DIA.	DIAMETER
DIAG.	DIAGONAL
DIM.	DIMENSION
DWG.	DRAWING
EA.	EACH
E.F.	EACH FACE
EJT	EXPANSION JOINT
EL.	ELEVATION
ELEC.	ELECTRICAL
EM	ENGINEER MANUAL
EQ.	EQUAL
ETL	ENGINEER TECHNICAL LETTER
E.W.	EACH WAY
EXIST.	EXISTING
EXP.	EXPANSION
FB	FLAT BAR
FF	FAR FACE
FT.	FOOT
F/W	FLOODWALL
HK.	HOOK
HORIZ.	HORIZONTAL
HSS	HOLLOW STRUCTURAL SECTION
HT.	HEIGHT
HW	HEIGHT WALL
ID	INSIDE DIAMETER
IF	INSIDE FACE
INV.	INVERT
JT.	JOINT
K	KILO POUNDS
KSF	KILOPOUNDS PER SQUARE FOOT
LD	DEVELOPMENT LENGTH
LG.	LONG
LOC.	LOCATION
LONGIT.	LONGITUDINAL
MAX.	MAXIMUM
MECH.	MECHANICAL
MIN.	MINIMUM
MISC.	MISCELLANEOUS
NF	NEAR FACE
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPG.	OPENING
OPP.	OPPOSITE
P/C	PRECAST
P.I.	POINT OF INTERSECTION
PL	PLATE
PLCS	PLACES
PVC	POLYVINYL CHLORIDE
R	RADIUS
REINF.	REINFORCING
REQD.	REQUIRED
SCH.	SCHEDULE
SECT.	SECTION
SH.	SHEAR
SHT.	SHEET
SIM.	SIMILAR
SPA.	SPACING,SPACES
SQ.	SQUARE
ST. STL	STAINLESS STEEL
STA.	STATION
STD.	STANDARD
STIFF.	STIFFENER
STIR.	STIRRUP
STL.	STEEL
SYMM.	SYMMETRICAL
T	TREAD OR TOP
T&B	TOP AND BOTTOM
TOC	TOP OF CONCRETE
TF	TOP FACE
TOF	TOP OF FOOTING
TOS	TOP OF SLAB
TOW	TOP OF WALL
TRANS.	TRANSVERSE
TW	THICKNESS OF WALL
TYP.	TYPICAL
UON	UNLESS OTHERWISE NOTED
VERT.	VERTICAL
W, WF	WIDE FLANGE
W/	WITH
W/L	WALL LINE
W/O	WITHOUT
WP	WORKING POINT
WT	WEIGHT, STRUCTURAL T FROM A W SERIES SECTION
+/- OR ±	PLUS/MINUS



CONCRETE NOTES:

1. Reference division 03 of the project specifications for additional information regarding concrete, reinforcement, accessories, formwork, waterstop and grouting.
2. Concrete shall have a minimum compressive strength (f'c) of 4000 psi at 28 days, 90 days if pozzolan or slag is used unless noted otherwise.
3. Stabilization slab concrete shall have a minimum compressive strength (f'c) of 2500 psi at 28 days, 90 days if pozzolan or slag is used.
4. Reinforcing steel shall have a minimum yield strength (fy) of 60,000 psi.
5. Construction joints shall be provided where shown in the drawings.
6. Unless noted otherwise, provide 3/4" chamfer at all exposed joints, edges, external corners, and vertical expansion joints.
7. All primary reinforcement shall have a minimum cover as shown in reinforcement clearance detail, unless noted otherwise. The cover for secondary reinforcement may be reduced from the above by the diameter of the bar.
8. All bends of reinforcement and all bar spacers and supports shall be in accordance with sp-66, american concrete institute detailing manual- 2002.
9. Reinforcing bar designation numbers shall conform to the numbering system of the concrete reinforcing steel institute.
10. Reinforcing bars shall be continuous at all corners unless noted otherwise.
11. Reinforcement, pipes, embedded items and other obstructions, shall be bent or shifted to avoid openings.
12. The embedment and splice table shown shall be used in determining lap splices and embedment lengths where lengths are not otherwise indicated. Splice lengths shall be based on the larger bar being lapped. The contractor will be allowed to make splices in addition to those indicated in the drawings, where essential to constructibility, subject to approval by the engineer. Splices other than those shown on the drawings and other than any additional splices required by the engineer will be at the contractor's expense.
13. All exterior formed surfaces not covered by backfill shall be class "A" finish.Surfaces covered by backfill shall be class "C" finish unless noted otherwise.

FOUNDATION NOTES:

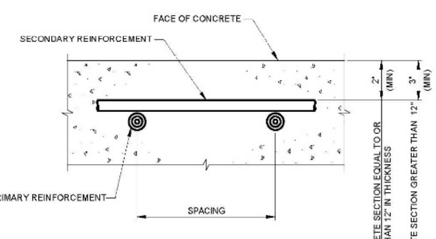
1. Reference specification section 31 63 29 of the project specifications for additional information regarding foundations and drilled concrete piers.
2. Reference specification section 31 23 00 for excavation and backfill and compaction requirements at the end wall.

EMBEDMENT & SPLICE TABLE NOTES:

1. Use the basic table if all the following conditions are met:
   a) center-to-center bar spacing laterally is at least 3 bar diameters.
   B) distance from the center of a bar to the nearest concrete surface must be at least 2 bar diameters.
2. The alternate table may be used if all of the following conditions are met:
   a) center-to-center bar spacing laterally is at least 5 bar diameters.
   B) distance from the center of a bar to the nearest concrete surface must be at least 2.5 bar diameters.
3. If concrete cover or edge distance is less than 1 bar diameter of the center-to-center bar spacing laterally is less than 3 bar diameters, see aci 318 for appropriate guidance.
4. Top bars are horizontal bars and bars inclined less than 45 degrees with respect to a horizontal plane which are placed such that more than 12 inches of concrete is cast in the member below the bar.
5. The table shown are for normal weight concrete with uncoated reinforcing bars.

UNCOATED REINFORCEMENT EMBEDMENT AND SPLICE TABLES – 4000 PSI

BAR SIZE	BASIC TABLE				ALTERNATE TABLE			
	MINIMUM EMBEDMENT LENGTH, INCHES		MINIMUM LAP LENGTH INCHES		MINIMUM EMBEDMENT LENGTH, INCHES		MINIMUM LAP LENGTH INCHES	
	TOP	OTHER	TOP	OTHER	TOP	OTHER	TOP	OTHER
3	18	14	24	18	12	12	14	12
4	25	19	32	25	15	12	19	15
5	31	24	40	31	18	14	24	18
6	37	28	48	37	22	17	29	22
7	54	42	70	54	32	25	42	32
8	62	47	80	62	37	28	48	37
9	70	54	90	70	42	32	54	42
10	78	60	102	78	47	36	61	47
11	87	67	113	87	52	40	68	52



REINFORCEMENT CLEARANCE DETAIL
NOT TO SCALE
(UNLESS NOTED OTHERWISE)

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U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION
EL PASO, TX

URS
URS Group, Inc.
9400 Amberglen Blvd
Austin, Texas 78729
(512) 454-4797
Project No. 505-9865

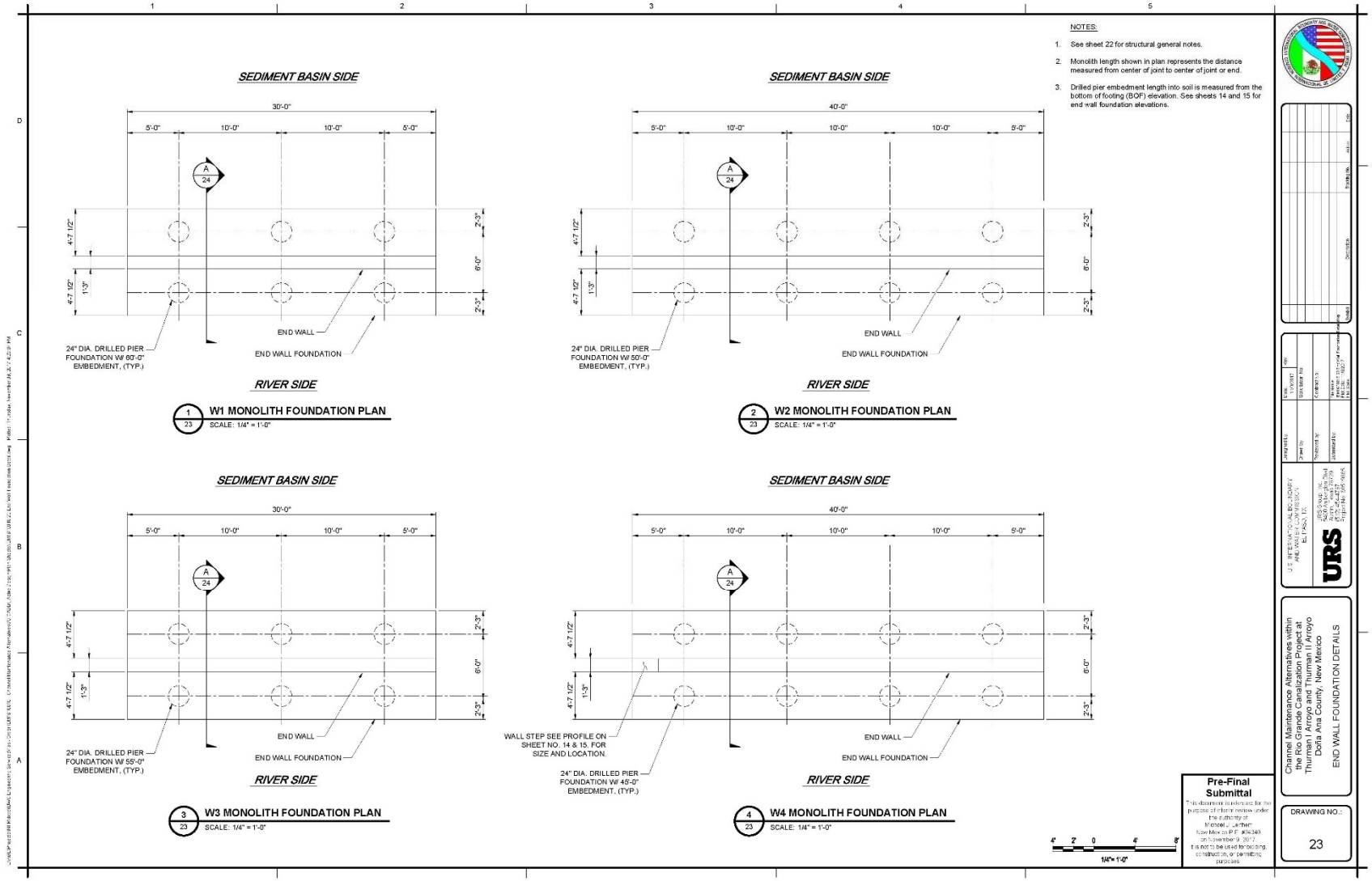
Designed by: | Date: 11/9/2017 | Rev.
Drawn by: | Solicitation No.
Reviewed by: | Contract No.
Submitted by: | File Name | Plot Date | Plot Scale

Symbol | Description | Tracking No. | Action | Date

Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico

STRUCTURAL GENERAL NOTES

DRAWING NO.: 22


NOTES:
1. See sheet 22 for structural general notes.
2. Monolith length shown in plan represents the distance measured from center of joint to center of joint or end.
3. Drilled pier embedment length into soil is measured from the bottom of footing (BOF) elevation. See sheets 14 and 15 for end wall foundation elevations.
SEDIMENT BASIN SIDE
30'-0"
5'-0"
10'-0"
10'-0"
5'-0"
A 24
4'-7 1/2"
1'-3"
4'-7 1/2"
2'-3"
6'-0"
2'-3"
24" DIA. DRILLED PIER FOUNDATION W/ 60'-0" EMBEDMENT, (TYP.)
END WALL
END WALL FOUNDATION
RIVER SIDE
1 23 W1 MONOLITH FOUNDATION PLAN
SCALE: 1/4" = 1'-0"
SEDIMENT BASIN SIDE
40'-0"
5'-0"
10'-0"
10'-0"
10'-0"
5'-0"
A 24
4'-7 1/2"
1'-3"
4'-7 1/2"
2'-3"
6'-0"
2'-3"
24" DIA. DRILLED PIER FOUNDATION W/ 50'-0" EMBEDMENT, (TYP.)
END WALL
END WALL FOUNDATION
RIVER SIDE
2 23 W2 MONOLITH FOUNDATION PLAN
SCALE: 1/4" = 1'-0"
SEDIMENT BASIN SIDE
30'-0"
5'-0"
10'-0"
10'-0"
5'-0"
A 24
4'-7 1/2"
1'-3"
4'-7 1/2"
2'-3"
6'-0"
2'-3"
24" DIA. DRILLED PIER FOUNDATION W/ 55'-0" EMBEDMENT, (TYP.)
END WALL
END WALL FOUNDATION
RIVER SIDE
3 23 W3 MONOLITH FOUNDATION PLAN
SCALE: 1/4" = 1'-0"
SEDIMENT BASIN SIDE
40'-0"
5'-0"
10'-0"
10'-0"
10'-0"
5'-0"
A 24
4'-7 1/2"
1'-3"
4'-7 1/2"
2'-3"
6'-0"
2'-3"
WALL STEP SEE PROFILE ON SHEET NO. 14 & 15. FOR SIZE AND LOCATION.
24" DIA. DRILLED PIER FOUNDATION W/ 45'-0" EMBEDMENT, (TYP.)
END WALL
END WALL FOUNDATION
RIVER SIDE
4 23 W4 MONOLITH FOUNDATION PLAN
SCALE: 1/4" = 1'-0"
4' 2' 0 4' 8'
1/4"= 1'-0"
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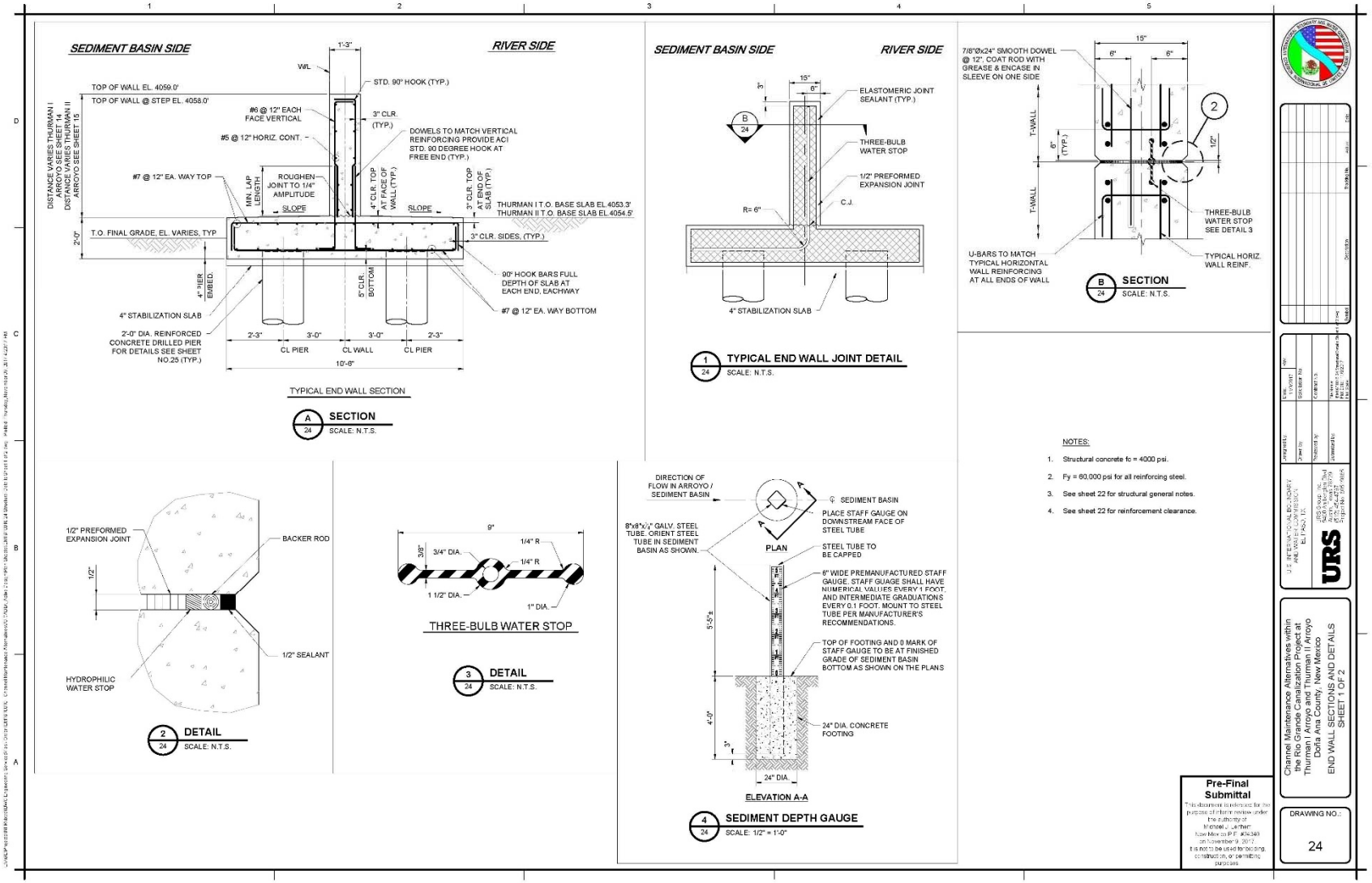
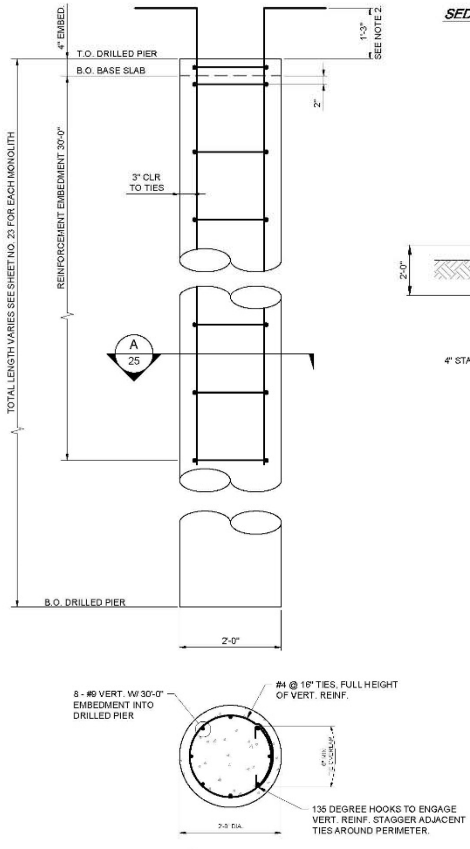
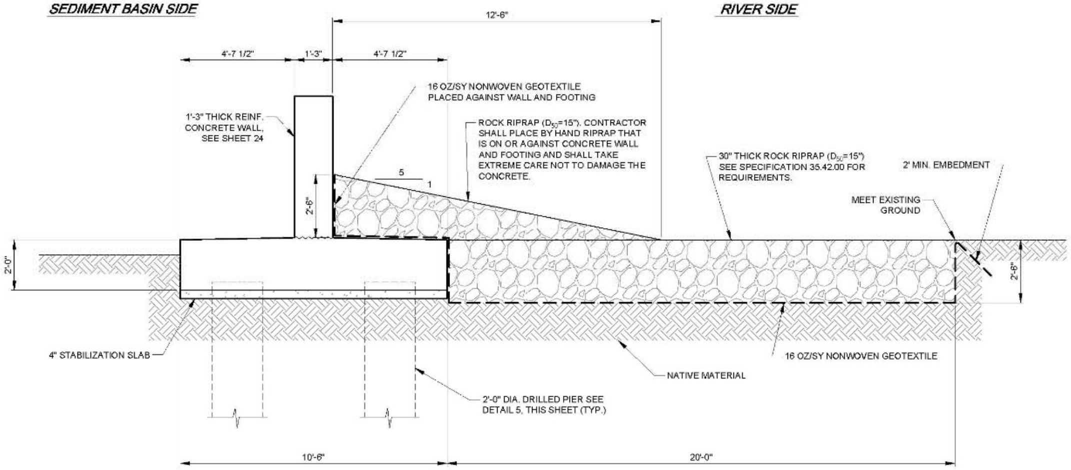
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
END WALL FOUNDATION DETAILS
DRAWING NO.:
23


SEDIMENT BASIN SIDE
RIVER SIDE
TOP OF WALL EL. 4059.0'
TOP OF WALL @ STEP EL. 4058.0'
#6 @ 12" EACH FACE VERTICAL
#5 @ 12" HORIZ. CONT.
#7 @ 12" EA. WAY TOP
ROUGHEN JOINT TO 1/4" AMPLITUDE
SLOPE
DOWELS TO MATCH VERTICAL REINFORCING PROVIDE ACI STD. 90 DEGREE HOOK AT FREE END (TYP.)
THURMAN I T.O. BASE SLAB EL 4053.3'
THURMAN II T.O. BASE SLAB EL 4054.5'
T.O. FINAL GRADE, EL. VARIES, TYP
3" CLR. SIDES, (TYP.)
90° HOOK BARS FULL DEPTH OF SLAB AT EACH END, EACHWAY
#7 @ 12" EA. WAY BOTTOM
4" STABILIZATION SLAB
2'-0" DIA. REINFORCED CONCRETE DRILLED PIER FOR DETAILS SEE SHEET NO.25 (TYP.)
CL PIER
CL WALL
10'-8"
TYPICAL END WALL SECTION
SECTION
SCALE: N.T.S.
ELASTOMERIC JOINT SEALANT (TYP.)
THREE-BULB WATER STOP
1/2" PREFORMED EXPANSION JOINT
C.J.
TYPICAL END WALL JOINT DETAIL
7/8"Ø x24" SMOOTH DOWEL @ 12", COAT ROD WITH GREASE & ENCASE IN SLEEVE ON ONE SIDE
T-WALL
U-BARS TO MATCH TYPICAL HORIZONTAL WALL REINFORCING AT ALL ENDS OF WALL
TYPICAL HORIZ. WALL REINF.
THREE-BULB WATER STOP SEE DETAIL 3
1/2" PREFORMED EXPANSION JOINT
BACKER ROD
1/2" SEALANT
HYDROPHILIC WATER STOP
DETAIL
THREE-BULB WATER STOP
DIRECTION OF FLOW IN ARROYO / SEDIMENT BASIN
SEDIMENT BASIN
PLACE STAFF GAUGE ON DOWNSTREAM FACE OF STEEL TUBE
8"x8"x¼" GALV. STEEL TUBE. ORIENT STEEL TUBE IN SEDIMENT BASIN AS SHOWN.
PLAN
STEEL TUBE TO BE CAPPED
6" WIDE PREMANUFACTURED STAFF GAUGE. STAFF GUAGE SHALL HAVE NUMERICAL VALUES EVERY 1 FOOT, AND INTERMEDIATE GRADUATIONS EVERY 0.1 FOOT. MOUNT TO STEEL TUBE PER MANUFACTURER'S RECOMMENDATIONS.
TOP OF FOOTING AND 0 MARK OF STAFF GAUGE TO BE AT FINISHED GRADE OF SEDIMENT BASIN BOTTOM AS SHOWN ON THE PLANS
24" DIA. CONCRETE FOOTING
ELEVATION A-A
SEDIMENT DEPTH GAUGE
NOTES:
1. Structural concrete fc = 4000 psi.
2. Fy = 60,000 psi for all reinforcing steel.
3. See sheet 22 for structural general notes.
4. See sheet 22 for reinforcement clearance.
Pre-Final Submittal
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
END WALL SECTIONS AND DETAILS
SHEET 1 OF 2
DRAWING NO.: 24



A / 25 **SECTION**
SCALE: N.T.S.

5 / 25 **TYPICAL DRILLED PIER DETAIL**
SCALE: N.T.S.



6 / 25 **TYPICAL ROCK RIPRAP DETAIL**
SCALE: 1/2" = 1'-0"

Drilled Pier Notes:

1. See sheet 22 for structural notes.
2. Extend typical vertical reinforcing into base slab and provide ACI standard 90 degree hook at ends.
3. At contractor's option, additional hooked vertical dowels may be used to extend reinforcing into base slab. Hooked dowels shall lap with typical vertical reinforcing per minimum splice table on sheet 22. Additional hooked vertical dowels are at no additional cost to the government.
4. Drilled pier construction to be preformed using either temporary casing, wet-slurry method or a combination of temporary casing with slurry. Dry method of drilled pier construction shall not be permitted.
5. Concrete to be placed via tremie methods.
6. Refer to Specification Section 31 63 29 Drilled Concrete Piers and Shafts for additional information and requirements.

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U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION EL PASO, TX

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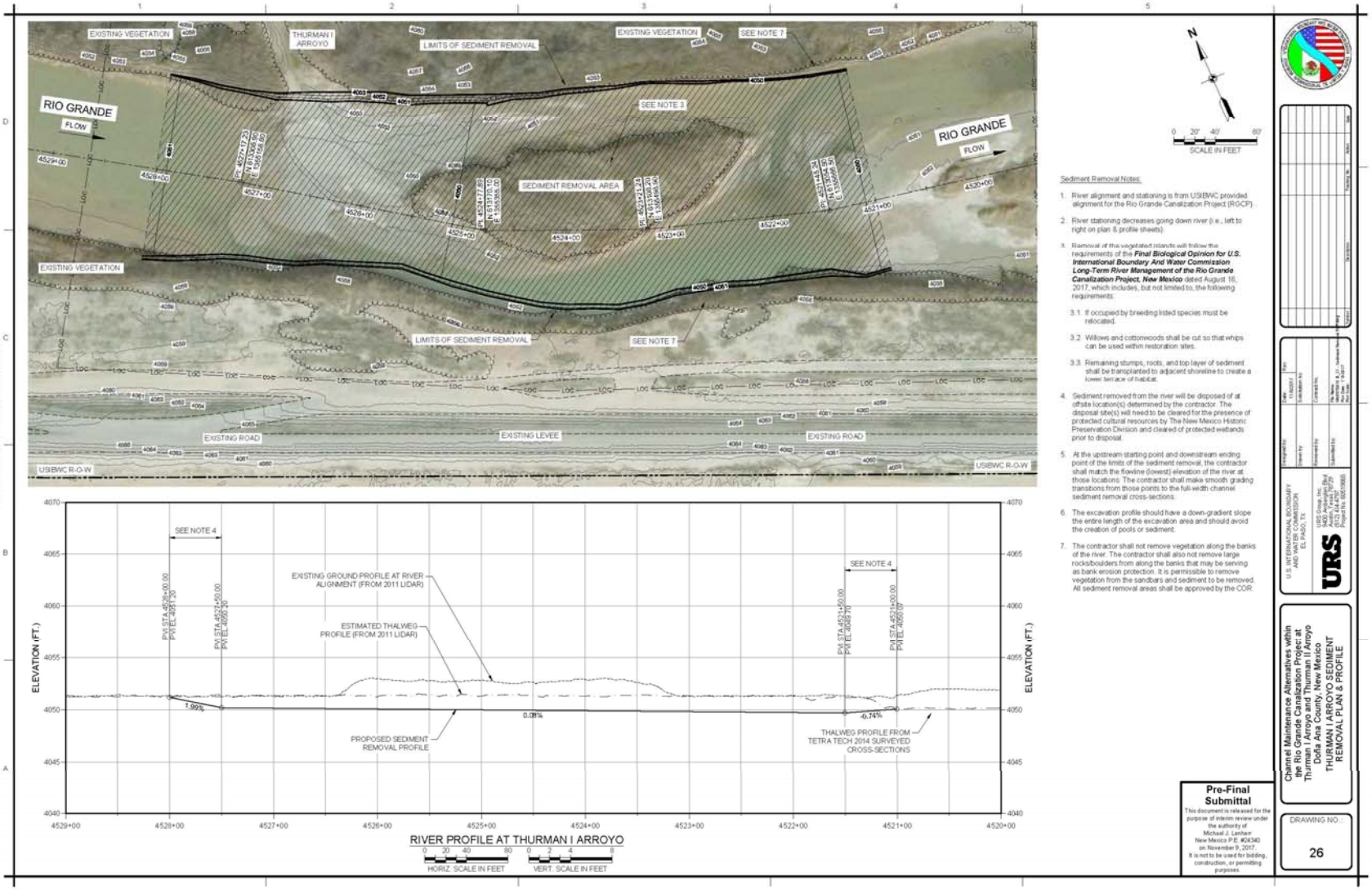
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico

END WALL SECTIONS AND DETAILS SHEET 2 OF 2

DRAWING NO.: 25


EXISTING VEGETATION
THURMAN I ARROYO
LIMITS OF SEDIMENT REMOVAL
SEE NOTE 7
SEE NOTE 3
RIO GRANDE FLOW
SEDIMENT REMOVAL AREA
EXISTING ROAD
EXISTING LEVEE
USIBWC R-O-W
SEE NOTE 4
EXISTING GROUND PROFILE AT RIVER ALIGNMENT (FROM 2011 LIDAR)
ESTIMATED THALWEG PROFILE (FROM 2011 LIDAR)
PROPOSED SEDIMENT REMOVAL PROFILE
THALWEG PROFILE FROM TETRA TECH 2014 SURVEYED CROSS-SECTIONS
ELEVATION (FT.)
RIVER PROFILE AT THURMAN I ARROYO
HORIZ. SCALE IN FEET
VERT. SCALE IN FEET
SCALE IN FEET
Sediment Removal Notes:
1. River alignment and stationing is from USIBWC provided alignment for the Rio Grande Canalization Project (RGCP).
2. River stationing decreases going down river (i.e., left to right on plan & profile sheets).
3. Removal of the vegetated islands will follow the requirements of the Final Biological Opinion for U.S. International Boundary And Water Commission Long-Term River Management of the Rio Grande Canalization Project, New Mexico dated August 16, 2017, which includes, but not limited to, the following requirements:
3.1. If occupied by breeding listed species must be relocated.
3.2. Willows and cottonwoods shall be cut so that whips can be used within restoration sites.
3.3. Remaining stumps, roots, and top layer of sediment shall be transplanted to adjacent shoreline to create a lower terrace of habitat.
4. Sediment removed from the river will be disposed of at offsite location(s) determined by the contractor. The disposal site(s) will need to be cleared for the presence of protected cultural resources by The New Mexico Historic Preservation Division and cleared of protected wetlands prior to disposal.
5. At the upstream starting point and downstream ending point of the limits of the sediment removal, the contractor shall match the flowline (lowest) elevation of the river at those locations. The contractor shall make smooth grading transitions from those points to the full-width channel sediment removal cross-sections.
6. The excavation profile should have a down-gradient slope the entire length of the excavation area and should avoid the creation of pools or sediment.
7. The contractor shall not remove vegetation along the banks of the river. The contractor shall also not remove large rocks/boulders from along the banks that may be serving as bank erosion protection. It is permissible to remove vegetation from the sandbars and sediment to be removed. All sediment removal areas shall be approved by the COR.
Pre-Final Submittal
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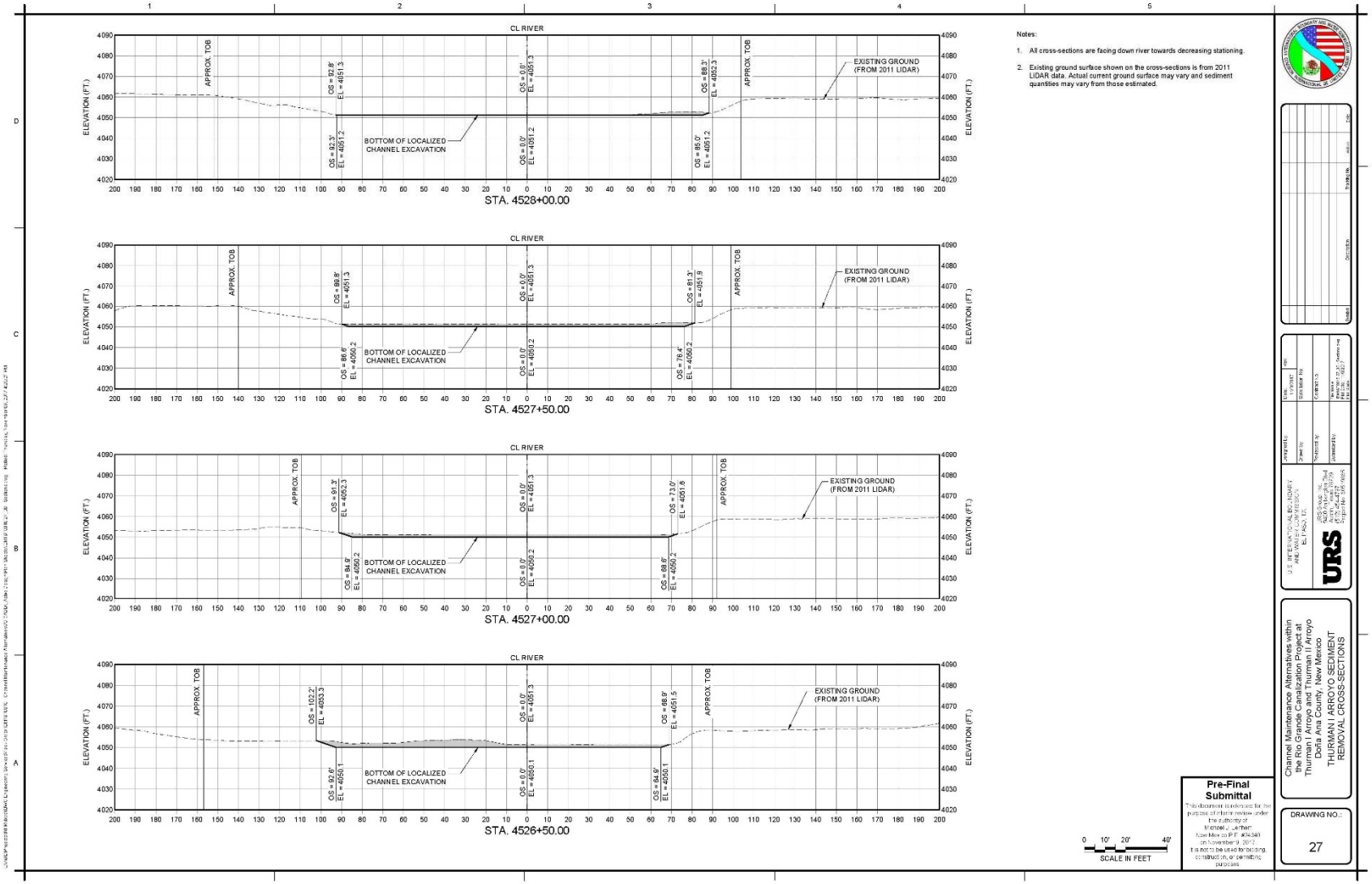
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN I ARROYO SEDIMENT REMOVAL PLAN & PROFILE
DRAWING NO.
26


CL RIVER
APPROX. TOB
EXISTING GROUND (FROM 2011 LIDAR)
BOTTOM OF LOCALIZED CHANNEL EXCAVATION
ELEVATION (FT.)
STA. 4528+00.00
STA. 4527+50.00
STA. 4527+00.00
STA. 4526+50.00
Notes:
1. All cross-sections are facing down river towards decreasing stationing.
2. Existing ground surface shown on the cross-sections is from 2011 LIDAR data. Actual current ground surface may vary and sediment quantities may vary from those estimated.
0 10' 20' 40'
SCALE IN FEET
Pre-Final Submittal
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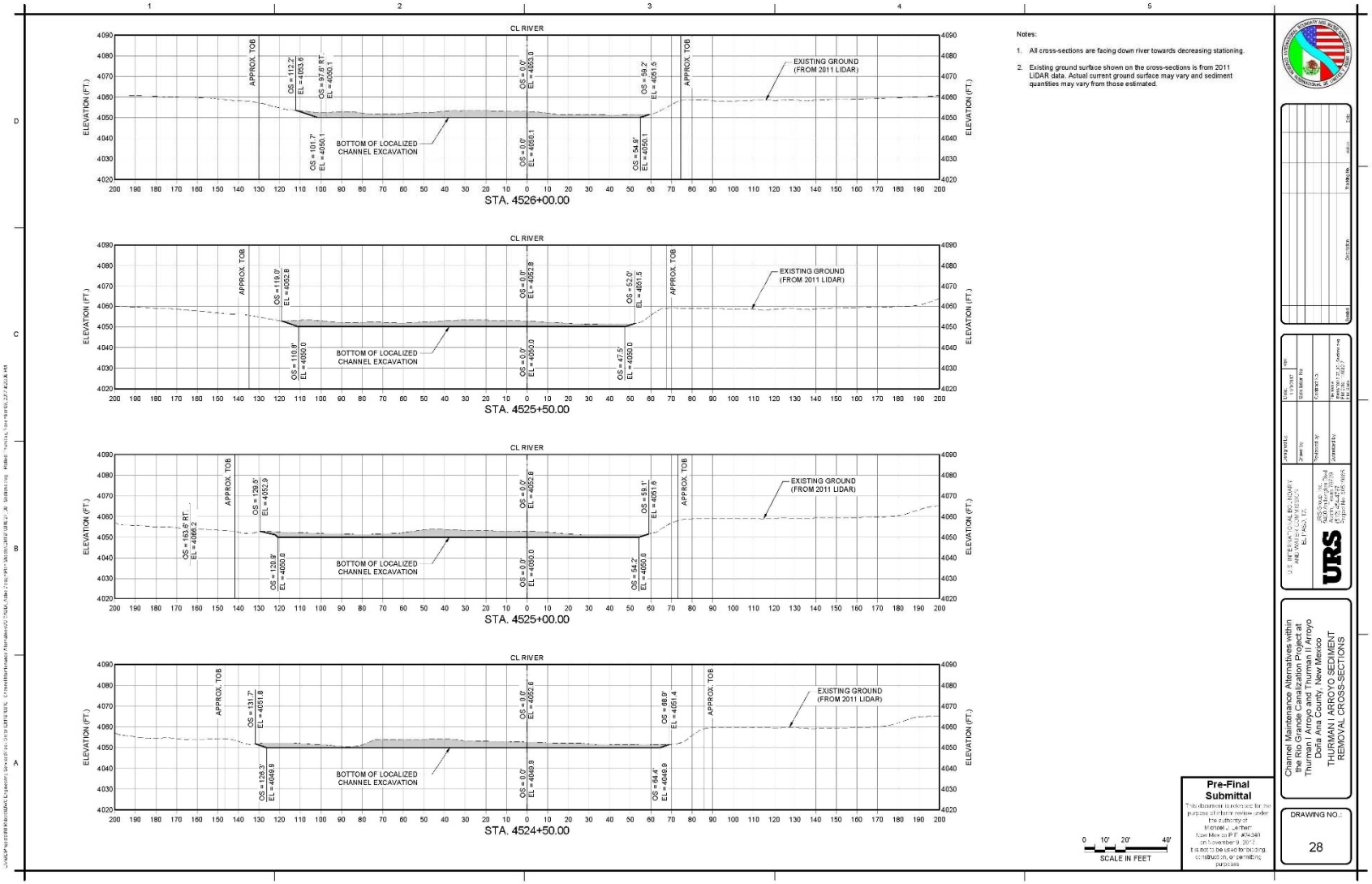
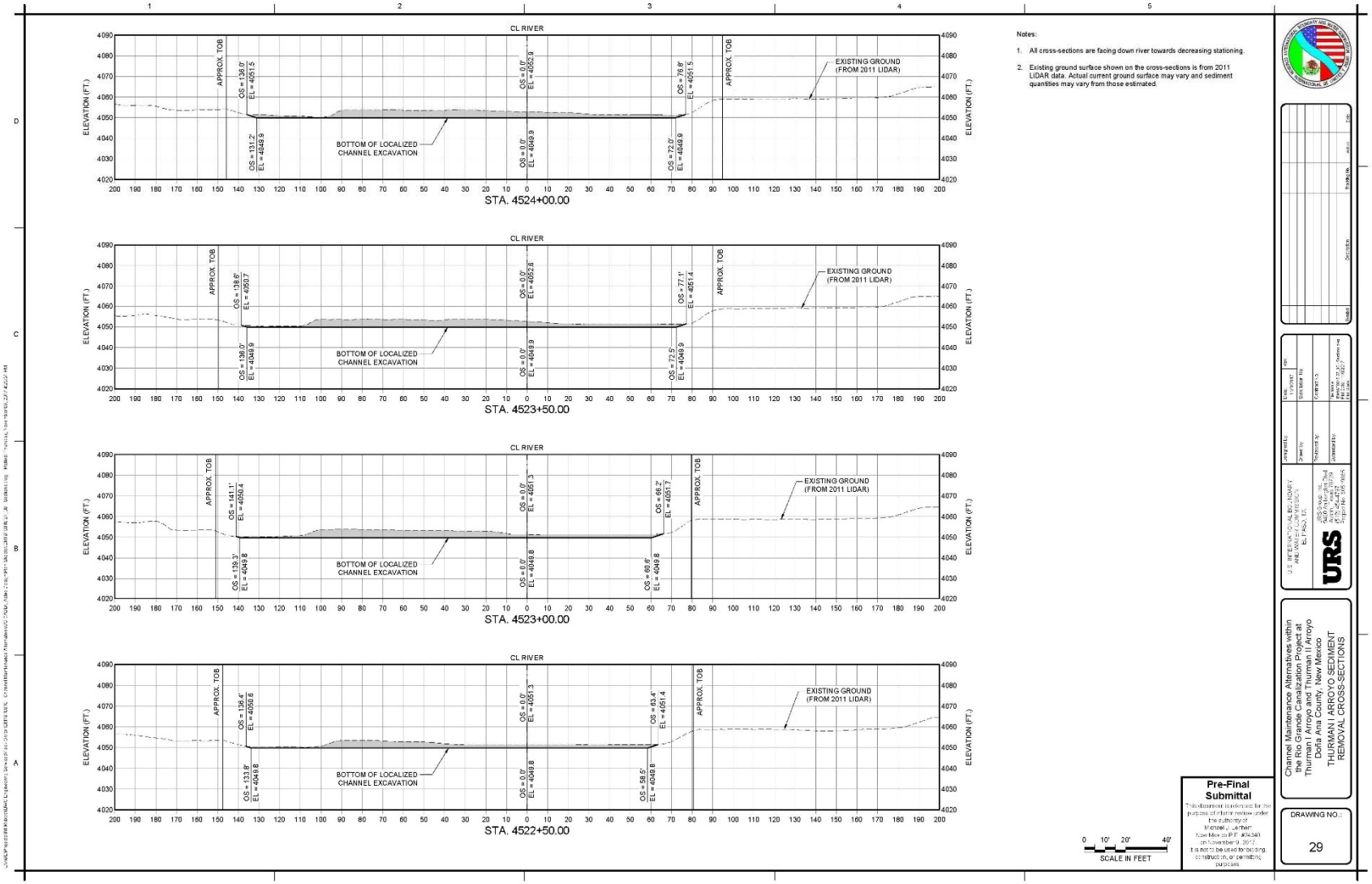
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN I ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
DRAWING NO.:
27


CL RIVER
APPROX. TOB
EXISTING GROUND (FROM 2011 LIDAR)
BOTTOM OF LOCALIZED CHANNEL EXCAVATION
ELEVATION (FT.)
STA. 4526+00.00
STA. 4525+50.00
STA. 4525+00.00
STA. 4524+50.00
Notes:
1. All cross-sections are facing down river towards decreasing stationing.
2. Existing ground surface shown on the cross-sections is from 2011 LIDAR data. Actual current ground surface may vary and sediment quantities may vary from those estimated.
SCALE IN FEET
Pre-Final Submittal
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN I ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
DRAWING NO.:
28


CL RIVER
ELEVATION (FT.)
APPROX. TOB
OS = 136.0'
EL = 4051.5
OS = 131.2'
EL = 4049.9
BOTTOM OF LOCALIZED
CHANNEL EXCAVATION
OS = 0.0'
EL = 4050.9
OS = 0.0'
EL = 4049.9
OS = 79.8'
EL = 4051.5
OS = 72.0'
EL = 4049.9
EXISTING GROUND
(FROM 2011 LIDAR)
STA. 4524+00.00
OS = 136.6'
EL = 4050.7
OS = 136.0'
EL = 4049.9
OS = 0.0'
EL = 4050.8
OS = 0.0'
EL = 4049.9
OS = 77.1'
EL = 4051.4
OS = 72.5'
EL = 4049.9
STA. 4523+50.00
OS = 141.1'
EL = 4050.4
OS = 139.3'
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OS = 0.0'
EL = 4051.3
OS = 0.0'
EL = 4049.8
OS = 66.2'
EL = 4051.7
OS = 66.6'
EL = 4049.8
STA. 4523+00.00
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OS = 133.8'
EL = 4049.8
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OS = 0.0'
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EL = 4051.4
OS = 56.5'
EL = 4049.8
STA. 4522+50.00
Notes:
1. All cross-sections are facing down river towards decreasing stationing.
2. Existing ground surface shown on the cross-sections is from 2011 LIDAR data. Actual current ground surface may vary and sediment quantities may vary from those estimated.
0 10' 20' 40'
SCALE IN FEET
Pre-Final Submittal
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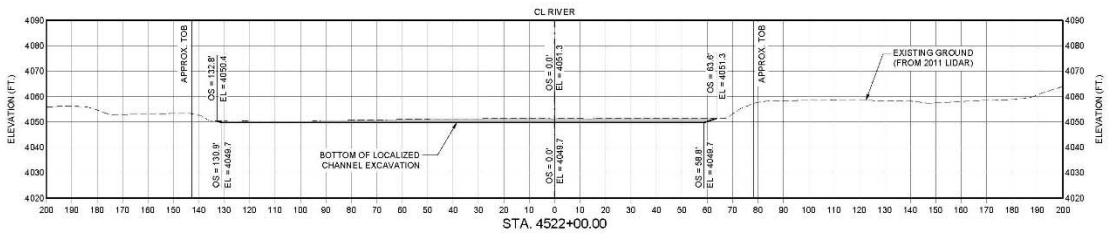
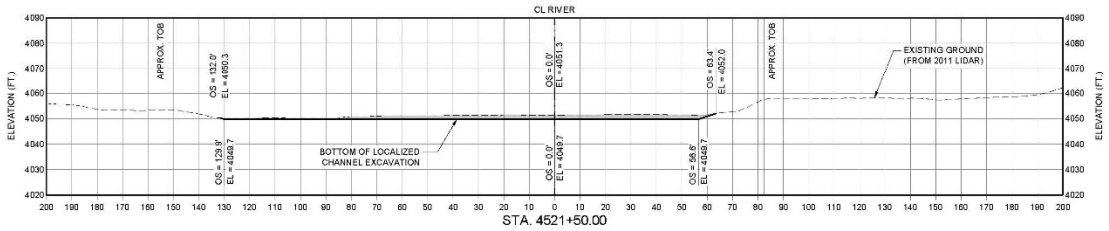
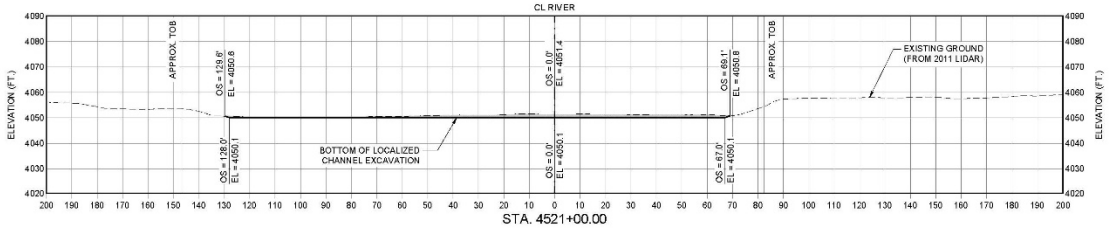
U.S. INTERNATIONAL BOUNDARY AND WATER COMMISSION
EL PASO, TX.
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
THURMAN I ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
DRAWING NO.:
29







Notes:

1. All cross-sections are facing down river towards decreasing stationing.
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0 10' 20' 40'
SCALE IN FEET

Pre-Final Submittal

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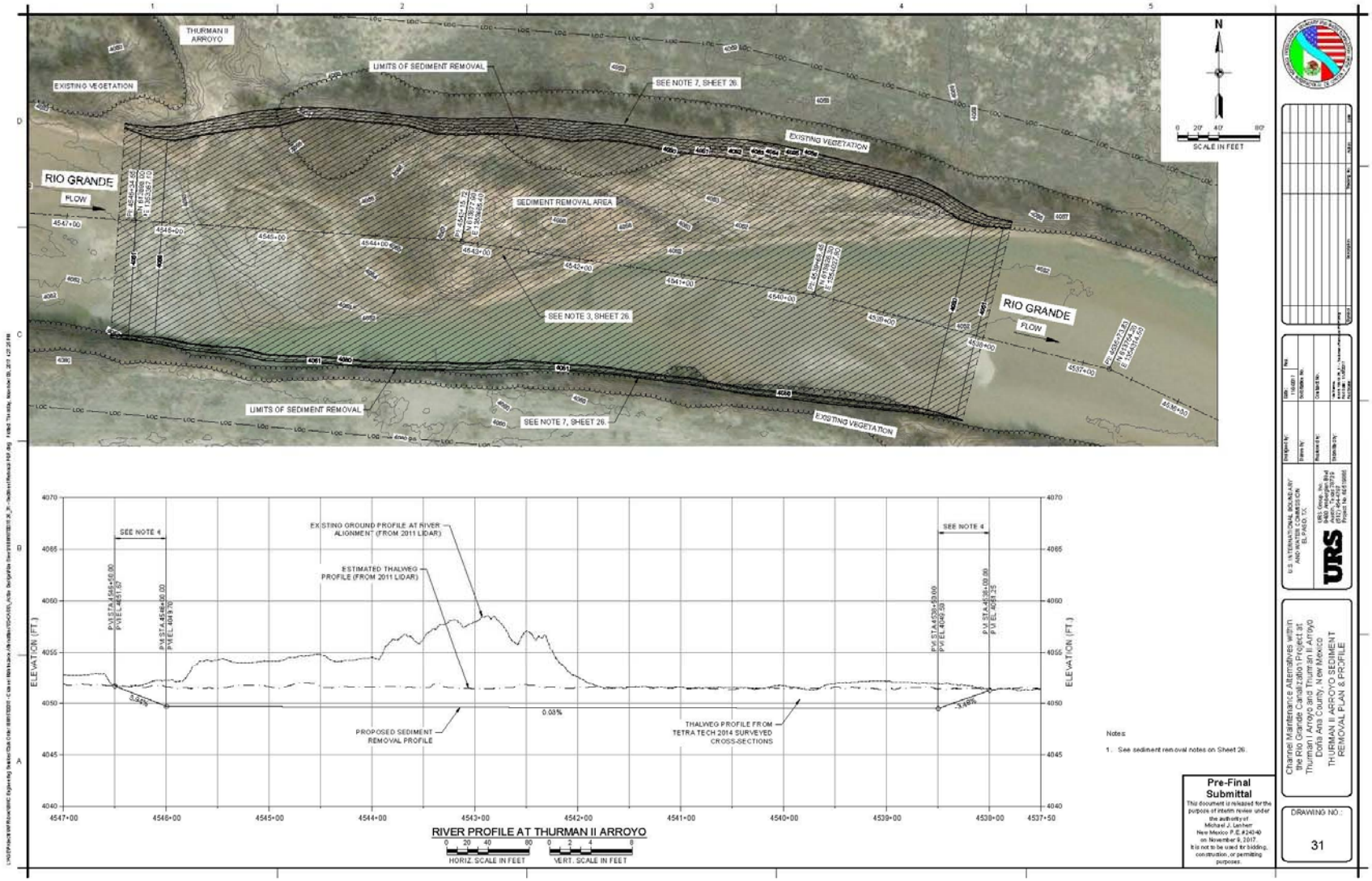
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
THURMAN I ARROYO SEDIMENT REMOVAL CROSS-SECTIONS

DRAWING NO.: 30


THURMAN II ARROYO
LIMITS OF SEDIMENT REMOVAL
SEE NOTE 7, SHEET 26.
EXISTING VEGETATION
RIO GRANDE FLOW
SEDIMENT REMOVAL AREA
SEE NOTE 3, SHEET 26.
LIMITS OF SEDIMENT REMOVAL
SEE NOTE 7, SHEET 26.
EXISTING VEGETATION
RIO GRANDE FLOW
N
SCALE IN FEET
SEE NOTE 4
SEE NOTE 4
EXISTING GROUND PROFILE AT RIVER ALIGNMENT (FROM 2011 LIDAR)
ESTIMATED THALWEG PROFILE (FROM 2011 LIDAR)
PROPOSED SEDIMENT REMOVAL PROFILE
THALWEG PROFILE FROM TETRA TECH 2014 SURVEYED CROSS-SECTIONS
0.04%
0.08%
0.04%
ELEVATION (FT.)
RIVER PROFILE AT THURMAN II ARROYO
HORIZ. SCALE IN FEET
VERT. SCALE IN FEET
Notes:
1. See sediment removal notes on Sheet 26.
Pre-Final Submittal
This document is released for the purpose of interim review under the authority of Michael J. Lenher New Mexico P.E. #24040 on November 9, 2017. It is not to be used for bidding, construction, or permitting purposes.
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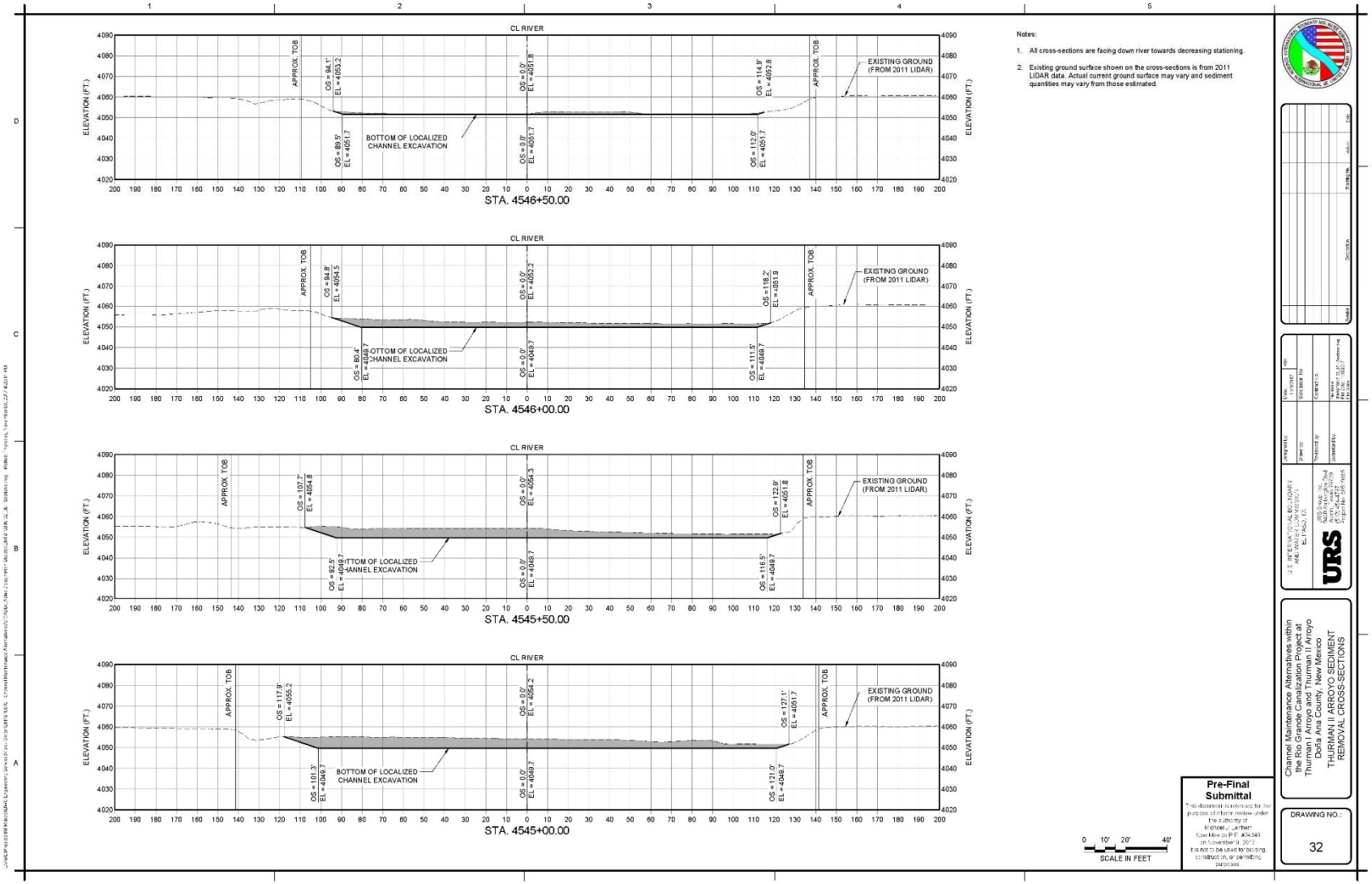
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
THURMAN II ARROYO SEDIMENT REMOVAL PLAN & PROFILE
DRAWING NO.:
31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OS = 101.2'
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OS = 0.0'
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OS = 127.1'
EL = 4051.7
OS = 121.0'
EL = 4049.7
STA. 4545+00.00
Notes:
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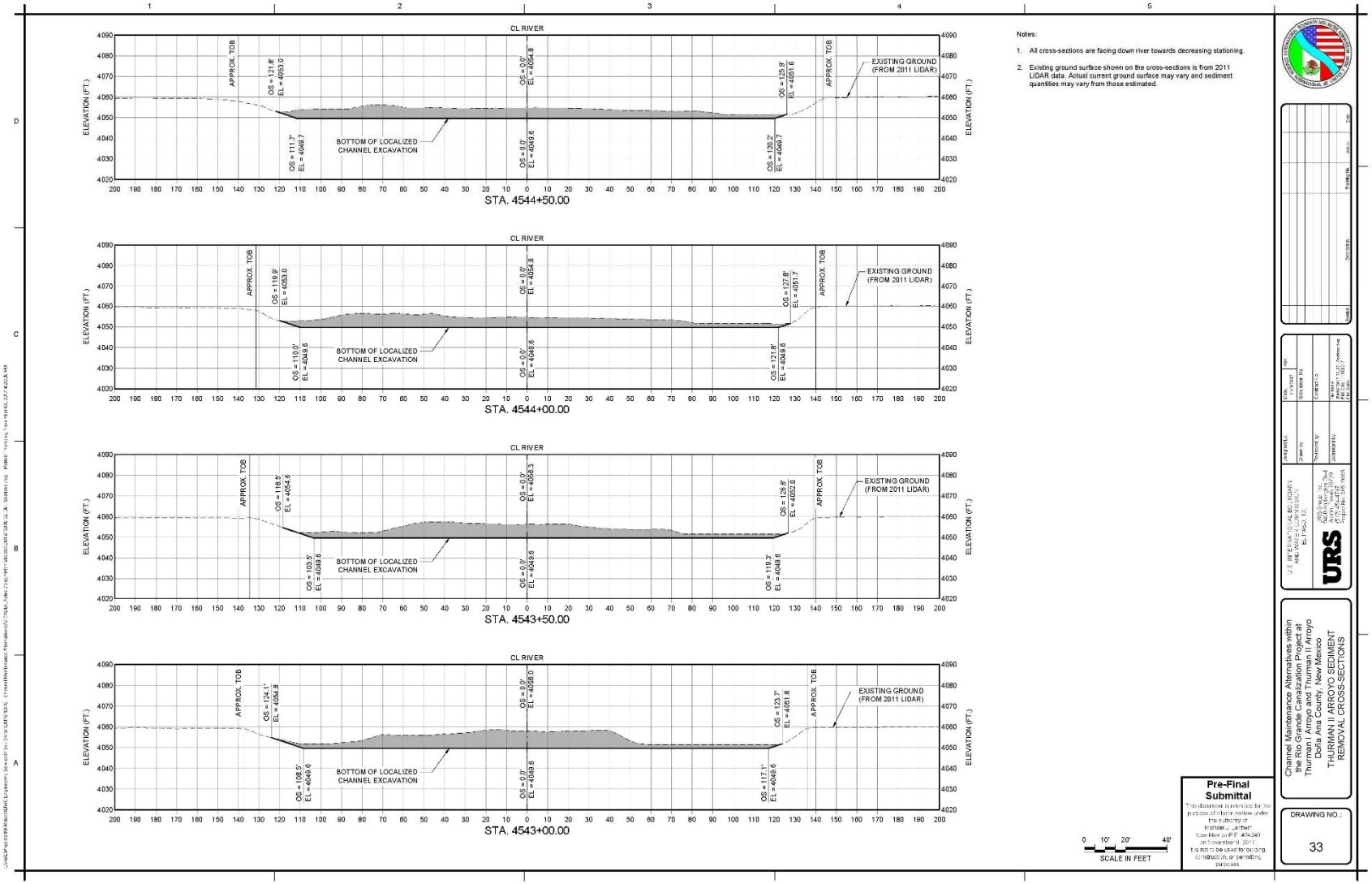
Doña Ana County, New Mexico
THURMAN II ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
DRAWING NO.:
32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OS = 111.7'
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BOTTOM OF LOCALIZED
CHANNEL EXCAVATION
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EL = 4054.8
OS = 0.0'
EL = 4049.6
OS = 125.9'
EL = 4051.8
OS = 126.2'
EL = 4049.7
APPROX. TOB
EXISTING GROUND
(FROM 2011 LIDAR)
ELEVATION (FT.)
STA. 4544+50.00
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OS = 110.0'
EL = 4049.6
OS = 11.0'
EL = 4054.6
OS = 0.0'
EL = 4049.6
OS = 127.8'
EL = 4051.7
OS = 121.8'
EL = 4049.6
STA. 4544+00.00
OS = 118.5'
EL = 4054.6
OS = 103.5'
EL = 4049.6
OS = 0.0'
EL = 4056.3
OS = 0.0'
EL = 4049.6
OS = 126.8'
EL = 4052.0
OS = 119.3'
EL = 4049.6
STA. 4543+50.00
OS = 124.1'
EL = 4054.8
OS = 108.5'
EL = 4049.6
OS = 0.0'
EL = 4058.0
OS = 0.0'
EL = 4049.6
OS = 123.7'
EL = 4051.8
OS = 117.1'
EL = 4049.6
STA. 4543+00.00
Notes:
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SCALE IN FEET
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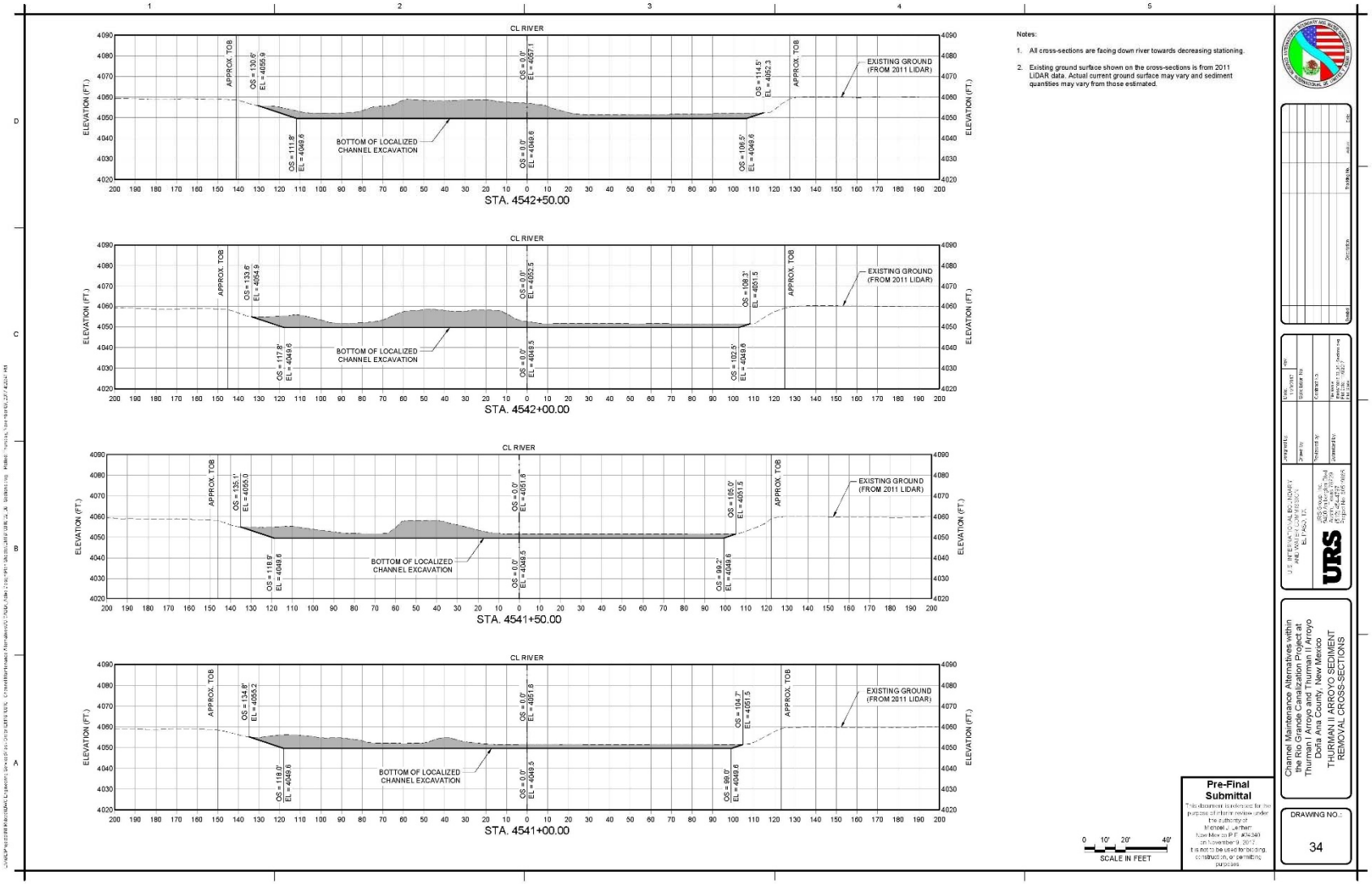
Doña Ana County, New Mexico
THURMAN II ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
DRAWING NO.:
33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OS = 111.8'
EL = 4049.6
BOTTOM OF LOCALIZED
CHANNEL EXCAVATION
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EL = 4057.1
OS = 0.0'
EL = 4049.6
OS = 114.5'
EL = 4052.3
OS = 106.5'
EL = 4049.6
APPROX. TOB
EXISTING GROUND
(FROM 2011 LIDAR)
ELEVATION (FT.)
STA. 4542+50.00
CL RIVER
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OS = 117.8'
EL = 4049.6
BOTTOM OF LOCALIZED
CHANNEL EXCAVATION
OS = 0.0'
EL = 4055.5
OS = 0.0'
EL = 4049.5
OS = 109.3'
EL = 4051.5
OS = 102.5'
EL = 4049.6
APPROX. TOB
EXISTING GROUND
(FROM 2011 LIDAR)
ELEVATION (FT.)
STA. 4542+00.00
CL RIVER
APPROX. TOB
OS = 135.1'
EL = 4055.0
OS = 118.9'
EL = 4049.6
BOTTOM OF LOCALIZED
CHANNEL EXCAVATION
OS = 0.0'
EL = 4051.6
OS = 0.0'
EL = 4049.5
OS = 105.0'
EL = 4051.5
OS = 99.2'
EL = 4049.6
APPROX. TOB
EXISTING GROUND
(FROM 2011 LIDAR)
ELEVATION (FT.)
STA. 4541+50.00
CL RIVER
APPROX. TOB
OS = 134.8'
EL = 4055.2
OS = 119.0'
EL = 4049.6
BOTTOM OF LOCALIZED
CHANNEL EXCAVATION
OS = 0.0'
EL = 4051.6
OS = 0.0'
EL = 4049.5
OS = 104.7'
EL = 4051.5
OS = 99.0'
EL = 4049.6
APPROX. TOB
EXISTING GROUND
(FROM 2011 LIDAR)
ELEVATION (FT.)
STA. 4541+00.00
Notes:
1. All cross-sections are facing down river towards decreasing stationing.
2. Existing ground surface shown on the cross-sections is from 2011 LIDAR data. Actual current ground surface may vary and sediment quantities may vary from those estimated.
0 10' 20' 40'
SCALE IN FEET
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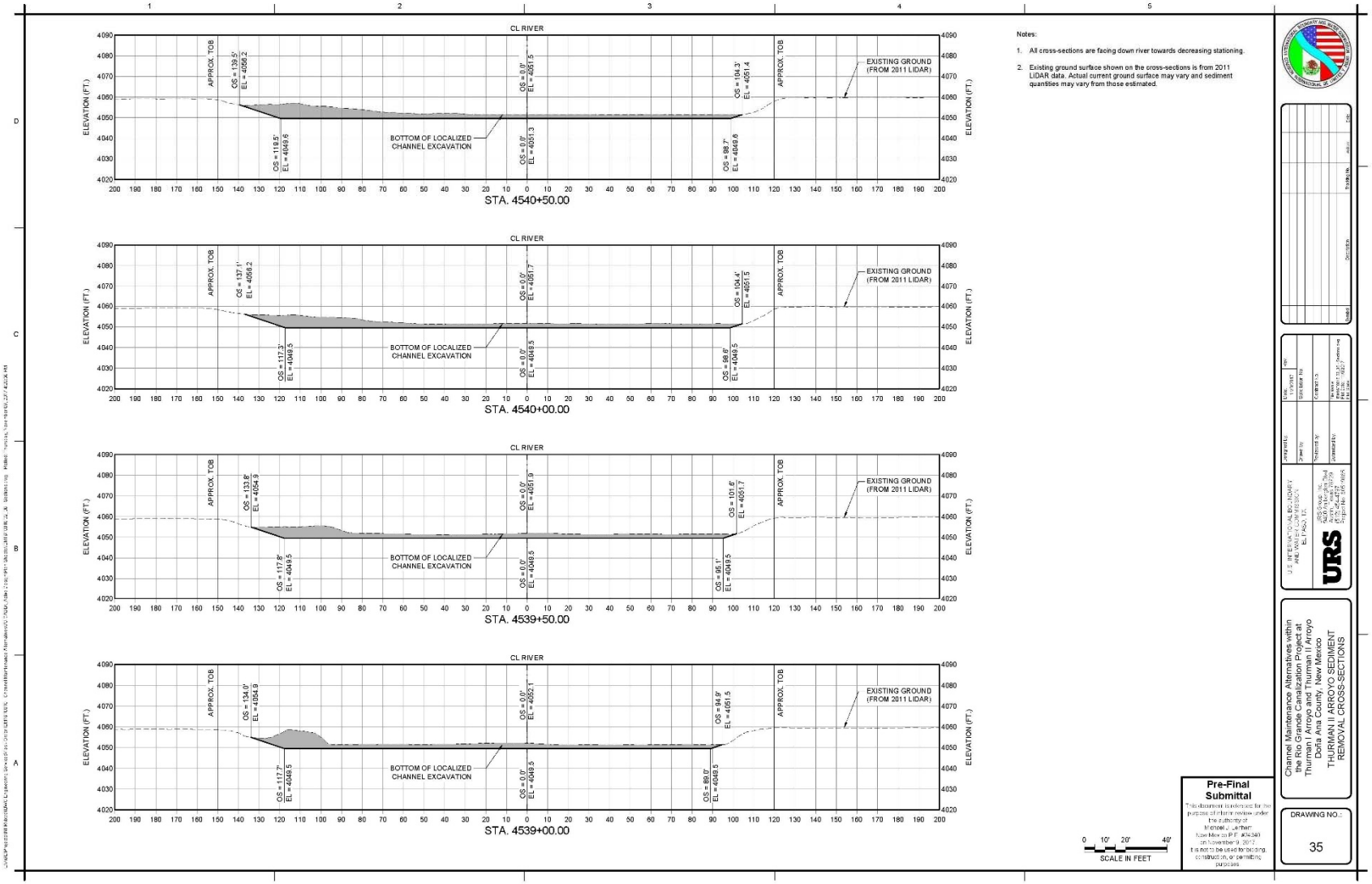
EL PASO, TX
URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo
Doña Ana County, New Mexico
THURMAN II ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
DRAWING NO.:
34


CL RIVER
APPROX. TOB
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EL = 4049.6
BOTTOM OF LOCALIZED CHANNEL EXCAVATION
OS = 0.0'
EL = 4051.5
OS = 0.0'
EL = 4051.3
OS = 104.3'
EL = 4051.4
OS = 88.7'
EL = 4049.6
EXISTING GROUND (FROM 2011 LIDAR)
ELEVATION (FT.)
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EL = 4056.2
OS = 117.3'
EL = 4049.5
OS = 0.0'
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EL = 4049.5
OS = 104.4'
EL = 4051.5
OS = 88.6'
EL = 4049.5
STA. 4540+00.00
OS = 133.8'
EL = 4054.9
OS = 117.8'
EL = 4049.5
OS = 0.0'
EL = 4051.9
OS = 0.0'
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EL = 4051.7
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STA. 4539+50.00
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EL = 4054.9
OS = 117.7'
EL = 4049.5
OS = 0.0'
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OS = 0.0'
EL = 4049.5
OS = 94.9'
EL = 4051.5
OS = 89.0'
EL = 4049.5
STA. 4539+00.00
Notes:
1. All cross-sections are facing down river towards decreasing stationing.
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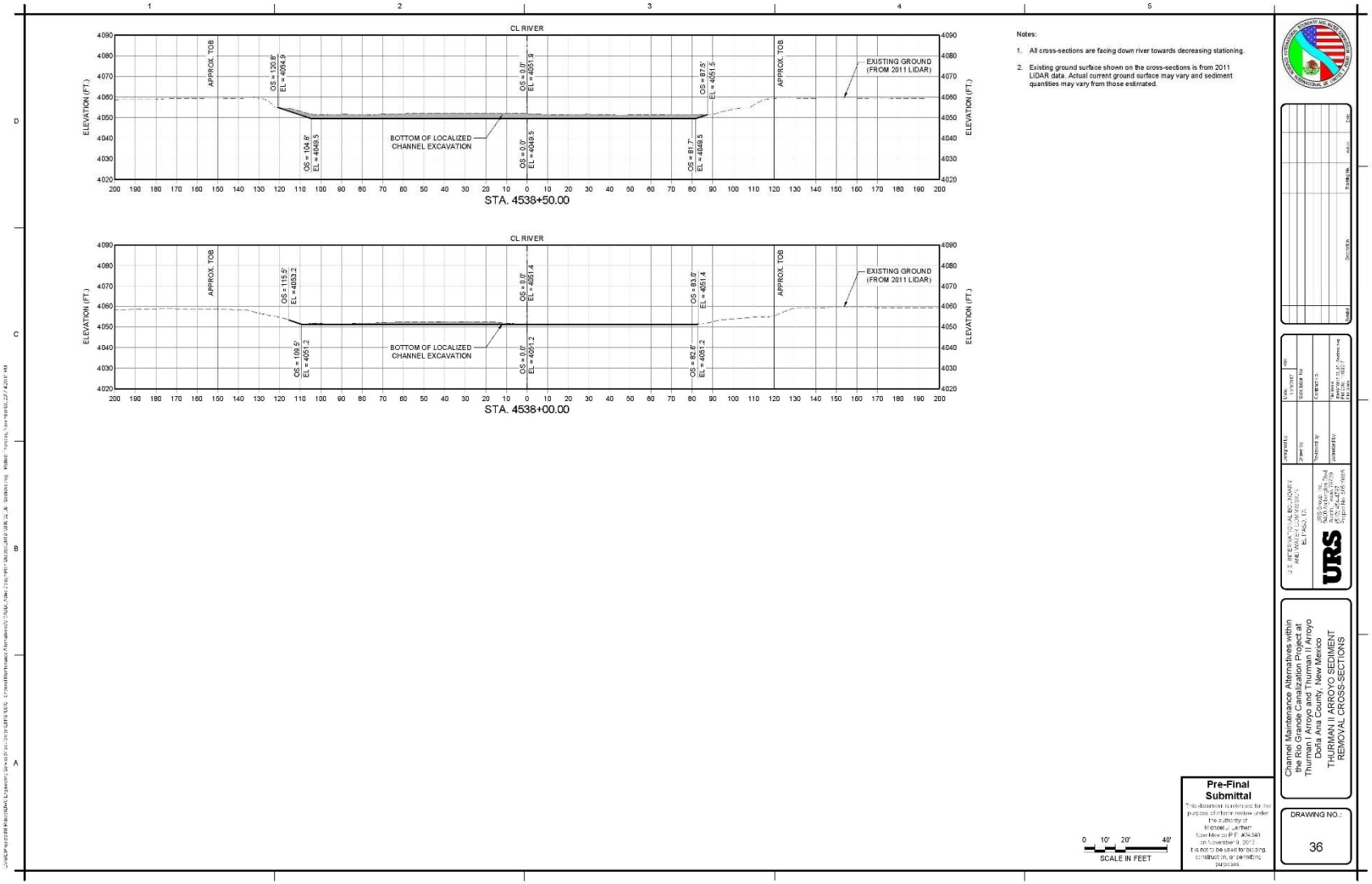
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN II ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
DRAWING NO.:
35


CL RIVER
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EL = 4049.5
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OS = 0.0'
EL = 4049.5
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EL = 4051.5
OS = 81.7'
EL = 4049.5
EXISTING GROUND (FROM 2011 LIDAR)
ELEVATION (FT.)
STA. 4538+50.00
CL RIVER
APPROX. TOB
OS = 115.5'
EL = 4053.2
OS = 109.5'
EL = 4051.2
BOTTOM OF LOCALIZED CHANNEL EXCAVATION
OS = 0.0'
EL = 4051.4
OS = 0.0'
EL = 4051.2
OS = 83.0'
EL = 4051.4
OS = 82.6'
EL = 4051.2
EXISTING GROUND (FROM 2011 LIDAR)
ELEVATION (FT.)
STA. 4538+00.00
Notes:
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URS
Channel Maintenance Alternatives within the Rio Grande Canalization Project at Thurman I Arroyo and Thurman II Arroyo Doña Ana County, New Mexico
THURMAN II ARROYO SEDIMENT REMOVAL CROSS-SECTIONS
DRAWING NO.:
36

Appendix B Photos of Project Area

THURMAN I

	
View of Thurman I looking upstream from the USIBWC levee, outside of USIBWC ROW, Feb 2016	View of Thurman I looking downstream from USIBWC levee
	
West bank of Thurman I standing looking downstream. Banks are unconsolidated material, Feb 2016	West bank of Thurman I standing looking downstream. Banks are unconsolidated material, July 2016

Willows and cattails along Thurman I nearing the confluence with the Rio Grande, looking downstream, Feb 2016

Thurman I nearing the confluence with the Rio Grande, looking downstream, July 2016

Panoramic view of the Thurman I delta in the Rio Grande, Feb 2016

	
Edge of Thurman I delta inside the Rio Grande, looking downstream of RG	Looking at confluence of Thurman I from the Thurman I delta inside RG
	
Foreground -Vegetation on sediment bar at the mouth of Thurman I near confluence with RG. Background -vegetation on the east bank of Thurman I. Feb 2016	Vegetation at the mouth of Thurman I near confluence with Rio Grande, July 2016.

	
Floodplain on north side of Thurman I (west bank), looking upstream	

.

THURMAN II

	
Thurman II looking upstream from USIBWC levee, off of USIBWC property, Feb 2016	Thurman II looking downstream from USIBWC levee, Feb
	
West bank of Thurman II, July 2016.	Gravel bar at downstream end of Thurman II toward the confluence with the RG, Feb 2016.

	
Looking downstream of Thurman II towards to confluence with the RG.	Floodplain on east bank, Feb 2016
	
West bank of Thurman II, looking upstream, Feb 2016	Vegetation along the banks of Thurman II, looking upstream from the confluence with the Rio Grande, Feb 2016

Vegetation at Thurman II towards the Rio Grande, July 2016.

Thurman II at the confluence of the Rio Grande, July 2016.

Panoramic view of the Thurman II delta inside the Rio Grande, looking downstream of the Rio Grande

Appendix C Distribution and Coordination

Federal

- Federal Emergency Management Agency
- Natural Resources Conservation Service, Las Cruces
- Advisory Council on Historic Preservation
- U.S. Army Corps of Engineers, Las Cruces
- U.S. Army Corps of Engineers, Albuquerque
- U.S. Customs and Border Patrol, El Paso Section
- U.S. Bureau of Land Management, Las Cruces
- U.S. Bureau of Reclamation – Albuquerque office
- U.S. Bureau of Reclamation - El Paso Field Office
- U.S. Bureau of Reclamation - Elephant Butte Dam
- U.S. Environmental Protection Agency Border Office
- U.S. Environmental Protection Agency Region 6
- U.S. Fish and Wildlife Service New Mexico Ecological Services Division

Tribes

- Comanche Indian Tribe
- Fort Sill Apache Tribe
- Isleta Pueblo
- Kiowa Tribe (east half of county)
- Mescalero Apache Tribe
- Navajo Nation
- Tesuque Pueblo
- White Mountain Apache Tribe
- Ysleta del Sur Pueblo

State

- New Mexico Historic Preservation Division
- New Mexico Department of Game and Fish
- New Mexico Department of Transportation
- New Mexico Energy, Minerals and Natural Resources Division
- New Mexico Environment Department, Watershed Protection Section, SWQB
- Interstate Stream Commission, New Mexico
- Rio Grande Compact Commissioner, Texas

County/ Municipal

- Doña Any County
- Doña Ana County Flood Commission
- City of Las Cruces
- Village of Hatch

USIBWC Upper Rio Grande Citizens Forum Board members

- John Balliew
- Danny Chavez

- Yvonne Curry
- Francine Jefferson
- Leticia Jimenez
- Travis Johnson
- Conrad Keyes
- Walton Low
- Suleiman Masoud
- Gill Sorg
- Ray Spears

Organizations

- Burlington Northern Santa Fe Railroad, Albuquerque
- University of Texas at El Paso, Center for Environmental Resource Management
- Audubon New Mexico
- Chihuahuan Desert Wildlife Rescue
- Elephant Butte Irrigation District
- El Paso County Water Improvement District No. 1
- Mesilla Valley Audubon
- Native Plant Society of New Mexico
- New Mexico Wilderness Alliance
- Paso del Norte Watershed Council
- Sierra Club, Rio Grande Chapter
- Southwest Environmental Center
- World Wildlife Fund
- Rio Grande Council of Governments
- Environmental Defense Fund, Austin
- New Mexico Farm and Livestock Bureau
- South Central New Mexico Stormwater Coalition
- New Mexico Cattlegrowers' Association
- New Mexico Pecan Growers Association

Elected Officials

- U.S. Senate New Mexico Congressional District 2, Senator Tom Udall
- U.S. Senate New Mexico Congressional District 2, Senator Martin Heinrich
- U.S Representative New Mexico Congressional District 2, Senator Steve Pearce
- New Mexico House District 36 Representative Nathan P. Small
- New Mexico House District 39 Representative Rudy S. Martinez
- New Mexico Senate District 35 Senator John Arthur Smith
- New Mexico Senate District 36 Senator Jeff Steinborn

News Media

- The Citizen Newspaper of Hatch
- Las Cruces Sun News
- Las Cruces Bulletin

Following is correspondence to and from USACE regarding being a cooperating agency.

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

July 31, 2017

Justin Riggs, Regulatory Manager
Department of the Army, Albuquerque District, Corps of Engineers
Las Cruces Regulatory Field Office
200 E. Griggs Ave
Las Cruces, New Mexico 88001

Subject: USIBWC Invitation to Participate as a Cooperating Agency – Environmental Assessment for Thurman I and II Arroyo Channel Maintenance Alternatives Pilot Project

Dear Mr. Riggs:

The International Boundary and Water Commission, United States Section (USIBWC), invites the U.S. Army Corps of Engineers to participate as a cooperating agency in the USIBWC's preparation of the *Environmental Assessment (EA) for Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, New Mexico*, pursuant to the Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) for cooperating agencies (40 CFR 1501.6).

The purpose of the project is to:

1) Address and control sediment inflow from Thurman I and II arroyos into the Rio Grande main stem,
2) Conduct a pilot study for channel maintenance alternatives that could be replicated in other areas of USIBWC's Rio Grande Canalization Project, and
3) Facilitate maintenance of the Rio Grande sediment input and minimize operational costs.

USIBWC preliminarily proposes to evaluate environmental impacts of three alternatives:

1. Alternative A: No Action Alternative – Routine Sediment Excavation
2. Alternative B: Mesh-Based Sediment Traps
3. Alternative C: Sediment Basin – Preferred Alternative.

Please coordinate with Ms. Elizabeth Verdecchia at (915) 832-4701 or by email at elizabeth.verdecchia@ibwc.gov. USIBWC appreciates your collaboration on this EA.

Sincerely,

Gilbert Anaya,
Division Chief,
Environmental Management Division

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
4101 JEFFERSON PLAZA NE
ALBUQUERQUE, NM 87109-3435

Reply to Attention of

Regulatory Division

SUBJECT: Action No. SPA 2017-00 00231-LCO (Channel Maintenance Alternatives at Thurman I and II Arroyos) in Dona Ana County New Mexico

Mr. Gilbert Anaya
Division Chief, Environmental Management Division
International Boundary and Water Commission
4171 N. Mesa Street, Suite 100
El Paso, Texas 79902-1441

Mr. Anaya:

We received your letter dated July 31, 2017 inviting the U.S. Army Corps of Engineers (Corps) Albuquerque District Regulatory Division to participate as a cooperating agency in the U.S. International Boundary and Water Commission's (USIBWC) preparation of the "Environmental Assessment (EA) for Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch New Mexico". We appreciate your invitation, however we decline to participate as a cooperating agency for this project. Our decision is based on information obtained during informal coordination with IBWC, including the 90% Construction of Channel Maintenance Alternatives submittal dated May 19, 2017. Based on the 90% design, the size and scope of the project should not exceed the limitations of a general permit. Our participation as a cooperating agency is generally commensurate with the scope and complexity of the anticipated 404 permitting action.

Although we are declining to participate as a cooperating agency, we look forward to continued interagency coordination on this project. In particular, it would be beneficial to discuss your plans for compensatory mitigation and any changes to the project size and scope that could result in reevaluation of whether a general permit is appropriate.

Thank you, and please coordinate directly with Justin Riggs, the regulatory project manager for this project. Justin can be reached by phone at 575-268-8612 or Justin.C.Riggs@usace.army.mil.

Sincerely,

Marcy Leavitt, Chief
NM/TX Branch
Albuquerque District Regulatory Division

Appendix D Draft Environmental Assessment Review Comments and Changes Made to the Draft EA

Commenting Entity	Subject	Response
Conrad Keyes, Paso del Norte Watershed Council	1) It seems that sections 1.6 and 2.2 headings should also be All Caps. 2) Section 3.3.2 - TCEQ was mentioned twice and I believe that should be NMED. 3) Section 3.6.2 - the first word of the paragraph shouldn't be Other, that word appears twice in the sentence. It probably should be USIBWC? 4) Section 5.1 - Why is TCEQ used instead of NMED, which is the state environmental agency for this reach of the Rio Grande Project.	All editorial comments changed as suggested
NM Historic Preservation Division	No Comment	Noted
Comanche Nation	No Properties have been identified	Noted

Other changes made to the Draft EA:

- Section 4.1 – Added reference to Nationwide Permit 43
- Section 3.1.3 – added that USIBWC anticipates implementing all requirements and recommendations from the 2017 Biological Opinion
- Table 3.2 – updated volume of sediment anticipated to be excavated under Alternative C based on the Prefinal design (USIBWC 2017d)
- Section 5.1 – Texas state agencies changed to New Mexico state agencies
- Appendix A – Project Designs changed to PreFinal instead of 90%

Following pages are:

- USIBWC distribution letter to stakeholders
- Comment response letters from the table above

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

October 12, 2017

Subject: Notice of Availability of the *Draft Environmental Assessment and Finding of No Significant Impact for Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, NM, Rio Grande Canalization Project.*

Dear Stakeholder:

The United States Section of the International Boundary and Water Commission (USIBWC) would like to inform you of the availability of the *Draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, NM, Rio Grande Canalization Project*. In compliance with the National Environmental Policy Act (NEPA), the draft EA is available for public comment for 30 days.

The USIBWC is considering constructing sediment control projects at Thurman I and II, two ephemeral tributaries of the Rio Grande, located within a portion of the Rio Grande Canalization Project protective levee system in Hatch, Doña Ana County, New Mexico. The USIBWC has the statutory authority to maintain the Rio Grande (Act of June 4, 1936, 49 Stat. 1463, Public Law No. 648 and 22 United States Code 277). USIBWC commissioned a 2015 study that recommended sediment control structures be built on Thurman I and II arroyos, among others, to trap sediment and assist in maintaining the Rio Grande.

The purpose is to construct sediment control structures on Thurman I and II arroyos with the following objectives 1) Control the inflow of sediment into the Rio Grande mainstem, 2) Conduct a pilot study for channel maintenance alternatives, and 3) Be accessible for maintenance and minimize operational costs.

This EA evaluates potential environmental impacts of the No Action Alternative and two alternatives. The Alternative A: No Action – Routine Sediment Excavation does not call for any construction but would require continued routine sediment excavation at the confluence of the arroyos and the Rio Grande. Alternative B: Mesh-Based Sediment Traps proposes to construct mesh and rebar sediment traps where each mesh would trap progressively smaller sediment particles. Alternative C: Sediment Basins is the Preferred Alternative, and calls for the construction of a sediment basin at each arroyo with a concrete end wall. Permits would be required from the U.S. Army Corps of Engineers for dredge and fill of Waters of the United States, per the Clean Water Act Sections 404 and 401; mitigation has been proposed for the permits. Potential impacts on natural, cultural, and other resources were evaluated. A FONSI has been prepared for the Preferred Alternative based on a review of the facts and analyses contained in the EA.

The Draft EA is available online at http://www.ibwc.gov/EMD/EIS_EA_Public_Comment.html. The Notice of Availability of the Draft EA is expected to be published in the Federal Register by mid October 2017. Written public comments are due by **November 20, 2017** and should be submitted to Elizabeth Verdecchia, Natural Resources Specialist, via email at

submitted to Elizabeth Verdecchia, Natural Resources Specialist, via email at Elizabeth.Verdecchia@ibwc.gov or via mail at 4171 N Mesa C-100, El Paso TX 79902. Request for public hearings or requests for hardcopies of the Draft EA should also be submitted to Ms. Verdecchia.

If you have questions or need additional information, please contact Ms. Verdecchia at (915) 832-4701.

Sincerely,

Gilbert Anaya
Division Chief
Environmental Management Division

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

OFFICE OF THE COMMISSIONER
UNITED STATES SECTION

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RECEIVED
OCT 20 2017
HISTORIC PRESERVATION DIVISION

October 12, 2017

Dr. Jeff Pappas
New Mexico Historic Preservation Division
407 Galisteo St. Suite 236
Santa Fe, NM 87501

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If you have questions or need additional information, please contact Ms. Verdecchia at (915) 832-4701.

Sincerely,

Gilbert Anaya
Division Chief
Environmental Management Division

COMMENTS:

John R Eck Nov 14, 2017
NM State Historic Preservation Office

Thanks for keeping the SHPO informed. We have no comments on the EA.

From: Conrad Keyes <cgkeyesjr@q.com>
To: "verdecchia, elizabeth" <elizabeth.verdecchia@ibwc.gov>
CC: "Nabil G CIV USARMY CESPA Shafike (US)" <nabil.g.shafike@usace.army.mil>
Date: 11/13/2017 10:15 AM
Subject: Channel Maintenance Alternatives Pilot Project - Draft EA Comment Period - Thurman Arroyos -- Keyes brief review

Liz Verdecchia - I was able to spend a couple of hours on the Review of the Draft EA on Thurman Arroyos after I called in for the presentation last week.

Here are my editorial comments for the Draft EA:

1) It seems that sections 1.6 and 2.2 headings should also be All Caps.
2) Section 3.3.2 - TCEQ was mentioned twice and I believe that should be NMED.
3) Section 3.6.2 - the first word of the paragraph shouldn't be Other, that word appears twice in the sentence. It probably should be USIBWC?
4) Section 5.1 - Why is TCEQ used instead of NMED, which is the state environmental agency for this reach of the Rio Grande Project.

Conrad Keyes, Jr., P.S., P.E., ScD
Chair, Paso del Norte Watershed Council
801 Raleigh Road, Las Cruces, NM 88005
575-523-7233, alt email-ckeyes@nmsu.edu
cell - 575.644.4966
http://www.pdnwc.org

----- Forwarded Message -----
From: "Nabil G CIV USARMY CESPA Shafike (US)" <Nabil.G.Shafike@usace.army.mil>
To: "Conrad Keyes" <cgkeyesjr@q.com>
Sent: Wednesday, October 18, 2017 7:26:32 AM
Subject: RE: [EXTERNAL] Fwd: Channel Maintenance Alternatives Pilot Project - Draft EA Comment Period - Thurman Arroyos (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Conrad, If you have time please do.

Nabil

-----Original Message-----
From: Conrad Keyes [mailto:cgkeyesjr@q.com]
Sent: Tuesday, October 17, 2017 3:29 PM
To: Shafike, Nabil G CIV USARMY CESPA (US) <Nabil.G.Shafike@usace.army.mil>
Subject: [EXTERNAL] Fwd: Channel Maintenance Alternatives Pilot Project - Draft EA Comment Period - Thurman Arroyos

Do you want me to review this one?

From: "Elizabeth Verdecchia" <Elizabeth.Verdecchia@ibwc.gov>
To: "Beth Bardwell" <bbardwell@audubon.org>, "Erek (EBID)" <efuchs@ebid-nm.org>, "Gary Esslinger" <gesslinger@ebid-nm.org>, "Naomi Ontiveros" <nontiveros@ebid-nm.org>, "Zack (EBID)" <zlibbin@ebid-nm.org>, "Jesus Reyes" <jreyes@epcwid1.org>, "Pete Rodriguez" <Prodriguez@epcwid1.org>, "John Gahr" <john_gahr@fws.gov>, "Dara Heinrich" <Dara_Parker@heinrich.senate.gov>, "Derrick Ohara" <Derrick.Ohara@ibwc.gov>, "Gilbert Anaya" <Gilbert.Anaya@ibwc.gov>, "Jose Nunez"

<Jose.Nunez@ibwc.gov>, "Jose Sierra" <Jose.Sierra@ibwc.gov>, "Luis Hernandez" <Luis.Hernandez@ibwc.gov>, "Padinare Unnikrishna" <Padinare.Unnikrishna@ibwc.gov>, "Tony Solo" <Tony.Solo@ibwc.gov>, "Vivian Gonzales" <Vivian.Gonzales@ibwc.gov>, "William Finn" <William.Finn@ibwc.gov>, "Lee Peters" <lep@leepeterslaw.com>, "P. King" <jpking@nmsu.edu>, "Conrad Keyes" <cgkeyesjr@q.com>, "Marco Grajeda" <marco_grajeda@tomudall.senate.gov>, "Melanie Udall" <Melanie_Goodman@tomudall.senate.gov>, "Rene Office)" <Rene_Romo@tomudall.senate.gov>, "Tiffany Udall" <tiffany_cox@tomudall.senate.gov>, "Bert Cortez" <FCortez@usbr.gov>, "Woody Irving" <wirving@usbr.gov>, "Kevin Bixby" <kevin@wildmesquite.org>
Cc: "Elizabeth Verdecchia" <Elizabeth.Verdecchia@ibwc.gov>
Sent: Tuesday, October 17, 2017 3:12:15 PM
Subject: Channel Maintenance Alternatives Pilot Project - Draft EA Comment Period - Thurman Arroyos

To ROD stakeholders,
Please see the attached Federal Register notice for the Notice of Availability of USIBWC's Draft Environmental Assessment and Finding of No Significant Impact for Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, NM, Rio Grande Canalization Project. This is for a pilot project of channel maintenance alternatives conceptually proposed in the 2015 Tetra Tech study.

Public comments will be accepted through Nov. 20, 2017 and can be sent to me. The full EA and appendices can be found here: Blockedhttps://www.ibwc.gov/EMD/EIS_EA_Public_Comment.html

Please feel free to distribute as you see fit.
Thank you

Liz

Elizabeth Verdecchia
Natural Resources Specialist
IBWC, U.S. Section
(915) 832-4701
"Excellence Through Teamwork"

COMANCHE NATION

International Boundary and Water Commission United States and Mexico
Attn: Ms. Elizabeth Verdecchia
4171 N. Mesa Street
Texas 79902-1441

November 14, 2017

Re: Notice of Availability of the Draft Environmental Assessment and Finding of No Significant Impact for Channel Maintenance Alternatives at Thurman I and II Arroyos in Hatch, NM, Rio Grande Canalization Project

Dear Ms. Verdecchia:

In response to your request, the above reference project has been reviewed by staff of this office to identify areas that may potentially contain prehistoric or historic archeological materials. The location of your project has been cross referenced with the Comanche Nation site files, where an indication of ***"No Properties"*** have been identified. (IAW 36 CFR 800.4(d)(1)).

Please contact this office at (580) 595-9960/9618) if you require additional information on this project.

This review is performed in order to identify and preserve the Comanche Nation and State cultural heritage, in conjunction with the State Historic Preservation Office.

Regards

Comanche Nation Historic Preservation Office
Theodore E. Villicana ,Technician
#6 SW "D" Avenue , Suite C
Lawton, OK. 73502