Design and Construction of Rio Grande Channel Maintenance Alternatives for Sediment Control

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Excellence through teamwork.
Project Location

Hatch, NM
Problem Identification

Problem

- Sediment accumulation in Rio Grande downstream of arroyo confluence
Sediment Accumulation Problem

Ongoing Sediment Inflow From The Tributary Arroyos Resulting In:

- Sediment Plugs
- Island Formations
- Raising of River Beds
- Increases in Water Surface Elevations
- Increased Flooding Risk to Adjoining Communities
- Sediment Accumulation Prevents Draining of Irrigation Return Flows

- Report identified nine (9) problem locations experiencing sediment accumulation along the 105.4 miles of the Rio Grande Canalization Project (RGCP)

- Report outlined best two Channel Maintenance Alternatives (CMAs) for each of nine (9) problem locations
Channel Maintenance Alternatives

◆ Sediment Removal Alternatives
  - Channel Excavation Long
  - Channel Excavation Short
  - Localized Channel Excavation

◆ Non-Sediment Removal Alternatives
  - Installation of Vortex Tubes
  - Low-Elevation Spur Dikes
  - Island Destabilization
  - Sediment Traps in Arroyos
USIBWC Selected Alternatives

- Design Sediment Traps at the Thurman I and Thurman II Arroyos
- Design Localized Channel Excavation in Rio Grande at the Thurman I and Thurman II Arroyos
Overall Project Objectives Are:

- To prevent future sediment from entering the Rio Grande at Thurman I and Thurman II arroyos
- To remove existing accumulated sediment in the Rio Grande downstream of the confluence with the two arroyos
Screen Based Sediment Traps

Conceptual Layout:
Excavated Sediment Trap - Thurman II Arroyo

Private Property
Station Line

0  150  300 Feet

TETRATECH
Thurman I and II sediment traps were selected as pilot projects.

Design awarded to URS in Sept 2016.

Contractor conducted baseline studies (rainfall, flows, SWAT modeling, HEC-HMS and HEC-RAS 2D modeling, estimation of sediment characteristics, arroyo sediment volumes, sediment mobility/shear).

Evaluated original concept of mesh based trap and recommended a sediment basin instead:
- Easier to maintain
- Less shear impacts
- Higher sediment capturing efficiency
Modified CMA Implementation:

- Thurman II Arroyo
- Thurman I Arroyo
- Excavated Sediment Basin with Gabion Inlet Flume and Concrete End Wall at Each Arroyo
- Localized Sediment Removal
- Rio Grande
- USIBWC R-O-W
- USIBWC R-O-W
- 25
Sediment Basin Design Specs

- **The end wall**
  - Height – 4.4 to 5.7 feet above the basin finish elevation to provide freeboard for the 100-year storm flows in the arroyo
  - Serves as an overflow weir for higher flows

- **Basin excavation below existing grade**
  - Thurman I Arroyo – 1 to 2.5 feet
  - Thurman II Arroyo – 2 to 4 feet
  - Arroyo widened to a maximum bottom width of 150 feet for each arroyo
  - Excavated channel lengths of Thurman I and II Arroyos would be 375 and 400 feet
Sediment Basin Design Specs

- **Sediment Basin Volumes**
  - Thurman I: 5.31 acre-feet (6,550 cm)
  - Thurman II: 5.43 acre-feet (6,698 cm)

- **Rio Grande Channel Excavation**
  - Localized Rio Grande Sediment Removal and Disposal
    - Thurman I: 5.5 acre-feet (6,728 cm)
    - Thurman II: 15.2 acre-feet (18,732 cm)
Thurman II Sediment Basin
Environmental Assessment

- USIBWC completed an Environmental Assessment and Finding Of No Significant Impact in December 2017

- USIBWC received the approved permit from U.S. Army Corps of Engineers in May 2018

- Task order for compensatory mitigation (2.62 acres) was awarded in September 2018
Mitigation Plan

Thurman II Arroyo Vegetation to Remove/Salvage

Legend:
- Islands & Vegetation to Remove
- Rip Rap
- End Walls
- Sediment Basins
- Access Roads
- Arroyos

Proposed Mitigation

Mitigation Type:
- beach side willow plantings
- embayment willow plantings
- Embayment Area
- USBWC Right of Way

Imagery: Digital Globe Nov 20, 2017
Map by USBWC EMD June 2018
Thurman I & II Contract was awarded to Kirkland construction, Rye, Colorado in September 2018

Contract award amount: $4,843,651.00

Period of performance: 240 calendar days after notice to proceed
Design-Build Project: Placitas Arroyo

- Design and construction of channel maintenance alternatives at Placitas arroyo within USIBWC right of way
- 100 year design flow
- Channel maintenance measure durability: minimum 50 years
Placitas Arroyo Project Location

Placitas Arroyo

Rio Grande

Village of Hatch, NM
Design-Build Project: Rincon to Bignell

- Design and construction of long channel excavation from Rincon to Bignell arroyos (3.46 miles)
- Design and construction of channel maintenance structures at Rincon Arroyo and Reed Arroyo within USIBWC right of way
- 100 year design flow
Project Location: Rincon to Bignell

Figure 2: Extents of Sediment Removal - Island Removal Rincon to Bignell
Project Location: Rincon to Bignell
Discussions/Questions
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