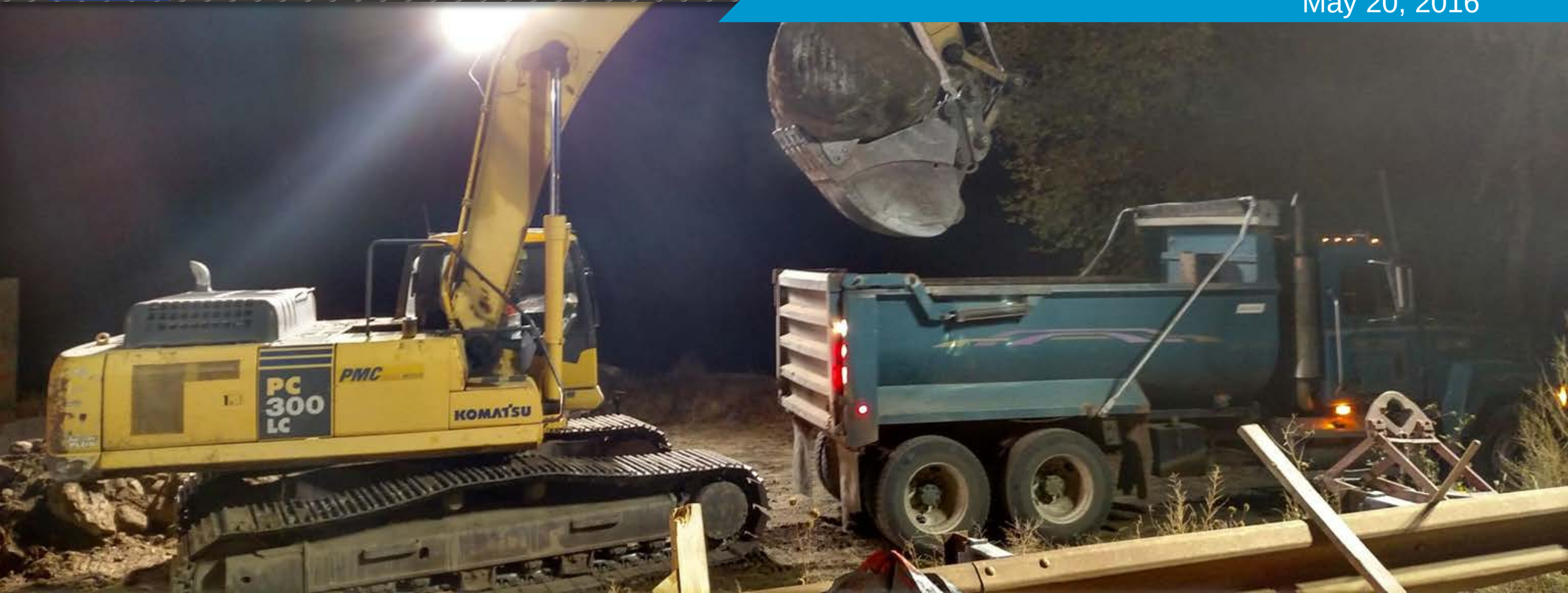
DBIA Rocky Mountain Region – 2016 Regional Conference

Colorado River Pump Station Project
Palisade, Colorado

May 20, 2016



Project Discussion Highlights

- **OVERVIEW – Location, Purpose, Need**
- **STATS – Size, Components, Features**
- **DESIGN / CONSTRUCTION – Objectives, Challenges, Layout, Opportunities**
- **EXECUTION – DBIA Contract (Modified), Timeline, Shared Savings, Benefits**

Project Location

- CDOT R/W
- 3 miles NE of Palisade
- DeBeque Canyon
- Adjacent to Colorado River
- ~ 1 mile west of WTP
- 1st of two Stations
- 230’ below PS No. 2
- 390’ below WTP

Project History, Purpose, Need

- Original PS constructed on the heels of the 1977 drought; currently relied upon to convey backup water supply
- PS's only extensive use was during the construction of the District's Plateau Creek Pipeline (1998-2001)
- PS originally designed for MDD of 7 MGD, current MDD is 14 MGD.
- Project involves rehabilitation/upsizing of PS and the replacement installation of several hundred feet of transmission line.
- New PS designed to meet future demands beyond 2050 and may be used to blend diverted water from the Colorado River with District's Plateau Creek supplies.
- The PS also has the ability to convey water associated with recently acquired rights in Reudi Reservoir that can be released into the Colorado River basin.

Station Demo

Project Statistics

- Pumps, 3 – 500hp VTPs
- Station Flow, 17.5 MGD
- Separate building w/ VFDs, Switchgear, SCADA, HVAC
- 400 LF of new discharge line (30” WSP)
- Surge Relief Line and Surge Anticipator Valve (SAV)
- Addition of new Air Release / Vacuum Valve Facilities
- I-70 Crossing
- OMID Power Canal Crossing

Pump Testing, Fresno, CA

Project Objectives and Challenges

- Complete Rehab of PS including addition new electrical/controls
- Improve remote operation and monitoring of station from WTP
- Prevent station encroachment towards I-70
- Replace/Upsize 400 feet of existing 18-inch WSP through I-70 right-of-way
- Pipeline Crossing of OMID's Power Canal
- Control Costs
- In service prior to peak summer demands
- Increase capacity and efficiency
- Sequence Construction so that station operations can be restored within 3 days.

OMID Power Canal Crossing

Project Site Challenges

New Electrical / Controls Building

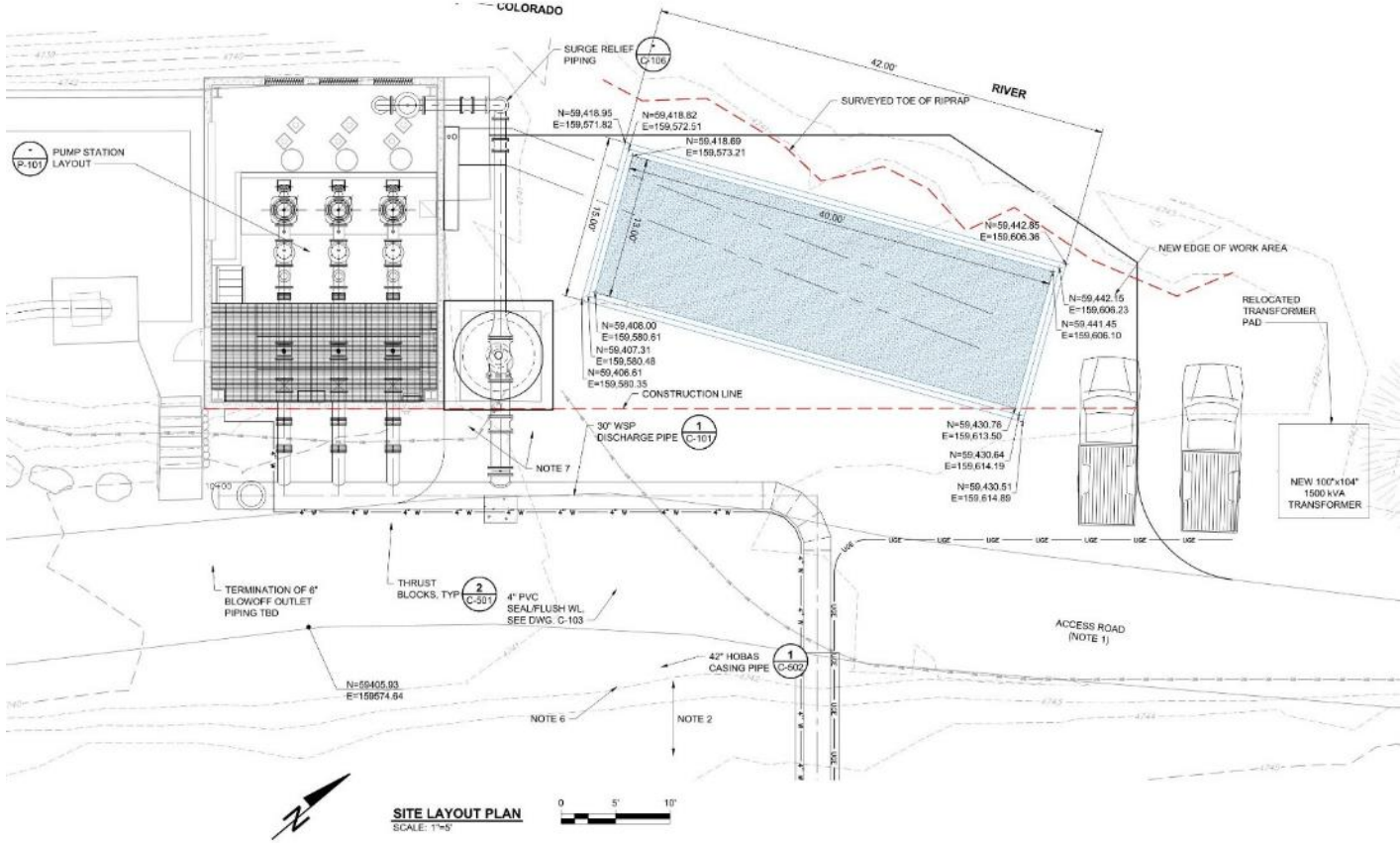
- **Need new E&IC components including 500hp VFDs, switchgear, PLC**
- **Pre-Design…can an new equipment “squeeze” in existing station?...No**
- **Solution: Design and Install External Skid Mounted Electrical Building**
  - Built in controlled manufacturing facility
  - Built closer to integrator’s office – QA/QC
  - More efficient HVAC design – new building, higher efficiency
  - Reduced encumbrance to other site construction
  - Lower costs and faster than on-site building construction

New Building Placement

New Electrical/Controls Building Installation

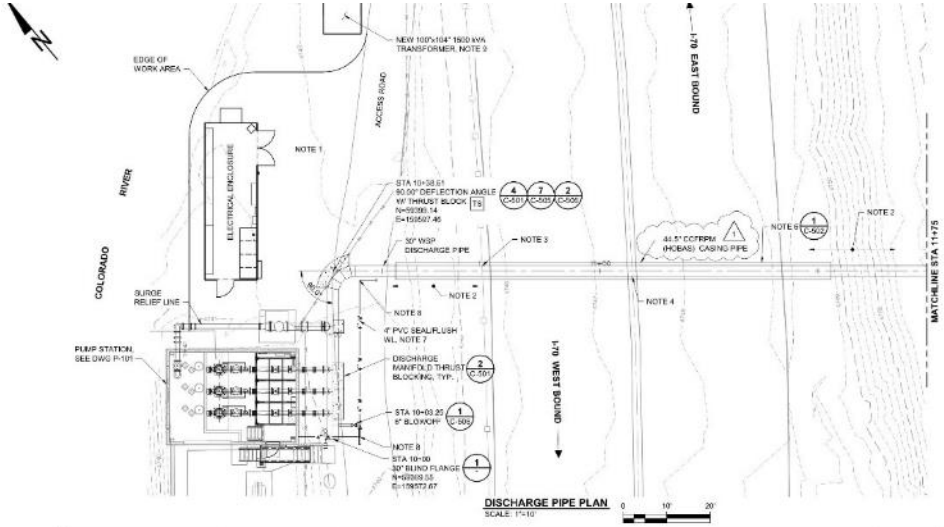
Prevent I-70 Encroachment and Impacts to River Embankment

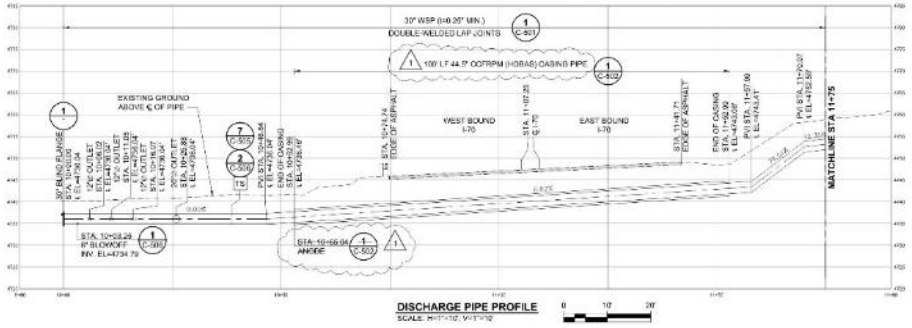
- **Coordinated the replacement of new pump station components on existing site**
- **D/B team worked together to position electrical building and prevent river and highway encroachment.**
- **Solution: Place building adjacent to existing building, reconfigure parking, and reposition new electrical transformer**



Interstate 70 Pipeline Crossing

- **Several Crossing Alternatives Evaluated**
  - Cross through existing Rapid Creek RCB Culvert
  - Tunneled Crossing
  - Open-Cut Crossing
- **Open Cut Crossing coordinated w/ CDOT**
- **'Round-the-Clock' Weekend Construction, 3 Phases**

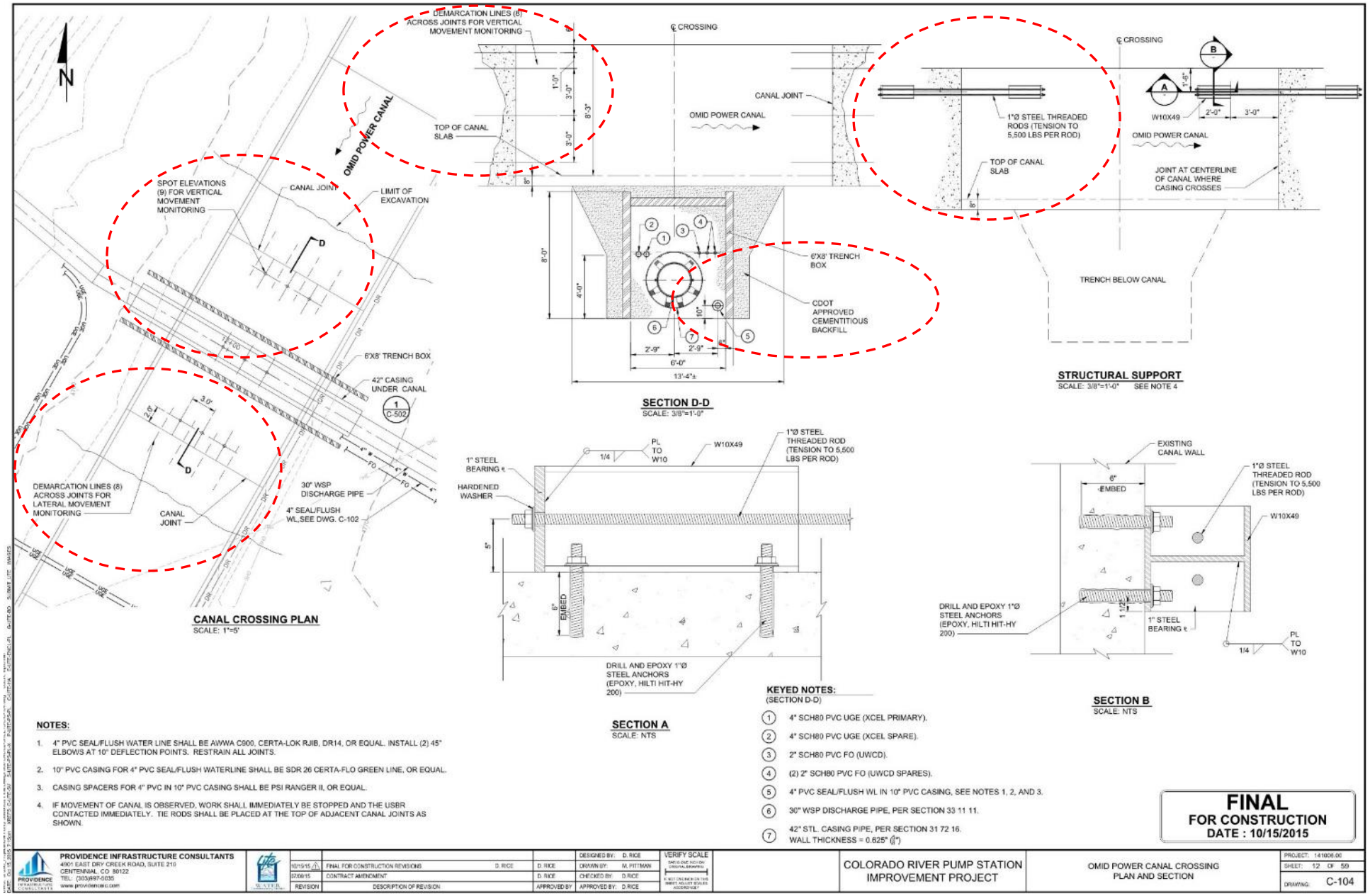




Interstate 70 Pipeline Crossing

OMID Power Canal Crossing

- **Power Canal**
  - Owned by U.S. Bureau of Reclamation
  - Operated by Orchard Mesa Irrigation District
  - Carries 850 cfs for irrigation and power generation
  - Canal offline Nov 1st for two weeks
- **Crossed when offline**
- **Reinforced Bracing at Canal Joints**
- **Continuous monitoring for movement**
- **Backfilled excavation w/ flowable concrete fill**



CANAL CROSSING PLAN
SCALE: 1"=5'

SECTION D-D
SCALE: 3/8"=1'-0"

STRUCTURAL SUPPORT
SCALE: 3/8"=1'-0" SEE NOTE 4

SECTION A
SCALE: NTS

SECTION B
SCALE: NTS

NOTES:

1. 4" PVC SEAL/FLUSH WATER LINE SHALL BE AWWA C900, CERTA-LOK RJIB, DR14, OR EQUAL. INSTALL (2) 45° ELBOWS AT 10° DEFLECTION POINTS. RESTRAIN ALL JOINTS.
2. 10" PVC CASING FOR 4" PVC SEAL/FLUSH WATERLINE SHALL BE SDR 26 CERTA-FLO GREEN LINE, OR EQUAL.
3. CASING SPACERS FOR 4" PVC IN 10" PVC CASING SHALL BE PSI RANGER II, OR EQUAL.
4. IF MOVEMENT OF CANAL IS OBSERVED, WORK SHALL IMMEDIATELY BE STOPPED AND THE USBR CONTACTED IMMEDIATELY. TIE RODS SHALL BE PLACED AT THE TOP OF ADJACENT CANAL JOINTS AS SHOWN.

KEYED NOTES:
(SECTION D-D)

1. 4" SCH80 PVC UGE (XCEL PRIMARY).
2. 4" SCH80 PVC UGE (XCEL SPARE).
3. 2" SCH80 PVC FO (UWCD).
4. (2) 2" SCH80 PVC FO (UWCD SPARES).
5. 4" PVC SEAL/FLUSH WL IN 10" PVC CASING, SEE NOTES 1, 2, AND 3.
6. 30" WSP DISCHARGE PIPE, PER SECTION 33 11 11.
7. 42" STL. CASING PIPE, PER SECTION 31 72 16. WALL THICKNESS = 0.625" (⅝")

FINAL
FOR CONSTRUCTION
DATE : 10/15/2015

PROVIDENCE INFRASTRUCTURE CONSULTANTS
4901 EAST DRY CREEK ROAD, SUITE 210
CENTENNIAL, CO 80122
TEL: (303)697-5035
www.providenceic.com

REVISION	DESCRIPTION OF REVISION		DESIGNED BY: D. RICE
10/15/15	FINAL FOR CONSTRUCTION REVISIONS D. RICE	D. RICE	DRAWN BY: M. PITTMAN
07/09/15	CONTRACT AMENDMENT	D. RICE	CHECKED BY: D. RICE
		APPROVED BY	APPROVED BY: D. RICE

VERIFY SCALE

COLORADO RIVER PUMP STATION IMPROVEMENT PROJECT

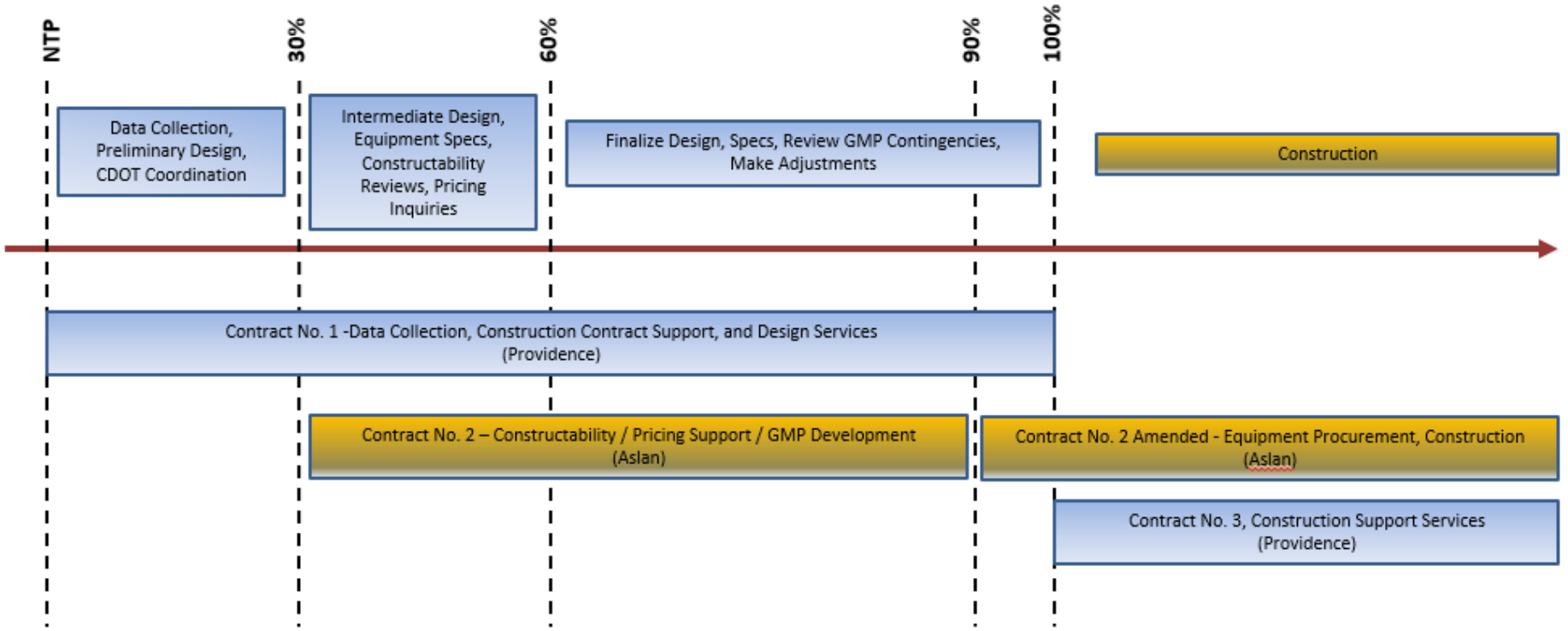
OMID POWER CANAL CROSSING PLAN AND SECTION

PROJECT: 141006.00
SHEET: 12 OF 59
DRAWING: C-104

Project Contract

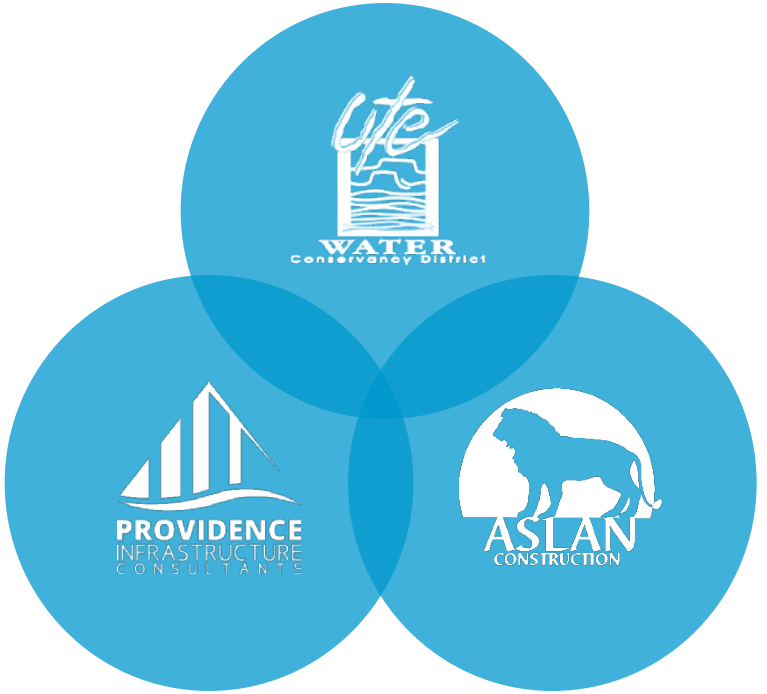
- **Project Designed/Constructed using DB/CMAR Hybrid Contract**
- **Cost plus Fixed Fee w/ Option for Guaranteed Maximum Price (GMP)**
  - Standard Forms 530 (Agreement) and 535 (General Conditions)
  - Standard Forms modified to allow Design Engineer to be independent (→ CMAR)
  - Many contract reviews / iterations w/ District's attorney
  - Provided Contractor 'Not-to-Exceed' Monetary Allowance for Pre-Construction Services
    - Begin Equipment Procurement
    - Attend Meetings
    - Provide Constructability Reviews
    - Develop Pricing
  - Amended Contract once pricing was complete and Fixed Fee GMP was negotiated

Project Execution



Contract Benefits

- **Cost Control**
  - Contractor provided Pre-Construction Services
  - Contract had ‘Shared Savings’ Incentive
- **Time Savings - Allowed procurement of equipment to begin early**
- **More productive coordination meetings (CDOT, USBR, Xcel)**
- **Fostered a true working relationship**
- **Provided the benefits of a typical D/B project but allowed engineer to remain independent owner’s representative**



DBIA Rocky Mountain Region – 2016 Regional Conference

Colorado River Pump Station Project
Palisade, Colorado

May 20, 2016

Daniel Rice, PE
Providence Infrastructure Consultants
drice@providenceic.com
303.997.5035

David Priske, PE
Ute Water Conservancy District
dpriske@utewater.org
970.242.7491

Mike Pelphrey
Aslan Construction
mikep@aslanconstruction.com
970.344.1040