APPENDIX N

MEMORANDUM: POTENTIAL LEVEE IDENTIFICATION AND ASSESSMENT

Reata Wash
Flood Control Improvement Study

Contract No. 2014-168-COS

Memorandum: Potential Levee Identification and Assessment

August 31, 2016

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EXPIRES: 9-30-17

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1. Executive Summary

In order to locate and evaluate the condition of potential levees along the project corridor, a levee identification and assessment task was conducted in support of the Reata Wash Flood Control Improvement Study. During this assessment, it was determined that there are three features in the Reata Wash Flood Control Improvement Study area that may be considered levees or levee-like structures. These include the following, as shown in Figure 1–1:

- Bell Road Potential Levee
- Reata Wash South Flood Protection
- Reata Wash North Flood Protection

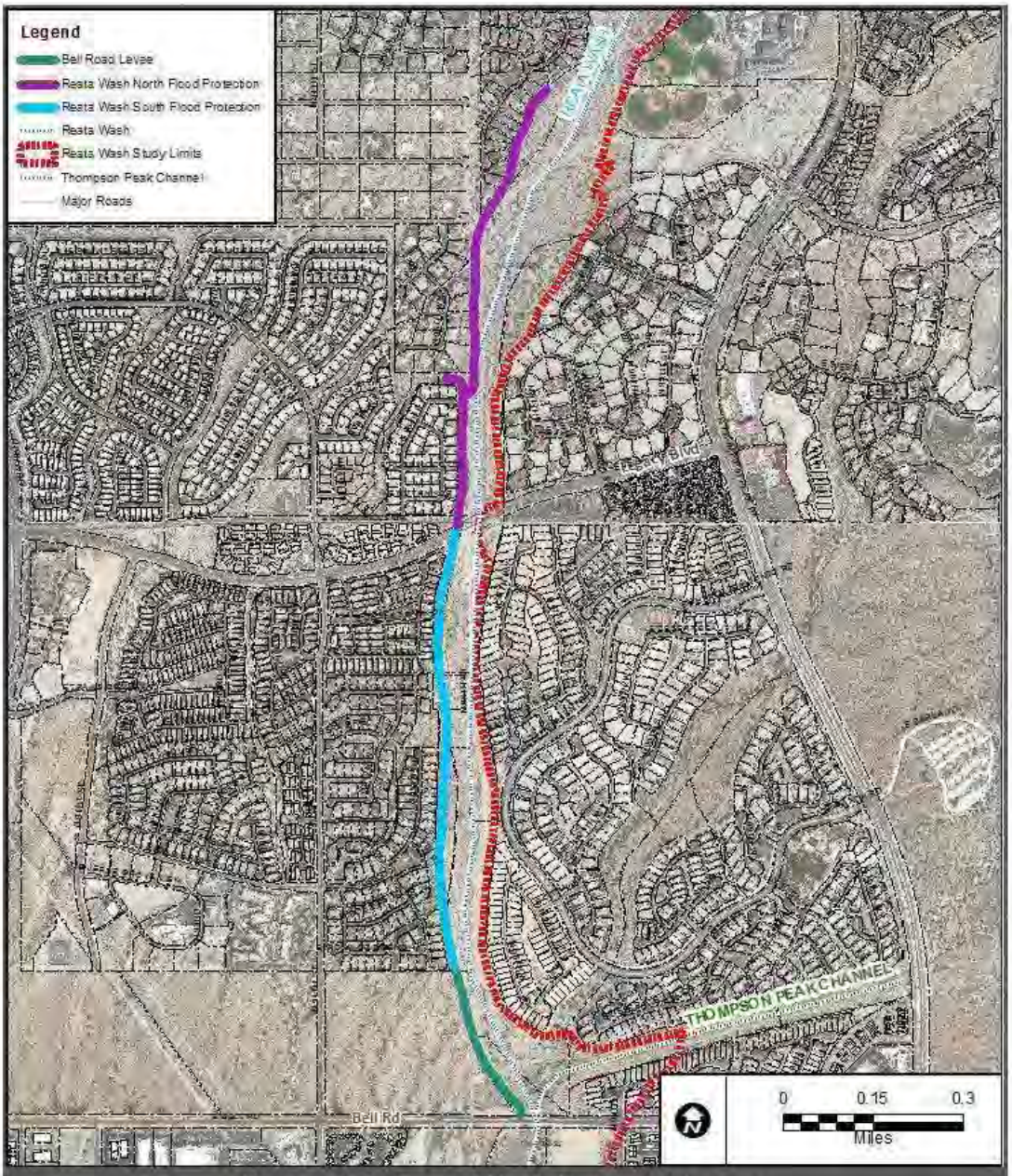

Figure 1–1 Reata Wash Potential Levees

The levee identification and assessment indicates the following:

- There is minimal documentation available for the Bell Road Potential Levee. Therefore, it needs further evaluation to make a determination of whether it meets Federal Emergency Management Agency (FEMA) levee accreditation standards. FEMA accreditation is unlikely in its current condition and with the currently available documentation.
- Reata Wash South Flood Protection area needs further evaluation as to the likelihood of "levee" classification and the potential for FEMA accreditation. FEMA accreditation is unlikely in its current condition and with the currently available documentation.
- Reata Wash North Flood Protection area needs further evaluation as to the likelihood of "levee" classification and the potential for FEMA accreditation. FEMA accreditation is unlikely in its current condition and with the currently available documentation.
- Future "levee" features will need to meet 44CFR65.10 criteria in order to be accredited by FEMA as flood control levees.

2. Overview

This memorandum documents the findings of the potential levee identification and assessment conducted in support of the City of Scottsdale's (City) Reata Wash Flood Control Improvement Study. The assessment was performed by staff from JE Fuller/Hydrology & Geomorphology, Inc. (JE Fuller), as a subconsultant to Wood, Patel & Associates (WPA), under Task 9 of City Contract # 2014-168-COS. The review and assessment of the levee data and information collected under Task 2 as it pertains to the following sections and subsections from Title 44 Chapter 1, Section 65.10 of the Code of Federal Regulations (44CFR65.10), Mapping of Areas Protected by Levee Systems:

- Section (b) Design Criteria; Subsections
  - (1) Freeboard,
  - (2) Closures,
  - (3) Embankment Protection,
  - (6) Interior Drainage and
  - (7) Other Design Criteria.
- Section (c) Operation Plans and Criteria.
- Section (d) Maintenance Plans and Criteria.

The principal focus was an assessment of the merits and deficiencies of each existing potential levee segment.

2.1 FEMA Definition of a Levee or Levee System

According to FEMA[1], a Levee or Levee System is defined as "a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control,

[1] Excerpts from FEMA FAQ "What is a Levee", October 2012.

or divert the flow of water in order to reduce the risk from temporary flooding." Levees reduce the risk of flooding, but do not eliminate the risk.

Levees and floodwalls are constructed using compacted soil, earthen or man-made materials, such as concrete or steel. To protect against erosion and scouring, earthen levees can be covered with grass and gravel, or by hard surfaces like stone, asphalt, or concrete. Levee systems may also include floodwalls, and associated structures, such as closure and drainage devices. These are constructed and operated in accordance with sound engineering practices. All of these elements work together to form a system for reducing flood risk. Levees often have "interior drainage" systems that work in conjunction with the levees to take stormwater from the landward side of the levee to the water side. An interior drainage system may include culverts, canals, ditches, storm sewers, and/or pumps.

2.2 Certification vs Accreditation

A levee is considered accredited by FEMA if evidence has been presented showing that the structure meets current design, construction, maintenance, and operation standards to enable it to provide protection from the one-percent-annual-chance (100-year) flood. This evidence is typically documented in a report and submitted to FEMA with a certification statement by a licensed professional engineer or Federal Agency responsible for levee design. The levee owner is responsible for ensuring that the levee is maintained and operated properly, and for providing evidence of certification. If it can be shown that a levee provides the appropriate level of protection, then FEMA will "accredit" (recognize). The flood control effects of FEMA-accredited levees can be shown on FEMA flood hazard maps. Areas protected by FEMA-accredited levees are shown as a moderate risk zone (Shaded X Zone) on FEMA flood hazard maps. Note that while FEMA accredits levees that meet 44CFR 65.10 criteria and maps areas behind them as having a certain risk level, FEMA does not perform the actual certifications.

2.3 Anatomy of a Levee

Levees and floodwalls are typically built parallel to a waterway, most often a river, in order to reduce the risk of flooding to the area behind the levee. Floodwalls, which are typically made of concrete or steel, are often constructed on a levee crown to increase the height of the levee, without increasing the base of the embankment. Figure 2–1 shows the components of a typical levee.

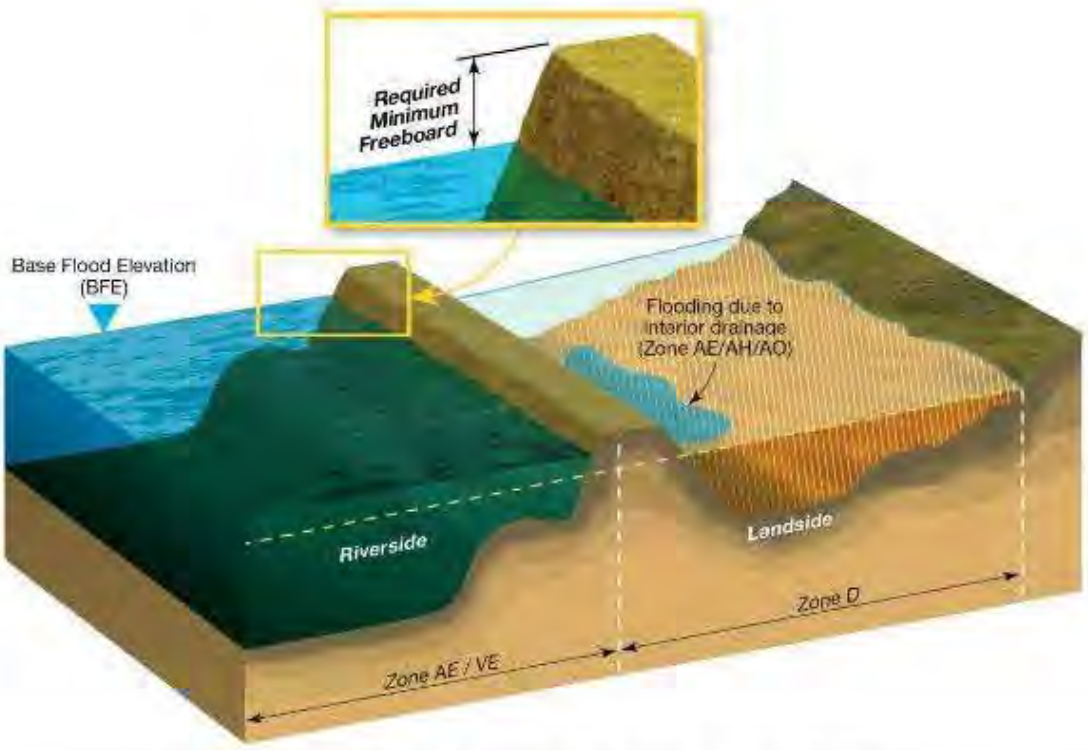

Figure 2–1 Cross Section View of a Typical Levee[2]

3. Study Area

The Reata Wash Flood Control Improvement Study is located within the city limits of Scottsdale, Arizona along the western flank of the McDowell Mountains, and northeast of the Loop 101 Freeway and the Central Arizona Project (CAP) Canal (Figure 3–1).

[2] Sound Reach Cross Section View from FEMA's "Analysis and Mapping Procedures for Non-Accredited Levee Systems, New Approach, July 2013

Figure 3–1 General Study Area Location

4. Reata Wash Corridor

The following identified levee-like structures along the Reata Wash corridor were considered for further evaluation: Bell Road Potential Levee, Reata Wash South Flood Protection and Reata Wash North Flood Protection.

4.1 Bell Road Potential Levee

The Bell Road Potential Levee embankment extends from the Bell Road Bridge north approximately 1,200 feet and ties into an existing embankment. See Figure 4–1.

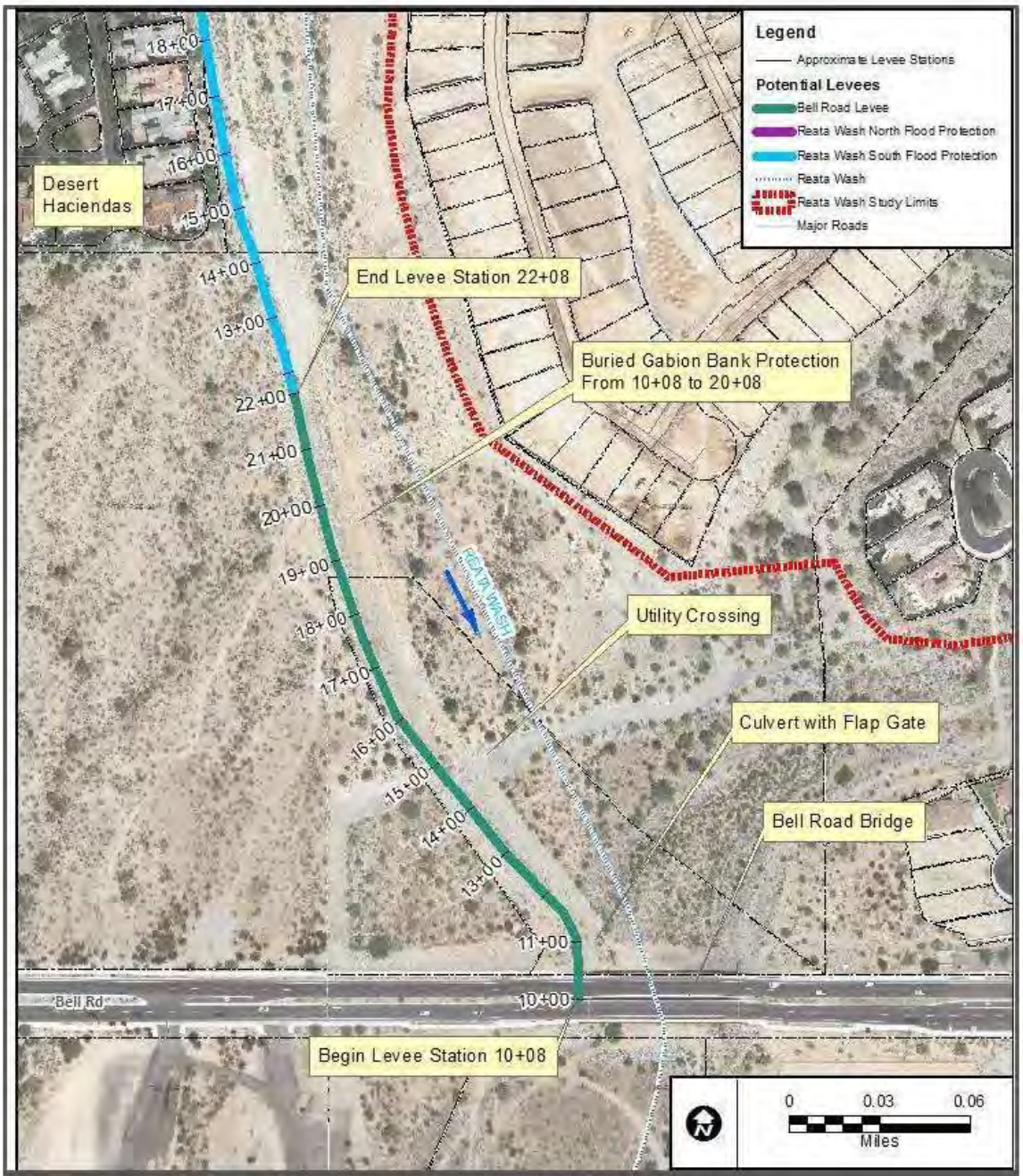

Figure 4–1 Bell Road Potential Levee

This potential levee was originally constructed as part of the Bell Road Widening project from 94th Street to 98th street, designed by WPA for the City (2007). The original levee improvements were designed for a discharge of 17,849 cubic feet per second (cfs); defined as the maximum peak discharge (100-year) corresponding to the conditions as specified in the Drainage Plan for 104th and Bell Road Study.

4.2 Reata Wash South/North Flood Protection

The Reata Wash South/North Flood Protection along the west bank of Reata Wash south and north of Legacy Boulevard appears to have the potential to function as a levee, based on the Reata Wash Flood Control Improvement Study computed 100-year water surface elevations in Reata Wash. The Reata Wash South Flood Protection extends from the Bell Road Potential Levee north to Legacy Boulevard. See Figure 4–2.

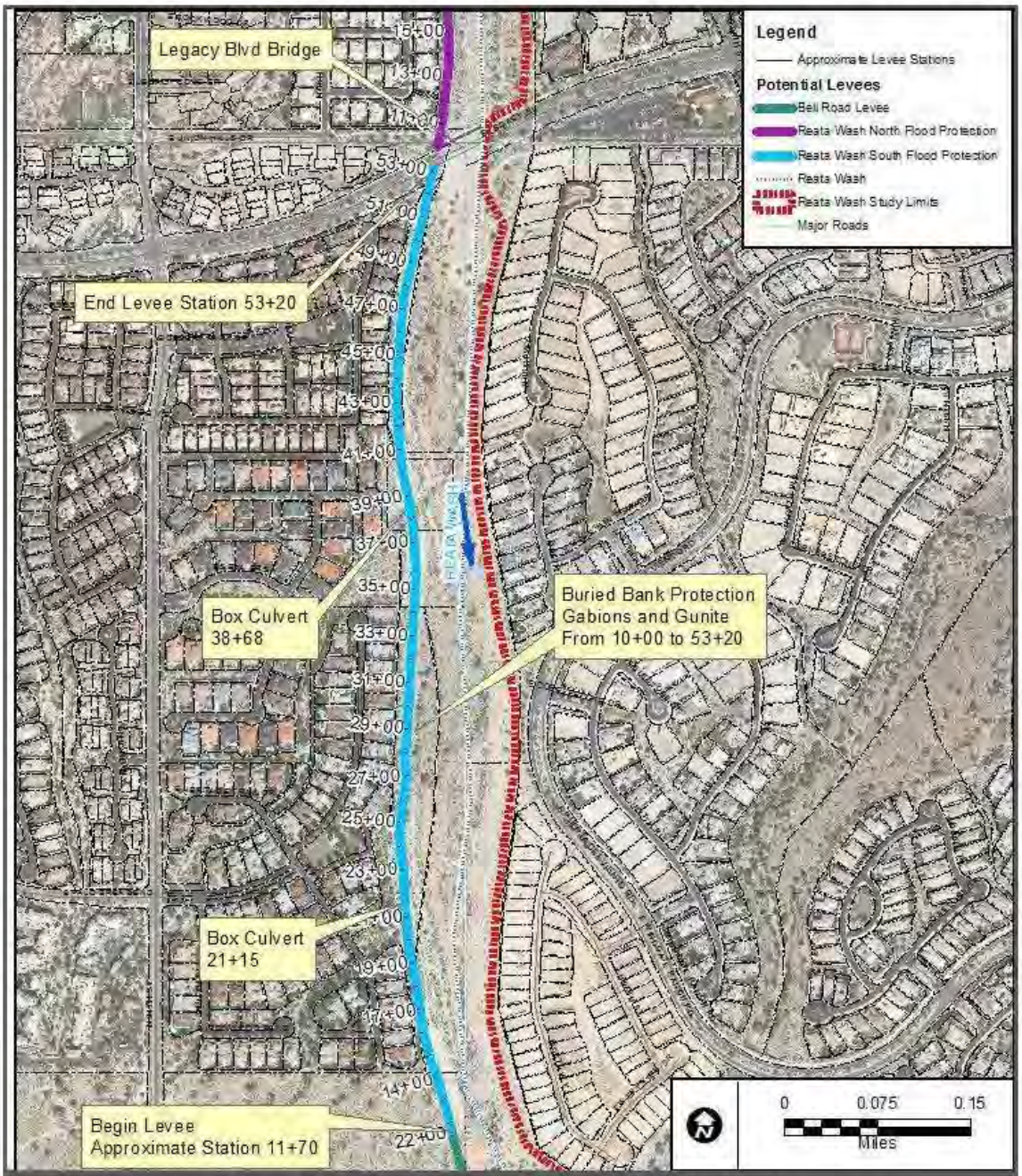

Figure 4–2 Reata Wash South Flood Protection

The Reata Wash North Flood Protection extends from Legacy Boulevard north to approximately 2,700 feet. The Reata Wash North Flood Protection embankment is elevated relative to the adjacent Reata Wash channel. See Figure 4–3.

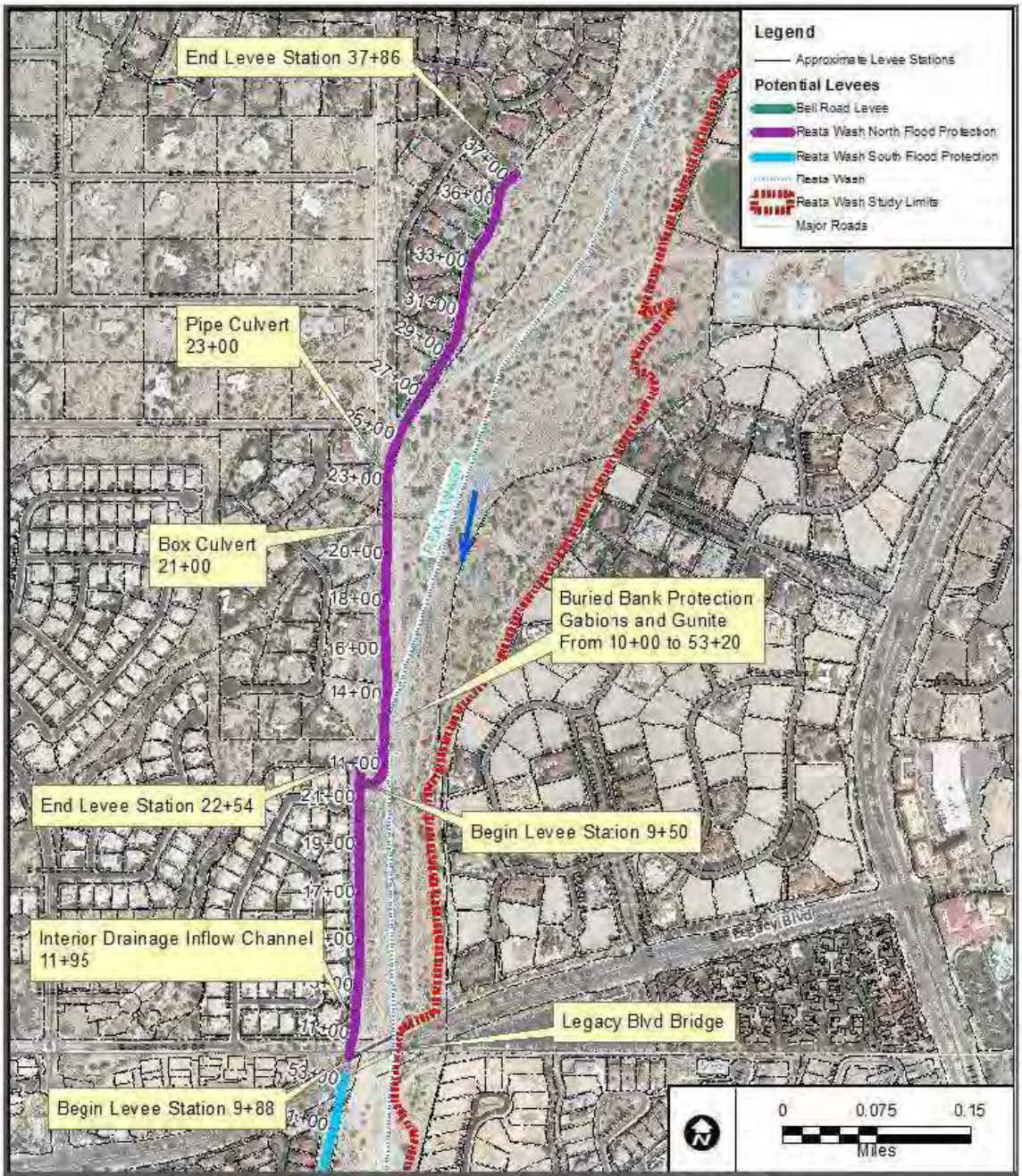

Figure 4–3 Reata Wash North Flood Protection

4.3 Initial Potential Levee Assessment

An assessment of each of the potential levee structures listed above is provided in Section 5 below. In the assessment, excerpts from 44CFR65.10 are included and shown in *"italics"* to identify them as FEMA criteria. Following the FEMA criteria excerpts in italics, is a discussion on whether the structure complies with the FEMA criteria.

5. Review of Data per 44CFR65.10 Requirements

A review of collected data has been performed to determine the availability, quality, and completeness of the necessary information for certifying that the Bell Road Potential Levee and Reata Wash South/North Flood Protection meet FEMA accreditation criteria as outlined in 44CFR65.10. Accreditation criteria and the available data applicable for each requirement are presented in detail throughout this section.

Direct excerpts from 44CFR65.10 applicable to Bell Road Potential Levee and Reata Wash South/North Flood Protection are quoted throughout this section in *"italics"*. The specific paragraph letter/number from 44CFR65.10 is shown in **bold** at the beginning of each excerpt.

5.1 General

***(a)**. For purposes of the NFIP[3], FEMA will only recognize in its flood hazard and risk mapping effort those levee systems that meet, and continue to meet, minimum design, operation, and maintenance standards that are consistent with the level of protection sought through the comprehensive flood plain management criteria established by §60.3 of this subchapter. Accordingly, this section describes the types of information FEMA needs to recognize, on NFIP maps, that a levee system provides protection from the base flood. This information must be supplied to FEMA by the community or other party seeking recognition of such a levee system at the time a flood risk study or restudy is conducted, when a map revision under the provisions of part 65 of this subchapter is sought based on a levee system, and upon request by the Administrator during the review of previously recognized structures. The FEMA review will be for the sole purpose of establishing appropriate risk zone determinations for NFIP maps and shall not constitute a determination by FEMA as to how a structure or system will perform in a flood event.*

5.2 Design Criteria

***(b)**. For levees to be recognized by FEMA, evidence that adequate design and operation and maintenance systems are in place to provide reasonable assurance that protection from the base flood exists must be provided. The following requirements must be met:*

5.2.1 Freeboard[4]

Riverine Levees

***(b)(1)(i)**. Riverine levees must provide a minimum freeboard of three feet above the water-surface level of the base flood. An additional one foot above the minimum is required within 100 feet in either side of structures (such as bridges) riverward of the levee or wherever the flow is constricted. An additional one-half foot above the minimum at the upstream end of the levee, tapering to not less than the minimum at the downstream end of the levee, is also required.*

Bell Road Potential Levee

Existing Data Review - Levee freeboard is documented in Section 4.2.3 of the Bell Road Widening, 94th Street to 98th Street Final Drainage Report. It is noted in Section 6.0 that the top of the proposed

[3] NFIP – National Flood Insurance Program.
[4] For the purposes of this study, freeboard is defined as the elevation of the embankment above the water surface elevation for Reata Wash.

embankment elevations were determined by adding the estimated freeboard (based on FEMA criteria for levee design) to the computed 100-year water surface elevations in Reata Wash. The upstream end of the Bell Road Potential Levee (approximate levee station[5] 22+08) ties into Reata Wash South Flood Protection.

Potential Levee Segment Assessment – The length of the potential levee was determined using available topographic data. The potential levee embankment is defined for areas where the land side toe elevation is at or below the 100-year water surface elevation in Reata Wash. For the Bell Road Potential Levee there are two embankment segments. For the purposes of this preliminary assessment the Bell Road Potential Levee is considered to extend from Bell Road north 1,200 feet.

Freeboard Determination – Potential levee freeboard was evaluated for Bell Road Potential Levee using available topographic data and the 100-year water surface elevation in Reata Wash. As seen in Figure 5–1 approximately 660 feet of the levee embankment does not meet FEMA freeboard requirements.

[5] Levee station refers to design stationing for specific levees

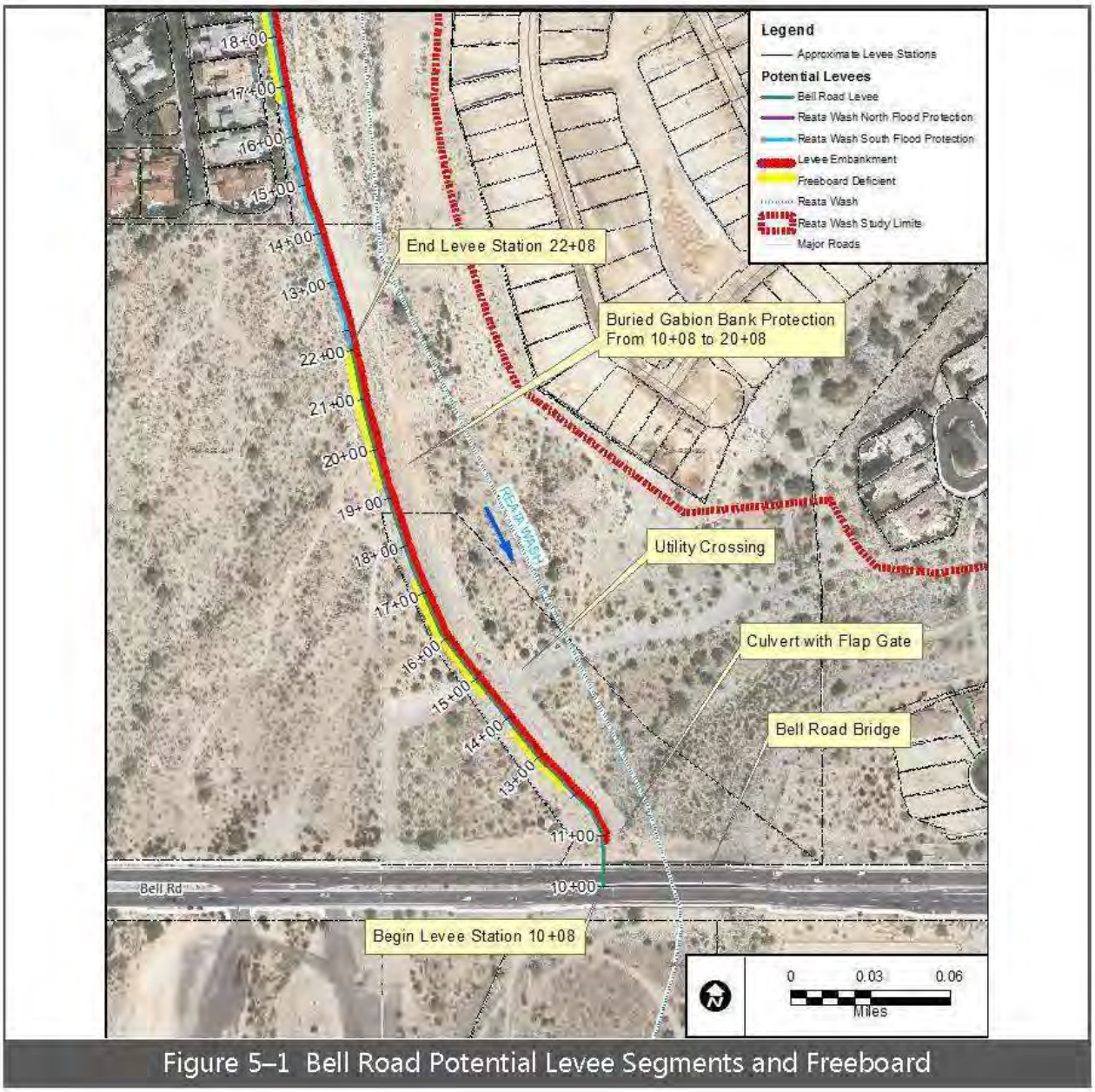

Figure 5–1 Bell Road Potential Levee Segments and Freeboard

Reata Wash South Flood Protection

Existing Data Review - Potential levee freeboard is documented in Section 7.4 of the Design Report for DC Ranch Planning Unit 1 South Flood Protection (see Appendix B). The tops of the proposed embankment elevations were determined by adding three feet to the calculated 100-year water surface elevation in Reata Wash.

Potential Levee Segment Assessment – The limits of the potential levee embankment were identified as the areas where the land side toe elevation is at or below the 100-year water surface elevation of Reata Wash. Two segments were determined to meet this criterion. Segment 1 is approximately 490 feet in length and includes the culvert at design levee station 21+15. Segment 2 is approximately 610 feet in length and includes the culvert at design levee station 38+68. See Figure 5–2.

Freeboard Determination – Levee freeboard was evaluated for Reata Wash South Flood Protection

using available topographic data and the 100-year water surface elevation in Reata Wash. As seen in Figure 5–1 approximately 480 feet in Segment 1 and 610 feet in Segment 2 do not meet FEMA freeboard requirements. See Appendix A for summary table.

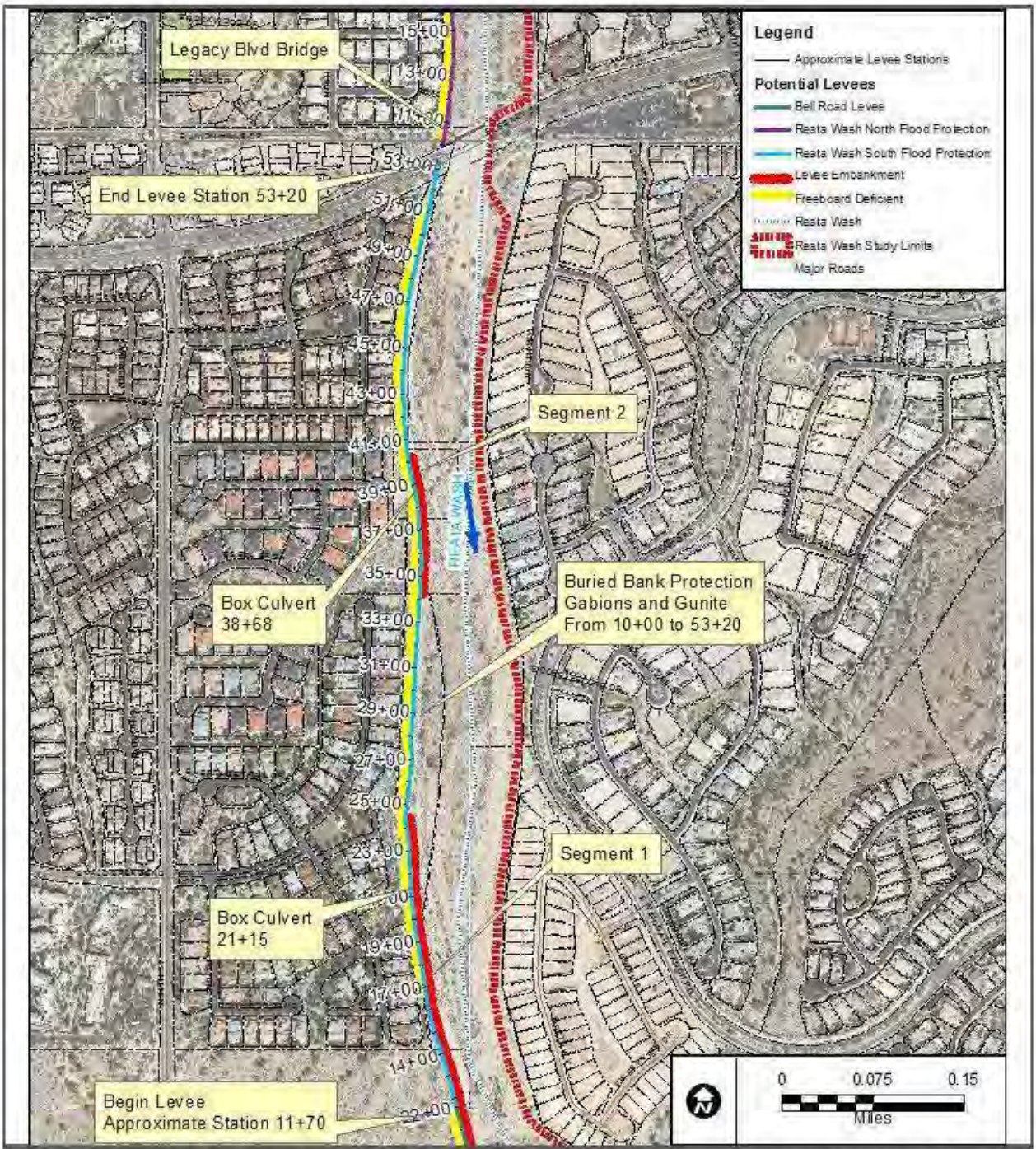

Figure 5–2 Reata Wash South Flood Protection Segments and Freeboard

Reata Wash North Flood Protection

Existing Data Review - Levee freeboard is documented in Section 7.4 of the Design Report for DC Ranch Planning Unit 1 South Flood Protection (see Appendix B). The tops of the proposed

embankment elevations were determined by adding three feet to the calculated 100-year water surface elevations.

Potential Levee Segment Assessment – The potential levee limits were evaluated to determine the limits of the levee embankment. A potential levee embankment exists if the land side toe elevation is at or below the 100-year water surface elevation in Reata Wash. Segment 1 was determined to meet this criterion. This segment is approximately 1,570 feet in length and includes the culvert at levee stations 21+00 and 23+00 (see Figure 5–3).

Freeboard Determination – Levee freeboard was evaluated for Reata Wash North Flood Protection using available topographic data and the 100-year water surface elevation in Reata Wash. As seen in Figure 5–3 approximately 1,480 feet do not meet FEMA freeboard requirements. See Appendix A for summary table.

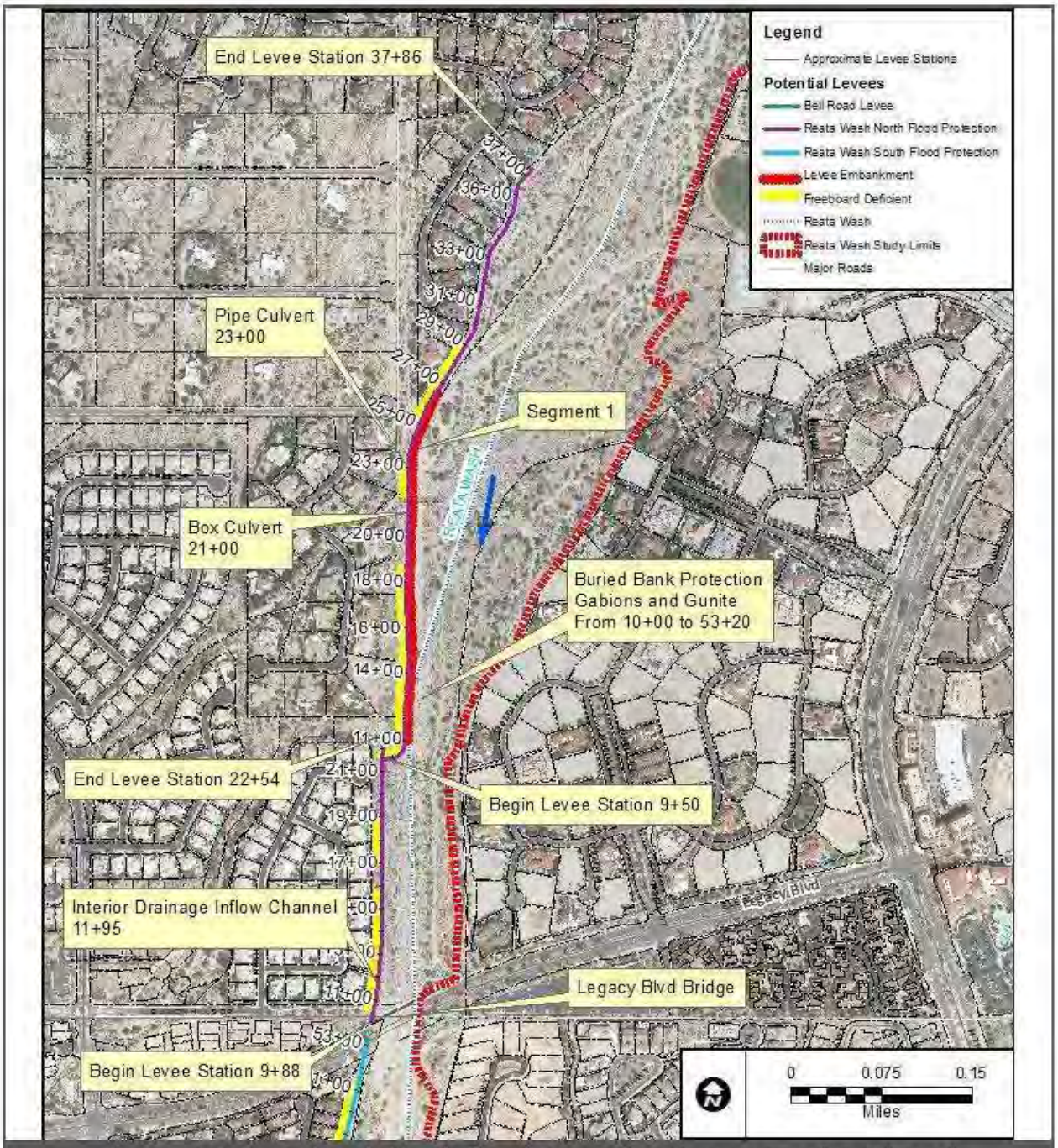

Figure 5–3 Reata Wash North Flood Protection Segment and Freeboard

5.2.2 Closures

***(b)(2)**. All openings must be provided with closure devices that are structural parts of the system during operation and design according to sound engineering practice.*

Bell Road Potential Levee

The Bell Road Potential Levee was designed with one culvert opening (for interior drainage) at levee station 11+00 that includes a flap gate to restrict waterside flows to back into interior drainage areas. See Table 5–1 and Figure 5–4.

Table 5–1 Bell Road Potential Levee Openings				
Approximate Levee Station[1]	**Opening Size**	**Closure Device (y/n)**	**Opening/Utility Type**	**Meets 44CFR 65.10 minimum Criteria (y/n)**
11+00	24 inch	y	Corrugated steel pipe	y

Note:
(1) Levee station per Bell Road Levee Design Plans. See Appendix B.

Figure 5–4 Bell Road Levee Flap Gate at Approximate Levee Station 11+00

Reata Wash South/North Flood Protection

The Reata Wash South Flood Protection structure includes with two locations designed to pass low flows through the embankment to small washes on the landward side of the potential levee. The Reata Wash North Flood Protection also includes a low flow pass-through structure and one inflow culvert structure to pass interior drainage[6] flows through the embankment into Reata Wash. See Table 5–2, Figure 5–5 and Figure 5–6.

Table 5–2 South/North Flood Protection Openings

Potential Levee Segment	Approximate Levee Station	Opening Size	Closure Device (y/n)	Opening/Utility Type	Meets 44CFR 65.10 minimum Criteria (y/n)
Reata Wash South	21+15	6 feet x 2 feet	n	Reinforced concrete box culvert	y
Reata Wash South	38+68	10 feet x 2 feet	n	Reinforced concrete box culvert	y
Reata Wash North	21+00	2 - 8 feet x 2 feet	n	Reinforced concrete box culvert	y
Reata Wash North	23+00	2 - 36 inch	n	Rubber gasket reinforced concrete pipe	n (flap gate missing)

Note:
(1) Levee station per South/North Flood Protection Design Plans. See Appendix B.

[6] Interior drainage includes runoff from the landward side of a levee that is blocked by the levee embankment.

Figure 5–5 Reata Wash South Flood Protection – Openings at Design Approximate Levee Station 21+15

Figure 5–6 Reata Wash North Flood Protection – Openings at Design Approximate Levee Station 21+00

5.3 Embankment Protection

***(b)(3)**. Engineering analyses must be submitted that demonstrate that no appreciable erosion of the levee embankment can be expected during the base flood, as a result of either currents or waves, and that anticipated erosion will not result in failure of the levee embankment or foundation directly or indirectly through reduction of the seepage path and subsequent instability. The factors to be addressed in such analyses include, but are not limited to: Expected flow velocities (especially in constricted areas); expected wind and wave action; ice loading; impact of debris; slope protection techniques; duration of flooding at various stages and velocities; embankment and foundation materials; levee alignment, bends, and transitions; and levee side slopes.*

Bell Road Potential Levee

Existing Data Review - Methods for determining embankment toe protection size and depth are documented in Section 5.0 of the Bell Road Widening, 94th Street to 98th Street Final Drainage Report (see Appendix B). It is noted in Section 6.0 of the same report that the estimated toe-depth for the levee embankment is based on ADWR State Standards and generally accepted engineering practices.

Embankment Protection Determination - An updated evaluation to determine toe protection adequacy was conducted for the Reata Wash Flood Control Improvement Study. Summary spread sheets for the toe protection computations are included in Appendix A. The evaluation results indicate that approximately 1,200 feet of the current embankment does not meet FEMA levee embankment protection requirements.

Reata Wash South Flood Protection

Existing Data Review - Methods for determining embankment protection size and depth of toe protection are documented in Section 7.0 of the Design Report for DC Ranch Planning Unit 1 South Flood Protection (see Appendix A). It is noted in Section 7.3 that the estimated toe-depth for the levee embankment is based on U. S. Bureau of Reclamation (USBR) (1984) (see Appendix B).

Embankment Protection Determination - An updated evaluation to determine toe protection adequacy was conducted for the Reata Wash Flood Improvement Study Summary spread sheets are included in Appendix A. The evaluation results indicate that approximately 200 feet of the current embankment does not meet FEMA levee embankment protection requirements.

Reata Wash North Flood Protection

Existing Data Review - Methods for determining embankment protection size and depth of toe protection are documented in Section 7.0 of the Design Report for DC Ranch Planning Unit 1 North Flood Protection (see Appendix B). It is noted in Section 7.3 that the estimated toe-depth for the levee embankment is based on USBR (1984).

Embankment Protection Determination - An updated evaluation to determine toe protection adequacy was conducted for the Reata Wash Flood Improvement Study. Summary spread sheets are included in Appendix A. The evaluation results indicate that approximately 1,490 feet of the current embankment does not meet FEMA levee embankment protection requirements.

5.4 Interior Drainage

(6) *Interior drainage. An analysis must be submitted that identifies the source(s) of such flooding, the extent of the flooded area, and, if the average depth is greater than one foot, the water-surface elevation(s) of the base flood. This analysis must be based on the joint probability of interior and exterior flooding and the capacity of facilities (such as drainage lines and pumps) for evacuating interior floodwaters.*

Bell Road Potential Levee

No documentation related to interior drainage was available as part of the Data Collection activities. Lacking any documentation, it is likely that FEMA would not accredit the structure as a levee.

Reata Wash South Flood Protection

No documentation related to interior drainage was available as part of the Data Collection activities. Lacking any documentation, it is likely that FEMA would not accredit the structure as a levee.

Reata Wash North Flood Protection

No documentation related to interior drainage was available as part of the Data Collection activities. Lacking any documentation, it is likely that FEMA would not accredit the structure as a levee.

5.5 Operation Plans and Criteria

(c) *Operation plans and criteria. For a levee system to be recognized, the operational criteria must be as described below. All closure devices or mechanical systems for internal drainage, whether manual or automatic, must be operated in accordance with an officially adopted operation manual, a copy of which must be provided to FEMA by the operator when levee or drainage system recognition is being sought or when the manual for a previously recognized system is revised in any manner. All operations must be under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP.*

(1) Closures. Operation plans for closures must include the following:

(i) Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists for the completed operation of all closure structures, including necessary sealing, before floodwaters reach the base of the closure.

(ii) A formal plan of operation including specific actions and assignments of responsibility by individual name or title.

(iii) Provisions for periodic operation, at not less than one-year intervals, of the closure structure for testing and training purposes.

(2) Interior drainage systems. Interior drainage systems associated with levee systems usually include storage areas, gravity outlets, pumping stations, or a combination thereof. These drainage systems will be recognized by FEMA on NFIP maps for flood protection purposes only if the following minimum criteria are included in the operation plan:

(i) Documentation of the flood warning system, under the jurisdiction of Federal, State, or community officials, that will be used to trigger emergency operation activities and demonstration that sufficient flood warning time exists to permit activation of mechanized portions of the drainage system.

(ii) A formal plan of operation including specific actions and assignments of responsibility by individual name or title.

(iii) Provision for manual backup for the activation of automatic systems.

(iv) Provisions for periodic inspection of interior drainage systems and periodic operation of any mechanized portions for testing and training purposes. No more than one year shall elapse between either the inspections or the operations.

(3) Other operation plans and criteria. Other operating plans and criteria may be required by FEMA to ensure that adequate protection is provided in specific situations. In such cases, sound emergency management practice will be the standard upon which FEMA determinations will be based.

Bell Road Potential Levee

Section 5.5 of the Bell Road Widening, 94th Street to 98th Street Final Drainage Report states that ongoing maintenance of the designed drainage systems is required to preserve the integrity and purpose of the system (see Appendix B). However, no operation plan was found for the Bell Road Potential Levee. Therefore, an operation plan (typically referred to as an Operation and Maintenance Manual) will need to be developed if levee accreditation is sought.

Reata Wash South Flood Protection

Section 7.8 of the Design Report for DC Ranch Planning Unit 1 South Flood Protection states that ongoing maintenance of the designed drainage systems is required to preserve the integrity and purpose of the system. However, no operation plan was found for the South Flood Protection. Therefore, an operation plan (typically referred to as an Operation and Maintenance Manual) will need to be developed if levee accreditation is sought.

Reata Wash North Flood Protection

Section 7.8 of the Design Report for DC Ranch Planning Unit 1 North Flood Protection states that ongoing maintenance of the designed drainage systems is required to preserve the integrity and purpose of the system. However, no operation plan was found for the North Flood Protection. Therefore, an operation plan (typically referred to as an Operation and Maintenance Manual) will need to be developed if levee accreditation is sought.

5.6 Maintenance Plans and Criteria

(d) *Maintenance plans and criteria. For levee systems to be recognized as providing protection from the base flood, the maintenance criteria must be as described herein. Levee systems must be maintained in accordance with an officially adopted maintenance plan, and a copy of this plan must be provided to FEMA by the owner of the levee system when recognition is being sought or when the plan for a previously recognized system is revised in any manner. All maintenance activities must be*

under the jurisdiction of a Federal or State agency, an agency created by Federal or State law, or an agency of a community participating in the NFIP that must assume ultimate responsibility for maintenance. This plan must document the formal procedure that ensures that the stability, height, and overall integrity of the levee and its associated structures and systems are maintained. At a minimum, maintenance plans shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.

Bell Road Potential Levee

Section 5.5 of the Bell Road Widening, 94th Street to 98th Street Final Drainage Report states that ongoing maintenance of the designed drainage systems is required to preserve the integrity and purpose of the system (see Appendix B). However, no operation plan was found for the Bell Road Potential Levee. Therefore, an operation plan (typically referred to as an Operation and Maintenance Manual) will need to be developed if levee accreditation is sought.

Reata Wash South Flood Protection

Section 7.8 of the Design Report for DC Ranch Planning Unit 1 South Flood Protection states that ongoing maintenance of the designed drainage systems is required to preserve the integrity and purpose of the system. However, no operation plan was found for the South Flood Protection. Therefore, an operation plan (typically referred to as an Operation and Maintenance Manual) will need to be developed if levee accreditation is sought.

Reata Wash North Flood Protection

Section 7.8 of the Design Report for DC Ranch Planning Unit 1 North Flood Protection states that ongoing maintenance of the designed drainage systems is required to preserve the integrity and purpose of the system. However, no operation plan was found for the North Flood Protection. Therefore, an operation plan (typically referred to as an Operation and Maintenance Manual) will need to be developed if levee accreditation is sought.

5.7 Certification Requirements

(e) *Certification requirements. Data submitted to support that a given levee system complies with the structural requirements set forth in paragraphs (b)(1) through (7) of this section must be certified by a registered professional engineer. Also, certified as-built plans of the levee must be submitted. Certifications are subject to the definition given at § 65.2 of this subchapter. In lieu of these structural requirements, a Federal agency with responsibility for levee design may certify that the levee has been adequately designed and constructed to provide protection against the base flood.*

Bell Road Potential Levee

No certification documentation was found as part of the Data Collection activities for this study. If levee accreditation is sought, submitting all the required certification documentation would be part of a future levee accreditation submittal to FEMA.

As-Built plans will need to accompany a FEMA accreditation submittal. Design plans for the Bell Road Potential Levee were found as part of the Data Collection activities, but no as-built plans (see

Appendix B).

Reata Wash South/North Flood Protection

No certification documentation was found as part of the Data Collection activities for this study. If levee accreditation is sought, submitting all the required certification documentation would be part of a future levee accreditation submittal to FEMA.

As-Built plans will need to accompany a FEMA accreditation submittal. Design plans for the Reata Wash South/North Flood Protection structures were found as part of the Data Collection activities, but no as-built plans (see Appendix B).

6. Conclusion

A review and assessment of the potential levee data and information was conducted relative to specific sections of FEMA levee accreditation requirements outlines in 44CFR65.10, Mapping of Areas Protected by Levee Systems. The review indicates the following with respect to potential levees located along the Reata Wash Flood Control Improvement Study corridor:

Bell Road Potential Levee System

- The Bell Road Potential Levee is the only flood control structure designed as a levee embankment along the Reata Wash corridor. While some data pertinent to 44CFR65.10 requirements were located, all design related elements of 44CFR65.10 (items under (b) Design Criteria) will require reevaluation in conjunction with potential future construction of any Reata Wash Flood Control Improvement Study implementation if FEMA levee accreditation is sought. Preliminary estimates indicate the following deficiencies exist in the Bell Road Potential Levee:
    - Segment 1 (Bell Road Potential Levee)
        - Length of levee segment 1 – 1,200 feet
        - Deficient freeboard length – 660 feet
        - Deficient scour protection – 1,200 feet
    - Operation and Maintenance Manuals will need to be developed for the Bell Road Potential Levee system. At a minimum, maintenance plans shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance.
    - Operation and Maintenance activities for the Bell Road Potential Levee system will need to be under the jurisdiction of an agency compliant with the requirements set out in 44CFR65.10 sub sections (7)(c) and (7)(d).
    - As-Built Plans for the Bell Road Potential Levee system will need to be prepared.

Reata Wash South/North Flood Protection

- An initial assessment comparing 100-year water surface elevations in Reata Wash to natural land side elevations at the toe of the potential levee identified areas that may be considered to be potential levee embankments. A potential levee condition exists if the natural land side toe elevation is below the 100-year water surface elevation within Reata Wash. It was determined that several segments along the Reata Wash South/North Flood Protection met this criterion. These segments were evaluated for compliance with 44CFR65.10 requirements. Preliminary estimates indicate the following deficiencies exist in the Reata Wash South/North Flood Protection for these segments:

  Reata Wash South Flood Protection. See Segment limits on Figure 5–2.

  - Segment 1
    - Length of levee segment 1 – 490 feet
    - Deficient freeboard length – 490 feet
    - Deficient scour protection – 70 feet
  - Segment 2
    - Length of levee segment 2 – 610 feet
    - Deficient freeboard length – 610 feet
    - Deficient scour protection – 200 feet

  Reata Wash North Flood Protection. See Segment limits on Figure 5–3.

  - Segment 1
    - Length of levee segment 1 – 1,570 feet
    - Deficient freeboard length – 1,480 feet
    - Deficient scour protection – 1,490 feet
  - Operation and Maintenance Manuals will need to be developed for the Reata Wash South/North Flood Protection levee system. At a minimum, maintenance plans shall specify the maintenance activities to be performed, the frequency of their performance, and the person by name or title responsible for their performance
  - Operation and Maintenance activities for the Reata Wash South/North Flood Protection levee system will need to be under the jurisdiction of an agency compliant with the requirements set out in 44CFR65.10 sub sections (7)(c) and (7)(d).
  - As-Built Plans for the Reata Wash South/North Flood Protection levee system will need to be prepared.

For Accreditation by FEMA a complete submittal will need to be prepared along with a Certification statement from a registered engineer.

Appendix A Potential Levee Segments, Freeboard and Bank Protection Summary

Table A–1 Potential Levee Limits Check							
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Water Surface Elevation above Mean Sea Level**	**Land Side Minimum Elevation above Mean Sea Level**	**Difference between Water Surface Elevation and Land Side Minimum Elevation**	**Potential Levee Description**	**Potential Levee Embankment?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
10+91	6126.11	1574.76	1570.12	-4.64	Tie-in at Bell Road Bridge	Yes	**Bell Road Potential Levee Segment**
11+39	6200	1574.81	1569.95	-4.86	Potential Bell Road Levee	Yes	
12+29	6300	1576.88	1575.05	-1.83	Potential Bell Road Levee	Yes	
13+20	6400	1577.97	1575.21	-2.76	Potential Bell Road Levee	Yes	
14+17	6500	1578.62	1576.52	-2.1	Potential Bell Road Levee	Yes	
15+16	6600	1581.37	1580.21	-1.16	Potential Bell Road Levee	Yes	
16+22	6700	1583.3	1583.41	0.11	Potential Bell Road Levee	No	
17+22	6800	1584.82	1586.11	1.29	Potential Bell Road Levee	No	
18+26	6900	1587.19	1587.74	0.55	Potential Bell Road Levee	No	
19+30	7000	1590.3	1590.42	0.12	Potential Bell Road Levee	No	
20+35	7100	1593.05	1589.94	-3.11	Potential Bell Road Levee	Yes	
21+36	7200	1594.69	1591.87	-2.82	Potential Bell Road Levee	Yes	
22+38	7300	1596.11	1593.17	-2.94	End of Potential Bell Road Levee	Yes	
12+62	7361.78	1597.6	1594.15	-3.45	Beginning of South Flood Protection	Yes	**South Flood Protection Potential Levee Segment 1**
14+4	7500	1600.33	1597.07	-3.26	South Flood Protection	Yes	
15+9	7600	1602.01	1602.13	0.12	South Flood Protection	No	
16+18	7700	1603.97	1603.91	-0.06	South Flood Protection	Yes	
17+25	7800	1606.1	1606.15	0.05	South Flood Protection	No	
18+33	7900	1607.92	1608.35	0.43	South Flood Protection	No	
19+71	8032.6	1610.83	1608.06	-2.77	South Flood Protection	Yes	
20+40	8100	1612.41	1607.2	-5.21	South Flood Protection	Yes	
21+46	8200	1614.5	1608.58	-5.92	South Flood Protection	Yes	
22+52	8300	1617.23	1612.11	-5.12	South Flood Protection	Yes	
23+13	8364.13	1618.63	1614.54	-4.09	South Flood Protection	Yes	

Table A–1 Potential Levee Limits Check							
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Water Surface Elevation above Mean Sea Level**	**Land Side Minimum Elevation above Mean Sea Level**	**Difference between Water Surface Elevation and Land Side Minimum Elevation**	**Potential Levee Description**	**Potential Levee Embankment?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
24+56	8500	1620.74	1619.77	-0.97	South Flood Protection	Yes	**South Flood Protection Potential Levee Segment 1**
25+57	8600	1622.82	1623.96	1.14	South Flood Protection	No	**Not a Potential Levee Segment**
26+50	8700	1624.25	1624.27	0.02	South Flood Protection	No	
27+50	8800	1625.47	1625.95	0.48	South Flood Protection	No	
28+48	8900	1626.87	1628.03	1.16	South Flood Protection	No	
29+39	9000	1628.74	1629.49	0.75	South Flood Protection	No	
30+37	9100	1630.35	1631.64	1.29	South Flood Protection	No	
31+32	9200	1632.67	1633.95	1.28	South Flood Protection	No	
32+27	9300	1634.65	1635.53	0.88	South Flood Protection	No	
33+24	9400	1636.57	1637.25	0.68	South Flood Protection	No	
34+23	9500	1639	1638.42	-0.58	South Flood Protection	Yes	**South Flood Protection Potential Levee Segment 2**
35+22	9600	1641.41	1638.63	-2.78	South Flood Protection	Yes	
36+23	9700	1643.8	1639.39	-4.41	South Flood Protection	Yes	
37+24	9800	1645.7	1641.19	-4.51	South Flood Protection	Yes	
38+23	9900	1647.89	1642.16	-5.73	South Flood Protection	Yes	
39+24	10000	1649.07	1643.33	-5.74	South Flood Protection	Yes	
40+30	10100	1650.29	1646.05	-4.24	South Flood Protection	Yes	
41+36	10200	1651.95	1653.78	1.83	South Flood Protection	No	**Not a Potential Levee Segment**
42+39	10300	1654.16	1655.02	0.86	South Flood Protection	No	
43+38	10400	1656.46	1656.26	-0.2	South Flood Protection	Yes	
44+44	10500	1658.99	1659.35	0.36	South Flood Protection	No	
45+48	10600	1661.17	1660.95	-0.22	South Flood Protection	Yes	

Table A–1 Potential Levee Limits Check							
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Water Surface Elevation above Mean Sea Level**	**Land Side Minimum Elevation above Mean Sea Level**	**Difference between Water Surface Elevation and Land Side Minimum Elevation**	**Potential Levee Description**	**Potential Levee Embankment?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
46+50	10700	1663.5	1664.1	0.6	South Flood Protection	No	**Not a Potential Levee Segment**
47+61	10800	1665.69	1666.6	0.91	South Flood Protection	No	
48+68	10900	1668.16	1669.2	1.04	South Flood Protection	No	
49+72	11000	1670.56	1671.04	0.48	South Flood Protection	No	
50+66	11130.61	1671.98	1672.19	0.21	South Flood Protection	No	
52+23	11271.2	1672.63	1673.51	0.88	South Flood Protection	No	
52+34	11316.65	1672.73	1676.15	3.42	South Flood Protection	No	
52+52	11376.89	1673.8	1677.27	3.47	South Flood Protection	No	
53+19	11492.27	1674.29	1678	3.71	End of South Flood Protection	No	
Road Embankment	11516.11		0		Legacy Boulevard		
53+75	11539.95	1677.02	1678	0.98	Beginning of North Flood Protection	No	
53+81	11545.46	1677.2	1679.72	2.52	North Flood Protection	No	
10+00	11561.97	1677.19	1679.17	1.98	North Flood Protection	No	
10+04	11567.48	1677.21	1679.25	2.04	North Flood Protection	No	
10+53	11582.03	1678.2	1680.52	2.32	North Flood Protection	No	
11+08	11600.41	1679.14	1680.93	1.79	North Flood Protection	No	
11+46	11614.66	1679.59	1681.49	1.9	North Flood Protection	No	
11+97	11665.28	1680.85	1683.33	2.48	North Flood Protection	No	
13+10	11777	1683.93	1685.31	1.38	North Flood Protection	No	
14+34	11900	1686.81	1688.89	2.08	North Flood Protection	No	
15+67	12033.11	1689.9	1692.32	2.42	North Flood Protection	No	
16+35	12100	1691.63	1694.17	2.54	North Flood Protection	No	
17+34	12200	1694.16	1696.4	2.24	North Flood Protection	No	
18+22	12289.17	1696.55	1699.73	3.18	North Flood Protection	No	

Table A–1 Potential Levee Limits Check							
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Water Surface Elevation above Mean Sea Level**	**Land Side Minimum Elevation above Mean Sea Level**	**Difference between Water Surface Elevation and Land Side Minimum Elevation**	**Potential Levee Description**	**Potential Levee Embankment?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
19+36	12400	1698.81	1704.21	5.4	North Flood Protection	No	~~Not a Potential Levee Segment~~
20+80	12545.24	1702.01	1703.62	1.61	North Flood Protection	No	
21+39	12600	1703.22	1705.9	2.68	North Flood Protection	No	
10+98	12700	1708.06	1699.35	-8.71	North Flood Protection	Yes	**North Flood Protection Levee Segment 1**
11+97	12800	1710.81	1708.34	-2.47	North Flood Protection	Yes	
12+97	12900	1712.68	1709.67	-3.01	North Flood Protection	Yes	
13+96	13000	1714.7	1712.03	-2.67	North Flood Protection	Yes	
14+97	13100	1716.58	1715.94	-0.64	North Flood Protection	Yes	
15+99	13200	1719.14	1716.47	-2.67	North Flood Protection	Yes	
17+3	13300	1721.33	1718.4	-2.93	North Flood Protection	Yes	
18+7	13400	1723.28	1721.72	-1.56	North Flood Protection	Yes	
19+12	13500	1725.3	1724.54	-0.76	North Flood Protection	Yes	
20+18	13600	1727.71	1726.23	-1.48	North Flood Protection	Yes	
21+35	13700	1730	1728.09	-1.91	North Flood Protection	Yes	
22+86	13835.07	1732.95	1732.47	-0.48	North Flood Protection	Yes	
23+57	13900	1734.53	1734.14	-0.39	North Flood Protection	Yes	
24+63	14000	1736.98	1735.21	-1.77	North Flood Protection	Yes	
25+68	14100	1739.31	1736.05	-3.26	North Flood Protection	Yes	
26+69	14200	1742.16	1738.07	-4.09	North Flood Protection	Yes	
27+71	14300	1744.59	1746.92	2.33	North Flood Protection	No	~~Not a Potential Levee Segment~~
28+75	14400	1746.85	1749.66	2.81	End of North Flood Protection Evaluation	No	

Note: 1 Levee segments identified for areas where the difference between Top of Bank Elevation and Water Surface Elevation is less than zero (0) feet.

Table A–2 Potential Levee Freeboard Check							
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Water Surface Elevation above Mean Sea Level**	**Top of Bank Elevation above Mean Sea Level**	**Difference between Top of Bank Elevation and Water Surface Elevation**	**Potential Levee Description**	**Potential Levee Freeboard Adequate?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
10+91	6126.11	1574.76	1579.29	4.53	Tie-in at Bell Road Bridge	Yes	**Bell Road Potential Levee Segment**
11+39	6200	1574.81	1578.86	4.05	Potential Bell Road Levee	Yes	
12+29	6300	1576.88	1579.27	2.39	Potential Bell Road Levee	No	
13+20	6400	1577.97	1580.34	2.37	Potential Bell Road Levee	No	
14+17	6500	1578.62	1581.76	3.14	Potential Bell Road Levee	Yes	
15+16	6600	1581.37	1582.94	1.57	Potential Bell Road Levee	No	
16+22	6700	1583.3	1585.77	2.47	Potential Bell Road Levee	No	
17+22	6800	1584.82	1587.93	3.11	Potential Bell Road Levee	Yes	
18+26	6900	1587.19	1591.27	4.08	Potential Bell Road Levee	Yes	
19+30	7000	1590.3	1592.91	2.61	Potential Bell Road Levee	No	
20+35	7100	1593.05	1594.8	1.75	Potential Bell Road Levee	No	
21+36	7200	1594.69	1597.24	2.55	Potential Bell Road Levee	No	
22+38	7300	1596.11	1600.74	4.63	End of Potential Bell Road Levee	Yes	
12+62	7361.78	1597.6	1601.66	4.06	Beginning of South Flood Protection	Yes	**South Flood Protection Potential Levee Segment 1**
14+4	7500	1600.33	1603.89	3.56	South Flood Protection	Yes	
15+9	7600	1602.01	1606.34	4.33	South Flood Protection	Yes	
16+18	7700	1603.97	1607.28	3.31	South Flood Protection	Yes	
17+25	7800	1606.1	1606.96	0.86	South Flood Protection	No	
18+33	7900	1607.92	1609.01	1.09	South Flood Protection	No	
19+71	8032.6	1610.83	1611.83	1	South Flood Protection	No	
20+40	8100	1612.41	1614.67	2.26	South Flood Protection	No	
21+46	8200	1614.5	1617.04	2.54	South Flood Protection	No	
22+52	8300	1617.23	1618.99	1.76	South Flood Protection	No	
23+13	8364.13	1618.63	1620.52	1.89	South Flood Protection	No	

Table A–2 Potential Levee Freeboard Check							
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Water Surface Elevation above Mean Sea Level**	**Top of Bank Elevation above Mean Sea Level**	**Difference between Top of Bank Elevation and Water Surface Elevation**	**Potential Levee Description**	**Potential Levee Freeboard Adequate?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
24+56	8500	1620.74	1622.9	2.16	South Flood Protection	No	**South Flood Protection Potential Levee Segment 1**
25+57	8600	1622.82	1624.52	1.7	South Flood Protection	No	**Not a Potential Levee Segment**
26+50	8700	1624.25	1625.36	1.11	South Flood Protection	No	
27+50	8800	1625.47	1627.74	2.27	South Flood Protection	No	
28+48	8900	1626.87	1629.65	2.78	South Flood Protection	No	
29+39	9000	1628.74	1631.08	2.34	South Flood Protection	No	
30+37	9100	1630.35	1632.52	2.17	South Flood Protection	No	
31+32	9200	1632.67	1634.93	2.26	South Flood Protection	No	
32+27	9300	1634.65	1637.36	2.71	South Flood Protection	No	
33+24	9400	1636.57	1638.93	2.36	South Flood Protection	No	
34+23	9500	1639	1641.25	2.25	South Flood Protection	No	**South Flood Protection Potential Levee Segment 2**
35+22	9600	1641.41	1644	2.59	South Flood Protection	No	
36+23	9700	1643.8	1646.25	2.45	South Flood Protection	No	
37+24	9800	1645.7	1648.58	2.88	South Flood Protection	No	
38+23	9900	1647.89	1649.99	2.1	South Flood Protection	No	
39+24	10000	1649.07	1650.89	1.82	South Flood Protection	No	
40+30	10100	1650.29	1653.17	2.88	South Flood Protection	No	
41+36	10200	1651.95	1654.65	2.7	South Flood Protection	No	**Not a Potential Levee Segment**
42+39	10300	1654.16	1655.89	1.73	South Flood Protection	No	
43+38	10400	1656.46	1658.13	1.67	South Flood Protection	No	
44+44	10500	1658.99	1660.18	1.19	South Flood Protection	No	
45+48	10600	1661.17	1662.19	1.02	South Flood Protection	No	

Table A–2 Potential Levee Freeboard Check							
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Water Surface Elevation above Mean Sea Level**	**Top of Bank Elevation above Mean Sea Level**	**Difference between Top of Bank Elevation and Water Surface Elevation**	**Potential Levee Description**	**Potential Levee Freeboard Adequate?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
46+50	10700	1663.5	1664.66	1.16	South Flood Protection	No	**Not a Potential Levee Segment**
47+61	10800	1665.69	1666.75	1.06	South Flood Protection	No	
48+68	10900	1668.16	1669.33	1.17	South Flood Protection	No	
49+72	11000	1670.56	1671.95	1.39	South Flood Protection	No	
50+66	11130.61	1671.98	1674	2.02	South Flood Protection	No	
52+23	11271.2	1672.63	1675.82	3.19	South Flood Protection	Yes	
52+34	11316.65	1672.73	1676.21	3.48	South Flood Protection	Yes	
52+52	11376.89	1673.8	1677.57	3.77	South Flood Protection	Yes	
53+19	11492.27	1674.29	1682.81	8.52	End of South Flood Protection	Yes	
Road Embankment	11516.11				Legacy Boulevard		
53+75	11539.95	1677.02	1682.3	5.28	Beginning of North Flood Protection	Yes	
53+81	11545.46	1677.2	1680.28	3.08	North Flood Protection	Yes	
10+00	11561.97	1677.19	1680.33	3.14	North Flood Protection	Yes	
10+04	11567.48	1677.21	1680.33	3.12	North Flood Protection	Yes	
10+53	11582.03	1678.2	1680.76	2.56	North Flood Protection	No	
11+08	11600.41	1679.14	1681.97	2.83	North Flood Protection	No	
11+46	11614.66	1679.59	1682.32	2.73	North Flood Protection	No	
11+97	11665.28	1680.85	1683.26	2.41	North Flood Protection	No	
13+10	11777	1683.93	1685.94	2.01	North Flood Protection	No	
14+34	11900	1686.81	1688.92	2.11	North Flood Protection	No	
15+67	12033.11	1689.9	1691.7	1.8	North Flood Protection	No	
16+35	12100	1691.63	1694.96	3.33	North Flood Protection	Yes	
17+34	12200	1694.16	1696.88	2.72	North Flood Protection	No	
18+22	12289.17	1696.55	1699.24	2.69	North Flood Protection	No	

Table A–2 Potential Levee Freeboard Check							
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Water Surface Elevation above Mean Sea Level**	**Top of Bank Elevation above Mean Sea Level**	**Difference between Top of Bank Elevation and Water Surface Elevation**	**Potential Levee Description**	**Potential Levee Freeboard Adequate?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
19+36	12400	1698.81	1702.26	3.45	North Flood Protection	Yes	~~Not a Potential Levee Segment~~
20+80	12545.24	1702.01	1705.28	3.27	North Flood Protection	Yes	
21+39	12600	1703.22	1705.87	2.65	North Flood Protection	No	
10+98	12700	1708.06	1707.55	-0.51	North Flood Protection	No	**North Flood Protection Levee Segment 1**
11+97	12800	1710.81	1711.12	0.31	North Flood Protection	No	
12+97	12900	1712.68	1714.58	1.9	North Flood Protection	No	
13+96	13000	1714.7	1716.75	2.05	North Flood Protection	No	
14+97	13100	1716.58	1719.43	2.85	North Flood Protection	No	
15+99	13200	1719.14	1721.61	2.47	North Flood Protection	No	
17+3	13300	1721.33	1723.65	2.32	North Flood Protection	No	
18+7	13400	1723.28	1725.87	2.59	North Flood Protection	No	
19+12	13500	1725.3	1728.78	3.48	North Flood Protection	Yes	
20+18	13600	1727.71	1731.04	3.33	North Flood Protection	Yes	
21+35	13700	1730	1733.17	3.17	North Flood Protection	Yes	
22+86	13835.07	1732.95	1735.42	2.47	North Flood Protection	No	
23+57	13900	1734.53	1738.27	3.74	North Flood Protection	Yes	
24+63	14000	1736.98	1740.15	3.17	North Flood Protection	Yes	
25+68	14100	1739.31	1742.11	2.8	North Flood Protection	No	
26+69	14200	1742.16	1744.33	2.17	North Flood Protection	No	
27+71	14300	1744.59	1746.99	2.4	North Flood Protection	No	~~Not a Potential Levee Segment~~
28+75	14400	1746.85	1749.36	2.51	End of North Flood Protection Evaluation	No	

Note: 1 Levee segments identified for areas where the difference between Top of Bank Elevation and Water Surface Elevation is less than zero (0) feet.

Table A–3 Embankment Toe Protection Check									
Approximate Potential Levee Station	Hydraulic Cross Section Identification #	Minimum Cross Section Elevation above Mean Sea Level	Total Scour Depth	Required Minimum Toe Depth	Estimated Design Toe Depth	Difference between Required Minimum Toe Depth and Estimated Design Toe Depth	Potential Levee Description	Toe Protection Adequate?	Segments[1]
(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)		(Yes/No)	
10+91	6126.11	1567.7	13.8	1553.9	1564.2	-10.3	Tie-in at Bell Road Bridge	No	**Bell Road Potential Levee Segment**
11+39	6200	1568.63	13.8	1554.9	1564.3	-9.5	Potential Bell Road Levee	No	
12+29	6300	1570.36	13.8	1556.6	1564.7	-8.1	Potential Bell Road Levee	No	
13+20	6400	1572.84	13.8	1559.1	1565.5	-6.4	Potential Bell Road Levee	No	
14+17	6500	1574.28	6.8	1567.5	1566.3	1.2	Potential Bell Road Levee	Yes	
15+16	6600	1576.91	14.6	1562.3	1572.0	-9.7	Potential Bell Road Levee	No	
16+22	6700	1577.99	14.6	1563.4	1570.7	-7.3	Potential Bell Road Levee	No	
17+22	6800	1579.16	14.6	1564.6	1574.1	-9.5	Potential Bell Road Levee	No	
18+26	6900	1580.67	16.3	1564.3	1576.2	-11.9	Potential Bell Road Levee	No	
19+30	7000	1583.87	16.3	1567.5	1578.5	-10.9	Potential Bell Road Levee	No	
20+35	7100	1585.73	8.7	1577.0	1578.7	-1.6	Potential Bell Road Levee	No	
21+36	7200	1586.99	11.2	1575.7	1577.2	-1.5	Potential Bell Road Levee	No	
22+38	7300	1589.54	11.2	1578.3	1579.3	-1.0	End of Potential Bell Road Levee	No	
12+62	7361.78	1592.05	11.0	1581.1	1581.2	-0.2	Beginning of South Flood Protection	No	**South Flood Protection Potential Levee Segment 1**
14+4	7500	1594.68	11.0	1583.7	1585.0	-1.3	South Flood Protection	No	
15+9	7600	1596.17	11.0	1585.2	1586.9	-1.7	South Flood Protection	No	
16+18	7700	1597.86	8.7	1589.2	1588.7	0.5	South Flood Protection	Yes	
17+25	7800	1599.88	12.1	1587.8	1590.4	-2.6	South Flood Protection	No	
18+33	7900	1601.53	12.1	1589.4	1592.6	-3.2	South Flood Protection	No	
19+71	8032.6	1603.79	11.7	1592.1	1593.1	-1.0	South Flood Protection	No	
20+40	8100	1604.59	11.7	1592.9	1596.5	-3.6	South Flood Protection	No	
21+46	8200	1607.14	11.7	1595.4	1595.0	0.4	South Flood Protection	Yes	

Table A–3 Embankment Toe Protection Check									
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Minimum Cross Section Elevation above Mean Sea Level**	**Total Scour Depth**	**Required Minimum Toe Depth**	**Estimated Design Toe Depth**	**Difference between Required Minimum Toe Depth and Estimated Design Toe Depth**	**Potential Levee Description**	**Toe Protection Adequate?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
22+52	8300	1609.97	9.9	1600.0	1601.1	-1.1	South Flood Protection	No	**South Flood Protection Potential Levee Segment 1**
23+13	8364.13	1611.45	8.3	1603.1	1602.3	0.8	South Flood Protection	Yes	
24+56	8500	1613.79	8.3	1605.5	1604.4	1.1	South Flood Protection	Yes	
25+57	8600	1614.87	8.3	1606.6	1605.9	0.6	South Flood Protection	Yes	**Not a Potential Levee Segment**
26+50	8700	1616.49	8.3	1608.2	1607.6	0.5	South Flood Protection	Yes	
27+50	8800	1619.06	8.3	1610.7	1610.0	0.8	South Flood Protection	Yes	
28+48	8900	1621.37	9.4	1611.9	1612.2	-0.2	South Flood Protection	No	
29+39	9000	1623.73	8.6	1615.1	1614.4	0.8	South Flood Protection	Yes	
30+37	9100	1624.94	8.6	1616.3	1616.6	-0.2	South Flood Protection	No	
31+32	9200	1628.06	8.6	1619.5	1618.9	0.6	South Flood Protection	Yes	
32+27	9300	1629.23	8.6	1620.6	1620.9	-0.2	South Flood Protection	No	
33+24	9400	1632.04	8.6	1623.4	1622.8	0.7	South Flood Protection	Yes	
34+23	9500	1634	8.6	1625.4	1624.7	0.7	South Flood Protection	Yes	**South Flood Protection Potential Levee Segment 2**
35+22	9600	1636.96	8.6	1628.4	1627.1	1.3	South Flood Protection	Yes	
36+23	9700	1639	9.9	1629.1	1629.7	-0.7	South Flood Protection	No	
37+24	9800	1639.81	9.9	1629.9	1631.5	-1.6	South Flood Protection	No	
38+23	9900	1640.8	7.8	1633.0	1631.0	2.0	South Flood Protection	Yes	
39+24	10000	1641.7	7.8	1633.9	1633.3	0.6	South Flood Protection	Yes	
40+30	10100	1644.68	7.8	1636.9	1636.3	0.6	South Flood Protection	Yes	

Table A–3 Embankment Toe Protection Check									
Approximate Potential Levee Station	Hydraulic Cross Section Identification #	Minimum Cross Section Elevation above Mean Sea Level	Total Scour Depth	Required Minimum Toe Depth	Estimated Design Toe Depth	Difference between Required Minimum Toe Depth and Estimated Design Toe Depth	Potential Levee Description	Toe Protection Adequate?	Segments[1]
(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)		(Yes/No)	
41+36	10200	1645.71	7.4	1638.3	1639.3	-1.0	South Flood Protection	No	Not a Potential Levee Segment
42+39	10300	1647.53	7.4	1640.1	1640.6	-0.5	South Flood Protection	No	
43+38	10400	1651.44	7.4	1644.0	1642.1	2.0	South Flood Protection	Yes	
44+44	10500	1653.85	7.4	1646.4	1644.3	2.1	South Flood Protection	Yes	
45+48	10600	1655.47	7.4	1648.1	1646.6	1.4	South Flood Protection	Yes	
46+50	10700	1657.7	10.1	1647.6	1649.3	-1.7	South Flood Protection	No	
47+61	10800	1658.9	10.1	1648.8	1651.9	-3.0	South Flood Protection	No	
48+68	10900	1663.18	10.1	1653.1	1653.9	-0.8	South Flood Protection	No	
49+72	11000	1665.85	10.1	1655.8	1655.6	0.2	South Flood Protection	Yes	
50+66	11130.61	1665.98	10.1	1655.9	1657.0	-1.0	South Flood Protection	No	
52+23	11271.2	1666.35	6.7	1659.7	1658.5	1.2	South Flood Protection	Yes	
52+34	11316.65	1666.71	6.7	1660.0	1658.6	1.4	South Flood Protection	Yes	
52+52	11376.89	1666.9	6.7	1660.2	1658.7	1.5	South Flood Protection	Yes	
53+19	11492.27	1668.34	0.0	1668.3	1660.1	8.3	End of South Flood Protection	Yes	
Road Embankment							Legacy Boulevard		
53+75	11539.95	1668.57	0.0	1668.6	1668.57	0.0	Beginning of North Flood Protection	Yes	
53+81	11545.46	1668.58	0.0	1668.6	1668.58	0.0	North Flood Protection	Yes	
10+00	11561.97	1672.33	0.0	1672.3	1672.33	0.0	North Flood Protection	Yes	
10+04	11567.48	1672.33	0.0	1672.3	1672.33	0.0	North Flood Protection	Yes	
10+53	11582.03	1671.63	6.7	1665.0	1664.8	0.1	North Flood Protection	Yes	
11+08	11600.41	1672.29	6.7	1665.6	1665.8	-0.1	North Flood Protection	No	
11+46	11614.66	1672.74	6.7	1666.1	1666.4	-0.4	North Flood Protection	No	

Table A–3 Embankment Toe Protection Check									
Approximate Potential Levee Station	Hydraulic Cross Section Identification #	Minimum Cross Section Elevation above Mean Sea Level	Total Scour Depth	Required Minimum Toe Depth	Estimated Design Toe Depth	Difference between Required Minimum Toe Depth and Estimated Design Toe Depth	Potential Levee Description	Toe Protection Adequate?	Segments[1]
(feet)	(feet)	(feet)	(feet)	(feet)	(feet)	(feet)		(Yes/No)	
11+97	11665.28	1674.76	6.7	1668.1	1667.4	0.7	North Flood Protection	Yes	Not a Potential Levee Segment
13+10	11777	1677.5	6.7	1670.8	1670.0	0.8	North Flood Protection	Yes	
14+34	11900	1680.42	7.5	1672.9	1673.0	-0.1	North Flood Protection	No	
15+67	12033.11	1683.38	7.8	1675.6	1676.2	-0.7	North Flood Protection	No	
16+35	12100	1685.62	7.8	1677.8	1677.9	-0.1	North Flood Protection	No	
17+34	12200	1687.43	8.7	1678.7	1680.3	-1.6	North Flood Protection	No	
18+22	12289.17	1690.57	6.8	1683.8	1682.4	1.4	North Flood Protection	Yes	
19+36	12400	1693.12	6.8	1686.3	1684.6	1.7	North Flood Protection	Yes	
20+80	12545.24	1696.4	6.7	1689.7	1687.8	2.0	North Flood Protection	Yes	
21+39	12600	1697.6	6.7	1690.9	1689.3	1.7	North Flood Protection	Yes	
10+98	12700	1699.71	6.7	1693.0	1690.8	2.2	North Flood Protection	Yes	North Flood Protection Potential Levee Segment 1
11+97	12800	1702.17	6.7	1695.5	1696.6	-1.0	North Flood Protection	No	
12+97	12900	1705.97	9.6	1696.4	1700.1	-3.7	North Flood Protection	No	
13+96	13000	1707.62	10.7	1696.9	1703.1	-6.2	North Flood Protection	No	
14+97	13100	1710.53	10.7	1699.8	1704.2	-4.4	North Flood Protection	No	
15+99	13200	1713.53	9.8	1703.8	1706.4	-2.6	North Flood Protection	No	
17+3	13300	1715.78	9.8	1706.0	1709.3	-3.3	North Flood Protection	No	
18+7	13400	1717.68	9.8	1707.9	1711.8	-3.9	North Flood Protection	No	
19+12	13500	1719.92	9.8	1710.2	1714.4	-4.2	North Flood Protection	No	
20+18	13600	1723.39	9.8	1713.6	1716.6	-3.0	North Flood Protection	No	
21+35	13700	1725.25	9.8	1715.5	1717.8	-2.3	North Flood Protection	No	
22+86	13835.07	1728.47	7.9	1720.6	1722.5	-1.9	North Flood Protection	No	

Table A–3 Embankment Toe Protection Check									
Approximate Potential Levee Station	**Hydraulic Cross Section Identification #**	**Minimum Cross Section Elevation above Mean Sea Level**	**Total Scour Depth**	**Required Minimum Toe Depth**	**Estimated Design Toe Depth**	**Difference between Required Minimum Toe Depth and Estimated Design Toe Depth**	**Potential Levee Description**	**Toe Protection Adequate?**	**Segments[1]**
(feet)	**(feet)**	**(feet)**	**(feet)**	**(feet)**	**(feet)**	**(feet)**		**(Yes/No)**	
23+57	13900	1730.73	7.9	1722.9	1723.4	-0.5	North Flood Protection	No	**North Flood Protection Potential Levee Segment 1**
24+63	14000	1733.04	7.9	1725.2	1726.1	-0.9	North Flood Protection	No	
25+68	14100	1735.08	7.9	1727.2	1729.2	-2.0	North Flood Protection	No	
26+69	14200	1737.16	6.7	1730.5	1732.1	-1.6	North Flood Protection	No	
27+71	14300	1739.41	6.7	1732.7	1734.8	-2.0	North Flood Protection	No	~~**Not a Potential Levee Segment**~~
28+75	14400	1741.82	6.7	1735.2	1737.5	-2.3	End of North Flood Protection Evaluation	No	

Note: 1 Levee segments identified for areas where the difference between Top of Bank Elevation and Water Surface Elevation is less than zero (0) feet.

Appendix B Supporting Documentation

Additional Supporting Documents included in the Data Collection Memorandum under separate Cover.

Library No.	Title, Date	File Name
RW0175	Reata Wash North Flood Protection (Drainage Report for DC Ranch Planning Unit 1 - North Flood Protection, October 2003)	RW0175_DesignReportforDCRanchPlanningUnit1NorthFloodProtection.pdf
RW0176	Reata Wash South Flood Protection (Drainage Report for DC Ranch Planning Unit 1 - South Flood Protection, October 2003)	RW0176_DesignReportforDCRanchPlanningUnit1SouthFloodProtection.pdf
RW0195	Bell Road Widening, 94th Street to 98th Street, Final Drainage Report, Part 1, June 2006	RW0195_052406 Final Drainage report part 1.pdf
RW0196	Bell Road Widening, 94th Street to 98th Street, Final Drainage Report, Part 2, June 2006	RW0196_052406 Final drainage report part 2.pdf
RW0197	Bell Road Levee Design Plans, December 2007	RW0197_Bell Rd Levee 12-21-07.pdf
RW0200	DC Ranch Various Reports and Design Plans, Varies	DC Ranch PU 1 North Flood Protection.pdf DC Ranch PU 1 South Flood Protection.pdf

APPENDIX O

MEMORANDUM: EXISTING CONDITION HYDRAULIC CAPACITY

Reata Wash
Flood Control Improvement Study

Contract No. 2014-168-COS

Memorandum: Existing Condition Hydraulic Capacity

August 31, 2016

Prepared for:

Capital Project Management
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Scottsdale, AZ. 85251

EXPIRES 12-31-16

Prepared By:

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LOGANSIMPSON

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associates
firm

Gannett Fleming

Technical Solutions

gci

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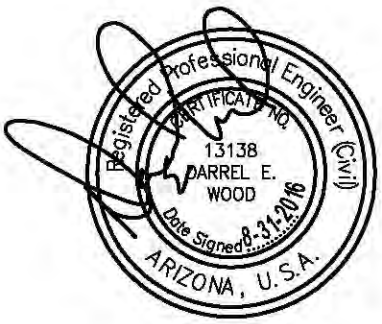


EXPIRES 12–31–16

1. EXECUTIVE SUMMARY

This *Existing Condition Hydraulic Capacity Memorandum* documents the results of hydraulic modeling of the existing Reata Wash drainage corridor using the U.S. Army Corps of Engineers HEC-RAS computer program (Reference 1). The study has been divided into five distinct hydraulic reaches as shown on *Exhibit 1 – Study Location Reach Map and Existing Condition Floodplain*. Existing condition hydraulic modeling has been performed for all reaches except Reach 2. Reach 2 does not have an existing conveyance system to convey the 100-year base flood peak discharge (peak discharge), thus an existing condition hydraulic model was not developed. The peak discharge used in this analysis is based upon the results of the study's hydrology analysis, which identified a Federal Emergency Management Agency (FEMA) compliant peak discharge as documented in the *Hydrologic Memorandum* (Reference 2). Due to the steep terrain, the flow regime is supercritical for most of the study. The existing condition floodplain limits have been delineated based on critical depth, per FEMA criteria, which are deeper than supercritical flow depths and therefore result in more conservative floodplain limits.

Potential deficiencies, solutions and recommendations have been identified based on the existing condition within the corridor on a per reach basis as follows:

- **Reach 1 - Pinnacle Peak Road to 1,000 feet north:** The existing condition hydraulic model demonstrates that the wash does not have the capacity to convey the study's peak discharge and, as a result, the existing condition floodplain extends well beyond the homeowner's drainage easements within this reach. In order to collect and convey the peak discharge to the existing Pinnacle Peak Road Bridge, potential improvements include channelization from the bridge to approximately 1,000 feet upstream. Additional City land rights for drainage easements are also anticipated at the upstream end of this reach to contain and collect flows. Due to the high velocities associated with the steep slopes in this part of the watershed, an incised grouted rock trapezoidal channel or 'U' channel with grouted rock invert are potential solutions for conveying the study's peak discharge.

- **Reach 2 – Pinnacle Peak Road to Cross Canyon Way:** This reach has an existing breakout flow condition along Dobson Wash that occurs on the alluvial fan (also referred to as FEMA Fan #2B in published literature) downstream of Pinnacle Peak Road. Reach 2 lacks an existing defined drainage channel and thus does not have the existing conveyance capacity to contain and convey the peak discharge within this reach. Therefore, an existing condition hydraulic model was not developed for this reach. Several potential solutions are available for

containing and conveying the design flow through this reach including an incised earthen trapezoidal channel, a perched earthen trapezoidal channel with levee banks, a concrete 'U' channel, a grouted rock trapezoidal channel and a covered closed conduit culvert. Minimizing the drainage system footprint and disturbance area and achieving an aesthetically acceptable solution are important considerations.

- **Reach 3 – Cross Canyon Way to Thompson Peak Parkway:** Similar to Reach 2, the northern segment of this reach does not have the capacity to contain and convey the peak discharge within property where the City has land rights. Flow also breaks out to the west at several locations along this reach. Potential solutions within this northern segment of the reach include a closed conduit culvert, a concrete "U" channel or a grouted rock trapezoidal channel. The middle and southern segments of the reach do have containment for the majority of the segments. The existing floodplain does encroach into several private properties along the western floodplain boundary, as shown on *Exhibit 1– Study Location Reach Map and Existing Condition Floodplain*. Bank protection measures are recommended for these areas where no bank protection exists to prevent floodplain encroachments into the referenced private property. Since the velocities within this reach are high enough to allow lateral migration to occur, these bank protection measures would mitigate the potential for lateral migration of the wash.

- **Reach 4 - Thompson Peak Parkway to Bell Road:** The peak discharge is contained within property where the City has land rights along this entire reach with an exception along the east bank south of Thompson Peak Parkway where the floodplain encroaches slightly into DC Ranch Park and at Ironwood Village 8-C (whose plat displays a strip of land labeled flood hazard area). It is noted that there are three locations within this reach where existing culverts convey low flows from Reata Wash to the southwest into washes that may meet the requirements of being designated as Clean Waters Act (CWA) Section 404 washes. Although the three culverts allow floodwaters to be diverted out of Reata Wash's study corridor no reductions in peak discharges have been applied to the Reata Wash study corridor downstream of these culverts.

- **Reach 5 – Bell Road to East McDowell Mountain Ranch Road:** Downstream of the Bell Road Bridge, the peak discharge exceeds the conveyance capacity of the existing limited in size channel, and the floodplain spreads out over a large unconfined path well beyond the limits of the corridor owned by the City. A potential solution for reducing the floodplain limits could include an incised earthen or concrete trapezoidal channel to contain and convey the peak

discharge from Bell Road to the East McDowell Mountain Ranch Road Bridge. Since significant width is available within the City owned corridor, an incised earthen trapezoidal channel would be very cost effective to implement.

The potential solutions described herein identify existing condition deficiencies that will be further analyzed with the study's recommended hydraulic solutions, as documented in the *Proposed Condition Hydraulic Memorandum* (Reference 3) The HEC-RAS output tables are shown in Appendix A, and digital files are included on the CD in Appendix C. The existing condition floodplain is shown on *Exhibit 1 – Study Location Reach Map and Existing Condition Floodplain.*

2. INTRODUCTION

This memo summarizes the assumptions, supporting calculations and conclusions for the preliminary existing condition hydraulic capacity of the drainage corridor for the Reata Wash Food Control Improvement Study. Areas of concern with respect to hydraulic elements will be noted including channel velocities, conveyance capacity and potential non-containment locations. Locations subject to existing containment via buried bank protection, raised embankments and potential levees will be noted.

All supporting exhibits and calculations are provided on the CD in Appendix C.

3. ANALYSIS, CONSTRAINTS AND HYDRAULIC PARAMETERS

Based upon the hydrologic analysis presented in the *Hydrologic Memorandum* (Reference 2) developed for this study, an analysis was performed for the existing condition hydraulic conveyance capacity within the Reata Wash Study drainage corridor. In the existing condition, sediment conveyance will not be consistent throughout the corridor. Therefore, this analysis only checks the hydraulic conveyance capacity based on FEMA compliant peak discharge flow and does not include the impact of additional factors including local scours and sediment transport. The *Proposed Condition Hydraulic Capacity Memorandum* (Reference 3) analysis does address these additional hydraulic parameters.

Existing condition hydraulic modeling has been performed for all reaches except Reach 2. Reach 2 lacks an existing defined drainage channel and thus the drainage corridor does not have the existing conveyance capacity to contain and convey the peak discharge within this reach. Therefore, an existing condition hydraulic model was not developed for this reach. The 100-year peak discharge used in this analysis is based upon the results of the hydrology task identifying a FEMA compliant peak discharge as documented in the *Hydrologic Memorandum* (Reference 2) developed for the study. The HEC-RAS cross section locations and existing condition peak discharges are shown on *Exhibit 2 – HEC-RAS Cross Section Locations and Peak Discharges*. The HEC-RAS output tables are included in Appendix A, cross section plots are included in Appendix B and digital files are included on the CD in Appendix C.

The hydraulic modeling includes the evaluation of various hydraulic parameters including Manning's Roughness Factor "n" based on the Flood Control District of Maricopa County (FCDMC) Hydraulics Manual (Reference 4). For natural earthen channel corridors with vegetation, the "n" values chosen range from 0.035 to 0.04 which is consistent with the previously approved Letter of Map Revision (LOMR) within the corridor (Reference 6).

4. RESULTS AND RECOMMENDATIONS

The results of the existing condition hydraulic analyses including potential deficiencies, solutions and recommendations have been identified based on a per reach basis as summarized below:

- **Reach 1:** This Reach extends from the Pinnacle Peak Road Bridge to approximately 1,000 feet north to ensure that all flow is contained within a defined area without any flow splits. This Reach was analyzed with a peak discharge flow of 13,015 cfs as identified in the *Hydrologic Memorandum (Reference 2)*. The average existing condition slope within this reach is approximately 2.8% and the average existing condition velocity is approximately 13.8 feet/second.

  The results of the analysis indicate that the flow is not contained within the existing drainage easement, but spreads out over 800 feet in width into the west overbank area. As a result, the flow overtops Pinnacle Peak Road west of the existing bridge and continues to the south into private residential lots. Although Reach 2 is not included in this analysis, a portion of northern end of the Reach 2 floodplain is included in *Exhibit 1*. The Reach 1 existing condition HEC-RAS model is 4264-EX-R1.prj.

  In order to collect and convey the study's peak discharge to the existing Pinnacle Peak Road Bridge, potential improvements include channelization from the bridge to approximately 1,000' upstream. Additional drainage easements are also anticipated at the upstream end of this reach to contain and collect flows. Due to the high velocities, (approximately 13.8 feet/second) associated with the steep slopes in this part of the watershed, an incised 'U' channel with a grouted rock invert with the potential for a grouted rock trapezoidal channel, where easement widths permit, are potential solutions to collect, contain and convey the peak discharge in this reach. These solutions are sensitive to current land features and reduce land area disruption by minimizing the improvement's footprint.

- **Reach 2:** This Reach extends from Pinnacle Peak Road to Cross Canyon Way and is approximately 6,100 feet in length. The middle and southern segments of Reach 2 were not analyzed, per the contract scope, since it was evident from the aerial and topographic mapping that a major flow spilt occurs in the existing condition at the fan apex at Dobson Wash downstream of Pinnacle Peak Road. These segments of the reach do not have the defined physical drainage corridor capacity to contain and convey the peak discharge downstream to Reach 3.

Potential FEMA complaint solutions for ensuring containment and conveying the design flow through the entire reach could include a closed conduit culvert, a concrete "U" channel, an incised earthen trapezoidal channel or a grouted rock trapezoidal channel. Minimizing the drainage system footprint and disturbance area as well as achieving an aesthetic acceptable solution are important considerations.

Reach 3: This Reach extends from Cross Canyon Way to Thompson Peak Parkway and is approximately 4,700 feet in length. This reach was analyzed with a peak discharge of 13,371 cfs at Cross Canyon Way and 13,063 cfs at E. Thompson Peak Parkway as identified in the *Hydrologic Memorandum* (Reference 2). The peak discharges used in the existing condition analysis for Reaches 3 through 5 were not reduced by the flow breakout at Dobson Wash, but assumes that the total peak discharge can be conveyed through Reach 2. The average existing condition slope within this reach is approximately 3.1% and the average existing condition velocity is approximately 17 feet/second. This reach was analyzed using the FEMA compliant full apex peak discharge flow. Reach 3 includes a split flow condition described in further detail below. This reach has been analyzed using four (4) HEC-RAS models listed below from upstream to downstream:

- Reach 3 North - Stations 235+00 to 228+00, Model: 4264-R3_228 to 235.prj
- Reach 3 East - Stations 228+00 to 212+00, Model: 4264-R3_SplitEast.prj
- Reach 3 West - Stations 228+00 to 212+00, Model: 4264-R3_SplitWest.prj
- Reach 3 South - Stations 212+00 to 16+00, Model: 4264-EX-R3 to R5.prj

Note: The Model 4262-EX-R3 to R5.prj includes Reach 3 South and Reaches 4 & 5

The northern segment of this reach does not have the capacity to contain and convey the peak discharge within the existing property on which the city has land rights. Flow breaks out to the south and west along this segment and encroaches into several privately owned parcels near Cross Canyon Way. A significant flow split occurs within the main wash several hundred feet south of Cross Canyon Way and continues approximately 1,600 feet downstream before converging again. A conservative approach was taken to delineate the floodplain in this segment by analyzing each side of the split with the full peak discharge. Using this methodology, several locations where identified where flow breaks out to the west into residential areas. The flow will continue southwesterly away from the Reata Wash corridor and may not return back into the corridor.

Potential solutions within the northern portion of the reach could include a closed conduit culvert, a concrete "U" channel or a grouted rock trapezoidal channel. The middle and southern segments of the reach do have containment for the majority of the segment. The existing floodplain does encroach into several private properties along the western floodplain boundary, as shown on *Exhibit 1 – Study Location Reach Map and Existing Condition Floodplain*. Bank protection measures are recommended for these areas where no bank protection exists. Since the velocities within this reach are high (approximately 17 feet/second), these bank protection measures would mitigate the potential for lateral migration of the wash.

Reach 4: This Reach extends from Thompson Peak Parkway to Bell Road and is approximately 12,300 feet in length. This reach was analyzed with a peak discharge of 13,063 cfs at Thompson Peak Parkway, 14,483 cfs at the confluence with North Beardsley Wash, 13,847 cfs at Legacy Boulevard (formerly known as Union Hills Drive) and 17,345 cfs at the confluence with South Beardsley Wash at Bell Road as identified in the *Hydrologic Memorandum* (Reference 2). Peak flow reductions occur along several reaches of the project due to HEC-1 channel routing storage attenuation. The average existing condition slope within this reach is approximately 2.2%, and the average existing condition velocity is approximately 12.7 feet/second. The Reach 4 existing condition HEC-RAS model (4264-EX-R3 to R5.prj) output tables are included in Appendix A, cross sections plots are included in Appendix B and digital files are included on the CD in Appendix C.

The peak discharge is contained within property where the City has land rights along this entire reach with an exception along the east bank south of Thompson Peak Parkway where the floodplain encroaches slightly into DC Ranch Park and at Ironwood Village 8-C (whose plat displays a strip of land labeled flood hazard area). There are four locations that have been identified as potential existing levees in the *Levee Assessment Memorandum* (Reference 5). The identified levees occur along the west bank at the following locations from upstream to downstream:

- La Reggia Subdivision (Stations 141+95 to 127+00)
- Sera Brisa Subdivision (Stations 101+00 to 95+34)
- DC Ranch Parcel 1.11 (Stations 84+70 to 79+00)
- North of Bell Road (Stations 66+05 to 61+90)

The proposed condition improvements analysis will need to ensure that the freeboard requirements are met along these levees. The height of the embankment/levees could be amended or a floodwall could be incorporated at these locations to meet FEMA requirements. It is noted that there are three locations within this reach where existing culverts convey low flows from Reata Wash to the southwest into washes that may meet the requirements of being designated as Clean Waters Act (CWA) Section 404 washes. Although the three culverts allow floodwaters to be diverted out of Reata Wash's study corridor no reductions in peak discharges have been applied to the Reata Wash study corridor downstream of these culverts.

Reach 5: This Reach extends from Bell Road to just south of E. McDowell Mountain Ranch Road in land owned by the City and the Bureau of Reclamation (WestWorld), and is approximately 3,800 feet in length. This reach was analyzed with a peak discharge of 17,345 cfs as identified in the *Hydrologic Memorandum* (Reference 2). The average existing condition slope within this reach is approximately 1.7% and the average existing condition velocity is approximately 8.8 feet/second. The Reach 5 existing condition HEC-RAS Model (4264-EX-R3 to R5.prj) output tables are included in Appendix A, cross sections plots are included in Appendix B and digital files are included on the CD in Appendix C.

Downstream of the Bell Road Bridge, the peak discharge exceeds the conveyance capacity of the existing channel and the floodplain spreads out over a large unconfined path beyond the limits of the property where the City has land rights. Potential solutions for reducing the floodplain limits include an incised earthen or concrete trapezoidal channel to contain and convey the peak discharge from Bell Road to the East McDowell Mountain Ranch Road Bridge. An incised earthen trapezoidal channel in this reach would reduce costs since this option could be contained within the available corridor already owned by the City. In order to achieve acceptable channel velocities and minimize excess excavation, a drop structure will be required upstream of the existing McDowell Mountain Ranch Road Bridge. The area between the drop structure and the bridge could potentially be used as a sediment basin.

5. REFERENCES

1. U.S. Army Corps of Engineers, HEC-RAS Computer Program, Version 4.1.0, Hydrologic Engineering Center, January 2010

2. Wood, Patel & Associates, Inc., Reata Wash Design Concept Report, Volume III, Appendix H: JE Fuller Hydrology and Geomorphology, Inc., *Reata Wash Flood Control Improvement Study, Hydrologic Memorandum, August 31,* 2016.

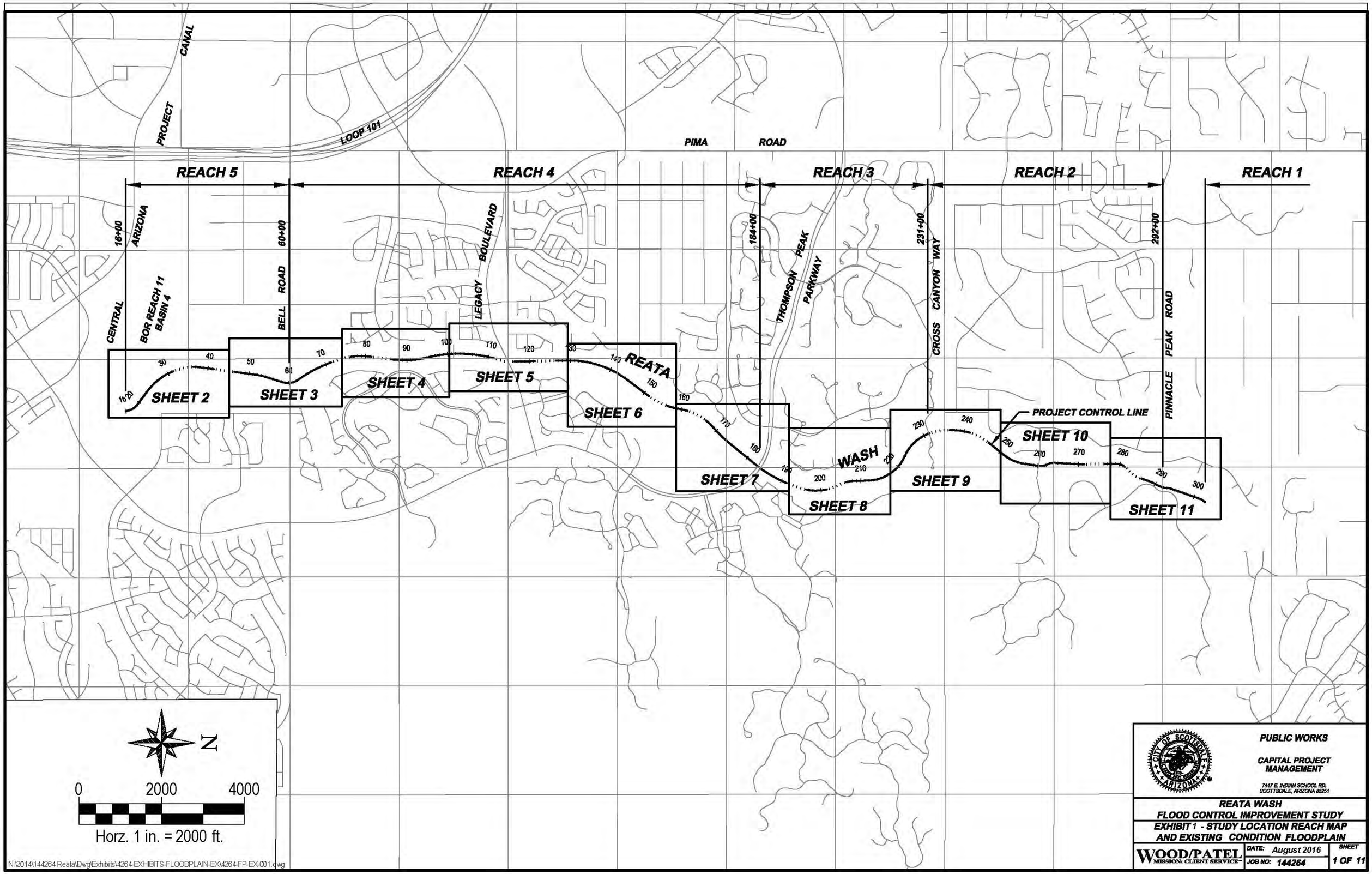
3. Wood, Patel & Associates, Inc., Reata Wash Design Concept Report, Volume III, Appendix P: Wood, Patel & Associates, Inc., *Reata Wash Flood Control Improvement Study, Proposed Condition Hydraulic Memorandum, August 31,* 2016.

4. Flood Control District of Maricopa County, Drainage Design Manual for Maricopa County, Arizona, Hydraulics, August 2013.

5. Wood, Patel & Associates, Inc., Reata Wash Design Concept Report, Volume III, Appendix N: JE Fuller Hydrology and Geomorphology, Inc., *Reata Wash Flood Control Improvement Study, Levee Assessment Memorandum,* August 31, 2016.

6. Wood, Patel & Associates, Inc., *Reata Wash Pass (Legacy Boulevard to Beardsley Wash North), Letter of Map Revision,* FEMA Case No. 13-09-0520P, June 2013.

EXHIBIT 1
Study Location Reach Map and Existing Condition Floodplain



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CITY OF SCOTTSDALE ARIZONA

PUBLIC WORKS

CAPITAL PROJECT MANAGEMENT

7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP AND EXISTING CONDITION FLOODPLAIN

WOOD/PATEL
MISSION: CLIENT SERVICE™

DATE: August 2016
JOB NO: 144264

SHEET
1 OF 11

REACH 5

LEGEND

- City of Scottsdale (COS) Property
- HOA Property - With COS Rights
- HOA Property - No COS Rights
- Private Property - No COS Rights
- Bureau of Reclamation
- D.E. Drainage Easement
- 10 Wash Control Line
- Exist. Floodplain Line

C.A.P.

BDR REACH 11
BASIN 4

WESTWORLD WAY

REATA WASH
PROJECT CONTROL LINE

MATCH LINE STA 46+00

N. 98th STREET

E. MCDOWELL MT. RANCH ROAD

N

0 200 400

Horz. 1 in. = 200 ft.

N:\2014\144264 Reata\Dwg\Exhibits\4264-EXHIBITS-FLOODPLAIN-EX\4264-FP-EX-002.dwg

CITY OF SCOTTSDALE ARIZONA

MUNICIPAL SERVICES DEPARTMENT

CAPITAL PROJECT MANAGEMENT

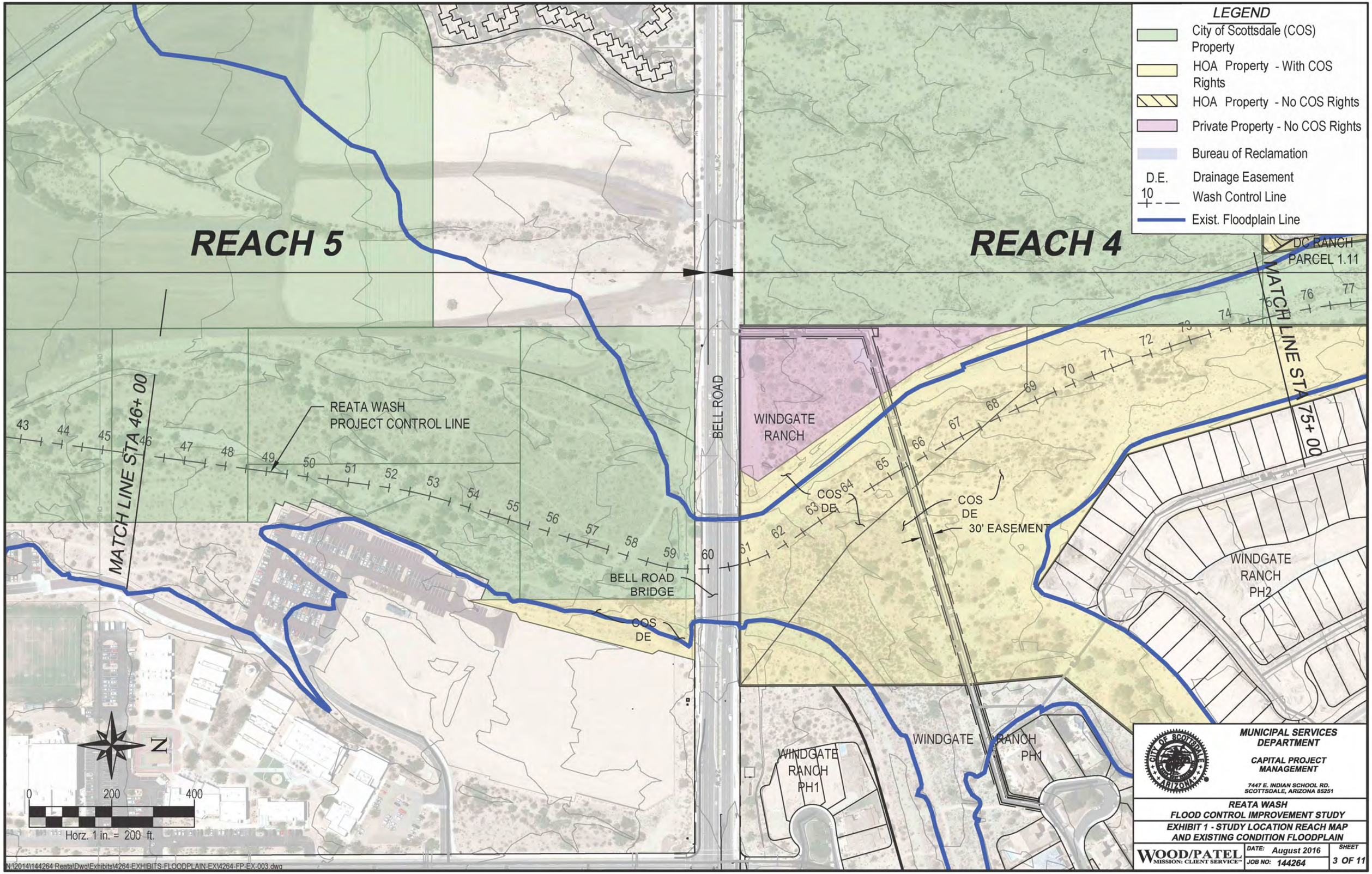
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY

EXHIBIT 1 - STUDY LOCATION REACH MAP AND EXISTING CONDITION FLOODPLAIN

WOOD/PATEL
MISSION: CLIENT SERVICE™

DATE: August 2016
JOB NO: 144264
SHEET 2 OF 11



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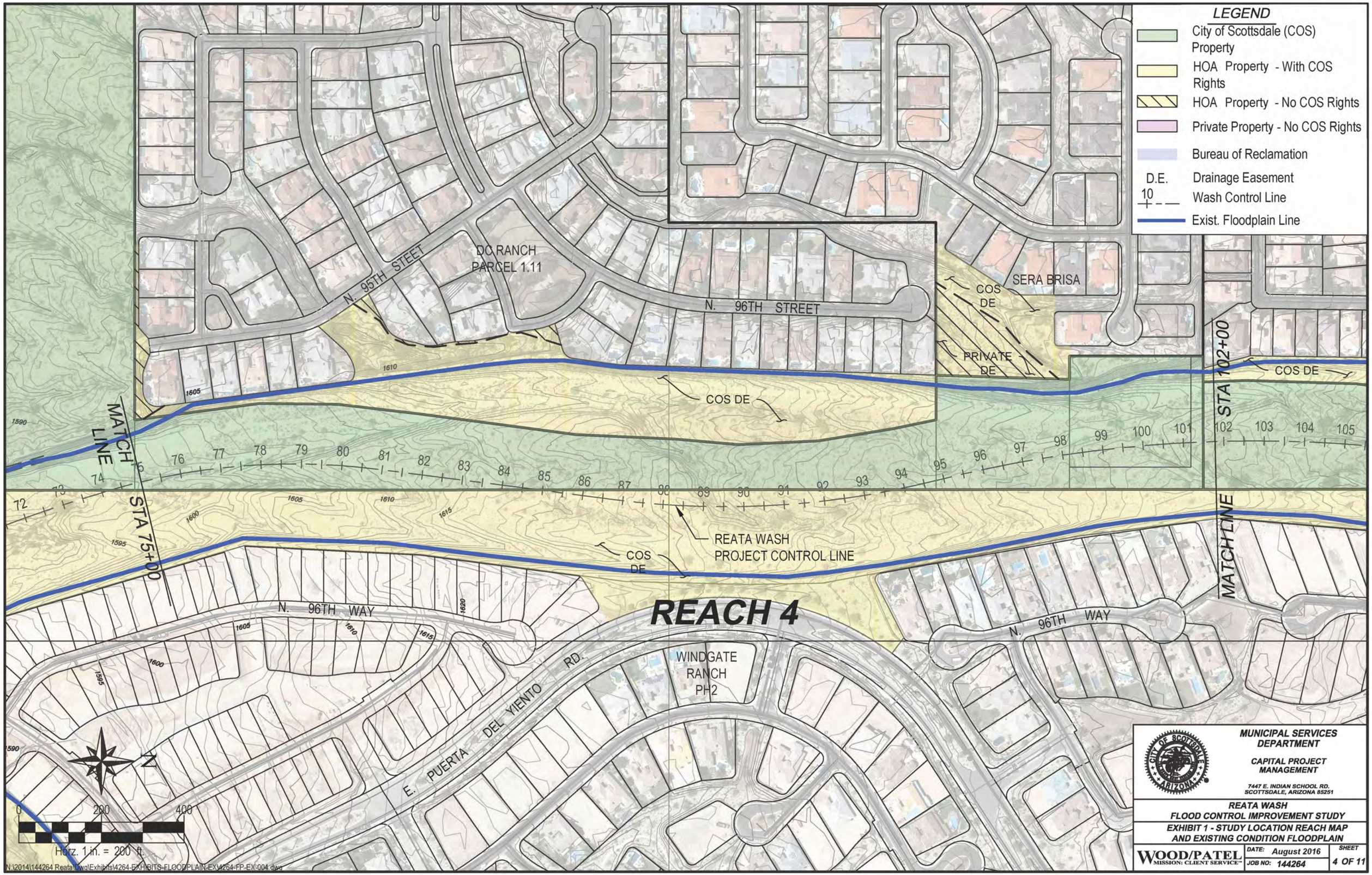
MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP
AND EXISTING CONDITION FLOODPLAIN

WOOD/PATEL
MISSION: CLIENT SERVICE

DATE: August 2016
JOB NO: 144264
SHEET 3 OF 11



MUNICIPAL SERVICES DEPARTMENT

CAPITAL PROJECT MANAGEMENT

7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP AND EXISTING CONDITION FLOODPLAIN

WOOD/PATEL MISSION: CLIENT SERVICE™

DATE: August 2016 | JOB NO: 144264 | SHEET 4 OF 11

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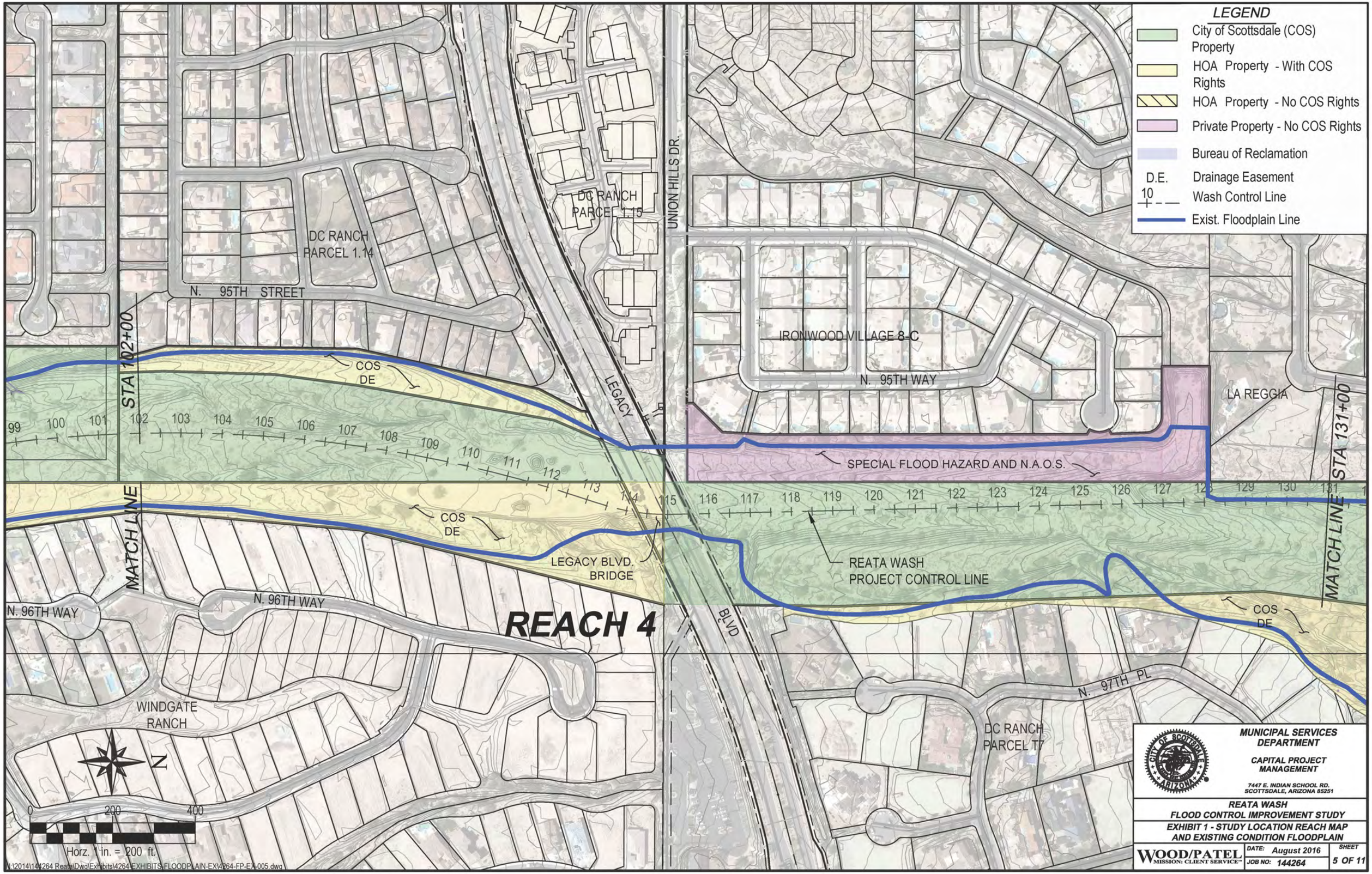
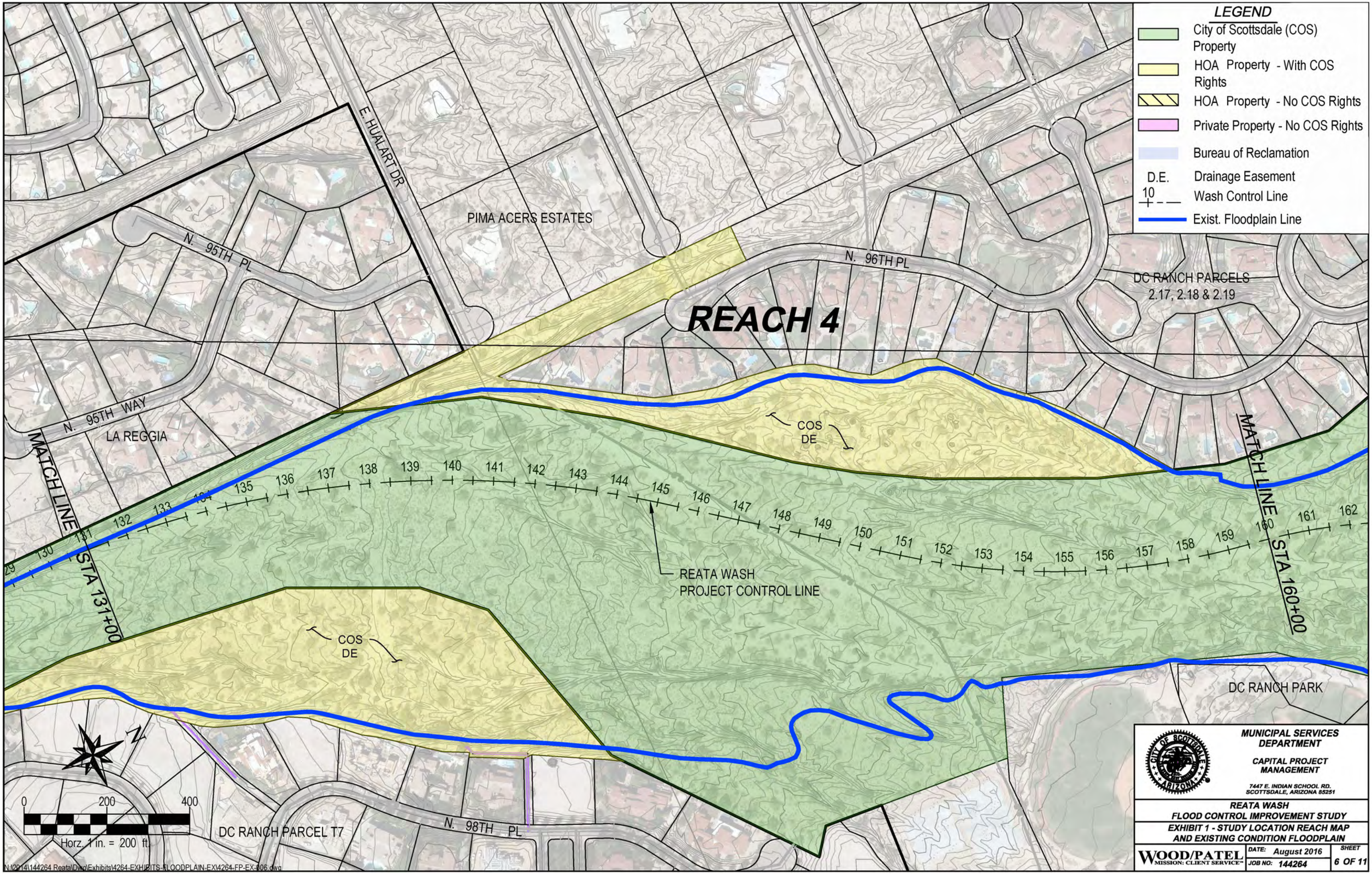

LEGEND
City of Scottsdale (COS) Property
HOA Property - With COS Rights
HOA Property - No COS Rights
Private Property - No COS Rights
Bureau of Reclamation
D.E. Drainage Easement
10 Wash Control Line
Exist. Floodplain Line
DC RANCH PARCEL 1.14
DC RANCH PARCEL 1.15
UNION HILLS DR.
N. 95TH STREET
IRONWOOD VILLAGE 8-C
N. 95TH WAY
LA REGGIA
STA 102+00
STA 131+00
COS DE
SPECIAL FLOOD HAZARD AND N.A.O.S.
99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131
MATCH LINE
MATCH LINE
LEGACY BLVD. BRIDGE
REATA WASH PROJECT CONTROL LINE
N. 96TH WAY
N. 96TH WAY
REACH 4
WINDGATE RANCH
BLVD
N. 97TH PL
DC RANCH PARCEL T7
N
0 200 400
Horz. 1 in. = 200 ft.
N:\2014\144264 Reata\Dwg\Exhibits\4264-EXHIBITS-FLOODPLAIN-EX\4264-FP-EX-005.dwg
MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251
REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP
AND EXISTING CONDITION FLOODPLAIN
WOOD/PATEL
MISSION: CLIENT SERVICE
DATE: August 2016
JOB NO: 144264
SHEET
5 OF 11


LEGEND
City of Scottsdale (COS) Property
HOA Property - With COS Rights
HOA Property - No COS Rights
Private Property - No COS Rights
Bureau of Reclamation
D.E. Drainage Easement
10 Wash Control Line
Exist. Floodplain Line
E. HUALART DR
PIMA ACERS ESTATES
N. 95TH PL
N. 96TH PL
DC RANCH PARCELS 2.17, 2.18 & 2.19
REACH 4
N. 95TH WAY
LA REGGIA
MATCH LINE
STA 131+00
STA 160+00
COS DE
REATA WASH PROJECT CONTROL LINE
DC RANCH PARK
DC RANCH PARCEL T7
N. 98TH PL
N
0 200 400
Horz. 1 in. = 200 ft
MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251
REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP
AND EXISTING CONDITION FLOODPLAIN
WOOD/PATEL
MISSION: CLIENT SERVICE
DATE: August 2016
JOB NO: 144264
SHEET 6 OF 11
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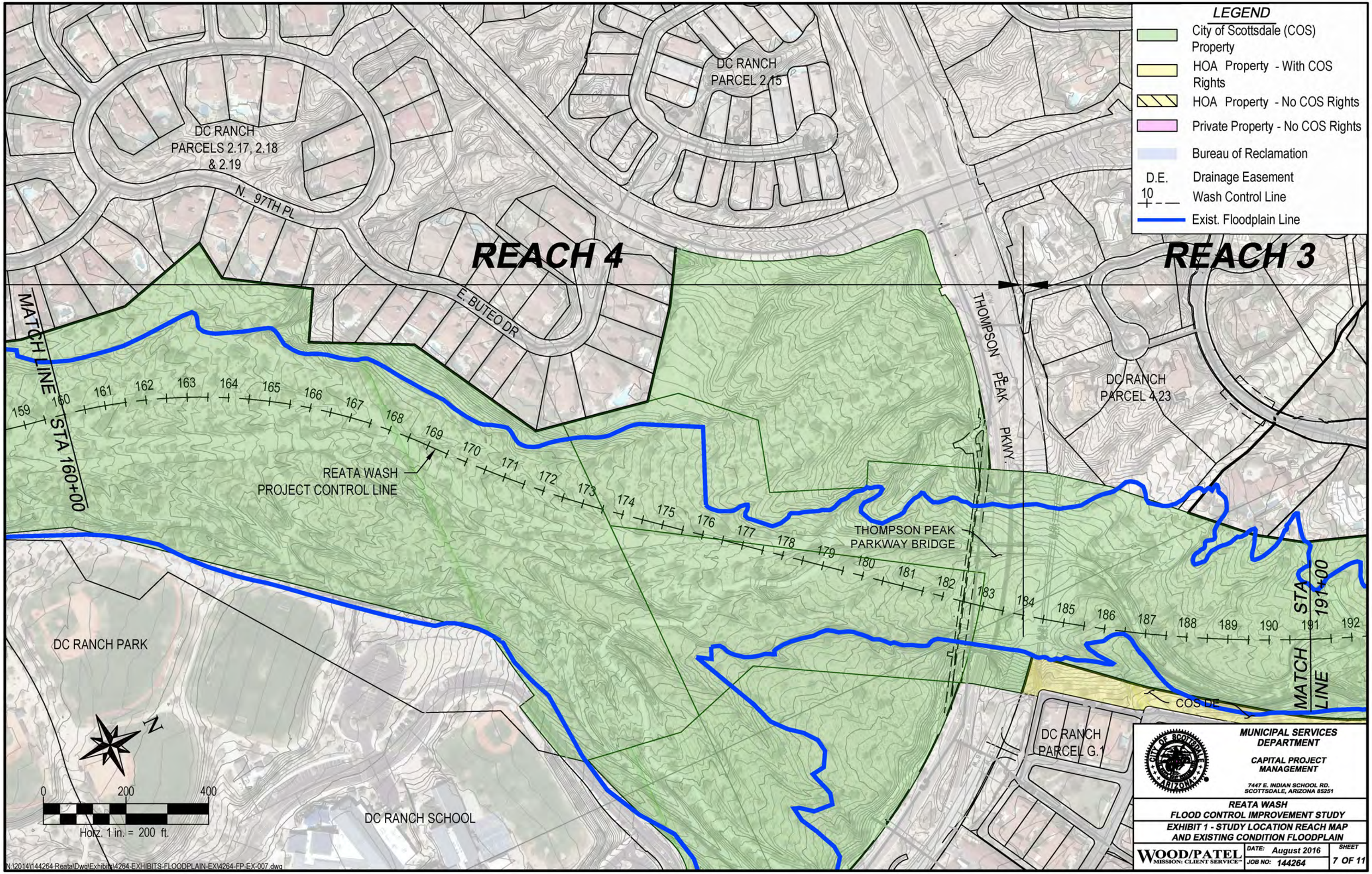
LEGEND
City of Scottsdale (COS) Property
HOA Property - With COS Rights
HOA Property - No COS Rights
Private Property - No COS Rights
Bureau of Reclamation
D.E. Drainage Easement
10 Wash Control Line
Exist. Floodplain Line
REACH 4
REACH 3
DC RANCH PARCELS 2.17, 2.18 & 2.19
DC RANCH PARCEL 2.15
N. 97TH PL
E. BUTEO DR
THOMPSON PEAK PKWY.
DC RANCH PARCEL 4.23
MATCH LINE STA 160+00
159
160
161
162
163
164
165
166
167
168
169
170
171
172
173
174
175
176
177
178
179
180
181
182
183
184
185
186
187
188
189
190
191
192
REATA WASH PROJECT CONTROL LINE
THOMPSON PEAK PARKWAY BRIDGE
MATCH LINE STA 191+00
COS DE
DC RANCH PARK
DC RANCH SCHOOL
DC RANCH PARCEL G.1
N
0
200
400
Horz. 1 in. = 200 ft.
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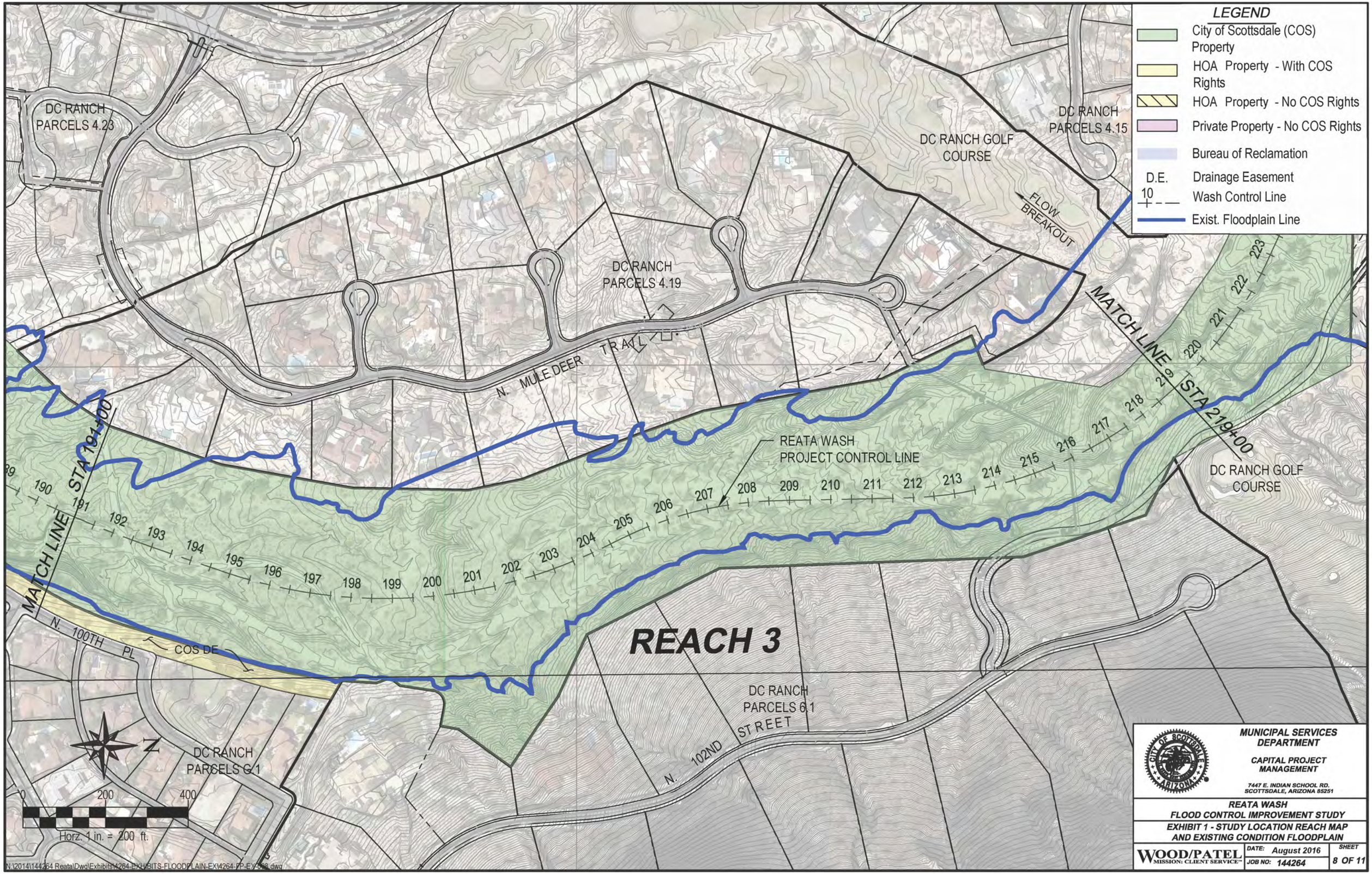
MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251
REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP AND EXISTING CONDITION FLOODPLAIN
WOOD/PATEL
MISSION: CLIENT SERVICE
DATE: August 2016
JOB NO: 144264
SHEET 7 OF 11


LEGEND
City of Scottsdale (COS) Property
HOA Property - With COS Rights
HOA Property - No COS Rights
Private Property - No COS Rights
Bureau of Reclamation
D.E. Drainage Easement
10 Wash Control Line
Exist. Floodplain Line
DC RANCH PARCELS 4.23
DC RANCH PARCELS 4.19
DC RANCH GOLF COURSE
DC RANCH PARCELS 4.15
FLOW BREAKOUT
N. MULE DEER TRAIL
MATCH LINE STA 194+00
MATCH LINE STA 219+00
REATA WASH PROJECT CONTROL LINE
DC RANCH GOLF COURSE
N. 100TH PL
COS DE
DC RANCH PARCELS 6.1
DC RANCH PARCELS 6.1
N. 102ND STREET
REACH 3
N
0
200
400
Horz. 1 in. = 200 ft.
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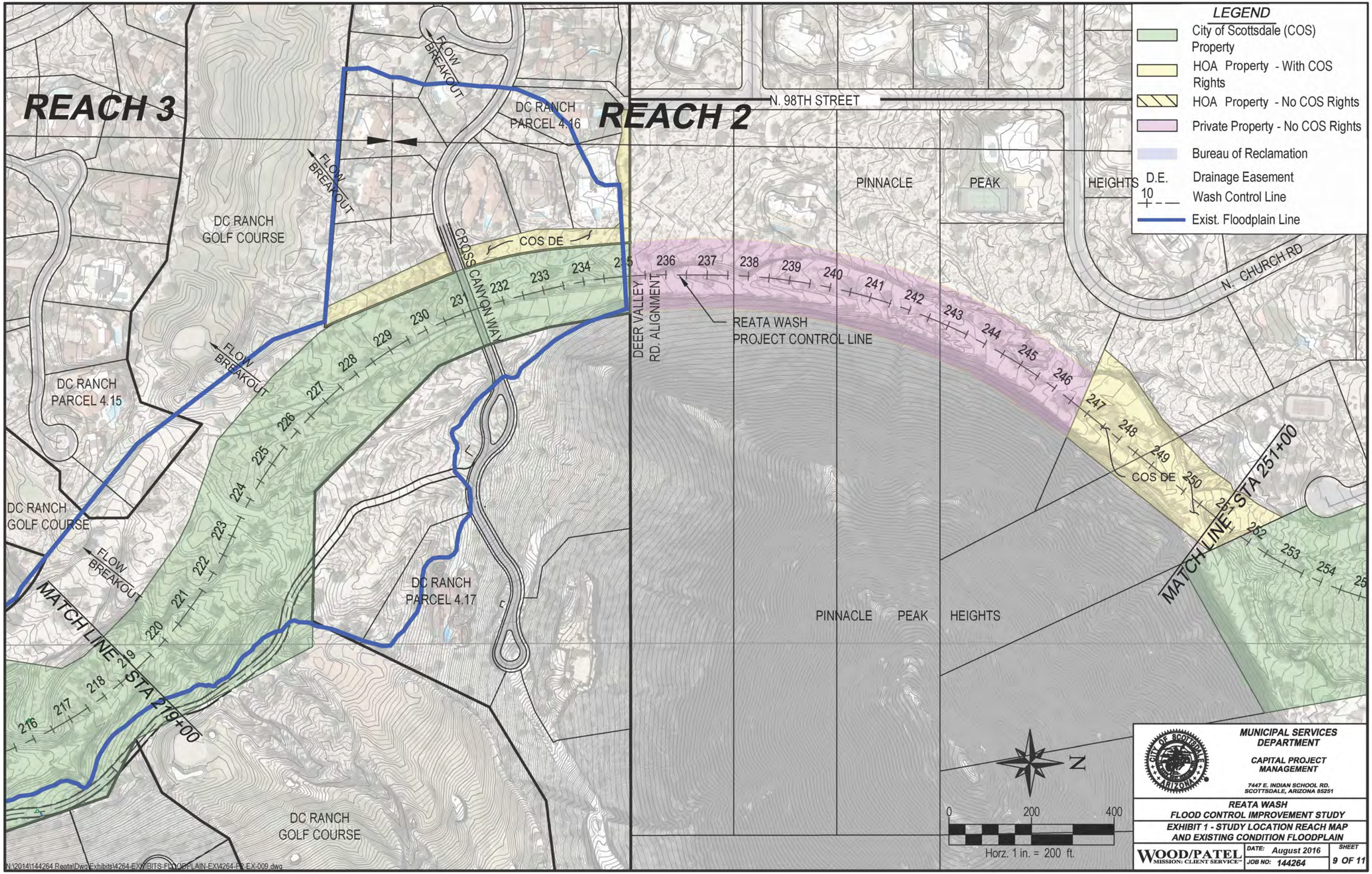
CITY OF SCOTTSDALE ARIZONA
MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251
REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP
AND EXISTING CONDITION FLOODPLAIN
WOOD/PATEL
MISSION: CLIENT SERVICE™
DATE: August 2016
JOB NO: 144264
SHEET
8 OF 11


REACH 3
REACH 2
N. 98TH STREET
DC RANCH PARCEL 4.16
DC RANCH GOLF COURSE
DC RANCH PARCEL 4.15
DC RANCH GOLF COURSE
DC RANCH PARCEL 4.17
DC RANCH GOLF COURSE
FLOW BREAKOUT
FLOW BREAKOUT
FLOW BREAKOUT
FLOW BREAKOUT
CROSS CANYON WAY
COS DE
DEER VALLEY RD. ALIGNMENT
REATA WASH PROJECT CONTROL LINE
N. CHURCH RD
COS DE
MATCH LINE STA 219+00
MATCH LINE STA 251+00
PINNACLE PEAK HEIGHTS
PINNACLE PEAK HEIGHTS
LEGEND
City of Scottsdale (COS) Property
HOA Property - With COS Rights
HOA Property - No COS Rights
Private Property - No COS Rights
Bureau of Reclamation
D.E. Drainage Easement
10 Wash Control Line
Exist. Floodplain Line
N
0
200
400
Horz. 1 in. = 200 ft.
MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251
REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP
AND EXISTING CONDITION FLOODPLAIN
WOOD/PATEL
MISSION: CLIENT SERVICE
DATE: August 2016
JOB NO: 144264
SHEET
9 OF 11
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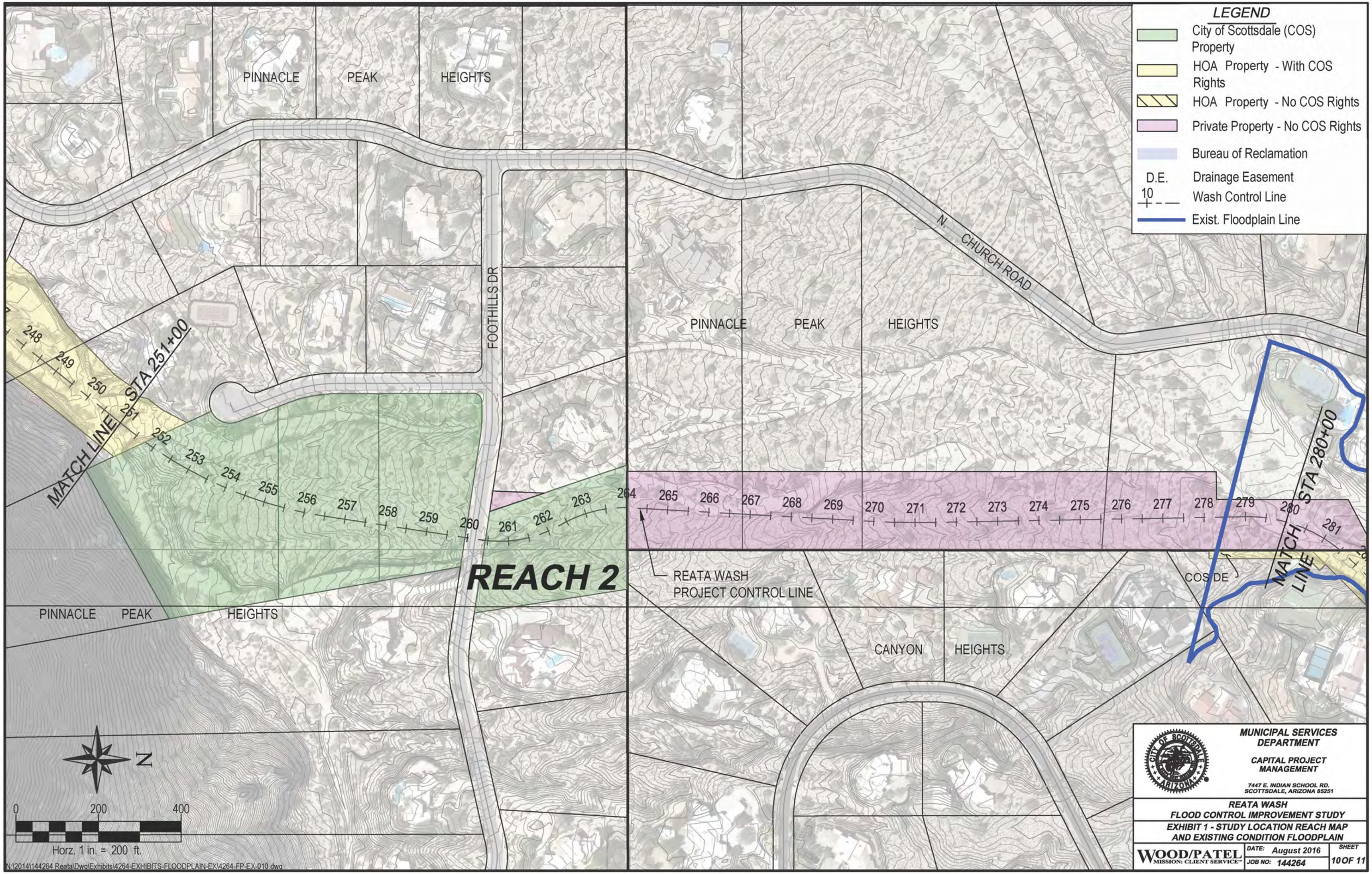
LEGEND
City of Scottsdale (COS) Property
HOA Property - With COS Rights
HOA Property - No COS Rights
Private Property - No COS Rights
Bureau of Reclamation
D.E. Drainage Easement
10 Wash Control Line
Exist. Floodplain Line
PINNACLE PEAK HEIGHTS
FOOTHILLS DR
N. CHURCH ROAD
STA 251+00
MATCH LINE
248
249
250
251
252
253
254
255
256
257
258
259
260
261
262
263
264
265
266
267
268
269
270
271
272
273
274
275
276
277
278
279
280
281
STA 280+00
MATCH LINE
REACH 2
REATA WASH
PROJECT CONTROL LINE
COS DE
CANYON HEIGHTS
N
0
200
400
Horz. 1 in. = 200 ft.
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MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251
REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP
AND EXISTING CONDITION FLOODPLAIN
WOOD/PATEL
MISSION: CLIENT SERVICE™
DATE: August 2016
JOB NO: 144264
SHEET
10 OF 11

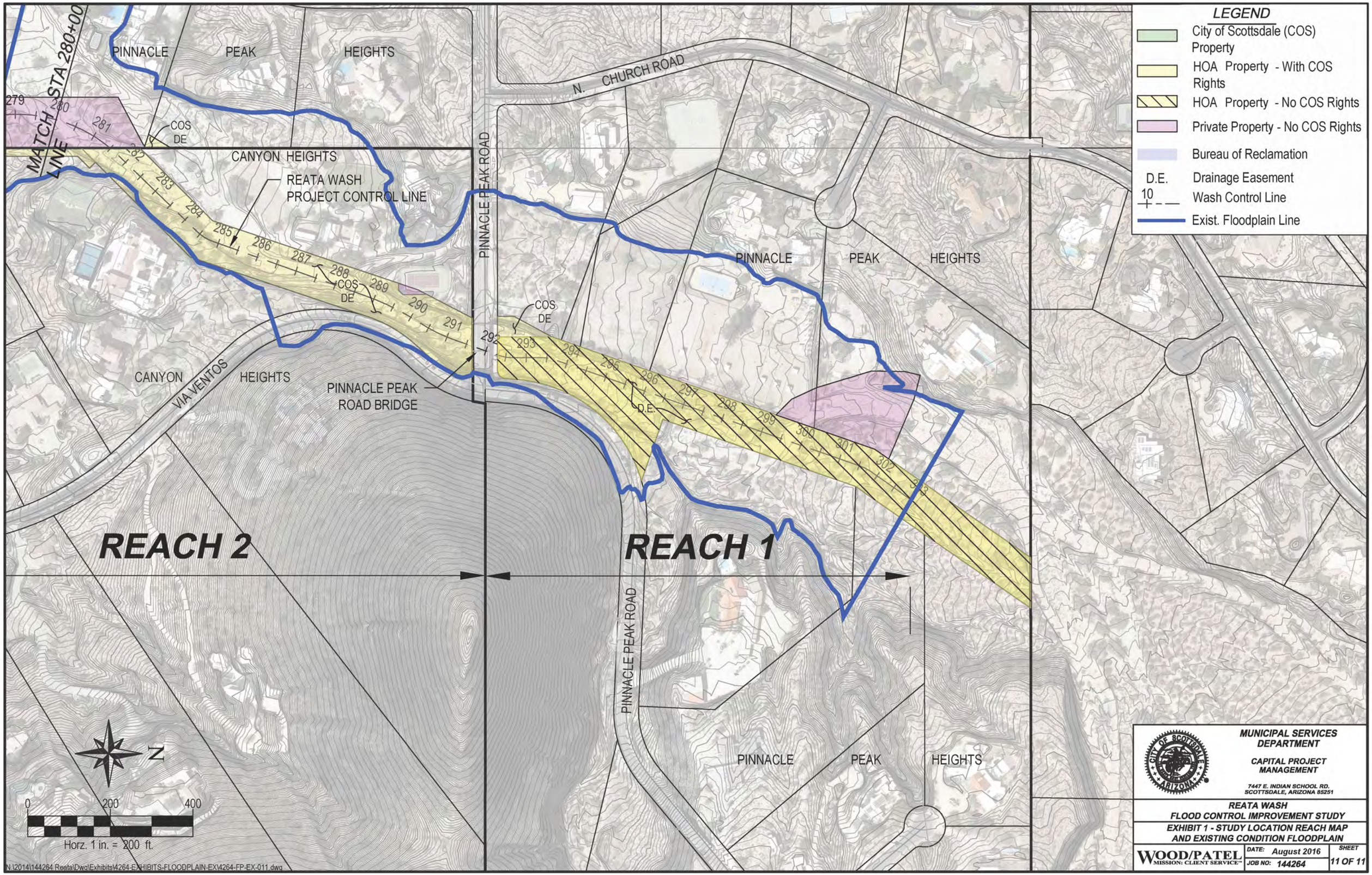

MATCH LINE STA 280+00
PINNACLE PEAK HEIGHTS
N. CHURCH ROAD
PINNACLE PEAK ROAD
CANYON HEIGHTS
REATA WASH
PROJECT CONTROL LINE
COS
DE
D.E.
CANYON VIA VENTOS HEIGHTS
PINNACLE PEAK
ROAD BRIDGE
REACH 2
REACH 1
279
280
281
282
283
284
285
286
287
288
289
290
291
292
293
294
295
296
297
298
299
300
301
302
303
LEGEND
City of Scottsdale (COS) Property
HOA Property - With COS Rights
HOA Property - No COS Rights
Private Property - No COS Rights
Bureau of Reclamation
D.E. Drainage Easement
10 Wash Control Line
Exist. Floodplain Line
N
0
200
400
Horz. 1 in. = 200 ft.
N:\2014\144264\Reata\Dwg\Exhibits\4264-EXHIBITS-FLOODPLAIN-EX\4264-FP-EX-011.dwg
MUNICIPAL SERVICES DEPARTMENT
CAPITAL PROJECT MANAGEMENT
7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251
REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 1 - STUDY LOCATION REACH MAP
AND EXISTING CONDITION FLOODPLAIN
WOOD/PATEL
MISSION: CLIENT SERVICE™
DATE: August 2016
JOB NO: 144264
SHEET
11 OF 11

EXHIBIT 2
HEC-RAS Cross Section Locations and Existing Condition Peak Discharges

REACH 5

REACH 4

REACH 3

REACH 2

REACH 1

CENTRAL

ARIZONA

BOR REACH 11 BASIN 4

BELL ROAD

LEGACY BOULEVARD

THOMPSON PEAK PARKWAY

CROSS CANYON WAY

PEAK ROAD

PINNACLE PEAK ROAD

PIMA ROAD

LOOP 101

PROJECT

CANAL

16+00

60+00

184+00

231+00

292+00

BELL ROAD BRIDGE
Q_{100} = 17,345 cfs

LEGACY BLVD. BRIDGE
Q_{100} = 13,847 cfs

Q_{100} = 14,483 cfs

THOMPSON PEAK PARKWAY BRIDGE
Q_{100} = 13,063 cfs

Q_{100} = 13,371 cfs

Q_{100} = 12,867 cfs

Q_{100} = 13,353 cfs

PINNACLE PEAK ROAD BRIDGE
Q_{100} = 13,015 cfs

PROJECT CONTROL LINE

REATA WASH

STA. 20+00
STA. 30+00
STA. 40+00
STA. 50+00
STA. 60+00
STA. 70+00
STA. 80+00
STA. 90+00
STA. 100+00
STA. 110+00
STA. 120+00
STA. 130+00
STA. 140+00
STA. 150+00
STA. 160+00
STA. 170+00
STA. 180+00
STA. 190+00
STA. 200+00
STA. 210+00
STA. 220+00
STA. 230+00
STA. 240+00
STA. 250+00
STA. 260+00
STA. 270+00
STA. 280+00
STA. 290+00
STA. 300+00
STA. 305+00

SOUTH BEARDSLEY WASH

NORTH BEARDSLEY WASH

SOUTH BEARDSLEY WASH BREAKOUT

STREAM 2A

STREAM 2B

N

0 2000 4000

Horz. 1 in. = 2000 ft.

N:\2014\144264 Reata\Dwg\Exhibits\4264-Exhibit 2-HEC-RAS Existing Cross Sections-Peak Discharges1.dwg

PUBLIC WORKS

CAPITAL PROJECT MANAGEMENT

7447 E. INDIAN SCHOOL RD.
SCOTTSDALE, ARIZONA 85251

REATA WASH
FLOOD CONTROL IMPROVEMENT STUDY
EXHIBIT 2 - HEC-RAS CROSS SECTION LOCATIONS & EXISTING CONDITION PEAK DISCHARGES

WOOD/PATEL
MISSION: CLIENT SERVICE

DATE: August 2016

JOB NO: 144264

SHEET 1 OF 1

APPENDIX A
HEC-RAS Output Tables

APPENDIX A
HEC-RAS Output Tables
Reach 1

Stations 274+00 to 306+00
Model: 4264-EX-R1.prj

HEC-RAS Plan: R1 River: REATA WASH Reach: 4264-010-CL Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
4264-010-CL	30600	PF 1	13015.00	2221.29	2226.56	2226.56	2227.84	0.017224	9.10	1437.35	572.55	1.00
4264-010-CL	30500	PF 1	13015.00	2217.04	2223.68	2223.68	2225.00	0.017079	9.27	1416.29	552.25	1.00
4264-010-CL	30400	PF 1	13015.00	2213.81	2220.18	2220.18	2221.48	0.017320	9.25	1442.52	571.30	1.01
4264-010-CL	30300	PF 1	13015.00	2211.62	2216.92	2216.92	2218.28	0.016711	9.40	1400.07	519.50	1.00
4264-010-CL	30200	PF 1	13015.00	2208.19	2213.63	2213.63	2214.98	0.016642	9.36	1403.78	523.78	1.00
4264-010-CL	30100	PF 1	13015.00	2204.37	2211.28	2211.28	2212.77	0.015873	9.90	1356.14	480.43	0.99
4264-010-CL	30000	PF 1	13015.00	2202.15	2208.19	2208.19	2209.69	0.011907	10.10	1434.60	526.34	0.90
4264-010-CL	29900	PF 1	13015.00	2200.12	2204.27	2204.27	2205.57	0.016854	9.21	1430.08	552.39	1.00
4264-010-CL	29800	PF 1	13015.00	2197.01	2201.42	2201.42	2202.72	0.017266	9.18	1433.62	571.60	1.01
4264-010-CL	29700	PF 1	13015.00	2193.82	2199.17	2199.17	2200.43	0.011467	10.32	1859.92	737.94	0.89
4264-010-CL	29600	PF 1	13015.00	2185.70	2194.24	2194.24	2196.72	0.007124	12.85	1159.48	351.63	0.86
4264-010-CL	29500	PF 1	13015.00	2181.65	2191.53	2191.53	2194.19	0.007840	13.17	1061.09	343.18	0.89
4264-010-CL	29400	PF 1	13015.00	2179.58	2189.97	2189.97	2191.93	0.006353	11.74	1428.88	454.63	0.72
4264-010-CL	29300	PF 1	13015.00	2176.43	2186.32	2186.32	2188.22	0.006857	11.72	1443.43	418.74	0.74
4264-010-CL	29250	PF 1	13015.00	2175.49	2184.80	2184.37	2186.22	0.005396	10.39	1882.04	509.84	0.66
4264-010-CL	29200	PF 1	13015.00	2174.20	2185.33		2185.76	0.002192	5.29	2458.87	456.66	0.40
4264-010-CL	29183.31	PF 1	13015.00	2173.94	2182.87	2181.85	2185.48	0.008624	12.99	1034.34	228.95	0.82
4264-010-CL	29150		Culvert									
4264-010-CL	29140.94	PF 1	13015.00	2172.96	2181.20	2181.20	2184.85	0.013207	15.33	849.01	116.51	1.00
4264-010-CL	29100	PF 1	13015.00	2171.86	2180.72	2180.72	2183.92	0.012208	14.37	921.60	162.43	0.98
4264-010-CL	29000	PF 1	13015.00	2168.90	2178.00	2178.00	2180.00	0.009488	13.25	1364.06	329.55	0.87
4264-010-CL	28900	PF 1	13015.00	2166.71	2176.04	2176.04	2178.53	0.013374	12.69	1034.23	224.97	0.98
4264-010-CL	28800	PF 1	13015.00	2163.89	2173.09	2173.09	2175.18	0.009364	13.48	1359.27	366.44	0.87
4264-010-CL	28700	PF 1	13015.00	2161.59	2169.95	2169.95	2171.60	0.015127	10.70	1327.39	425.37	0.99
4264-010-CL	28600	PF 1	13015.00	2159.41	2166.44	2166.44	2168.02	0.013473	10.99	1409.19	444.06	0.96
4264-010-CL	28500	PF 1	13015.00	2157.73	2163.19	2163.19	2164.81	0.014754	10.30	1288.16	409.00	0.97
4264-010-CL	28400	PF 1	13015.00	2155.19	2160.67	2160.67	2162.48	0.013255	10.93	1250.61	357.12	0.95
4264-010-CL	28300	PF 1	13015.00	2152.37	2158.15	2158.15	2160.13	0.013620	11.42	1183.97	304.27	0.97
4264-010-CL	28200	PF 1	13015.00	2150.04	2155.89	2155.89	2158.16	0.014631	12.27	1094.85	247.81	1.01
4264-010-CL	28100	PF 1	13015.00	2147.17	2154.10	2154.10	2156.27	0.012790	12.01	1154.15	295.49	0.96
4264-010-CL	28000	PF 1	13015.00	2144.03	2151.12	2151.12	2153.19	0.014704	11.59	1135.84	297.92	1.00
4264-010-CL	27900	PF 1	13015.00	2142.38	2148.00	2148.00	2149.69	0.015251	10.52	1271.55	388.44	0.99
4264-010-CL	27800	PF 1	13015.00	2140.44	2145.43	2145.43	2146.78	0.015787	9.53	1445.64	554.17	0.98
4264-010-CL	27700	PF 1	13015.00	2137.91	2142.44	2142.44	2143.73	0.018324	9.27	1450.23	590.13	1.03
4264-010-CL	27600	PF 1	13015.00	2133.99	2139.44	2139.44	2140.77	0.014529	9.48	1466.59	554.23	0.95
4264-010-CL	27500	PF 1	13015.00	2130.21	2135.21	2135.21	2136.41	0.017788	9.05	1510.49	632.79	1.01
4264-010-CL	27400	PF 1	13015.00	2126.99	2131.37	2131.37	2132.52	0.018009	8.89	1517.32	660.38	1.01

APPENDIX A
HEC-RAS Output Tables
Reach 3 North

Stations 235+00 to 228+00
Model: 4264-R3_228 to 235.prj

HEC-RAS Plan: Plan 01 River: Reach 3 Reach: 4264-010-CL Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
4264-010-CL	23500	PF 1	13371.00	1999.20	2006.91	2006.91	2008.90	0.009720	13.35	1272.02	301.36	0.98
4264-010-CL	23400	PF 1	13371.00	1996.71	2003.45	2003.45	2005.06	0.010081	12.82	1434.34	410.25	0.98
4264-010-CL	23300	PF 1	13371.00	1994.82	2000.79	2000.79	2002.31	0.010672	12.00	1453.91	444.94	0.99
4264-010-CL	23200	PF 1	13371.00	1992.12	1998.23	1998.23	1999.80	0.010720	13.27	1580.69	533.32	1.01
4264-010-CL	23100	PF 1	13371.00	1987.71	1994.17	1994.17	1995.42	0.011825	12.35	1628.13	618.87	1.03
4264-010-CL	23000	PF 1	13371.00	1985.03	1991.30	1991.30	1992.57	0.014363	12.48	1550.82	601.68	1.09
4264-010-CL	22900	PF 1	13371.00	1982.24	1988.09	1988.09	1989.35	0.013461	11.09	1598.09	687.13	1.06
4264-010-CL	22800	PF 1	13371.00	1979.06	1984.30	1984.30	1985.42	0.013355	11.82	1685.01	758.65	1.07

APPENDIX A
HEC-RAS Output Tables
Reach 3 East

Stations 228+00 to 212+00
Model: 4264-R3_SplitEast.prj

HEC-RAS Plan: R3-SE River: REATA WASH Reach: 4264-010-CL Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
4264-010-CL	23500	PF 1	13371.00	1999.20	2008.44	2008.44	2011.30	0.008725	14.80	1056.78	183.39	0.97
4264-010-CL	23400	PF 1	13371.00	1996.71	2004.92	2004.92	2007.42	0.009216	14.45	1126.70	215.40	0.98
4264-010-CL	23300	PF 1	13371.00	1994.82	2001.83	2001.83	2004.10	0.010219	13.47	1165.63	254.64	1.00
4264-010-CL	23200	PF 1	13371.00	1992.12	1998.76	1998.76	2000.58	0.010641	14.07	1319.43	331.47	1.03
4264-010-CL	23100	PF 1	13371.00	1987.71	1995.83	1995.83	1997.69	0.009802	13.91	1339.76	338.85	0.99
4264-010-CL	23000	PF 1	13371.00	1985.03	1992.48	1992.48	1994.11	0.011985	13.50	1373.72	389.60	1.04
4264-010-CL	22900	PF 1	13371.00	1982.24	1992.16		1992.55	0.001415	5.91	2787.27	464.63	0.38
4264-010-CL	22800	PF 1	13371.00	1981.20	1989.45	1989.45	1992.02	0.010659	13.26	1063.29	210.00	1.00
4264-010-CL	22700	PF 1	13371.00	1979.06	1987.07	1987.07	1989.41	0.009326	13.38	1165.26	239.77	0.97
4264-010-CL	22600	PF 1	13371.00	1974.80	1982.61	1982.61	1984.76	0.009776	13.32	1218.18	270.00	0.98
4264-010-CL	22500	PF 1	13371.00	1970.38	1977.45	1977.45	1980.25	0.011771	13.72	1026.19	220.00	1.06
4264-010-CL	22400	PF 1	13371.00	1966.35	1973.36	1973.36	1975.90	0.008441	13.23	1103.81	213.84	0.93
4264-010-CL	22300	PF 1	13371.00	1960.89	1968.76	1968.76	1970.89	0.007230	12.84	1269.22	288.12	0.87
4264-010-CL	22200	PF 1	13371.00	1954.68	1962.85	1962.85	1965.31	0.008133	12.93	1134.79	260.37	0.91
4264-010-CL	22100	PF 1	13371.00	1950.13	1957.84	1957.84	1960.25	0.008734	12.78	1133.14	257.46	0.93
4264-010-CL	22000	PF 1	13371.00	1943.50	1951.27	1951.27	1953.70	0.008695	12.79	1120.44	236.65	0.93
4264-010-CL	21900	PF 1	13371.00	1939.31	1947.25	1947.25	1949.84	0.008928	13.15	1078.00	218.94	0.95
4264-010-CL	21800	PF 1	13371.00	1936.30	1943.60	1943.60	1946.23	0.009859	13.14	1050.76	212.09	0.98
4264-010-CL	21700	PF 1	13371.00	1932.27	1940.56	1940.56	1943.16	0.008335	13.26	1092.33	219.36	0.93
4264-010-CL	21600	PF 1	13371.00	1929.22	1938.76	1938.76	1941.71	0.007861	13.94	1018.86	199.18	0.92
4264-010-CL	21500	PF 1	13371.00	1925.40	1933.84	1933.84	1936.88	0.008266	14.19	998.38	178.14	0.94
4264-010-CL	21400	PF 1	13371.00	1922.24	1928.46	1928.46	1931.00	0.009865	12.87	1067.35	222.70	0.98
4264-010-CL	21300	PF 1	13371.00	1919.56	1926.50	1926.50	1929.09	0.009644	13.16	1073.83	221.05	0.98
4264-010-CL	21200	PF 1	13371.00	1917.15	1925.72	1924.87	1927.10	0.006049	9.42	1427.12	307.95	0.75

APPENDIX A
HEC-RAS Output Tables
Reach 3 West

Stations 228+00 to 212+00
Model: 4264-R3_SplitWest.prj

HEC-RAS Plan: R3-SW River: REATA WASH Reach: 4264-010-CL Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
4264-010-CL	23500	PF 1	13371.00	1999.20	2008.44	2008.44	2011.30	0.008725	14.80	1056.78	183.39	0.97
4264-010-CL	23400	PF 1	13371.00	1996.71	2004.92	2004.92	2007.42	0.009216	14.45	1126.70	215.40	0.98
4264-010-CL	23300	PF 1	13371.00	1994.82	2001.83	2001.83	2004.10	0.010219	13.47	1165.63	254.64	1.00
4264-010-CL	23200	PF 1	13371.00	1992.12	1998.76	1998.76	2000.58	0.010641	14.07	1319.43	331.47	1.03
4264-010-CL	23100	PF 1	13371.00	1987.71	1995.83	1995.83	1997.69	0.009802	13.91	1339.76	338.85	0.99
4264-010-CL	23000	PF 1	13371.00	1985.03	1992.48	1992.48	1994.11	0.011985	13.50	1373.72	389.60	1.04
4264-010-CL	22900	PF 1	13371.00	1982.24	1988.35	1988.35	1990.82	0.010848	11.88	1482.32	464.63	0.98
4264-010-CL	22800	PF 1	13371.00	1979.06	1987.27	1987.27	1989.54	0.009613	14.72	1190.05	242.14	0.99
4264-010-CL	22700	PF 1	13371.00	1976.14	1983.64	1983.64	1985.83	0.010384	13.93	1188.78	260.61	1.01
4264-010-CL	22600	PF 1	13371.00	1972.82	1979.91	1979.91	1982.18	0.010396	14.63	1169.54	246.52	1.03
4264-010-CL	22500	PF 1	13371.00	1969.19	1977.38	1977.38	1979.59	0.007514	13.58	1249.91	258.36	0.89
4264-010-CL	22400	PF 1	13371.00	1965.13	1973.28	1973.28	1975.18	0.007465	13.77	1383.80	316.03	0.90
4264-010-CL	22300	PF 1	13371.00	1960.47	1967.60	1967.60	1969.85	0.009923	14.31	1188.25	254.00	1.00
4264-010-CL	22200	PF 1	13371.00	1956.44	1965.02	1965.02	1967.18	0.006885	12.93	1273.03	275.99	0.86
4264-010-CL	22100	PF 1	13371.00	1952.04	1960.93	1960.93	1963.60	0.006962	13.88	1122.09	208.18	0.88
4264-010-CL	22000	PF 1	13371.00	1949.35	1957.27	1957.27	1960.11	0.008267	13.87	1029.44	191.02	0.93
4264-010-CL	21900	PF 1	13371.00	1946.06	1953.94	1953.94	1956.87	0.008942	13.92	1015.19	208.44	0.96
4264-010-CL	21800	PF 1	13371.00	1941.09	1948.76	1948.76	1951.45	0.010294	13.16	1018.34	193.30	1.00
4264-010-CL	21700	PF 1	13371.00	1938.81	1946.31	1946.31	1949.06	0.009764	13.37	1016.62	189.86	0.98
4264-010-CL	21600	PF 1	13371.00	1935.28	1944.27	1944.27	1947.58	0.008118	14.71	962.57	182.58	0.92
4264-010-CL	21500	PF 1	13371.00	1931.72	1940.51	1940.51	1943.86	0.009371	14.73	919.38	143.49	0.98
4264-010-CL	21400	PF 1	13371.00	1928.41	1937.75	1937.75	1941.29	0.008695	15.20	906.99	134.49	0.97
4264-010-CL	21300	PF 1	13371.00	1924.47	1932.75	1932.75	1935.95	0.009384	14.53	954.79	154.22	0.97
4264-010-CL	21200	PF 1	13371.00	1917.15	1925.72	1924.87	1927.10	0.006049	9.42	1427.12	307.95	0.75

APPENDIX A
HEC-RAS Output Tables
Reach 3 South and Reaches 4 & 5

Stations 212+00 to 16+00
Model: 4264-EX-R3 to R5.prj

HEC-RAS Plan: EX-R3toR5 River: REATA WASH Reach: 4264-010-CL Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
4264-010-CL	21200	PF 1	13371.00	1917.08	1925.72	1925.72	1928.36	0.009131	13.30	1087.76	337.34	0.96
4264-010-CL	21100	PF 1	13371.00	1915.11	1920.02	1921.89	1926.28	0.043133	20.46	713.95	263.77	1.92
4264-010-CL	21000	PF 1	13371.00	1912.39	1917.59	1919.03	1922.37	0.028401	18.20	834.87	264.12	1.59
4264-010-CL	20900	PF 1	13371.00	1908.90	1914.17	1915.76	1919.37	0.030691	19.33	804.71	325.46	1.66
4264-010-CL	20800	PF 1	13371.00	1905.55	1909.21	1911.02	1915.25	0.055877	19.77	688.98	265.99	2.09
4264-010-CL	20700	PF 1	13371.00	1902.02	1906.78	1907.92	1910.80	0.028218	16.13	838.34	255.99	1.54
4264-010-CL	20600	PF 1	13371.00	1899.35	1903.48	1904.76	1907.64	0.035413	16.94	863.48	333.95	1.70
4264-010-CL	20500	PF 1	13371.00	1895.74	1900.06	1901.26	1904.11	0.034629	16.15	829.45	290.72	1.66
4264-010-CL	20400	PF 1	13371.00	1891.92	1897.19	1898.43	1900.89	0.028327	15.44	879.00	298.31	1.52
4264-010-CL	20300	PF 1	13371.00	1889.85	1894.38	1895.45	1898.12	0.026792	16.02	912.61	300.80	1.51
4264-010-CL	20200	PF 1	13371.00	1888.61	1892.17	1893.45	1895.87	0.019014	15.81	987.16	421.32	1.32
4264-010-CL	20100	PF 1	13371.00	1883.38	1890.28	1890.91	1894.11	0.016101	15.82	883.81	464.82	1.24
4264-010-CL	20000	PF 1	13371.00	1881.30	1884.08	1885.82	1890.34	0.131676	22.60	702.94	408.12	2.98
4264-010-CL	19900	PF 1	13371.00	1877.74	1882.24	1882.81	1884.77	0.022053	13.95	1128.50	388.34	1.35
4264-010-CL	19800	PF 1	13371.00	1874.11	1879.38	1880.27	1882.46	0.022907	14.94	1035.21	368.39	1.40
4264-010-CL	19700	PF 1	13371.00	1871.10	1878.05	1878.37	1880.48	0.014444	13.37	1167.43	408.80	1.14
4264-010-CL	19600	PF 1	13371.00	1869.56	1876.00	1876.75	1878.88	0.016820	14.91	1134.93	418.14	1.24
4264-010-CL	19500	PF 1	13371.00	1868.18	1874.57	1875.31	1877.29	0.014251	14.05	1162.87	433.94	1.15
4264-010-CL	19400	PF 1	13371.00	1866.03	1871.75	1872.83	1875.30	0.026460	17.40	1073.30	417.60	1.53
4264-010-CL	19300	PF 1	13371.00	1863.64	1869.71	1870.49	1872.72	0.021992	15.41	1073.20	346.52	1.38
4264-010-CL	19200	PF 1	13371.00	1861.08	1866.98	1868.01	1870.58	0.020374	15.28	904.05	287.87	1.34
4264-010-CL	19100	PF 1	13371.00	1857.52	1866.86	1866.86	1869.17	0.008080	12.46	1209.43	310.36	0.90
4264-010-CL	19000	PF 1	13371.00	1855.58	1864.38	1865.46	1867.95	0.015660	17.75	1170.53	374.26	1.25
4264-010-CL	18900	PF 1	13371.00	1852.15	1861.72	1863.32	1866.11	0.019850	19.60	1032.73	320.83	1.40
4264-010-CL	18800	PF 1	13371.00	1850.34	1858.99	1860.48	1863.89	0.023910	21.11	954.33	282.75	1.53
4264-010-CL	18700	PF 1	13371.00	1848.20	1854.37	1856.25	1860.58	0.043577	23.69	841.05	320.13	1.98
4264-010-CL	18600	PF 1	13371.00	1844.48	1852.48	1853.91	1856.91	0.023716	17.15	862.55	317.56	1.46
4264-010-CL	18500	PF 1	13063.00	1842.56	1849.19	1850.88	1854.11	0.032630	18.07	781.42	276.34	1.67
4264-010-CL	18400	PF 1	13063.00	1840.18	1847.99	1848.88	1851.11	0.019209	15.05	997.44	327.52	1.31
4264-010-CL	18345	PF 1	13063.00	1838.78	1848.72	1847.55	1849.79	0.004242	9.18	1680.46	355.80	0.66
4264-010-CL	18322		Bridge									
4264-010-CL	18300	PF 1	13063.00	1837.67	1845.62	1846.52	1848.88	0.027251	15.71	973.68	315.91	1.36
4264-010-CL	18200	PF 1	13063.00	1834.23	1841.94	1842.95	1845.41	0.045079	14.94	874.58	333.02	1.62
4264-010-CL	18100	PF 1	13063.00	1832.60	1839.70	1840.10	1842.08	0.021455	12.40	1063.03	319.69	1.17
4264-010-CL	18000	PF 1	13063.00	1830.72	1836.94	1837.50	1839.79	0.023495	13.55	964.28	260.23	1.24
4264-010-CL	17900	PF 1	13063.00	1828.18	1834.45	1835.09	1837.23	0.027525	13.37	977.02	304.24	1.31
4264-010-CL	17800	PF 1	13063.00	1826.34	1832.52	1832.84	1834.75	0.019850	12.00	1091.15	320.12	1.13
4264-010-CL	17700	PF 1	13063.00	1824.08	1828.84	1830.29	1832.40	0.026880	13.33	983.18	323.18	1.30
4264-010-CL	17600	PF 1	13063.00	1821.57	1828.32	1828.41	1830.28	0.013879	11.43	1200.17	420.99	0.98
4264-010-CL	17500	PF 1	13063.00	1819.18	1825.63	1826.45	1828.43	0.023399	14.15	1102.59	473.43	1.25
4264-010-CL	17400	PF 1	13063.00	1817.31	1822.85	1823.89	1825.73	0.031087	14.14	1018.27	408.08	1.40
4264-010-CL	17300	PF 1	13063.00	1814.84	1820.28	1821.12	1822.99	0.023430	14.04	1042.97	540.13	1.25
4264-010-CL	17200	PF 1	14483.00	1812.56	1816.92	1817.80	1819.94	0.038851	15.12	1086.79	455.88	1.54
4264-010-CL	17100	PF 1	14483.00	1810.08	1814.98	1815.32	1817.01	0.019102	12.80	1356.54	446.42	1.13
4264-010-CL	17000	PF 1	14483.00	1808.97	1810.93	1811.89	1814.03	0.047461	15.74	1073.04	497.22	1.68
4264-010-CL	16900	PF 1	14483.00	1802.94	1808.77	1808.96	1810.45	0.022481	10.82	1407.51	541.78	1.16
4264-010-CL	16800	PF 1	14483.00	1799.46	1805.78	1806.25	1807.84	0.029816	12.05	1277.93	521.66	1.32
4264-010-CL	16700	PF 1	14483.00	1798.06	1803.10	1803.51	1805.00	0.026248	11.93	1355.98	553.73	1.25
4264-010-CL	16600	PF 1	14483.00	1795.14	1799.77	1800.42	1802.16	0.029645	12.73	1224.78	528.07	1.33
4264-010-CL	16500	PF 1	14483.00	1792.83	1797.84	1798.17	1799.65	0.018922	11.44	1436.74	555.81	1.10
4264-010-CL	16400	PF 1	14483.00	1790.16	1795.08	1795.87	1797.29	0.028980	12.87	1291.56	582.48	1.32
4264-010-CL	16300	PF 1	14483.00	1787.76	1792.84	1793.15	1794.63	0.022414	12.08	1414.46	546.42	1.19
4264-010-CL	16200	PF 1	14483.00	1785.16	1789.98	1790.48	1792.27	0.023993	12.62	1241.83	481.51	1.23
4264-010-CL	16100	PF 1	14483.00	1782.55	1787.82	1788.25	1790.00	0.020909	12.95	1308.31	449.24	1.18
4264-010-CL	16000	PF 1	14483.00	1780.21	1785.29	1785.80	1787.62	0.026984	12.28	1188.32	425.73	1.28
4264-010-CL	15900	PF 1	14483.00	1778.54	1783.02	1783.39	1785.16	0.021557	11.81	1247.82	418.20	1.16
4264-010-CL	15800	PF 1	14483.00	1775.69	1780.46	1780.98	1782.79	0.025655	12.29	1198.13	450.51	1.25
4264-010-CL	15700	PF 1	14483.00	1773.65	1777.79	1778.29	1779.92	0.030924	11.71	1237.03	515.26	1.33
4264-010-CL	15600	PF 1	14483.00	1770.37	1775.10	1775.46	1776.95	0.027014	11.16	1341.22	582.89	1.25
4264-010-CL	15500	PF 1	14483.00	1768.18	1772.43	1772.77	1774.19	0.027677	10.69	1368.61	610.41	1.25
4264-010-CL	15400	PF 1	14483.00	1764.45	1770.81	1770.81	1772.06	0.017444	9.04	1630.35	677.04	1.01
4264-010-CL	15300	PF 1	14483.00	1762.83	1767.89	1768.32	1769.66	0.033459	10.67	1360.74	694.36	1.34
4264-010-CL	15200	PF 1	14483.00	1760.15	1765.76	1765.82	1766.96	0.019810	8.79	1650.60	769.27	1.05
4264-010-CL	15100	PF 1	14483.00	1758.33	1763.00	1763.30	1764.53	0.029757	9.96	1465.80	764.63	1.26
4264-010-CL	14965.18	PF 1	14271.00	1755.32	1760.49	1760.49	1761.58	0.019342	8.41	1704.59	795.13	1.03
4264-010-CL	14900	PF 1	14271.00	1753.81	1758.63	1758.87	1760.08	0.027638	9.55	1491.67	747.46	1.21
4264-010-CL	14800	PF 1	14271.00	1751.69	1756.58	1756.63	1757.77	0.018156	8.82	1639.96	778.54	1.01
4264-010-CL	14700	PF 1	14271.00	1749.33	1753.78	1754.22	1755.52	0.027262	10.61	1353.48	691.89	1.24
4264-010-CL	14600	PF 1	14271.00	1746.37	1751.22	1751.72	1752.96	0.024099	11.22	1420.27	695.09	1.20
4264-010-CL	14500	PF 1	14271.00	1744.85	1748.90	1749.27	1750.54	0.023660	10.92	1471.17	732.79	1.18
4264-010-CL	14400	PF 1	14271.00	1741.82	1746.78	1747.14	1748.38	0.019647	11.02	1520.04	726.04	1.10
4264-010-CL	14300	PF 1	14271.00	1739.41	1744.32	1744.81	1746.13	0.025792	12.15	1504.95	827.54	1.25
4264-010-CL	14200	PF 1	14271.00	1737.16	1742.03	1742.38	1743.53	0.024523	11.25	1591.67	838.92	1.21
4264-010-CL	14100	PF 1	14271.00	1735.08	1739.19	1739.55	1740.74	0.031767	10.98	1474.15	807.87	1.32
4264-010-CL	14000	PF 1	14271.00	1733.04	1737.18	1737.18	1738.25	0.020049	8.94	1749.82	836.32	1.06
4264-010-CL	13900	PF 1	14271.00	1730.73	1734.53	1734.76	1735.88	0.027429	10.13	1559.64	800.62	1.23
4264-010-CL	13835.07	PF 1	14271.00	1728.47	1733.08	1733.18	1734.30	0.020792	8.90	1619.62	766.56	1.07
4264-010-CL	13700	PF 1	14271.00	1725.25	1730.13	1730.23	1731.48	0.020928	9.33	1537.83	678.22	1.09
4264-010-CL	13600	PF 1	14271.00	1723.39	1727.75	1727.97	1729.30	0.022311	10.08	1442.33	612.02	1.13

HEC-RAS Plan: EX-R3toR5 River: REATA WASH Reach: 4264-010-CL Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
4264-010-CL	13500	PF 1	14271.00	1719.92	1725.27	1725.54	1726.99	0.023626	10.58	1370.19	567.89	1.17
4264-010-CL	13400	PF 1	14271.00	1717.88	1723.53	1723.58	1725.00	0.017381	9.82	1481.90	540.81	1.03
4264-010-CL	13300	PF 1	14059.00	1715.78	1721.43	1721.62	1723.13	0.019769	10.55	1360.18	498.94	1.10
4264-010-CL	13200	PF 1	14059.00	1713.53	1719.21	1719.46	1721.09	0.020777	11.07	1283.89	443.40	1.13
4264-010-CL	13100	PF 1	14059.00	1710.53	1716.47	1716.95	1718.91	0.021791	12.84	1155.92	362.32	1.18
4264-010-CL	13000	PF 1	14059.00	1707.82	1715.07	1715.13	1717.15	0.014284	11.94	1253.41	317.44	1.00
4264-010-CL	12900	PF 1	14059.00	1705.97	1712.60	1713.10	1715.39	0.020187	13.91	1086.22	287.95	1.18
4264-010-CL	12800	PF 1	14059.00	1702.17	1710.98	1711.38	1713.57	0.015524	13.25	1135.50	280.50	1.06
4264-010-CL	12700	PF 1	14059.00	1699.71	1707.43	1708.56	1711.45	0.026177	16.21	898.86	241.83	1.35
4264-010-CL	12600	PF 1	14059.00	1697.60	1702.06	1703.77	1707.62	0.055106	21.02	781.97	260.71	1.91
4264-010-CL	12545.24	PF 1	14059.00	1696.40	1701.85	1702.53	1704.93	0.025126	14.59	1005.91	258.88	1.30
4264-010-CL	12400	PF 1	14059.00	1693.12	1699.89	1699.31	1701.80	0.018130	13.80	1043.91	242.65	1.13
4264-010-CL	12289.17	PF 1	14059.00	1690.57	1696.45	1697.08	1699.63	0.020482	14.49	1002.83	241.48	1.20
4264-010-CL	12200	PF 1	14059.00	1687.43	1693.67	1694.66	1697.49	0.026701	15.86	912.67	232.08	1.36
4264-010-CL	12100	PF 1	14059.00	1685.62	1691.26	1692.14	1694.86	0.024673	15.40	941.64	236.43	1.31
4264-010-CL	12033.11	PF 1	14059.00	1683.38	1689.46	1690.39	1693.17	0.025500	15.68	930.63	235.81	1.33
4264-010-CL	11900	PF 1	14059.00	1680.42	1686.59	1687.33	1688.99	0.021186	15.05	975.34	231.56	1.23
4264-010-CL	11777	PF 1	14059.00	1677.50	1683.57	1684.46	1687.22	0.023353	15.66	943.22	228.64	1.29
4264-010-CL	11665.28	PF 1	13847.00	1674.76	1680.29	1681.36	1684.28	0.029108	16.11	873.35	228.44	1.41
4264-010-CL	11614.66	PF 1	13847.00	1672.74	1679.31	1680.08	1682.86	0.023319	15.14	923.38	217.07	1.27
4264-010-CL	11600.41	PF 1	13847.00	1672.29	1678.89	1679.62	1682.37	0.022617	15.07	935.82	218.90	1.26
4264-010-CL	11582.03	PF 1	13847.00	1671.63	1677.69	1678.70	1681.61	0.027990	16.02	883.77	221.61	1.38
4264-010-CL	11567.48	PF 1	13847.00	1672.33	1676.49	1677.72	1680.90	0.024125	17.06	836.74	214.02	1.47
4264-010-CL	11561.97	PF 1	13847.00	1672.33	1676.51	1677.72	1680.83	0.004312	16.89	841.18	214.15	1.46
4264-010-CL	11545.46	PF 1	13847.00	1668.58	1676.15	1674.01	1676.93	0.000263	7.24	1993.84	228.88	0.41
4264-010-CL	11539.95	PF 1	13847.00	1668.57	1677.93	1674.13	1678.91	0.000326	7.94	1775.71	234.49	0.46
4264-010-CL	11516.11		Culvert									
4264-010-CL	11492.27	PF 1	13847.00	1668.34	1674.81		1676.86	0.006097	11.51	1211.74	189.03	0.80
4264-010-CL	11376.89	PF 1	13847.00	1666.90	1674.35	1673.70	1676.48	0.006202	12.25	1248.30	215.73	0.81
4264-010-CL	11316.65	PF 1	13847.00	1666.71	1673.30	1673.30	1676.00	0.008945	13.77	1115.62	219.74	0.96
4264-010-CL	11271.2	PF 1	13847.00	1666.35	1672.15	1672.66	1675.31	0.012819	15.18	1027.92	223.64	1.13
4264-010-CL	11130.61	PF 1	13847.00	1665.98	1672.26	1671.88	1673.90	0.008583	10.50	1406.40	390.53	0.88
4264-010-CL	11000	PF 1	13847.00	1665.85	1670.86	1670.86	1672.54	0.012816	10.84	1350.37	413.37	1.04
4264-010-CL	10900	PF 1	13847.00	1663.18	1667.80	1668.50	1670.48	0.033406	13.28	1062.69	399.55	1.41
4264-010-CL	10800	PF 1	13847.00	1658.90	1665.76	1666.01	1667.72	0.020054	11.35	1247.17	407.99	1.12
4264-010-CL	10700	PF 1	13847.00	1657.70	1663.51	1663.86	1665.60	0.022229	11.70	1206.01	406.23	1.17
4264-010-CL	10600	PF 1	13847.00	1655.47	1661.13	1661.52	1663.31	0.023390	11.99	1178.95	395.87	1.20
4264-010-CL	10500	PF 1	13847.00	1653.85	1659.03	1659.33	1661.08	0.020653	11.81	1218.56	396.45	1.14
4264-010-CL	10400	PF 1	13847.00	1651.44	1656.29	1656.83	1658.73	0.025986	12.64	1115.85	376.28	1.27
4264-010-CL	10300	PF 1	13847.00	1647.53	1654.23	1654.53	1656.34	0.020441	11.81	1199.65	373.30	1.14
4264-010-CL	10200	PF 1	13847.00	1645.71	1651.93	1652.31	1654.23	0.021354	12.37	1150.58	350.10	1.17
4264-010-CL	10100	PF 1	13847.00	1644.68	1650.69	1650.54	1652.51	0.011073	11.25	1347.65	335.26	0.90
4264-010-CL	10000	PF 1	13847.00	1641.70	1649.46	1649.46	1651.40	0.010737	11.96	1351.32	342.48	0.90
4264-010-CL	9900	PF 1	13847.00	1640.80	1648.23	1648.27	1650.28	0.011619	12.99	1321.23	321.24	0.94
4264-010-CL	9800	PF 1	13847.00	1639.81	1645.27	1646.11	1648.43	0.028779	15.43	1020.75	321.70	1.39
4264-010-CL	9700	PF 1	13847.00	1639.00	1644.11	1644.18	1646.04	0.018567	11.98	1271.93	350.68	1.06
4264-010-CL	9600	PF 1	13847.00	1638.96	1641.11	1641.77	1643.79	0.029870	13.26	1063.89	370.29	1.36
4264-010-CL	9500	PF 1	13847.00	1634.00	1639.05	1639.36	1641.11	0.021210	11.74	1216.59	396.22	1.16
4264-010-CL	9400	PF 1	13847.00	1632.04	1636.39	1636.90	1638.67	0.027824	12.20	1152.38	429.68	1.29
4264-010-CL	9300	PF 1	13847.00	1629.23	1634.93	1634.93	1636.49	0.016307	10.07	1384.32	457.00	1.01
4264-010-CL	9200	PF 1	13847.00	1628.06	1632.60	1632.95	1634.57	0.022365	11.37	1256.57	476.51	1.17
4264-010-CL	9100	PF 1	13847.00	1624.94	1630.25	1630.64	1632.24	0.024176	11.41	1243.60	481.45	1.21
4264-010-CL	9000	PF 1	13847.00	1623.73	1629.04	1629.04	1630.54	0.013911	9.99	1458.16	494.60	0.95
4264-010-CL	8900	PF 1	13847.00	1621.37	1627.34	1626.87	1628.79	0.009251	9.92	1517.50	439.12	0.81
4264-010-CL	8800	PF 1	13847.00	1619.06	1625.88	1625.88	1627.88	0.007889	11.85	1362.06	392.64	0.88
4264-010-CL	8700	PF 1	13847.00	1616.49	1623.62	1624.59	1626.75	0.013447	15.18	1190.50	493.12	1.15
4264-010-CL	8600	PF 1	13847.00	1614.87	1622.10	1623.13	1625.22	0.017397	15.86	1152.28	437.92	1.28
4264-010-CL	8500	PF 1	13847.00	1613.79	1620.12	1621.11	1623.32	0.020609	15.69	1096.96	426.03	1.36
4264-010-CL	8364.13	PF 1	13847.00	1611.45	1618.23	1618.94	1620.84	0.014180	14.99	1277.92	463.34	1.16
4264-010-CL	8300	PF 1	13847.00	1609.97	1616.59	1617.55	1619.74	0.019017	17.01	1155.68	425.11	1.34
4264-010-CL	8200	PF 1	13847.00	1607.14	1613.73	1614.83	1617.46	0.026344	17.63	1024.53	405.52	1.53
4264-010-CL	8100	PF 1	13847.00	1604.59	1611.86	1612.80	1615.11	0.018760	16.23	1097.13	379.39	1.32
4264-010-CL	8032.6	PF 1	13847.00	1603.79	1610.14	1611.20	1613.71	0.022084	16.86	1038.07	373.16	1.42
4264-010-CL	7900	PF 1	13847.00	1601.53	1607.56	1608.34	1610.45	0.023950	13.81	1051.13	343.26	1.26
4264-010-CL	7800	PF 1	13847.00	1599.88	1606.30	1606.48	1608.37	0.014622	12.16	1267.46	348.19	1.01
4264-010-CL	7700	PF 1	13847.00	1597.86	1603.78	1604.40	1606.56	0.021009	13.89	1076.93	318.24	1.20
4264-010-CL	7600	PF 1	13847.00	1596.17	1602.09	1602.42	1604.43	0.019097	12.31	1139.89	320.15	1.12
4264-010-CL	7500	PF 1	13847.00	1594.68	1600.67	1600.72	1602.76	0.014679	11.82	1221.50	312.76	1.01
4264-010-CL	7361.78	PF 1	13847.00	1592.05	1597.45	1598.00	1600.21	0.022597	13.54	1057.27	298.57	1.23
4264-010-CL	7300	PF 1	13847.00	1589.54	1595.89	1596.50	1598.79	0.022680	14.25	1047.90	292.15	1.24
4264-010-CL	7200	PF 1	13847.00	1586.99	1595.17	1595.17	1597.31	0.010192	12.34	1282.21	299.25	0.89
4264-010-CL	7100	PF 1	13847.00	1585.73	1592.72	1593.48	1595.82	0.020130	14.83	1053.08	297.94	1.20
4264-010-CL	7000	PF 1	13847.00	1583.87	1589.76	1590.82	1593.22	0.033719	15.16	948.55	312.20	1.47
4264-010-CL	6900	PF 1	13847.00	1580.67	1588.43	1588.72	1590.46	0.017066	11.85	1270.09	401.36	1.07
4264-010-CL	6800	PF 1	13847.00	1579.16	1586.74	1587.02	1588.77	0.016777	11.64	1268.38	430.01	1.05
4264-010-CL	6700	PF 1	13847.00	1577.99	1585.21	1585.58	1587.10	0.015865	11.37	1367.95	563.74	1.02
4264-010-CL	6600	PF 1	17345.00	1576.91	1583.57	1584.03	1585.69	0.012708	12.58	1660.40	589.52	1.07
4264-010-CL	6500	PF 1	17345.00	1574.28	1581.31	1582.10	1584.07	0.019230	13.81	1404.13	559.76	1.28
4264-010-CL	6400	PF 1	17345.00	1572.84	1580.10	1580.51	1582.19	0.014867	11.90	1582.86	587.42	1.12

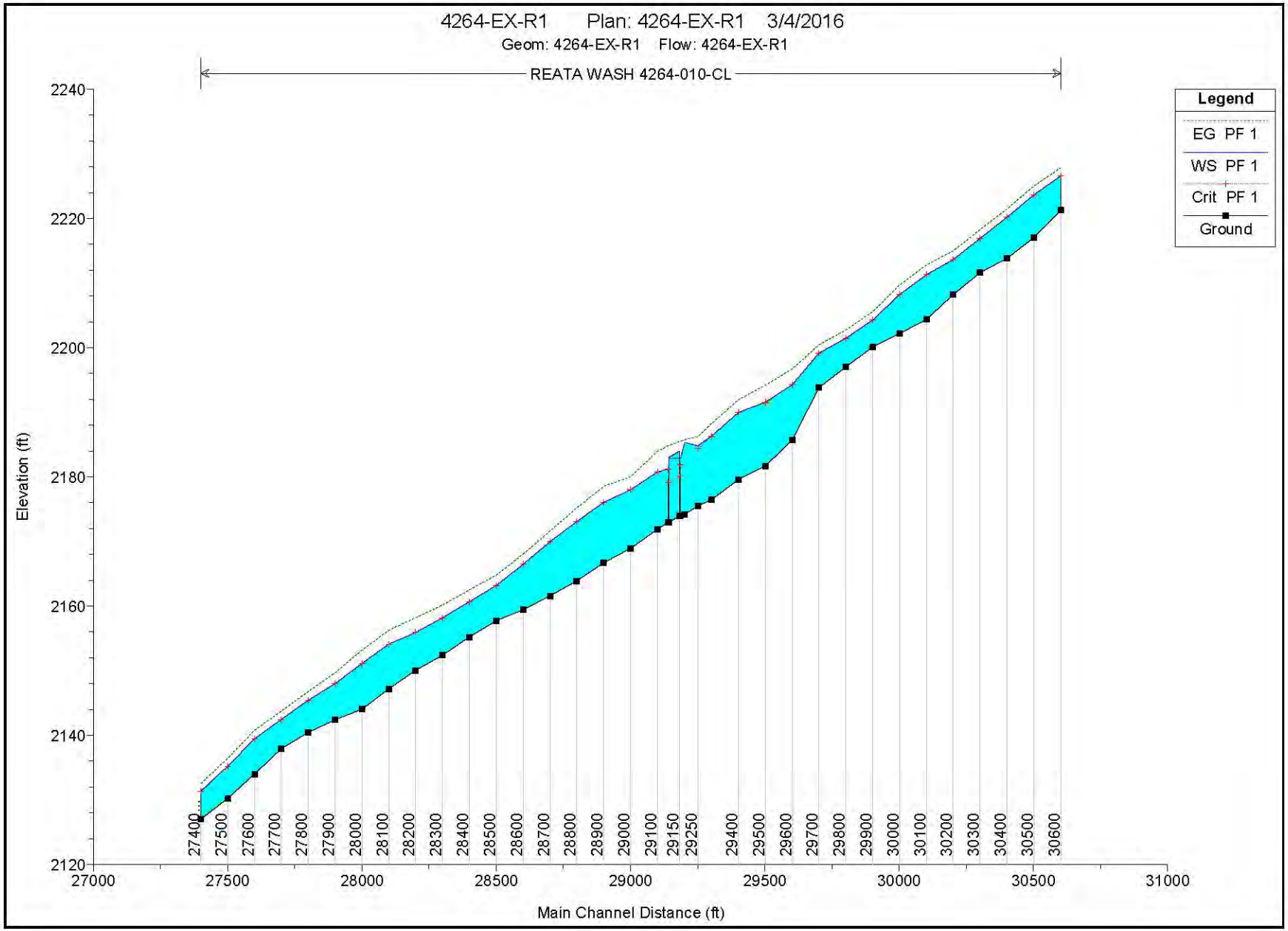
HEC-RAS Plan: EX-R3toR5 River: REATA WASH Reach: 4264-010-CL Profile: PF 1 (Continued)

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
4264-010-CL	6300	PF 1	17345.00	1570.36	1574.96	1576.30	1579.55	0.044368	17.99	1033.41	391.99	1.88
4264-010-CL	6200	PF 1	17345.00	1568.83	1575.12	1575.12	1577.54	0.010495	12.48	1391.89	302.92	1.00
4264-010-CL	6126.11	PF 1	17345.00	1567.70	1575.10	1573.49	1576.65	0.004371	9.98	1738.50	258.36	0.68
4264-010-CL	6084.06	PF 1	17345.00	1567.00	1575.03	1573.01	1576.45	0.003869	9.54	1818.69	251.09	0.62
4264-010-CL	6060		Bridge									
4264-010-CL	6041.11	PF 1	17345.00	1568.96	1574.57	1572.76	1576.08	0.004108	9.88	1759.87	250.17	0.65
4264-010-CL	6024.98	PF 1	17345.00	1568.80	1574.54	1572.61	1576.00	0.003858	9.72	1784.39	248.19	0.64
4264-010-CL	6000		Bridge									
4264-010-CL	5981.62	PF 1	17345.00	1565.98	1574.43	1571.75	1575.64	0.002065	8.84	1962.52	247.08	0.55
4264-010-CL	5900	PF 1	17345.00	1564.88	1573.12	1573.12	1575.23	0.011012	13.16	1537.30	344.30	1.03
4264-010-CL	5800	PF 1	17345.00	1563.43	1570.90	1571.47	1573.66	0.019248	14.94	1318.75	339.85	1.30
4264-010-CL	5700	PF 1	17345.00	1563.22	1567.82	1568.69	1571.15	0.029871	15.43	1187.16	366.44	1.55
4264-010-CL	5600	PF 1	17345.00	1561.17	1566.33	1566.55	1568.53	0.016174	12.57	1464.36	396.35	1.17
4264-010-CL	5500	PF 1	17345.00	1557.92	1564.90	1564.97	1566.87	0.014051	12.18	1557.35	416.72	1.10
4264-010-CL	5400	PF 1	17345.00	1556.06	1563.38	1563.46	1565.39	0.014862	11.88	1526.26	411.66	1.12
4264-010-CL	5300	PF 1	17345.00	1555.31	1561.36	1561.69	1563.69	0.018328	12.12	1415.65	393.99	1.21
4264-010-CL	5200	PF 1	17345.00	1554.76	1560.83	1560.44	1562.41	0.010154	9.52	1719.60	409.43	0.92
4264-010-CL	5100	PF 1	17345.00	1553.01	1559.23	1559.23	1561.27	0.013608	10.61	1518.56	374.38	1.05
4264-010-CL	5000	PF 1	17345.00	1551.25	1556.15	1556.99	1559.15	0.036585	11.37	1263.22	504.61	1.55
4264-010-CL	4900	PF 1	17345.00	1549.60	1555.22	1555.22	1556.79	0.014711	9.24	1728.22	555.13	1.05
4264-010-CL	4800	PF 1	17345.00	1548.42	1552.92	1553.34	1554.82	0.024951	10.39	1576.44	653.22	1.32
4264-010-CL	4700	PF 1	17345.00	1547.81	1552.02	1552.02	1553.33	0.014831	8.76	1913.96	720.53	1.04
4264-010-CL	4600	PF 1	17345.00	1546.01	1550.28	1550.37	1551.62	0.018270	9.74	1883.33	787.85	1.15
4264-010-CL	4500	PF 1	17345.00	1544.81	1548.54	1548.58	1549.77	0.017436	10.37	1976.19	852.78	1.15
4264-010-CL	4400	PF 1	17345.00	1542.68	1547.29	1546.97	1548.18	0.011189	8.88	2316.06	905.91	0.94
4264-010-CL	4300	PF 1	17345.00	1540.01	1545.70	1545.70	1546.86	0.014697	10.74	2089.40	890.97	1.09
4264-010-CL	4200	PF 1	17345.00	1536.62	1544.23	1544.26	1545.37	0.012760	11.09	2208.25	983.53	1.04
4264-010-CL	4100	PF 1	17345.00	1535.76	1542.23	1542.51	1543.70	0.021880	12.57	1883.86	985.68	1.31
4264-010-CL	4000	PF 1	17345.00	1535.34	1541.34	1541.16	1542.31	0.013272	8.42	2212.09	940.98	0.98
4264-010-CL	3900	PF 1	17345.00	1533.70	1540.08	1539.75	1540.95	0.011145	8.48	2384.47	1065.17	0.92
4264-010-CL	3800	PF 1	17345.00	1532.59	1538.82		1539.73	0.010891	9.02	2348.26	1030.88	0.93
4264-010-CL	3700	PF 1	17345.00	1530.97	1537.08	1537.08	1538.21	0.016003	10.36	2062.15	902.22	1.11
4264-010-CL	3600	PF 1	17345.00	1530.12	1534.79	1535.07	1536.22	0.026056	11.35	1836.90	991.40	1.36
4264-010-CL	3500	PF 1	17345.00	1528.49	1533.73	1533.40	1534.55	0.011149	7.92	2443.78	1118.56	0.90
4264-010-CL	3400	PF 1	17345.00	1527.31	1532.30	1532.20	1533.26	0.014380	8.47	2227.25	1083.12	1.02
4264-010-CL	3300	PF 1	17345.00	1525.83	1530.82	1530.69	1531.81	0.014836	8.80	2185.43	998.77	1.04
4264-010-CL	3200	PF 1	17345.00	1524.71	1529.07	1529.07	1530.18	0.016863	8.31	2048.28	924.78	1.07
4264-010-CL	3100	PF 1	17345.00	1521.43	1528.03	1528.88	1528.39	0.003172	6.38	3809.10	1259.72	0.54
4264-010-CL	3000	PF 1	17345.00	1516.69	1528.04		1528.22	0.000624	4.43	6170.29	1417.09	0.26
4264-010-CL	2900	PF 1	17345.00	1515.16	1528.09		1528.15	0.000180	2.82	9413.25	1494.89	0.15
4264-010-CL	2800	PF 1	17345.00	1513.20	1528.03		1528.13	0.000188	3.21	8308.34	1350.98	0.16
4264-010-CL	2700	PF 1	17345.00	1510.37	1528.02		1528.11	0.000152	3.04	9053.67	1432.21	0.14
4264-010-CL	2600	PF 1	17345.00	1508.79	1528.02		1528.10	0.000107	2.71	10060.31	1581.74	0.12
4264-010-CL	2500	PF 1	17345.00	1504.64	1528.02		1528.08	0.000077	2.47	11423.40	1834.65	0.10
4264-010-CL	2400	PF 1	17345.00	1504.13	1528.02		1528.07	0.000055	2.30	13145.64	1933.31	0.09
4264-010-CL	2300	PF 1	17345.00	1503.56	1528.02		1528.06	0.000057	2.27	13815.96	1996.73	0.09
4264-010-CL	2200	PF 1	17345.00	1503.55	1528.02		1528.06	0.000045	2.13	14311.26	2100.18	0.08
4264-010-CL	2100	PF 1	17345.00	1503.56	1528.01		1528.05	0.000057	2.07	14737.31	2553.02	0.09
4264-010-CL	2000	PF 1	17345.00	1503.56	1528.01		1528.05	0.000045	1.88	15567.36	2498.22	0.08
4264-010-CL	1900	PF 1	17345.00	1503.56	1528.01		1528.04	0.000040	1.87	15646.78	2159.62	0.08
4264-010-CL	1800	PF 1	17345.00	1503.56	1528.00		1528.04	0.000041	1.86	14994.32	1918.91	0.08
4264-010-CL	1700	PF 1	17345.00	1504.05	1528.00		1528.03	0.000039	1.81	15194.21	1861.02	0.07
4264-010-CL	1600	PF 1	17345.00	1504.19	1528.00	1512.41	1528.03	0.000036	1.70	15681.30	1919.31	0.07

APPENDIX B
HEC-RAS Cross Sections

APPENDIX B
HEC-RAS Profiles and Cross Sections
Reach 1

Stations 274+00 to 306+00


4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
REATA WASH 4264-010-CL
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
2240
2220
2200
2180
2160
2140
2120
27000
27500
28000
28500
29000
29500
30000
30500
31000
Main Channel Distance (ft)
27400
27500
27600
27700
27800
27900
28000
28100
28200
28300
28400
28500
28600
28700
28800
28900
29000
29100
29150
29250
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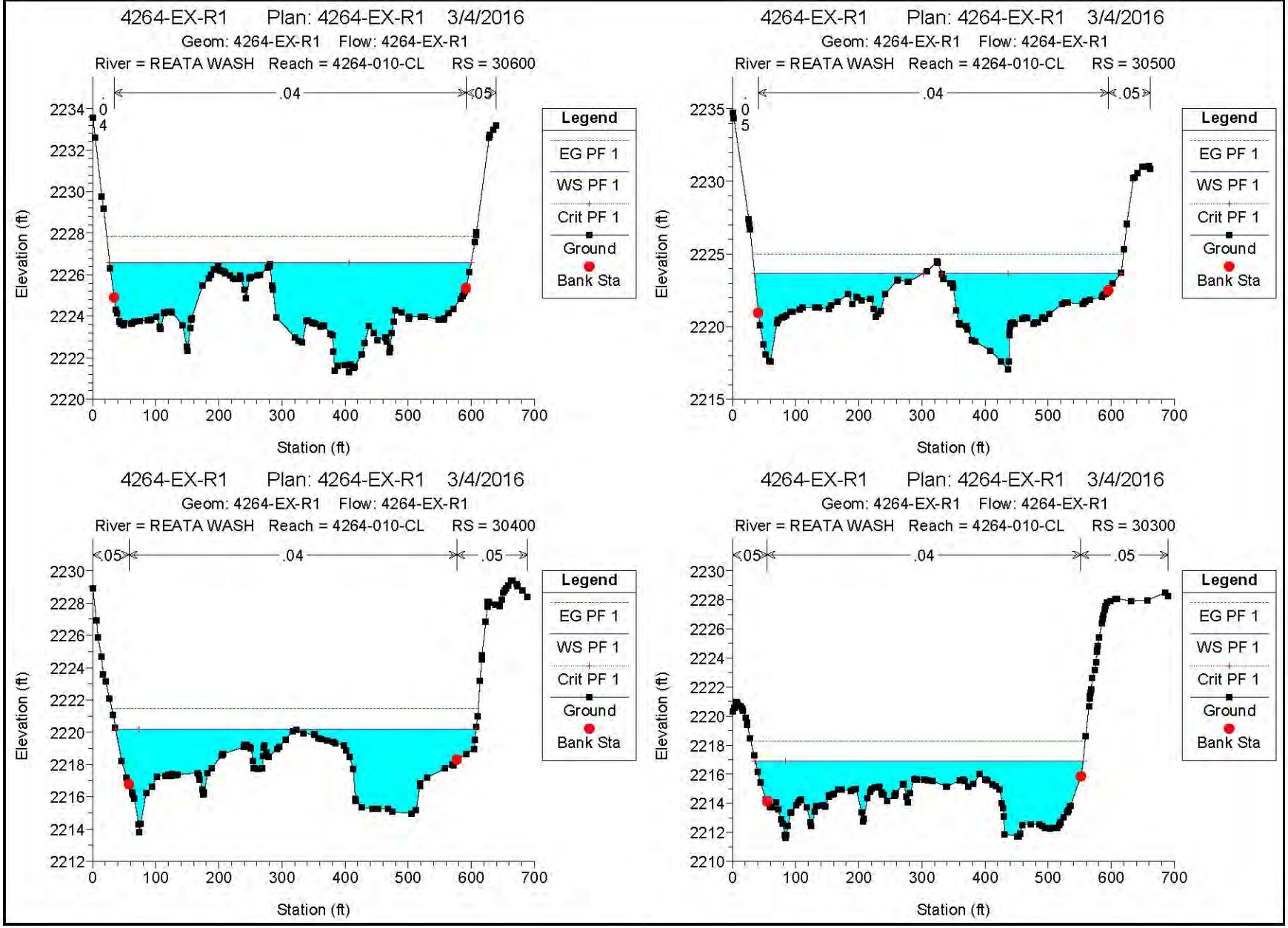
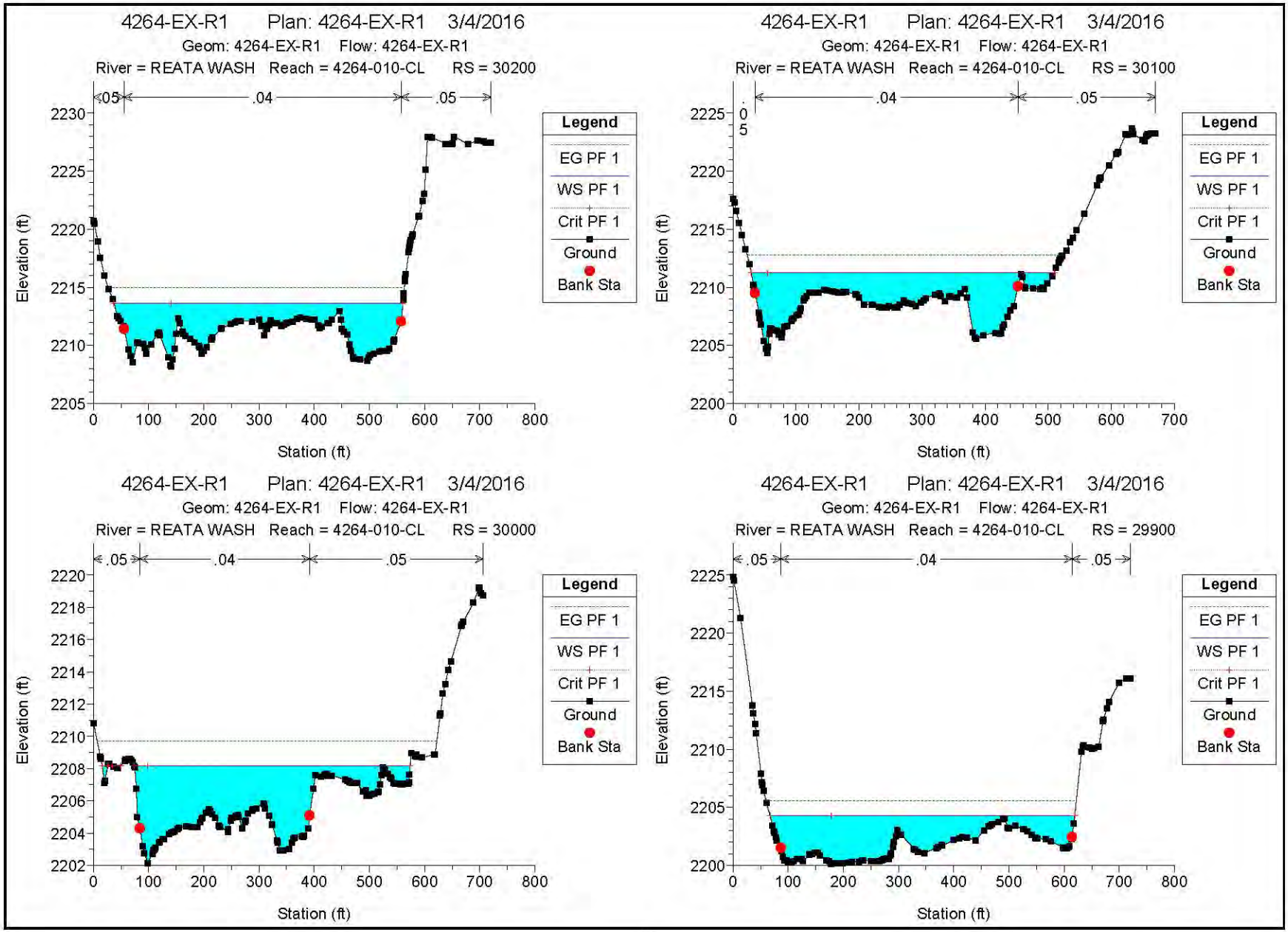
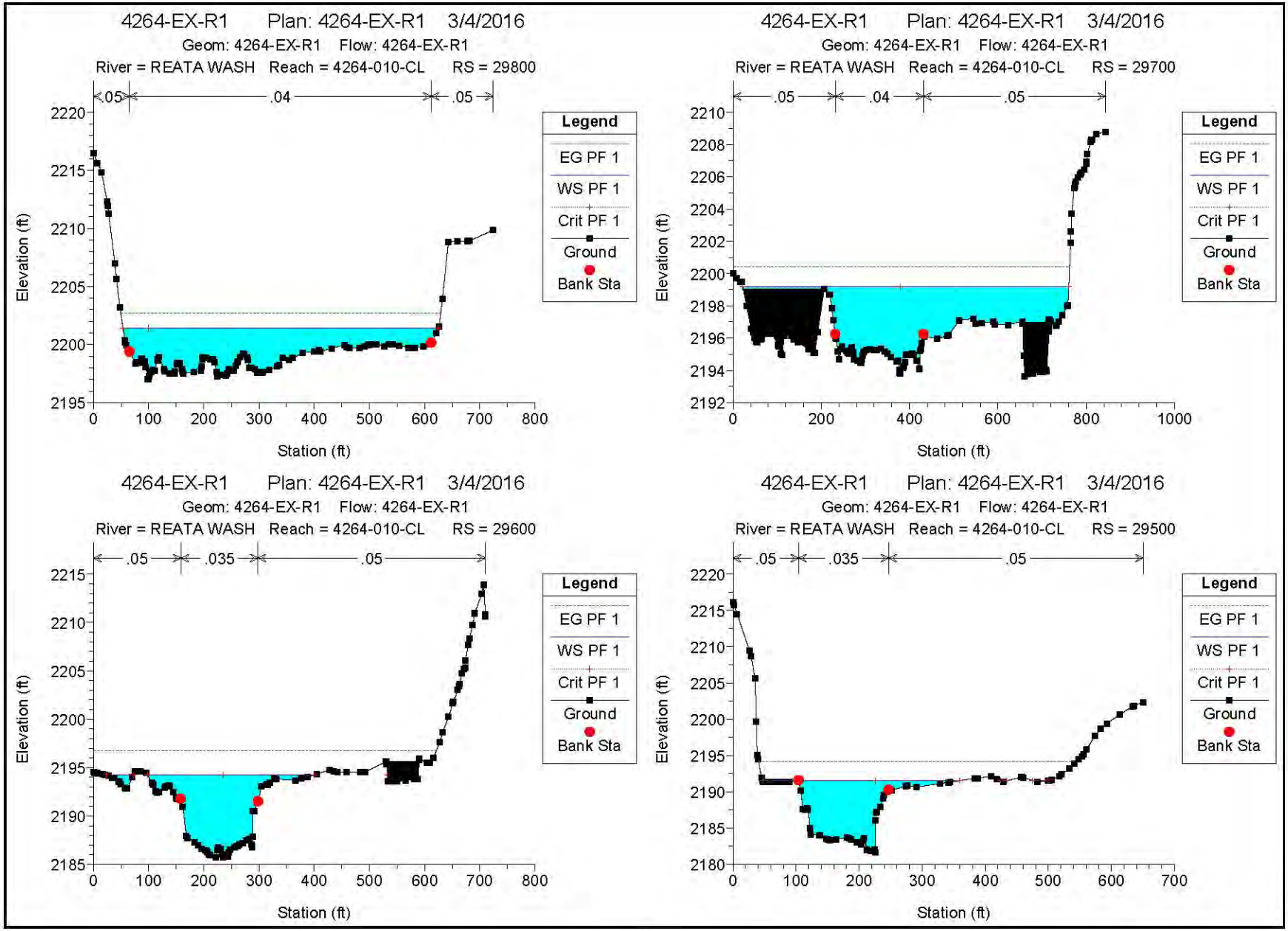
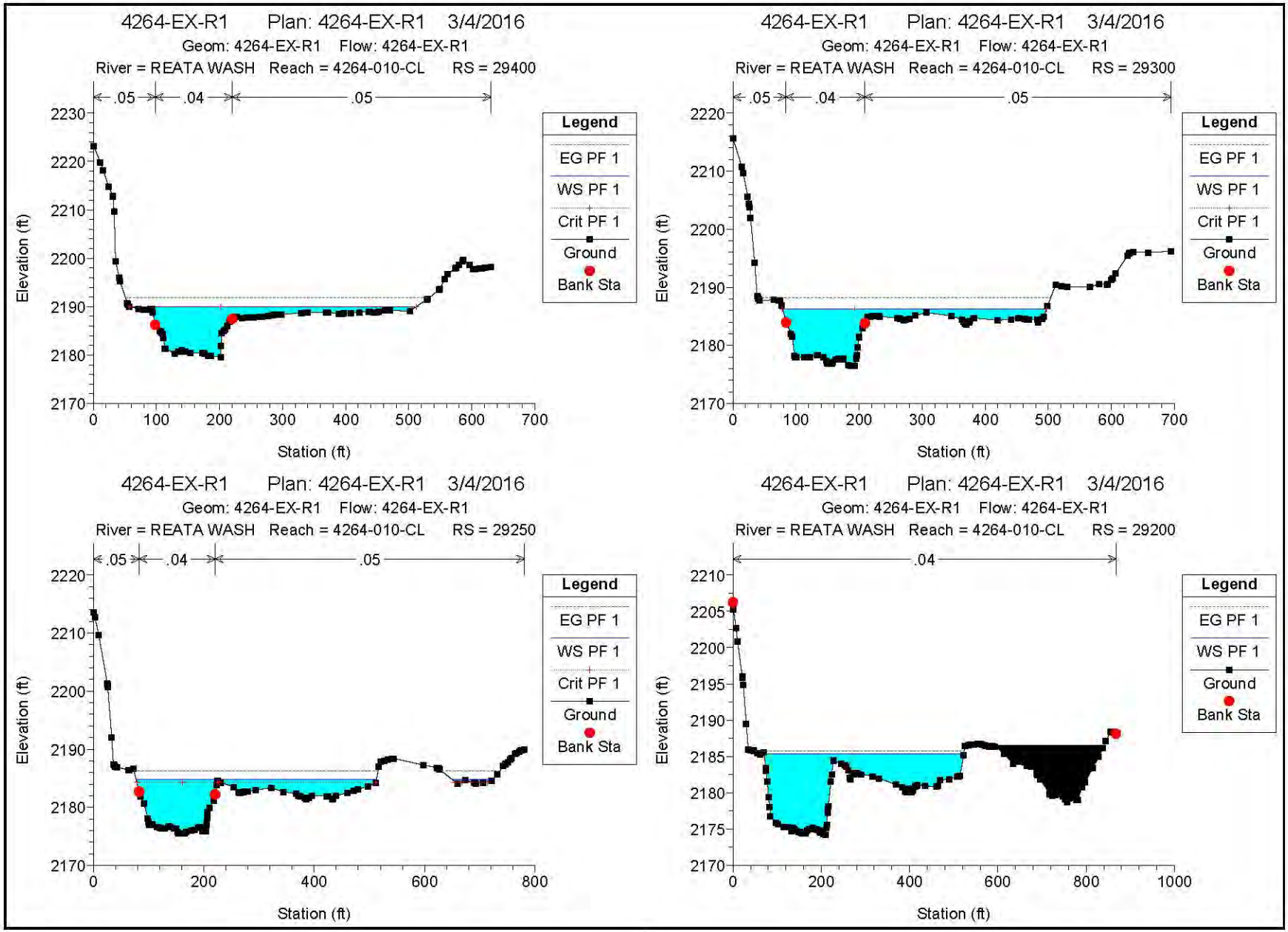
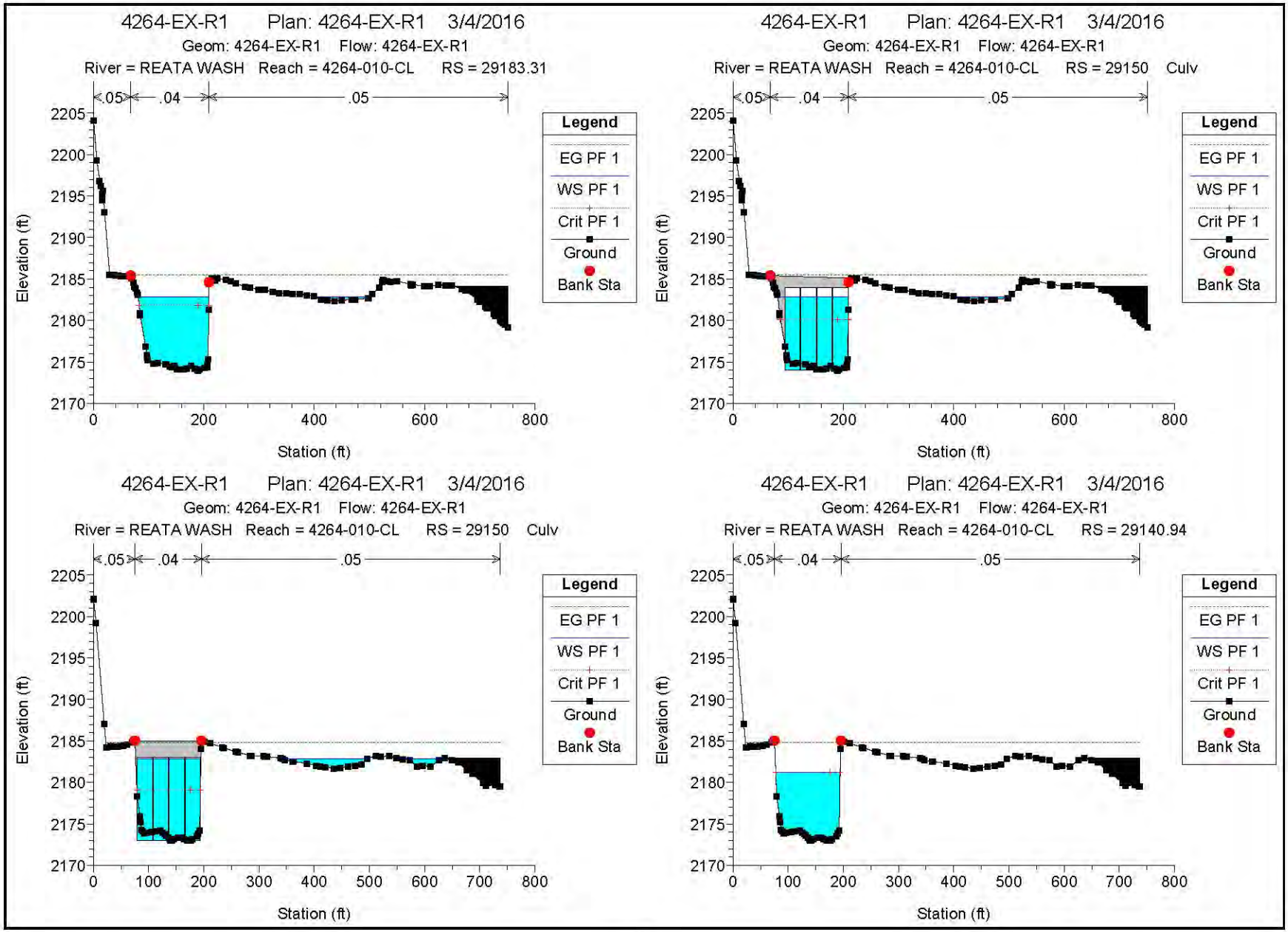
29500
29600
29700
29800
29900
30000
30100
30200
30300
30400
30500
30600

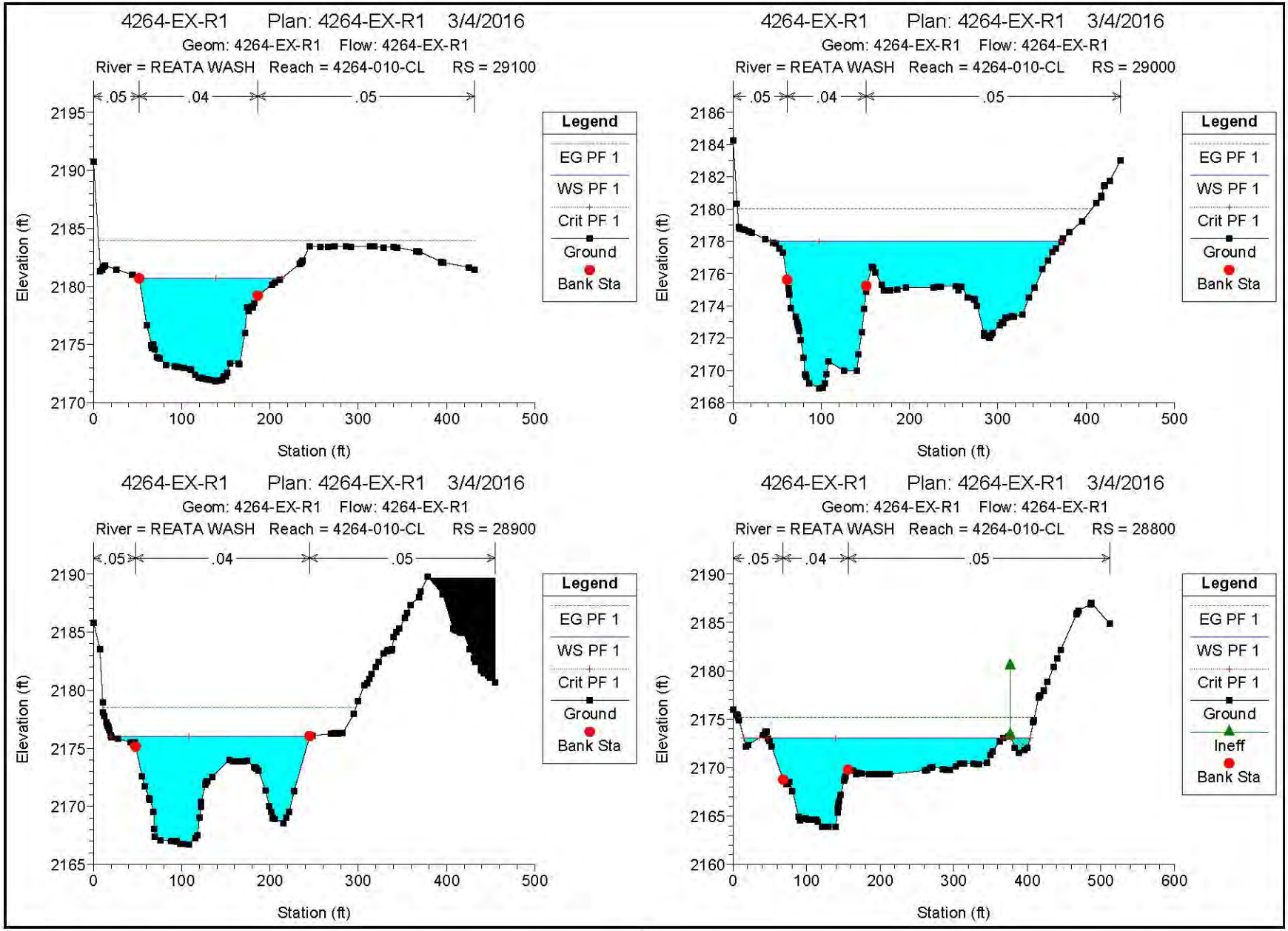

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 30600
.04
.05
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 30500
.04
.05
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 30400
.05
.04
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 30300
.05
.04
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

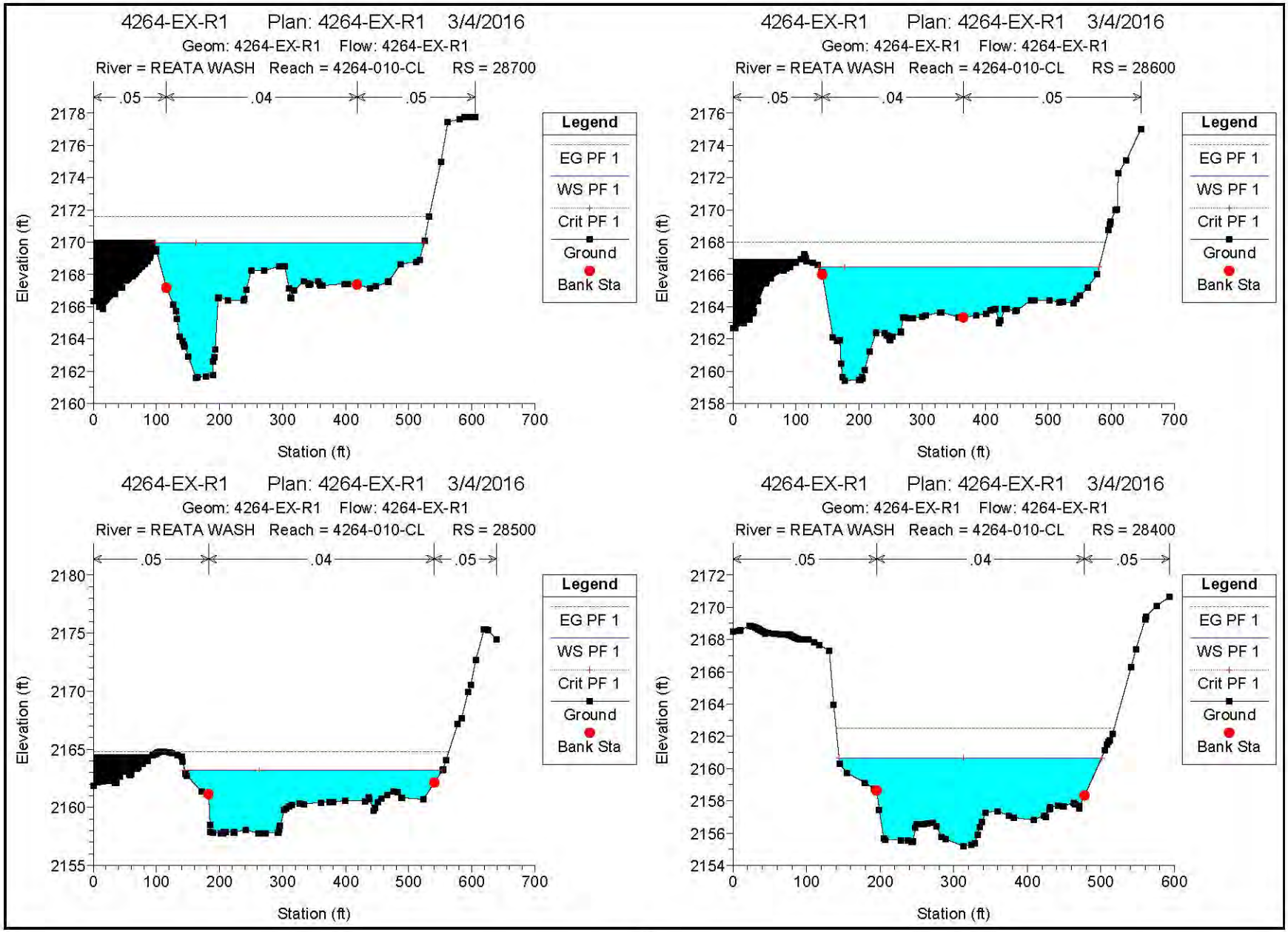

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 30200
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 30100
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 30000
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29900
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

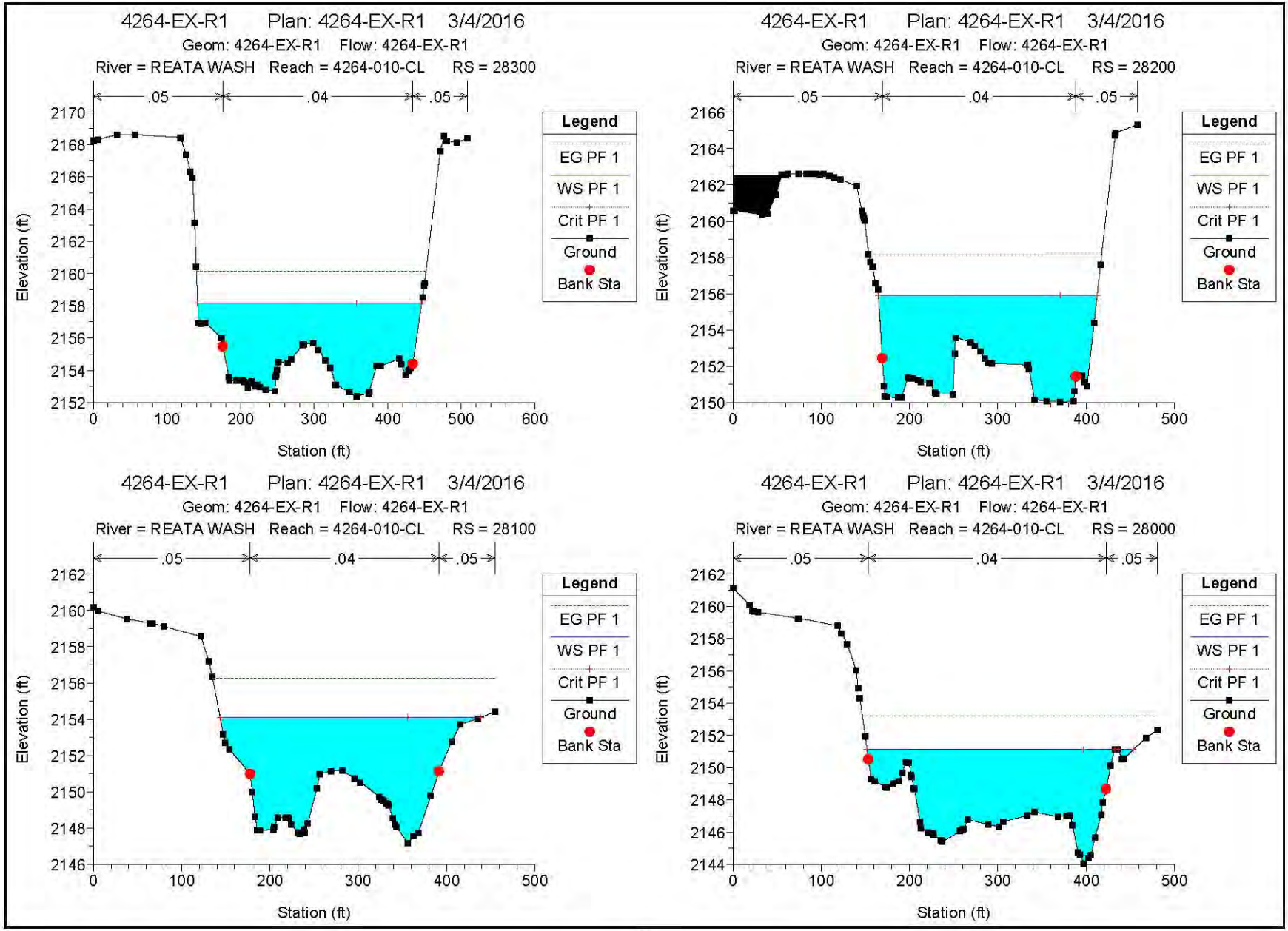

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29800
.05
.04
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29700
.05
.04
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29600
.05
.035
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29500
.05
.035
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

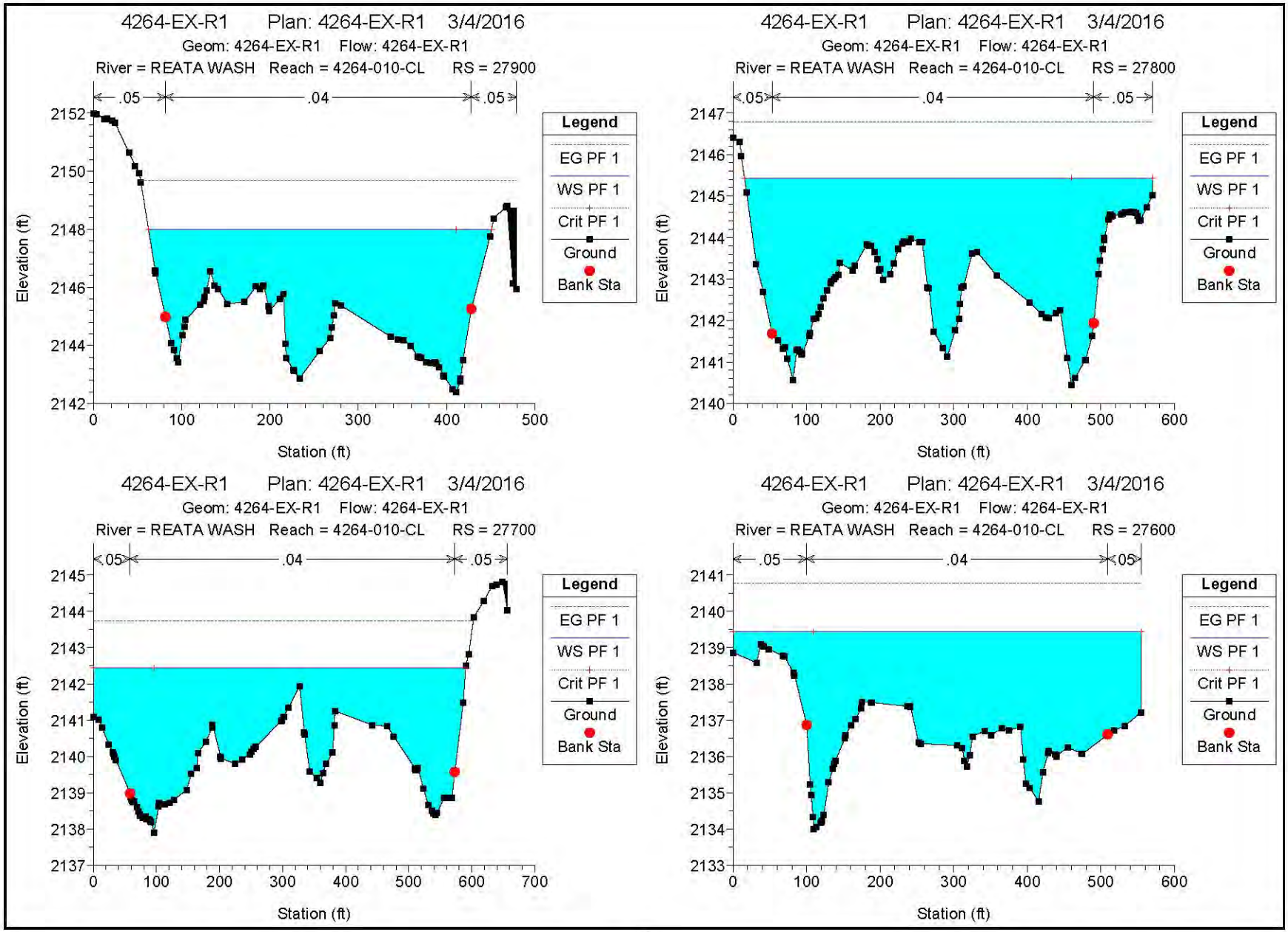

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29400
.05 .04 .05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29300
.05 .04 .05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29250
.05 .04 .05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29200
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta

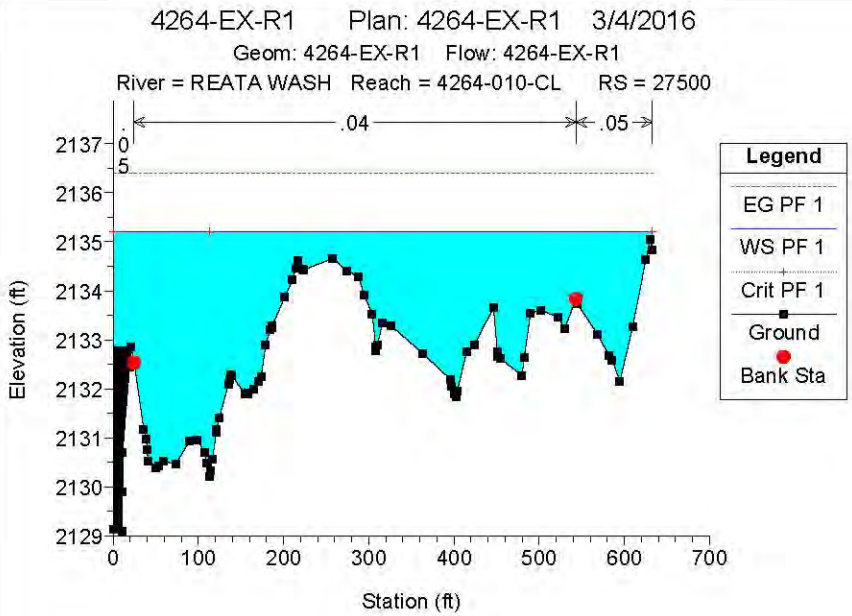

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29183.31
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29150 Culv
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29150 Culv
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29140.94
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

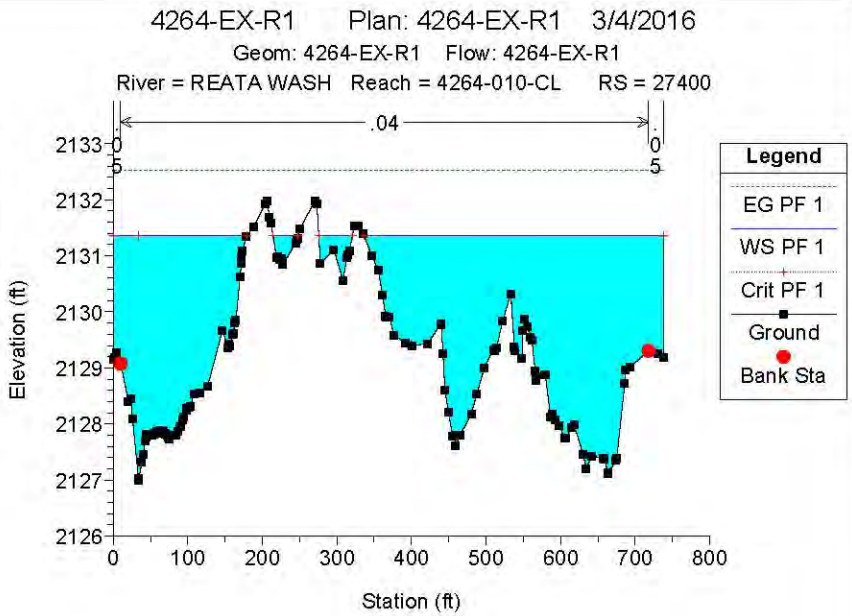

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29100
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 29000
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28900
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28800
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28700
.05
.04
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28600
.05
.04
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28500
.05
.04
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28400
.05
.04
.05
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28300
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28200
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28100
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 28000
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

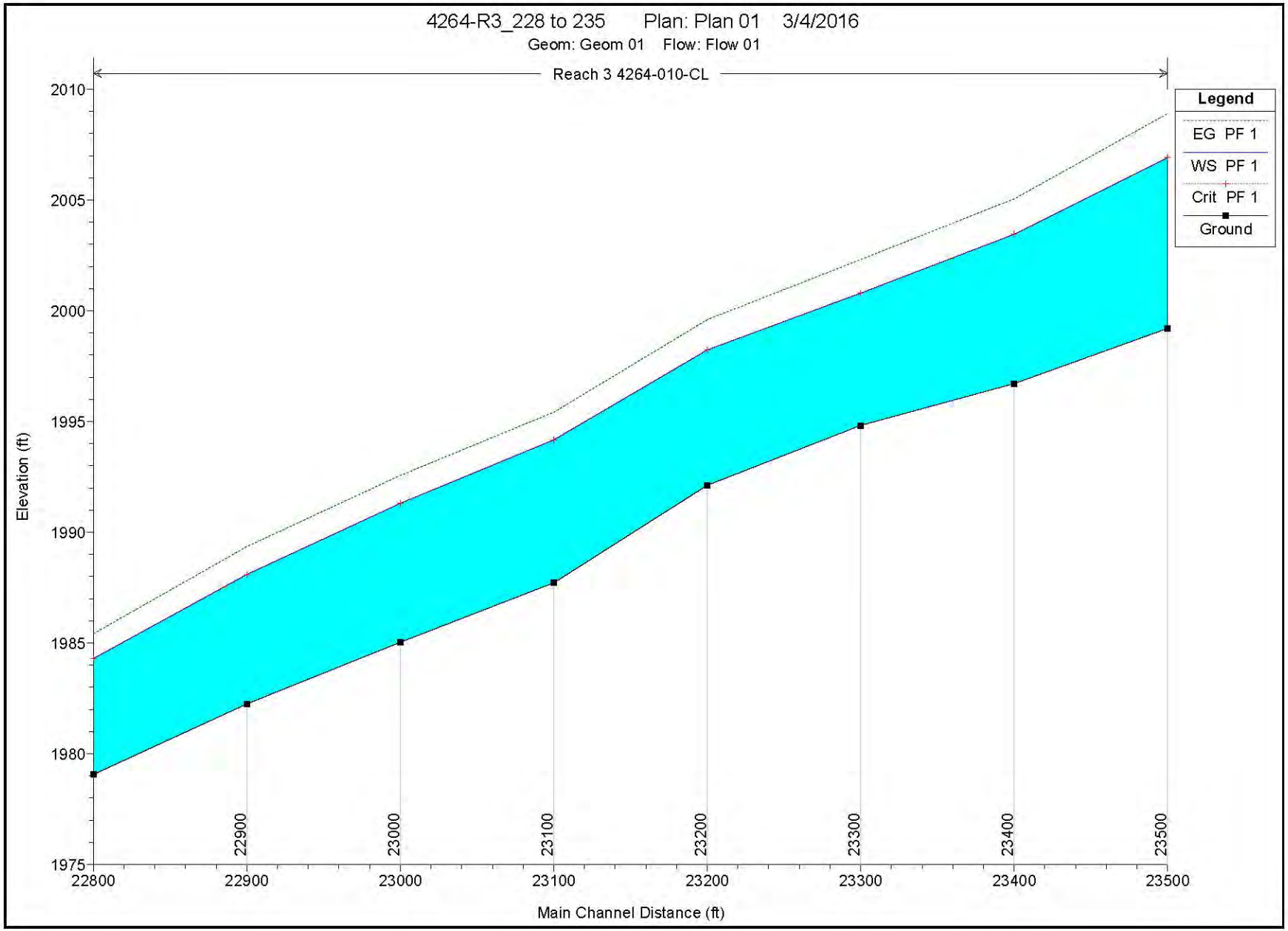

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 27900
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 27800
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 27700
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 27600
.05
.04
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

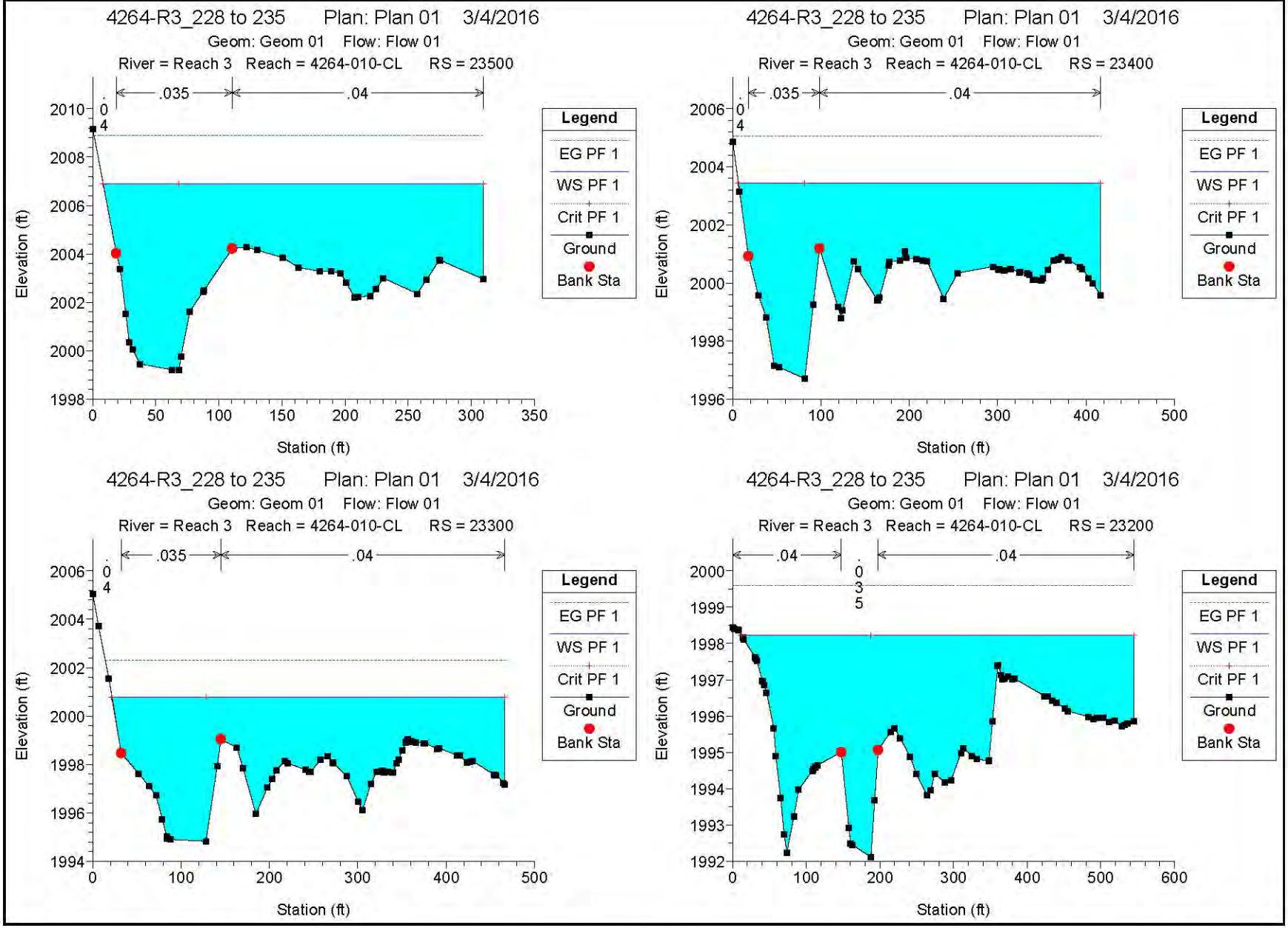

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 27500
.04
.05
0
5
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

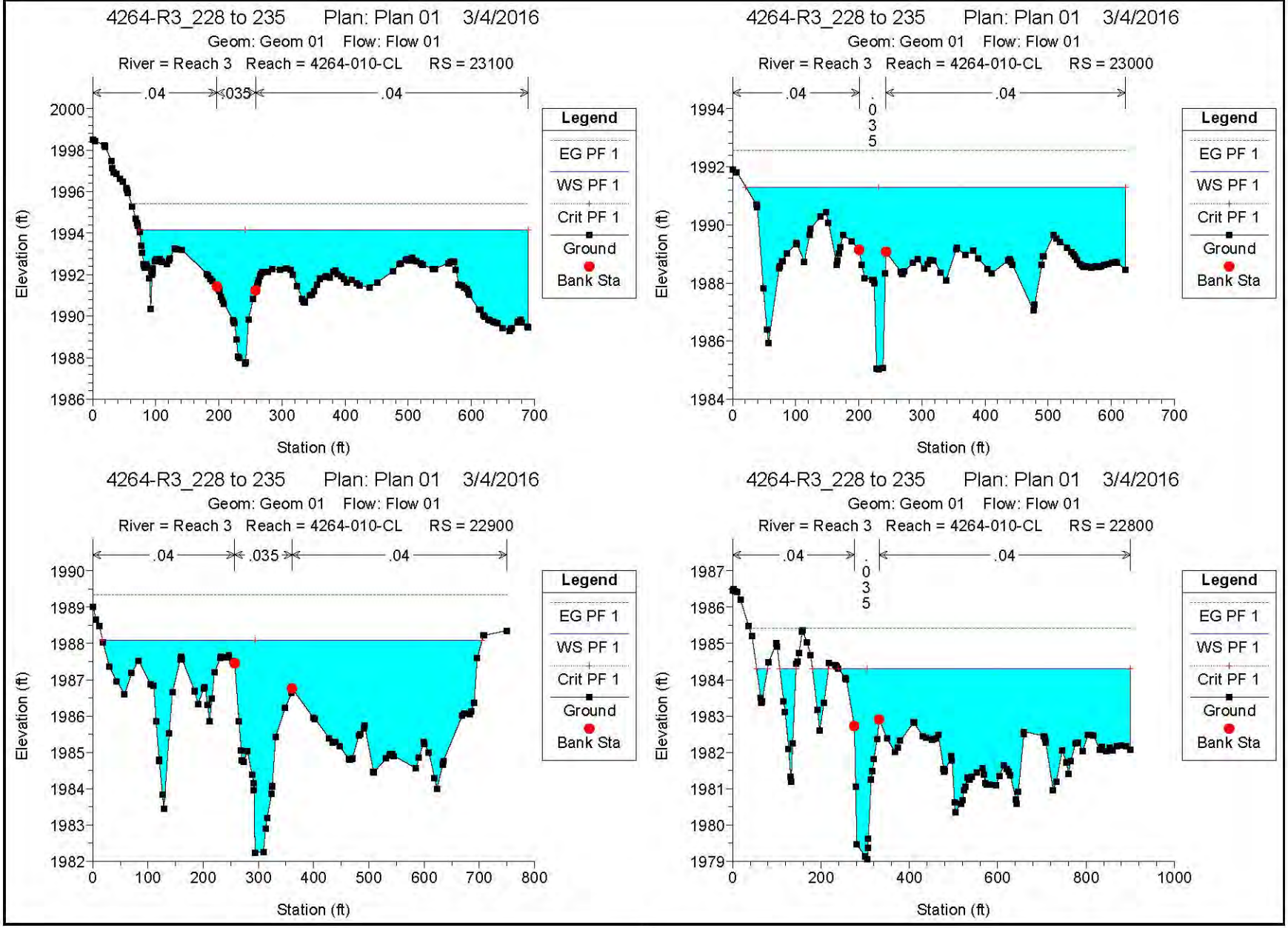

4264-EX-R1 Plan: 4264-EX-R1 3/4/2016
Geom: 4264-EX-R1 Flow: 4264-EX-R1
River = REATA WASH Reach = 4264-010-CL RS = 27400
.04
0
5
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

APPENDIX B
HEC-RAS Profiles and Cross Sections
Reach 3 North

Stations 235+00 to 228+00
Model: 4264-R3_228 to 235.prj

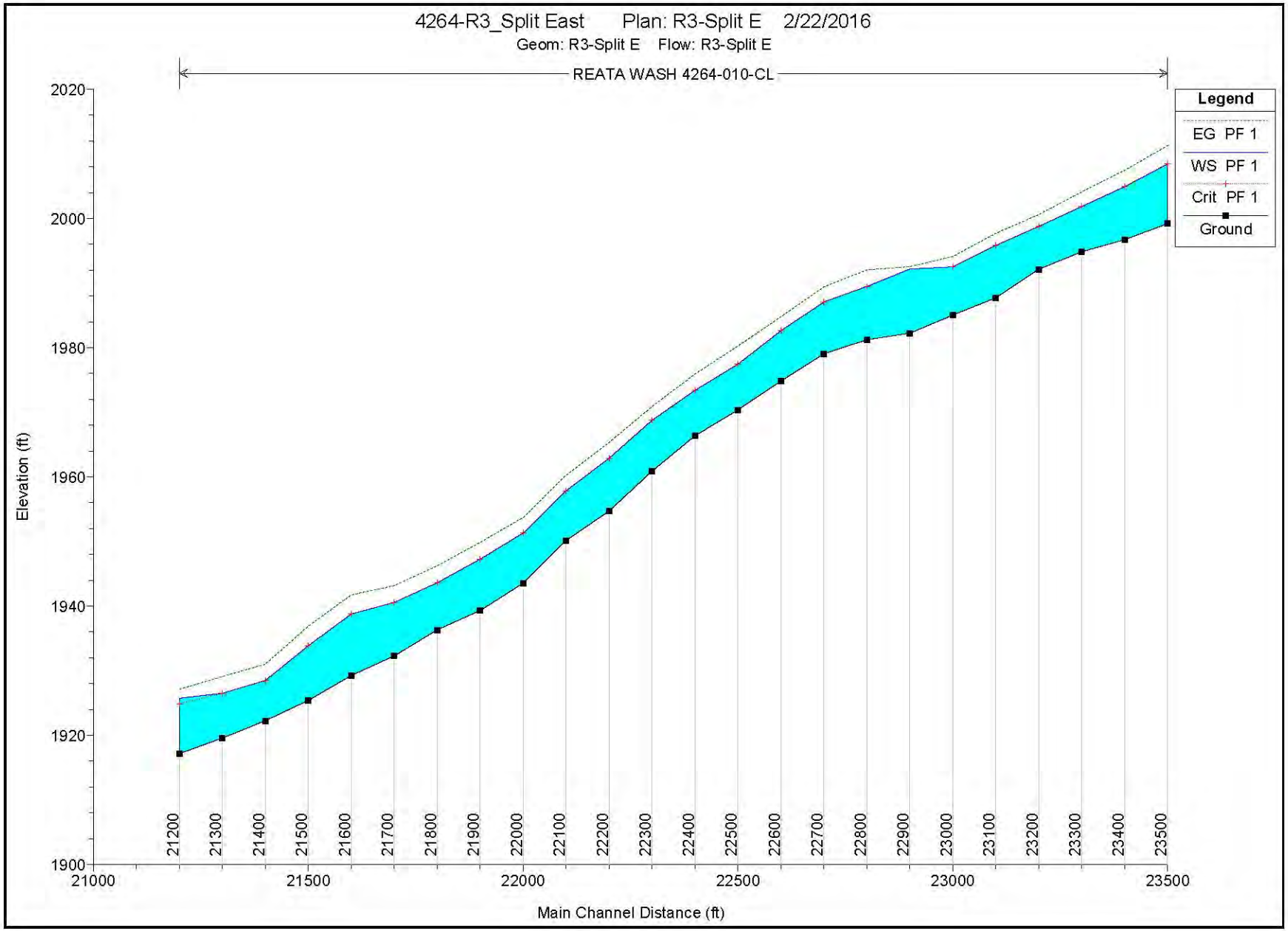

4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
Reach 3 4264-010-CL
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
2010
2005
2000
1995
1990
1985
1980
1975
22800
22900
23000
23100
23200
23300
23400
23500
Main Channel Distance (ft)

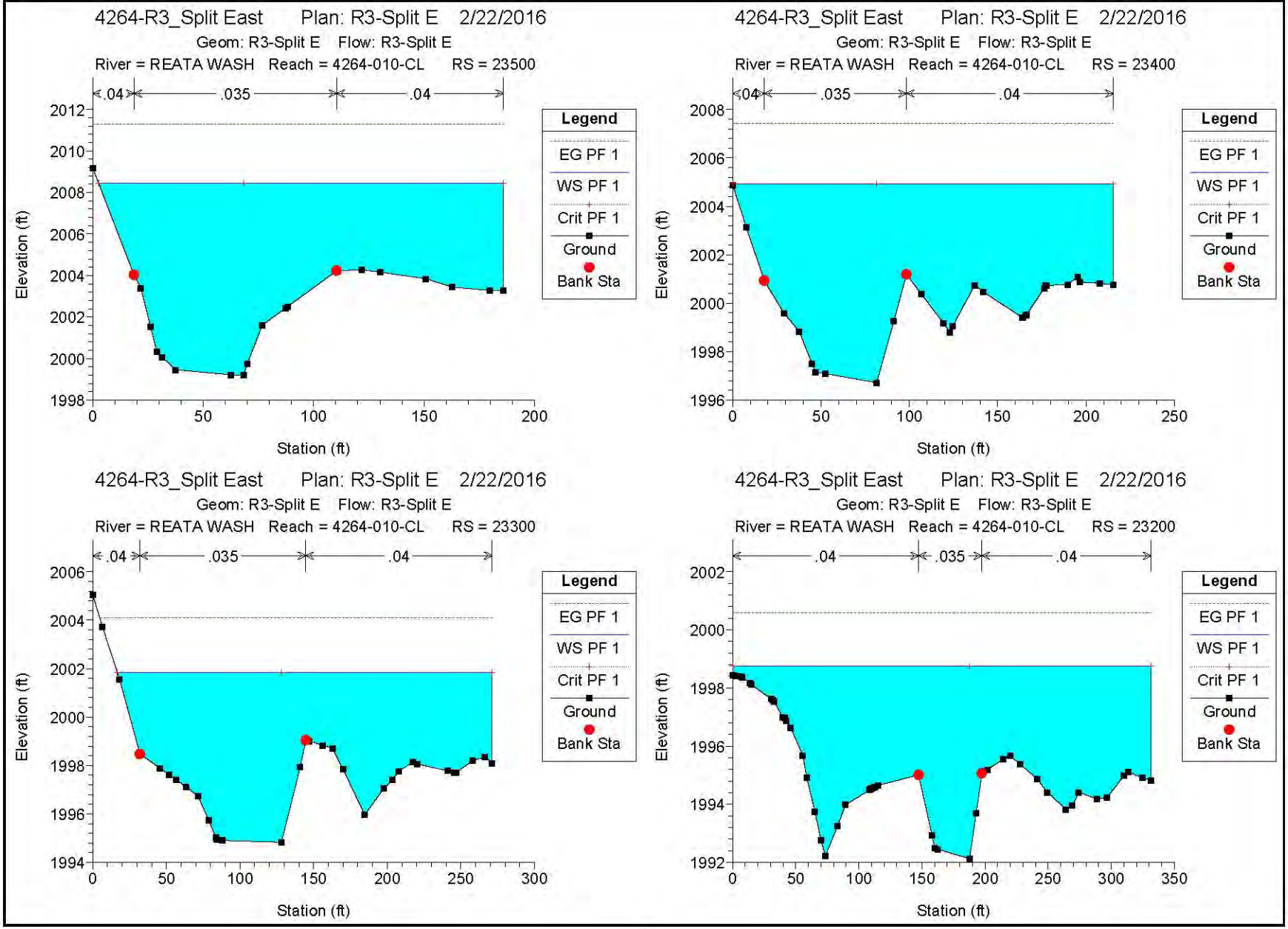

4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
River = Reach 3 Reach = 4264-010-CL RS = 23500
.035
.04
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
River = Reach 3 Reach = 4264-010-CL RS = 23400
.035
.04
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
River = Reach 3 Reach = 4264-010-CL RS = 23300
.035
.04
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
River = Reach 3 Reach = 4264-010-CL RS = 23200
.04
.04
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

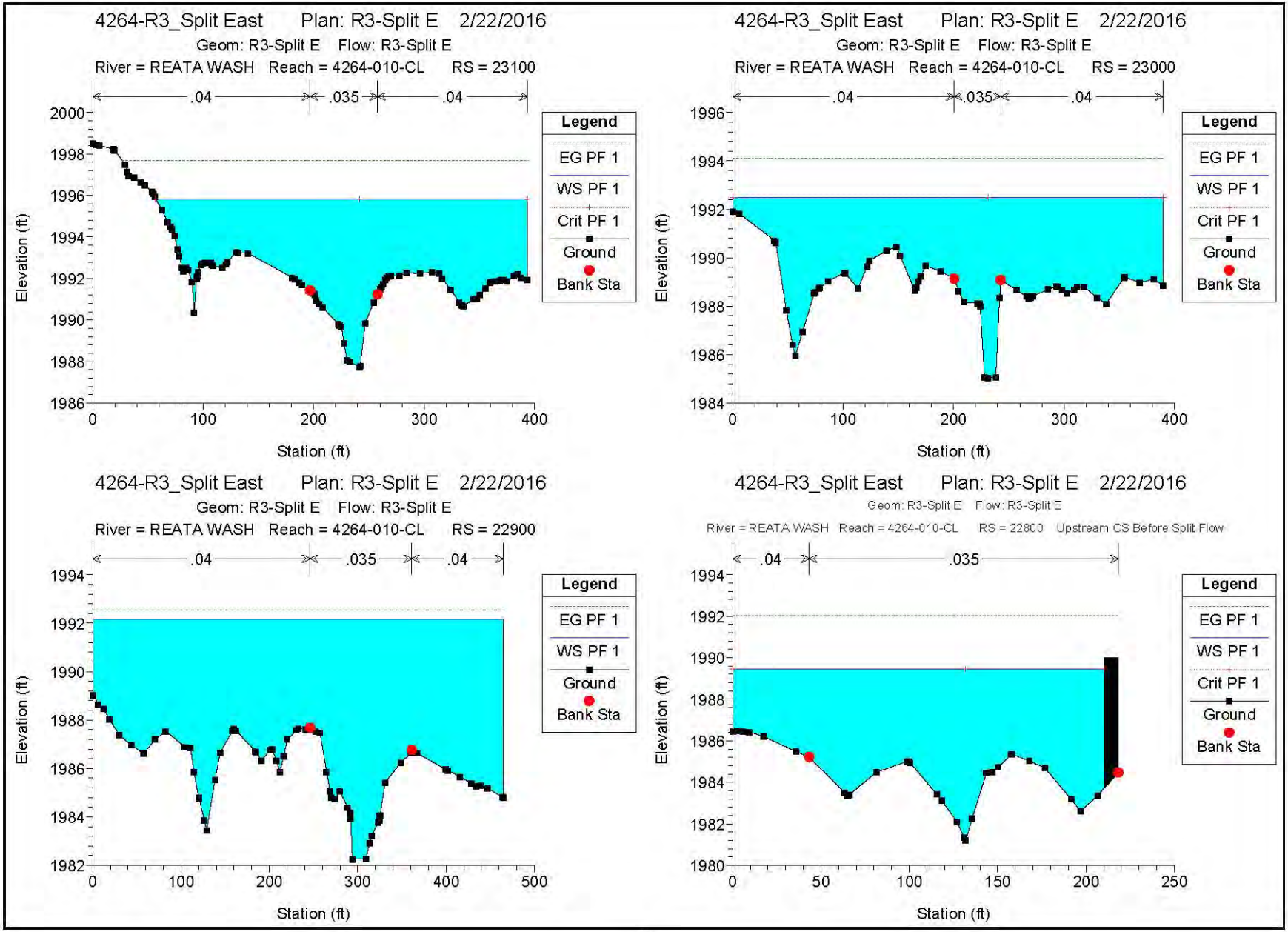

4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
River = Reach 3 Reach = 4264-010-CL RS = 23100
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
River = Reach 3 Reach = 4264-010-CL RS = 23000
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
River = Reach 3 Reach = 4264-010-CL RS = 22900
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_228 to 235 Plan: Plan 01 3/4/2016
Geom: Geom 01 Flow: Flow 01
River = Reach 3 Reach = 4264-010-CL RS = 22800
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

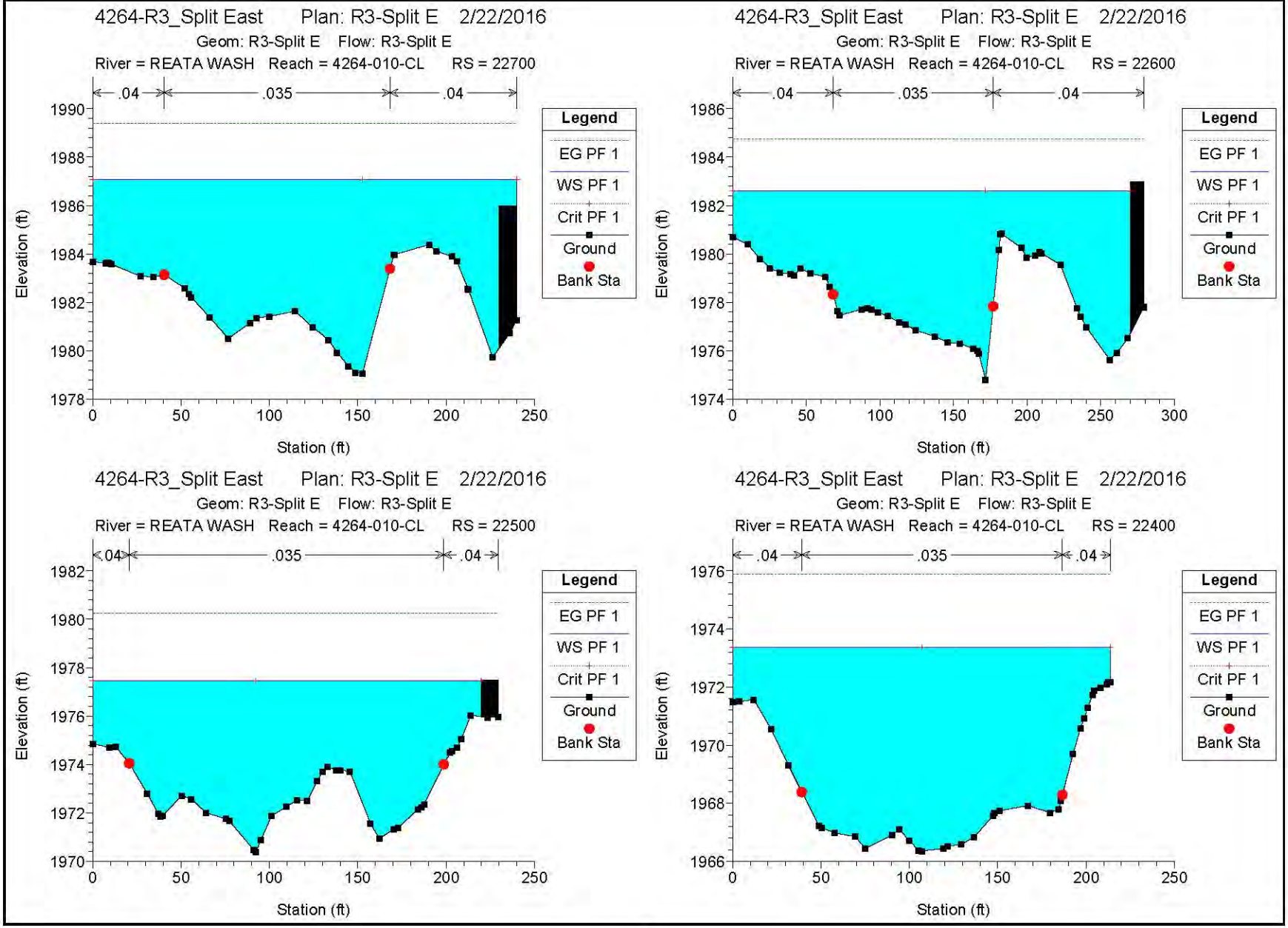
APPENDIX B
HEC-RAS Profiles and Cross Sections
Reach 3 East

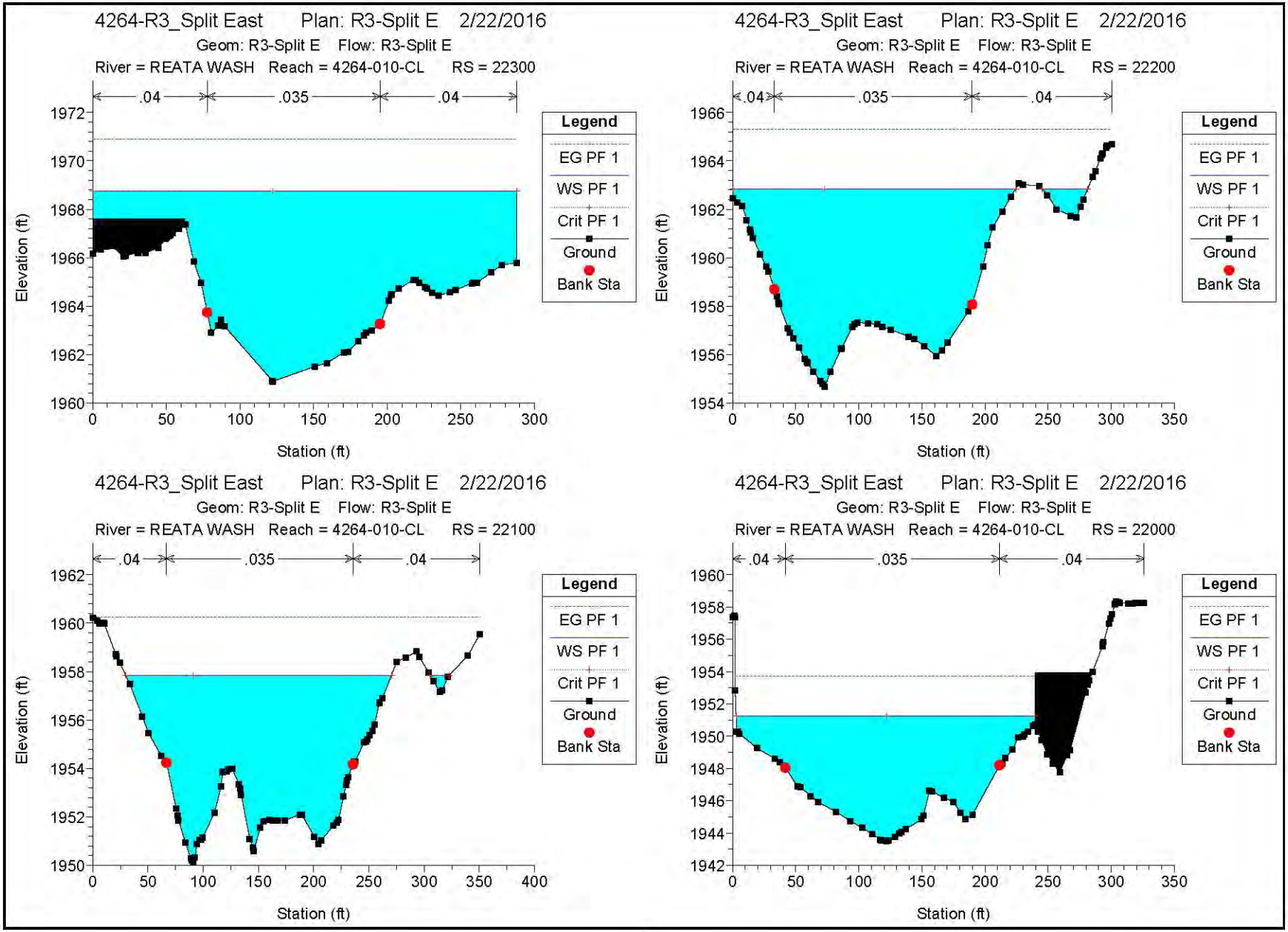
Stations 228+00 to 212+00
Model: 4264-R3_SplitEast.prj

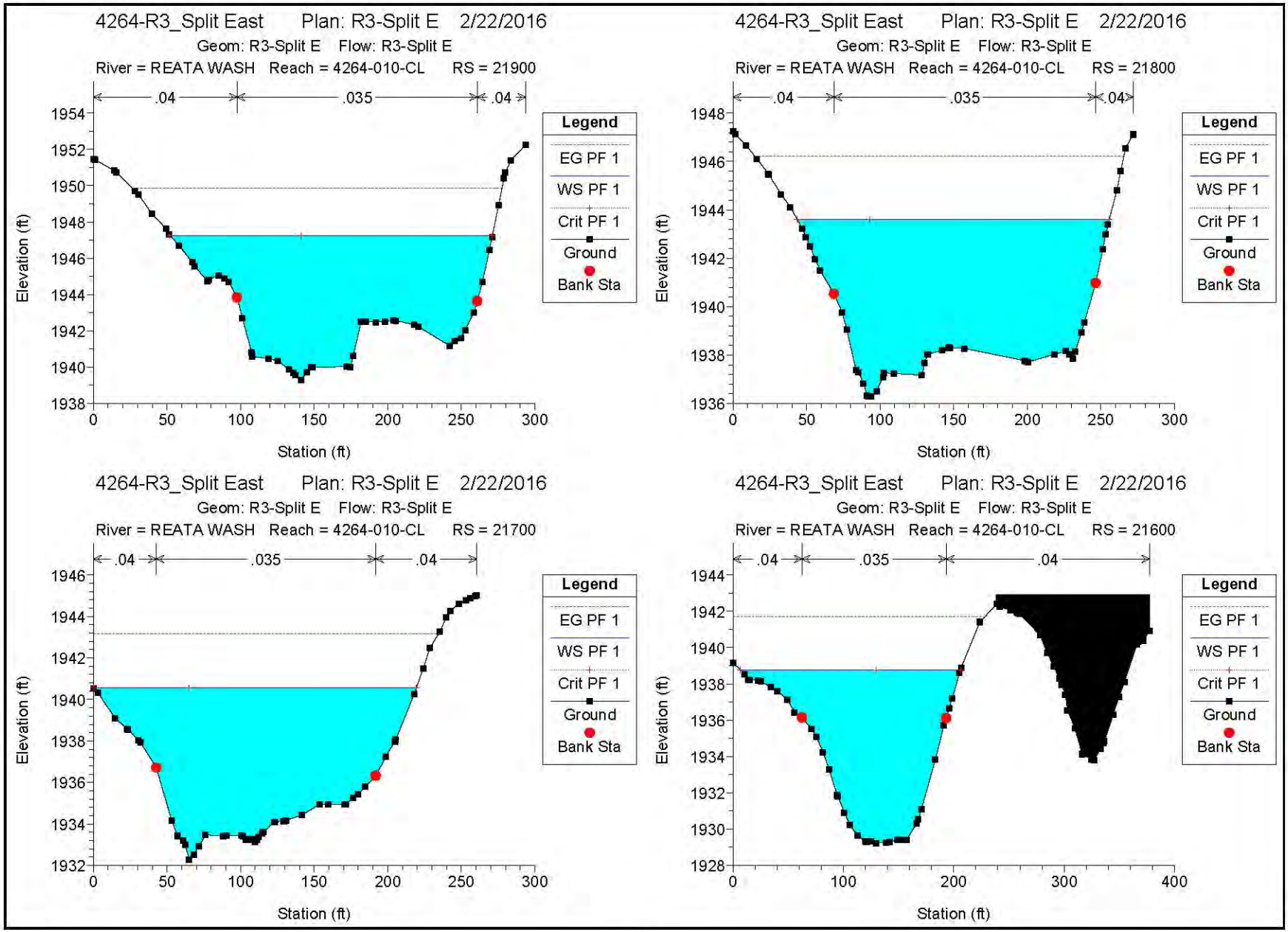

4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
REATA WASH 4264-010-CL
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
2020
2000
1980
1960
1940
1920
1900
21000
21500
22000
22500
23000
23500
21200
21300
21400
21500
21600
21700
21800
21900
22000
22100
22200
22300
22400
22500
22600
22700
22800
22900
23000
23100
23200
23300
23400
23500
Main Channel Distance (ft)

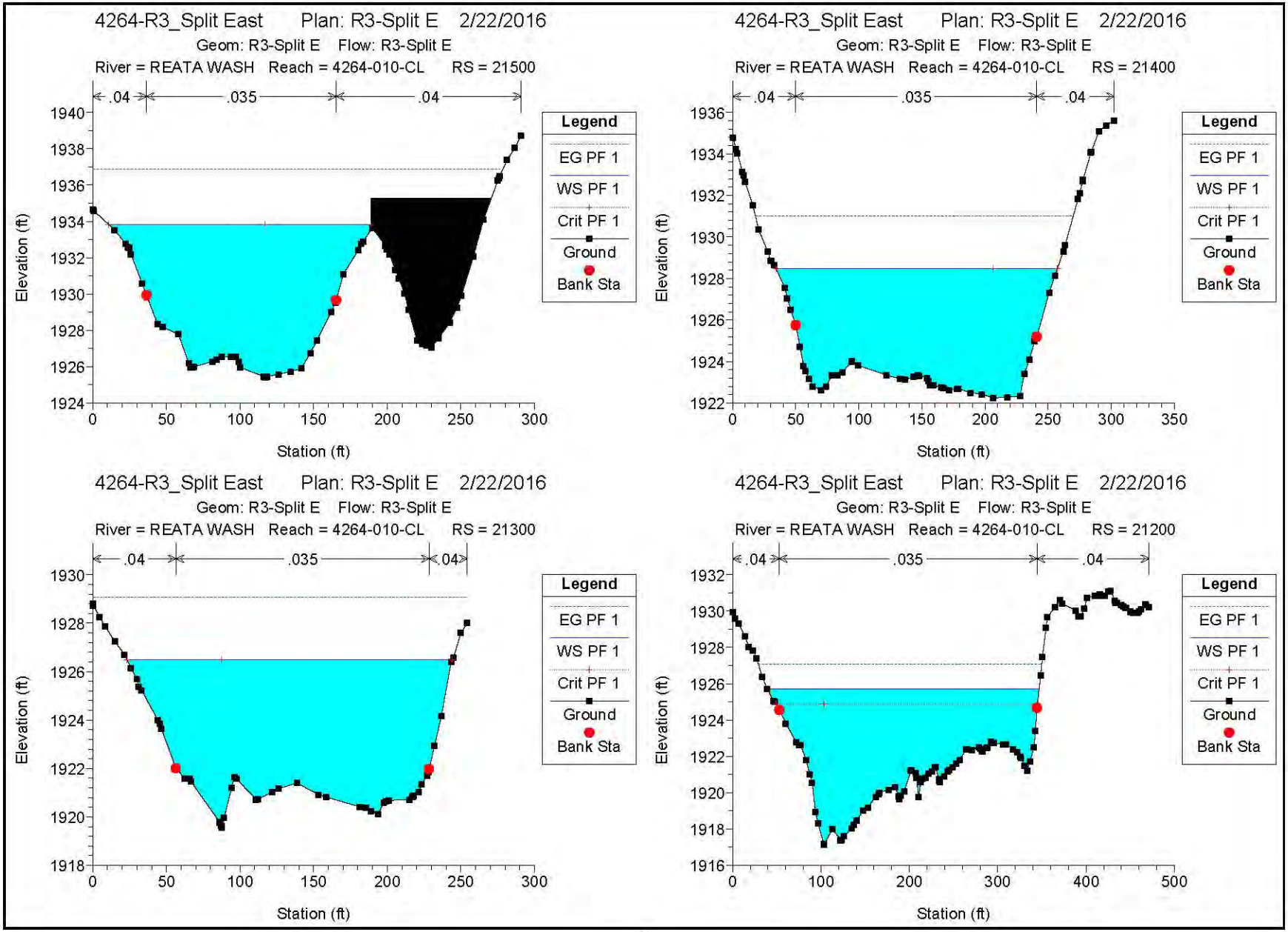

4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 23500
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 23400
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 23300
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 23200
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 23100
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 23000
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22900
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22800 Upstream CS Before Split Flow
.04
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22700
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22600
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22500
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22400
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

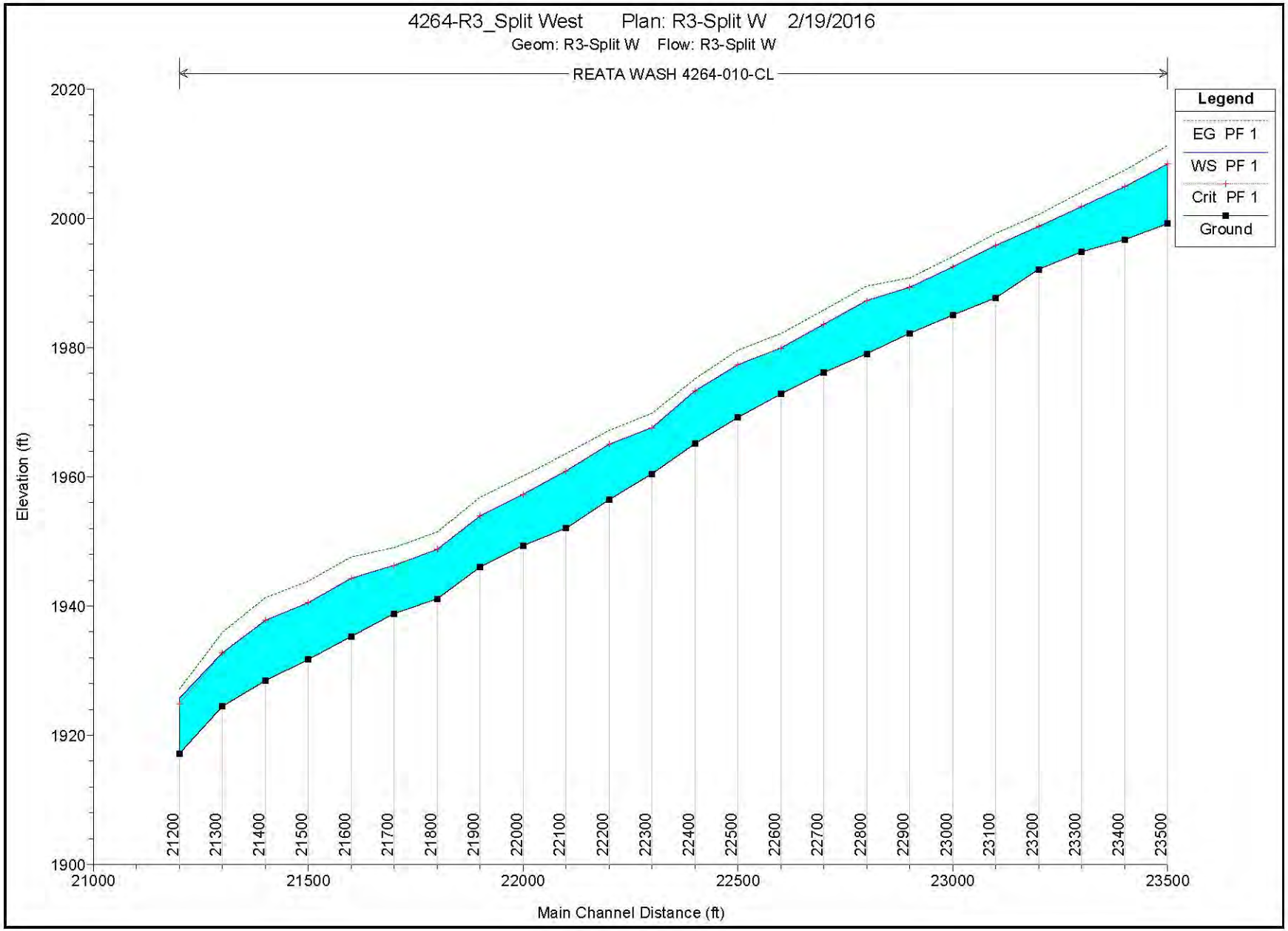

4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22300
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22200
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22100
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 22000
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

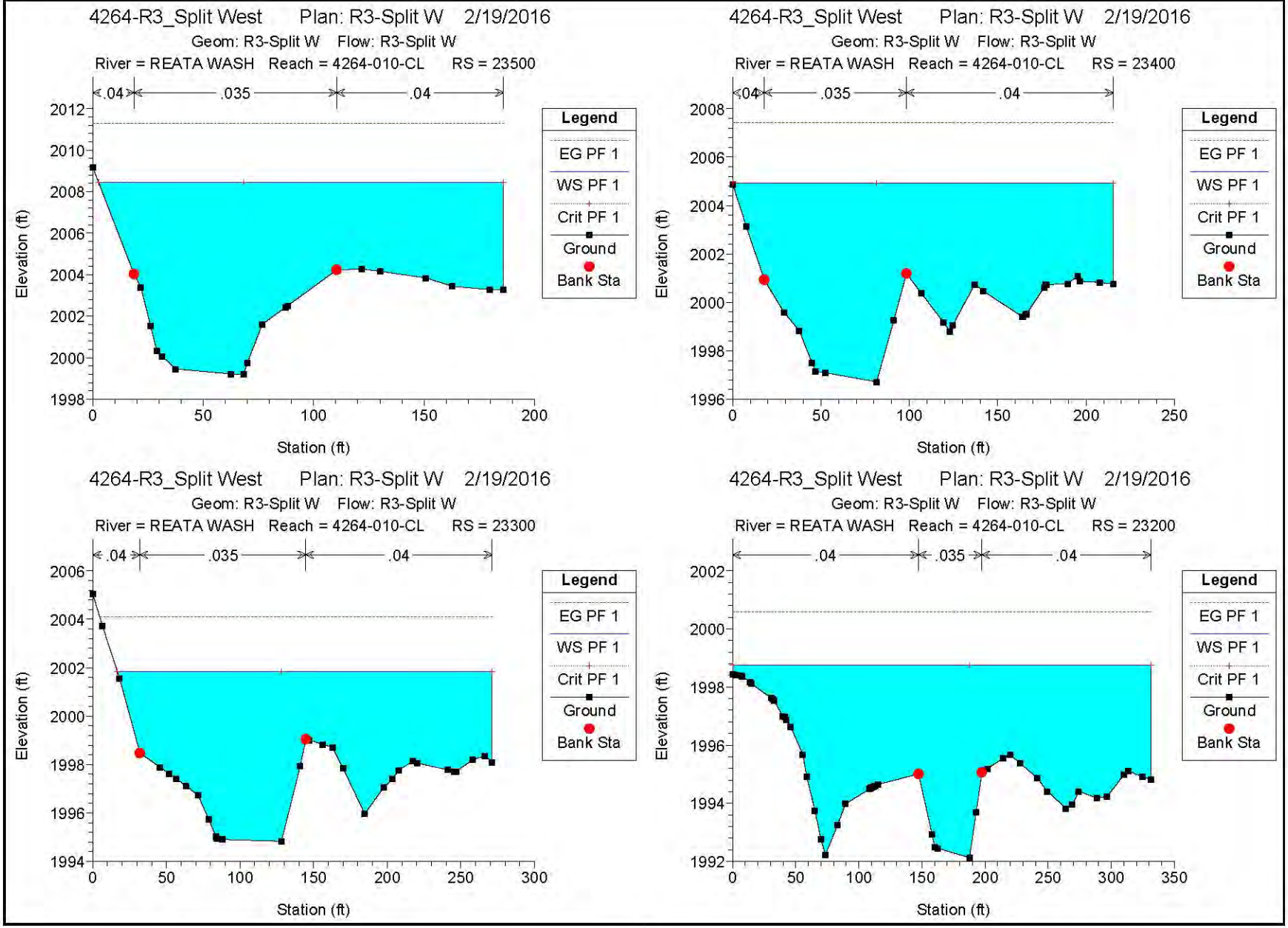

4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 21900
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 21800
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 21700
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 21600
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

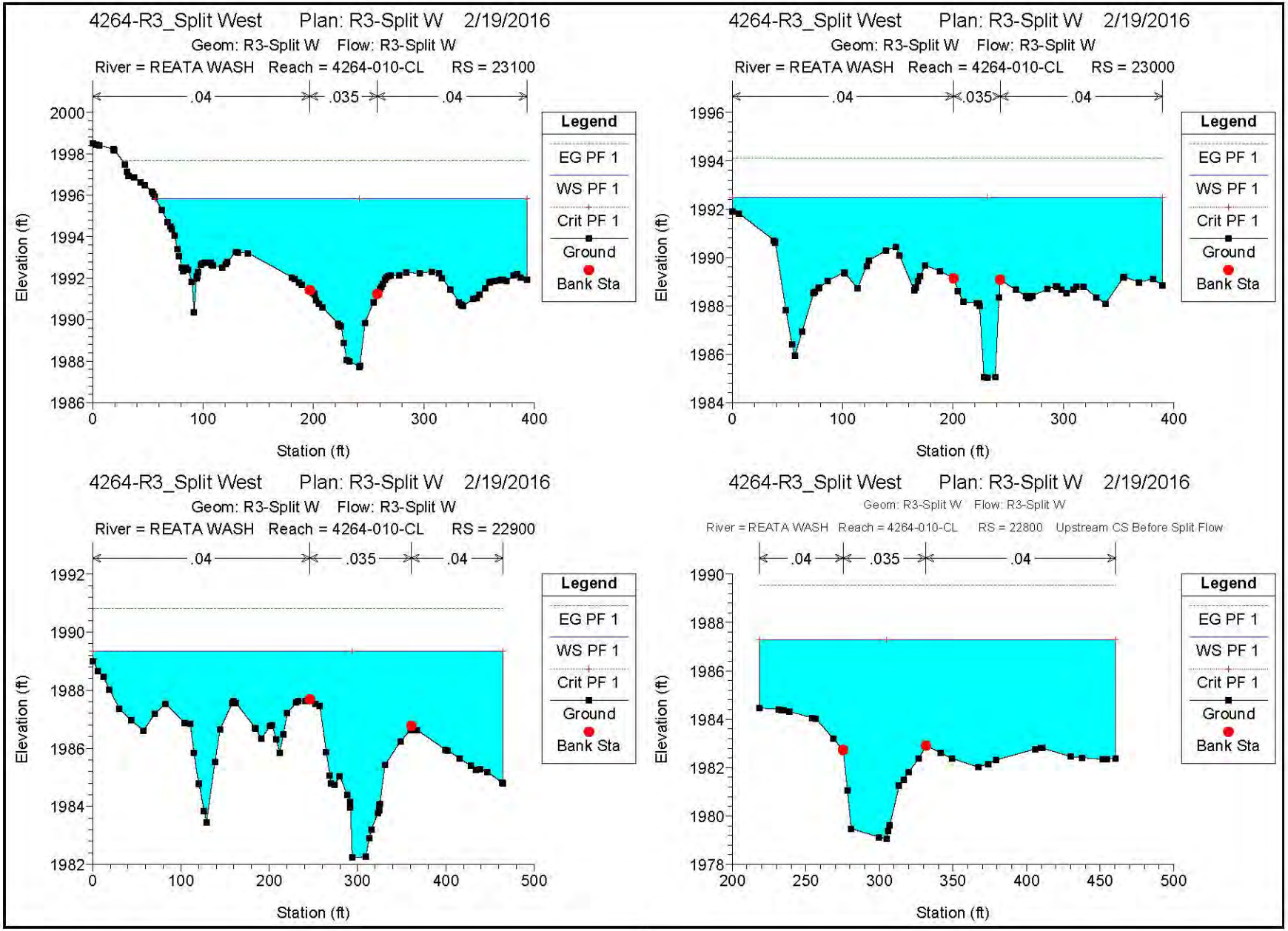

4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 21500
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 21400
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 21300
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split East Plan: R3-Split E 2/22/2016
Geom: R3-Split E Flow: R3-Split E
River = REATA WASH Reach = 4264-010-CL RS = 21200
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

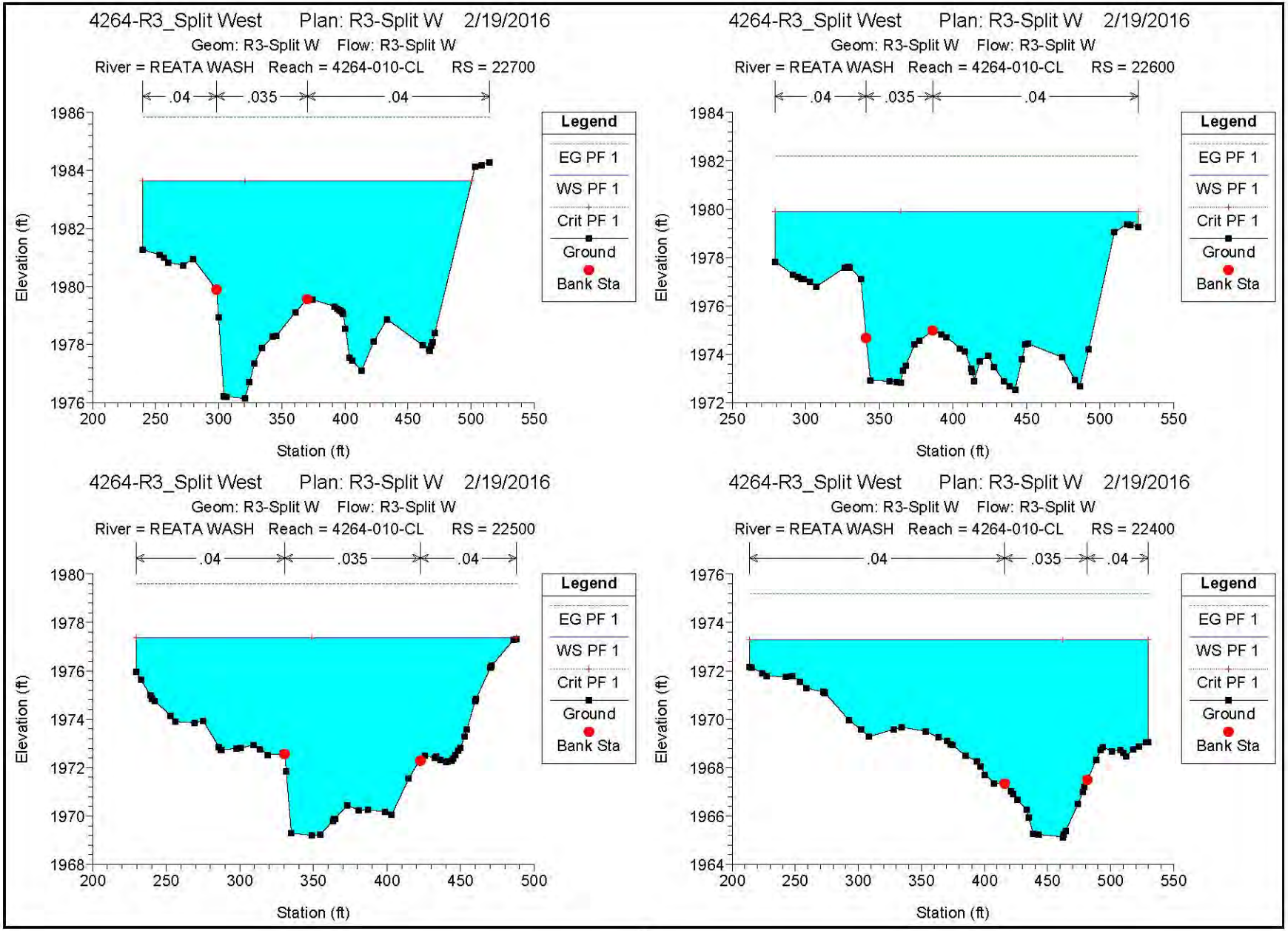
APPENDIX B
HEC-RAS Profiles and Cross Sections
Reach 3 West

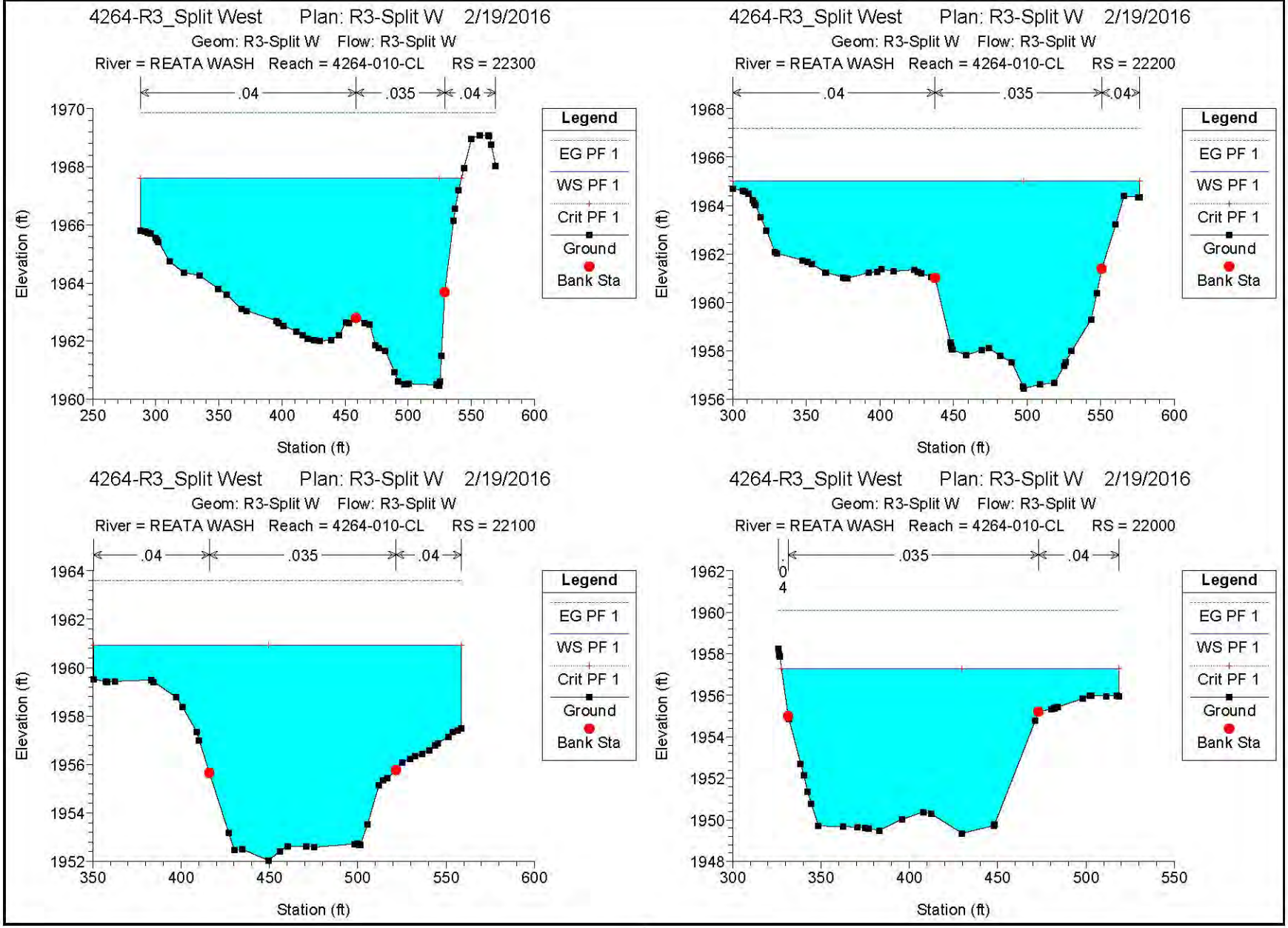
Stations 228+00 to 212+00
Model: 4264-R3_SplitWest.prj

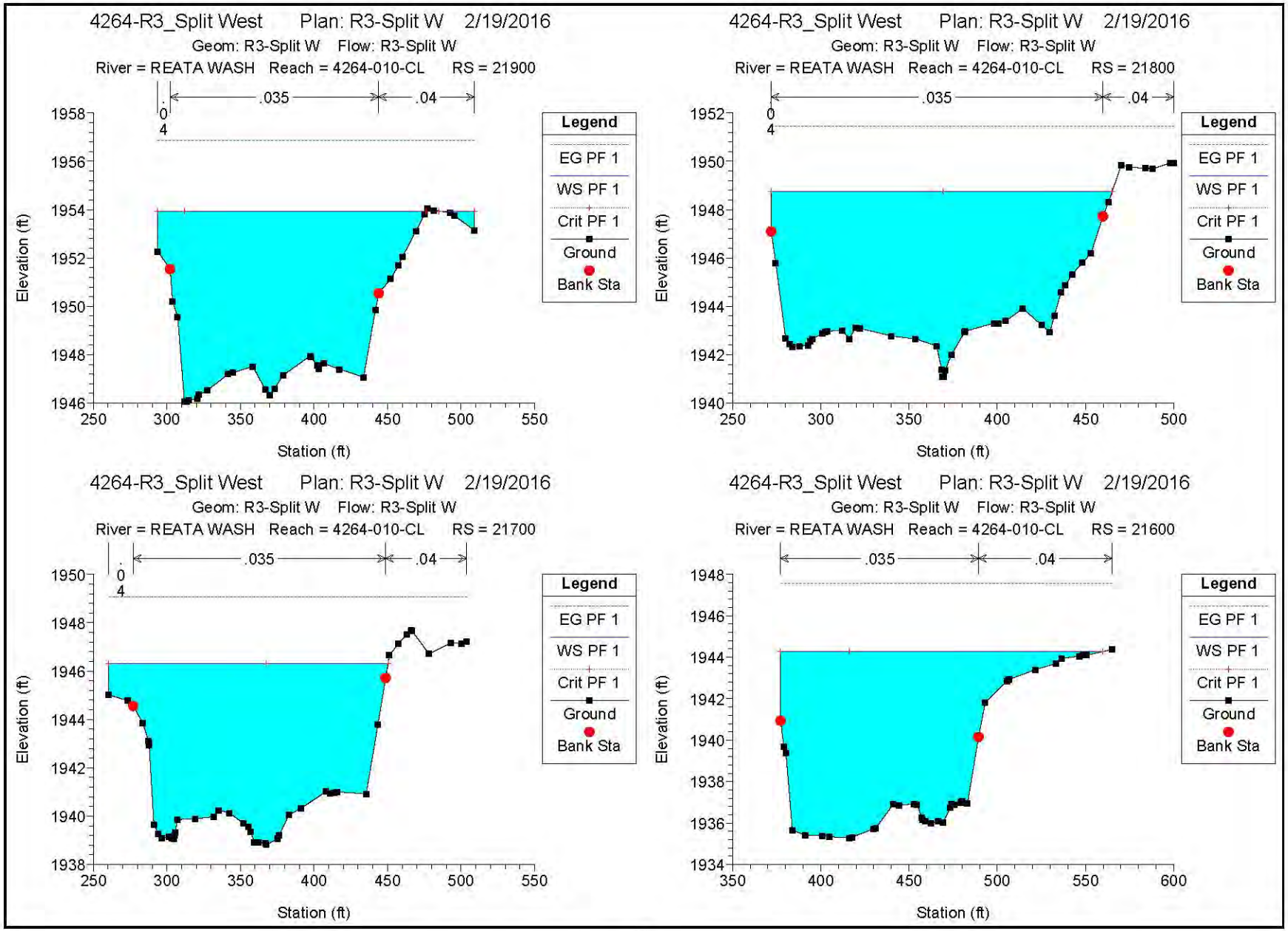

4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
REATA WASH 4264-010-CL
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Elevation (ft)
2020
2000
1980
1960
1940
1920
1900
21000
21500
22000
22500
23000
23500
Main Channel Distance (ft)
21200
21300
21400
21500
21600
21700
21800
21900
22000
22100
22200
22300
22400
22500
22600
22700
22800
22900
23000
23100
23200
23300
23400
23500

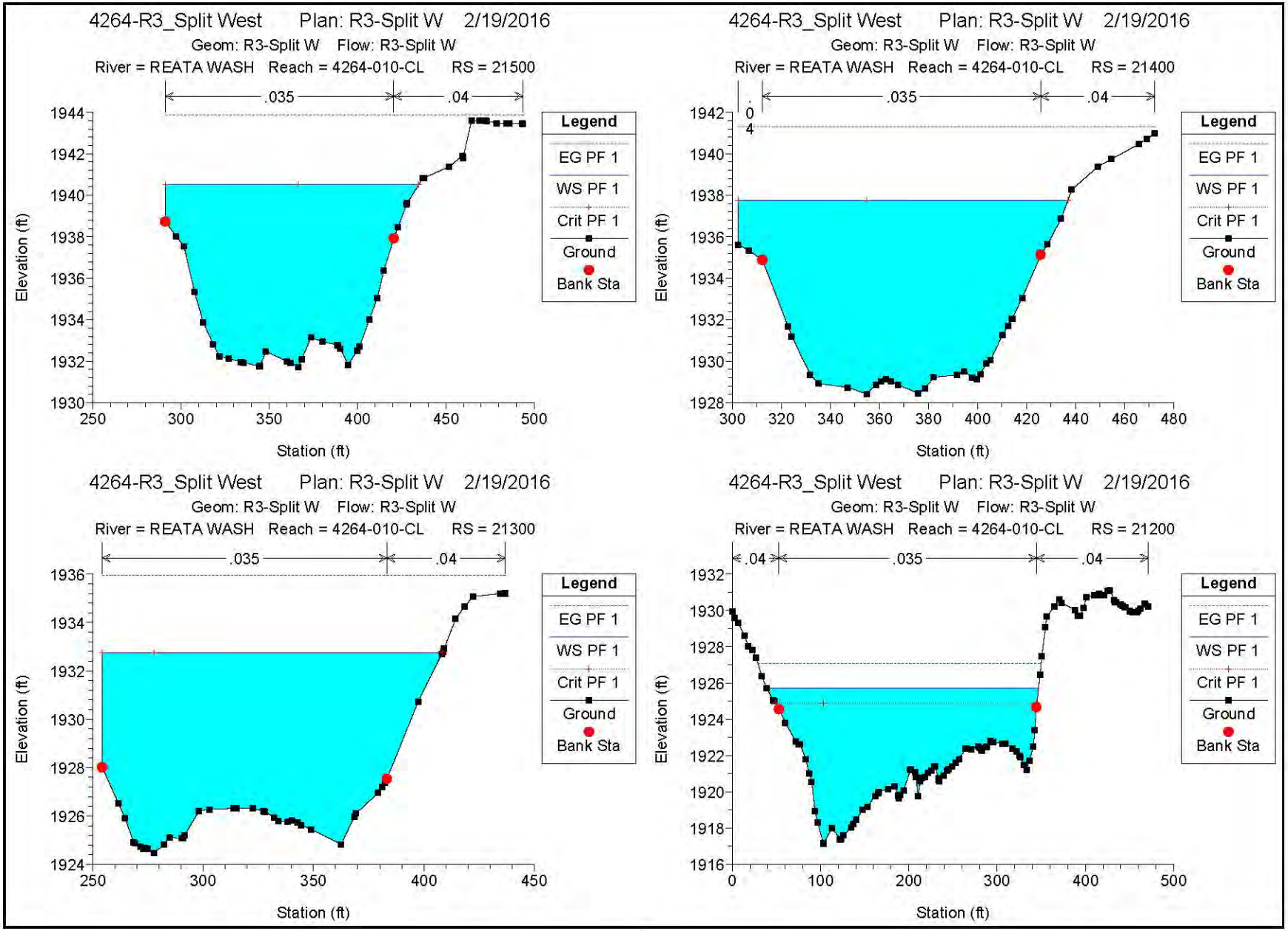

4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 23500
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 23400
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 23300
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 23200
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 23100
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 23000
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22900
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22800 Upstream CS Before Split Flow
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22700
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22600
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22500
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22400
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

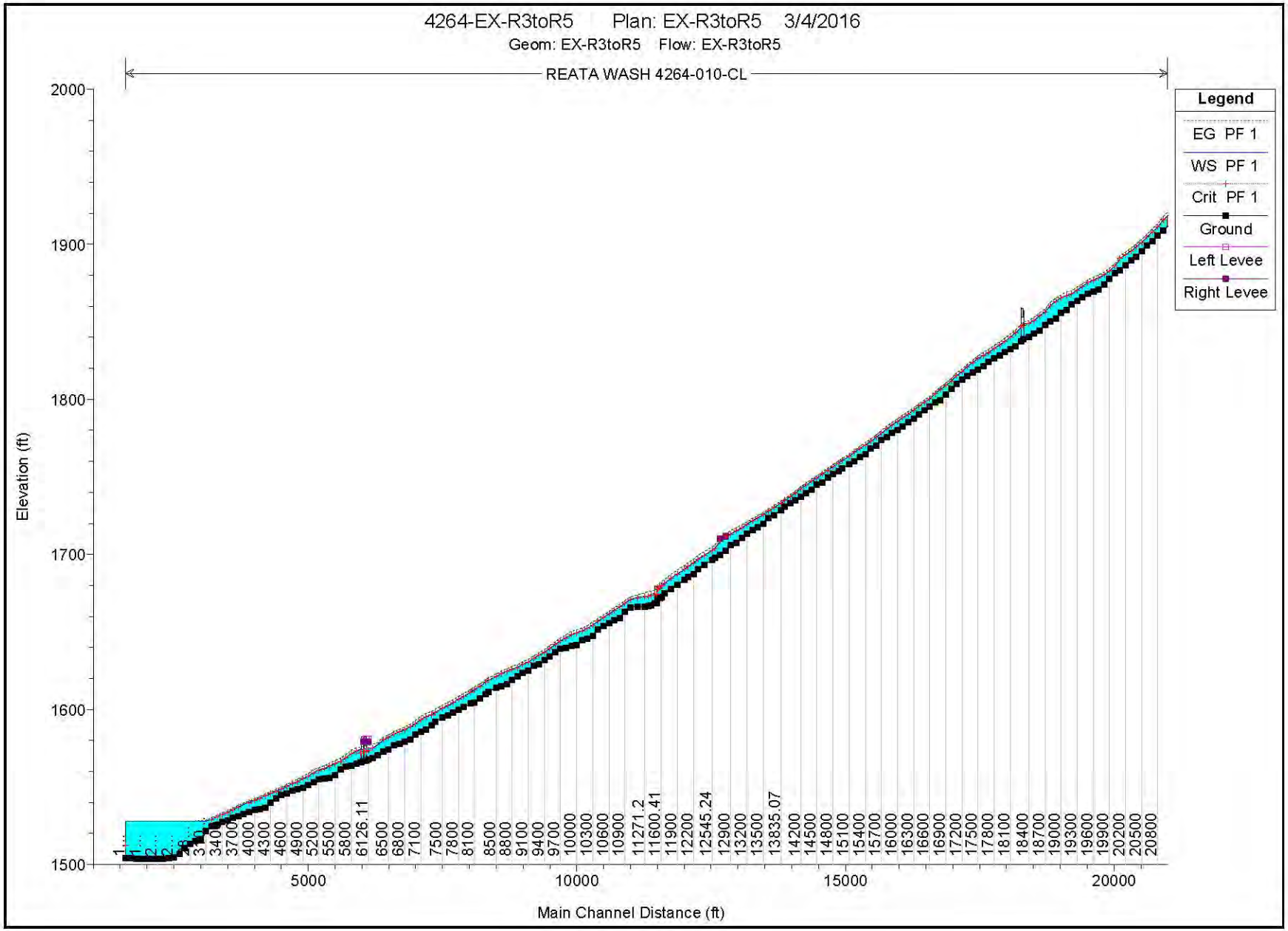

4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22300
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22200
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22100
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 22000
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

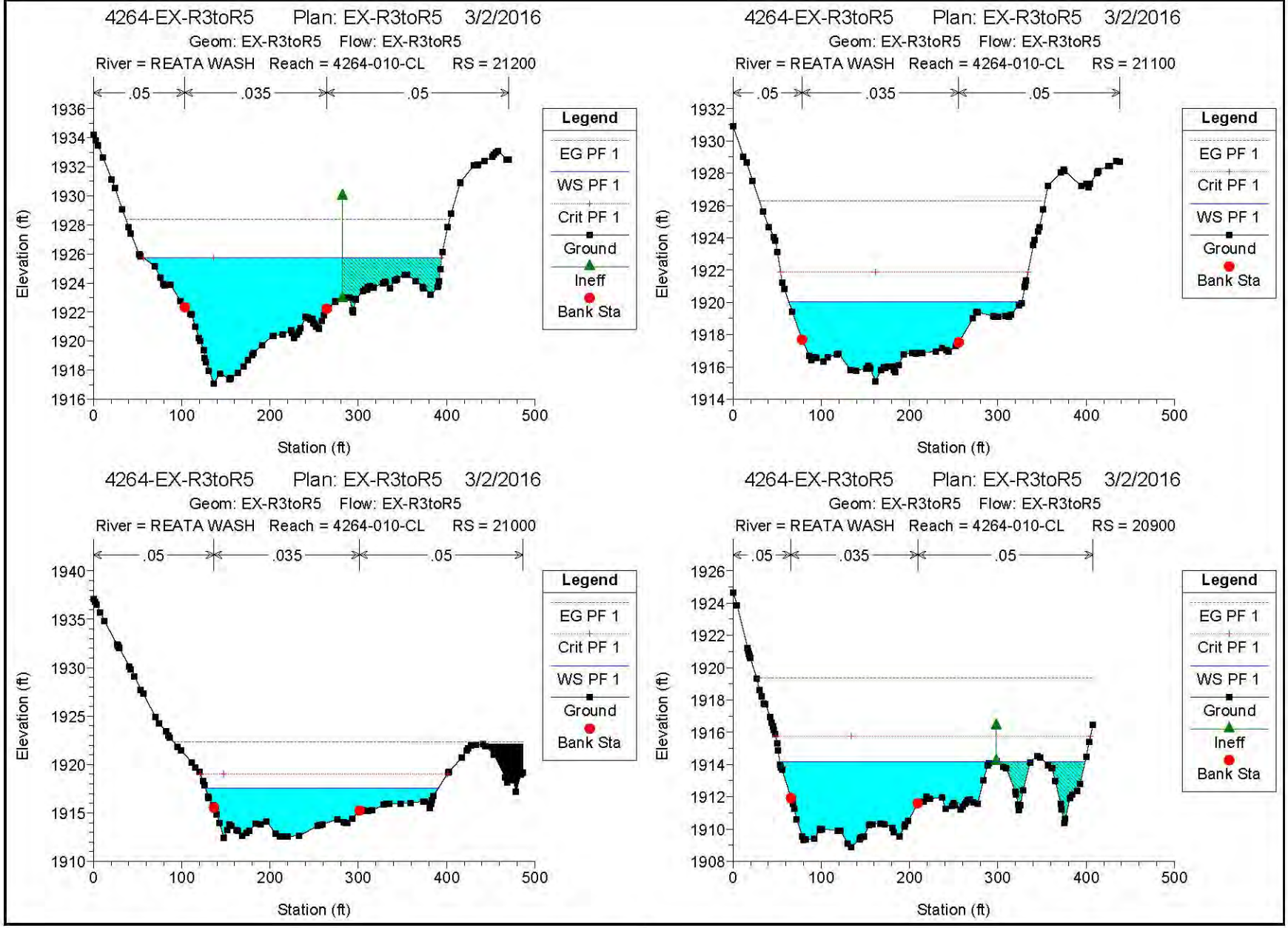

4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 21900
.035
.04
0
4
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 21800
.035
.04
0
4
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 21700
.035
.04
0
4
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 21600
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

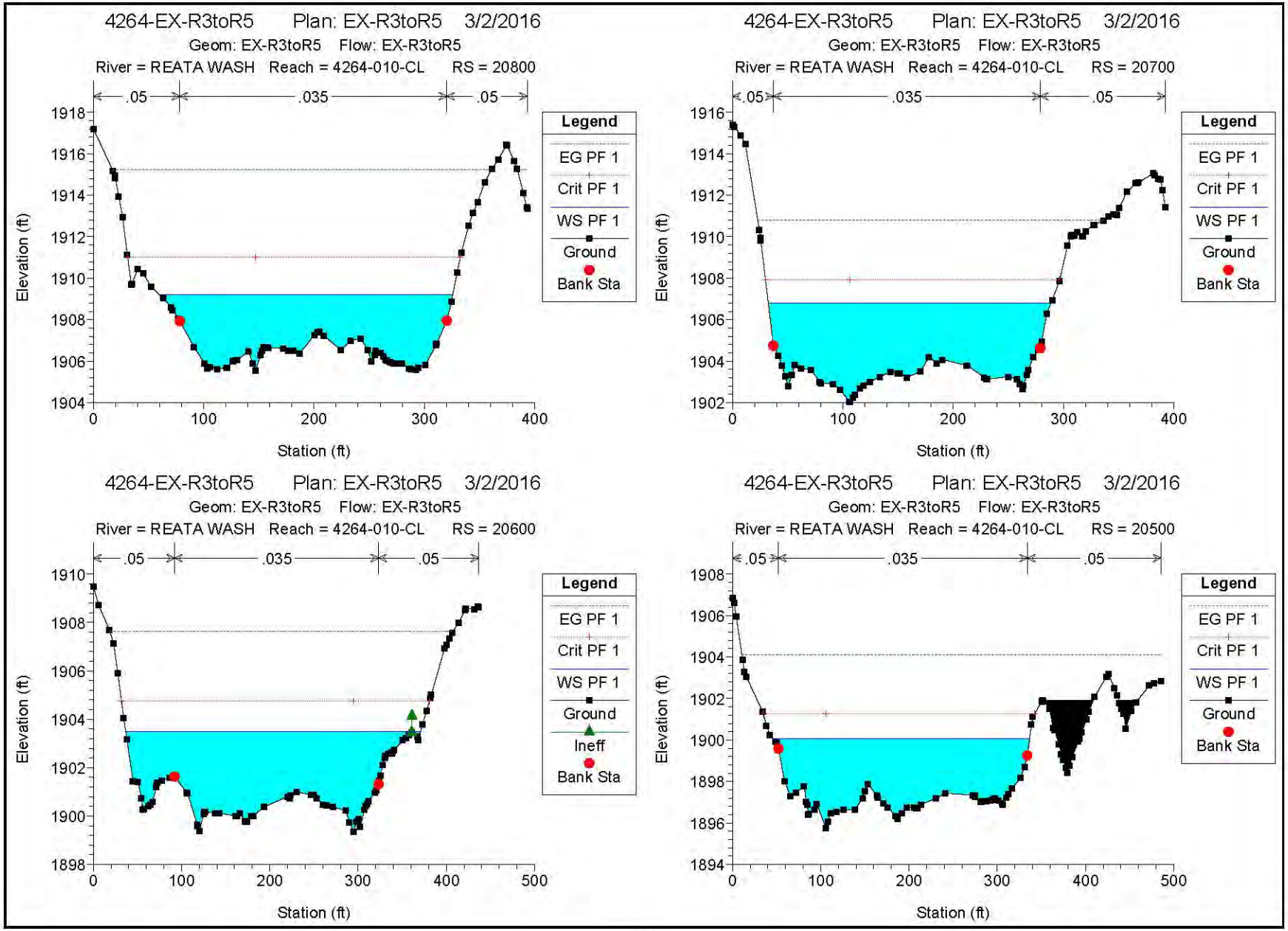

4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 21500
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 21400
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 21300
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-R3_Split West Plan: R3-Split W 2/19/2016
Geom: R3-Split W Flow: R3-Split W
River = REATA WASH Reach = 4264-010-CL RS = 21200
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

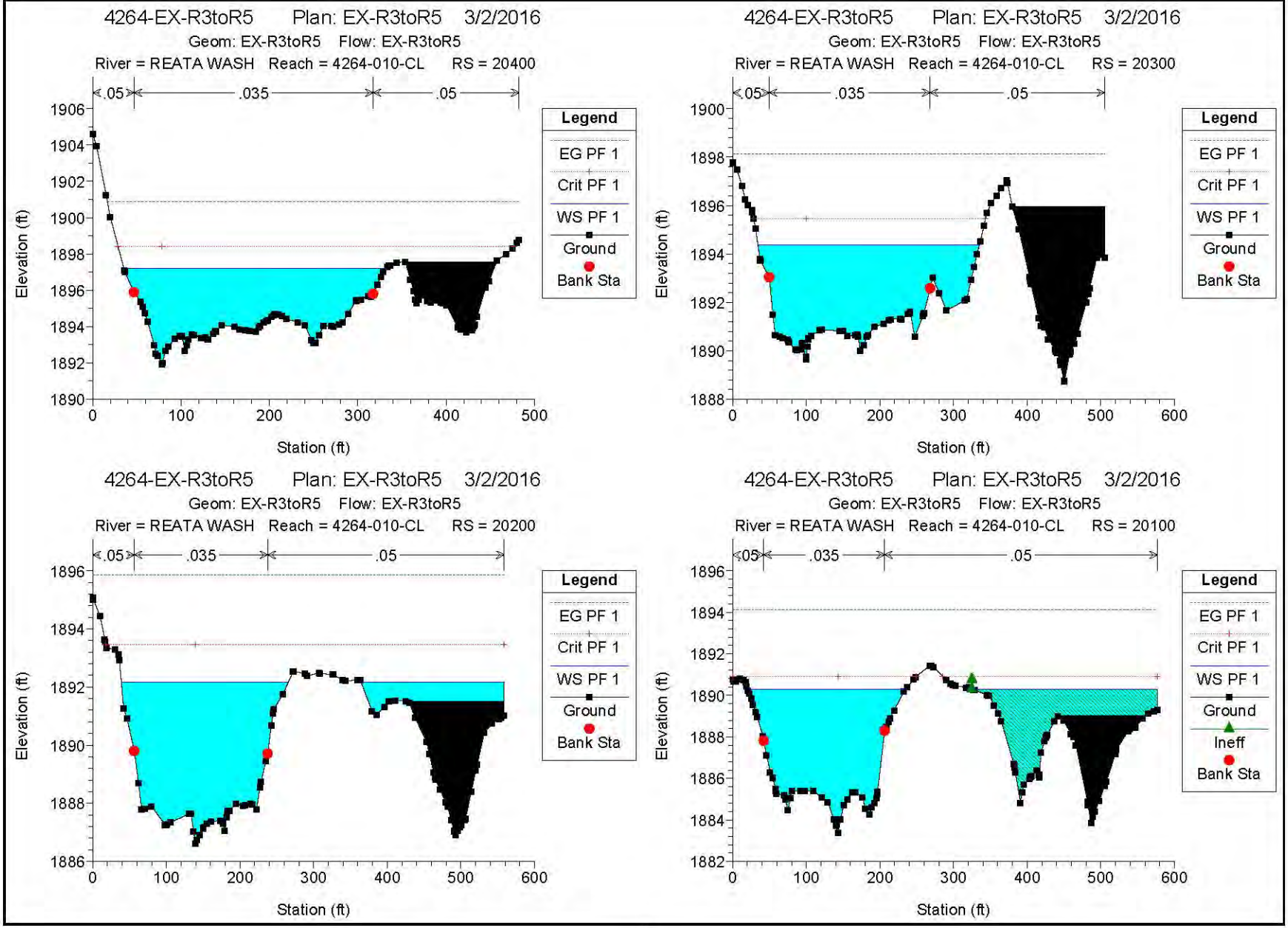
APPENDIX B
HEC-RAS Profiles and Cross Sections
Reach 3 South and Reaches 4 & 5

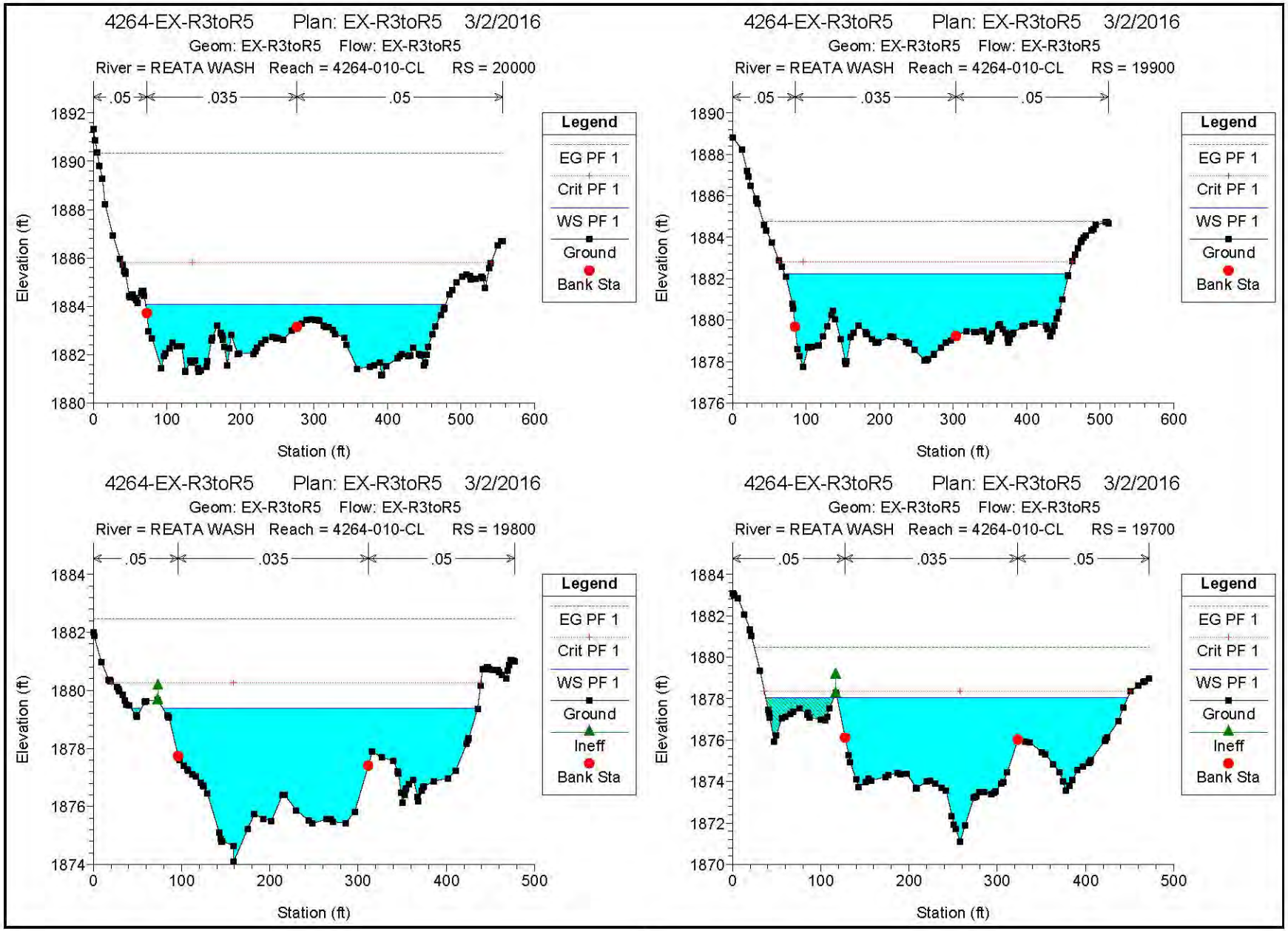
Stations 212+00 to 16+00
Model: 4264-EX-R3 to R5.prj

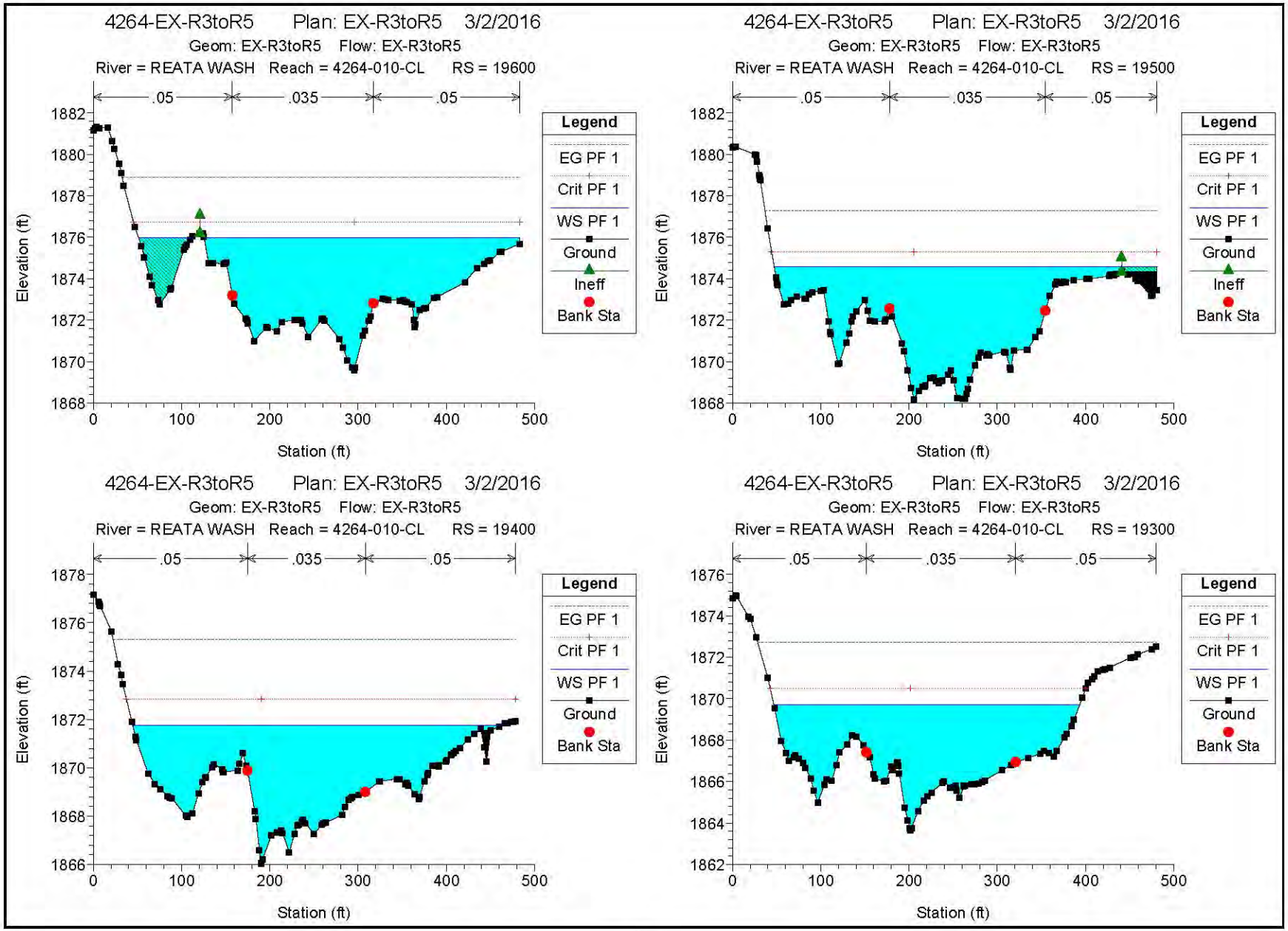

4264-EX-R3toR5 Plan: EX-R3toR5 3/4/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
REATA WASH 4264-010-CL
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Left Levee
Right Levee
Elevation (ft)
Main Channel Distance (ft)
2000
1900
1800
1700
1600
1500
5000
10000
15000
20000

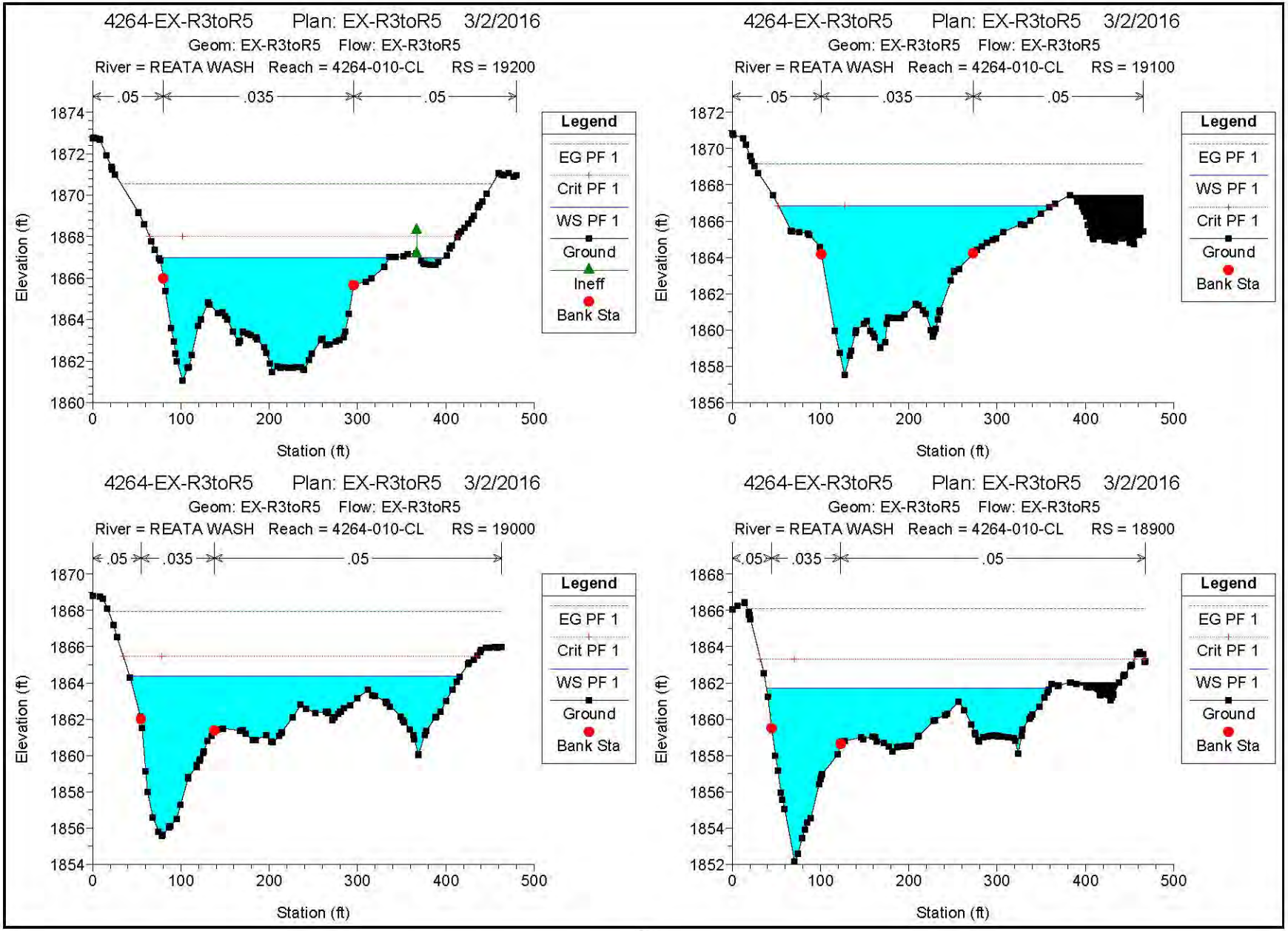

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 21200
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 21100
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 21000
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20900
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta

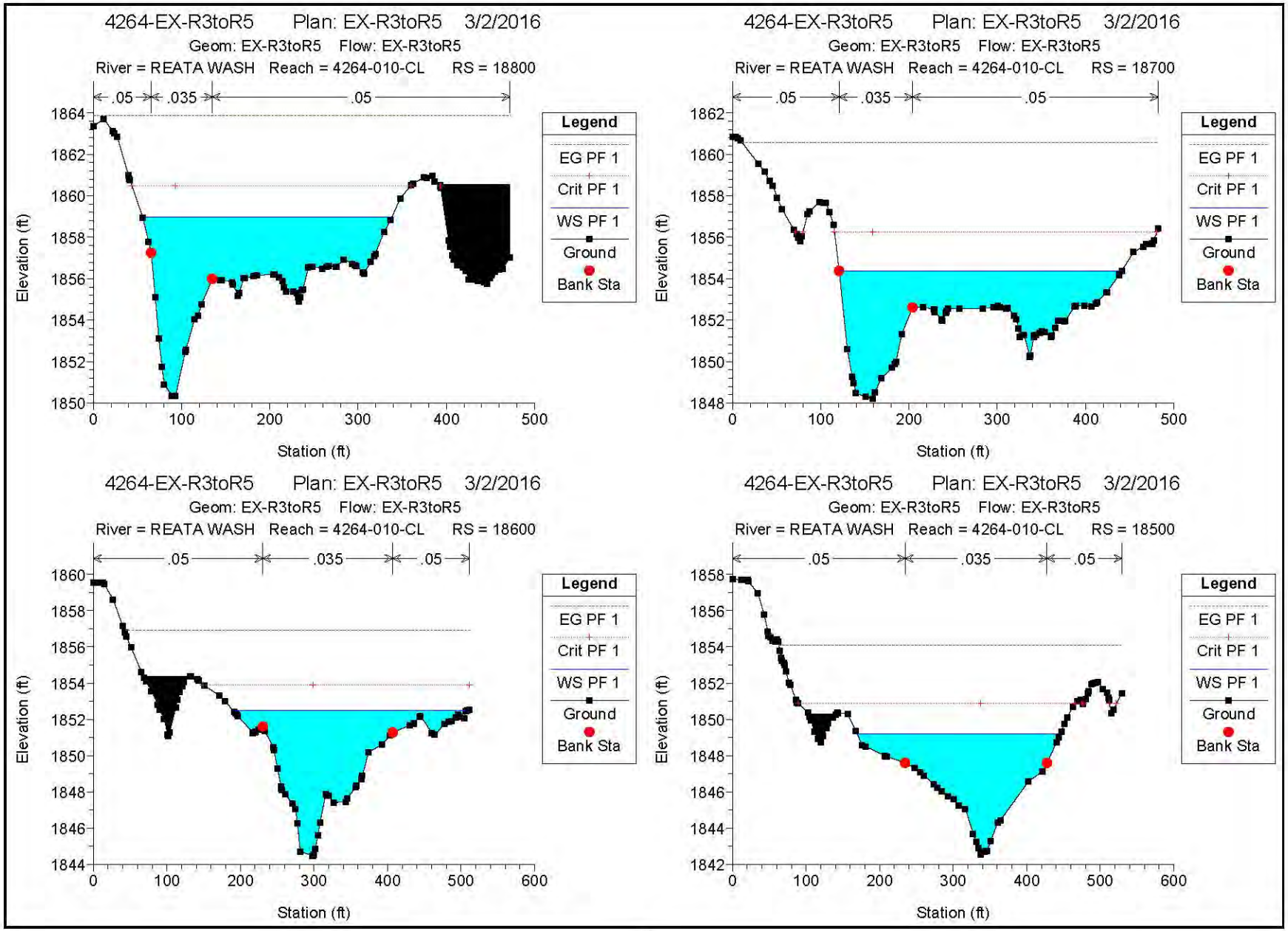

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20800
.05
.035
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20700
.05
.035
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20600
.05
.035
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20500
.05
.035
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

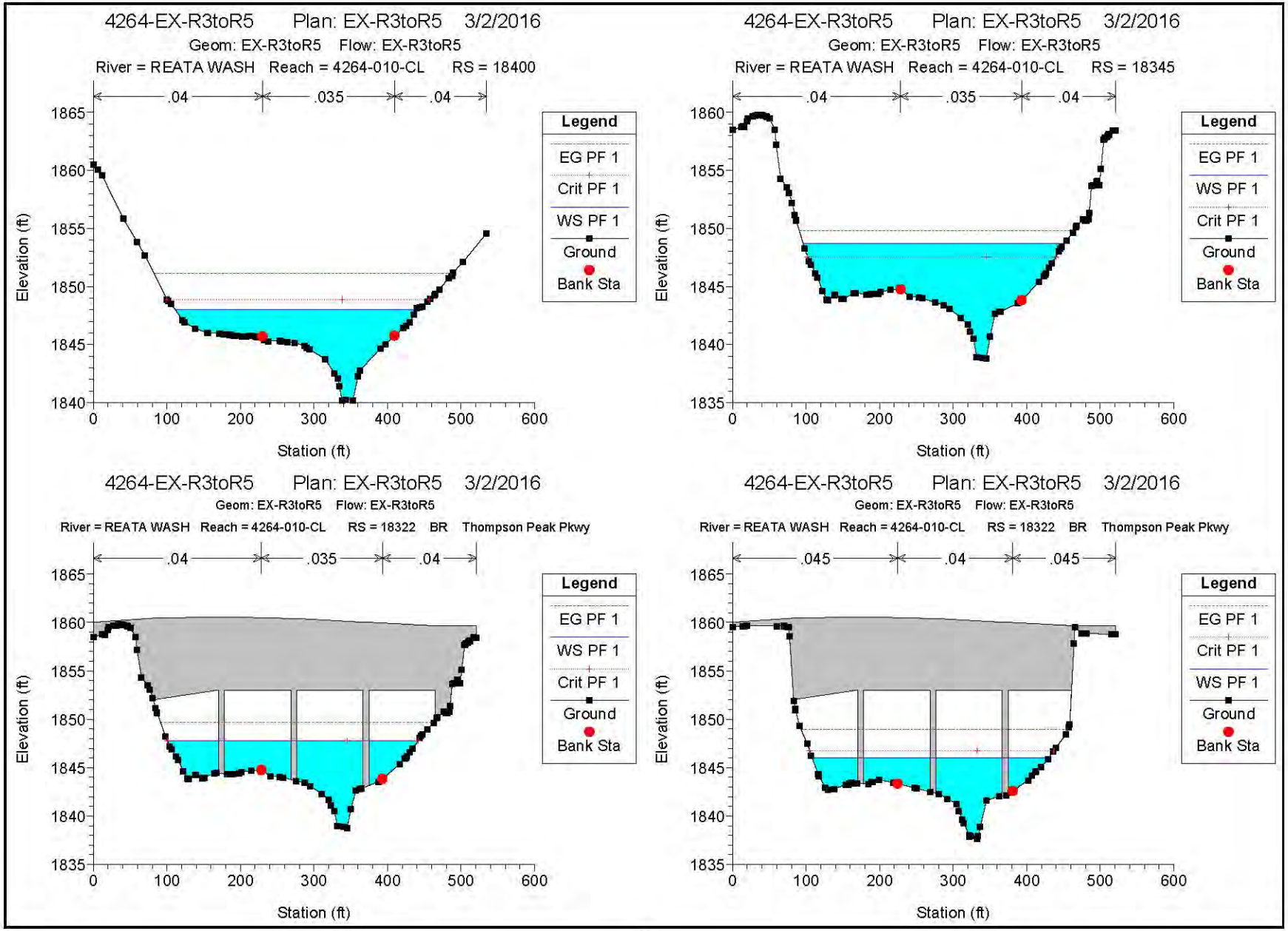

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20400
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20300
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20200
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20100
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta

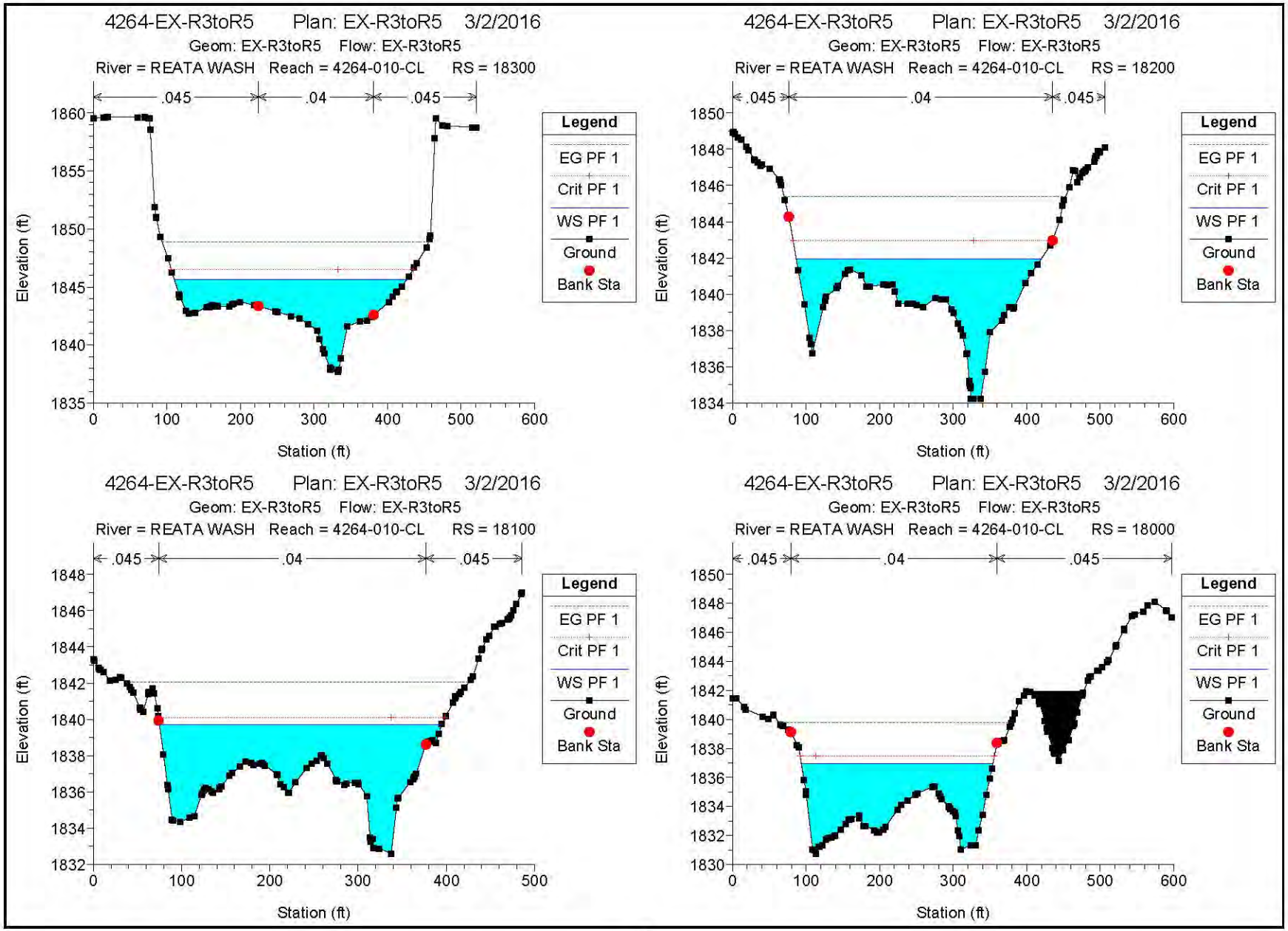

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 20000
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19900
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19800
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19700
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta

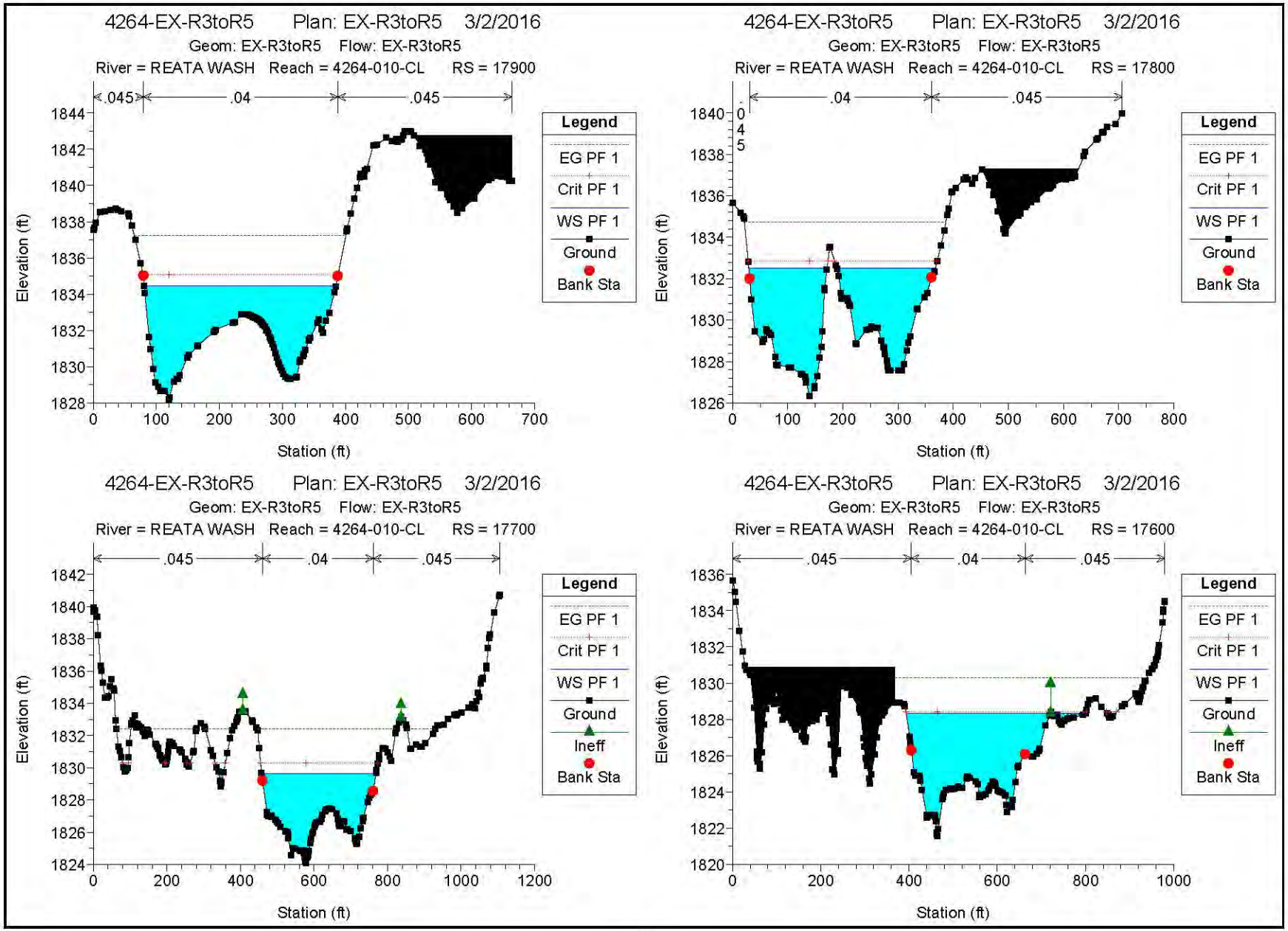

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19600
.05
.035
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19500
.05
.035
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19400
.05
.035
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19300
.05
.035
.05
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

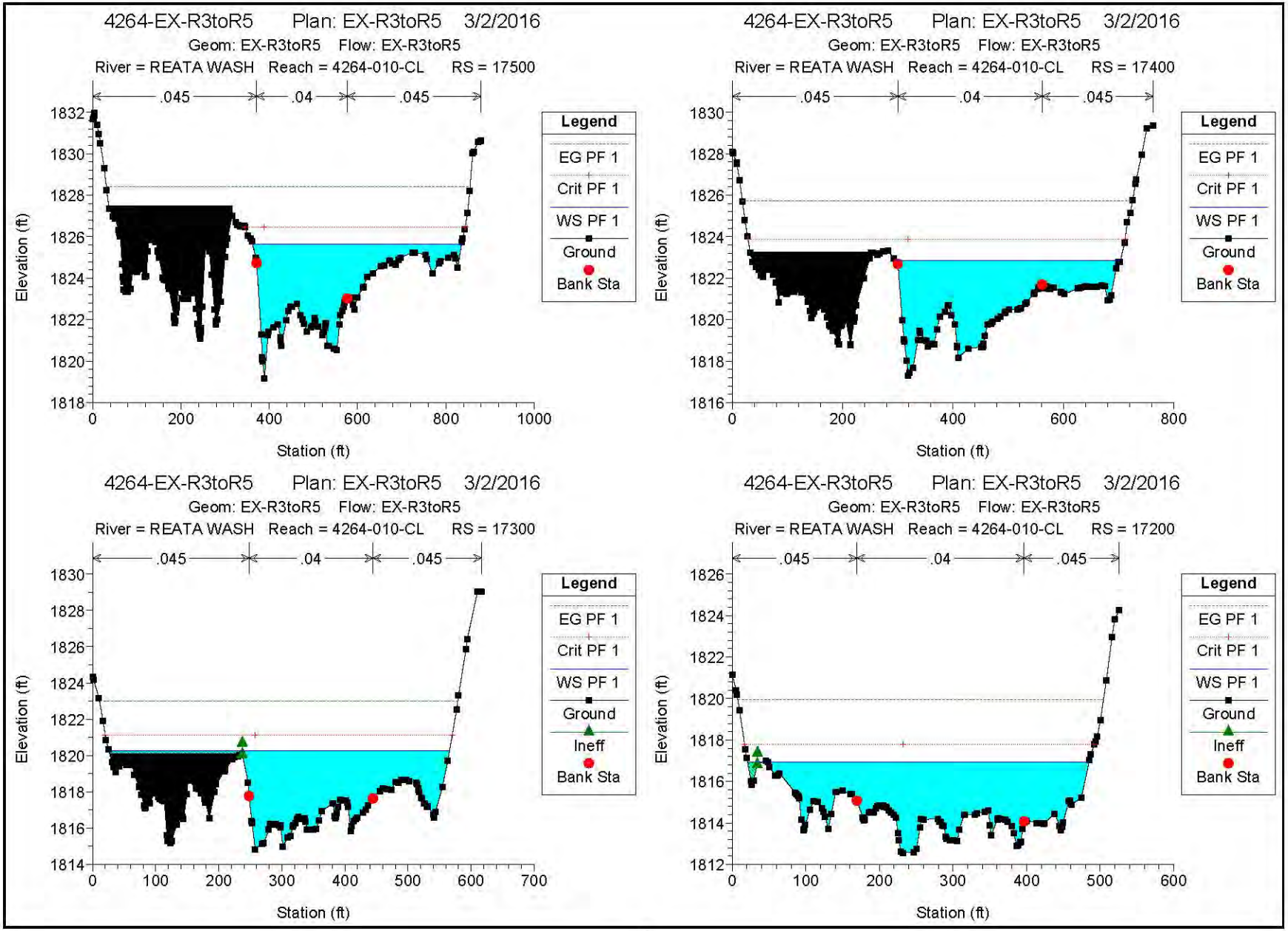

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19200
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19100
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 19000
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18900
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

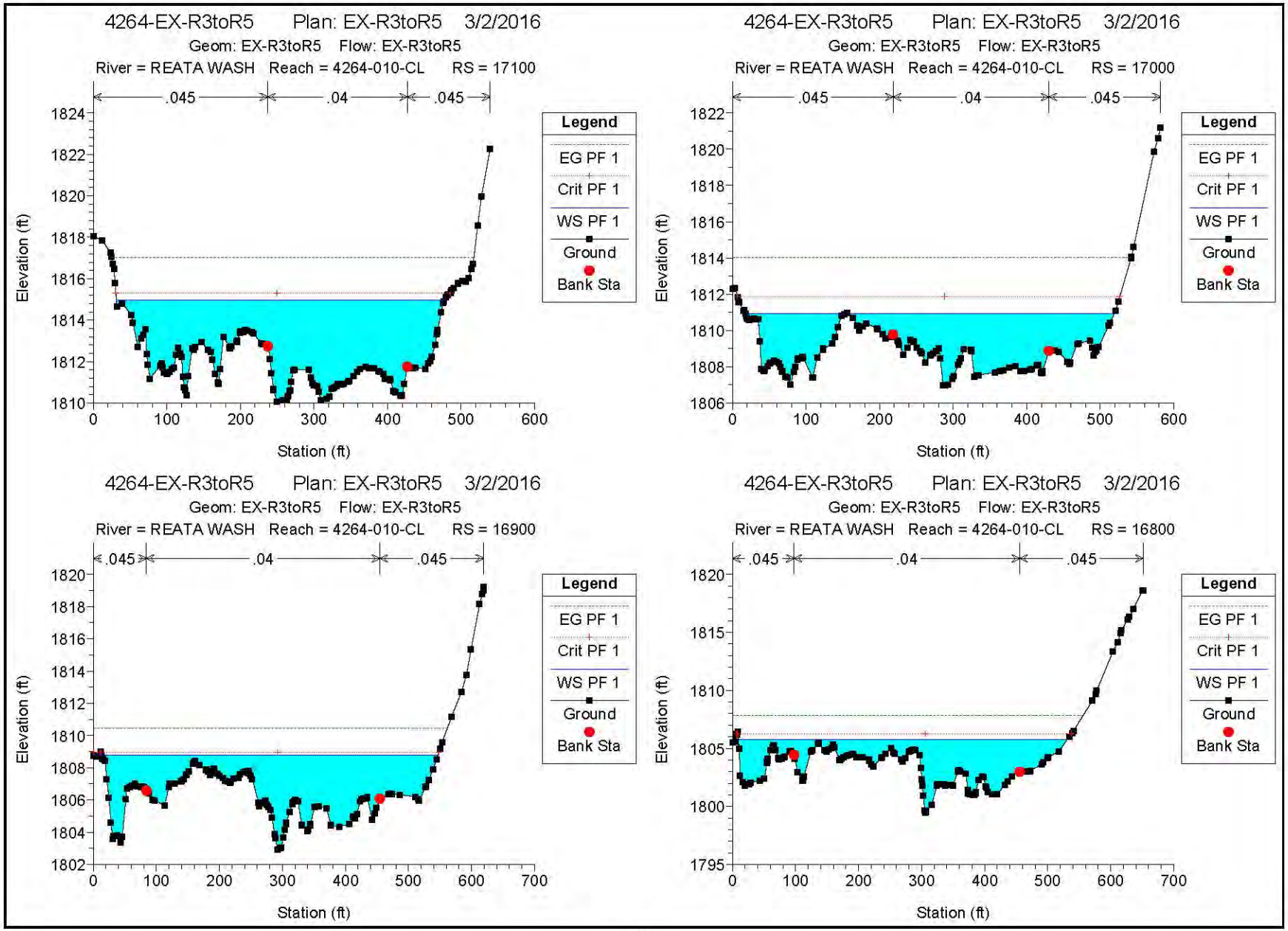

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18800
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18700
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18600
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18500
.05
.035
.05
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

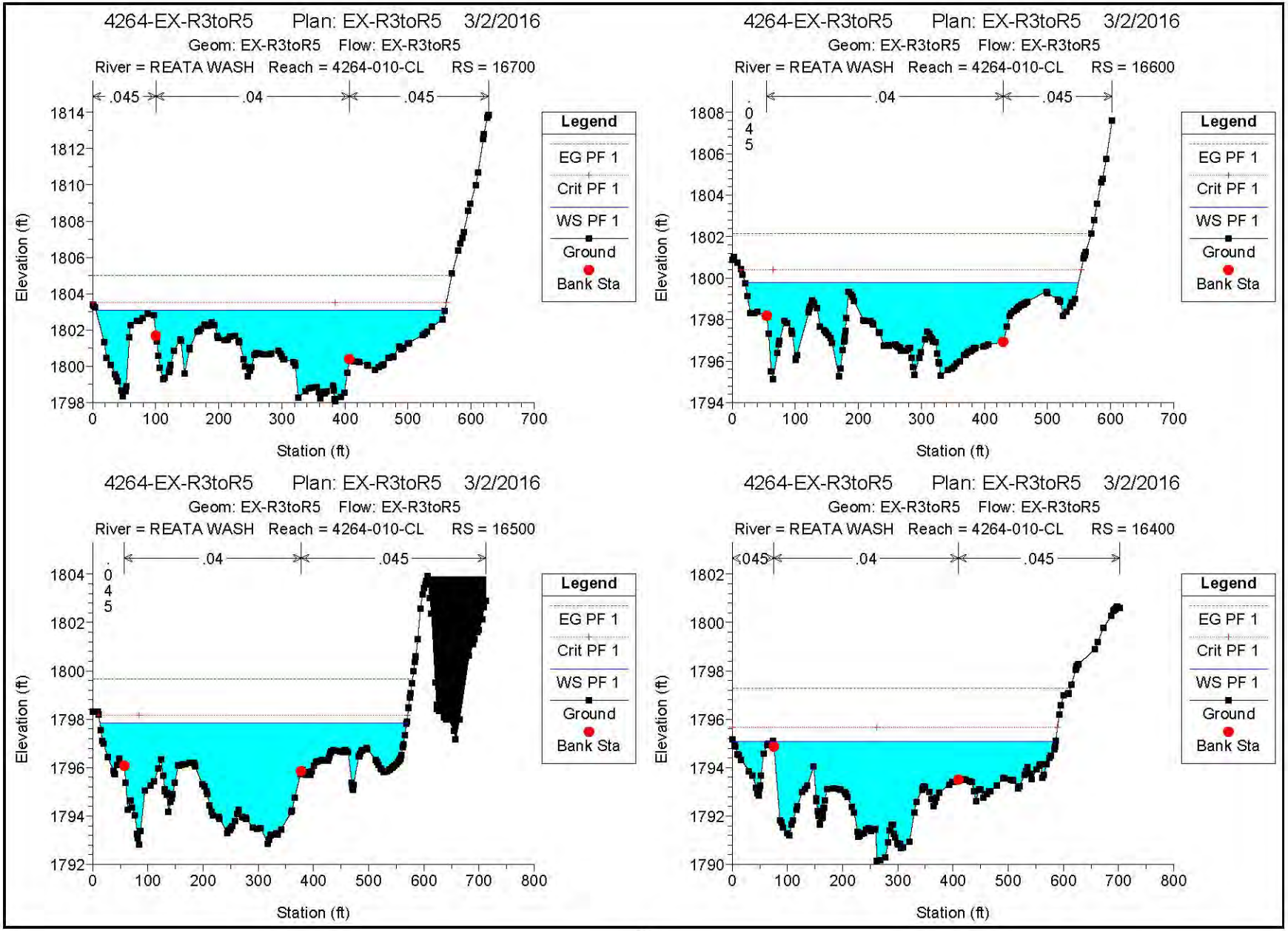

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18400
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18345
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18322 BR Thompson Peak Pkwy
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18322 BR Thompson Peak Pkwy
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18300
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18200
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18100
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 18000
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17900
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17800
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17700
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17600
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17500
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17400
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17300
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17200
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17100
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 17000
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16900
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16800
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16700
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16600
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16500
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16400
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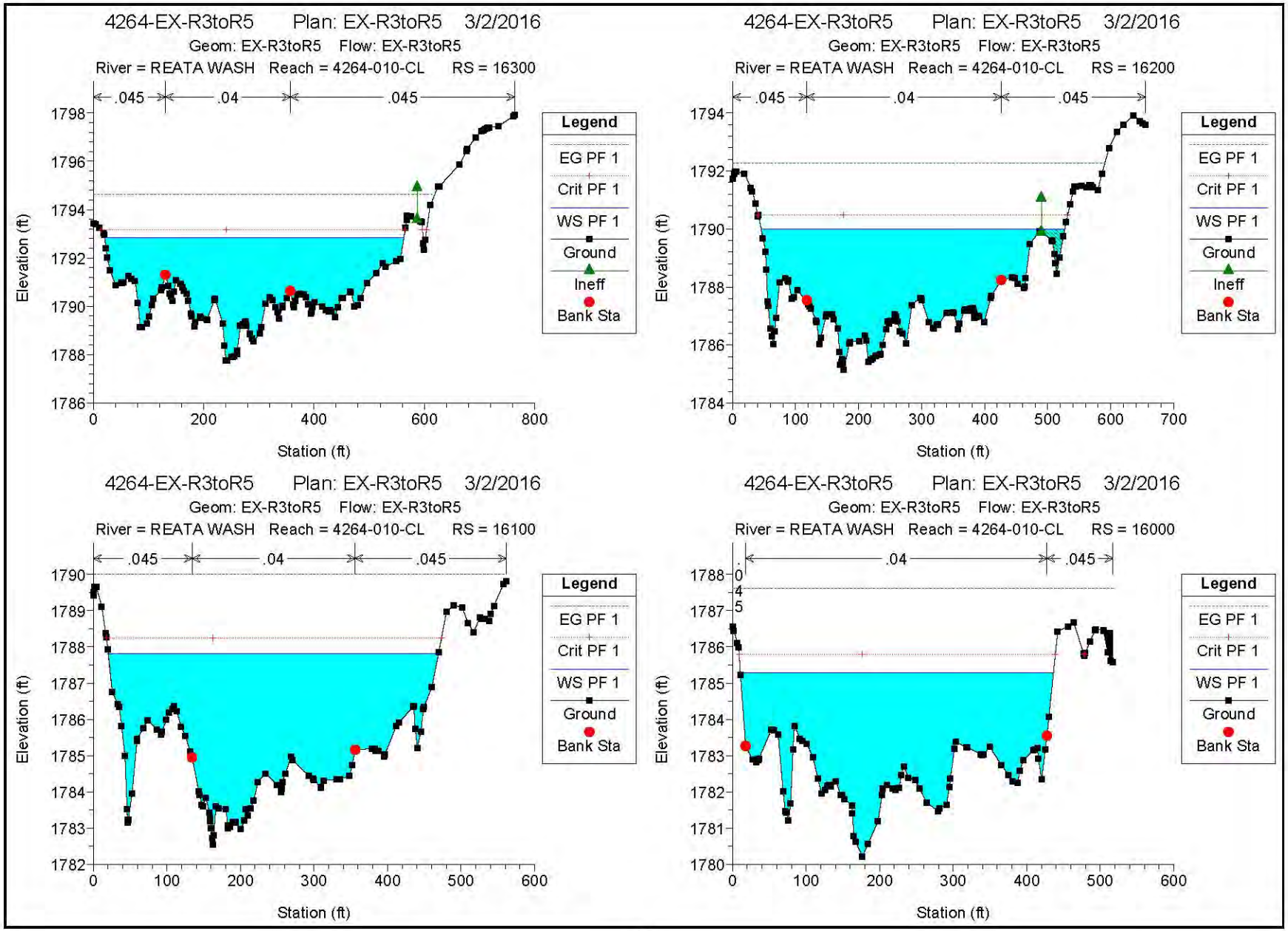
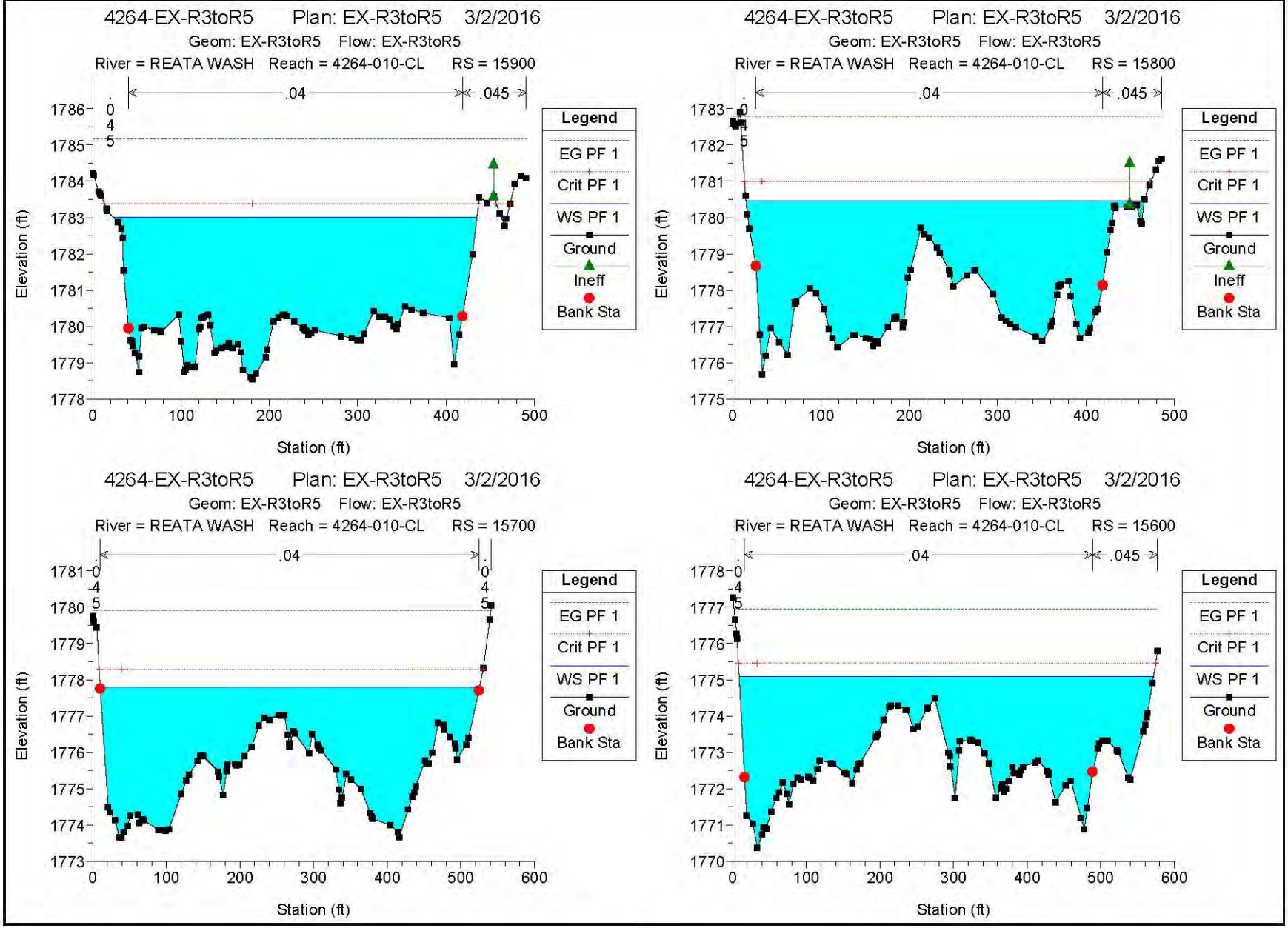
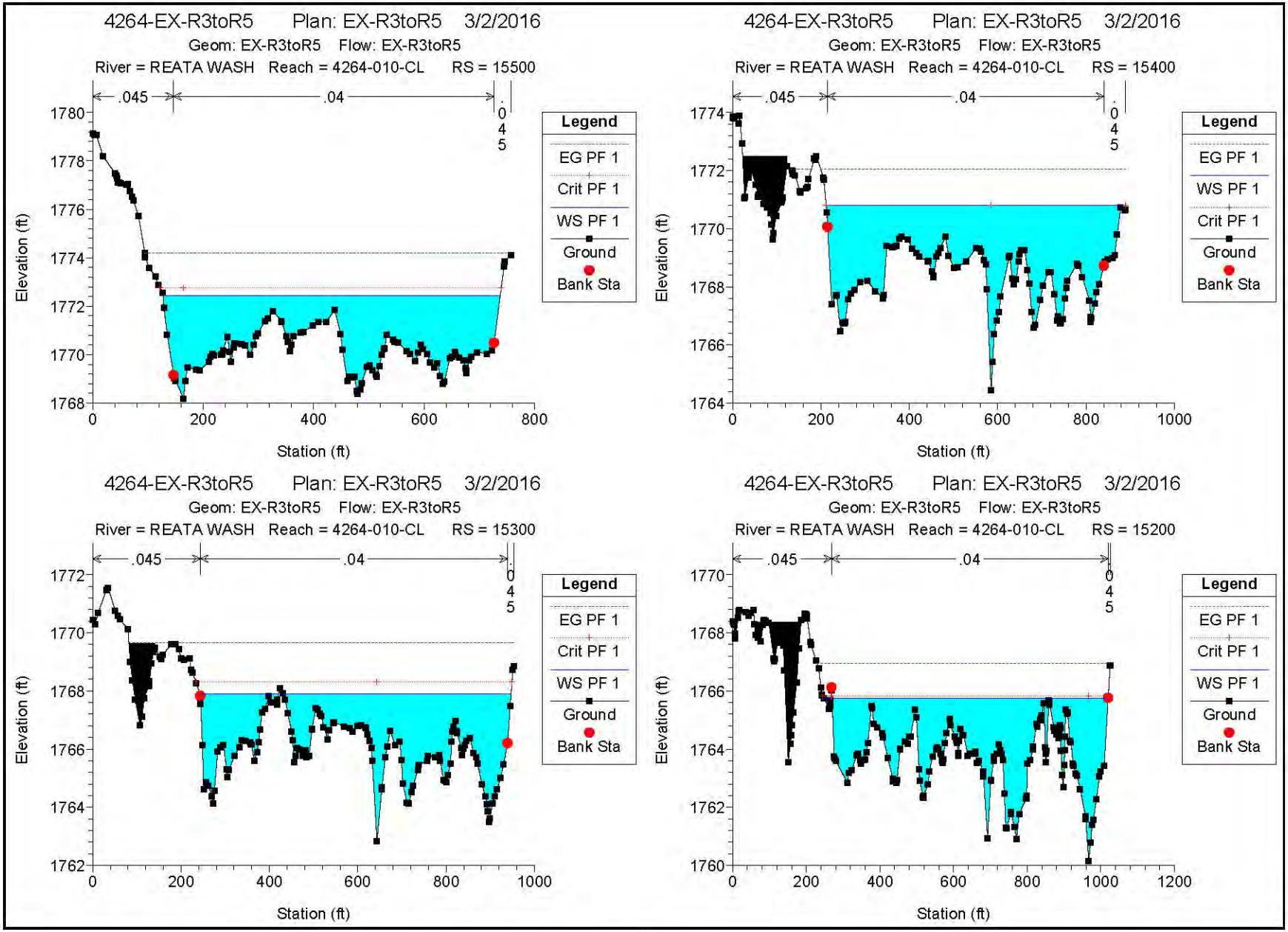
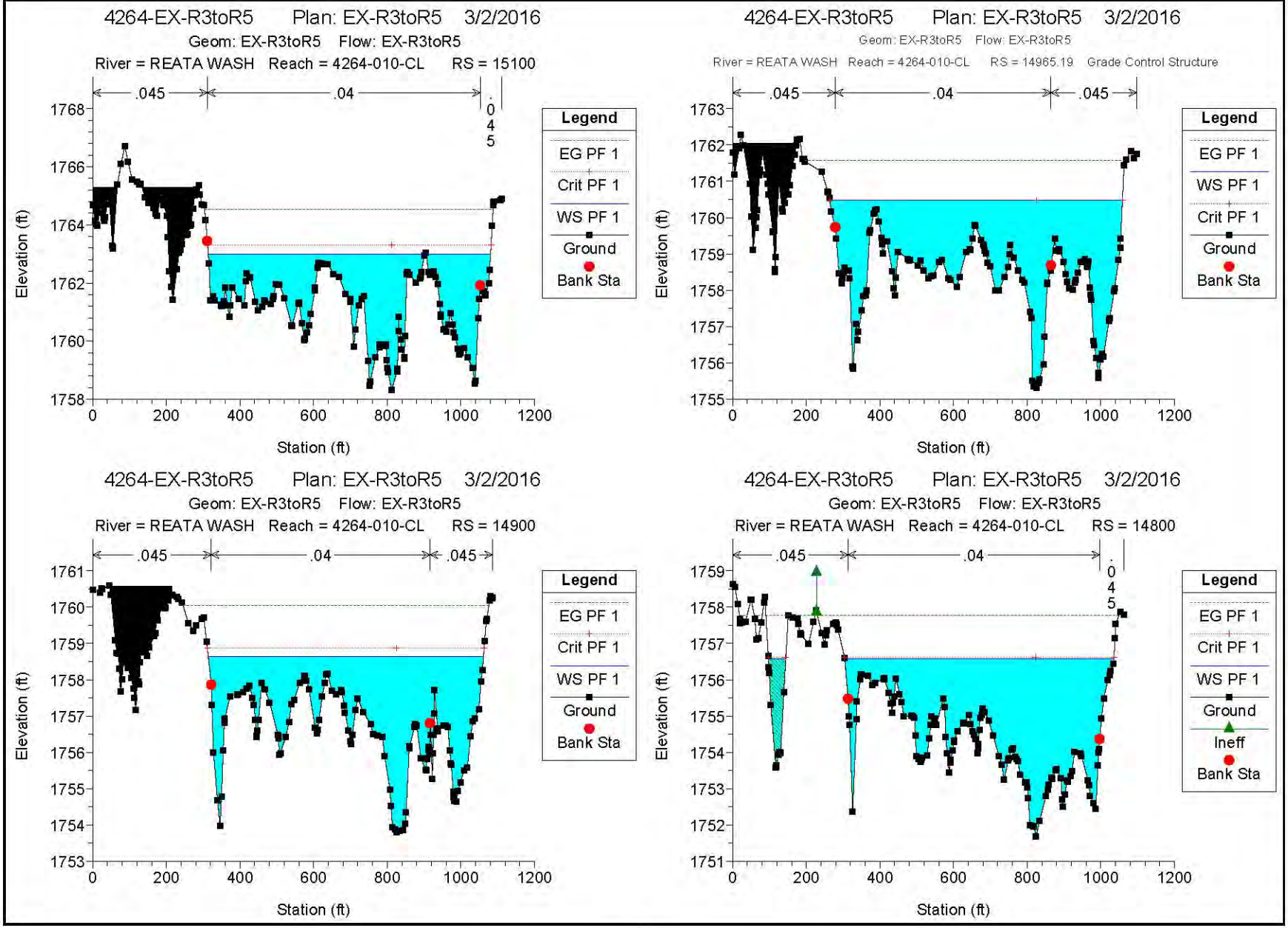
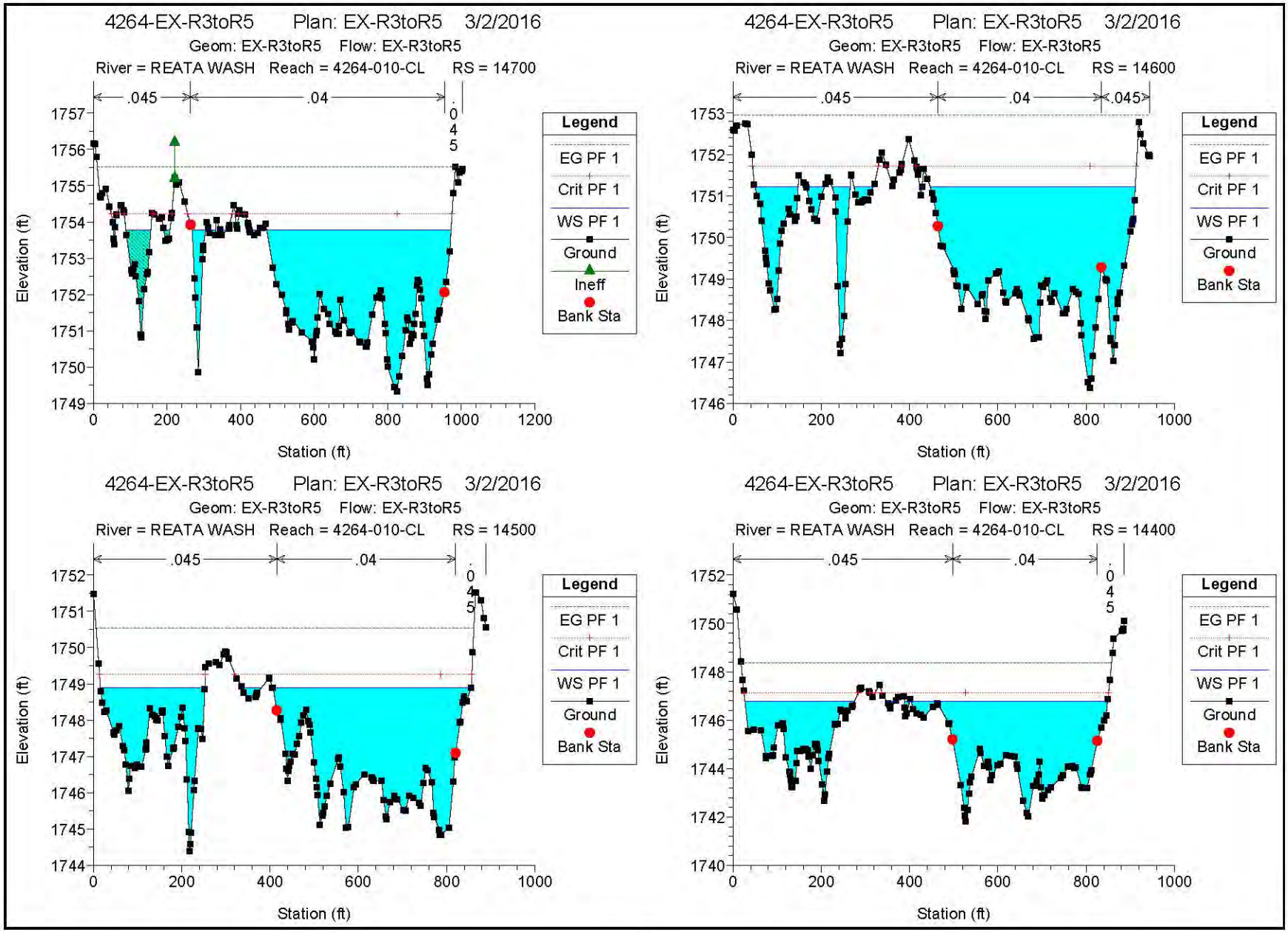
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

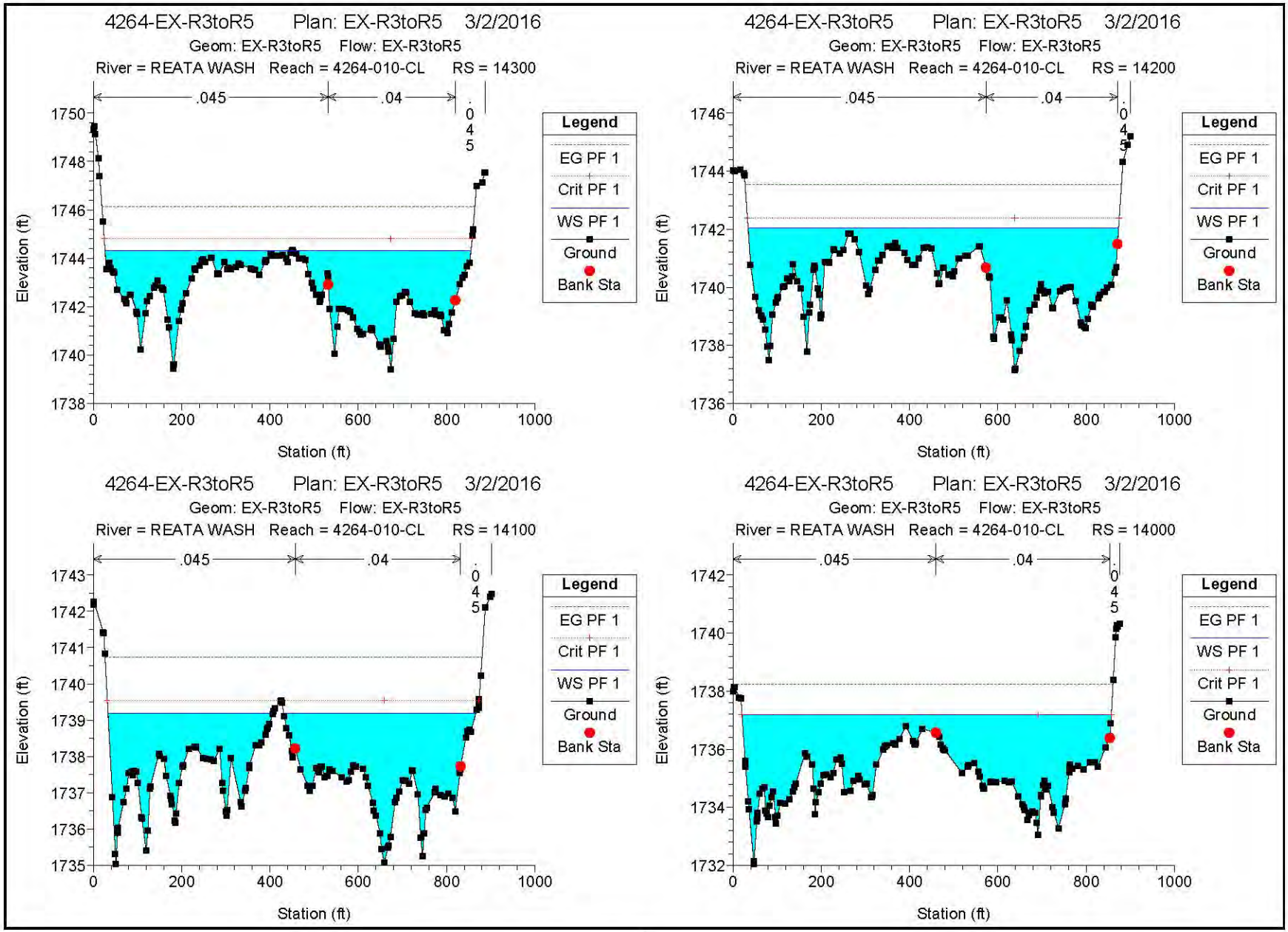

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16300
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16200
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16100
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 16000
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

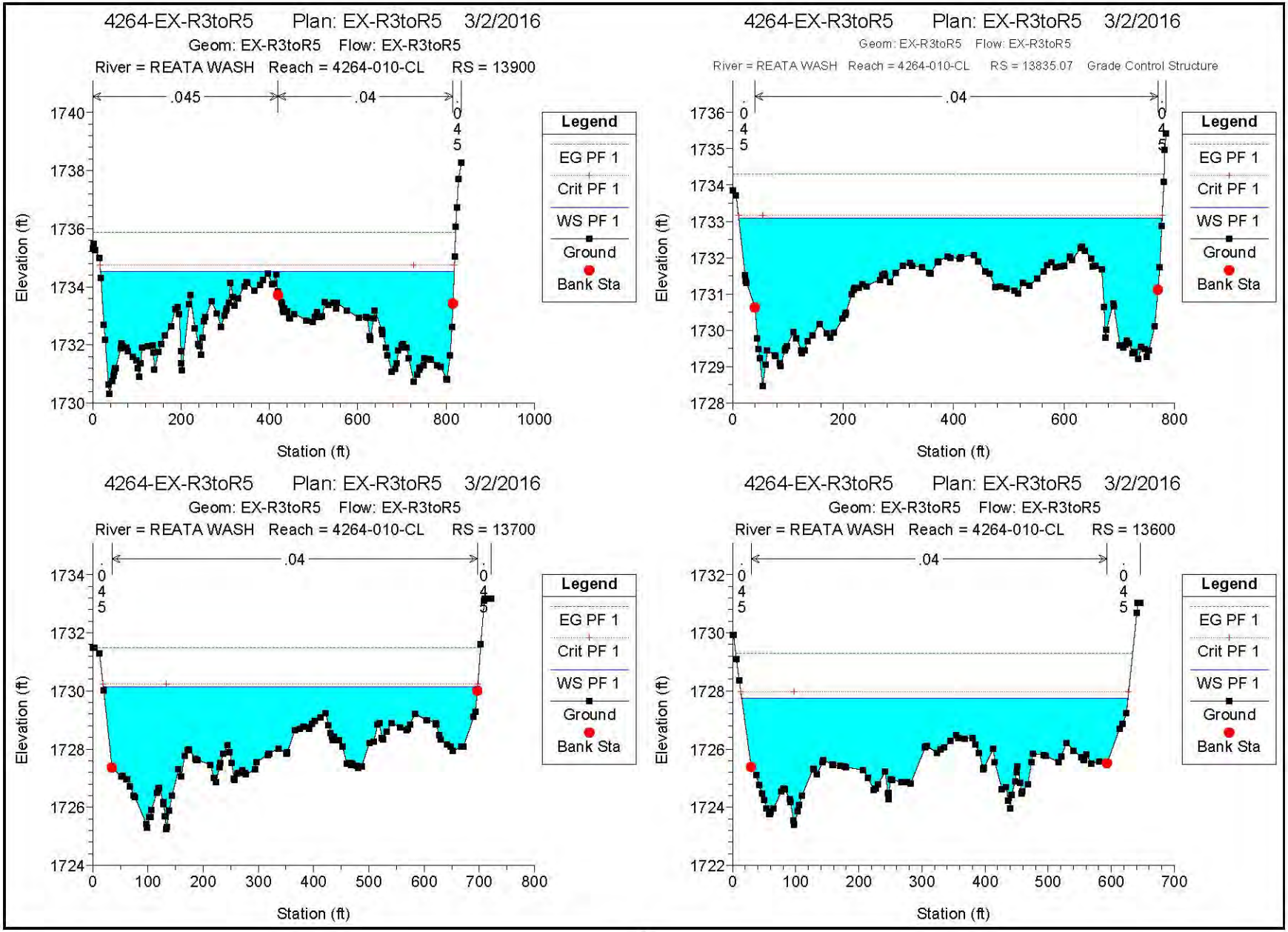

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15900
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15800
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15700
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15600
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

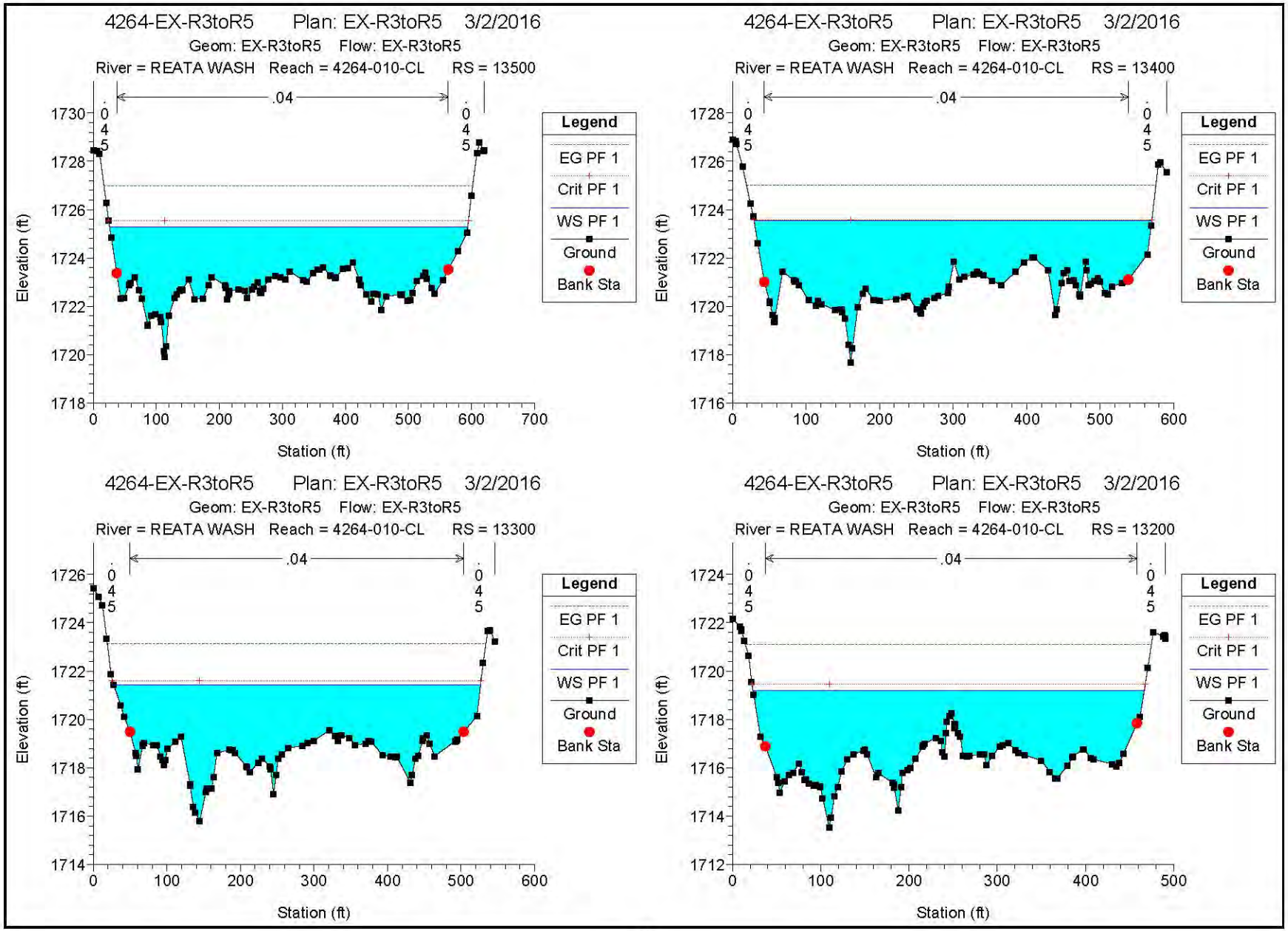

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15500
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15400
.045
.04
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15300
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15200
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 15100
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14965.19 Grade Control Structure
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14900
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14800
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14700
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14600
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14500
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14400
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14300
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14200
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14100
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 14000
.045
.04
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13900
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13835.07 Grade Control Structure
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13700
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13600
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta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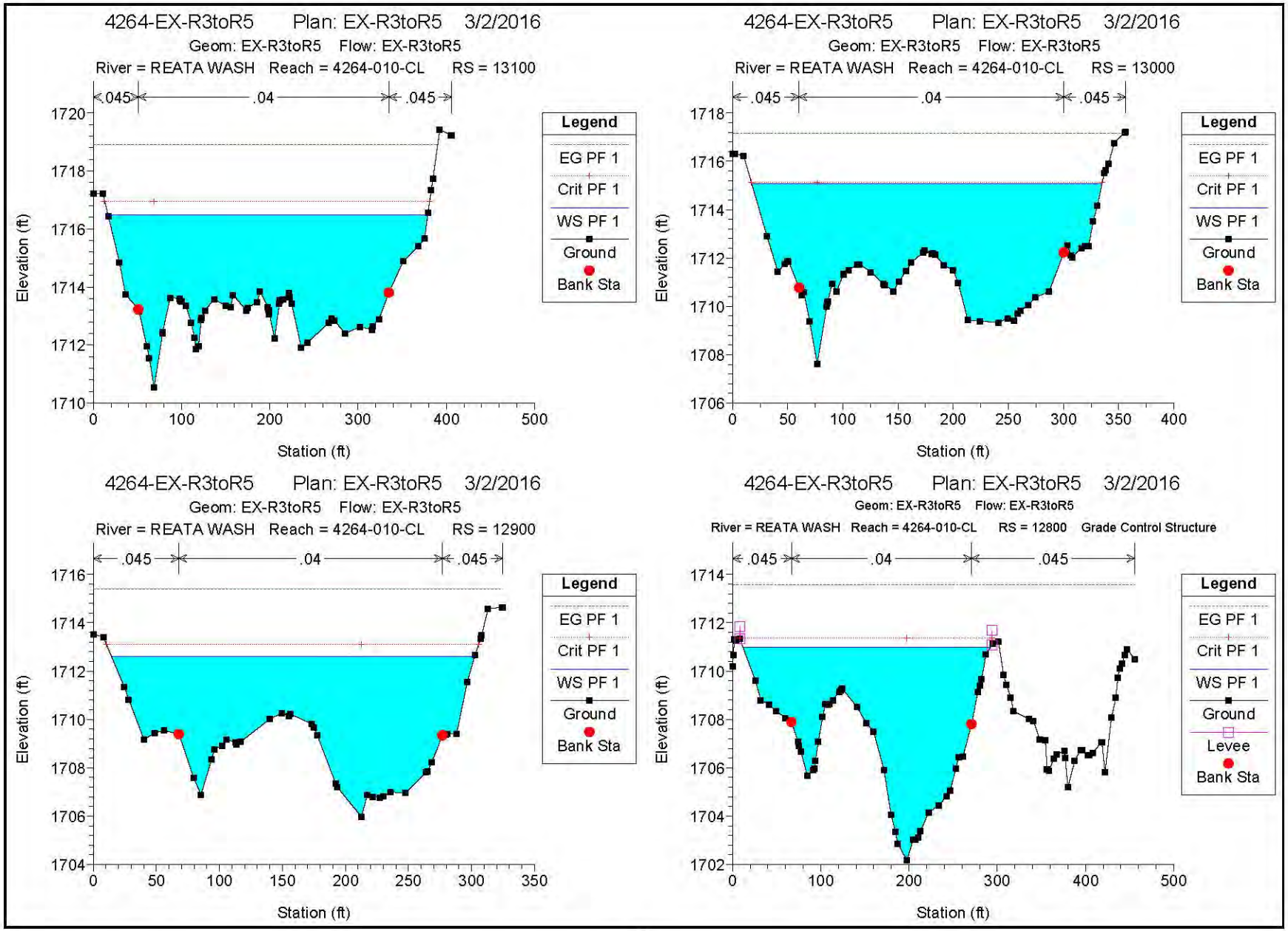
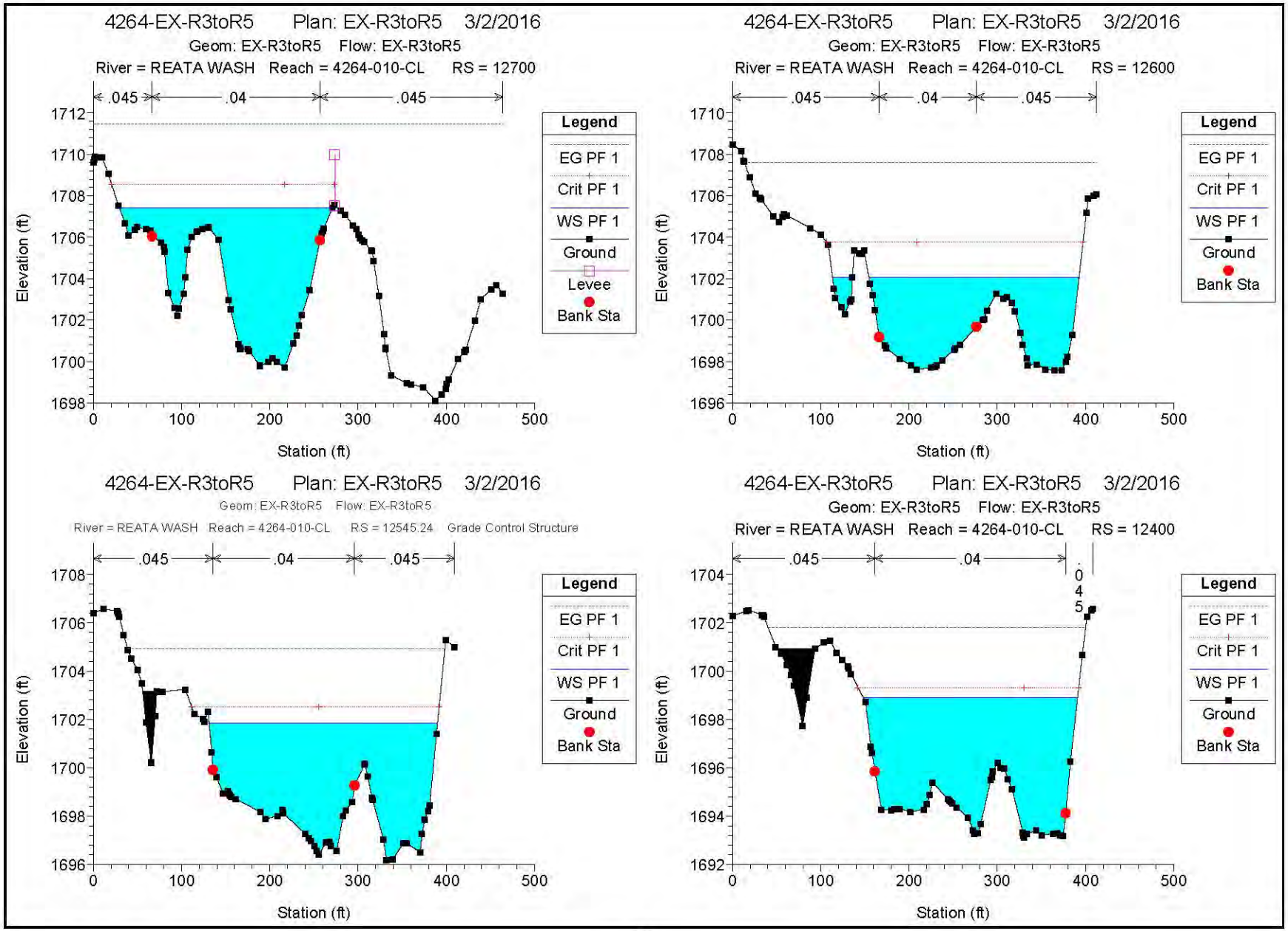
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13500
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13400
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13300
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13200
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13100
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 13000
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12900
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12800 Grade Control Structure
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12700
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Levee
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12600
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12545.24 Grade Control Structure
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12400
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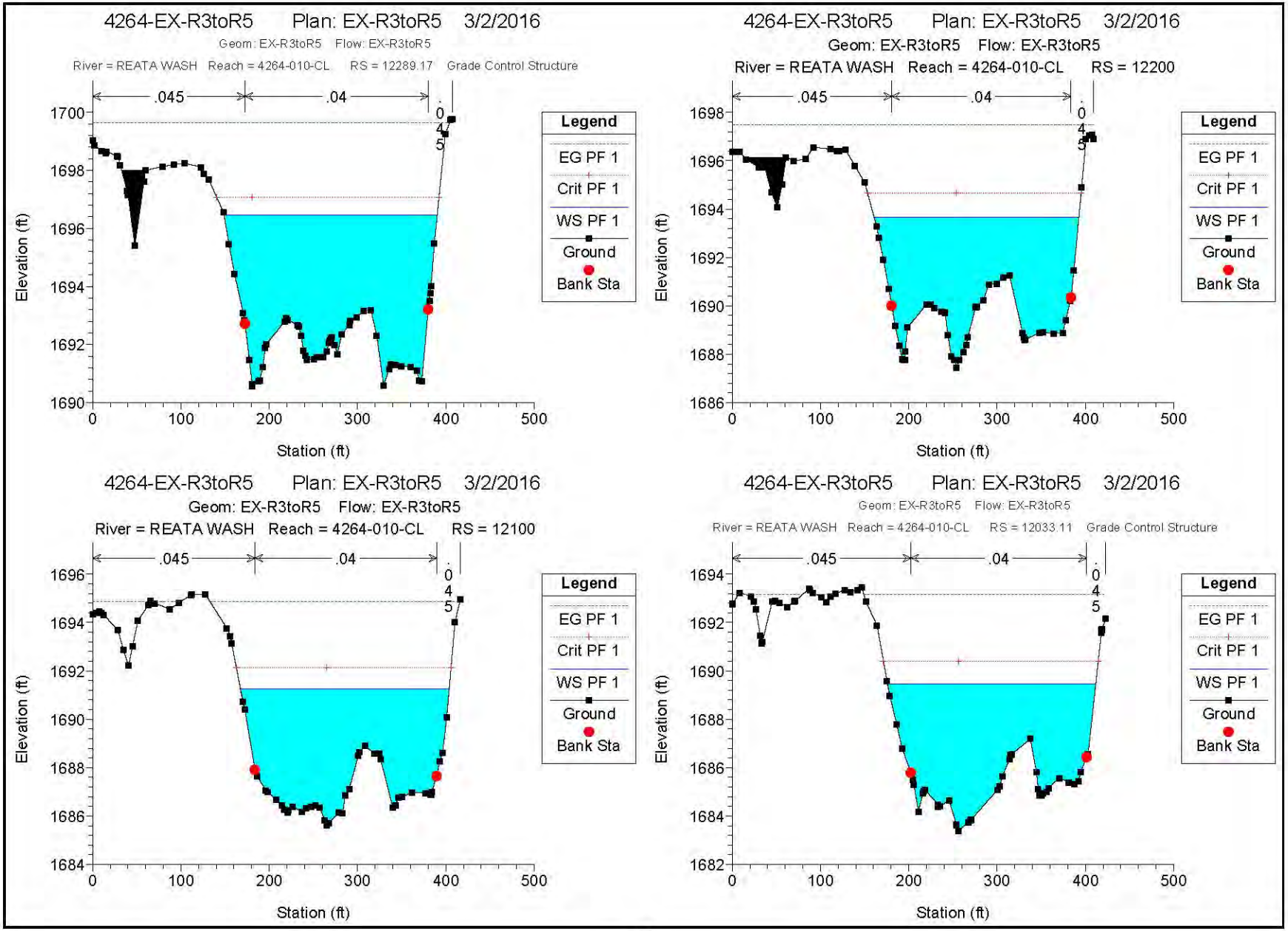
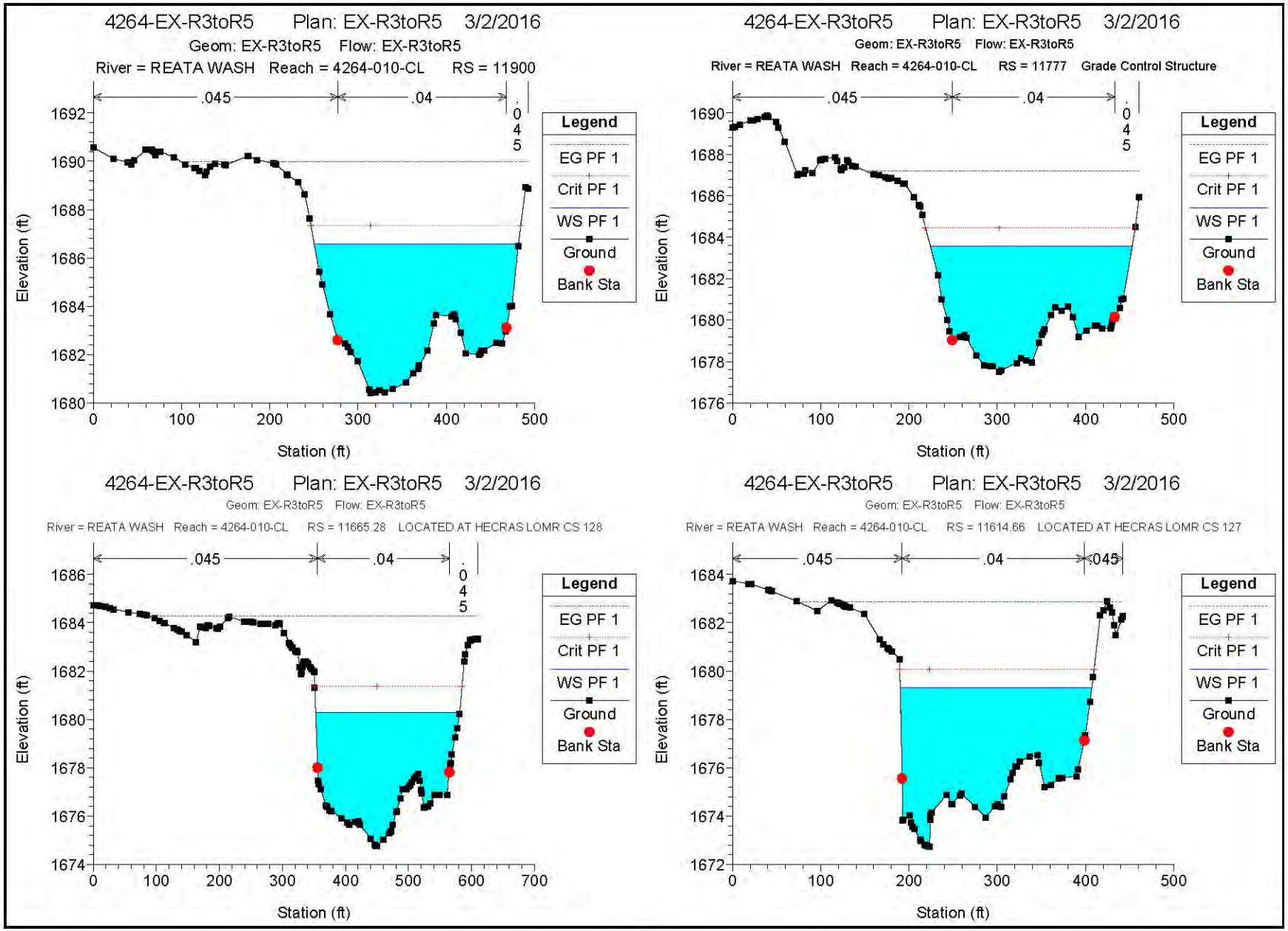
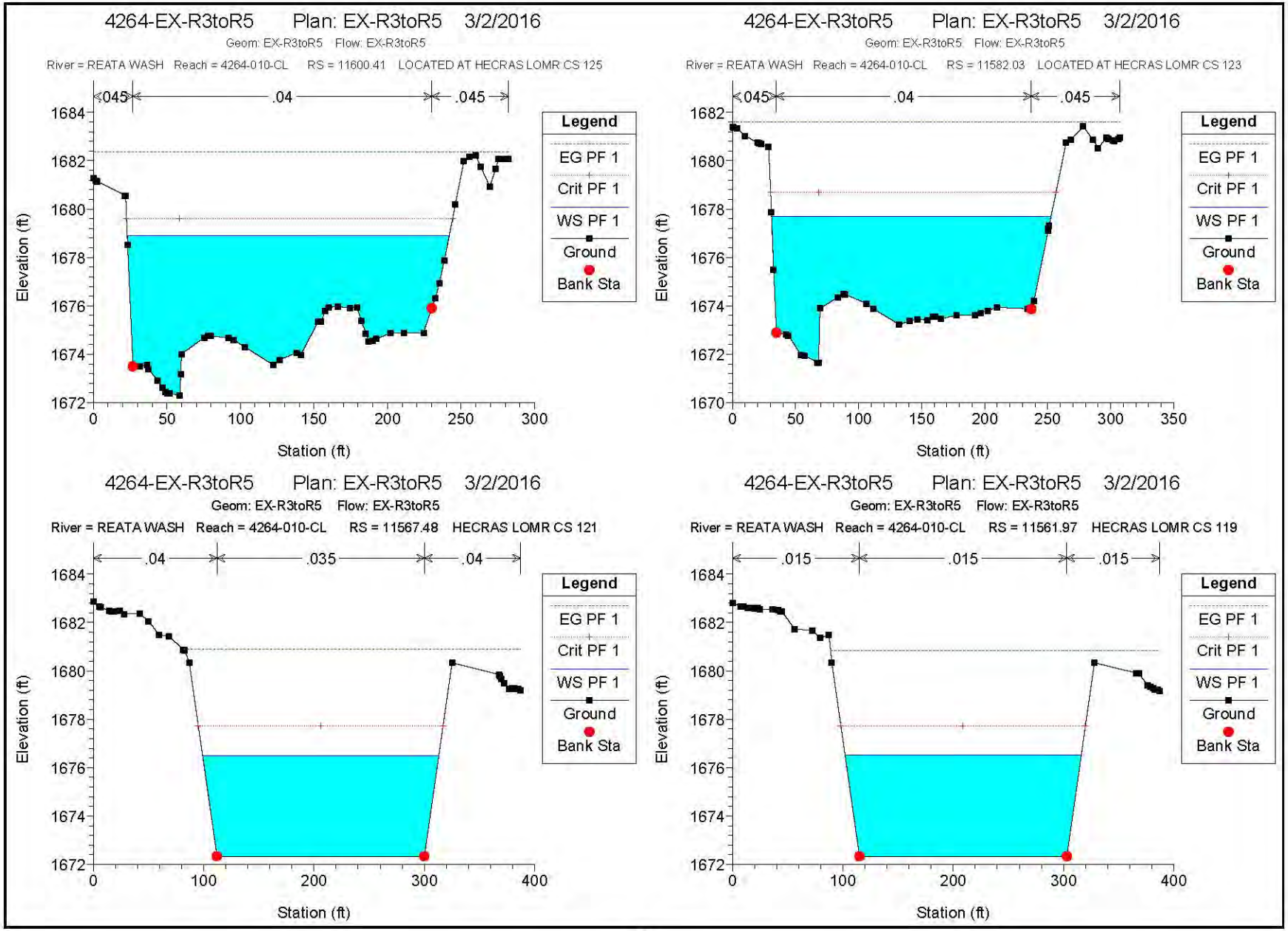
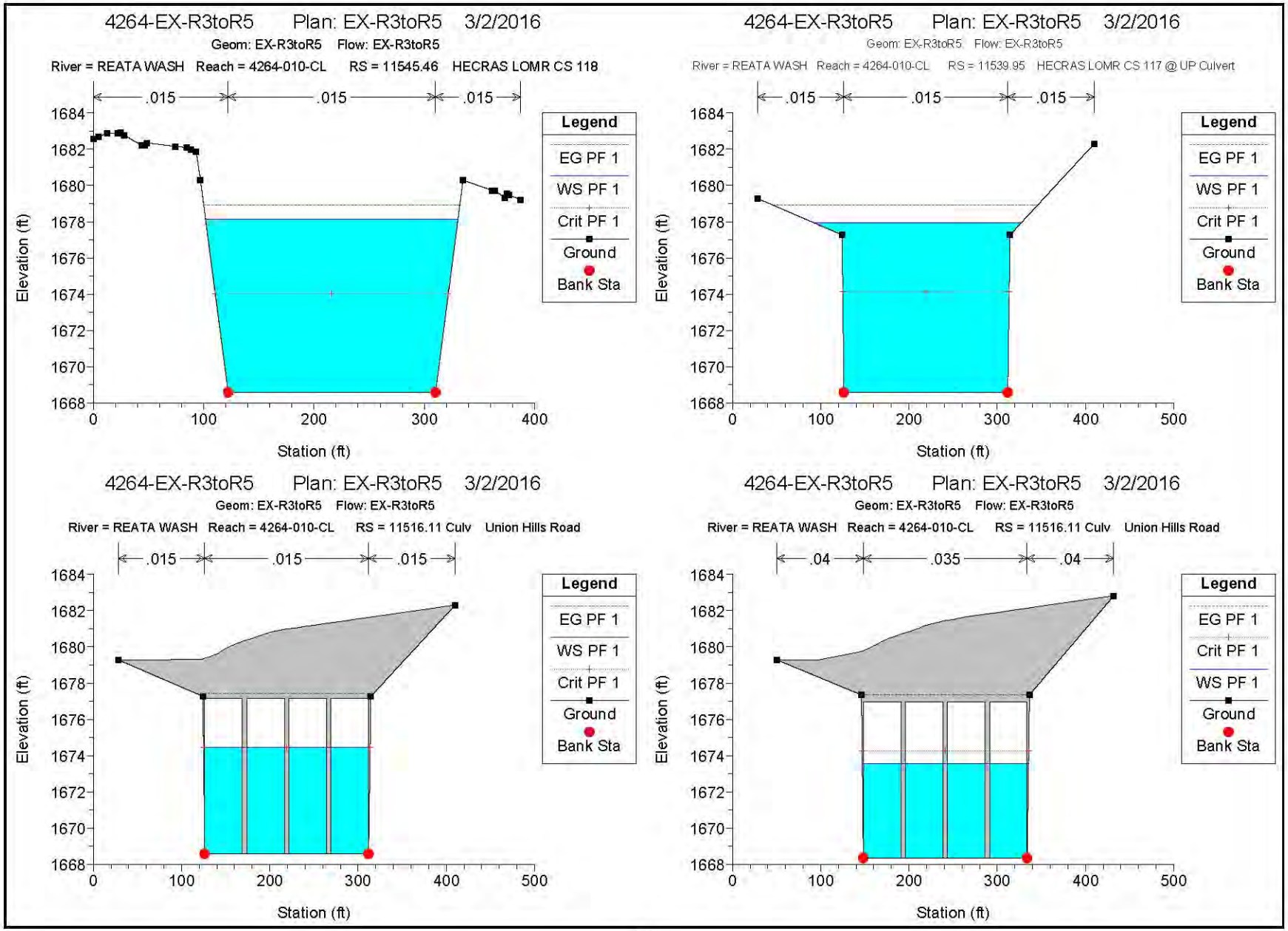
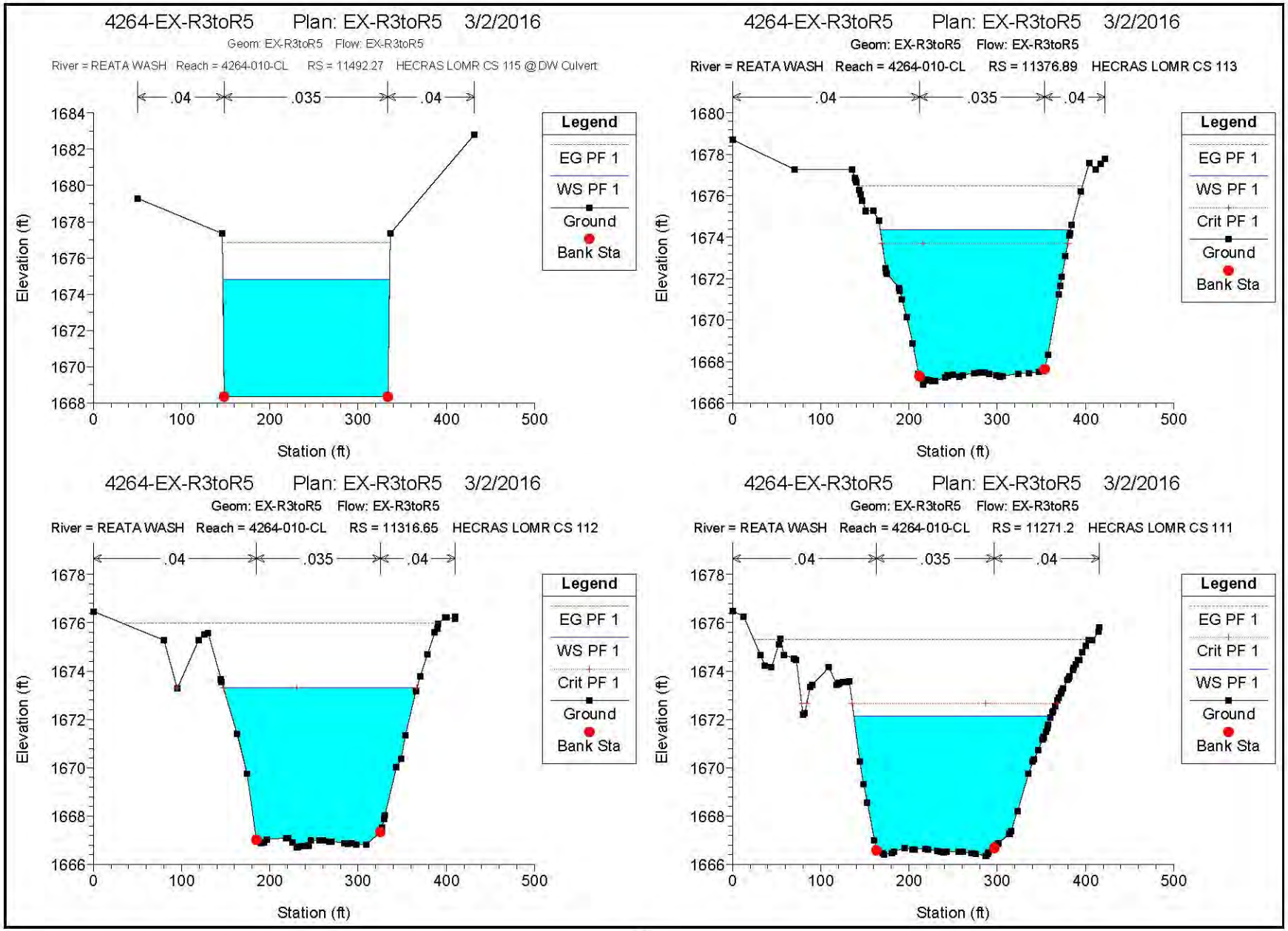
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

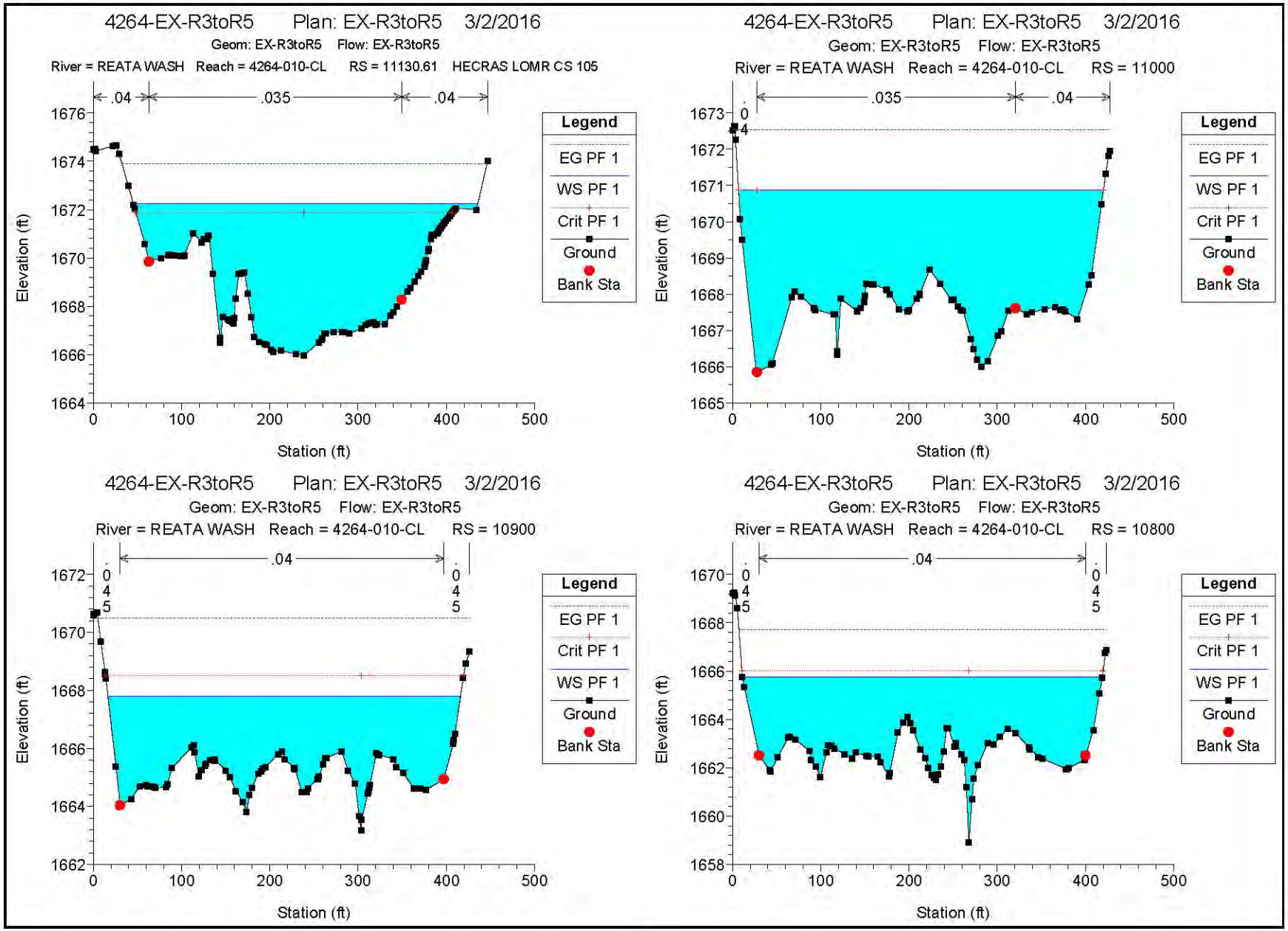

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12289.17 Grade Control Structure
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12200
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12100
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 12033.11 Grade Control Structure
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

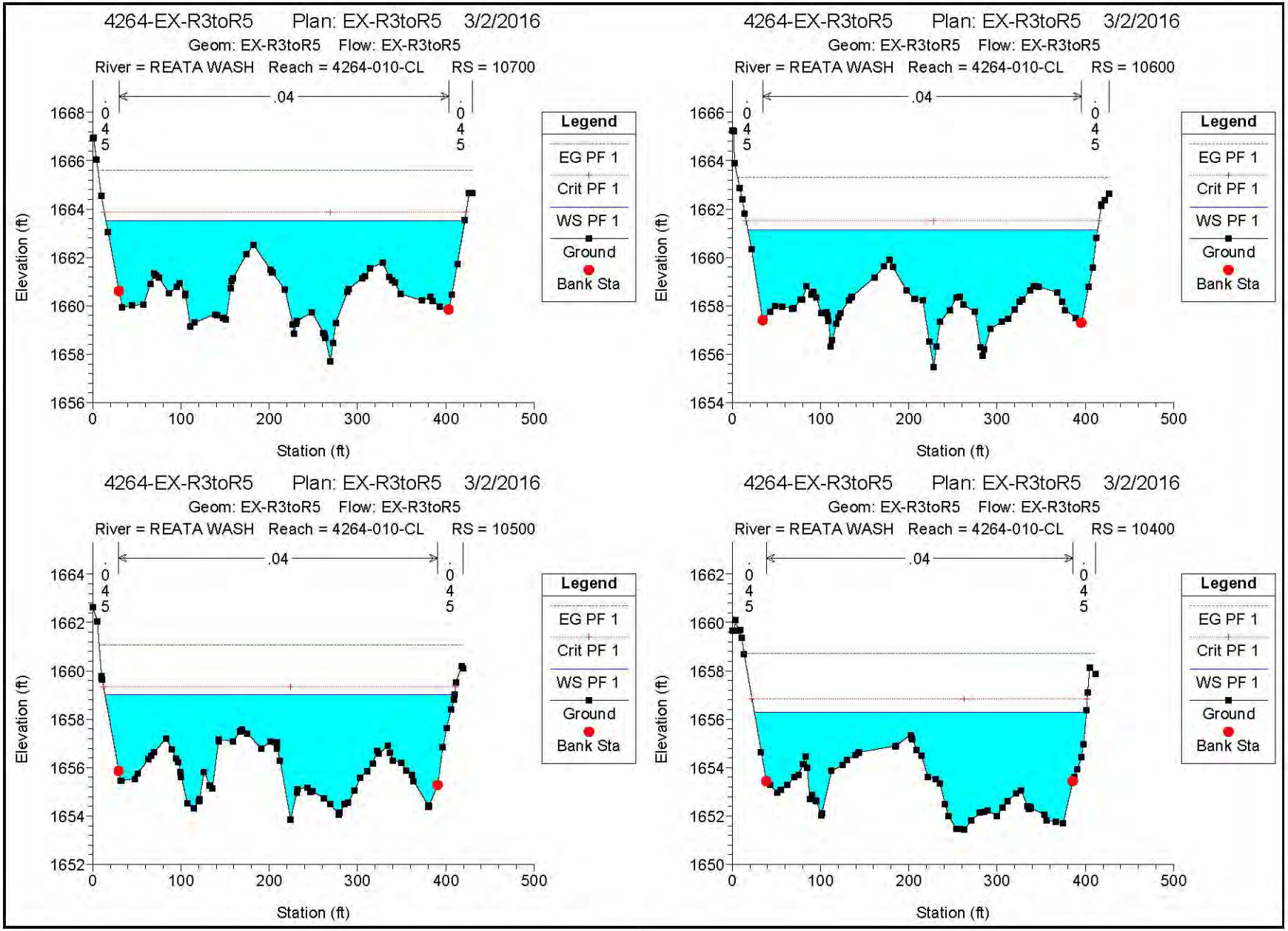

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11900
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11777 Grade Control Structure
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11665.28 LOCATED AT HECRAS LOMR CS 128
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11614.66 LOCATED AT HECRAS LOMR CS 127
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

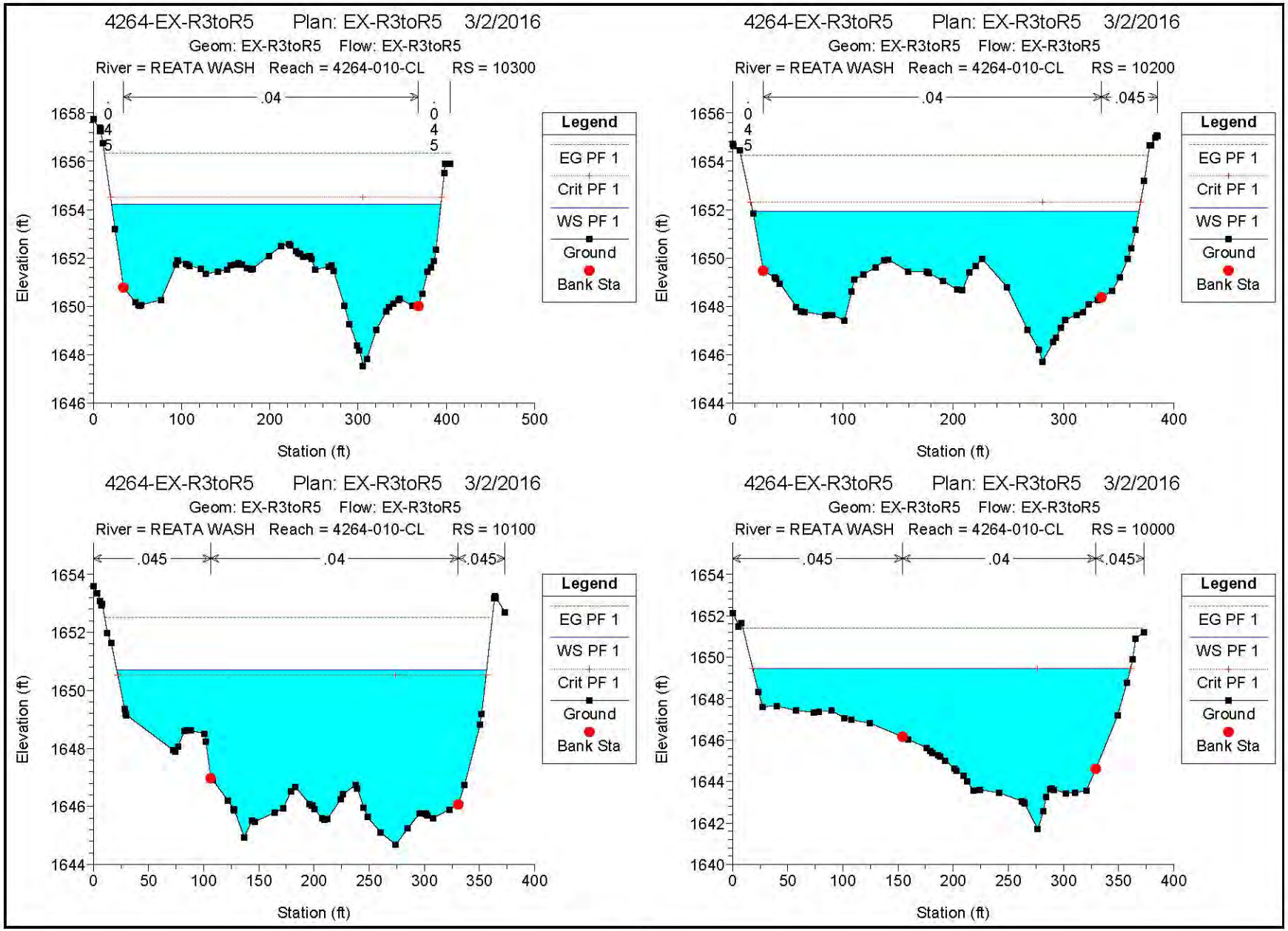

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11600.41 LOCATED AT HECRAS LOMR CS 125
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11582.03 LOCATED AT HECRAS LOMR CS 123
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11567.48 HECRAS LOMR CS 121
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11561.97 HECRAS LOMR CS 119
.015
.015
.015
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

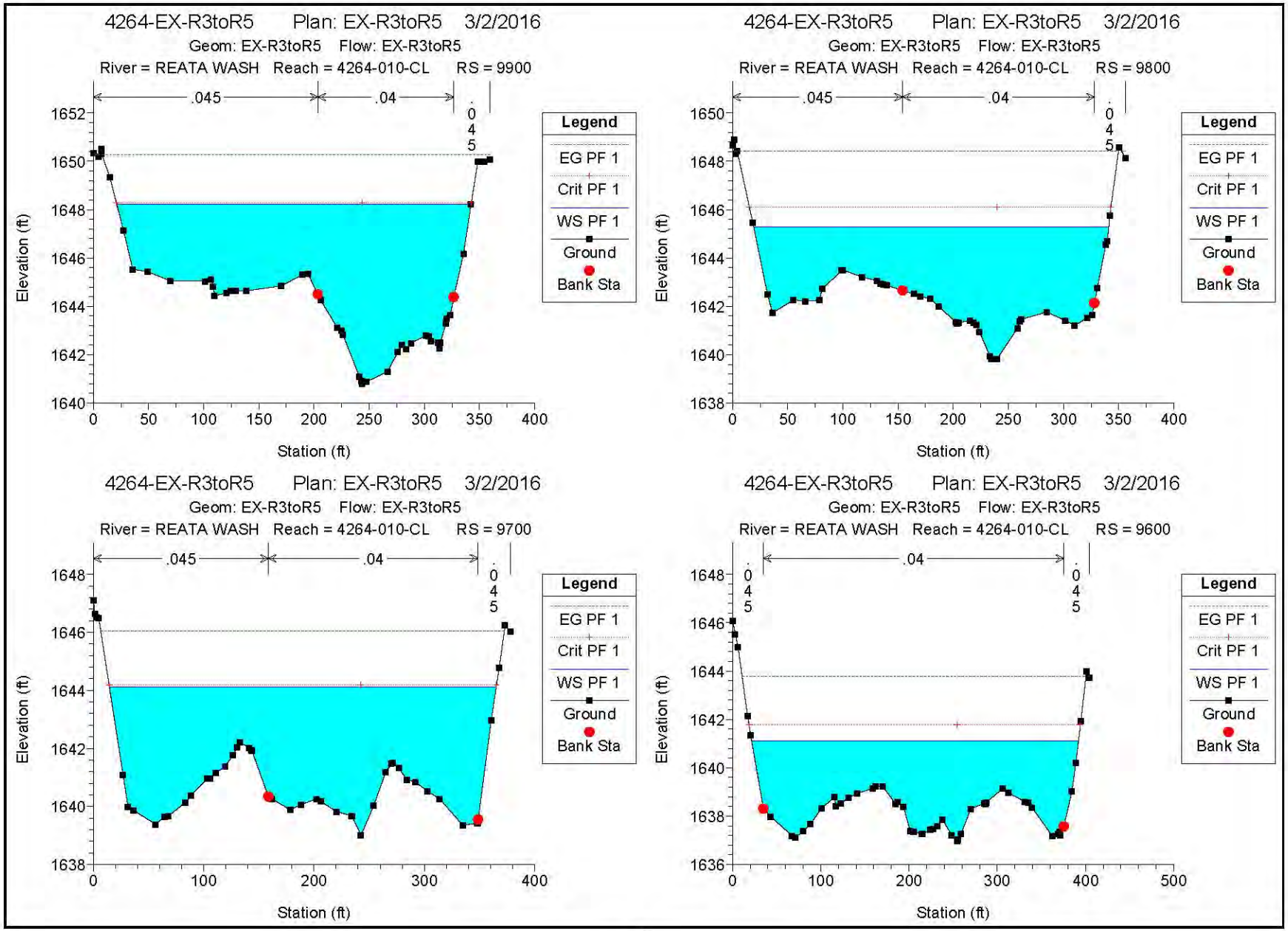

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11545.46 HECRAS LOMR CS 118
.015
.015
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11539.95 HECRAS LOMR CS 117 @ UP Culvert
.015
.015
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11516.11 Culv Union Hills Road
.015
.015
.015
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11516.11 Culv Union Hills Road
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

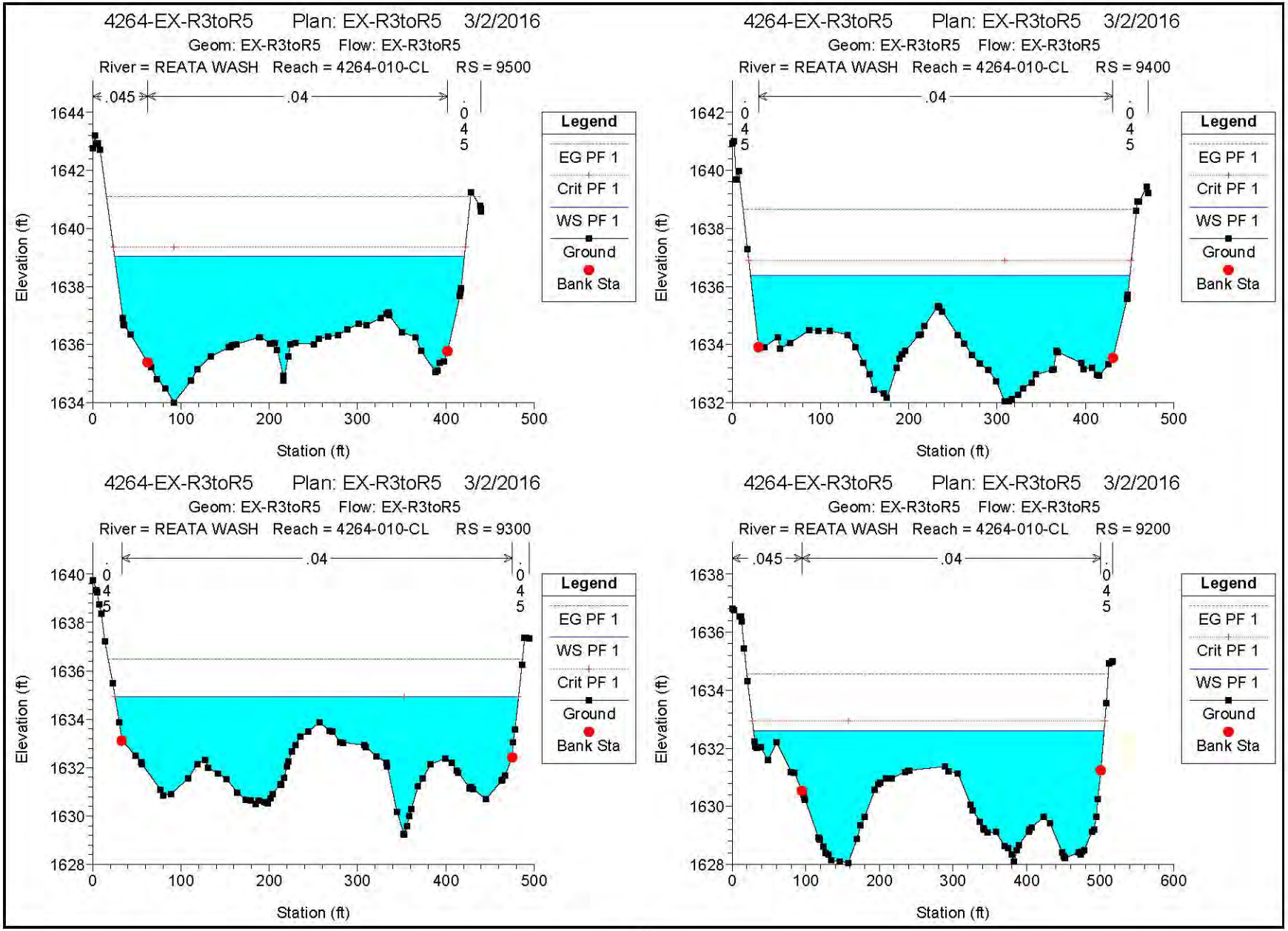

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11492.27 HECRAS LOMR CS 115 @DW Culvert
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11376.89 HECRAS LOMR CS 113
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11316.65 HECRAS LOMR CS 112
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11271.2 HECRAS LOMR CS 111
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

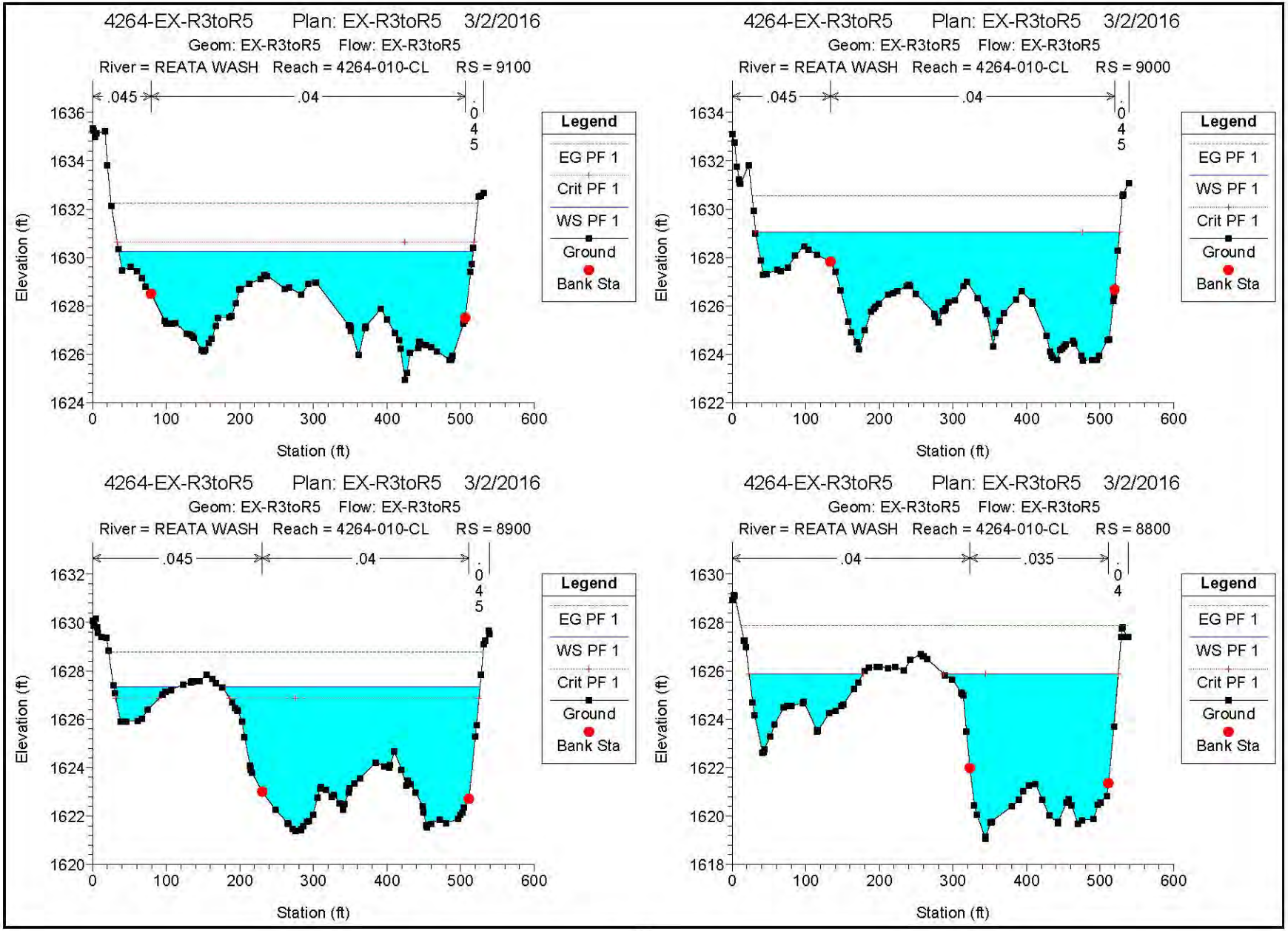

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11130.61 HECRAS LOMR CS 105
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 11000
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10900
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10800
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

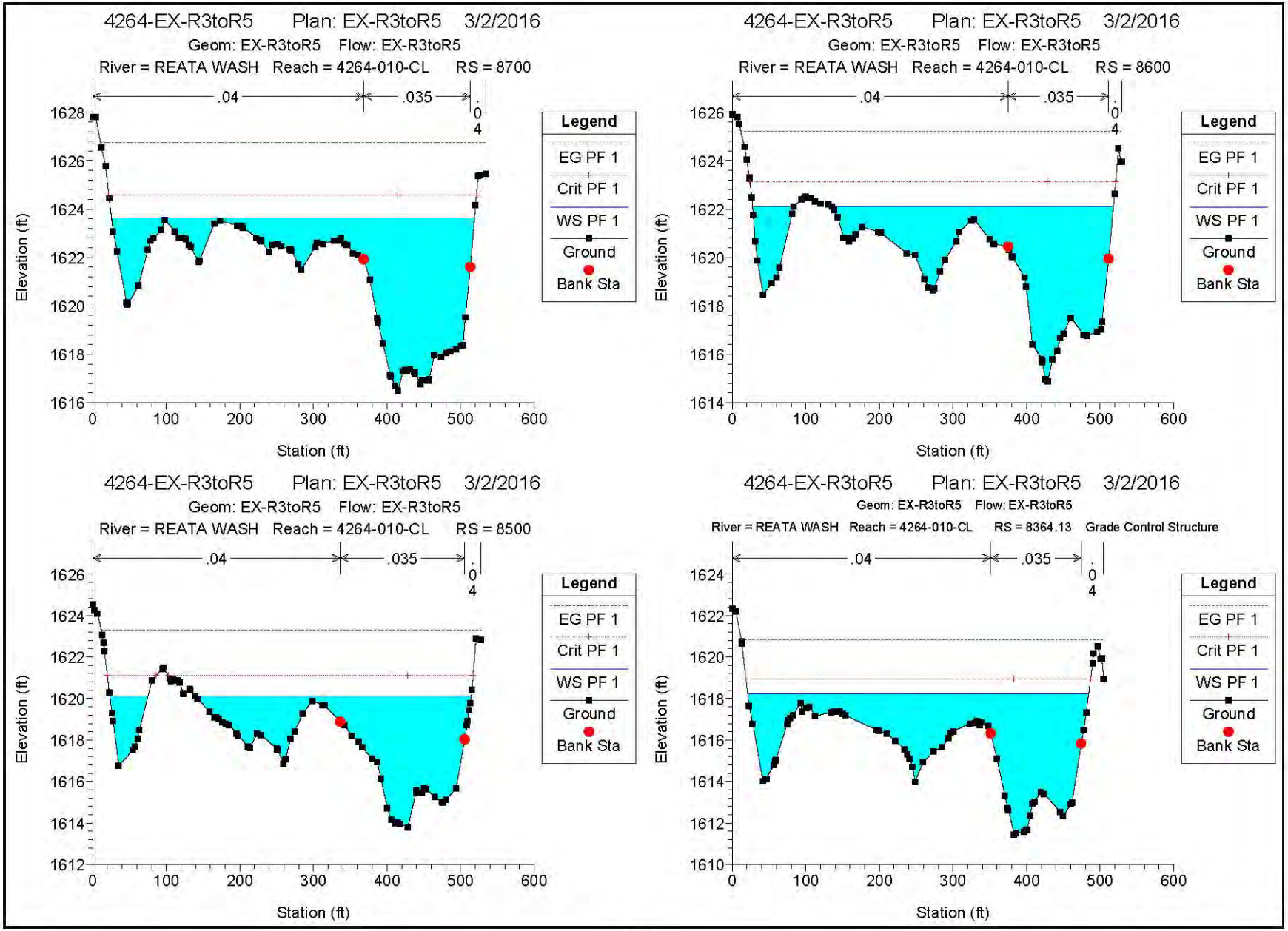

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10700
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10600
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10500
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10400
.04
.045
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

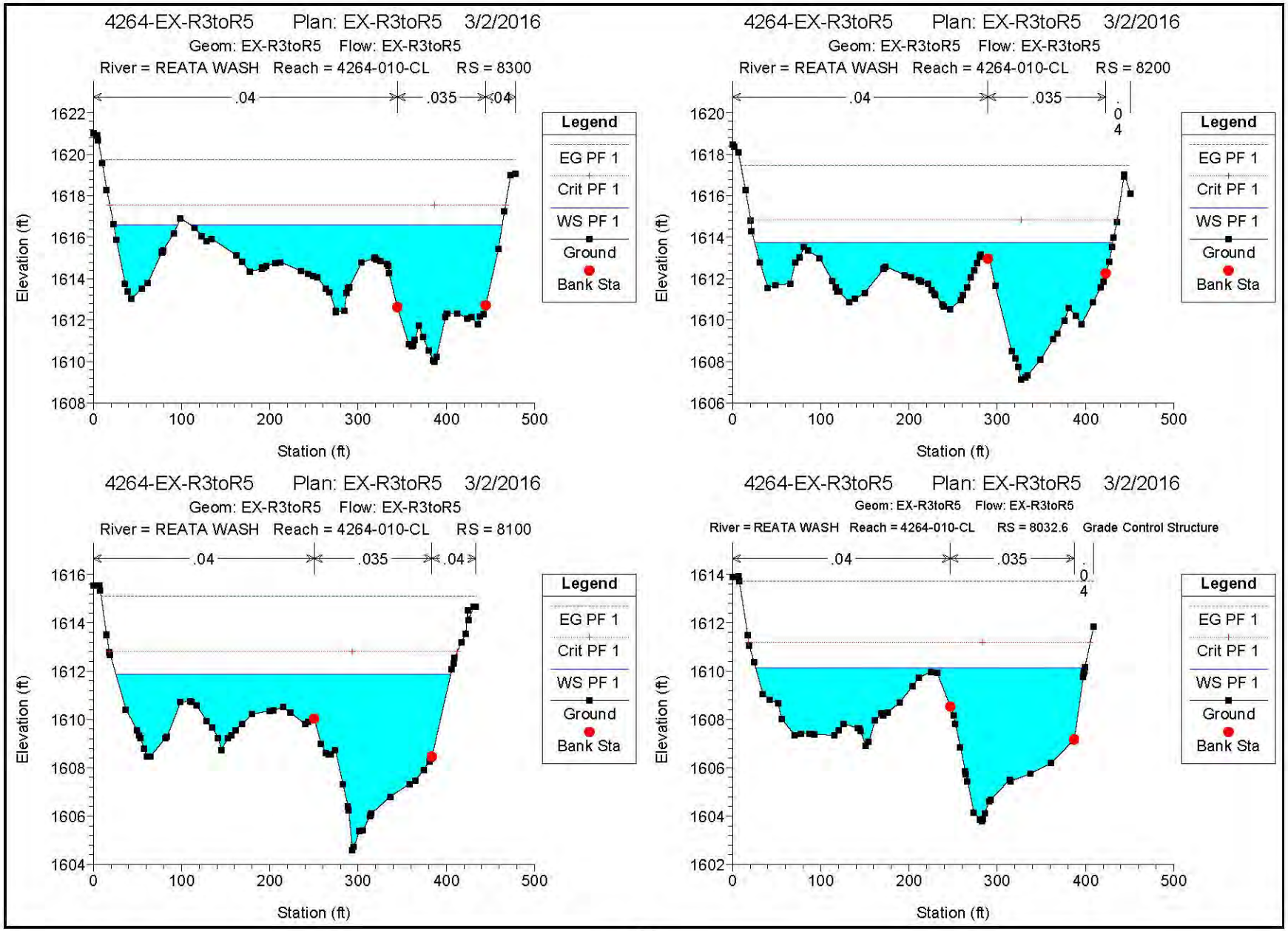

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10300
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10200
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10100
.045
.04
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 10000
.045
.04
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

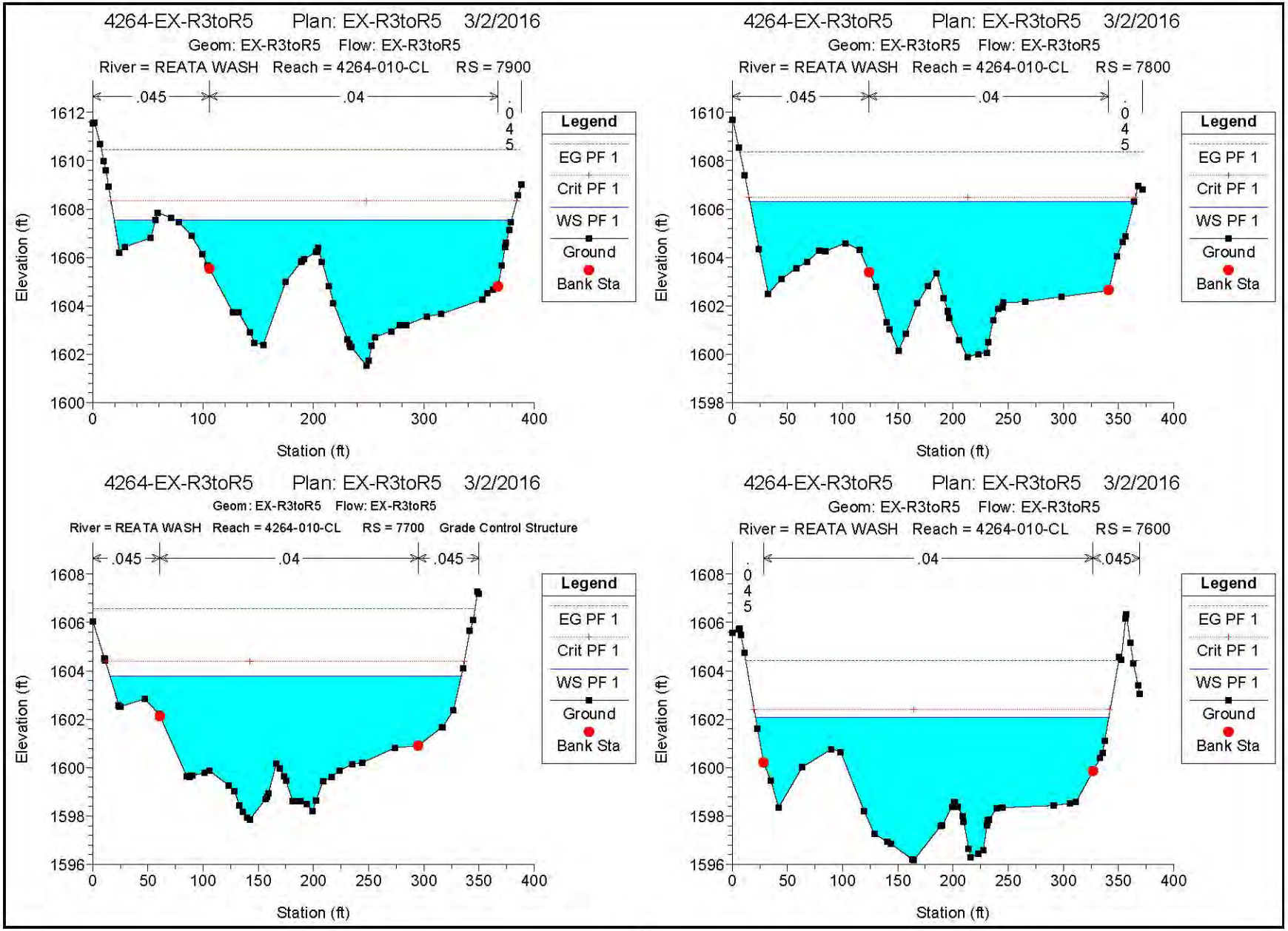

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9900
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9800
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9700
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9600
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

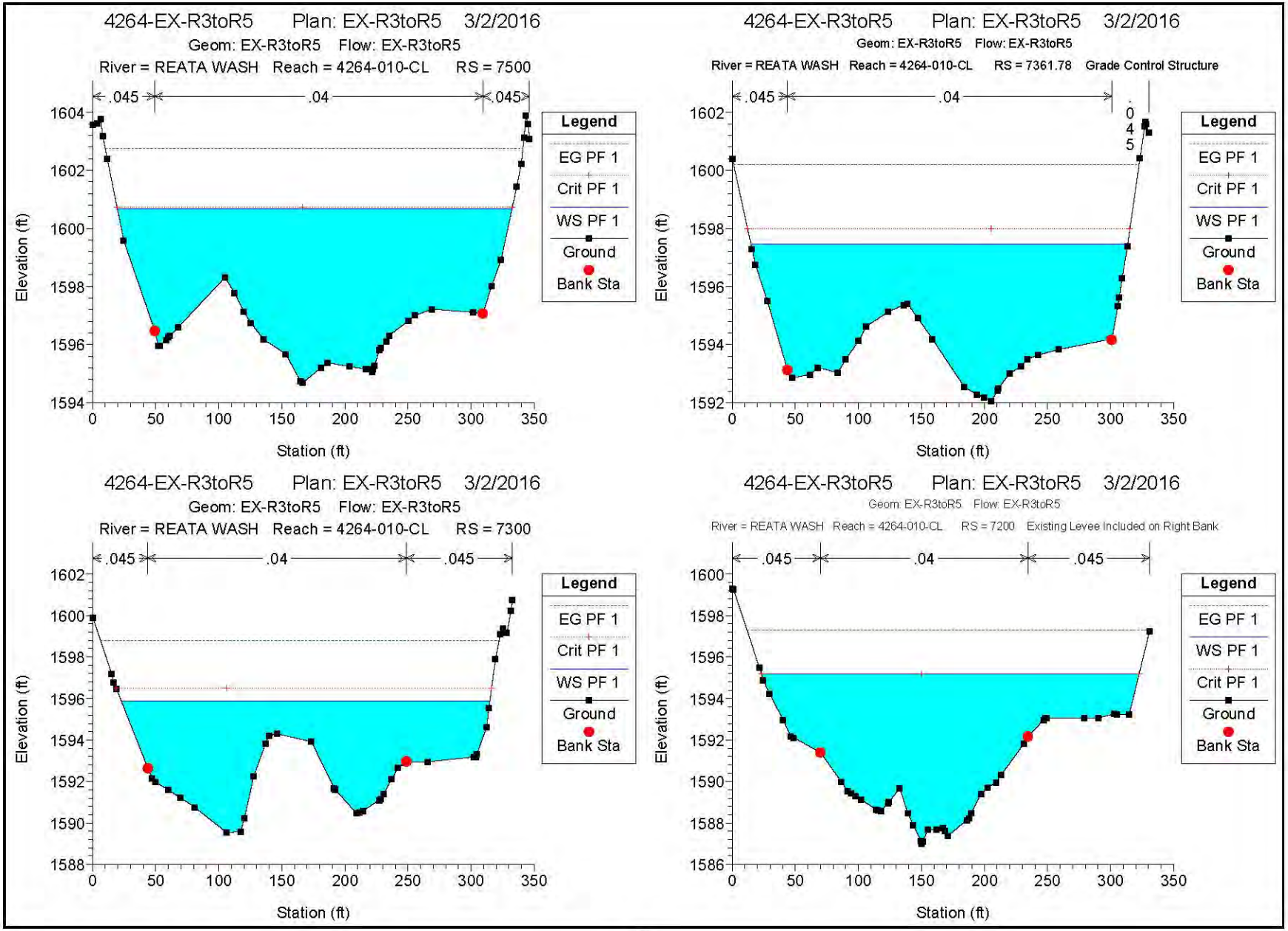

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9500
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9400
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9300
.045
.04
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9200
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

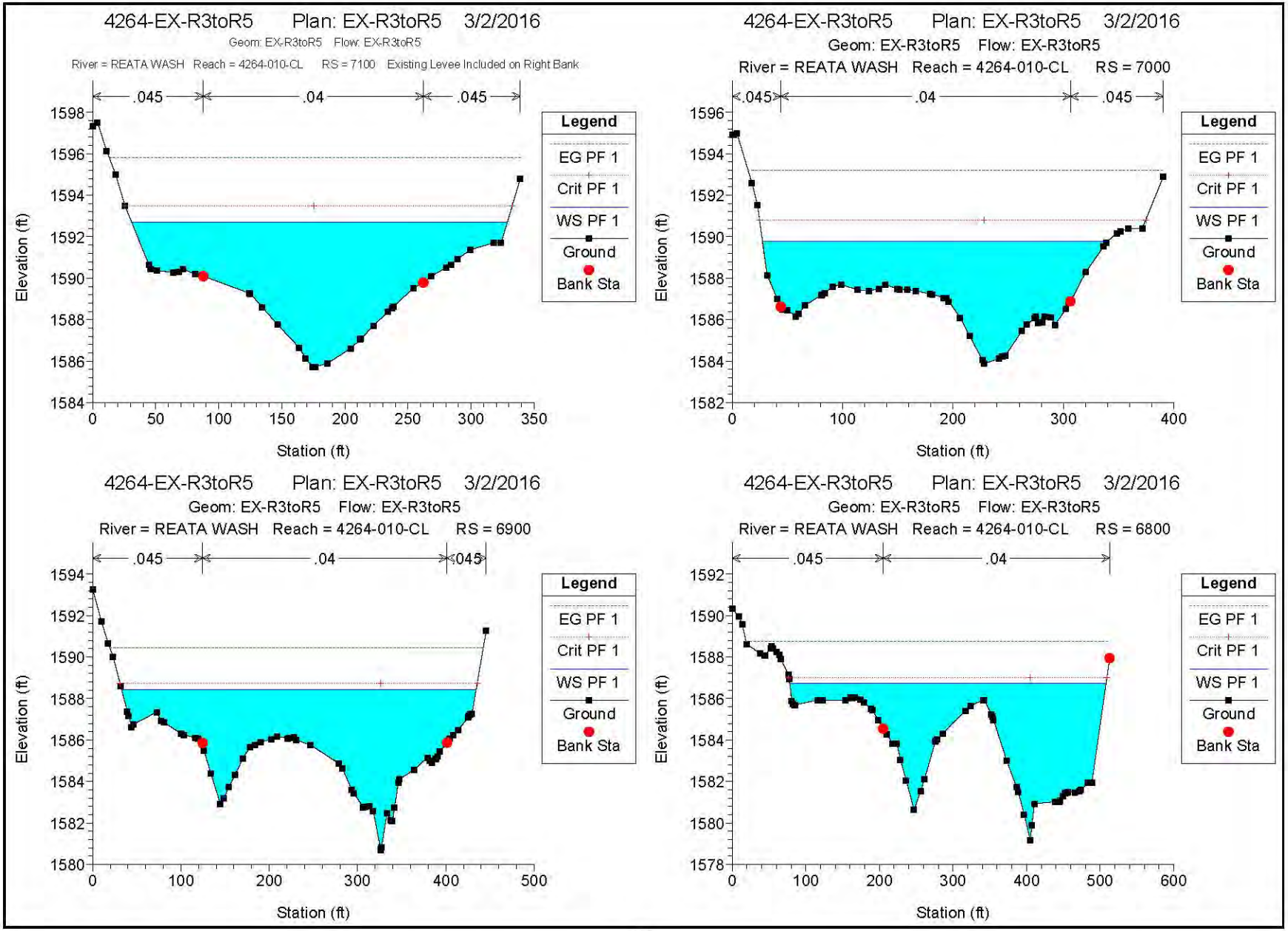

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9100
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 9000
.045
.04
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8900
.045
.04
.045
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8800
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

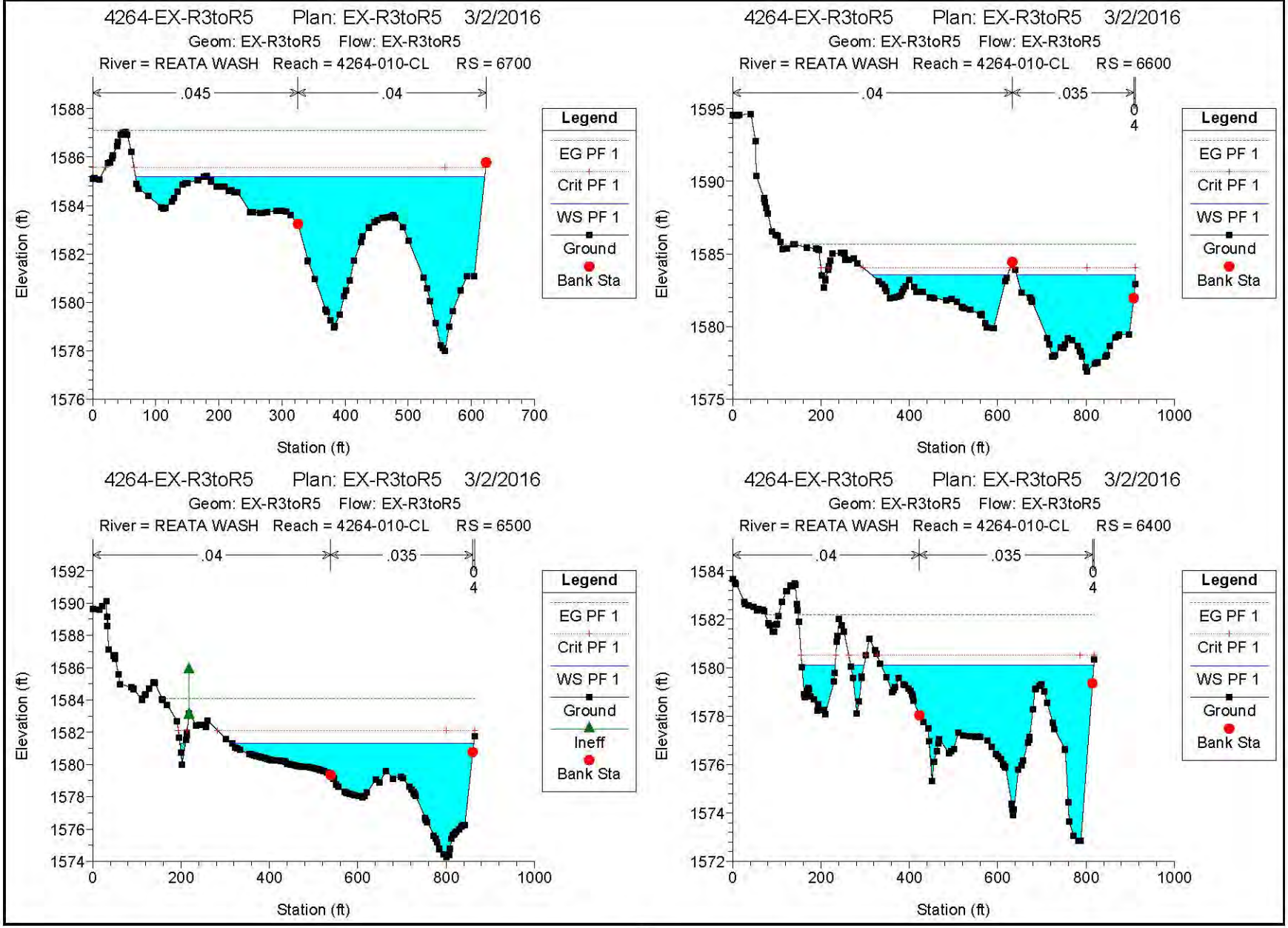

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8700
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8600
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8500
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8364.13 Grade Control Structure
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

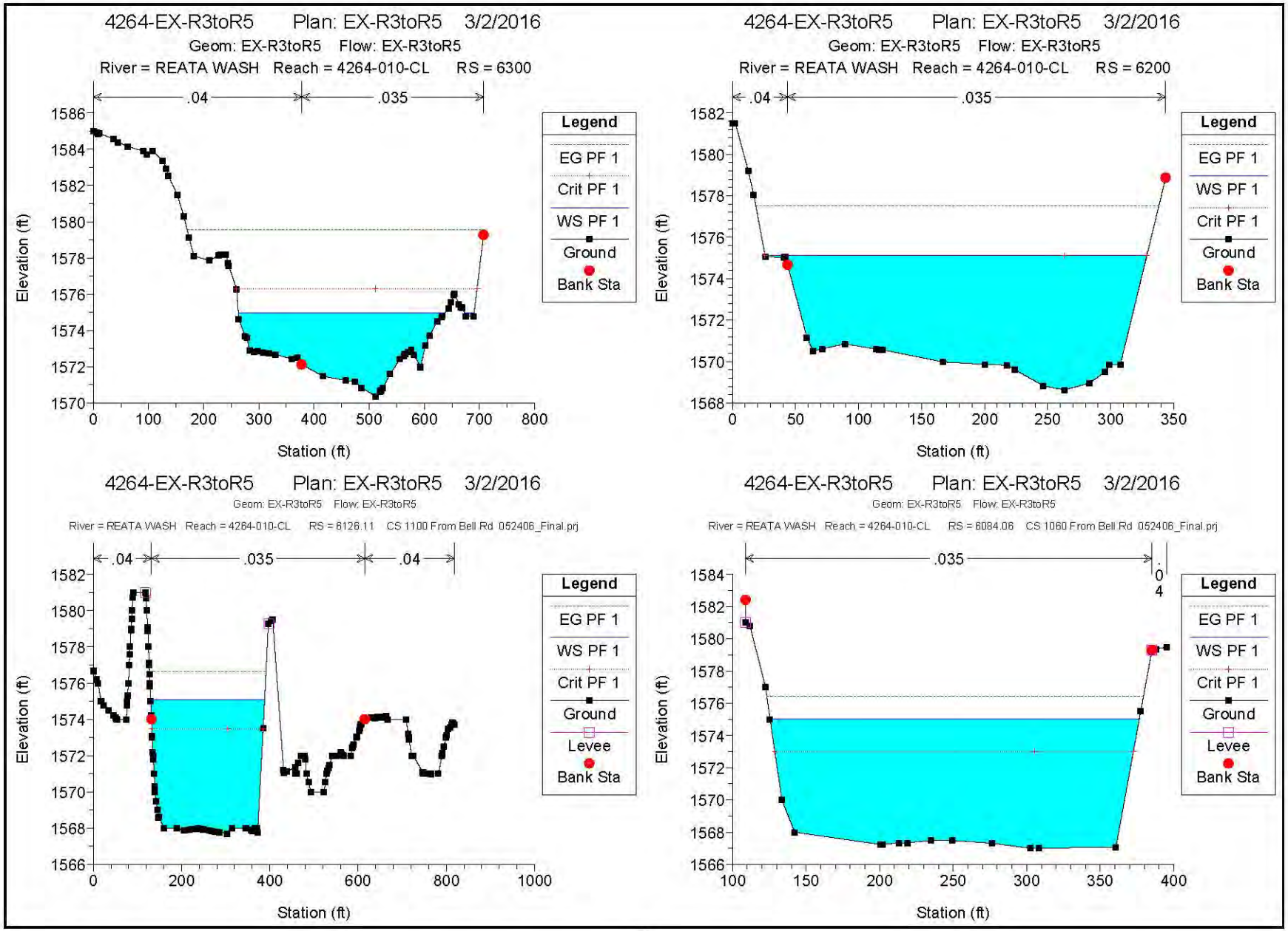

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8300
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8200
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8100
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 8032.6 Grade Control Structure
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

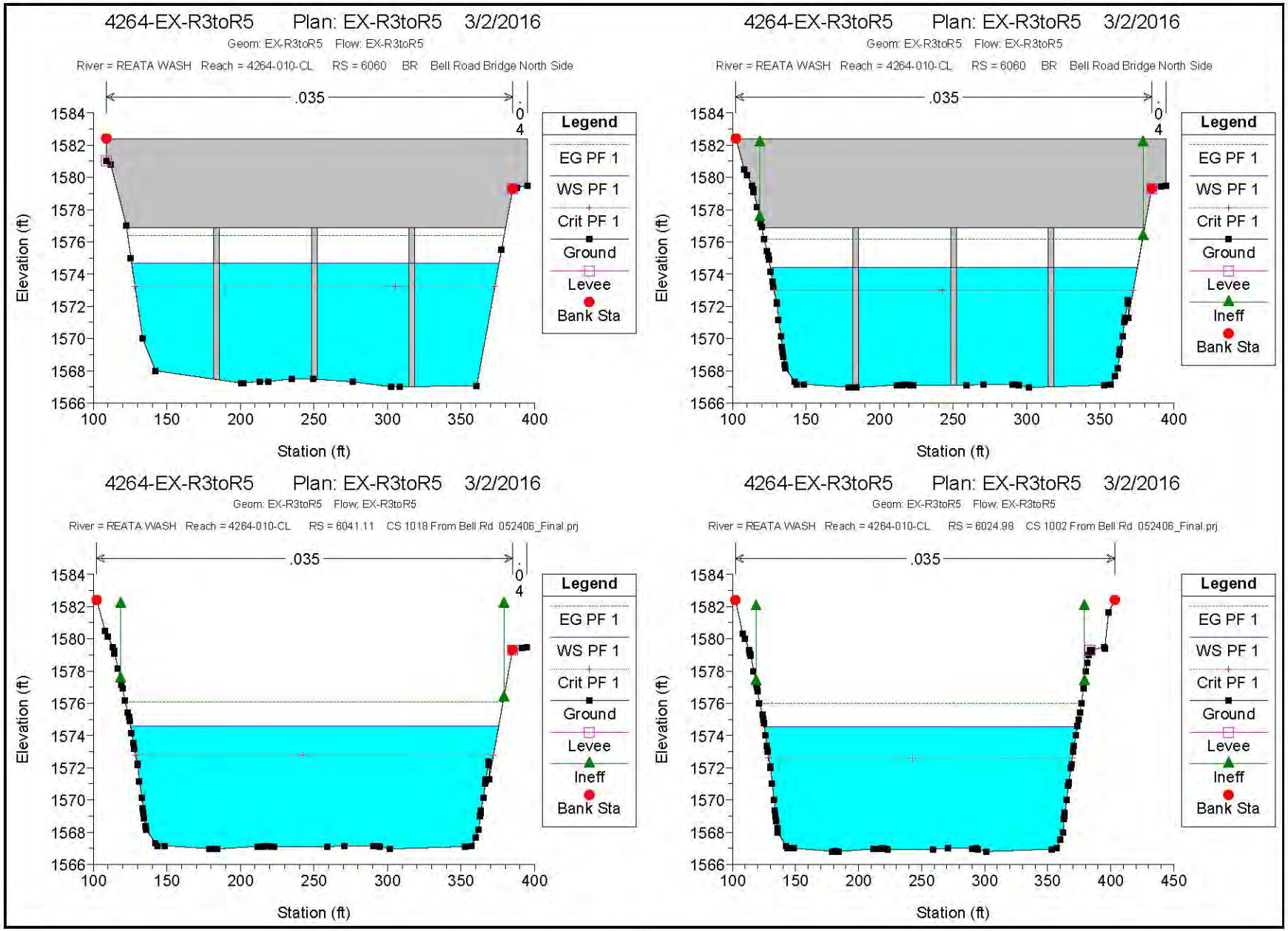

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7900
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7800
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7700 Grade Control Structure
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7600
.045
.04
.045
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

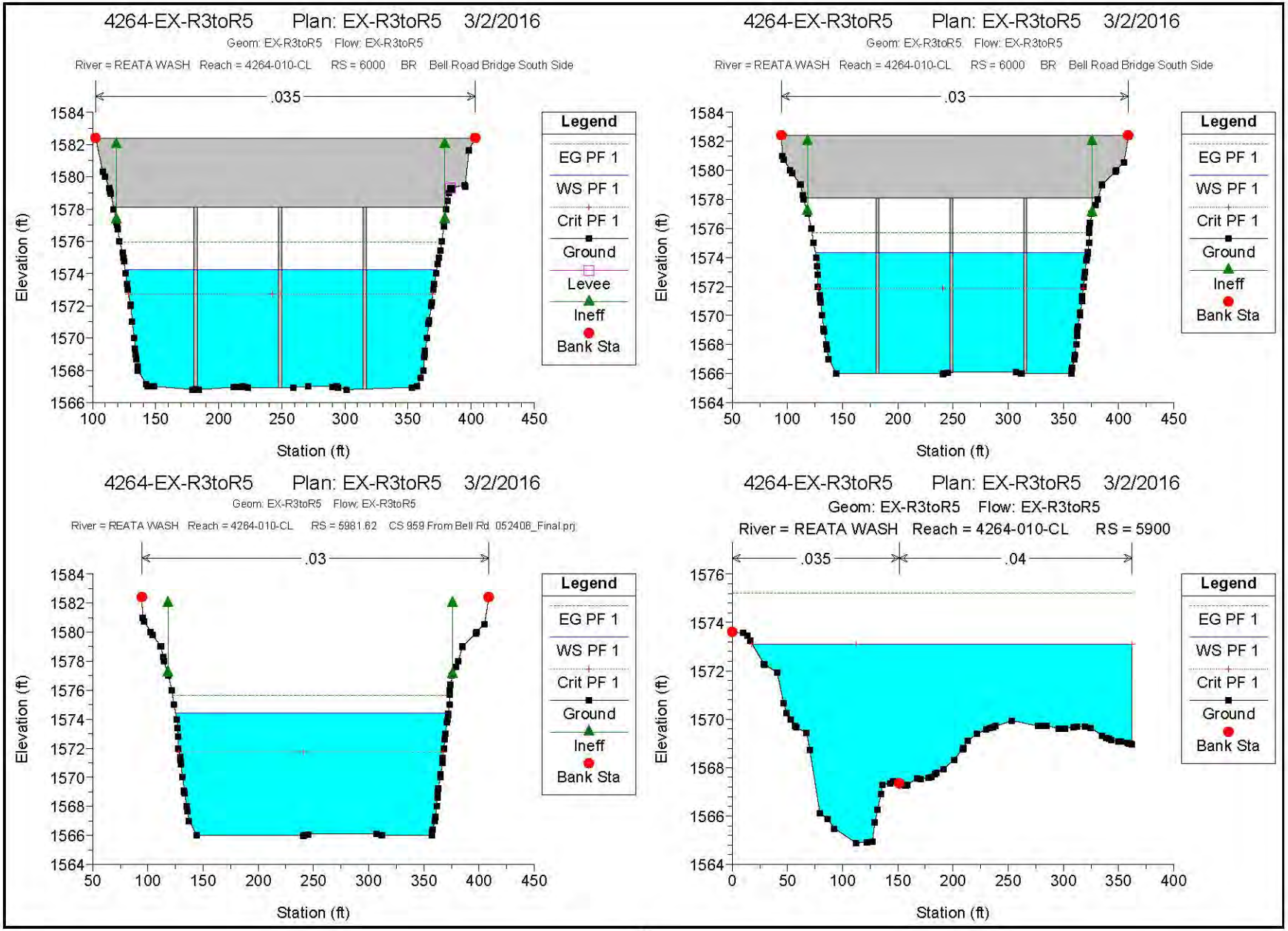

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7500
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7361.78 Grade Control Structure
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7300
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7200 Existing Levee Included on Right Bank
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

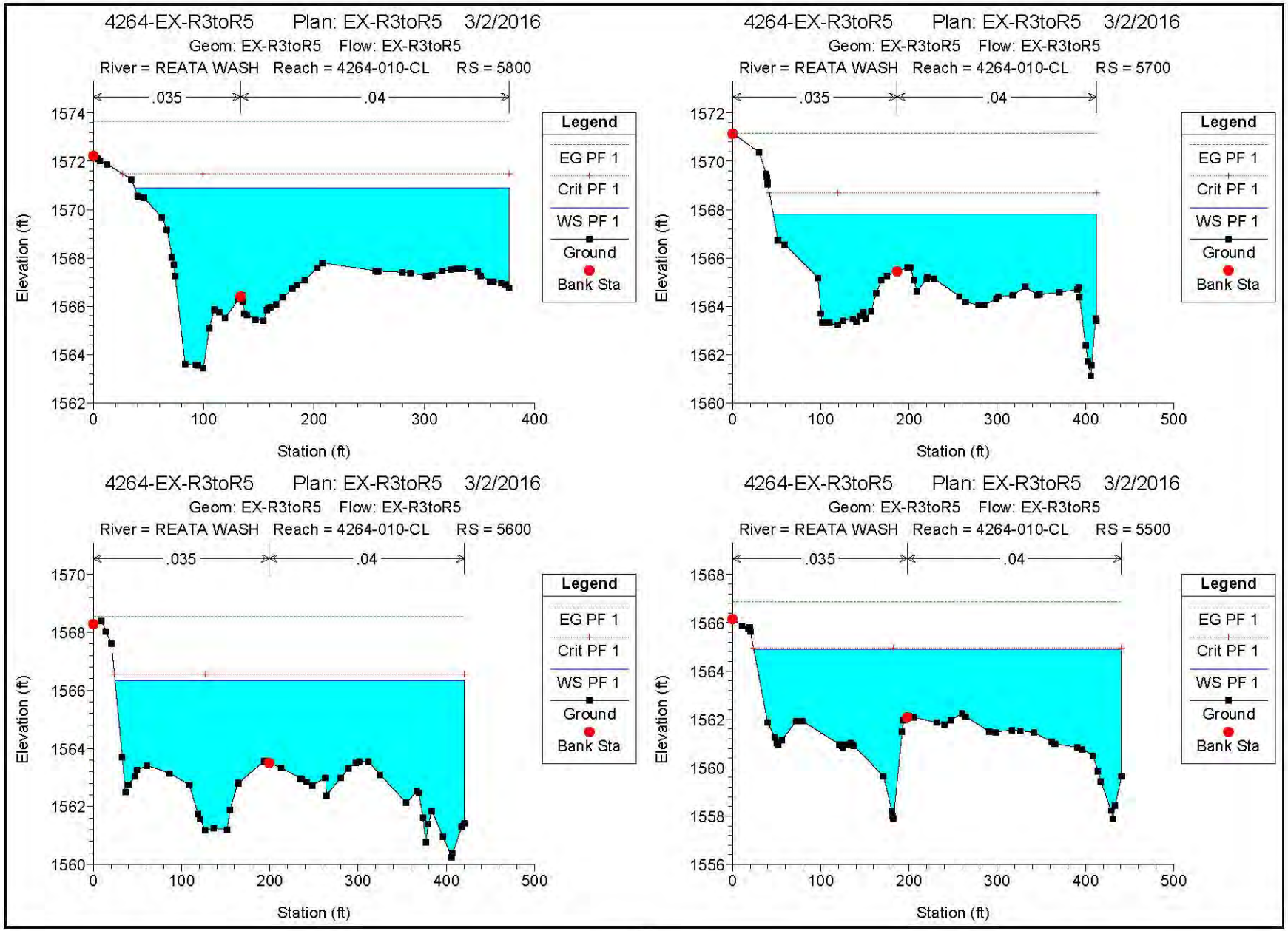

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7100 Existing Levee Included on Right Bank
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 7000
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6900
.045
.04
.045
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6800
.045
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

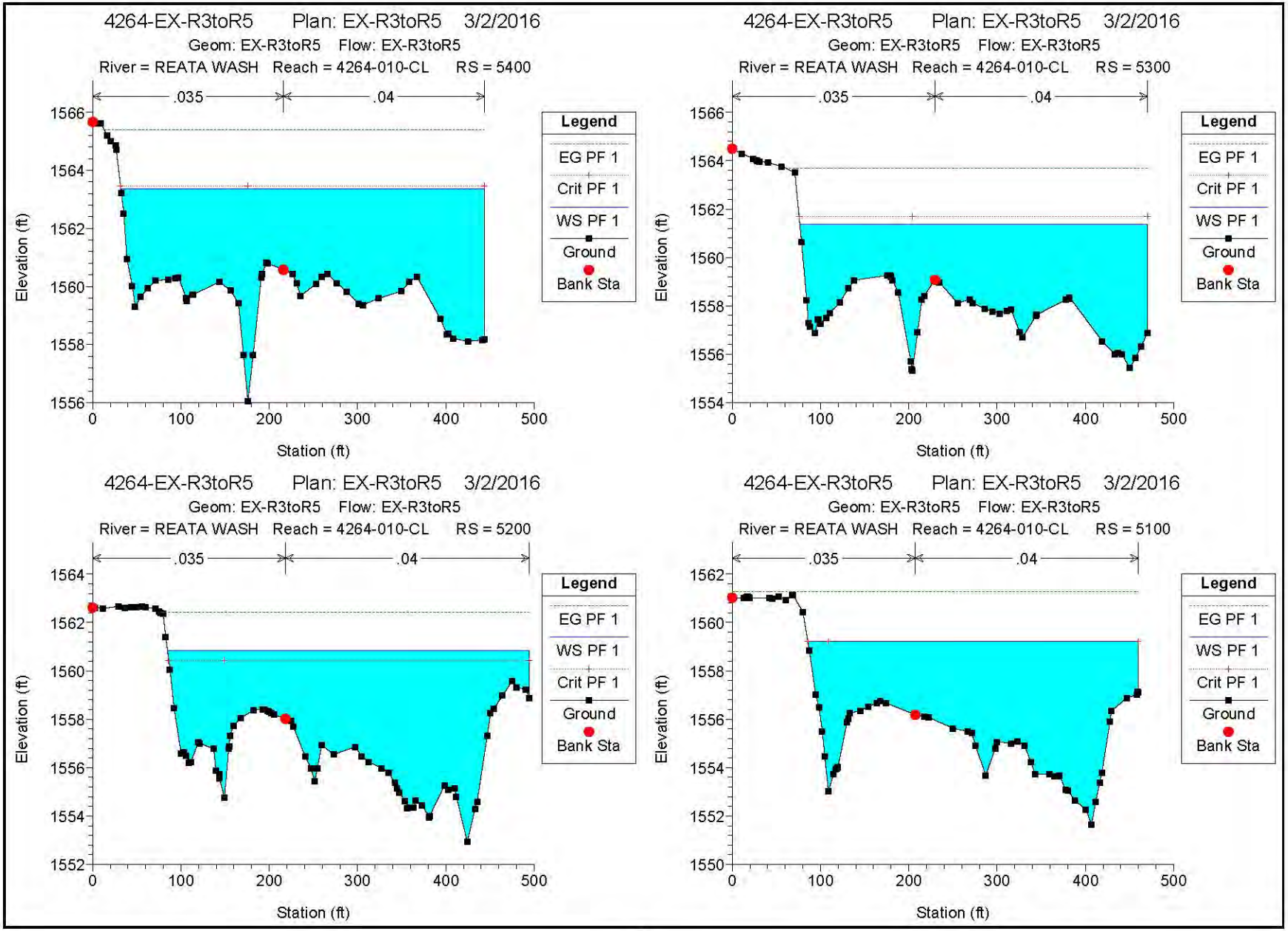

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6700
.045
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6600
.04
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6500
.04
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6400
.04
.035
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

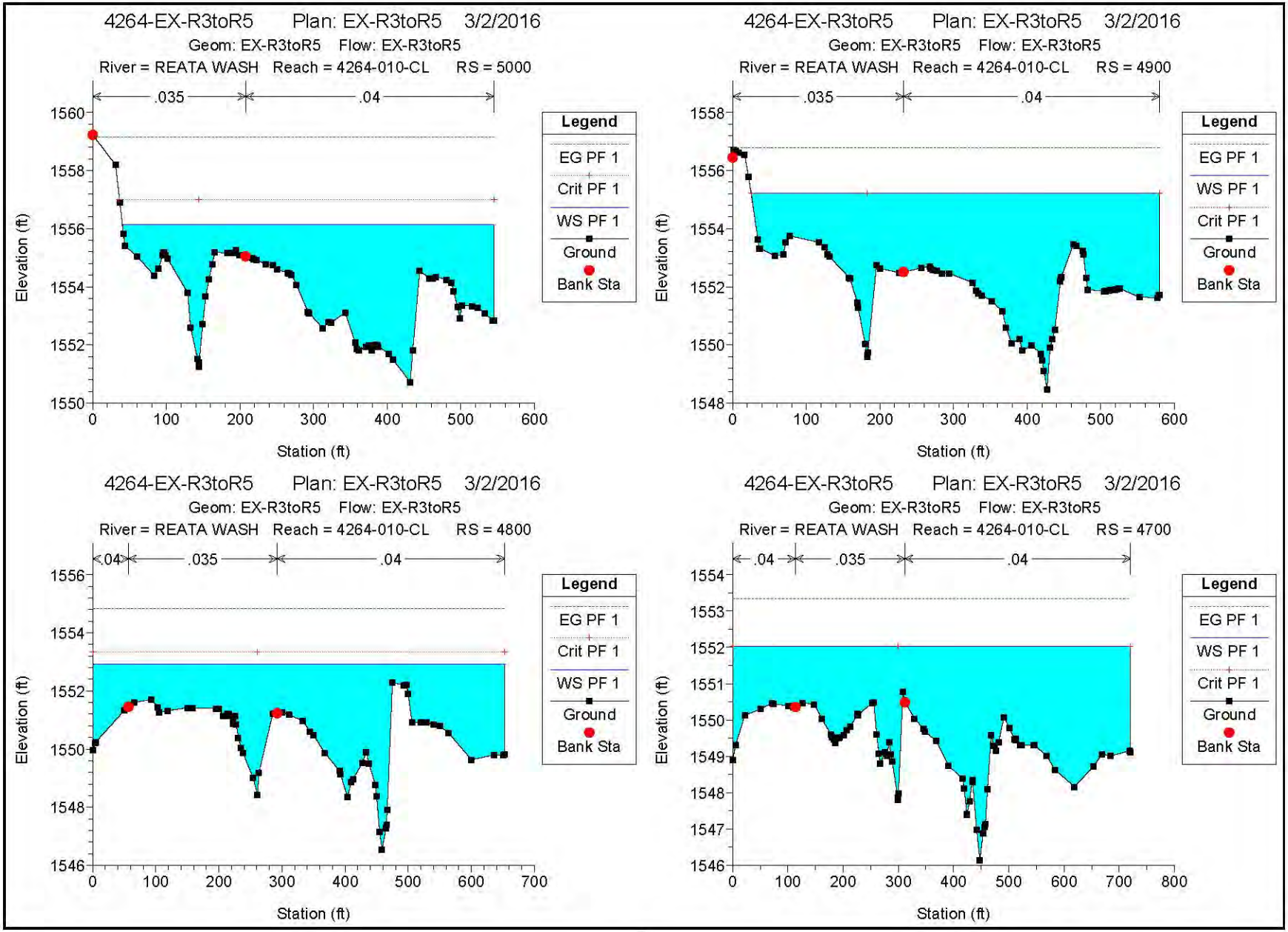

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6300
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6200
.04
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6126.11 CS 1100 From Bell Rd 052406_Final.prj
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6084.06 CS 1060 From Bell Rd 052406_Final.prj
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta

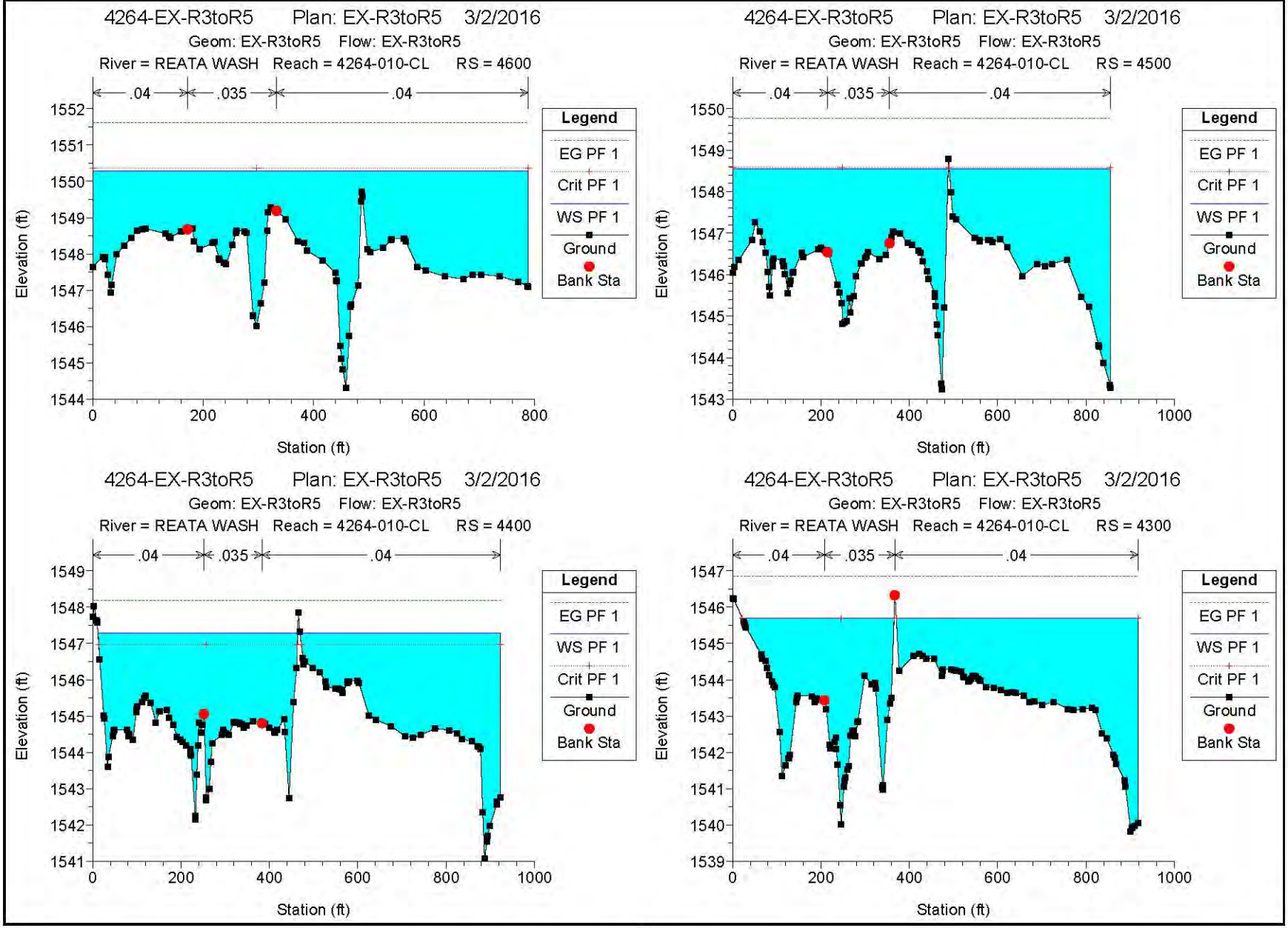

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6060 BR Bell Road Bridge North Side
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6060 BR Bell Road Bridge North Side
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6041.11 CS 1018 From Bell Rd 052406_Final.prj
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6024.98 CS 1002 From Bell Rd 052406_Final.prj
.035
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
Elevation (ft)
Station (ft)

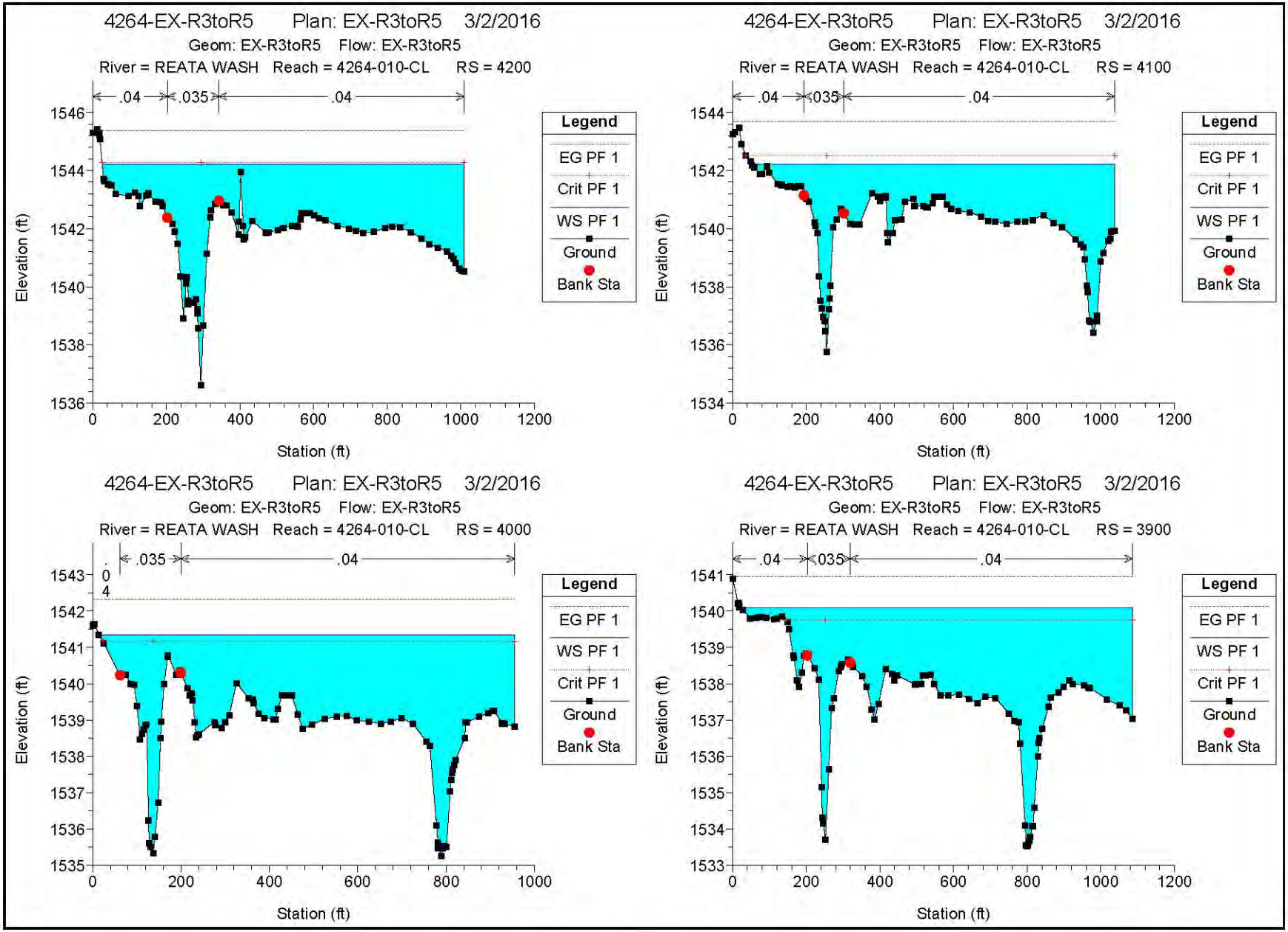

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6000 BR Bell Road Bridge South Side
.035
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Levee
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 6000 BR Bell Road Bridge South Side
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5981.62 CS 959 From Bell Rd 052408_Final.prj
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5900
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

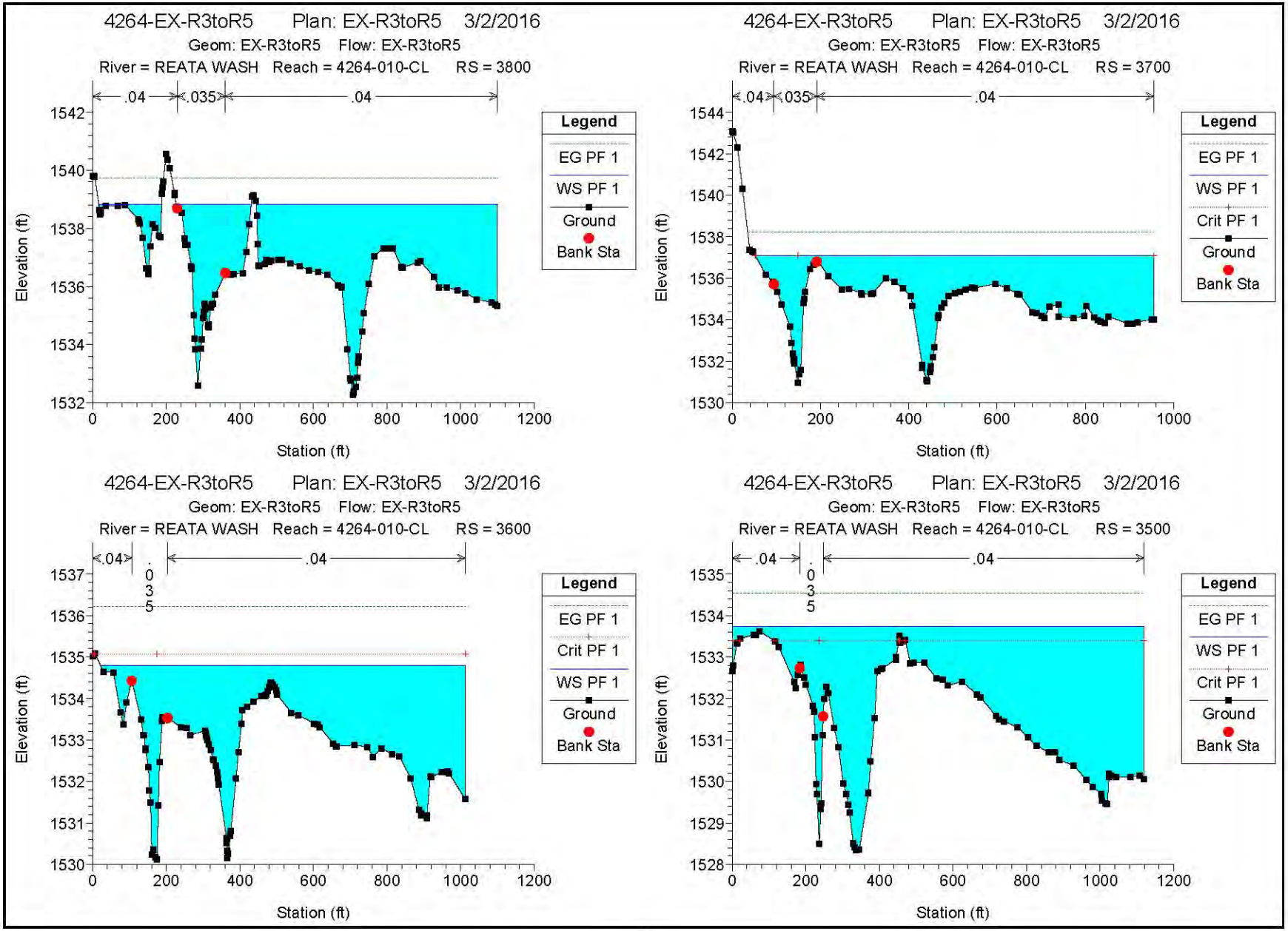

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5800
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5700
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5600
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5500
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta

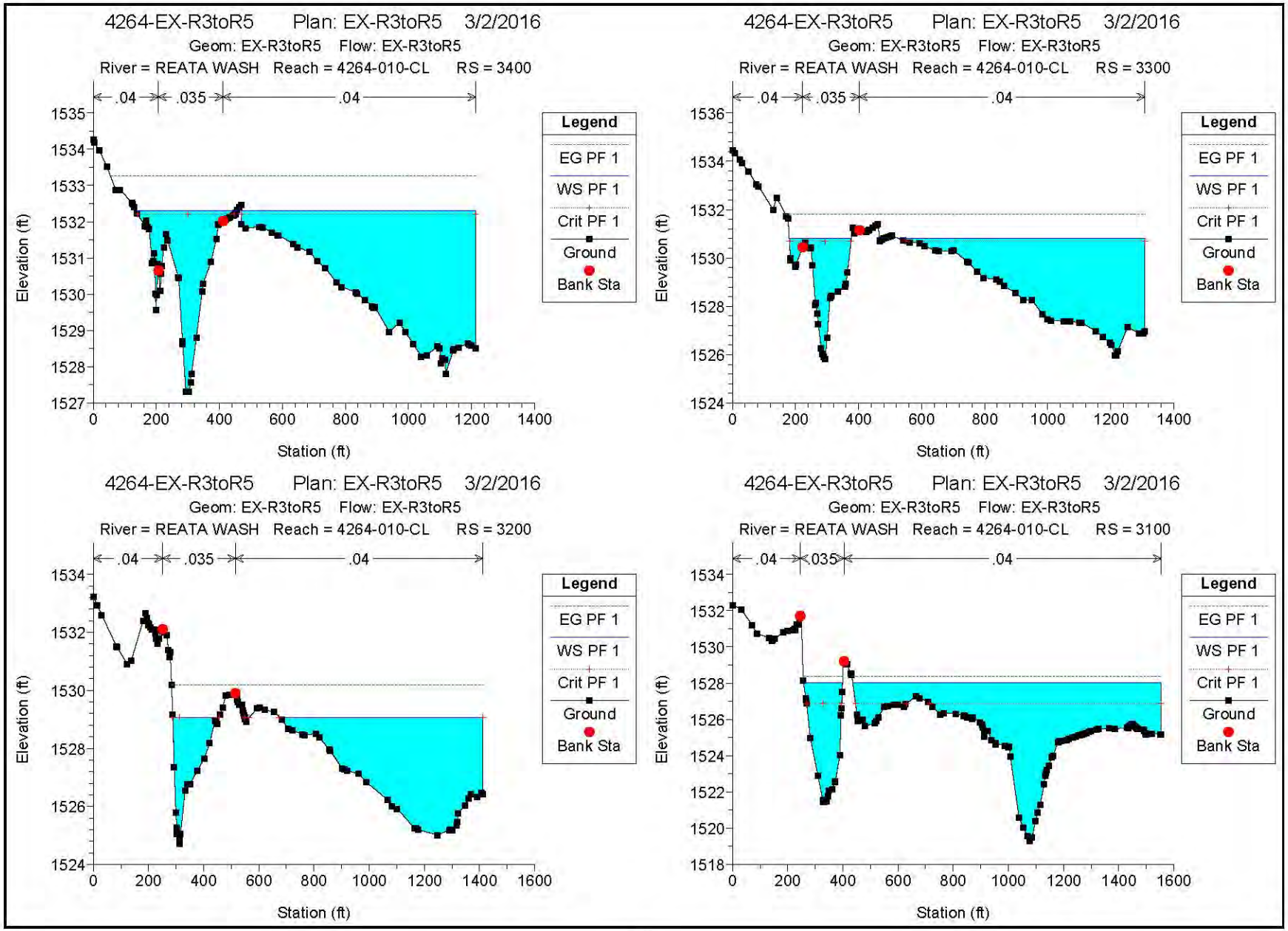

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5400
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5300
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5200
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5100
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

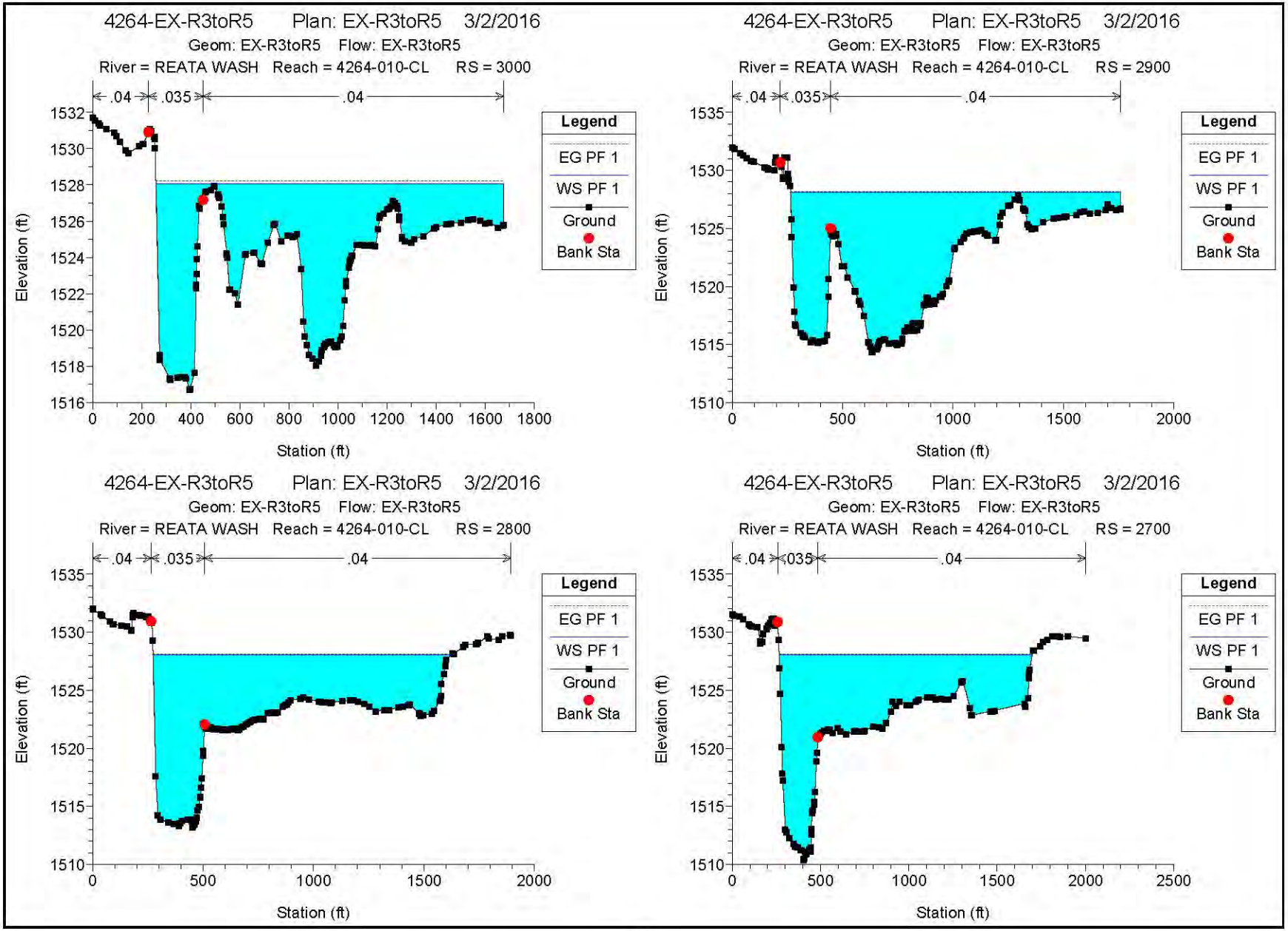

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 5000
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4900
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4800
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4700
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

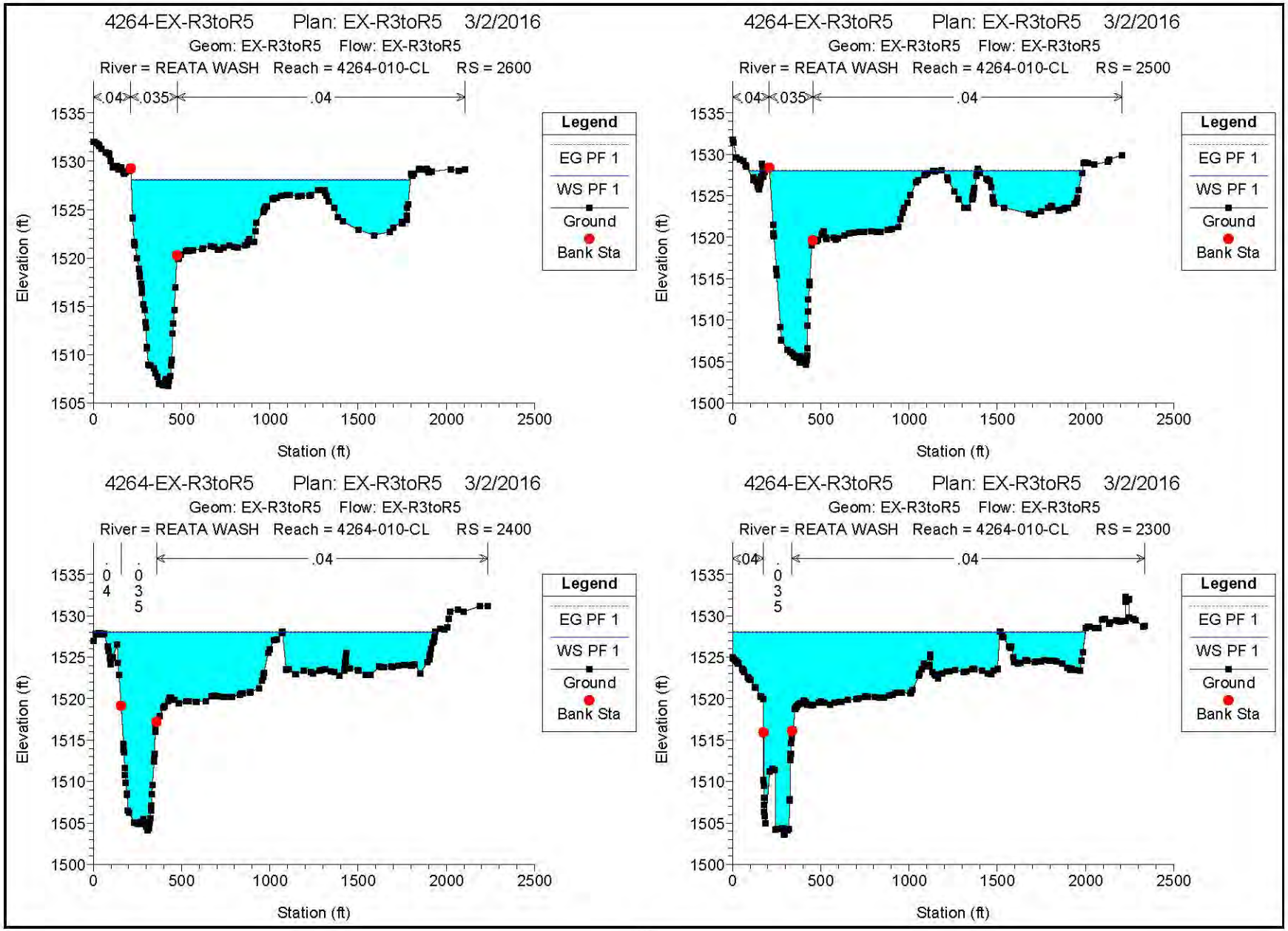

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4600
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4500
.04
.035
.04
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4400
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4300
.04
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

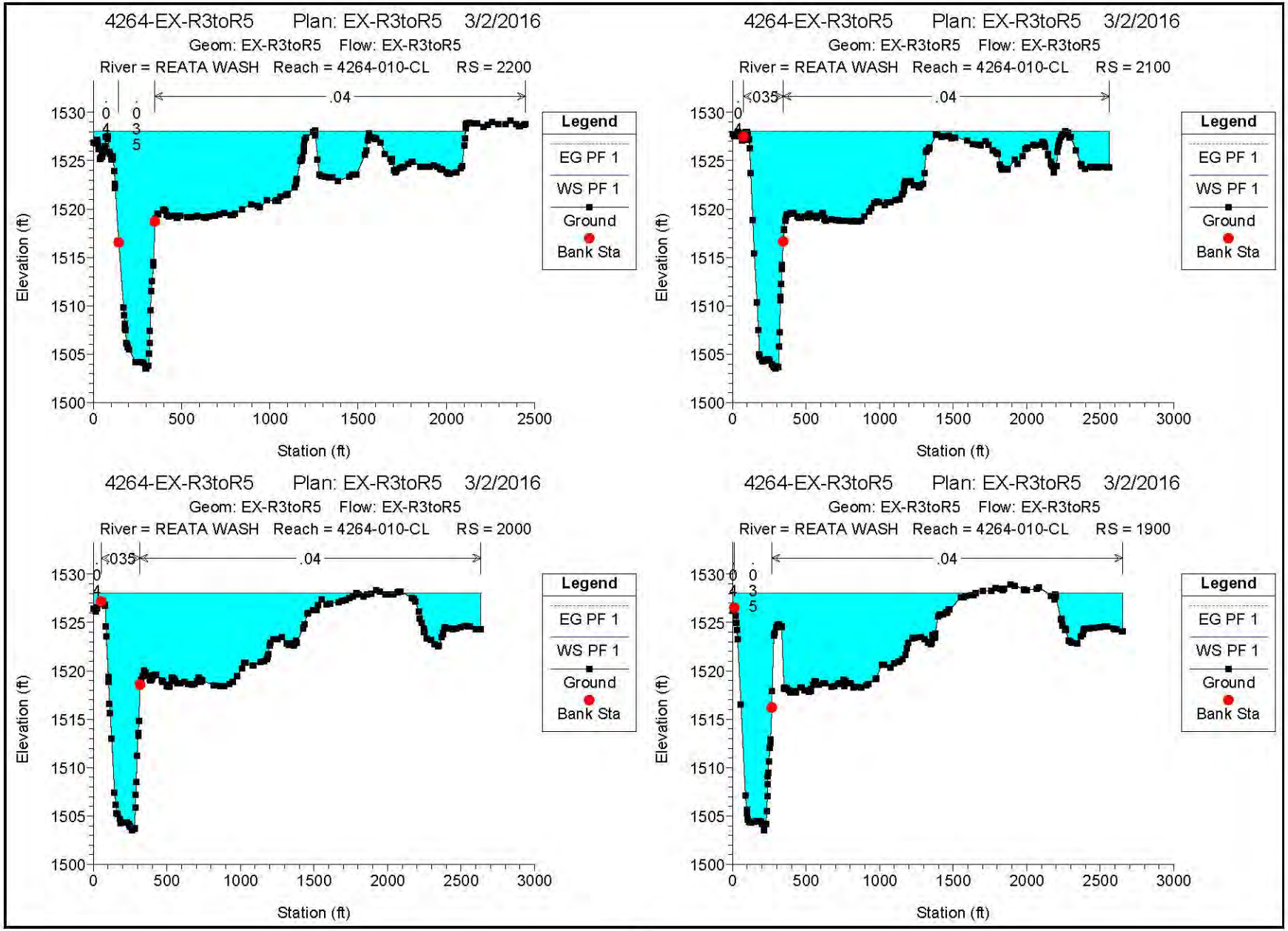

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4200
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4100
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 4000
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3900
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

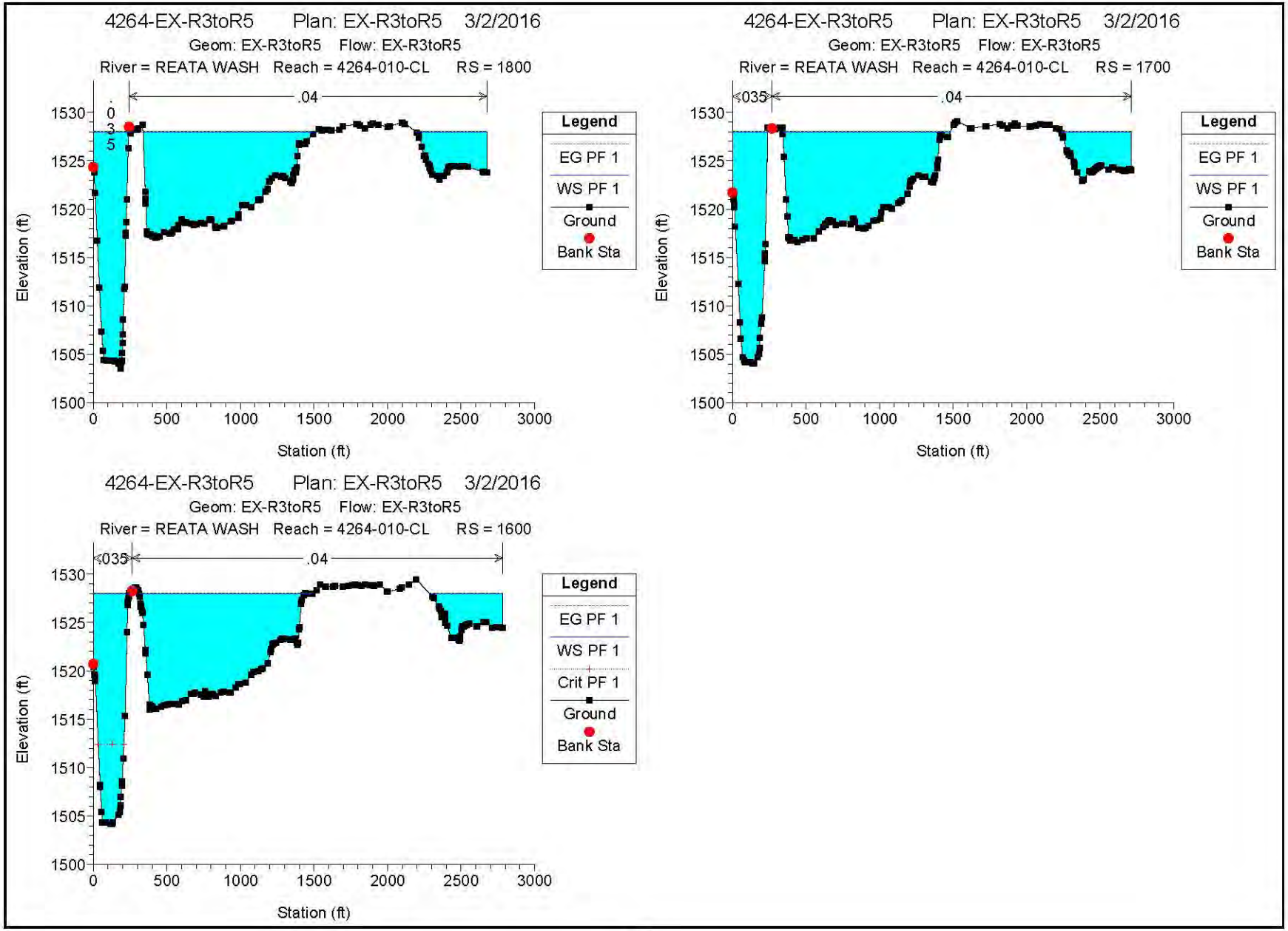

4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3800
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3700
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3600
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
Crit PF 1
WS PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3500
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3400
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3300
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3200
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3100
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 3000
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2900
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2800
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2700
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2600
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2500
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2400
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2300
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2200
.04
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2100
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 2000
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 1900
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 1800
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 1700
.035
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
4264-EX-R3toR5 Plan: EX-R3toR5 3/2/2016
Geom: EX-R3toR5 Flow: EX-R3toR5
River = REATA WASH Reach = 4264-010-CL RS = 1600
.035
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

APPENDIX C
Digital Files (CD)