Interim Assessment to Report Storm Damage to Sediment Control Structures and Monitoring Stations in Los Alamos and Pueblo Canyons

INTRODUCTION

The New Mexico Environment Department (NMED) issued an approval with modifications on January 11, 2010 (NMED 2010, 108444) for the Monitoring Plan for Los Alamos and Pueblo Canyons Sediment Transport Mitigation Project (LANL 2009, 107457). Los Alamos and Pueblo Canyons were subject to a series of storm events in August 2010 that resulted in significant damage to some of the sediment control structures and gages installed as part of the mitigation project plan. NMED has requested an interim assessment of the effects of the August storm events (NMED 2010, 110666) before the annual monitoring report, due May 30 of each year, required by the approval with modifications letter (NMED 2010, 108444). This interim assessment is required to provide documentation of all bank and channel erosion, channel scour or undercutting, and deposition related to the sediment control structures; evaluation of any newly created flow paths; and any other changes that could affect the performance of the structures and monitoring stations. This interim assessment summarizes the impact of the storms and provides a schedule for repairing damages that require interim action before other actions that may be presented as part of the May 30, 2011, report. Table 1 presents the information requested by NMED (2010, 110666).

Table 1
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Table	Title
2	Summary of August 2010 Storm Events
3	Observations and Recommendations for Los Alamos Canyon Low-Head Weir
4	Observations and Recommendations for DP Canyon Grade-Control Structure
5	Observations and Recommendations for Pueblo Canyon Grade-Control Structure
6	Observations and Recommendations for the Pueblo Canyon Wing Ditch and Willow Plantings
7	Observations and Recommendations for Pueblo Canyon Cross-Vane Structures
8	Observations and Recommendations for Wetlands from Los Alamos County's Pueblo Canyon Wastewater Treatment Plant to East End of Reach P4 West
9	Observations and Recommendations for LA-SMA-2 Sediment Basins
10	Observations and Recommendations for Damaged Monitoring Stations

During August 2010, two rain events caused high flows throughout portions of Los Alamos and Pueblo Canyons. These two precipitation events occurred on August 15–16 and August 23. As a result of these high flows, following each event Los Alamos National Laboratory (LANL) personnel assessed the condition of the structures listed in Table 1 to determine whether preventive and corrective maintenance actions would be required as a result of stormwater damage (Figure 1). Although site visits and assessments were made after each event, the August 15–16 event was the only one that triggered the need for formal inspections (precipitation > 0.5 in. within 24 h). Table 2 presents a summary of both August 2010 storms.

Table 2
Summary of August 2010 Storm Events

Station ID	August 15–16, 2010, Peak Flow (cfs)[a]	Comment (August 15–16 Storm)	August 23, 2010, Peak Flow (cfs)	Comment (August 23 Storm)
E039.1	190	08/15/10—Two peaks: 1st peak = 140 cfs; 2nd peak = ~190 cfs. 08/16/10–No appreciable flow.	140	Peak flow of 140 cfs occurred after 18:00.
E050.1	200	08/15/10—Peak flow = ~190 cfs. Travel time from E050.1 to E109.9 = 1 h, 55 min for 1st peak; 1 h, 10 min for 2nd peak. 08/16/10—Peak flow = ~250 cfs. Travel time from E050.1 to E109.9 = 1 h, 15 min.	0[b]	No flow recorded
E060.1	130	08/15/10—No appreciable flow. 08/16/10—Peak flow = ~130 cfs. Travel time from E060.1 to E109.9 = 1 h, 10 min.	0[b]	Trivial flow (<0.04 cfs)
E109.9	750	08/15/10 flow—Canyon not fully wetted; antecedent moisture condition I (AMC I). 08/16/10 flow—Rise at E109.9 between 14:30 to 14:55 because of flows from Guaje Canyon (AMC II).	750	No meaningful hydrograph could be created, as gage stuck at 15:30. Flows from Guaje Canyon (E099) peaked at 15:55, with a stage of 1.35 ft. Flow in Rio Grande at Otowi at 15:55 was 1210 cfs.

Note: All data are provisional.

[a] cfs = Cubic feet per second.

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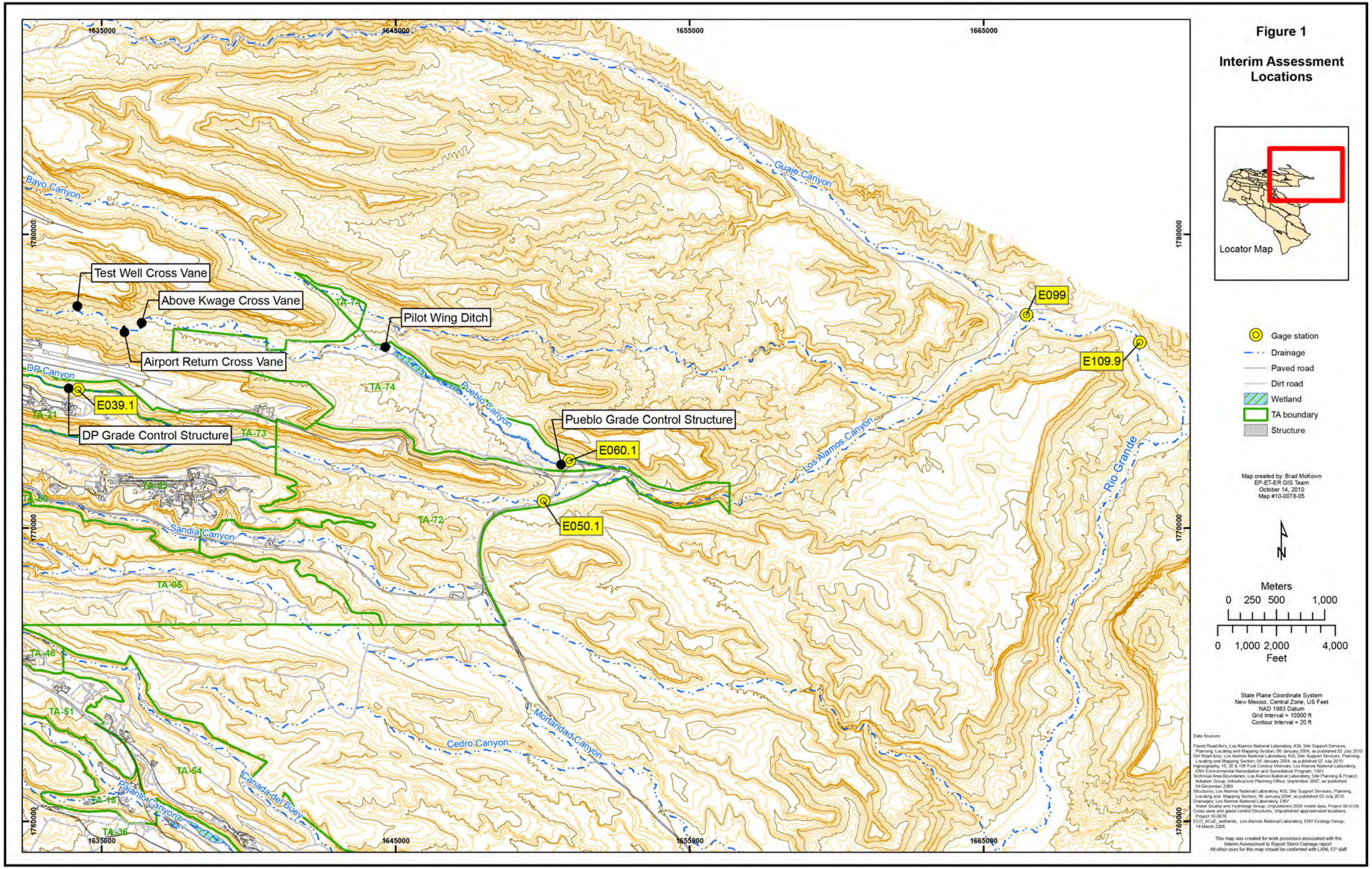


Figure 1 Interim assessment locations

Table 3
Observations and Recommendations for Los Alamos Canyon Low-Head Weir

Observation	Recommendation	Schedule
No damage observed from August 2010 floods.	No interim action recommended.	Not applicable

Table 4
Observations and Recommendations for DP Canyon Grade-Control Structure

Observation	Recommendation	Schedule
No damage related to August 2010 floods. Sediment aggradation is occurring as anticipated.	No interim action recommended.	Not applicable

Table 5
Observations and Recommendations for Pueblo Canyon Grade-Control Structure

Observation	Recommendation	Schedule
1. 75-ft x 3-ft x 5-ft trench eroded on upstream face of structure.	Repair erosion. The goal is to reset filter fabric along upstream face of structure, fill trench, and recompact fill material.	Complete: Q1, fiscal year (FY) 2011
2. Erosion on upstream southwest corner of structure.	Repair hole. The repair will be addressed as part of the action described above.	
3. 30-ft x 4-ft x 5-ft portion of stream bank directly downstream of structure has eroded away.	Fill scoured area and armor stream bank with riprap.	

Note: Figures 2 and 3 show some of the damage.



Figure 2 Erosional scour occurred upstream of Pueblo Canyon grade-control structure. Piping created a pathway beneath the structure.



Figure 3 **An estimated 200 yd^3 of material was displaced on the downstream side of the structure.**

Table 6
Observations and Recommendations for the Pueblo Canyon Wing Ditch and Willow Plantings

Observation	Recommendation	Schedule
No damage observed from August 2010 floods.	No interim action recommended.	Not applicable

Table 7
Observations and Recommendations for Pueblo Canyon Cross-Vane Structures

Observation	Recommendation	Schedule
1. Left and right legs of Test Well 1 cross-vane structure no longer exist.	No interim action recommended for performance. Other actions may be taken for Clean Water Act compliance.	DOE and LANL met with NMED's Hazardous Waste Bureau and DOE's Oversight Bureau on 10/15/10. Discussed options for cross-vane structures. Additional site walkover planned with NMED for fall 2010 or early spring 2011. Final recommendation will be presented in the May 2011 report based on full analysis of available data to date.
2. Left leg of Airport return cross-vane structure no longer exists.	No interim action recommended for performance. Other actions may be taken for Clean Water Act compliance.	
3. Portion of left leg of Kwage cross-vane structure no longer exists.	No interim action recommended for performance. Other actions may be taken for Clean Water Act compliance.	

Note: Figures 4 through 6 show some of the damage.



Figure 4 **The cross-vane structures located in Pueblo Canyon were all partially or completely damaged by the August 2010 storm events.**



Figure 5 **Sediment accumulation occurred behind portions of the structures, but erosional scour occurred around and between several of the boulders.**



Figure 6 **LANL will work with NMED to assess a different approach to flow dissipation and sediment deposition in Pueblo Canyon.**

Table 8
Observations and Recommendations for Wetlands from
Los Alamos County's Pueblo Canyon Wastewater Treatment Plant to East End of Reach P4 West

Observation	Recommendation	Schedule
1. No damage observed from August 2010 floods.	No interim action recommended.	Not applicable
2. Minor stream bank erosion noted on southern bank near old wastewater treatment bank. The erosion is not exclusively related to August 2010 floods and doesn't affect performance of the Pueblo Canyon mitigations.	No interim action recommended.	Recommendations for additional actions, if necessary, will be presented in the May 2011 report based on full analysis of available data to date.

Table 9
Observations and Recommendations for LA-SMA-2 Sediment Basins

Observation	Recommendation	Schedule
1. Minor erosion noted on spillway. Conditions not exclusively related to August 2010 floods.	No interim actions recommended.	Recommendations for additional actions, if necessary, will be presented in the May 2011 report based on full analysis of available data to date.
2. Minor erosion noted on southeast corner of furthest downstream berm. Conditions at the sediment basins are not exclusively related to August 2010 floods.	No interim actions recommended.	

Note:LA-SMA-2 is not shown in Figure 1. Figures 7 through 9 show erosion, dislodged samplers, and a functioning spillway, respectively.



Figure 7 **LA-SMA-2 sediment basins were not damaged; only minor erosion was observed. The structures performed as designed. The spillway will be armored with riprap.**



Figure 8 **Samplers were temporarily dislodged.**



Figure 9 The spillway performed as designed.

Table 10
Observations and Recommendations for Damaged Monitoring Stations

Observation	Recommendation	Schedule
1. Wire-enclosed riprap downstream of E109.9 was damaged.	Repair/replace wire-enclosed riprap.	Complete Q1 FY2011
2. Float stuck at E109.9 during August 23, 2010, flood.	Repair and test gage.	Complete Q1 FY2011
3. Minor settling noted in flumes at E109.9, E050.1, and E060.1.	1. Set control points at each flume. 2. Conduct survey to measure any future settling and adjust rating tables, as needed.	Complete Q1 FY2011

Note: Figures 10 through 12 show damage to monitoring station E109.9.



Figure 10 **Flows estimated at >700 cfs topped the recently installed supercritical flume at E109.9, creating substantial sediment and debris deposits.**



Figure 11 **Samples were collected from both the 8/15/10 and 8/23/10 events at E109.9. Telemetry signals were sent to the Buckman Direct Diversion Project.**



Figure 12 Riprap on the downstream side of the E109.9 flume was damaged. Repairs have been scheduled.

REFERENCES

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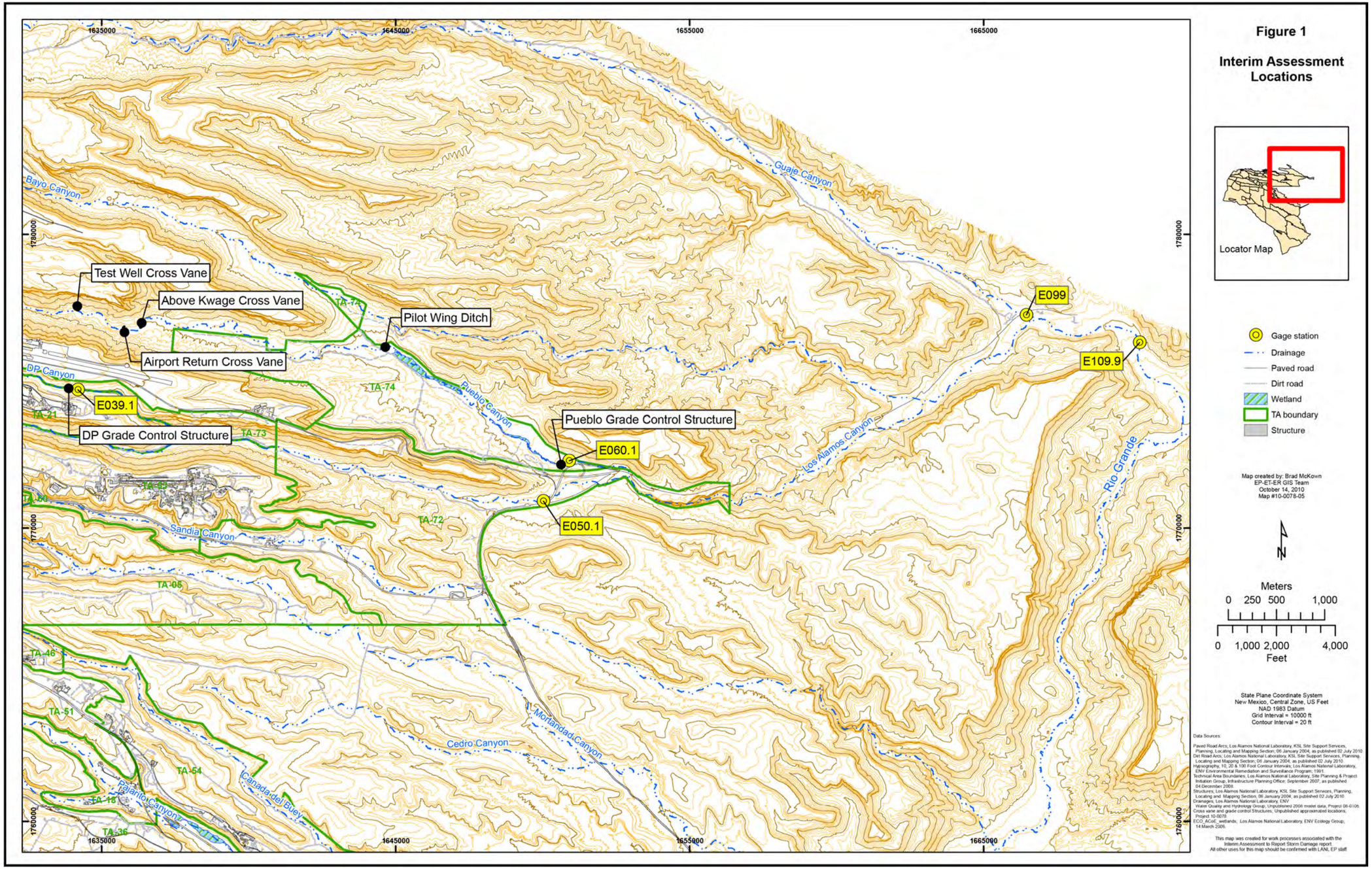


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