

Level II Antidegradation Review

Union Pacific Railroad Great Salt Lake Causeway, Temporary East Culvert Closure Project

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Prepared for
Union Pacific Railroad
Omaha, NE 68179

Prepared by
HDR Engineering, Inc.

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1.0 Background

Union Pacific Railroad (UPRR) operates trains on a rock-fill causeway in Utah's Great Salt Lake. UPRR is proposing to permanently close the east culvert of the causeway and implement a previously authorized compensatory mitigation action (constructing a bridge) to offset the effects of closing the east and west culverts of the causeway. These actions are referred to in this document as the proposed project.

The current proposed project refers to the temporary closure of the east culvert in response to UPRR's request for emergency authorization. This action required a Nationwide Permit (NWP) from the U.S. Army Corps of Engineers (USACE, ACOE, or the Corps) and a Utah 401 Water Quality Certification from the Utah Division of Water Quality (UDWQ or DWQ).

In December 2013, USACE issued a NWP 14 for the temporary closure of the east culvert in the UPRR causeway (USACE 2013) in response to UPRR's request for emergency authorization. This action required a Level I Antidegradation Review (ADR) application form and supplementary information, dated December 10 and 11, 2013, respectively, to support the Utah 401 Water Quality Certification application for the temporary closure of the east culvert. However, UDWQ determined that a Level II ADR review was necessary. The text in italics below is taken directly from the UPRR's March 10 acknowledgement of the UDWQ determination and also was included in the initial UPRR Level II ADR submission (UPRR 2014a).

UPRR's Level I ADR submittal provided information and analysis demonstrating that the water quality effects associated with the temporary closure of the east culvert would be temporary and limited and that a Level II ADR should not be required. However, in a letter dated February 25, 2014, DWQ stated that the Level I ADR did not provide sufficient evidence that the water quality effects of temporary closure of the east culvert would qualify as temporary (UDWQ 2014a). Therefore, DWQ stated, "UPRR is required to conduct a Level II ADR to address degradation that may occur in the interim period prior to the establishment of permanent mitigation."

UPRR acknowledged DWQ's determination to require a Level II ADR for this project in a letter dated March 10, 2014, and included a clarification of two points made by DWQ in its review that appeared to have affected DWQ's conclusion that a Level I ADR did not qualify as temporary (UPRR 2014c). The two points are summarized below:

- First, UPRR has submitted an easement application to the Utah Division of Forestry, Fire and State Lands. The easement application has been received and is in review.*
- Second, as described in detail in UPRR's response to public comments on the Utah 401 Water Quality Certification, the Level I ADR analysis for temporary and limited water quality impacts was based on a period of 2 years. UPRR has submitted a proposed schedule to USACE stating that the water and salt balance modeling will be completed in April 2014 and that the Comprehensive Mitigation and Monitoring Plan will be submitted in June 2014. With these submittal dates, agency and public review may be completed, and the permit and water quality certification determinations on the proposed approvals for the permanent closure of the east culvert and bridge construction should be made by November 2014. Design plans for the proposed compensatory mitigation bridge are complete, and, if the modeling dictates that a different bridge configuration would better duplicate the aquatic functions of the culverts, the bridge configuration can be easily and quickly revised. Assuming that the project is reviewed and approved on this schedule, construction of the bridge can be started in early 2015 and completed by the*

end of 2015, which would be within 2 years of the east culvert closure. On this basis, UPRR believed that any impacts of the project, which were shown in UPRR's submittal to be limited, could properly be determined to be "temporary."

The UPRR letter also stated that, while UPRR accepts DWQ's Level II determination and is moving forward to complete and submit it, UPRR is concerned about the implications for the schedule of DWQ's statements that the schedule for completing the work is "unresolved" and "indefinite." UPRR shares the agencies' and the public's desire to determine the proper mitigation and get it into place as soon as possible. UPRR believes that the above schedule can be met and that agency approvals and permits can be issued in time to construct the mitigation bridge in 2015.

UPRR submitted the Level II ADR to UDWQ in April 2014 (UPRR 2014a). After the submittal of the Level II ADR, UDWQ responded with review comments and requested that UPRR resubmit the Level II ADR in a report format and provide additional information (UDWQ 2014b).

1.1 Purpose of This Report

UPRR is submitting this Level II ADR with the additional information requested by UDWQ (2014b) to support the Utah 401 Water Quality Certification dated December 16, 2013, which is required for the USACE NWP 14 dated December 6, 2013, for the temporary placement of fill material into the east culvert of the Great Salt Lake railroad causeway to facilitate the culvert's emergency closure.

There are no effluent discharges associated with the project that would degrade water quality and potentially impair the beneficial uses of the lake. The proposed project—a temporary reduction of water and salt transfer that would result from the temporary closure of the east culvert—would have a limited effect on the exchange of water and salt through the causeway, with the actual effect depending on lake water surface elevations (WSE) and salinity values. In this Level II ADR, UPRR provides an analysis of the potential reduction in the exchange of water and salt through the causeway as a result of the temporary east culvert closure.

UDWQ stated in its review comments that salinity and salt load may be used as a surrogate for water quality parameters of concern. Therefore, for this resubmitted Level II ADR report, UPRR conducted an ADR that considers the effects of temporarily closing the east culvert, including a temporary reduction of water and salt transfer through the causeway, and those effects on the salinity and salt load of the lake and on the lake's beneficial uses.

What are beneficial uses?

Lakes, rivers, and other water bodies have uses to humans and other life. These uses are called beneficial uses.

1.2 Contents of This Level II ADR Resubmittal

UPRR has prepared this Level II ADR resubmittal to be consistent with the Utah 401 Water Quality Certification and USACE NWP 14 authorization for the temporary closure of the east culvert to demonstrate consistency with the antidegradation policy of the State of Utah. The following topics are discussed in this resubmittal:

- Project description
- Standards for receiving waters
- Social and economic necessity
- Parameters of concern
- Analysis of culvert repair alternatives
- Additional analysis of interim mitigation measures
- Additional supporting documents
- Summary and conclusion

2.0 Project Description

The following text is similar to that contained in the previous UPRR Level II ADR (UPRR 2014a).

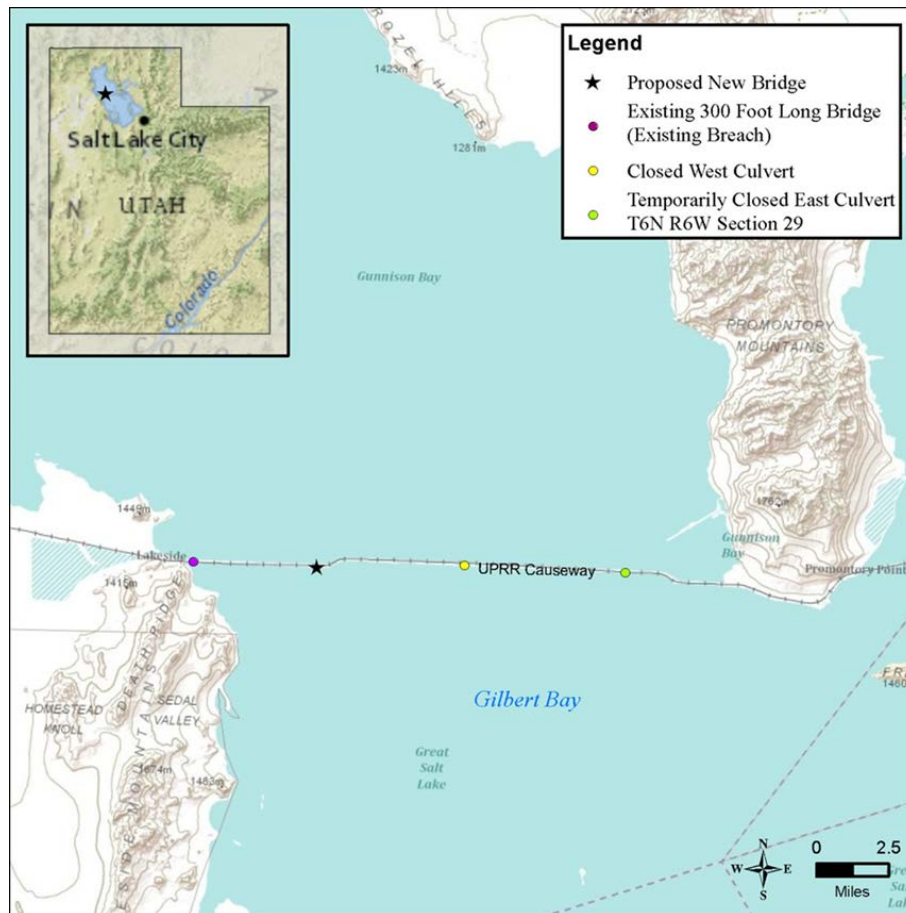
This project involves the temporary, one-time placement of fill (about 3,650 cubic yards of clean rock) into the east culvert to prevent the collapse of the culvert and the closing of the railroad causeway to train traffic. Emergency temporary closure was necessary because the concrete culvert was failing due to settlement and age (original construction was in 1959) and was jeopardizing the structural integrity of the railroad causeway.

The east culvert is about 15 feet wide and 23 feet tall and spans the width of the causeway. As of November 2012, the invert of the east culvert is at about elevation 4,173 feet (National Geodetic Vertical Datum of 1929 [NGVD 29]), the top of the causeway is about 4,216 feet (NGVD 29), and the Great Salt Lake is about 22 feet deep at the culvert location.

The temporary authorization of east culvert closure will remain pending authorization of permanent closure and construction of the compensatory mitigation (proposed bridge) through a separate USACE individual permit and Utah 401 Water Quality Certification. The application for authorization of the permanent closure of the east culvert and the construction of a compensatory mitigation causeway opening to replace the aquatic function of the east and west culverts was submitted to USACE and DWQ on January 7, 2014. UPRR anticipates that the temporary closure of the east culvert will last about 2 years and is working toward authorization for permanent closure and construction of the mitigation facility by November 2014 and December 2015, respectively.

Figure 1 below illustrates the project area in the lake.

Figure 1. Project Area



3.0 Standards for Receiving Waters

The proposed project would place fill to temporarily close the east culvert, which is in the UPRR causeway that crosses the open water of the Great Salt Lake, specifically between Gilbert Bay and Gunnison Bay. The following information is provided for the receiving waters.

3.1 Beneficial Uses

The Great Salt Lake has designated beneficial uses for the different named bays within the lake (Table 1 below). The proposed project would be located in the UPRR causeway, which borders Gilbert Bay (part of the South Arm) and Gunnison Bay (the North Arm). The project would have no direct impacts on Farmington and Bear River Bays (both located in the South Arm). Therefore, UPRR focuses this analysis on the open waters of Gilbert and Gunnison Bays.

Table 1. Beneficial-Use Classes for Gilbert and Gunnison Bays

Class	Location	Geographical Boundary	Beneficial Uses
5A	Gilbert Bay (South Arm)	All open waters at or below approximately 4,208 feet in elevation south of the UPRR causeway, excluding all of Farmington Bay south of the Antelope Island causeway and salt evaporation ponds.	Protected for frequent primary and secondary contact recreation, waterfowl, shore birds, and other water-oriented wildlife, including their necessary food chain
5B	Gunnison Bay (North Arm)	All open waters at or below approximately 4,208 feet in elevation north of the UPRR causeway and west of the Promontory Mountains, excluding salt evaporation ponds.	Protected for infrequent primary and secondary contact recreation, waterfowl, shore birds, and other water-oriented wildlife, including their necessary food chain

Source: Utah Administrative Code (UAC) R317-2-6, Use Designations, as in effect March 1, 2014

3.2 Water Quality Standards

UDWQ applies numeric and narrative standards to waters of the state to protect designated beneficial uses. Numeric standards refer to specific water quality criteria that are applied to each class of water to protect its beneficial uses. Gilbert Bay (Class 5A) has an established tissue-based standard for selenium (Utah Administrative Code [UAC] R317-14, Numeric Criteria, as in effect March 1, 2014), but no other numeric standards apply to the Great Salt Lake in terms of protecting water quality. The selenium criterion is 12.5 milligrams per kilogram (mg/kg) dry weight in bird egg tissue.

Narrative standards are applied to all waters within the state's boundaries, including the Great Salt Lake. Narrative standards are general statements that prohibit the discharge of waste or other substances that result in unacceptable water quality conditions such as visible pollution or undesirable aquatic life. If a water body does not meet numeric or narrative water quality standards and the beneficial uses of that water body are adversely affected, the water body could be designated as impaired under the federal Clean Water Act and targeted for activities to improve its water quality.

UDWQ previously conducted water quality sampling in the Great Salt Lake to assess ambient water quality and provide information for the future development of numeric water quality criteria for the lake (UDWQ 2012). UDWQ's strategy recognizes that the numeric criteria might vary based on salinity levels that in turn affect biological and human uses of the lake.

For this project, UPRR considers the effects of temporarily closing the east culvert, including a temporary reduction of water and salt transfer through the causeway, and those effects on the salinity and salt load of the lake and on the lake's beneficial uses. The project effect would be considered adverse if it resulted in impairment of the lake's beneficial uses.

3.3 Impaired Waters

Neither the Great Salt Lake nor any part of the lake is on or proposed to be included on the state list of impaired waters (UDWQ 2010, 2014c). The list of impaired waters is referred to as the 303(d) list since the listing process follows the regulatory requirements of Section 303(d) of the Clean Water Act. Impaired waters are defined as those water bodies not meeting their beneficial uses. Typically, these waters exceed the specific numeric water quality standards associated with a specific class or beneficial use.

3.4 Antidegradation Policy

Along with protection of Great Salt Lake for beneficial uses, UDWQ has a statewide antidegradation policy that protects water bodies from activities that could lower or degrade water quality. The policy requirements include review and analyses to determine whether a project would violate water quality standards and impact the beneficial uses of the water bodies. Activities that lower or degrade water quality can be allowed if UDWQ determines that these activities are necessary for important economic or social development. To facilitate this policy, all waters in Utah are designated as Category 1, 2, or 3 waters. The Great Salt Lake is considered a Category 3 water subject to antidegradation reviews (UAC R317-2-12, Category 1 and 2 Waters, as in effect March 1, 2014). Category 3 waters are all waters not designated as Category 1 or 2.

4.0 Social and Economic Necessity

This section provides details to facilitate the UDWQ concurrence that the project is socially and economically necessary and to describe the social and economic benefits realized through the proposed temporary closure of the east culvert. This section also discusses whether there would be impacts to social and economic activities that may result in a loss due to the project. The following text in italics is taken directly from the previous UPRR Level II ADR (UPRR 2014a).

The temporary closure of the east culvert will have very limited water quality effects on Gunnison Bay and Gilbert Bay due to the temporary reduction of water and salt transfer through the causeway. It is necessary to incur such potential water quality effects in order to avoid social and economic hardships that would be associated with the closure of the causeway to train traffic.

Section 4.1 includes discussions on the social and economic benefits that are associated with temporary closure of the east culvert. Section 4.2 includes discussion of the social and economic losses that are associated with temporary closure of the east culvert.

4.1 Social and Economic Benefits

The following text in italics is taken directly from the previous UPRR Level II ADR (UPRR 2014a).

UPRR has been part of the state of Utah since the completion of the transcontinental railroad in the 1860s. Utah is a hub for UPRR today. UPRR has more than 1,400 employees in the state and has made private investments of more than \$290 million in Utah's transportation infrastructure from 2007 to 2012.

Inspections conducted in October 2013 to assess the structural integrity of the east culvert revealed deterioration beyond repair. UPRR, believing that collapse was imminent, sought emergency approval of east culvert closure from USACE and Utah 401 Water Quality Certification from DWQ to close the east culvert.

In response to USACE's requests, on November 8, 2013, UPRR submitted additional analysis describing the social and economic hardships that would result from the potential closing the causeway across the Great Salt Lake to train traffic (letter attached). The corresponding economic and social benefits that would be realized through implementation of the project (avoiding shutdown of the causeway to train traffic) are summarized below. Safe and efficient train traffic through Utah, and avoidance of severe economic and social impacts that would

result from shutdown of the Great Salt Lake Causeway to train traffic, would be realized by the implementation of the proposed project (the temporary closure of the east culvert in the causeway across the Great Salt Lake).

Benefits to Interstate Commerce. *Just as a causeway shutdown would have clearly impacted interstate commerce, closing the culvert, which was necessary to allow safe and efficient train traffic, would benefit interstate commerce. UPRR's customers rely heavily on interstate shipments over the Lakeside Subdivision main line, which crosses the Great Salt Lake. Maintaining a safe and reliable transportation corridor would avoid impacts to interstate shipments that normally cross the lake and would avoid the ripple effect of a causeway shutdown that would extend throughout the rail network.*

Benefits to Property. *The Great Salt Lake causeway structure is an integral part of the Lakeside Subdivision, which is the main east-west line linking West Coast, Midwestern, and Eastern customers and markets. Closure of the culvert made it possible for the causeway to remain open and operable, which in turn allowed this portion of the east-west interstate line to remain operable. In contrast, the collapse of the culvert would have caused an immediate loss of productive use of UPRR's property (not only the causeway itself but an additional 178 route-miles between Ogden, Utah, and Wells, Nevada) that would have continued until the causeway's structural integrity is restored.*

Economic Impacts. *Authorizing closure of the culvert, which in turn allowed for the continued safe operation of the causeway and the interstate route that relies on it, made it possible to avoid the significant economic impacts of shutdown detailed in Union Pacific's November 8, 21, and 27, 2013, submittals to USACE. The following is an excerpt from UPRR's November 21, 2013, submission summarizing the economic impacts that would have resulted from a causeway shutdown:*

"As detailed herein, shutdown of the Causeway route would result in immediate, unforeseen and significant economic hardship to Union Pacific, its customers, the public and interstate commerce. It would force interstate rail traffic from the Causeway—22–24 extra trains per day—onto the local Shafter route, which already supports regional and local train traffic, immediately overloading it. This route goes through downtown Salt Lake City and some of the most populated and industrialized parts of the metropolitan Salt Lake City and Ogden areas. Forcing all the Causeway train traffic onto this route would increase road and highway traffic congestion as well as vehicle air emissions. It would immediately impact Union Pacific and its customers. Direct costs alone would exceed \$258,000 per day. Because the Corps' standard permit process would be expected to take at least one year if the Corps refuses to utilize emergency permit processing procedures, the direct costs alone—excluding lost revenues—would be over \$94 million per year. These are just some of the examples of significant economic hardship that would result from shutdown of the Causeway" UPRR to USACE, November 21, 2013, at pp. 2–3 (see attached).

Additional details regarding these economic impacts that were avoided are detailed in this letter, starting at page 10, and on pages 5–6 of UPRR's supplemental submission dated November 27, 2013 (see attached).

The economic benefits of this approval are reflected in the successful avoidance of all these significant impacts through closing the culvert, which allowed for ongoing safe use of the Great Salt Lake causeway and the interstate route.

Social Impacts. *In addition to the economic benefits, the closure of the east culvert benefitted the public. By allowing train traffic to continue on the causeway and the interstate route, rerouting of an additional 22–24 trains over the Shafter Subdivision through downtown Salt Lake*

City and Ogden was avoided. This avoided the increased road and highway traffic delays and associated vehicle emission impacts that would have been associated with the rerouting of the trains. The public was benefitted by not being inconvenienced with motorists having to wait for additional trains to pass and increased fuel costs and vehicle emissions associated with additional idling and delays.

4.2 Social and Economic Losses

Based on analysis, there would be no social or economic losses resulting from the temporary closure of the east culvert for 2 years. South Arm salinity showed a measured decrease of 4.3% salinity over the 2004–2009 period, while the culverts were fully functioning (unobstructed). Based on UPRR’s analysis submitted with its Level I ADR application, temporary closure of the east culvert for 2 years is estimated to result in an additional, contributory reduction of South Arm salinity on the order of 0.26%, over this same period, based on the analysis presented in the Utah 401 Water Quality Certification application dated December 10, 2013.

The analysis previously submitted in the UPRR Utah 401 Water Quality Certification application and Level I ADR submitted on December 10, 2013, Attachment C, is reproduced below.

- 1) *UPRR has completed the first of its three-step modeling plan, using the USGS [U.S. Geological Survey] Water and Salt Balance computer model. The first step was to rerun the existing model calibrated for the period from 1987 through 1998 (12 years). This step included modeling a hypothetical scenario with two unobstructed culverts as they existed in November 2012, using 1987–1998 hydrology. In fact, during that period, the culverts were plugged with rubble and ineffective for most of this time. At the end of the modeling period (1998), the simulation produced a South Arm salinity of 11.3%. The average South Arm salinity based on actual measurements was 8.9%, a difference of 2.4%. This suggests that the average effect of the two unobstructed culverts on South Arm salinity was limited to about 0.2% per year over the 12-year period. In other words, during extended periods of high water levels, such as existed during the time period of 1987–1998, flows through the unobstructed two culverts are estimated to contribute only about a 0.2% increase in South Arm salinity annually. This analysis indicates that the east culvert contributes an increase of 0.1% to the South Arm salinity.*

The analysis is conducted over a range of South Arm water surface elevations of a high 4,211 feet in 1987 to 4,201 feet in 1998, higher water surface elevations than exist today.

South Arm Salinity Change, 1987–1998, Actual and Modeled

Initial Condition		Ending Condition			
		Actual¹		Simulated Culverts	
Density, g/ml	% Salinity	Density, g/ml	% Salinity	Density, g/ml	% Salinity
1.051	7.7	1.060	8.9	1.077	11.3

1. UGS [Utah Geological Survey], average density at station RT-4, October 28, 1998

- 2) *In addition to the 1998 modeling summary above, salt transfers for the period from spring 2004 to spring 2009—a period of lower but relatively stable water elevations, can be calculated and evaluated using three sets of interrelated data from that period:*
 - *Sampled North and South Arm salinities*
 - *Measured bidirectional flows through the culverts*

- *Total salt load in the South Arm*

This period is the only one on record that is relevant for this purpose because it begins when UPRR removed all rubble from the culverts and constructed protective berms and ends with the latest known computation of salt load in the North and South Arms (Kidd M. Waddell, "The Potential Effects of the Proposed Great Salt Lake Minerals Project on the Water and Salt Balance of Great Salt Lake, Utah," 2010).

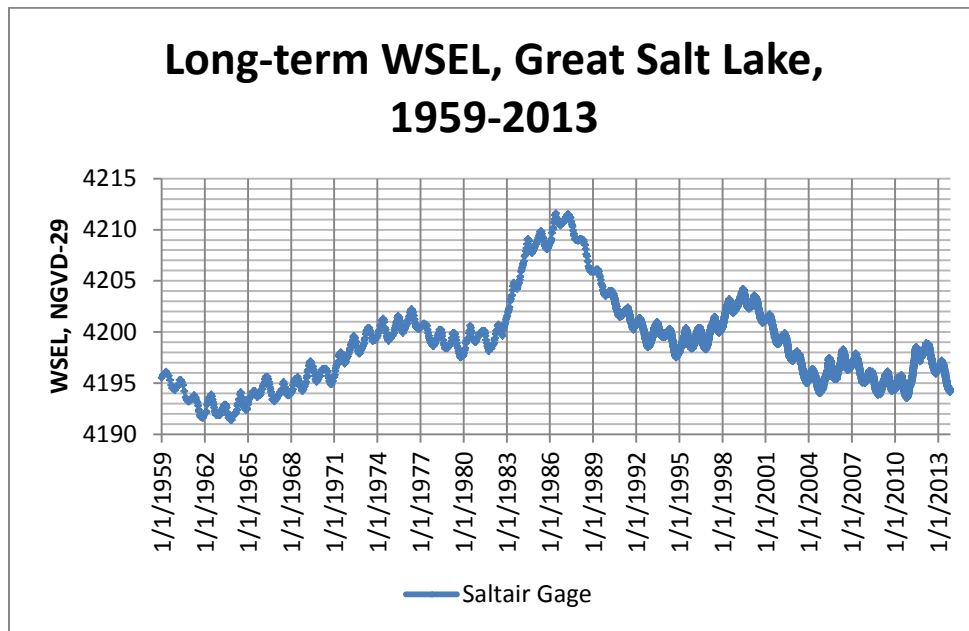
In spring 2009, total salt load in the South Arm was approximately 1.7 billion tons. Measured average South Arm salinity was 15.5% at a water surface elevation of about 4196 feet. Correlating the salinities and the bidirectional flows through the culverts, the net salt transfer through the two culverts (over a 5-year period ending spring 2009) was about 150 million tons north to south. Had the culverts been closed during that time, the estimated salt load in the South Arm in spring 2009 would therefore be 1.55 billion tons, or a salinity of 14.2%. This suggests that the average effect of the two culverts on South Arm salinity was limited to about 0.26% per year. In other words, during low water levels, such as existed at that time, flows through the unobstructed culverts are estimated to contribute about a 0.26% increase in South Arm salinity annually (although this might be partially offset by increased salt transfers through the causeway fill due to increased salinity differential). Lake elevations during this period were similar to the current elevation.

Therefore, using the 1998 modeling data, which is currently the best available until the completion of modeling effort, and the 2004–2009 salt transfer analysis, the estimated impact on South Arm salinity due to closure of both culverts would be expected to be on the order of 0.2% to 0.25% per year. [The contribution of the east culvert would be half that of 0.1 to 0.13% per year, for an estimated effect of 0.26% for two years.] During the 2004–2009 time period, South Arm salinity varied 4.3% (between 11.9% and 16.2%), an order of magnitude greater than the estimated annual contribution of the culverts, confirming that other factors affect salinity much more than the culverts.

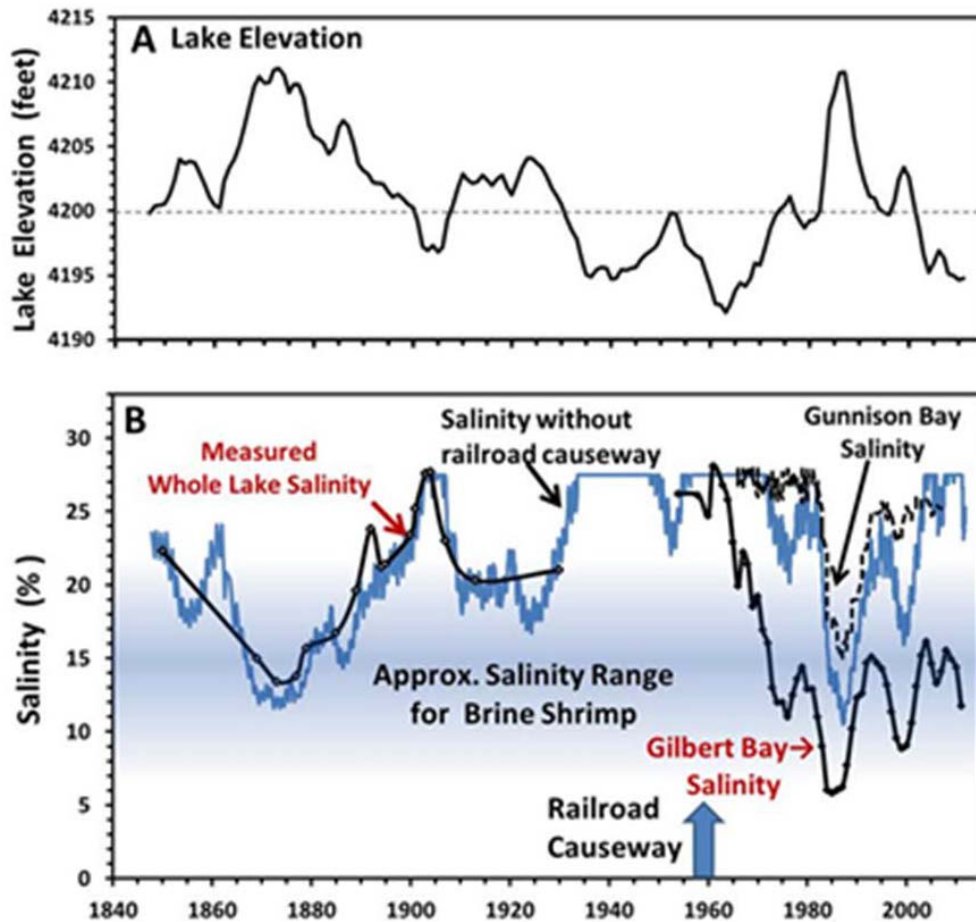
The Level I ADR also included a review of the historical context for lake levels and salinities, which is summarized below.

Historical Water Surface Elevation and Salinity Review. As a closed basin system, the Great Salt Lake experiences annual variations in lake elevation and in salinity. Lake levels and average salinities are a result of the natural contribution of water inflows that bring water to the lake and evaporation, which removes water from the lake, and manmade influences such as surface water diversions, modifications to the causeway, the operation of the West Desert Pumping Project and industrial extractions. Generally, the lake level rises (and South Arm salinity decreases) during the winter and spring and the level recedes (and South Arm salinity increases) during the summer and fall. Annual variation averages about two feet.

Since the construction of the railroad causeway (completed in 1959), the lake has experienced record low elevation (4191.4 feet in October and November 1963) and record high elevation (4211.6 feet in June 1986). South Arm lake elevations, as recorded at the USGS Saltair gauge, are plotted below. Seasonal variations are apparent, but are greatly exceeded by long-term trends (over several years). For example, while "average" lake elevation is referenced as 4200 feet, the lake has been below that average elevation for over 12 consecutive years, since August 10, 2001.



The development of salinity differentials between the two arms of the lake following construction of the causeway is well documented. By the mid-1970s, the South Arm salinity appears to have reached a new equilibrium, and thereafter generally tracked inversely with the lake elevation. Since then, South Arm salinity has varied between about 6% and 16%. (Figure below from Null, Wurtsbaugh, and Miller, “Can the causeway in the Great Salt Lake be used to manage salinity?”, http://www.usu.edu/ecology/files/uploads/FOGSL_newsletter_Null_Draft_4_Feb_2013.pdf)



Low South Arm salinities occurred in the mid-1980s (about 5%) and around 2000 (about 9%), both coinciding with higher water elevations. Conversely, higher salinities, about 15%, occurred around 1995 and from 2002 to 2004, coinciding with lower water elevations. The Comprehensive Great Salt Lake Management Plan states that, since 1984, the average salinity in the South Arm is 11% (Utah Forestry, Fire and State Lands, 2012).

Below is a graphical representation of the North and South Arms salinity values over various lake elevations and with respect to causeway opening modifications (e.g., Lakeside breach) for two time periods 1966–1984 and 1984–2010. (Open-File Report 596, Utah Geological Survey, 2012).

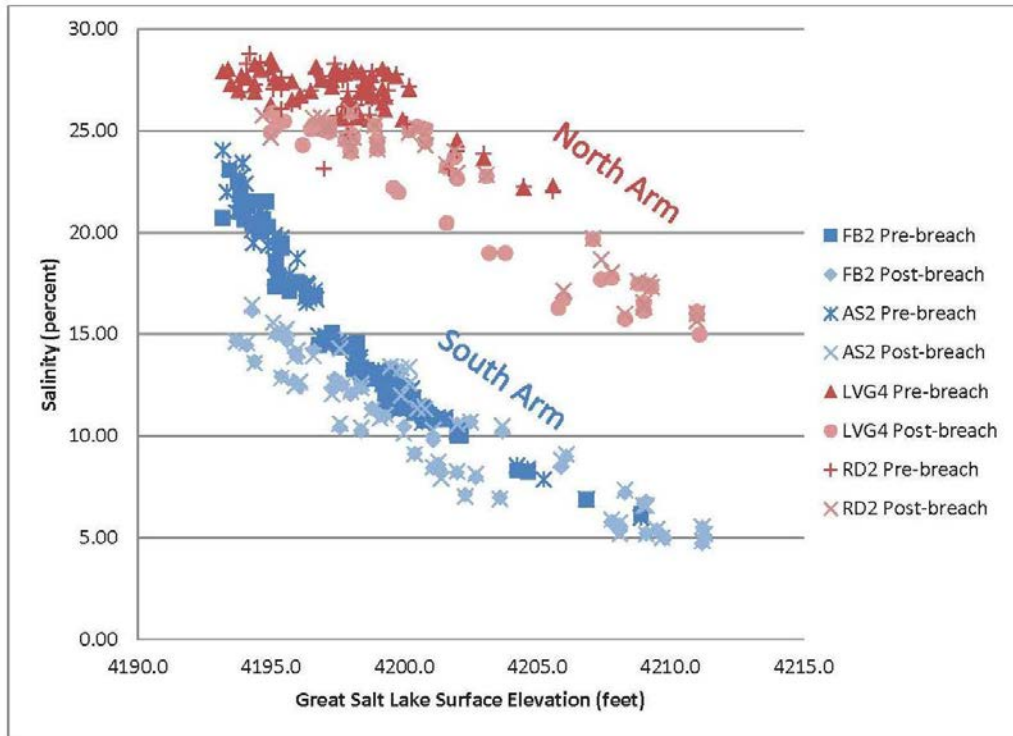


Figure 2. Salinity of Great Salt Lake versus surface elevation of Great Salt Lake. Blue symbols represent data from the south arm of Great Salt Lake and red symbols represent data from the north arm. For each point, salinity of brine has been averaged from sample depths of 5 to 15 feet. Deeper sample depths were not included to remove effects of deep brine layer. For each sample site, the data before and after the railroad causeway breach in 1984 have been represented differently to highlight changes in salinity trends.

The Utah Division of Water Quality has documented that the different bays within the Great Salt Lake vary in salinity from 2% to 27%, with Gilbert Bay ranging from 7% to 15% (A Great Salt Lake Water Quality Strategy, DWQ 2012).

Current (December 10, 2013) South Arm lake elevation is 4194.3 feet. South Arm salinity was about 13.1% on October 31, 2012 (latest available data for UGS station AS-2 reported average upper layer density). Water surface elevation has declined nearly two feet since then, however, so the historical record indicates that current salinity is likely about 15%.

Conclusion. The temporary closure of the East Culvert will not affect the amount of annual inflows to the lake. The temporary closure will have a limited effect on the exchange of water and salt through the causeway, with the actual effect dependent on lake elevations and salinity values. Therefore, a projected temporary 0.5% decline in South Arm salinity (from a current value of 15%) is minor in comparison to historical salinity values and variations, which historically are in the range of 11% (between approximately 5% and 16%).

5.0 Parameters of Concern

Parameters of concern (POCs) are normally defined as water quality pollutants that are present in the applicant's discharge (wastewater effluent) at concentrations greater than ambient concentrations in the receiving water. Since there is no discharge of effluent associated with this project, UPRR did not identify POCs in the original Level II ADR submittal (UPRR 2014a).

In the Level II ADR comment letter, UDWQ requested that UPRR identify the interim monitoring water quality parameters as potential POCs and explain why they do not qualify as POCs (UDWQ 2014b). UDWQ also stated that salinity or salt load can be used as a surrogate for POCs in the analysis, since the water and salt balance model has been accepted for use in the analysis of the permanent culverts closure project and determination of the compensatory mitigation.

This section reviews the permitted activity (that is, the temporary east culvert closure), identifies the water quality parameters required for monitoring during the temporary closure period, and evaluates the use of salinity and salt load as appropriate for this analysis.

5.1 Potential POCs – Water Quality Parameters

The following text is similar to that contained in the previous UPRR Level II ADR (UPRR 2014a) and has been revised to address UDWQ's review comments.

There is no discharge of wastewater effluent associated this project. This project involves the temporary, one-time placement of fill (about 3,650 cubic yards of clean rock) into the east culvert to prevent the collapse of the culvert and the closing of the railroad causeway to train traffic.

In accordance with Section 4.0 of the Utah Antidegradation Review Implementation Guidance document, the following considerations are provided to determine the POCs associated with the temporary closure of the east culvert:

1. Because there is no discharge of wastewater or effluent pollutant concentrations, there is no new introduction of pollutants that may affect ambient concentrations. Proposed activities include the one-time placement of fill material and do not include the discharge of effluent pollutants. Impacts from this project are limited to those resulting from a temporary reduction in water and salt transfer between Gunnison Bay and Gilbert Bay.
2. There is no existing or required effluent discharge permit that identifies water quality pollutants or POCs.
3. There are no existing or proposed pollutant concentrations and/or loads currently established, since there are no numeric water quality stands for the Great Salt Lake. However, narrative standards require the protection of beneficial uses. Those are addressed herein.
4. There are no water quality pollutants of concern associated with the one-time placement of fill material for the temporary closure of the east culvert. In its review comments, UDWQ acknowledges that salinity and salt load are appropriate for this POC analysis. Therefore, this analysis focuses on salinity and the protection of the designated beneficial uses of Gilbert and Gunnison Bays through meeting the narrative standard.

There would be no discharges of effluent associated with the proposed project that would degrade water quality to impair beneficial uses of the lake, so there are no traditional POCs identified. As UDWQ advised, salinity and salt loads are appropriate POCs for the purpose of this evaluation. The project would cause an adverse effect if the temporary closure of the east culvert resulted in temporary lake salinities that impair the lake's beneficial uses. Therefore, protecting lake's designated beneficial uses is the focus of this Level II ADR.

5.2 Potential POCs – Interim Monitoring Water Quality Parameters

UDWQ has required, per condition 3 of the Utah 401 Water Quality Certification, that UPRR monitor the North and South Arms' ambient lake water quality and brine shrimp conditions during the temporary closure period (UDWQ 2013). Monitoring of water quality analytes and brine shrimp is described in the UPRR Interim Monitoring Plan, Temporary Closure of the East Culvert, Great Salt Lake Causeway, Revised March 10, 2014. These water quality parameters, which are specified in the 401 Certification, are listed below in Table 2.

Table 2. UPRR Interim Monitoring Water Quality Parameters and Constituents

Field Measurements	Laboratory Analysis
Secchi depth	Water density
pH	Dissolved oxygen
Specific conductivity	Hardness
Temperature	Sulfate
Water depth	Total dissolved solids (salinity)
Depth to deep brine layer (if present)	Total metals: arsenic, copper, lead, mercury, selenium, zinc

In addition to interim monitoring of these water quality parameters and constituents at two Gunnison Bay locations and three Gilbert Bay locations, UPRR is collecting brine shrimp for laboratory analyses and population counts at the three Gilbert Bay locations.

No cause-and-effect relationship has been established between the proposed project—the temporary reduction of water and salt transfer through the causeway that would result from the temporary closure of the east culvert—and potential water quality effects on the monitored parameters identified in Table 2 above. Therefore, UPRR determined that the interim monitoring parameters (excluding salinity) do not have a potential to be degraded by the project as currently planned, and therefore the parameters are not named as POCs for this analysis. Therefore, these interim monitoring parameters (in Table 2) have not been identified or ranked as POCs, since they have no potential to be degraded from the temporary closure of the east culvert in a way that would impair the lake's beneficial uses.

5.3 POC Analysis – Salinity and Salt Load

UDWQ has stated that the use of salinity and salt load as a surrogate for POCs is acceptable (UDWQ 2014b). Therefore, UPRR has analyzed the potential impacts of the project on lake salinity and salt load as surrogate POCs.

UPRR has conducted water and salt balance modeling and calculations to estimate the temporary effects on salinity and salt load from the temporary closure of the east culvert. These temporary effects would be considered adverse if the temporary closure of the east culvert caused a change in salinity in a way that would impair the lake's beneficial uses.

The salinity and salt load analysis presented in Section 4.2, Social and Economic Losses, is summarized below to support the determination that the temporary east culvert closure will not adversely affect lake salinity and that the beneficial uses will not be impaired.

UPRR analyzed the temporary reduction in water and salt transfer due to the temporary culvert closure based on measured lake data and on assumptions that lake conditions will be similar through the interim 2-year period. The analysis was based on the water and salt balance model results and salt load estimates. The temporary closure will contribute to a temporary reduction of the exchange of water and salt through the causeway. As discussed in Section 4.2, UPRR determined that salinity in the South Arm could be reduced by an estimated 0.13% per year due to the temporary closure of the east culvert. This estimate is based on (1) the salt load analysis of lake conditions during the spring of 2009 when the South Arm WSE was about 4,196 feet and measured salinity was about 15.5% and (2) an evaluation of the measured flow rates through the two culverts. The actual temporary effect would depend on lake elevations and salinity values during the interim period.

The analysis focuses on effects on the South Arm, recognizing that Gunnison Bay would also experience a temporary effect due to the temporary reduction of water and salt transfer through the causeway. The temporary effect on Gunnison Bay is determined to be similar but opposite, in that the temporarily reduced north-to-south salt transfer would slightly increase the salt load in Gunnison Bay. This temporary effect would not impair Gunnison Bay's beneficial uses.

The salinities of Gilbert and Gunnison Bays have varied in the past, and the State has not determined the beneficial uses to be impaired by this variation. Based on UPRR's analysis, the projected temporary reduction in South Arm salinity (0.13% per year) would result in salinities that are within historical salinity values and variations. Therefore, the slight temporary reduction in water and salt transfer due to the temporary closure of the east culvert would not impair the lake's beneficial uses and would not exceed the lake's water quality standards and therefore would meet the State of Utah's antidegradation policy.

6.0 Analysis of Culvert Repair Alternatives

The Level II ADR analysis includes an evaluation by UPRR to determine whether there are feasible less-degrading alternatives to the proposed project (temporary closure of the east culvert). UPRR provided an alternatives analysis to USACE to support the emergency closure permitting for the east culvert and provides that same information below. This analysis focuses on potential actions and construction means and methods to repair the deteriorating culvert that would avoid the temporary reduction in water and salt transfer associated with closing the east culvert.

UPRR submitted a letter dated November 27, 2013, to USACE that discusses the culvert repair alternatives to temporarily closing the east culvert that UPRR considered. As this analysis demonstrates, no feasible less-degrading alternatives to the temporary closure of the east culvert have been identified.

The text in italics below reproduces the portions of UPRR's letter that are relevant to the culvert repair alternatives reviewed.

I. ACOE QUESTIONS REGARDING TEMPORARY STRUCTURAL ALTERNATIVES TO CLOSING THE CULVERT

- A. *ACOE QUESTION: We are still awaiting a detailed response to our question as to the potential of spanning the east culvert with a steel plate as an interim measure to help increase the life of the east culvert and maintain some flow between the N and S arms. Please provide a written response for our record that supports your decision as to whether or not this alternative would be feasible. If it is not feasible, what has changed since the 2011 PCN [preconstruction notification] proposal?*

UPRR RESPONSE:

Section IV of Union Pacific's November 21 request for reconsideration outlined Union Pacific's general concerns about the various proposals the Corps' Regulatory Branch has advanced. As explained therein, Union Pacific believes that it is neither feasible nor safe to attempt to place a steel plate or concrete slab over the top of the existing failing culvert or in the unstable substrate.

To review the critical facts, the most recent inspection found that the culvert has severely deteriorated to the point that it is beyond repair and there is a great deal of concern about its stability. Union Pacific and its professional engineers believe there is a significant and imminent risk that the East culvert will fail completely if not closed. Divers cannot safely reenter the culvert for any purpose, and surface inspections have shown that surface material around the culvert is falling into it.

Furthermore, in light of the ongoing failure of the culvert, it is unclear just how much, if any, the remaining culvert is functioning in terms of maintaining the contribution to flow and salt transfer that was occurring when the culverts were open and flowing. Accordingly, circumstances have changed significantly since the March 2011 PCN was submitted—at a time when the culvert was relatively stable and was functioning in terms of water flow and salt transfer. Union Pacific no longer believes that alternatives considered then are feasible or that there is any likely short term aquatic benefit of pursuing them in light of the failing condition of the culvert.

Regarding the steel plate question, UPRR has not suggested nor entertained a temporary repair alternative using a steel plate. (The 2011 PCN mentioned a "concrete slab or deck.")

A steel plate of a thickness that could be reasonably handled and utilized for this purpose could span only a few feet under railroad loading without excessive stress and deflection, and even less with any fill material above it. In contrast, the potential slip surfaces from a culvert failure, i.e., the surfaces that would be displaced by failure, would extend over 100 feet longitudinally at track level. The use of a steel plate or any other similar structural alternative would simply not extend far enough to cover potential slip surfaces without excessive instability.

All of the alternatives listed in the 2011 PCN were considered for stable culverts with intact structural integrity. This is no longer the case with the East culvert. It has completely separated into two pieces, which are offset from each other. The culvert is unstable, and failure would likely undermine fill material both above it and alongside it. There is nothing stable on which to support a plate, slab or deck, a necessity for placing something like this between the tracks and the culvert. It is simply not practical to construct anything stable on this unstable substrate.

Under the circumstances as they have developed here, Union Pacific strongly believes that there is no feasible alternative to closing the culvert as soon as possible. Further, Union Pacific is increasingly concerned that further delay of culvert closure would be counterproductive and would expose railroad operations to additional undue risk.

B. ACOE SUBQUESTIONS: Also, in removing the ballast from above the culvert, it may necessary to buttress the walls using a structure similar to a trench wall support system. Would this type of structure help stabilize the walls of the ballast above the culvert and alleviate stability concerns?

UPRR RESPONSE:

We are uncertain as to the meaning of this question. Removing the ballast above the culvert would render the causeway inoperable for railroad transportation. There is approximately 15 feet of fill and ballast between the top of the failed box culvert and the track.

Perhaps the reference is to a temporary excavation as part of one of the impractical structural alternatives referenced by the Corps. Assuming this is the case, "buttressing" the culvert walls by such a method is also impractical and of dubious benefit. Shoring systems for trenching work, such as Trench Boxes, are generally used for shallow excavations like utility installations and always use struts of some kind to brace the two opposing walls. Even if the causeway were excavated to the top of the culvert, a 25-ft deep wall would be required and would only partially relieve the culvert wall of soil pressure. And the presence of the culvert precludes the use of struts. So, walls would have to be laterally supported by some type of tie-back requiring a specialty geotechnical contractor. These activities would necessitate shutdown of rail operations for at least several weeks. The result would be a failed culvert surrounded by extensive new infrastructure, at least partially dependent on the culvert for its support, in an unstable and highly corrosive environment.

7.0 Additional Analysis of Interim Mitigation Measures

UDWQ requested additional information regarding potential interim measures that UPRR had previously evaluated. This section describes two measures that were evaluated: (1) interim pumping, which UPRR did not select because it would be impractical, and (2) interim modification of the geometry of the existing 300-foot-long bridge, which UPRR submitted in the UPRR Interim Mitigation Plan (UPRR 2014b).

UPRR considered interim measures that could be implemented if monitoring data indicated that the temporary closure of the east culvert contributed to an adverse effect on lake salinity that would impair the lake's beneficial uses. UPRR based the analysis of these measures on the estimate that the interim period will last 2 years (from the December 2013 temporary closure of the east culvert until December 2015 when the construction of the proposed compensatory mitigation bridge is completed).

UPRR evaluated both measures to determine whether they would increase or decrease the water and salt transfer through the causeway as a way to compensate for the temporary reduction in water and salt transfer caused by temporarily closing the east culvert. The actual analysis of the water and salt transfer through the interim period would be based on the results of the interim monitoring data and lake conditions.

For example, if the salinity monitoring data indicated that salinity in Gilbert Bay was lower than the historic salinity variability range due to a project-caused temporary reduction in water and salt transfer and that the beneficial uses of Gilbert Bay were impaired by that temporary reduction, UPRR would evaluate ways to increase the north-to-south flows through the causeway. The reverse would also be true; if the salinity monitoring data indicated that salinity in Gilbert Bay was higher than the historic salinity variability range due to a project-caused temporary increase in water and salt transfer and that the beneficial uses of Gilbert Bay were impaired by the temporary increase, UPRR would evaluate ways to decrease the north-to-south flows through the causeway.

7.1 Interim Pumping

7.1.1 Description

UPRR prepared a letter dated November 27, 2013, that was sent to USACE. This letter discusses interim mitigation measures that were considered, but eliminated, to offset the temporary reduction of water and salt transfer due to the temporary east culvert closure prior to the construction of the compensatory mitigation bridge.

The text in italics below reproduces the portions of UPRR's letter that are relevant to the interim pumping alternative reviewed. Estimated rough order-of-magnitude costs are provided after the letter text.

II. ACOE QUESTIONS REGARDING OTHER INTERIM MEASURES AND SHORT TERM IMPACTS OF CULVERT CLOSURE

- A. ACOE QUESTION: Also, please provide any further information to document why you believe other interim measures are not practical – i.e., pumping or some other method to maintain some connectivity between the arms.

UPRR RESPONSE:

UPRR has responded to these questions previously in our responses of November 1 and 8 and documents referenced therein. Our prior submissions discussed other methods as well as pumping.

Union Pacific continues to believe that a pumping project would be infeasible and would provide very limited benefit.

First, as discussed in our November 21 submission, connectivity between the two parts of the Great Salt Lake will not be discontinued by closure of the culvert as implied by the question. In fact, water flow and salt transfer continues through the causeway itself and through the existing Rambo Bridge. As discussed in Response II.B below the actual contribution of the culverts to South Arm salinity is relatively small in relation to that of the causeway, particularly under current lake levels. Given the volume of salt transfer through the causeway, any contribution by pumping would be small in relation to those volumes.

Second, with regard to interim pumping of brine from North to South, it is not clear at this point in the modeling and impacts analysis being conducted pursuant to Union Pacific's September 25 letter to the Army Corps of Engineers how much brine was being transferred North to South and South to North through the East and West culverts. While USGS periodic spot estimates of these flows are available, they are inconsistent and show no apparent correlation to lake elevations or salinities. Even if the lower limits of USGS measured flows were used to set pumping targets, our calculations of pumping capacity even for a system as large as that of Great Salt Lake Minerals is that it could at best pump only about one third of the brine required to replace net North to South salt transfer through the culverts. Therefore, such a pumping station's best case annual contribution to the salinity of the South Arm would be only a few hundredths of a percent increase.

Finally, while it might be technically possible to construct a pumping station similar to the existing Great Salt Lake Mineral facility, it would be a significant project in its own right. Pumps would not be readily available and would have to be custom built. Power would have to come either from a new 3-phase electrical line or from a generator (more likely multiple generators in parallel). Estimated lead time for pumps and power equipment (procurement only) is six months minimum. Furthermore, Great Salt Lake Minerals' experience indicates that pumping during the winter months is impractical. Therefore, any small contribution to salt transfer would be further reduced by a long delay (perhaps up to a year) before a pump station could actually go on line.

7.1.2 Estimated Rough Order-of-Magnitude Cost

UDWQ has requested a rough order-of-magnitude cost estimate for the interim pumping measure. Although UDWQ has acknowledged that this interim measure is highly impracticable, UDWQ requested that UPRR provide a cost estimate for interim pumping to substantiate the infeasibility of the measure (UDWQ 2014b).

Determination of Design Pumping Rate. UPRR previously conducted an analysis to determine the estimated net salt transfer from the North Arm to the South Arm, over a 5-year period ending in the spring of 2009, contributed by the free-flowing east and west culverts. This analysis, which is presented in Section 4.2, Social and Economic Losses, concludes that a net North Arm to South Arm transfer of about 150 million tons of salt was conveyed by the two culverts over 5 years. Therefore, on average, an estimated 30 million tons per year of salt were conveyed from the North Arm to South Arm by the east culvert. To replace this annual amount of salt transfer would require 12 months of pumping about 44 cubic feet per second (cfs) from the North Arm to the South Arm.

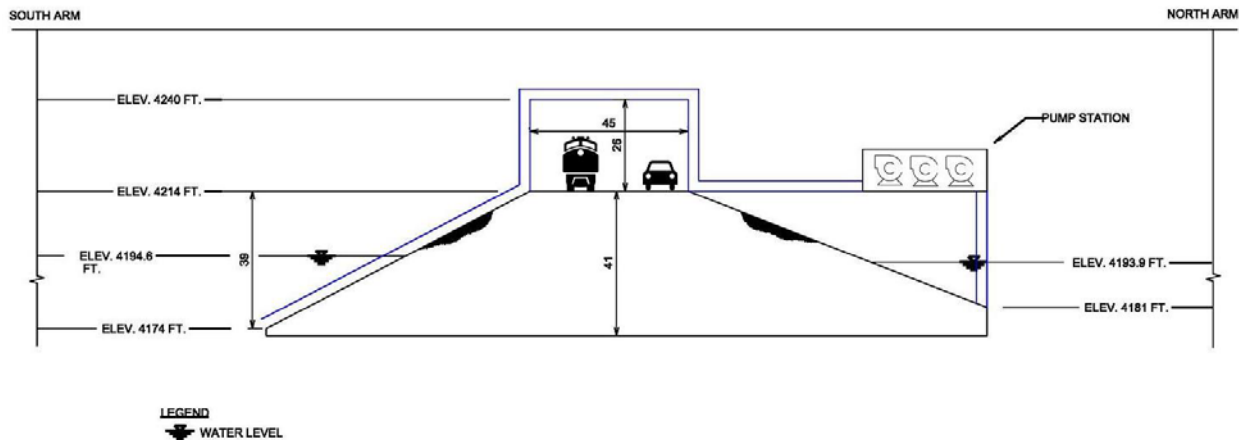
For the analysis of the interim pumping measure, the annual design pumping flow rate was determined to be 44 cfs to replace the net salt transfer conveyed by the temporarily closed east culvert.

However, the actual flows conveyed by the east culvert were highly variable since 2004 for a specific WSE. If this interim measure were implemented, additional analysis regarding salinity, flow rates, and other factors would need to be considered.

Pump Station Design. With the annual design pumping rate of 44 cfs over the interim period, considerations are made due to expected pumping issues during the coldest winter months. It is well documented that, during the winter months, the cold air temperatures and subsequently cold water temperatures can cause the temporary precipitation of Glauber's salt (mirabilite). The mirabilite would precipitate, covering pipes, pumps, and other submerged pump station features, thereby disrupting pumping and potentially causing equipment failure. Due to this operational consideration, UPRR has estimated that the pump station would be shut down for 2 months each year due to wintertime temperature and salt precipitation concerns, and therefore UPRR increased the average pumping rate to 55 cfs to compensate for the operational shutdown.

There are multiple possible pump station configurations to convey about 55 cfs over the causeway. UPRR determined that conveying water under or through the causeway is not feasible. Therefore, this estimate assumes conveyance over the causeway, which would require enough vertical clearance to maintain train traffic operations. Figure 2 shows a conceptual layout of a pump station. This analysis does not attempt to identify the most efficient pumping configuration nor optimize the system.

Figure 2. Interim Pump Station Schematic



This configuration would pump water through two 54-inch-diameter steel pipes for about 300 linear feet up and over the causeway and would discharge the water on the other side of the causeway. The minimum clearance over the tracks would be 24 feet above the top of rail (28 feet from the road surface) and 12 feet laterally from the track centerline. This configuration would convey water from the current WSE of about 4,195 feet up to an elevation of 4,236 feet, resulting in a pump head of about 41 feet. The design criteria for the pump station are summarized in Table 3.

What is pump head?

Pump head is the height, usually in feet, to which a pump is designed to raise water.

Table 3. Interim Pump Station Design Criteria

Item	Unit	Number
Pumping flow (cfs)	CFS	55
Pumping flow (gpm)	GPM	24,700
Pipe length	LF	296
Pipe diameter	IN	54
Number of pipes	EA	2
Pumping head	FT	41
Pumps	EA	3
Fuel tanks	EA	1
Platform	EA	1

CFS = cubic feet per second;
 GPM = gallons per minute; LF = linear feet,
 IN = inches, FT = feet, EA = each

Rough Order-of-Magnitude Estimate of Costs. UPRR obtained a quote from a pump supplier for submersible pumps to meet the design criteria in Table 3 above. Each pump is rated for a head of 46 feet at 19,000 gpm (gallons per minute). Two pumps would be required to convey the flow, with a third pump on standby for maintenance purposes. Each pump would have 3:1 gear drives and a 175-bhp (brake horsepower) diesel engine with pollution-prevention (air emissions control) equipment. Three on-site diesel fuel tanks would provide fuel storage capacity. The itemized construction cost estimate is provided in Table 4 below. Annual operation and maintenance costs are estimated at 3% of construction costs.

Table 4. Pump Station Construction Cost Estimate

Item	Unit	Number	Cost (\$)	Total (\$)
Forebay, wet excavation	CY	10,000	3	30,000
Platform ^a	LS	1	500,000	500,000
Pumps, gear drives, engines ^b	EA	3	255,000	765,000
Two discharge pipes, 54-inch diameter	LF	592	150	88,800
12,000-gallon fuel tank	EA	1	40,000	40,000
			Subtotal	1,423,800
Site surveying	LS	1	10,000	10,000
Engineering (8%)	LS	1	134,304	113,900
Contingency (25%)	LS	1	419,700	355,950
Permitting	LS	1	50,000	50,000
			Subtotal	529,850
Operation and maintenance ^c	Per year	2	42,700	85,400
			Total	2,038,250

CY = cubic yards; LS = lump sum; EA = each, LF = linear feet

^a Cost includes pump station platform and railroad crossing structure.

^b Cost based on 19,000-gpm submersible pumps, 3:1 gear drives, and 175-bhp diesel engines.

^c Annual operation and maintenance costs are 3% of construction costs.

Conclusion. For the reasons discussed above in Section 4.2, Social and Economic Losses, and Section 7.1.1, Description, this interim measure was eliminated based on impracticality.

7.2 Interim Mitigation Measure – Modification of the Geometry of the Existing 300-foot-long Bridge

UPRR submitted an Interim Mitigation Plan to USACE and UDWQ on March 16, 2014 (UPRR 2014b). This plan discusses interim contingency measures that were considered to offset the temporary reduction of water and salt transfer due to temporarily closing the east culvert before constructing the compensatory mitigation bridge. Provided below is the discussion in the plan regarding the measure to modify the geometry of the existing 300-foot-long bridge if interim monitoring data indicate that lake salinity changes due to the temporary culvert closure caused impairment of the lake's beneficial uses. The monitoring plan listed the steps that would be taken before implementing this measure. The text in italics below is an excerpt from the UPRR Interim Mitigation Plan that discusses this measure.

In coordination with USACE and UDWQ and Great Salt Lake management agencies, UPRR will evaluate the following temporary physical changes to the area underlying the existing 300-foot-long-bridge in the causeway:

- *If the lake elevations are such that only south-to-north flows are conveyed through the existing breach and the salt load analysis indicates that the South Arm is losing salt, UPRR will design and install a restrictive berm on the south side of the existing 300-foot-long bridge to temporarily reduce the south-to-north flow through the breach and reduce the loss of salt to the North Arm. UPRR expects that this berm might only be 1 to 2 feet high and would be inundated when the lake elevation begins to rise.*

This interim mitigation measure could be implemented, as needed, in accordance with the Interim Mitigation Plan (UPRR 2014b).

8.0 Additional Supporting Documents

The following additional supporting documents are identified for reference to support the temporary east culvert closure project:

- *UPRR Causeway Water and Salt Balance Modeling Progress Report – Modeling Step 1*, dated February 25, 2014, provided salinity and salt load information to support the analysis in Section 4.2, Social and Economic Losses, of this document. UDWQ has accepted the water and salt balance modeling effort as a method to determine the overall effects of the project (permanent closure of the culverts and construction of the mitigation action [bridge]) and has stated that salinity or salt load can be used as a surrogate for POCs for the ADR analysis (UDWQ 2014b).
- The UPRR Interim Monitoring Plan, revised March 10, 2014, was submitted to meet Utah 401 Water Quality Certification requirements for monitoring parameters specifically identified in the certification (UPRR 2014d).
- The UPRR Interim Mitigation Plan, dated March 6, 2014, identifies interim mitigation measures that would be implemented if the temporary reduction in water and salt transfer between Gilbert and Gunnison Bays, due to the temporary closure of the east culvert, results in lake salinities that cause impairment to beneficial uses (UPRR 2014b).

9.0 Summary and Conclusion

This Level II ADR report is submitted to demonstrate compliance with the State of Utah's antidegradation policy in fulfillment of condition 2 of the Utah 401 Water Quality Certification for the temporary closure of the east culvert, located in the UPRR causeway, Great Salt Lake, Utah (UDWQ 2013). The report was modified to meet the requirements of and supplemental information requested by subsequent UDWQ review comment letters (UDWQ 2014a, 2014b).

The temporary closure of the east culvert required the one-time placement of fill (about 3,650 cubic yards of clean rock) into the east culvert to prevent the collapse of the culvert and the closing of the railroad causeway to train traffic. Emergency closure was necessary because the concrete culvert was failing due to settlement and age (the culvert was originally constructed in 1959) and was jeopardizing the structural integrity of the railroad causeway. The term of the temporary east culvert closure is projected to be approximately 2 years, pending that the permanent east culvert closure and compensatory mitigation bridge and control berm are authorized by USACE and UDWQ and are constructed.

The project is not associated with any effluent discharges that contain chemical, physical, or biological constituents that are normally considered POCs. UDWQ stated in its review comments that salinity and salt load may be used as a surrogate for the typical water quality POCs for this analysis (UDWQ 2014b). Therefore, UPRR prepared this Level II ADR report that considers the potential effects of temporarily closing the east culvert, including a temporary reduction of water and salt transfer through the causeway, and those effects on the salinity and salt load of the lake and on the lake's beneficial uses.

UPRR analyzed the effects of a temporary reduction in water and salt transfer due to the temporary culvert closure based on measured lake data and on assumptions that lake conditions will be similar through the interim 2-year period. The analysis was based on the water and salt balance model results and lake salt load estimates. The temporary closure of the east culvert will contribute to a temporary reduction of water and salt transfer through the causeway between Gilbert and Gunnison Bays. UPRR determined that salinity in the South Arm could be reduced by an estimated 0.13% per year due to the temporary closure of the east culvert. This estimate is based on (1) the salt load analysis of lake conditions during the spring of 2009 when the South Arm WSE was about 4,196 feet and measured salinity was about 15.5% and (2) an evaluation of the measured flow rates through the two culverts. The actual temporary effect would depend on lake elevations and salinity values during the interim period.

The projected temporary 0.13% decline in South Arm salinity (from a South Arm salinity of 15%) is minor compared to historical salinity values and variations. The salinities of Gilbert and Gunnison Bays have varied in the past, and the State has not determined the beneficial uses to be impaired by this variation. Based on UPRR's analysis, the projected temporary reduction in lake salinity would result in salinities that are within historical salinity values and variations. Therefore, the slight temporary reduction in water and salt transfer due to the temporary closure of the east culvert would not impair the lake's beneficial uses. For these reasons, the project is consistent with the State's antidegradation policy and would not exceed the lake's water quality standards and therefore would meet the State of Utah's antidegradation policy.

10.0 References

[UDWQ] Utah Division of Water Quality

- 2010 2010 Utah Integrated Report Water Quality Assessment 305(b) Report/USEPA Approved 303(b) List. Available online at www.waterquality.utah.gov/WQAssess/PreviousIR.htm.
- 2012 A Great Salt Lake Water Quality Strategy. April.
- 2013 Utah 401 Water Quality Certification No. SPK-2011-00755, Temporary Closure of the East Culvert of Great Salt Lake Causeway. December 16.
- 2014a Letter to UPRR, subject “Notification of Requirements to Prepare a Level II Antidegradation Review.” February 25.
- 2014b Letter to UPRR, subject “Level II Antidegradation Review Comments, Temporary East Culvert Causeway Closure, Great Salt Lake.” May 9.
- 2014c Utah Integrated Report Water Quality Assessment 305(b) Report/USEPA. Draft 2012–2014 Report. Available online at www.waterquality.utah.gov/WQAssess/currentIR.htm.

[UPRR] Union Pacific Railroad

- 2014a Level II Antidegradation Review. April 4.
- 2014b Interim Mitigation Plan, Temporary Closure of the East Culvert, Great Salt Lake Causeway. March 6.
- 2014c Letter to UDWQ, subject “Union Pacific Railroad Causeway East Culvert Temporary Closure Project, Utah Water Quality 401 Certification, SPK-2011-00755.” March 10.
- 2014d Interim Monitoring Plan, Temporary Closure of the East Culvert, Great Salt Lake Causeway. Revised March 10.

[USACE] United States Army Corps of Engineers

- 2013 Nationwide 14 Permit Verification, UPRR Causeway Temporary Closure of the East Culvert, SPK-2011-00755. December 6.

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APPENDIX A

UPRR Letter to USACE, November 8, 2013

UNION PACIFIC RAILROAD

Impacts Associated with Imminent Culvert Failure on the Great Salt Lake Causeway

Economic Impacts

Union Pacific Railroad's main line west from Ogden across the Great Salt Lake is part of the Lakeside Subdivision. There is only one alternate rail route from the Salt Lake Valley west to northern California—the Shafter Subdivision which runs west from Salt Lake City around the south side of the Great Salt Lake. The two subdivisions follow separate alignments until they join at Wells, Nevada.

On average, 16 trains cross the Great Salt Lake Causeway on the Lakeside Subdivision per day.

If the Causeway was unusable, the trains would need to be rerouted over the Shafter Subdivision. The Shafter Subdivision is approximately 73.3 miles longer than the Lakeside Sub, has approximately 1700 feet more rise and fall, and has approximately 1700 more degrees of curvature. All three factors increase fuel consumption. The Shafter Sub also has east bound siding restrictions. These siding restrictions would force running on average one additional train per day from origin to destination. Therefore 17 additional trains would be added to the Shafter Sub per day.

Union Pacific's Network Planning Group has analyzed costs associated with such a reroute. Rerouting all traffic from the Lakeside Subdivision to the Shafter Subdivision would result in increased direct costs to Union Pacific of \$258,000 per day. In addition, there are likely additional costs due to congestion on the Shafter Sub route, such as additional crews required by the Federal Railroad Administration's hours of service rules.

In addition to costs to Union Pacific, there would also be impacts to the public. Most notably, an additional 17 trains per day would traverse 38 at-grade crossings between Ogden and Smelter (18 miles west of Salt Lake City), causing inconvenience to motorists and increased vehicle exhaust.

Impacts on Property

The Causeway is a major structural asset and a critical element of Union Pacific's Overland Route and overall transportation infrastructure. Collapse of the culvert would render the causeway inoperable, which in turn would render this portion of the Overland Route inoperable. Accordingly, the collapse of the culvert would cause an immediate loss of productive use of our property (not only the Causeway itself but an additional 145 route miles between Ogden and Wells) that would continue until the Causeway is restored.

Impacts on Interstate Commerce

The effects of shutdown would clearly impact interstate commerce. Our customers rely heavily on shipments over the Lakeside Subdivision main line. Not only would there be a direct impact on shipments over that line, but the ripple effect of such a shutdown would extend throughout the rail network. Such costs cannot be quantified in the time frame for responding to the Corps' inquiry.

APPENDIX B

UPRR Letter to USACE, November 21, 2013



Pillsbury Winthrop Shaw Pittman LLP
2550 Hanover Street | Palo Alto, CA 94304-1115 | tel 650.233.4500 | fax 650.233.4545

Wayne M. Whitlock
tel 650.233.4528
wayne.whitlock@pillsburylaw.com

November 21, 2013

Via Electronic Mail and Hand Delivery

Brigadier General C. David Turner
Commander
Mr. Wade L. Eakle
Regulatory Program Manager
U.S. Army Corps of Engineers,
South Pacific Division
1455 Market Street
San Francisco, CA 94103-1398

Mr. Jason A. Gipson
Branch Chief, Regulatory Division
U.S. Army Corps of Engineers,
Sacramento District
Nevada-Utah Regulatory Branch
533 West 2600 South, Suite 150
Bountiful, Utah 84010

Colonel Michael Farrell
Commander, Sacramento District
Mr. Michael S. Jewell
Chief, Regulatory Division
Mr. Michael G. Nepstad
Deputy Chief, Regulatory Division
U.S. Army Corps of Engineers,
Sacramento District
1325 J Street
Sacramento, CA 95814

Re: Union Pacific Railroad – Great Salt Lake Causeway – East Culvert
Closure - Request for Reconsideration of Army Corps' Branch Chief's
Emergency Situation Determination

Dear Sirs:

This letter concerns the imminent failure of the East culvert in the Great Salt Lake Causeway. Its condition threatens shutdown of the Causeway, which is a critical transportation structure that supports Union Pacific's main East-West interstate rail line. The risk of imminent failure of the Culvert and the resulting shutdown of the Causeway constitutes an emergency situation that requires expedited review and authorization.

On November 8, the Corps' Utah-Nevada Branch Chief, Jason Gipson, made an initial determination that the imminent failure of the East Culvert is not an

“Emergency Situation” under 33 CFR 325.2(e)(4).¹ On that basis, Mr. Gipson determined not to utilize emergency procedures to authorize closure as requested by Union Pacific Railroad (“Union Pacific” or “UPRR”). For the reasons detailed herein, on behalf of Union Pacific, we request reconsideration of the November 8 initial determination by Utah-Nevada Regulatory Branch Chief.² Due to the time-critical nature of this issue, we further ask for your expedited review of this request at the appropriate level within the Corps’ South Pacific Division and Sacramento District.

The East culvert must be closed in order to provide for the continued safe operation of the rail line on the Causeway. The Corps has indicated that the culvert closure requires a Clean Water Act Section 404 permit. A full individual permit and 401 certification process would take at least one year, during which the Causeway would have to be shut down. Therefore, the use of emergency procedures is necessary in order to provide the authorization to avoid the shutdown of the Causeway route. The Corps’ denial of Union Pacific’s request, if sustained in response to this request for reconsideration, would result in the shutdown the Great Salt Lake Causeway and the interstate rail route through Union Pacific’s Central Corridor for at least a year, likely more, while standard permitting procedures are completed.

As detailed herein, shutdown of the Causeway route would result in immediate, unforeseen and significant economic hardship to Union Pacific, its customers, the public and interstate commerce. It would force interstate rail traffic from the Causeway—22-24 extra trains per day—onto the local Shafter route, which already supports regional and local train traffic, immediately overloading it. This route goes through downtown Salt Lake City and some of the most populated and industrialized parts of the metropolitan Salt Lake City and Ogden areas. Forcing all the Causeway train traffic onto this route would increase road and highway traffic congestion as well as vehicle air emissions. It would immediately impact Union Pacific and its customers. Direct costs alone would exceed \$258,000 per day. Because the Corps’ standard permit process would be expected to take at least one year if the Corps refuses to utilize emergency permit processing procedures, the direct costs alone—excluding lost revenues—would be over \$94 million per year. These are just some of

¹ See Regulatory Branch Chief Initial Emergency Determination (November 8, 2013) (enclosed as Exhibit A).

² Union Pacific has gathered additional information in support of its request for reconsideration which is submitted herein. To the extent there are any inconsistencies between this submission and the information contained in Union Pacific’s November 8 submission (UPRR Initial Response to ACOE Request for Additional Information (November 8, 2013) (enclosed as Exhibit B)) in response to the Regulatory Branch’s questions, the information contained herein supersedes the earlier submission.

the examples of significant economic hardship that would result from shutdown of the Causeway and which make it necessary for the Corps to authorize and use emergency procedures.

I. Background and Historical Context.

On October 21, 2013, Union Pacific notified the Army Corps Utah-Nevada Regulatory Branch of imminent failure of the East culvert and requested that the Corps authorize closure of the culvert pursuant to Nationwide Permit 14 and Union Pacific's Pre-Construction Notification ("PCN") submitted in March 2011.³ As further outlined in its October 21 notification letter, pursuant to its March 2011 PCN, Union Pacific had originally requested Corps approval to close both the East and West culverts, which were deteriorating, and build a 180-ft bridge to compensate for the loss of aquatic functions the culverts provided in the Great Salt Lake. But, in August 2012, it became necessary for the Corps to grant emergency authorization to close the West culvert when underwater inspections revealed that its failure was imminent. On August 29, 2012, the Corps issued verification of coverage under Nationwide Permit 14 (the "August 2012 NWP")⁴, which authorized emergency closure of the West culvert and construction of the 180-ft bridge subject to a number of special conditions, including preparation of a mitigation and monitoring plan that satisfied the Corps' compensatory mitigation regulations.

As described in Union Pacific's October 21 notification letter and request for emergency authorization, the August 2012 NWP did not authorize closure of the East culvert at that time because its failure was not imminent. However, in an October 3, 2012 clarification of its Special Conditions, the Corps specified a procedure whereby Union Pacific could reactivate its March 2011 PCN application if subsequent inspections revealed that the East culvert suddenly deteriorated to a point where failure was imminent. The Corps explained this process as follows:

As soon as we receive your notification of the imminent failure of the East Culvert, we would reactivate your PCN application and verify a NWP 14 for closure of the East Culvert.⁵

³ See UPRR Notification of Imminent Failure and Request for Approval to Close East Culvert with Jacob Associates Report (October 21, 2013) (enclosed as Exhibit C).

⁴ ACOE NWP 14 Verification Re West Culvert Closure and Compensatory Mitigation Bridge Project (August 29, 2012) (enclosed as Exhibit D).

⁵ ACOE Clarification of August 2012 NWP Special Conditions (October 3, 2012) (enclosed as Exhibit E).

After closure of the West culvert, Union Pacific's consultant, Jacobs Associates, which had been inspecting the culverts periodically since 2004, continued inspecting the East culvert. Although previous inspections had found the condition of the East culvert to be relatively stable, the October 2013 inspection unexpectedly identified a sudden increase in deterioration. Jacobs Associates reported conditions indicating an imminent risk of culvert failure and informed Union Pacific that it would no longer be safe to perform underwater inspections of the culvert. Therefore, it became necessary to close the culvert in order to maintain the safety of the rail line.

On October 21, 2013, Union Pacific notified the Corps of the need to close the East culvert due to its sudden deterioration, following the process for obtaining emergency Corps approval for closing the East culvert outlined by the Corps in October 2012.

In its discussions with the Corps' Utah Regulatory Branch about Union Pacific's emergency notification and request for emergency approval of culvert closure, the Corps assured Union Pacific that it would process the request either under NWP 14 as outlined in the Corps' October 3, 2012 letter or using Regional General Permit 60 (Repair and Protection Activities in Emergency Situations). Consistent with that assurance, on October 24, the Corps issued a notice to federal and State coordinating agencies of its intent to authorize emergency closure of the East culvert under Nationwide Permit 14 as the Corps had outlined in October 2012.⁶

In a November 4 email to Union Pacific, the Corps changed its position. The Corps confirmed its intent to authorize emergency closure, stating "we recognize the emergency condition of the East Culvert and acknowledge the need to close this culvert without delay." However, the email stated that the Corps would be unable to follow the NWP 14 process it had outlined in October 2012, or issue emergency authorization under other General Permits. According to the email, this was "due to the Corps' inability to demonstrate the action would result in no more than minimal individual and cumulative adverse effects on the aquatic environment."⁷

This statement was in apparent reference to the ongoing informal consultation process on the August 2012 NWP, which had been instituted by the then-District Engineer, Colonel Leady. In this consultation process, Union Pacific has proposed and is carrying out an extensive modeling and impacts analysis with two of the Great Salt Lake's most well-respected experts, Wallace Gwynn and Kidd Waddell. In light of

⁶ See ACOE Notice to Coordinating Agencies of Intent to Authorize East Culvert Closure under NWP 14 (October 24, 2013) (enclosed as Exhibit F).

⁷ ACOE Determination of Necessity To Proceed With Emergency Closure Authorization Under Standard Permit Emergency Procedures (November 4, 2013) (enclosed as Exhibit G).

that ongoing but unfinished process, the Corps stated that permitting the emergency closure would now fall under the Corps' "South Pacific Division Regulatory Program Standard Permit Emergency Procedures" which provide for abbreviated procedures for review, coordination and decision making in emergency situations pursuant to 33 CFR 325.2(e)(4).

According to the November 4 email to Union Pacific, the Corps was "currently working our procedures and preparing necessary documentation for the South Pacific Division [including] draft special conditions which we will forward by email for your review and acceptance."⁸

Based on the Corps' assurances that closure would be authorized using emergency procedures, Union Pacific scheduled the closure of the East culvert for November 11 and began the process of mobilizing the necessary equipment.⁹ Further, as requested in the Corps' November 4 email, Union Pacific contacted the Utah Division of Water Quality ("DWQ") to obtain certification of the emergency closure under Clean Water Act Section 401 (unlike the Nationwide permits or RGP 60, the Corps indicated that use of an individual permit even with emergency procedures required Utah's individual 401 certification). The Utah DWQ responded quickly, providing draft conditions of certification for discussion on Thursday, November 7.

Union Pacific and the Utah DWQ were very close to completing the discussions on the 401 certification process as of Friday, November 8—the date by which the plan to close the culvert on November 11 had to be confirmed or cancelled in order to carry out the work on the causeway. However, in a phone call with Union Pacific on the morning of November 8, the Corps unexpectedly raised new concerns. Citing a negative and inaccurate *Salt Lake Tribune* news article, the Corps expressed concerns about whether an emergency determination was justified and indicated the Corps would be requesting additional information.

On November 8, 2013 at 2 p.m. Central time, Union Pacific received a list of questions from the Branch Chief's office seeking additional information to be provided to Colonel Farrell supporting the position that the closure of the East Culvert is an "emergency situation" under 33 CFR 325.2(e)(4).¹⁰ Hoping to maintain its scheduled closure date of November 11, Union Pacific replied four hours later with a

⁸ Exhibit G (ACOE Determination of Necessity).

⁹ Union Pacific had originally planned to close the culvert on November 4 but changed its plan to November 11 to accommodate the Corps' review and agency consultation efforts.

¹⁰ See ACOE Email with Questions Regarding Determination of Emergency Situation (November 8, 2013) (enclosed as Exhibit H).

short response to the questions regarding the significant impacts that would result from failure of the culverts.¹¹ Within an hour, Union Pacific received an email from Regulatory Branch Chief Jason Gipson stating his determination that:

[T]he information provided does NOT meet the standards or definition of the [Corps' South Pacific Division] 'emergency situation.' There appears to be an alternative to using the causeway that does not appear to be an unforeseen nor significant economic impact. As such, we would need to process this action as a Standard Individual Permit.¹²

On that basis, it was necessary for Union Pacific to postpone the closure of the East Culvert that had been scheduled for Monday, November 11. However, in a conference call on that date, Mr. Gipson indicated the Corps would reconsider his initial determination that there was no emergency situation if Union Pacific provided additional information to support a determination of emergency.

Union Pacific maintains that the East culvert is at risk of imminent failure and that its request to close the East culvert clearly qualifies for processing under the South Pacific Division's emergency procedures, consistent with 33 CFR 325.2. Further, Union Pacific must object to the significant last-minute changes in the Corps' position, making these urgent circumstances even more challenging. Union Pacific has made a good faith effort to respond to every Corps request and every change of position. However, we are concerned that the significant safety concerns and the economic urgency of the situation have not received adequate consideration. Union Pacific requests that the Corps reconsider the Branch Chief's determination. We believe that the Branch Chief drew invalid conclusions from Union Pacific's November 8 submission, which, based on the very limited time available to respond, necessarily presented a limited response to the issues raised. Further, we dispute the Branch Chief's interpretation of the emergency situation criteria set forth in the regulations.

On these grounds, Union Pacific respectfully submits this letter and supplemental information, and requests that the Corps reconsider its determination that no "emergency situation" is present as set forth in Corps regulations and the South Pacific Division's Emergency Procedures.

¹¹ See Exhibit B (UPRR Initial Response).

¹² Exhibit A (Regulatory Branch Chief Initial Emergency Determination).

II. Union Pacific Railroad's Submission of Supplemental Information and Request for Reconsideration.

At the outset, Union Pacific reaffirms its existing commitment to work with the Corps, the Utah DWQ and other coordinating agencies to complete the extensive modeling and impacts analysis that Union Pacific is carrying out pursuant to the August 2012 NWP authorization and the informal consultation process, which may be folded into the individual permit process that accompanies the East culvert closure. This robust modeling and impacts evaluation effort is designed to confirm the design of the compensatory mitigation bridge as well as a monitoring and adaptive management program. Union Pacific has engaged two of the most well respected experts on the Great Salt Lake, Kidd Waddell and Wallace Gwynn, to assist in the modeling and evaluation efforts. The modeling and evaluation process includes regular interaction with the Corps and federal and state coordinating agencies to provide progress reports and obtain agency input. In addition to reviewing and approving these efforts at each significant step, the ultimate product of the overall effort—the final compensatory mitigation bridge design and an accompanying monitoring and adaptive management program—will, of course, be subject to approval by the Army Corps of Engineers and Utah Department of Water Quality.

Like the Corps and State agencies, Union Pacific had hoped that the East culvert would remain stable during the period that this evaluation is being completed. In explaining to Union Pacific his November 4 determination regarding the necessity of permitting with emergency procedures instead of NWP 14, Mr. Gipson expressed his surprise that the culvert had deteriorated suddenly to the point of imminent failure. Union Pacific was similarly surprised at this sudden deterioration. We appreciate the State DWQ's willingness to grant state certification of an emergency closure in these circumstances, conditioned on completing the modeling and study process we have been working through together with the Corps' Regulatory Branch.

As explained further below, the Causeway, which was constructed by Southern Pacific Railroad before the Union Pacific-Southern Pacific merger¹³, is a critical element of the Union Pacific railroad network. It is imperative that Union Pacific

¹³ Southern Pacific Railroad, then a competitor of Union Pacific, built the original causeway. In the 1950s, Southern Pacific constructed the fill portion of Great Salt Lake Causeway and installed the East and West culverts for the principal purpose of allowing boat traffic to pass through the causeway. In 1996, Union Pacific and Southern Pacific merged, making Union Pacific the owner and operator of the Causeway. As the culverts sank deeper in the lake over the years, they also provided for bi-directional water flow and transfer of salt between the North and the South Arms of the Great Salt Lake. Construction of the compensatory mitigation bridge was proposed to compensate for the loss of these functions.

maintain the safe operation of the Causeway and that it remain open to support Union Pacific's interstate rail shipments. There is an alternative route. However, contrary to the Branch Chief's assertion, the fact that an alternative route exists does not remove the urgency or render this a non-emergency situation. In the case of the Causeway, the information submitted below summarizes the impacts that would result from forcing Causeway traffic onto the alternative route for at least a year, if not more, during the time the Corps' and the States' standard permitting processes are completed.

For the reasons discussed herein, Union Pacific requests that the Corps reconsider its November 8 preliminary decision and process Union Pacific's request for approval of emergency closure of the East Culvert either using the South Pacific Division's Emergency Procedures or, as the Corps originally indicated in its October 3 letter to Union Pacific, under Nationwide Permit 14 and the procedures the Corps established in that letter.

A. The Circumstances Here Constitute an "Emergency Situation" that Must Be Addressed through the Corps' Emergency Procedures.

The imminent failure of the East culvert in the Great Salt Lake Causeway is described above. Its condition threatens shutdown of the Causeway as a critical transportation structure that supports Union Pacific's main East-West interstate rail line. The risk of imminent failure is an emergency situation that requires expedited review and authorization. The Corps' November 8 refusal to utilize emergency procedures, if sustained in response to this request for reconsideration, would force shutdown of the Causeway route.

Under Corps' regulations, Division Engineers are authorized to approve special permit processing procedures in an "emergency situation," defined as:

[A] situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures.¹⁴

As described in Union Pacific's October 21 notification letter and request for emergency authorization, and the Jacobs Associates report accompanying that

¹⁴ 33 CFR 325.2(e)(4).

request, the East culvert is at imminent risk of failure. Corrective action requiring an Army Corps permit must be taken, i.e., the East culvert must be closed in order to provide for the continued safe operation of the rail line on the Causeway. However, as explained above, the overall project (closing the culverts and replacing them with a compensatory mitigation bridge) entails continued evaluation of Union Pacific's compensatory mitigation bridge construction proposal, which was approved in concept in the August 2012 NWP. The focus of the modeling and impacts analysis is to confirm that the bridge proposal as designed will adequately compensate for the loss of aquatic functions provided by the West and East culverts.

If the Corps refuses to use emergency procedures to allow closure of the East culvert, and instead requires completion of the existing modeling and impacts evaluation process as well as completion of the Corps public review and the State 401 certification review periods, the overall approval process to close the culvert in this emergency situation could take at least one year. In fact, the process would likely take even longer due to seasonal limitations on construction. For purposes of the discussion below, this one year plus time period is considered the "normal time needed to process the application under standard procedures" referenced in the regulations.

Under the Corps' regulations, the evaluation of the emergency situation must be made in relation to the impacts of using the normal permitting alternative—which, in this case, would delay closure of the culvert and force the shutdown of Union Pacific's Causeway route for at least one year and likely longer. As explained further below, such a shutdown would result in a significant loss of property, as well as a significant, immediate and unforeseen economic hardship. Therefore, Union Pacific's request for the use of emergency procedures to approve the causeway shutdown constitutes an "Emergency Situation." 33 CFR 325.2(e)(4).

B. Loss of Property from Causeway Shutdown While Standard Corps' Permit Processing is Completed Would be Significant.

The Great Salt Lake Causeway structure is an integral part of the Lakeside Subdivision which is the main East-West line linking West Coast, Midwestern and Eastern customers and markets. The failure of the East culvert would render the Causeway structure inoperable and necessitate shutting down the 178-mile rail line the Causeway serves. Therefore, the damage to the Causeway structure caused by culvert failure would constitute a significant loss of the use of this valuable property and the entire rail line until the time that the structure could be repaired and rail operations restored.

C. In Addition, Significant, Immediate and Unforeseen Economic Hardship Would Result from Causeway Closure During the Period While Standard Corps Permit Processing is Completed. This Hardship Would Fall Upon The General Public As Well As Union Pacific, Its Customers And Interstate Commerce.

In addition to the above-described loss of property, significant economic hardship would result from shutting down the Causeway during the “normal time needed to process the application under standard procedures.” This hardship would be “immediate, unforeseen, and significant.” 33 CFR 325.2(e)(4).

Mr. Gipson based his initial determination on the fact that an alternative route is available to transport freight should the Causeway route be shut down. However, the simple fact that an alternative route is available does not end the inquiry under the Corps regulations. Following is a brief summary of the Causeway route and the alternative route, followed by a summary of the impacts that would result from a shutdown of the Causeway route.

1. The Causeway Route and the Shafter Route are Not Readily Interchangeable to Accommodate Shifts of Train Traffic.

a. The Causeway Route.

The Great Salt Lake Causeway is a critical element of Union Pacific’s Lakeside Subdivision, which is part of the main east-west interstate rail line in the central corridor of the United States. It serves major markets on the West Coast, California’s Central Valley, the Midwest and the East Coast, for example, intermodal traffic from Lathrop and Oakland, California to and from Chicago; bulk commodities, such as grain moving from Midwest farms to California and time-sensitive shipments of produce from California’s Central Valley to the East Coast.

The Causeway route extends for 178 miles from Wells, Nevada to Ogden, Utah. It currently supports an average of 16 trains per day of East-West traffic, and the level of traffic is expected to increase as the holiday season approaches. The Causeway route supports trains up to 9,000 feet long, representing an average of 600 intermodal box cars and 750 conventional rail cars per day. This volume of train traffic is the rough equivalent of 2,500-3,000 semi-trucks per day.

***b. The Alternative “Shafter Route” and Distinctions
Between the Causeway and Shafter Routes.***

As explained in the November 8 submission, Union Pacific has another rail route—referred to herein as the “Shafter route”¹⁵—that intersects the Causeway route west of the Great Salt Lake near Wells, Nevada and east of the Great Salt Lake at Ogden, Utah. However, it is 250 miles in length, which is 73 miles longer than the Causeway route. Significantly, this route over Union Pacific’s Shafter Subdivision is also very active, servicing different but also very important regional and local markets, with a current average of 14 trains per day using the downtown Salt Lake City portion of the Shafter route. This line also supports East-West Amtrak traffic with two trains per day. In contrast to the interstate Causeway route, it does not support the same length of trains. Its train length limit, based on the length of sidings available for train meets, is 5,700 feet long.

The Shafter route goes around the south end of the Great Salt Lake near Magna, through the industrial areas west of Salt Lake City International Airport and downtown Salt Lake City and then north through urban and industrial areas to Ogden. Thus, it passes through some of the more heavily populated, busiest parts of the Salt Lake and Ogden metropolitan areas.

The Shafter route has 42 more at-grade public crossings than the Causeway route (58 versus 16). Significantly, in contrast to the Causeway route, which has only 2 at-grade public crossings in populated or higher traffic areas, 38 of the 58 (or 65 percent) public at-grade crossings on the Shafter route are within the downtown area of Salt Lake City and surrounding urban and industrial areas that have significant local vehicle traffic.

In addition, the Shafter route has approximately 1,700 feet more rise and fall in elevation, and approximately 1,700 more degrees of curvature, than the Causeway route. The current average run time for trains traveling over the Shafter route is over four hours per train longer than over the Causeway route. Equivalent trains on the Shafter route use an average of 900 gallons more fuel than those on the Causeway route, making freight transportation over the Shafter route more costly than over the Causeway route.

¹⁵ As referenced herein, the “Shafter route” includes: (a) Union Pacific’s Shafter subdivision, which runs between “Alazon” near Wells, Nevada and “Smelter”, near Magna, Utah, (b) the portion of the Lynndyl Subdivision between Smelter and Salt Lake City, at Union Pacific’s rail yard in North Salt Lake City and (c) the Salt Lake City Subdivision, which runs from the North Salt Lake City rail yard north to Ogden, where the Salt Lake City subdivision intersects with the Causeway route.

2. Significant Economic Hardship on the Public, Union Pacific, Its Customers and Interstate Commerce Would Result from Shutting Down the Causeway Route and Forcing Rail Traffic onto the Shafter Route For Over One Year While a Standard Permitting Process Is Completed.

If the Causeway route were shut down, as threatened by the Corps' initial rejection of emergency procedures, the Shafter route would be the only alternative for transporting the interstate freight that currently ships over the Causeway. Because the Shafter route is already being utilized, shifting the interstate freight shipments from the Causeway route to the Shafter route is not a simple matter—particularly if the shutdown extended for at least one year, as would be expected here, while a standard individual permit and State 401 certification are being processed. Following is a summary of the anticipated impacts of shutting down the Causeway and shifting its traffic to the Shafter route:

- Due to the shorter allowable train length on the Shafter subdivision, shifting the average 16 Causeway route trains to the Shafter route would necessitate breaking them up into an average of 22-24 shorter trains.
- Thus, 22-24 more trains (for a total of 36-38 trains) per day would run over the downtown portion of the Shafter route. This would increase average rail traffic by up to 2.7 times the current average through the downtown area of Salt Lake City and the more heavily populated areas west of the downtown area on this route.¹⁶ Please note that this information supersedes the information on this point provided in Union Pacific's preliminary submittal on November 8.
- This increase in train traffic over the Shafter route and its 58 public at-grade crossings—with 38 (or 65 percent) of them in the metropolitan Salt Lake City and Ogden areas—would necessarily impact local vehicle traffic and increase vehicle emissions associated with traffic delays. Further, an increase in local train traffic in these areas would present additional safety concerns associated with vehicle traffic around at-grade crossings—both at these public crossings and at the numerous private at-grade crossings in these areas.
- Adding 22-24 trains to the Shafter route per day would increase rail traffic on that route in excess of its “fluid” capacity, i.e., the maximum traffic flow that can be operated without causing delays or service interruptions that result in

¹⁶ The Salt Lake City to Ogden portion of the route has a current average of 28 trains per day. Adding 22-24 trains to that segment would increase its traffic level approximately 1.8 times the current average to 50-52 trains per day.

failure to meet Union Pacific's customer delivery and service commitments.¹⁷ The shift of Causeway traffic to the Shafter route would increase the average run time for trains on this route, which is already over four hours longer than the run time for trains on the longer, more efficient trains that use the Causeway route. This increase would add 3-4 more hours to the Shafter route, resulting in an overall increase of 7-8 hours in run time for trains forced off the Causeway route to the Shafter route.

- Because Amtrak uses the Shafter subdivision line for its East-West traffic between San Francisco, Chicago and the East Coast, Amtrak service also would be adversely impacted by this increase in freight train traffic and associated additional run times on the Shafter route.
- Because some interstate freight shipments over the Causeway route are time-sensitive (e.g., produce from California's Central Valley to the East Coast), extended run times could impact Union Pacific's ability to serve these markets and cause a shift to truck transportation, thereby adding to road and highway congestion as well as vehicle emissions. Union Pacific recognizes the concerns that such impacts could raise in the Salt Lake valley during the winter months when temperature inversions affect air quality.
- The increase in number of trains and the extended run times on the Shafter route would necessitate the use of additional train crews and increase labor costs. A 7-8 hour increase in run times of individual trains would increase the frequency of occasions when the Federal Railroad Administration hours of service regulations require a crew change while the train is en route—potentially causing cascading delays and increased labor costs throughout the system as delayed trains are forced to await replacement crews.¹⁸
- Forcing the Causeway traffic to this longer route (both in distance and time) with a greater rise and fall than the Causeway route, would increase fuel usage to levels above those needed for the normal train traffic patterns described, *supra*. Each Shafter route train uses approximately 900 more gallons of diesel fuel, so this shift of traffic would use 5-6 million more gallons per year in the Salt Lake City area.
- These circumstances would unquestionably impact interstate commerce. The delays in service alone would force changes in distribution patterns and the

¹⁷ Forcing 22-24 extra trains to the Shafter route would exceed fluid capacity of all three portions of the Shafter route described in footnote 15.

¹⁸ When the FRA's crew hour limits—including but not limited to the 12-hour limit on hours of service—are reached, a crew change must occur before the train can proceed. *See* 49 CFR 228. The manner in which hours of service restrictions are managed is beyond the scope of this letter; suffice it to say that, under these limits, train traffic delays such as those contemplated here could have significant effects on the rail system.

competitiveness of Union Pacific and the customers it serves—both in the context of its East-West interstate business served by the Causeway route and its regional and local business served by the Shafter route. The resulting traffic shifts and dislocations would inevitably result in still other changes, potentially including shifting some freight transportation to trucking, with an attendant increase in truck traffic and fuel use.

As this summary reflects, shutting down the Causeway would immediately impact the public, in terms of rerouted trains through downtown Salt Lake City and more heavily populated areas with multiple at-grade crossings in those areas. The public would also be affected through the impacts on Amtrak traffic on the Shafter subdivision.

3. Union Pacific Would Suffer Direct Economic Impacts From a Shutdown of the Causeway and the Rerouting of Freight and Train Traffic.

As described in its November 8 submission, Union Pacific has estimated the direct costs Union Pacific would incur as a result of shutting down the Causeway and forcing traffic onto the Shafter Subdivision. These costs include the costs of operating additional trains and additional train crews due to train length limits, additional costs associated with run-time increases and further additions associated with delays and traffic congestion, and additional fuel. These costs are estimated to be \$258,000 per day, which translates into over \$94 million per year. Taking account of the likelihood that the time associated with standard permitting would take longer than one year, those costs would increase significantly.

Significantly, these estimates are only the direct costs associated with a shutdown of the Causeway route and forcing Causeway route traffic onto the Shafter route. It is not possible without an extensive, time consuming study to estimate lost revenues that would result. Therefore, lost revenues are not included in this estimate.

When the Regulatory Branch Chief explained the Corps' initial rejection of emergency procedures, he indicated that such costs did not appear to be significant in light of the significant size of Union Pacific as a company and particularly its annual profits. Union Pacific rejects the notion that the relative size of a company or its profits renders the economic impacts described herein less significant than if the impact were to a smaller, less profitable company or an individual. Such a determination would be arbitrary and capricious on its face. In any case, as demonstrated above with Union Pacific's supplemental information, these figures relate only to costs—not to lost revenues. Further, they do not include the economic impacts to the public, Union Pacific customers and interstate commerce as described above. Union Pacific asserts that the extensive impacts reflected in this summary are

sufficient to support a determination to use South Pacific Division emergency procedures consistent with Army Corps regulations.

4. Economic Hardship Would be Immediate.

As described above, the economic impact resulting from culvert failure and causeway closure would be immediate. Freight in route would have to be rerouted over other parts of the railroad network immediately, with resulting impacts as described above.

5. The Economic Hardship Was Unforeseen.

Under the Corps' regulations, an emergency situation arises when *economic hardship* is significant, immediate and unforeseen—not when the underlying event is unforeseeable. In this case, both the economic hardship and the underlying event—the sudden deterioration and imminent failure of the East Culvert—were unforeseen.

Regarding the economic hardship: the Corps represented to Union Pacific that, should the unexpected occur and the East culvert failure suddenly become imminent, an expedited process would be utilized to authorize closure. As described above, the possibility that the Corps would not recognize the culvert closure as an emergency and as a necessity was never at issue or, to Union Pacific's knowledge, even considered until Friday November 8. Thus, the economic hardship that would result if the Corps denies the use of emergency procedures and requires completion of the standard permit processes was both unforeseen and clearly unforeseeable. This lack of even a hint that there was an issue before Friday November 8 is one of the bases for the objections to this process.

Again, the timing of the sudden culvert deterioration was unforeseen. Further, based on Union Pacific's and the Corps' experience with the West culvert, the timing of the failure was unforeseeable. The Corps has acknowledged the unforeseen (and unforeseeable) nature of the culvert failure. As explained above, earlier inspections of the culverts had identified deterioration in the culverts and the necessity of eventually closing of both the East and West culverts. In 2010, Union Pacific began meeting with the Corps and State agencies to develop a plan to close the culverts and replace their aquatic function with a bridge. That process resulted in Union Pacific's submission of its March 2011 PCN application for coverage of this project under Nationwide Permit 14. However, the Corps' review process stalled, and the Corp originally rejected Union Pacific's PCN in March 2012.

By August of 2012, an inspection of the West culvert revealed that deterioration of the West Culvert had reached the point that failure was imminent. As a result, Union

Pacific provided additional supporting information and sought reconsideration of its Nationwide Permit 14 application, requesting immediate authorization to close the West culvert on an emergency basis.¹⁹ At the time, the inspections by Jacobs Associates indicated that the East Culvert was relatively stable in comparison to the West Culvert. On that basis, when UP applied for emergency approval to close the failing West culvert, UP indicated that although the East Culvert would eventually need to be closed, that need was not immediate. Union Pacific stated:

The east culvert was also surveyed recently. Its condition is not as critical as the west culvert, although eventual failure of the east culvert is inevitable. It appears that the east culvert can remain open for the short term to continue to allow some circulation at this location. Therefore, UPRR will leave the east culvert in place for now and continue to monitor its condition. At the point in the future that failure of the east culvert becomes imminent, UPRR will notify the Corps of the necessity of closing it.²⁰

Based on previous inspection reports and the slow progression of the West culvert deterioration that led up to its failure, neither Union Pacific nor the Corps expected failure of the East culvert based on the results of the July 2012 inspection. These expectations are reflected in the agreement between Union Pacific and the Corps that closure of the East culvert was not necessary at the time the West culvert failed and had to be filled. Both entities anticipated that the modeling, studies and development of the monitoring plan required under the August 2012 Nationwide Permit authorization could be completed before the East culvert failed. Unfortunately, the East culvert deterioration did not follow the pattern of the West culvert. Instead, after the March 2013 inspection, the East culvert deteriorated suddenly and more rapidly than expected based on Union Pacific's and Jacob Associates' experience with the West culvert.

Accordingly, both the economic hardship and the underlying event were unforeseen by Union Pacific and the Corps. The preliminary determination that the economic hardship was not unforeseen should be reversed based upon the additional facts and analysis provided herein.

¹⁹ See UPRR Declaration of Emergency Conditions at West Culvert and Request for Reconsideration of Supporting Information (August 16, 2012) (enclosed as Exhibit I).

²⁰ *Id.*

6. Summary.

Consider, for purposes of analogy, the discovery of an imminent failure of an automobile/truck bridge connecting two densely populated metropolitan areas. The existence of a smaller regional bridge 35 miles away, over which traffic could be re-routed, would not eliminate the character of the emergency arising from the imminent failure of the primary bridge and the risk of closure. The compounding costs of re-routing traffic, fuel adjustments, traffic impacts, impacts to the alternative route through increased use and varied ripple effects, including impacts to interstate commerce, would demand an urgent response to avoid the closure of a primary corridor. Similarly, the imminent failure and risk of closure of the primary rail corridor through Salt Lake Valley warrants an urgent response. Citing the existence of a single alternate route through a populated, heavy traffic area of Salt Lake City as reason for not expediting review of Union Pacific's emergency closure application simply ignores the realities on the ground. The effort to re-route trains through a more demanding, more populated route would cause precisely the kind of situation that emergency procedures anticipate: an immediate, unforeseen economic hardship in the form of direct and indirect costs to Union Pacific exceeding a quarter of a million dollars a day. In addition, it would result in significant and immediate economic hardship to be borne by Union Pacific's customers, as well as the public, including impacts to local vehicle traffic, local rail traffic, increased concerns about public safety, not to mention the increased risk of shipping delays (especially during the upcoming holiday season). This shutdown would clearly affect interstate commerce adversely.

We trust that the Corps' review of the supplemental information and analysis provided herein will support a Corps determination to use emergency procedures. As shown above, the economic impacts would extend well beyond the direct costs to that Union Pacific estimated in its November 8 submission.

D. Elevated Review is Necessary and Appropriate.

We appreciate Branch Chief Gipson's willingness to consider additional information. We also appreciate the affirmation of the Corps' readiness to consider this submission expressed to Union Pacific by District Regulatory Division Acting Chief Nepstad. Given the urgency of this matter, Union Pacific hereby asks that the review of Union Pacific's request also be performed at the District and Division Level and as necessary by District Commander Farrell and Division Commander Turner.

Army Corps' regulations provide that where there is substantial doubt as to the regulations or policies applicable to a proposed activity, it is appropriate for permit applications to be elevated for review, either to the District Engineer or Division Engineer. *See* 33 CFR 325.8(b)(3)-(c)(2).

Further, review by the District Engineer is called for by the Corps' "emergency procedures" regulations. Section 325.2(e)(4) and the South Pacific Division Regulatory Program Emergency Procedures provide that it is the District Engineer's role to understand the circumstances constituting an emergency and then elevate those facts to the Division Engineer for further review and additional instructions. *See* South Pacific Division Regulatory Program Emergency Procedures, 12502-SPD 7.2 ("In response to specific requests from the regulated public, the District Engineer must determine whether the use of emergency procedures is warranted.").

Here, under the urgent circumstances described above, Union Pacific wishes to ensure that the Division Engineer and the District Engineer are sufficiently informed of the facts at issue, in the first instance. Because of the urgency of the situation, it is proper for this matter to be elevated to the appropriate level to the District and Division levels to facilitate authorization of the emergency procedures needed to ensure the safe operation of the Causeway as provided in 33 CFR 325.2(e)(4).

III. The State of Utah is Prepared to Issue a Conditional 401 Certification for the Emergency Closure.

As explained above, the Utah Division of Water Quality has provided the conditions it intends to include with its 401 certification; DWQ and Union Pacific will soon complete working out the final details for processing the 401 certification. We understand that the State is prepared to issue a public notice that it intends to take emergency action as soon as the Corps determines to use emergency procedures to authorize culvert closure.

IV. No Other Concern Would Warrant Rejection or Further Delay of Culvert Closure Approval Under Emergency Procedures.

Union Pacific is aware that there are concerns at the District, based in part on inaccurate allegations made in news reports, that culvert closure would shut off the last source of water and salt transfer through the Causeway between the North and South parts of the Great Salt Lake. That claim is untrue. Both the Causeway itself and the existing Rambo bridge opening continue to allow for substantial transfer of water and salt between the North and South arms of the Great Salt Lake. Our Great Salt Lake experts, Wally Gwynn and Kidd Waddell, have confirmed these statements. As stated above, Union Pacific is conducting a robust modeling and impacts analysis to ensure that the long term mitigation solution adequately replaces the pre-closure contribution of both East and West culvert to bi-directional water flow and salt exchange between the North and South parts of the Great Salt Lake. In the short term, that exchange will be reduced by East culvert closure (assuming it is currently contributing to that exchange in spite of its deterioration). However, substantial flows and salt exchange (far greater volumes than contributed by the two culverts combined

before closure) between the North and South parts of the Lake continue through the Causeway itself and the existing Rambo Bridge.

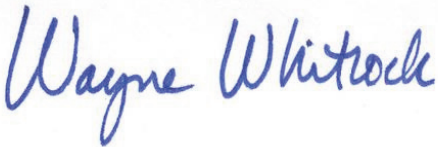
Union Pacific also acknowledges the Regulatory Branch's desire to identify practical engineering alternatives to closing the culvert on an emergency basis. Union Pacific has been asked to explain and justify not implementing various alternatives and wishes to work cooperatively with the Corps to address such questions. However, we must emphasize again that, in the view of Union Pacific and its professional engineers, there is a significant and imminent risk that the East culvert will fail completely if not closed. As reflected in Jacobs Associates' most recent report, at the time of the last inspection the culvert had severely deteriorated to the point that it is beyond repair. Divers cannot safely reenter the culvert for any purpose, and surface inspections have shown that surface material around the culvert is falling into it. Under these conditions, there is not sufficient evidence that any such interim alternative measure would adequately protect the track structure and, therefore, Causeway train traffic, against a culvert collapse, especially considering the severe deterioration identified by the Jacobs Associates' recent inspection. Further, Union Pacific's engineers are not confident that any identified alternative would remain serviceable during the time it would take to complete an individual Corp permit and 401 certification process and construct the compensatory mitigation bridge. Finally, under these circumstances, one can only speculate as to whether and, if so, how much the failing culvert continues to contribute to bi-directional water flow and salt transfer between the North and South parts of the Great Salt Lake. In the face of the safety and economic hardship concerns described herein, continued pursuit of alternatives that could only theoretically preserve the culvert function based on speculation about the aquatic benefits of doing so would be counterproductive.

Again, Union Pacific is fully committed to working with the Corps and Utah DWQ to complete the robust modeling, impacts evaluation and compensatory mitigation bridge review process that is well underway and progressing, just as required under the August 2012 NWP authorization. Union Pacific is scheduled to present its progress on this effort to the Corps, Utah DWQ and other coordinating agencies on November 25 in Salt Lake City. This effort, supported by our respected experts, presents the most sure path to replacing the aquatic functions of both East and West culverts successfully. We request that the Corps quickly authorize the emergency closure of the East culvert so that Union Pacific, the Corps and Utah DWQ can focus on this process again, in order to complete it and have the appropriate compensatory mitigation in place as quickly and effectively as possible.

V. **Conclusion.**

For the reasons stated herein, Union Pacific Railroad respectfully requests that the Corps of Engineers make a determination that the circumstances here justify the use of emergency procedures to authorize closure of the East culvert and proceed to authorize that work as soon as possible.

Sincerely,



Wayne M. Whitlock
Counsel for Union Pacific Railroad

Enclosures

cc: Mr. Mark L. McCune
Ms. Debra L. Schafer
Mr. Stephen L. Cheney
Robert C. Bylsma, Esq.

List of Exhibits
Union Pacific Railroad – Great Salt Lake Causeway – East Culvert Closure
Request for Reconsideration of Army Corps’ Branch Chief’s Emergency Situation Determination

Exhibit No.	Description
A	Regulatory Branch Chief Initial Emergency Determination (November 8, 2013)
B	UPRR Initial Response to ACOE Request for Additional Information (November 8, 2013)
C	UPRR Notification of Imminent Failure and Request for Approval to Close East Culvert with Jacob Associates Report (October 21, 2013)
D	ACOE NWP 14 Verification Re West Culvert Closure and Compensatory Mitigation Bridge Project (August 29, 2012)
E	ACOE Clarification of August 2012 NWP Special Conditions (October 3, 2012)
F	ACOE Notice to Coordinating Agencies of Intent to Authorize East Culvert Closure under NWP 14 (October 24, 2013)
G	ACOE Determination of Necessity To Proceed With Emergency Closure Authorization Under Standard Permit Emergency Procedures (November 4, 2013)
H	ACOE Email with Questions Regarding Determination of Emergency Situation (November 8, 2013)
I	UPRR Declaration of Emergency Conditions at West Culvert and Request for Reconsideration of Supporting Information (August 16, 2012)

Exhibit A

From: Gipson, Jason A SPK <Jason.A.Gipson@usace.army.mil>
Sent: Friday, November 08, 2013 7:08 PM
To: Mark L. McCune
Cc: John J. Hovanec; Robert C. Bylsma; Stephen L. Cheney; Whitlock, Wayne M.; Scott D. Moore; Aaron M. Hunt; Daniel T. Harbeke; Anderson, Kathleen E SPK; Leah Ann Lamb; wbaker@utah.gov; 'Laura Lockhart'; 'cbittner@utah.gov'
Subject: RE: [EXTERNAL] Re: Questions re additional info for us to provide to Colonel Farrel supporting position that closure of East Culvert is an Emergency Situation (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Mark,

I have reviewed the information you submitted. However, based on my review and our counsels' concurrence I have determined that the information provided does NOT meet the standards or definition of the SPD "emergency situation". There appears to be an alternative to using the causeway that does not appear to be an unforeseen nor significant economic impact. As such, we would need to process this action as a Standard Individual Permit.

I apologize it took so long to respond.

Let us know how we're doing. Please complete the survey at:
<http://per2.nwp.usace.army.mil/survey.html>

Jason Gipson
Chief, Utah-Nevada Regulatory Branch
533 West 2600 South, Suite 150
Bountiful, Utah 84010

Ph: 801-295-8380 x 14
Fax: 801-295-8842

Information on the Regulatory Program.
<http://www.spk.usace.army.mil/Missions/Regulatory.aspx>

-----Original Message-----

From: Mark L. McCune [mailto:MLMCCUNE@up.com]
Sent: Friday, November 08, 2013 6:16 PM
To: Anderson, Kathleen E SPK
Cc: Gipson, Jason A SPK; John J. Hovanec; Robert C. Bylsma; Stephen L. Cheney; Whitlock, Wayne M.; Scott D. Moore; Aaron M. Hunt; Daniel T. Harbeke
Subject: [EXTERNAL] Re: Questions re additional info for us to provide to Colonel Farrel supporting position that closure of East Culvert is an

Emergency Situation (UNCLASSIFIED)

Kathleen,

Please see the attached document for impacts to the Union Pacific which would result from closing the Causeway. There would be significant immediate and continuing economic hardship imposed on the UP should this occur. This responds to the first three bullet points in your questions document.

The Jacobs report identified the risk of imminent failure and that it would be purely speculative to conclude that stopping train traffic will have any effect on the deterioration that is occurring. Even if traffic were removed from the Causeway, it is my professional opinion that deterioration and failure of the East Culvert would not be delayed. The loading from fill over the culvert is much larger than the loads imposed by passing trains.

Regarding compensatory pumping of brine from the North Arm to the South Arm, we had previously responded that this is not feasible. We have discussed this with Joe Havasi of Great Salt Lake Minerals and he advised that during cold weather increased brine viscosity tends to clog the pumps and other equipment and presents major maintenance issues. In addition, we note that the Utah DWQ has not seen the need or benefit of such an effort. For that reason, they have not proposed to impose such a responsibility. We request that you defer to their judgment on this and not impose this as a condition. And, were we to attempt to do so, we would still be left with the unanswerable question of how much brine should be pumped.

Finally, we remind the Corps of our discussions with Kidd Waddell and Wally Gwynn, the foremost experts on the Great Salt Lake. Although the closure of the East culvert would eliminate that source of flows, our experts have told us that the existing causeway fill and the Lakeside breach contribute to flows between the two arms of the Lake.

Thanks.

(See attached file: Financial_Impacts_Causeway.pdf)

Mark L. McCune, PE
Director Structures Design
Union Pacific Railroad Company
(402) 544-5194

Inactive hide details for "Anderson, Kathleen E SPK" ---11/08/2013 02:15:17 PM---Classification: UNCLASSIFIED Caveats: NONE"Anderson, Kathleen E SPK" ---11/08/2013 02:15:17 PM---Classification: UNCLASSIFIED Caveats: NONE

From: "Anderson, Kathleen E SPK" <Kathleen.Anderson@usace.army.mil>
To: "Mark L. McCune" <MLMCCUNE@up.com>, "Debra L. Schafer" <DEBRALSCHAFFER@UP.COM>, "Stephen L. Cheney" <SLCHENEY@up.com>, "Robert C. Bylsma" <RCBYLSMA@up.com>, "Whitlock, Wayne M." <wayne.whitlock@pillsburylaw.com>

Cc: Leah Ann Lamb <llamb@utah.gov>, Walter Baker <wbaker@utah.gov>, "William Damery" <wdamery@utah.gov>, Melissa Hubbell <mhubbell@utah.gov>, "cbittner@utah.gov" <cbittner@utah.gov>, "Gipson, Jason A SPK" <Jason.A.Gipson@usace.army.mil>, "Nepstad, Michael G SPK" <Michael.G.Nepstad@usace.army.mil>

Date: 11/08/2013 02:15 PM

Subject: Questions re additional info for us to provide to Colonel Farrel supporting position that closure of East Culvert is an Emergency Situation (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

Kathleen Anderson
Regulatory Assistant
Nevada-Utah Regulatory Branch
801-295-8380 x10

Classification: UNCLASSIFIED

Caveats: NONE

[attachment "Questions for UPRR re Emergency Permitting.docx" deleted by Mark L. McCune/UPC] [attachment "GSLM pump station at Promontory Point.pdf" deleted by Mark L. McCune/UPC]

**

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**

Classification: UNCLASSIFIED

Caveats: NONE

Exhibit B

From: Mark L. McCune <MLMCCUNE@up.com>
Sent: Friday, November 08, 2013 5:16 PM
To: Anderson, Kathleen E SPK
Cc: Gipson, Jason A SPK; John J. Hovanec; Robert C. Bylsma; Stephen L. Cheney; Whitlock, Wayne M.; Scott D. Moore; Aaron M. Hunt; Daniel T. Harbeke
Subject: Re: Questions re additional info for us to provide to Colonel Farrel supporting position that closure of East Culvert is an Emergency Situation (UNCLASSIFIED)
Attachments: Financial_Impacts_Causeway.pdf

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Finally, we remind the Corps of our discussions with Kidd Waddell and Wally Gwynn, the foremost experts on the Great Salt Lake. Although the closure of the East culvert would eliminate that source of flows, our experts have told us that the existing causeway fill and the Lakeside breach contribute to flows between the two arms of the Lake.

Thanks.

(See attached file: Financial_Impacts_Causeway.pdf)

Mark L. McCune, PE
Director Structures Design
Union Pacific Railroad Company
(402) 544-5194

▼ "Anderson, Kathleen E SPK" ---11/08/2013 02:15:17 PM---Classification: UNCLASSIFIED Caveats: NONE

From: "Anderson, Kathleen E SPK" <Kathleen.Anderson@usace.army.mil>
To: "Mark L. McCune" <MLMCCUNE@up.com>, "Debra L. Schafer" <DEBRALSCHAFER@UP.COM>, "Stephen L. Cheney" <SLCHENEY@up.com>, "Robert C. Bylsma" <RCBYLSMA@up.com>, "Whitlock, Wayne M."

<wayne.whitlock@pillsburylaw.com>

Cc: Leah Ann Lamb <llamb@utah.gov>, Walter Baker <wbaker@utah.gov>, "William Damery" <wdamery@utah.gov>, Melissa Hubbell <mhubbell@utah.gov>, "cbittner@utah.gov" <cbittner@utah.gov>, "Gipson, Jason A SPK" <Jason.A.Gipson@usace.army.mil>, "Nepstad, Michael G SPK" <Michael.G.Nepstad@usace.army.mil>

Date: 11/08/2013 02:15 PM

Subject: Questions re additional info for us to provide to Colonel Farrel supporting position that closure of East Culvert is an Emergency Situation (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

Kathleen Anderson
Regulatory Assistant
Nevada-Utah Regulatory Branch
801-295-8380 x10

Classification: UNCLASSIFIED

Caveats: NONE

[attachment "Questions for UPRR re Emergency Permitting.docx" deleted by Mark L. McCune/UPC] [attachment "GSLM pump station at Promontory Point.pdf" deleted by Mark L. McCune/UPC]

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UNION PACIFIC RAILROAD

Impacts Associated with Imminent Culvert Failure on the Great Salt Lake Causeway

Economic Impacts

Union Pacific Railroad's main line west from Ogden across the Great Salt Lake is part of the Lakeside Subdivision. There is only one alternate rail route from the Salt Lake Valley west to northern California—the Shafter Subdivision which runs west from Salt Lake City around the south side of the Great Salt Lake. The two subdivisions follow separate alignments until they join at Wells, Nevada.

On average, 16 trains cross the Great Salt Lake Causeway on the Lakeside Subdivision per day.

If the Causeway was unusable, the trains would need to be rerouted over the Shafter Subdivision. The Shafter Subdivision is approximately 73.3 miles longer than the Lakeside Sub, has approximately 1700 feet more rise and fall, and has approximately 1700 more degrees of curvature. All three factors increase fuel consumption. The Shafter Sub also has east bound siding restrictions. These siding restrictions would force running on average one additional train per day from origin to destination. Therefore 17 additional trains would be added to the Shafter Sub per day.

Union Pacific's Network Planning Group has analyzed costs associated with such a reroute. Rerouting all traffic from the Lakeside Subdivision to the Shafter Subdivision would result in increased direct costs to Union Pacific of \$258,000 per day. In addition, there are likely additional costs due to congestion on the Shafter Sub route, such as additional crews required by the Federal Railroad Administration's hours of service rules.

In addition to costs to Union Pacific, there would also be impacts to the public. Most notably, an additional 17 trains per day would traverse 38 at-grade crossings between Ogden and Smelter (18 miles west of Salt Lake City), causing inconvenience to motorists and increased vehicle exhaust.

Impacts on Property

The Causeway is a major structural asset and a critical element of Union Pacific's Overland Route and overall transportation infrastructure. Collapse of the culvert would render the causeway inoperable, which in turn would render this portion of the Overland Route inoperable. Accordingly, the collapse of the culvert would cause an immediate loss of productive use of our property (not only the Causeway itself but an additional 145 route miles between Ogden and Wells) that would continue until the Causeway is restored.

Impacts on Interstate Commerce

The effects of shutdown would clearly impact interstate commerce. Our customers rely heavily on shipments over the Lakeside Subdivision main line. Not only would there be a direct impact on shipments over that line, but the ripple effect of such a shutdown would extend throughout the rail network. Such costs cannot be quantified in the time frame for responding to the Corps' inquiry.

Exhibit C

UNION PACIFIC RAILROAD
1400 Douglas Street, STOP 0910
Omaha, Nebraska 68179-0910

Structures Design Group

P 402 544 5194
F 402 501 0478
mlmccune@up.com

October 21, 2013

File: Bridge 739.79 Lakeside Sub
Culvert 750.53 Lakeside Sub

Via Electronic Mail and First Class Mail

Mr. Jason Gipson
Branch Chief, Regulatory Division
U.S. Army Corps of Engineers, Sacramento District
Nevada-Utah Regulatory Branch
533 West 2600 South, Suite 150
Bountiful, Utah 84010

Re: Union Pacific Railroad (UPRR) - Great Salt Lake Causeway - Notification of Imminent Failure of East Culvert and Declaration of Emergency Conditions - Request to Reactivate UPRR Preconstruction Notification

Dear Jason:

I am writing to follow up on the telephone report our outside counsel, Wayne Whitlock, made to you on October 14, 2013 regarding the results of our recent inspection of the East culvert in the Great Salt Lake Causeway. Unfortunately, that inspection revealed that the East culvert has now deteriorated to the point that it is beyond repair. We believe collapse of the culvert is imminent. Therefore, we are notifying the Army Corps of Engineers (Corps) that UPRR must move forward with closure of the East culvert as soon as possible to avoid a potential derailment due to culvert failure under train traffic. We request Corps authorization of this emergency closure.

Background. On August 29, 2012, the Corps authorized emergency closure of the West culvert pursuant to Nationwide Permit 14 (August 2012 NWP); the Corps also authorized construction of the proposed bridge to compensate for the loss of aquatic functions resulting from culvert closure. The August 2012 NWP authorization included a number of Special Conditions, including a requirement to develop of a compensatory mitigation and monitoring plan for Corps approval before bridge construction could proceed.

UPRR had sought authority to close both East and West culverts in the original March 2011 Preconstruction Notification (PCN). UPRR renewed its request for that authorization on August 16, 2012 when an inspection of the two culverts revealed that the West culvert had cracked and broken. It posed an imminent risk of collapse. Therefore, UPRR declared an emergency condition and requested Corps authorization to close the West culvert immediately.



At that time, the East culvert was deteriorating but its condition was not as critical as the West culvert. Therefore, although UPRR sought coverage for eventual closure of the East culvert, UPRR explained in its August 16 notification that it planned to leave that culvert in place for now in order to allow bi-directional flows through that culvert as long as safety conditions permitted. Specifically, UPRR proposed closure of the East culvert at the time the bridge would be constructed—unless culvert conditions worsened to the point that immediate closure would be required for safety reasons. UPRR's rationale for including the East culvert under the same authorization was that closure of the East culvert was inevitable because it was in the process of failing, and the bridge was proposed to compensate for the impacts of closing both East and West culverts.

In response, the Corps determined not to provide the requested coverage for eventual East culvert closure. The Corps acknowledged that the compensatory mitigation bridge (and the mitigation and monitoring plan called for in the August 2012 NWP Special Conditions) addressed the impacts of closing both culverts. However, the Corps stated its preference to avoid confusion of emergency and non-emergency closure work in the August 2012 NWP authorization and its hope that closure of the East culvert would not become necessary until the new bridge could be constructed. Rather than requiring a new permit application if emergency closure became necessary, the Corps clarified that it would provide such authorization by reactivating UPRR's existing PCN application:

[W]e are cognizant of the fact that you were not withdrawing your request to close the East Culvert and appreciate your good faith efforts to leave the East Culvert in place as long as it is possible to safely do so. We feel it appropriate to authorize closure of the East Culvert separately when it is evident that it necessary to do so. As soon as we receive your notification of the imminent failure of the East Culvert, we would reactivate your PCN application and verify a NWP 14 for closure of the East Culvert. ACOE to UPRR (October 3, 2012).

UPRR has prepared this notification consistent with the Corps' October 3 direction.

Request to Reactivate Preconstruction Notification. As reflected in our August 16 letter, we shared the Corps' hope that it would not be necessary to close the East culvert before the compensatory mitigation bridge could be constructed. Unfortunately, as reflected in the enclosed inspection report prepared by Jacobs Associates, the East culvert has deteriorated to conditions similar to those of the West culvert at the time it became necessary to close it. Further, we have determined that the culvert is beyond repair. Jacobs Associates' report reflects that culvert failure is imminent, posing the risk that the culvert could collapse and cause a train derailment. Therefore, UPRR is declaring an emergency condition that necessitates East culvert closure as soon as possible.

Pursuant to the Corps' October 3, 2012 direction, we request that the Corps reactivate the outstanding portion of UPRR's March 2011 Preconstruction Notification that covered closure of the East culvert and authorize emergency closure of the culvert under Nationwide Permit 14.

It will take a few days to mobilize the necessary equipment and materials. Currently, we expect to perform the emergency closure work on November 4. We will keep you informed as our plans develop.

Consultation Process on Existing Corps Permit. As we address the issues associated with emergency closure of the East culvert, UPRR again acknowledges the separate rights and obligations established under the August 2012 NWP authorization—specifically, the need to complete our reevaluation of potential

impacts of replacing the two causeway culverts with a new bridge and develop a revised mitigation and monitoring plan based on the results. UPRR remains fully committed to the consultation and agency coordination process established by the Corps and UPRR to resolve those issues.

We appreciated the opportunity to meet with the Corps and the coordinating agencies on October 2 to discuss UPRR's proposed impacts reevaluation and agency coordination plan described in our September 25 letter to the Corps and for the positive feedback UPRR has received. We look forward to working with you to complete the reevaluation plan and then make any appropriate adjustments to the bridge design and the mitigation monitoring plan that result from this reevaluation. We believe that the Corps' consultation process and our joint efforts present the best opportunity to achieve our common objectives of getting the mitigation in place as soon as possible in order to minimize the effects of culvert closure.

In that regard, we propose to schedule the next informal consultation meeting outlined in our September 25 letter as soon as possible in November to discuss the results of the first phase of the evaluation and the next steps, including a schedule for completing the impacts evaluation and the consultation process. In that meeting, we also propose to brief the Corps and the coordinating agencies on the East culvert closure and answer any questions of the coordinating agencies.

Please feel free to call me with any questions about our request for emergency authorization. We will contact you to make arrangements for the briefing meeting proposed above. Thank you in advance for your continued cooperation in our efforts to address these important safety and environmental concerns.

Sincerely,



Mark L. McCune, PE
Director Structures Design

Enclosure

cc: Ms. Kathleen Anderson
Ms. Debra L. Schafer
Mr. Stephen L. Cheney
Robert C. Bylsma, Esq.
Mr. Daniel T. Harbeke
Wayne M. Whitlock, Esq.

PROJECT MEMORANDUM

To: Mark McCune, P.E., Steve Cheney, P.E., UPRR
From: Carol Ravano, P.E.
Job No.: 4294.0
Date: 21 October 2013
Subject: Great Salt Lake Causeway East Culvert- Results of Diving Inspection, 11 October 2013

1 Introduction

As part of Jacobs Associates' on-going monitoring of the East Culvert on the Great Salt Lake Causeway, Blackwater Marine inspected the East Culvert on Friday 11 October 2013. The previous dive into the culvert was on Monday, 4 March 2013. The memorandum summarizing the observations of that dive was sent to UPRR on 20 March 2013.

Upon arriving at the site, a safety meeting was held by Cory Choate of UPRR. Present at the site were George Lulham, Bryan Cox (diver), and two helpers from Blackwater Marine, and Carol Ravano from Jacobs Associates. Mr. Lulham gave a briefing on the dive sequence, roles, and safety.

2 Results of East Culvert Dive Inspection

Bryan Cox entered the East Culvert from the north side at 10 a.m. and completed his dive at 1130 a.m. While in the culvert, the diver had a camera mounted on his dive helmet which transmitted to a screen inside the dive trailer; there was also voice communication between the diver and the dive trailer. The diver examined the sidewalls, bottom, and crown of the culvert visually and tactilely.

2.1 11 October 2013 Crack Observations

In the March 2013 memo to the UPRR reporting the results of the March inspection, we stated "...the diver did note that the cracks that are approximately 30 feet from the north entrance have increased in size since the last dive in July 2012. These cracks now continue over the crown and the floor of the culvert, connecting into a crack on the east wall. There also appeared to be one- to two-inch rounded gravel material coming out of the crack on the west wall; this is an indication that the original backfill material, which is rounded, is coming out of the crack."

2.1.1 East Sidewall

During the 11 October 2013 dive, the following observations were made regarding the crack in the east sidewall: There is an existing crack located in the east sidewall, approximately 30 feet in from the north culvert entrance that was first noted in July 2005. Over the years, the crack has increased in width and it is now 18-inches wide and greater than 12 inches deep; the concrete sidewall has continued to spall and there is exposed, corroding rebar present in the crack. As of March 2013, the crack on the east sidewall had split at the top (approx. 10 foot level) into 2 separate cracks. During this 11 October 2013 dive, the diver noted that there are now 4 separate cracks at the top of this crack and that the size and number of loose concrete blocks has increased. The diver described this crack as looking like a tree, with the large open crack as the trunk and then the branches at the top. The loose concrete blocks are located where the cracks diverge from the main trunk.

One of the loose blocks on the east sidewall, located where the cracks diverge, was described by the diver as approximately 6 feet high and 18 inches wide. Just below this block, there were several smaller blocks of loose concrete, less than one foot in diameter. The large block weighs approximately one ton, but because of the buoyant force of the super saline water, the diver was able to move the block around.

As the diver was attempting to scale the cracks in the east sidewall to reach the crown, smaller pieces of the concrete (less than 6 inches in size), broke off in his hand. The diver also noted that there are parallel cracks that continue from the above described crack, through the 45 degree chamfer that is located at the intersection of the sidewall and the crown, and across the culvert crown, connecting with the major crack on the west sidewall, which is described below. Because the water clarity was good during this dive, we were able to see the bubbles which formed at each of the crack lines, indicating that there is a slight offset between the cracks.

At the base of this crack in the east sidewall, there is a pile of rock material that is less than six inches in diameter, presumed to have come into the culvert through the open crack. The diver examined the rock and found that there was a mixture of angular and rounded rock. The angular rock is presumed to be ballast which has either migrated down the outside of the culvert and come through the crack or has fallen into the GSL and been carried into the culvert by the currents. The rounded rock is presumed to be backfill, which was placed around the culvert during the original construction in the 1950s. The diver took a sample of this rock out of the culvert; a photo of it is shown in Appendix A. This rounded rock indicates that the material surrounding the culvert is coming through the crack, resulting in a potential loss of material under the track section.

2.1.2 West Sidewall

Opposite the crack in the east sidewall, there is a crack in the west sidewall which appears to have widened since the March 2013 dive. The crack is approximately 2 feet wide at the base and greater than 12 inches deep. This crack divides into 3 smaller cracks, spaced approximately 2 to 3 feet apart, at about 10 feet up from the culvert bottom. Where the main crack divides into the smaller cracks, there are loose blocks of concrete, less than 1 foot in diameter.

Due to the amount of debris on the culvert bottom, the diver was not able to see or feel the crack, which is present on the bottom. This crack was present during previous dives and is presumed to still be present.

Similar to what we observed in March 2013, during this dive, we noted a pile of smaller rock, less than 6 inches in diameter, at the base of the crack in the west sidewall. The observations of the diver are similar to what was described above at the base of the crack on the east sidewall. This material is presumed to have come into the culvert through the open crack

During the dive, the diver also noted that the crack does continue through the 45 degree chamfers that are located at the intersections of the sidewalls and the crown and bottom of the culvert, making it a continuous crack around the entire perimeter of the culvert.

3 Conclusions and Recommendations

Based on the diver's observations inside the culvert during this dive, previous culvert inspections dating from January 2005, and our previous experience with the culverts, we make the following conclusions and recommendations:

1. The East Culvert has separated into two sections, with significant degradation at the interface, and has lost its original structural integrity.
2. It appears that the original culvert backfill material is coming into the culvert through the cracks in the east and west sidewalls.
3. This pattern of worsening crack formation, the formation of the loose concrete blocks, and the backfill material flow into the culvert is similar to the structural degradation process observed at the West Culvert prior to its closure in 2012.
4. The 2006 grouting program at the West culvert occurred when the culvert was still in adequate structural condition, with no loose blocks of concrete present. This is not the case with the East Culvert. The current condition of the East Culvert is more similar to the West Culvert just prior to its closure. Grouting the exterior of this culvert might prevent additional backfill material from entering the culvert, but it will not cause the culvert to regain its structural integrity.
5. Blackwater Marine divers, specifically Bryan Cox, have been diving in the West and East Culverts since 2005. Mr. Cox is the most knowledgeable about the conditions of the East Culvert. Due to the condition of the culvert, especially with the presence of the loose blocks of concrete, Blackwater Marine considers it unsafe to continue to dive in the culvert for inspection purposes.

GSL East Culvert Memo

16 October 2013

Page 4 of 6

6. Based on the above points, we consider the culverts to be at risk of imminent failure and unable to be repaired; therefore, we do recommend completely filling in the culvert.

Please contact me if you have questions or would like to discuss.

Attachments:

Appendix A- Site Condition Photos and Sketches

Appendix A-Site Condition Photos and Sketches

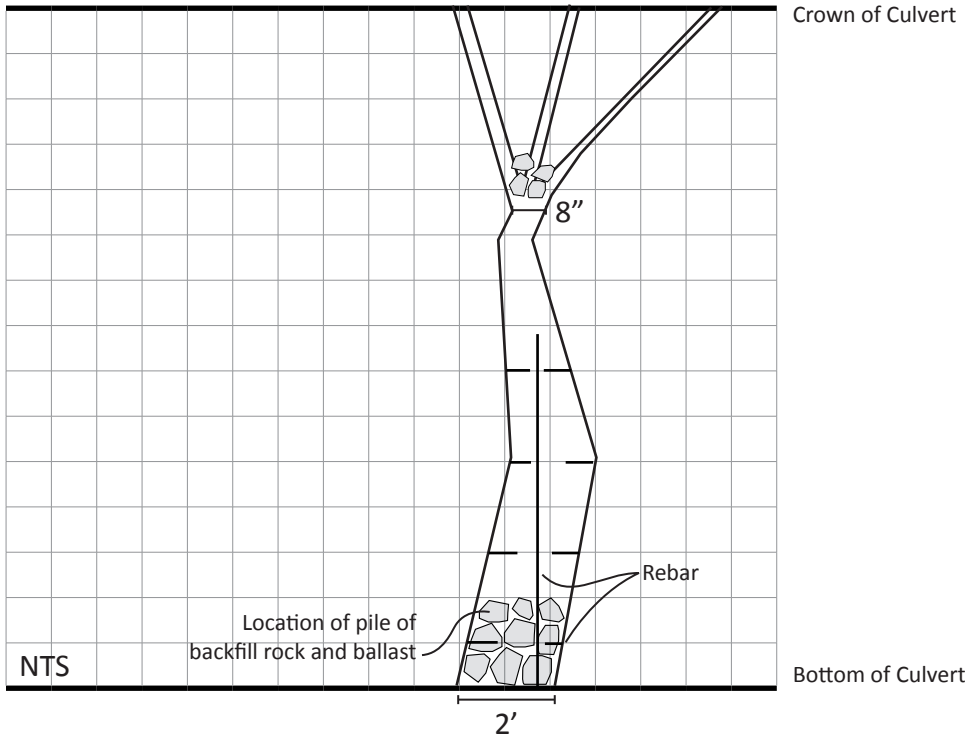


Photo 1- Sample of rounded rock taken from pile at base of crack in the west sidewall of the East Culvert. This is presumed to be original backfill material.



Photo 2-View of North Side of East Culvert. The water level is approximately 1.5 to 2 feet lower than in March 2013

WEST SIDEWALL



EAST SIDEWALL

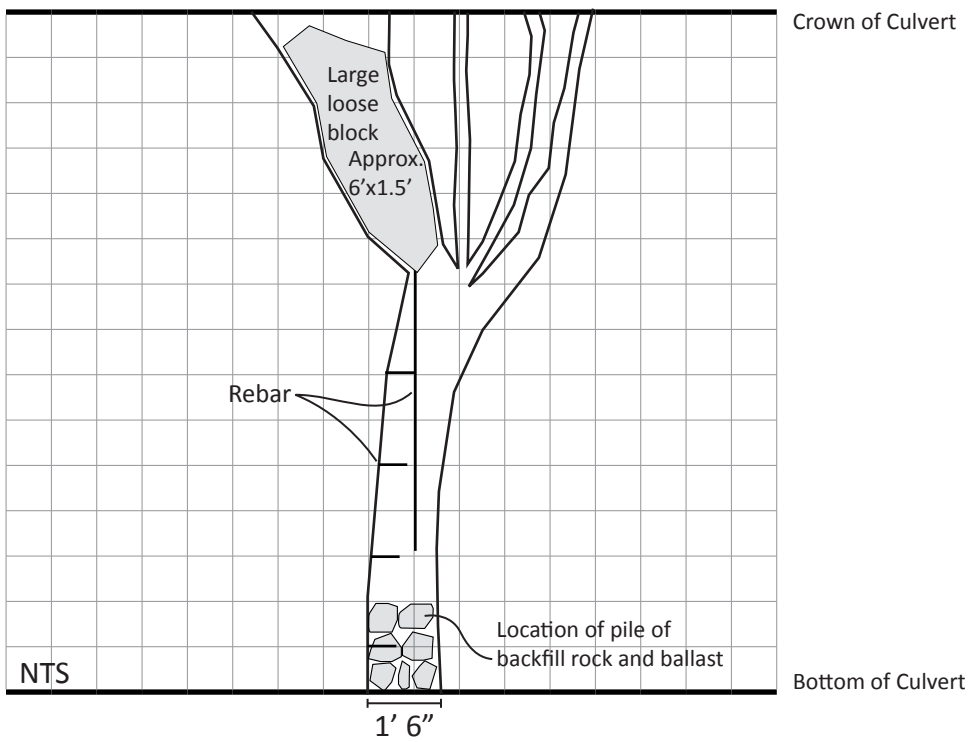


Exhibit D



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

August 29, 2012

Regulatory Division (SPK-2011-00755)

Mr. Mark L. McCune, P.E.
Director, Structures Design
Union Pacific Railroad
1440 Douglas Street, Stop 0910
Omaha, Nebraska 68179-0910

Dear Mr. McCune:

We are responding to your August 16, 2012 request for a Department of the Army permit for the Great Salt Lake UPRR Causeway West Culvert Closure and Bridge Construction project. This approximately two-acre linear project involves activities, including discharges of dredged or fill material, in waters of the United States to fill the failing West culvert located at Mile Post 744.94 and to construct a 180-foot long pile-support bridge on the west end of the causeway between Mile Post 739.79 to 739.83. The West culvert is located in the Great Salt Lake, in Section 26, Township 6 North, Range 9 West, Salt Lake Meridian, Latitude 41.2229°, Longitude -112.6608°, Box Elder County, Utah.

Based on the additional information you provided in your letter dated August 16, 2012, the proposed activity, resulting in the permanent loss of approximately 0.15- acre of waters of the Great Salt Lake to fill the West Culvert and temporary impacts to approximately 1.28 acres of waters associated with constructing the shoofly track, is authorized by Nationwide Permit Number (NWP) 14, Linear Transportation Projects (see enclosure 1, project maps and figures). Your work must comply with the general terms and conditions listed on the enclosed NWP 14 information sheets (enclosure 2), the Utah regional conditions (enclosure 3), and the following Special Conditions:

1. You are authorized to take immediate action to close the failing West culvert to preclude a potential derailment due to culvert failure under traffic. All equipment must work from the causeway or from floating barges.
2. To compensate for the impacts of closure of the West culvert and impairment of bi-directional circulation of flows in that area, you shall construct the proposed 180-foot-long, pile-supported bridge at the west end of the causeway.

3. You shall work with the Corps to develop a final comprehensive mitigation and monitoring plan, which must be approved by the Corps in writing prior to initiation of construction activities for the new bridge.

4. The final compensatory mitigation and monitoring plan shall be submitted to the Corps no later than November 30, 2012.

5. Your mitigation and monitoring plan shall address the collection of baseline of bi-directional flows as well as the installation of appropriate monitoring gages, such as an Acoustic Doppler Current Profiler (ADCP) instruments or equivalent, to provide real-time water quality information on bi-directional flows, velocities, salinity levels and concentrations, etc., after construction of the bridge.

6. Your compensatory mitigation plan shall also address adaptive management measures to ensure minimization of adverse effects to circulation of flows. Your mitigation plan shall be presented in the format of the Sacramento District's Habitat Mitigation and Monitoring Proposal Guidelines, dated December 30, 2004, or subsequent guidance. The purpose of this requirement is to ensure the compensatory mitigation would, at a minimum, replace the functions of the aquatic environment that would be lost through project implementation.

7. You shall continue to monitor the East culvert to help ensure continued bi-directional circulation of flows at that location. Should it become evident that failure of the East culvert is imminent, you shall notify the Corps for authorization under a separate NWP 14 verification for that action prior to closure of that culvert.

8. You shall work to promptly resolve easement issues with the Utah Division of Forestry, Fire and State Lands to minimize the potential for additional loss of bi-directional flows between the North and South Arms of the Great Salt Lake. Upon resolution of the easement issues, you are authorized to commence construction of the temporary shoofly track; however, you must notify the Corps at least 10 work days in advance of commencement of the temporary fill work.

9. You shall comply with all terms and conditions of the enclosed Utah Department of Environmental Quality Section 401 Water Quality Certification, dated April 16, 2012 (enclosure 4).

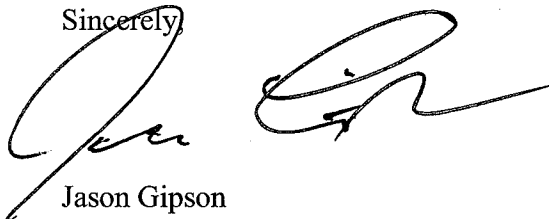
10. You must sign the enclosed Compliance Certification and return it to this office within 30 days after completion of the authorized work (enclosure 5).

This verification is valid for two years from the date of this letter or until the Nationwide Permit is modified, reissued, or revoked, whichever comes first. Failure to comply with the General and Regional Conditions of this Nationwide Permit, or the project-specific Special Conditions of this authorization, may result in the suspension or revocation of your authorization.

We would appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the *Customer Survey* from the link on our District program website at: www.spk.usace.army.mil/Regulatory/Missions.aspx.

Please refer to identification number SPK-2011-00755 in any correspondence concerning this project. If you have any questions, please contact Kathleen Anderson at the Utah Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010, telephone 801-295-8380, ext. 10, or email Kathleen.Anderson@usace.army.mil.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jason Gipson', written in a cursive style.

Jason Gipson
Chief, Nevada-Utah Regulatory Branch
Sacramento District

Enclosures

Copy furnished without enclosures:

Ms. Laura Ault, Utah Division of Forestry, Fire and State Lands, 1594 West North Temple,
Suite 1210, P.O. Box 145703, Salt Lake City, Utah 84114-5703

Ms. Julia McCarthy, U.S. Environmental Protection Agency Region 8, 1595 Wynkoop Street,
Denver, Colorado 80202

Mr. William Damery, Utah Division of Water Quality, 195 North 1950 West, P.O. Box 144870,
Salt Lake City, Utah 84114-4870

COMPLIANCE CERTIFICATION

Permit File Number: SPK-2011-00755

Nationwide Permit Number: NWP 14 Linear Transportation Projects.

Permittee: Mark L. McCune, P.E.
Union Pacific Railroad
1440 Douglas Street, Stop 0910
Omaha, Nebraska 68179-0910

County: Box Elder

Date of Verification: August 29, 2012

Within 30 days after completion of the activity authorized by this permit, sign this certification and return it to the following address:

U.S. Army Corps of Engineers-Sacramento District
Utah Regulatory Office
533 West 2600 South, Suite 150
Bountiful, Utah 84010
FAX: 801-295-8842
DLL-CESPK-RD-Compliance@usace.army.mil

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of the permit your authorization may be suspended, modified, or revoked. If you have any questions about this certification, please contact the Corps of Engineers at 801-295-8380.

* * * * *

I hereby certify that the work authorized by the above-referenced permit, including all the required mitigation, was completed in accordance with the terms and conditions of the permit verification.

Signature of Permittee

Date

Exhibit E



DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

October 3, 2012

Regulatory Division (SPK-2011-00755)

Mr. Mark L. McCune, P.E.
Director, Structures Design
Union Pacific Railroad
1440 Douglas Street, Stop 0910
Omaha, Nebraska 68179-0910

Dear Mr. McCune:

We are responding to your September 18, 2012 letter regarding the Nationwide Permit (NWP) 14 verification we issued for the Great Salt Lake Union Pacific Railroad (UPRR) Causeway West Culvert Closure and Bridge Construction project. This approximately two-acre linear project involves activities, including discharges of dredged or fill material, in waters of the United States to fill the failing West Culvert located at Mile Post 744.94 and to construct a 180-foot-long pile-support bridge on the west end of the causeway between Mile Post 739.79 to 739.83. The West Culvert is located in the Great Salt Lake, in Section 26, Township 6 North, Range 9 West, Salt Lake Meridian, Latitude 41.2229°, Longitude -112.6608°, Box Elder County, Utah.

Your letter addressed several concerns related to the NWP 14 we issued on August 29, 2012 to facilitate immediate closure of the West Culvert. The purpose of this letter is to respond to your concerns and provide additional clarifying information.

With regard to your concern about the need for a separate authorization for the East Culvert, you have acknowledged that this culvert does not require immediate closure at this time. Since it will not be possible for the UPRR to start construction of the bridge concurrently with closure of the West Culvert, we determined it appropriate to not authorize closure of the East Culvert until such time as the culvert exhibits further deterioration that warrants immediate closure. We did not authorize the East Culvert to be filled in our August 29, 2012 letter because we did not have a final mitigation plan and did we not want to confuse the issue of emergency and non-emergency work. Our intent is to ensure the continued connectivity between the North and South Arms and circulation of flows in the deeper waters of the lake after closure of the West Culvert so that your NWP verification is compliant, to the extent practicable, with the General Conditions of the NWP. We are hopeful that it will not become necessary to close the East Culvert until construction of the new bridge is completed.

Although Special Condition 2 states that UPRR shall construct the proposed 180-foot-long pile-supported bridge to compensate for the impacts of closure of the West Culvert, we are aware that this bridge was intended to compensate for closure of both culverts. Further, we are cognizant of the fact that you were not withdrawing your request to close the East Culvert and appreciate your good faith efforts to leave the East Culvert in place as long as it is possible to safely do so. We feel it appropriate to authorize closure of the East Culvert separately when it is evident that it necessary to do so. As soon as

we receive your notification of the imminent failure of the East Culvert, we would reactivate your PCN application and verify a NWP 14 for closure of the East Culvert.

Special Conditions 3, 4, 5 and 6 relate to development and submission of a final mitigation and monitoring plan as required under 33 CFR 332, U.S. Army Corps of Engineers and Environmental Protection Agencies' Joint Regulations on Compensatory Mitigation for Losses of Aquatic Resources dated April 10, 2008 (33 CFR 332). A mitigation plan is required for all forms of compensatory mitigation, whether the project will be permittee-responsible mitigation, purchase of mitigation banking credits, or an in-lieu fee mitigation project. For general permits such as your NWP 14 verification, 33 CFR 332 provides the District Engineer flexibility to issue a permit prior to approval of a final mitigation plan, providing that the final plan is approved prior to commencing work in waters of the U.S. Permittees are also required to commence the mitigation work prior to or concurrent with the authorized discharge activity to minimize temporal losses of waters of the U.S. Due to the emergency situation with the West Culvert, on behalf of the District Engineer, we authorized UPRR to take immediate action to close the failing culvert and implement Special Conditions 3, 4, 5, and 6 to allow this work to commence in waters prior to development and final Corps approval of the final mitigation and monitoring plan.

As you noted in your September 18, 2012 letter, there is also leeway for a mitigation proposal for a general permit action to be finalized and approved in the permit authorization through inclusion of additional special conditions supplementing the draft proposal. However, your application does not include a draft mitigation plan but rather included a statement that NWP 14 does not require mitigation for projects that do not impact wetlands and also stated that the project is self-mitigating as the bridge would offset the loss of flow through the filled culverts. General Condition 23, Mitigation, subparagraph b states: "Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal." Further, subparagraph d states: "For losses of streams or other open waters that require pre-construction notification, the District Engineer may require compensatory mitigation...to ensure that the activity results in minimal adverse effects on the aquatic environment." We have determined it appropriate to require compensatory mitigation to ensure that implementation of the project does not result in more than minimal impacts to the lake and its aquatic ecosystem and, further, that it will be necessary for UPRR to monitor the effects on factors such as flows and salinity gradients after the bridge is constructed.

We are enclosing a fact sheet describing the required mitigation plan elements detailed in 33 CFR 332.4(c)(2)-(14) as well as a fact sheet that describes the format and contents of monitoring reports. Ecologically-based standards that will be used to determine whether the mitigation project is achieving the defined plan objectives and an adaptive management strategy are required components of the mitigation plan. Some of the 12 mitigation plan elements will not apply to your project; however, you should address all other elements. For example, your proposal would also include a schedule for monitoring. Generally, a minimum of 5 years of monitoring shall occur and one annual monitoring report submittal is required. Per Special Condition 4 of you NWP 14 verification, this plan needs to be submitted to the Corps by November 30, 2012. Failure to comply with this Special Condition would result in non-compliance with the authorization.

As the Corps stated in our August 1, 2012 meeting regarding adaptive management strategies required in the mitigation plan, it is not the Corps' intent that the 180-foot bridge structure would need to be lengthened or otherwise modified after its construction, but rather the trench beneath the

bridge may require modifications. Modifications to the trench could include, but are not limited to, deepening or lengthening beyond the existing easement if monitoring indicates that the bridge is not performing in the manner that UPRR indicates it would. Other potential adaptive management actions could include constructing an additional causeway breach and bridge to the east on the Saline Fill.

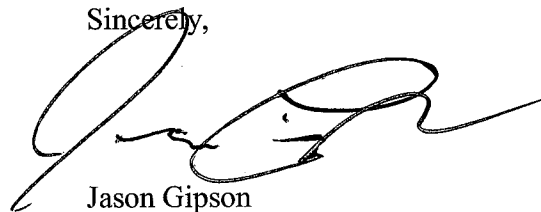
Proposing appropriate monitoring protocols and methodologies as well as the factors to examine are the responsibility of the applicant, but ultimately approved by the Corps. Although the Corps does not mandate the factors to monitor, we suggests UPRR consider monitoring issues such as salinity concentrations, flows, velocities, bi-directional flows, etc. after the bridge opening is constructed. Monitoring can take many forms including continuous data capture through instrumentation such as Acoustic Doppler Current Profiler (ADCP) or other similar gauging equipment. Alternatively, data can be acquired through manual sampling by onsite personnel. However, manual sampling would have to occur on a basis frequent enough so as to provide a robust data set to evaluate. We are happy to continue working with you in developing your final mitigation plan, if you desire.

The wording of Special Condition 8 was included in an effort to minimize the potential for delay in commencement of the bridge construction early next spring as projected in your August 16, 2012 letter. We are aware there are potential Causeway lease/right-of-way issues between UPRR and the State. Because of this, we are concerned about the potential for both culverts to require closure before these issues were resolved and the bridge not being constructed or in the process of construction. Again, filling the culverts and not adhering to the Special Conditions of the verification would result in the project being in non-compliance, regardless of the emergency issue. We wish to avoid any such issues.

We acknowledge the telephone conversation of September 21, 2012 wherein you expressed the need to go forward with immediate closure of the West Culvert to preclude the potential for a load-bearing failure. We reiterate here that you are authorized to conduct this work in accordance with Special Condition 1 of your NWP 14 verification letter dated August 29, 2012. We hope that this letter has resolved the concerns you expressed about the special conditions in the NWP 14 for the West Culvert.

Please refer to identification number SPK-2011-00755 in any correspondence concerning this project. If you have any questions, please contact Kathleen Anderson at the Utah Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010, telephone 801-295-8380, ext. 10, or email Kathleen.Anderson@usace.army.mil.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jason Gipson', written over a horizontal line.

Jason Gipson
Chief, Nevada-Utah Regulatory Branch
Sacramento District

Enclosures

Copy Furnished without enclosures:

Ms. Laura Ault, Utah Division of Forestry, Fire and State Lands, 1594 West North Temple,
Suite 1210, Post Office Box 145703, Salt Lake City, Utah 84114-5703

Ms. Julia McCarthy, U.S. Environmental Protection Agency Region 8, Wetlands and Watersheds
Unit (8EPR-EP), 1595 Wynkoop Street, Denver, Colorado 80202-1129

Exhibit F

From: Anderson, Kathleen E SPK <Kathleen.Anderson@usace.army.mil>
Sent: Monday, October 28, 2013 9:06 AM
To: Whitlock, Wayne M.
Subject: FW: UPRR Notification of Imminent Failure of East Culvert and Request to Reactivate Preconstruction Notification for emergency authorization to close culvert (UNCLASSIFIED)
Attachments: UPRR Ltr 21 Oct 2013-USACE Notification re Imminent Failure of East Culvert _Final 20131021_.pdf; UPRR (JA) GSL East Culvert Status Memo-10-21-13.pdf

Classification: UNCLASSIFIED

Caveats: NONE

Wayne, here is the email that you requested.

Kathleen Anderson
Regulatory Assistant
Nevada-Utah Regulatory Branch
801-295-8380 x10

-----Original Message-----

From: Anderson, Kathleen E SPK
Sent: Thursday, October 24, 2013 11:05 AM
To: 'Bill Damery (401 Cert)'; 'llamb@utah.gov'; 'cbittner@utah.gov'; Jodi Gardberg; 'Toby Hooker'; Laura Ault; 'Dick Buehler'; 'freddonaldson@utah.gov'; chris.cline@fws.gov; 'Betsy Herrmann (FWS)'; Julia McCarthy (EPA R8); angeroth@usgs.gov; craigmiller@utah.gov; 'johnluft@utah.gov'; 'Pam Kramer (DWR)'; 'jimvanleeuwen@utah.gov'; 'Andrew Rupke'
Cc: Gipson, Jason A SPK; 'Sindy Smith'
Subject: UPRR Notification of Imminent Failure of East Culvert and Request to Reactivate Preconstruction Notification for emergency authorization to close culvert (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

Wayne Whitlock, UPRR outside counsel, notified Jason Gipson by phone on October 14th, that the October 11 diving inspection of the East Culvert revealed that significant deterioration had occurred since the March 2013 dive and that the East Culvert is under imminent threat of collapse.

We received a letter from the UPRR by email on Monday, declaring the emergency condition of the East Culvert and requesting that we re-activate their July 2011 Nationwide Permit Preconstruction Notification to facilitate authorization to take immediate necessary actions to close the East Culvert due to the potential for imminent collapse of the culvert. A copy of the UPRR letter and accompanying Jacobs Associates Project Memorandum detailing

the October 11th East Culvert Diving Inspection, both dated October 21, 2013, are attached for your review.

It is our intent to quickly issue a Corps Nationwide Permit 14 verification letter to authorize closure of the East Culvert under emergency conditions to avoid a track failure. The UPRR anticipates they will be able to mobilize the equipment and materials to initiate the closure work on November 4th. We anticipate issuance of the NWP 14 prior to initiation of the closure work.

We are aware of concerns about the effects of closure of this culvert as we had hoped it might remain open until such time as all the issues concerning closure of the culverts and construction of the proposed bridge were resolved. Unfortunately, it has become necessary to close the East Culvert too.

Please advise us as soon as possible (NLT 31 Oct) if you have any additional or new concerns that we should address in processing a NWP 14 authorization for closure of the East Culvert.

The previous NWP 14 verification for closure of the West Culvert has been suspended due to unresolved concerns and consultation is on-going with UPRR to resolve these issues about the potential effects of closure of the culverts and construction of the bridge as compensatory mitigation for closure of both culverts. We anticipate another agency meeting before the holidays with UPRR and their consultants. The meeting will focus on the progress of their

Work to update the USGS Model from 1998 forward and recalibrate it with data through 2012 to compare baseline simulations (full flowing culverts prior to November 2012) to a simulation of the proposed bridge. The UPRR intends to use the results of this modeling and analysis to develop their final mitigation and monitoring plan.

Sorry for the short suspense - but we appreciate your understanding and prompt response (NLT 31 Oct).

Kathleen Anderson
Regulatory Assistant
Nevada-Utah Regulatory Branch
801-295-8380 x10

Classification: UNCLASSIFIED
Caveats: NONE

Classification: UNCLASSIFIED

Caveats: NONE

UNION PACIFIC RAILROAD
1400 Douglas Street, STOP 0910
Omaha, Nebraska 68179-0910

Structures Design Group

P 402 544 5194
F 402 501 0478
mlmccune@up.com

October 21, 2013

File: Bridge 739.79 Lakeside Sub
Culvert 750.53 Lakeside Sub

Via Electronic Mail and First Class Mail

Mr. Jason Gipson
Branch Chief, Regulatory Division
U.S. Army Corps of Engineers, Sacramento District
Nevada-Utah Regulatory Branch
533 West 2600 South, Suite 150
Bountiful, Utah 84010

Re: Union Pacific Railroad (UPRR) - Great Salt Lake Causeway - Notification of Imminent Failure of East Culvert and Declaration of Emergency Conditions - Request to Reactivate UPRR Preconstruction Notification

Dear Jason:

I am writing to follow up on the telephone report our outside counsel, Wayne Whitlock, made to you on October 14, 2013 regarding the results of our recent inspection of the East culvert in the Great Salt Lake Causeway. Unfortunately, that inspection revealed that the East culvert has now deteriorated to the point that it is beyond repair. We believe collapse of the culvert is imminent. Therefore, we are notifying the Army Corps of Engineers (Corps) that UPRR must move forward with closure of the East culvert as soon as possible to avoid a potential derailment due to culvert failure under train traffic. We request Corps authorization of this emergency closure.

Background. On August 29, 2012, the Corps authorized emergency closure of the West culvert pursuant to Nationwide Permit 14 (August 2012 NWP); the Corps also authorized construction of the proposed bridge to compensate for the loss of aquatic functions resulting from culvert closure. The August 2012 NWP authorization included a number of Special Conditions, including a requirement to develop a compensatory mitigation and monitoring plan for Corps approval before bridge construction could proceed.

UPRR had sought authority to close both East and West culverts in the original March 2011 Preconstruction Notification (PCN). UPRR renewed its request for that authorization on August 16, 2012 when an inspection of the two culverts revealed that the West culvert had cracked and broken. It posed an imminent risk of collapse. Therefore, UPRR declared an emergency condition and requested Corps authorization to close the West culvert immediately.



At that time, the East culvert was deteriorating but its condition was not as critical as the West culvert. Therefore, although UPRR sought coverage for eventual closure of the East culvert, UPRR explained in its August 16 notification that it planned to leave that culvert in place for now in order to allow bi-directional flows through that culvert as long as safety conditions permitted. Specifically, UPRR proposed closure of the East culvert at the time the bridge would be constructed—unless culvert conditions worsened to the point that immediate closure would be required for safety reasons. UPRR's rationale for including the East culvert under the same authorization was that closure of the East culvert was inevitable because it was in the process of failing, and the bridge was proposed to compensate for the impacts of closing both East and West culverts.

In response, the Corps determined not to provide the requested coverage for eventual East culvert closure. The Corps acknowledged that the compensatory mitigation bridge (and the mitigation and monitoring plan called for in the August 2012 NWP Special Conditions) addressed the impacts of closing both culverts. However, the Corps stated its preference to avoid confusion of emergency and non-emergency closure work in the August 2012 NWP authorization and its hope that closure of the East culvert would not become necessary until the new bridge could be constructed. Rather than requiring a new permit application if emergency closure became necessary, the Corps clarified that it would provide such authorization by reactivating UPRR's existing PCN application:

[W]e are cognizant of the fact that you were not withdrawing your request to close the East Culvert and appreciate your good faith efforts to leave the East Culvert in place as long as it is possible to safely do so. We feel it appropriate to authorize closure of the East Culvert separately when it is evident that it necessary to do so. As soon as we receive your notification of the imminent failure of the East Culvert, we would reactivate your PCN application and verify a NWP 14 for closure of the East Culvert. ACOE to UPRR (October 3, 2012).

UPRR has prepared this notification consistent with the Corps' October 3 direction.

Request to Reactivate Preconstruction Notification. As reflected in our August 16 letter, we shared the Corps' hope that it would not be necessary to close the East culvert before the compensatory mitigation bridge could be constructed. Unfortunately, as reflected in the enclosed inspection report prepared by Jacobs Associates, the East culvert has deteriorated to conditions similar to those of the West culvert at the time it became necessary to close it. Further, we have determined that the culvert is beyond repair. Jacobs Associates' report reflects that culvert failure is imminent, posing the risk that the culvert could collapse and cause a train derailment. Therefore, UPRR is declaring an emergency condition that necessitates East culvert closure as soon as possible.

Pursuant to the Corps' October 3, 2012 direction, we request that the Corps reactivate the outstanding portion of UPRR's March 2011 Preconstruction Notification that covered closure of the East culvert and authorize emergency closure of the culvert under Nationwide Permit 14.

It will take a few days to mobilize the necessary equipment and materials. Currently, we expect to perform the emergency closure work on November 4. We will keep you informed as our plans develop.

Consultation Process on Existing Corps Permit. As we address the issues associated with emergency closure of the East culvert, UPRR again acknowledges the separate rights and obligations established under the August 2012 NWP authorization—specifically, the need to complete our reevaluation of potential

impacts of replacing the two causeway culverts with a new bridge and develop a revised mitigation and monitoring plan based on the results. UPRR remains fully committed to the consultation and agency coordination process established by the Corps and UPRR to resolve those issues.

We appreciated the opportunity to meet with the Corps and the coordinating agencies on October 2 to discuss UPRR's proposed impacts reevaluation and agency coordination plan described in our September 25 letter to the Corps and for the positive feedback UPRR has received. We look forward to working with you to complete the reevaluation plan and then make any appropriate adjustments to the bridge design and the mitigation monitoring plan that result from this reevaluation. We believe that the Corps' consultation process and our joint efforts present the best opportunity to achieve our common objectives of getting the mitigation in place as soon as possible in order to minimize the effects of culvert closure.

In that regard, we propose to schedule the next informal consultation meeting outlined in our September 25 letter as soon as possible in November to discuss the results of the first phase of the evaluation and the next steps, including a schedule for completing the impacts evaluation and the consultation process. In that meeting, we also propose to brief the Corps and the coordinating agencies on the East culvert closure and answer any questions of the coordinating agencies.

Please feel free to call me with any questions about our request for emergency authorization. We will contact you to make arrangements for the briefing meeting proposed above. Thank you in advance for your continued cooperation in our efforts to address these important safety and environmental concerns.

Sincerely,



Mark L. McCune, PE
Director Structures Design

Enclosure

cc: Ms. Kathleen Anderson
Ms. Debra L. Schafer
Mr. Stephen L. Cheney
Robert C. Bylsma, Esq.
Mr. Daniel T. Harbeke
Wayne M. Whitlock, Esq.

Exhibit G

From: Anderson, Kathleen E SPK <Kathleen.Anderson@usace.army.mil>
Sent: Monday, November 04, 2013 10:34 AM
To: Mark L. McCune; Debra L. Schafer; Stephen L. Cheney; Whitlock, Wayne M.; Robert C. Bylsma
Cc: Laura Ault; Dick Buehler; freddonaldson@utah.gov; Chris Cline; Betsy Herrmann; Julia McCarthy (EPA R8); llamb@utah.gov; wbaker@utah.gov; mhubbell@utah.gov; cbittner@utah.gov; johnluft@utah.gov; jimvanleeuwen@utah.gov; Pam Kramer (DWR); angeroth@usgs.gov; Andrew Rupke; Gipson, Jason A SPK; Nepstad, Michael G SPK; Jewell, Michael S SPK; Cavanaugh, Thomas J SPD; Eakle, Wade L SPD
Subject: Re UPRR Notification of Imminent Failure of East Culvert and Declaration of Emergency Conditions (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

We recognize the emergency condition of the East Culvert and acknowledge the need to close this culvert without delay. However, after careful review of our regulations and agency comments and discussion with our District Office, we have determined that we are unable to authorize closure of the East Culvert under a Nationwide Permit or other General Permits due to the Corps' inability to demonstrate the action would result in no more than minimal individual and cumulative adverse effects on the aquatic environment (33 CFR Part 330). Therefore, authorization to close the culvert could only fall under our South Pacific Division Regulatory Program Standard Permit Emergency Procedures which provide for abbreviated procedures for review, coordination and decision making in emergency situations pursuant to 33 CFR 325.2(e)(4).

These procedures authorize the District Engineer, in consultation of with the Division Engineer, to engage in special permitting procedures. However, the Corps is prohibited by statute from issuing any authorization, verbal or otherwise, without the activity first receiving 401 Water Quality certification. Ref 33 USC 1341 (a), "No license or permit shall be granted until the certification required by this section has been obtained or has been waived as provided in the preceding sentence. No license or permit shall be granted if certification has been denied by the State, interstate agency, or the Administrator, as the case may be."

We have been in contact with Leah Ann Lamb and Walt Baker of the Division of Water Quality regarding this matter. In order to move this process forward, UPRR must take immediate action to apply for an individual water quality certification for the closure action.

We are currently working our procedures and preparing necessary documentation for the South Pacific Division. We will be working on draft special conditions which we will forward by email for your review and acceptance. Once 401 certification has been received and we have concluded our coordination procedures, on behalf of the District Engineer, we will provide verbal (email) authorization with any appropriate special conditions, followed

by written authorization as soon as possible.

Further, in accordance with 33 CFR 325.2(e)(4), we will issue a public notice detailing any special procedures authorized, including our rationale, within 30 days of the date of the District Engineer's authorization to use special processing procedures. This notice will be circulated to appropriate Federal, State, and local agencies and the affected public as defined in 33 CFR 325(a)(3)-(7).

Kathleen Anderson
Regulatory Assistant
Nevada-Utah Regulatory Branch
801-295-8380 x10

Classification: UNCLASSIFIED
Caveats: NONE

Exhibit H

From: Anderson, Kathleen E SPK <Kathleen.Anderson@usace.army.mil>
Sent: Friday, November 08, 2013 12:15 PM
To: Mark L. McCune; Debra L. Schafer; Stephen L. Cheney; Robert C. Bylsma; Whitlock, Wayne M.
Cc: Leah Ann Lamb; Walter Baker; William Damery; Melissa Hubbell; cbittner@utah.gov; Gipson, Jason A SPK; Nepstad, Michael G SPK
Subject: Questions re additional info for us to provide to Colonel Farrel supporting position that closure of East Culvert is an Emergency Situation (UNCLASSIFIED)
Attachments: Questions for UPRR re Emergency Permitting.docx; GSLM pump station at Promontory Point.pdf

Classification: UNCLASSIFIED
Caveats: NONE

Kathleen Anderson
Regulatory Assistant
Nevada-Utah Regulatory Branch
801-295-8380 x10

Classification: UNCLASSIFIED
Caveats: NONE

As discussed when Wayne phoned earlier this am, Jason briefed our District Engineer late yesterday afternoon. We have some additional questions that we must answer today to allow us to make a more informed decision about whether special individual permit processing procedures under emergency procedure is warranted.

To clarify, under Corps regulations, an “emergency situation” is defined as one which would “result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures” (33 CFR 325.2(e)(4)). For any activity that would result in impacts to waters of the U.S., the District Engineer must determine if an emergency situation exists and, in turn, recommend special permitting procedures to our South Pacific Division Engineer who would instruct the District as to further processing.

Please provide responses to the following questions:

- Describe short- and long-term impacts to UPRR operations due to a closed causeway for weeks/months – i.e., would overall east-west operations just slow down due to need to use alternate routes; would the overall number of trains be reduced such that interstate commerce delays are encountered; does current traffic use maximum length per train or could additional cars be added to scheduled trains; is the alternate route through Salt Lake City the only east-west alternative; etc.?
- Please describe the economic hardship incurred with the loss of the causeway if corrective action is not taken.
- Please describe the significant loss of property that may occur.
- If traffic is immediately removed from causeway, would the East Culvert area continue to deteriorate and rapidly collapse?
- In light of the significant effects to Great Salt Lake under closure of the East Culvert, we are inquiring about minimizing temporal losses through interim mitigation measures. What is the feasibility of North Arm brine being pumped into the South Arm to replace lost flows into the South Arm until such time as the bridge could be constructed – one thought we brainstormed was that it might be possible for UPRR construct a pump/lift station similar to the Great Salt Lake Minerals station at the east end of Promontory Point – or to enter into an agreement with GSLM to utilize their existing pumping activities at the west shore of Promontory Point from fall through late winter? Attached is an aerial of the pump station we are referring to.
- Also, please provide any available documentation of the sink holes that have developed in the ballast near the track over the East Culvert.

Untitled Map

Write a description for your map.

Legend

Google earth

© 2013 Google
Image © 2013 DigitalGlobe

1000 ft



Exhibit I

UNION PACIFIC RAILROAD
1400 Douglas Street, STOP 0910
Omaha, Nebraska 68179-0910

Structures Design Group

P 402 544 5194
F 402 501 0478
mlmccune@up.com

August 16, 2012

File: Bridge 739.79 Lakeside Sub
Culvert 744.94 Lakeside Sub
Culvert 750.53 Lakeside Sub

Mr. Michael Jewell
Sacramento District, Regulatory Branch
U.S. Army Corps of Engineers
1325 J Street
Sacramento, CA 95814-2922

Subject: Union Pacific Railroad Causeway over the Great Salt Lake (GSL)—Culvert Failure and
Emergency Closure

Dear Mike:

Thank you for the opportunity to meet with you and Jason Gipson on August 1, 2012. As previously mentioned, we have enjoyed an excellent working relationship with your office and appreciate your time and effort to help us resolve this ongoing permitting issue. This letter confirms the key points we discussed at our meeting, in which Union Pacific Railroad (UPRR) requested reconsideration of its application for approval of its previously submitted Nationwide Permit 14 Pre-Construction Notification (NWP 14 PCN). Following is a summary of each of these points:

- **Declaration of emergency condition at the West Culvert requiring immediate action:** UPRR continues to monitor the east and west culverts for signs of imminent failure. A recent survey was performed July 31, 2012, by a team of divers and geotechnical engineers. The west culvert continues to fail, and has now separated and broken. Previous attempts to patch the culvert using a concrete grout have failed, and we believe the collapse of the culvert is imminent. As we discussed in the meeting, UPRR must move forward with immediate closure of the west culvert to avoid a potential derailment due to culvert failure under traffic.
- **UPRR will monitor the East Culvert but wait to close it until safety conditions dictate:** The east culvert was also surveyed recently. Its condition is not as critical as the west culvert, although eventual failure of the east culvert is inevitable. It appears that the east culvert can remain open for the short term to continue to allow some circulation at this location. Therefore, UPRR will leave the east culvert in place for now and continue to monitor its condition. At the point in the future that failure of the east culvert becomes imminent, UPRR will notify the Corps of the necessity of closing it.
- **UPRR proposed to build the bridge as an accommodation to other interests; although UPRR is still willing to construct the bridge, UPRR does not need to build the proposed bridge to**



facilitate railroad operations on the causeway: UPRR has proposed to construct a bridge as a good faith attempt to provide circulation to replace the circulation that could be lost as a result of the closure of the failed culverts. The culverts were originally installed to allow boat passage through the causeway. The Rambo Bridge project was constructed to allow water levels to equalize across the causeway. Based on the original design parameters for the causeway, there is no engineering need for a new bridge to ensure effective causeway operation and use. The culverts were nearly 100 percent plugged until recent years when the Corps requested that UPRR clean and reopen them. The protective berms installed to prevent rocks and debris from filling the culverts could be removed, and the culverts would almost certainly fill naturally. No modeling or adaptive management was performed when flow was re-established through the culverts and the berms were installed. UPRR is prepared to go forward constructing the bridge as proposed and on the schedule outlined below once we receive the Corps approval to proceed. However, we appreciate the Corps concurrence stated in our meeting that the bridge construction need not delay any action needed to address the failing culverts for safety reasons.

- **The proposed bridge is designed to accommodate worst case conditions for circulation:** The NWP 14 PCN included an Appendix C that provided the engineering design basis for the sizing of the proposed bridge. The replacement bridge was designed for the lake elevation in early 2011, which was near the historical low. Accordingly, this design represents a worst-case flow replacement scenario to make sure that **at least the same** flow would occur through the proposed bridge at low lake elevations as occurs through the two culverts as they currently exist; greater flow and circulation would occur when the lake elevation is at higher levels, such as those that exist at present. The bridge cannot feasibly be constructed in the same location as the culverts because the geotechnical conditions at the culverts are unstable and, therefore, not acceptable for placement of the bridge. The location selected for the proposed bridge provides the deepest water available at a geotechnically stable location while avoiding curves on the railroad alignment.
- **The bridge design information submitted by UPRR supports the bridge proposal; additional modeling previously requested is infeasible:** The U.S. Geological Survey Utah Water Science Center previously developed a salt balance model. It has been suggested that this model could be updated and then used to simulate the effects of various-size openings in the Great Salt Lake Causeway on the salt and water balance of the lake to support a determination as to the appropriate size of the bridge. This suggested approach would include adaptive management to change the size of the bridge as additional data is gathered and the model is updated following construction. As we discussed, this suggested approach is simply not feasible. One of the greatest challenges this proposal presents is that the model is not capable of taking account of the many significant and ever-changing variables that would affect the north/south circulation, let alone the impacts of the continued sinking of the culverts.

These variables are entirely out of the control of UPRR and the Corps. Such ever-changing conditions make establishing the bridge size based on this modeling proposal a moving target. This proposal would not provide a sound basis for determining the bridge size. Furthermore, given the significant investment that must be made to design and construct the bridge, we believe the bridge size must be established based upon the best available current information rather than providing for future adjustments to the bridge size under an adaptive management concept.

As discussed above, UPRR has provided significant support for its estimates that the bridge, as designed, would provide at least the equivalent circulation when the lake is at or near its historical lowest level—in other words during the worst case conditions for circulation. Whereas the information contained in UPRR's bridge proposal reflects that the bridge replaces the function of the culverts, the suggestion to do further modeling implies that UPRR and the bridge proposal have much greater influence on flow and salinity in the dynamic system of the Great Salt Lake than the information in the record supports.

- **Bridge construction schedule:** Typical fall and winter weather conditions on the Great Salt Lake preclude beginning construction of a replacement bridge until March 2013, with construction expected to take approximately 8 months. Expedious issuance of an NWP 14 would provide for restoration of interchange flows as quickly as possible.
- **Acreeage of waters of the U.S. affected:** The size of the footprint and volume of material where removal of causeway would occur at the bridge location would more than offset the size of the footprint of fill and volume of material placed at the culvert locations when the culverts are filled. Thus, there would be no net loss of waters of the U.S.; rather there would be a net increase in waters of the U.S.

With the submission of these clarifying points, UPRR formally requests reconsideration of the NWP 14 PCN application by the Sacramento District Engineer. Furthermore, we hereby inform you of the imminent need to fill the existing west culvert as an emergency action.

Yours truly,



Mark L. McCune, P.E.
Director Structures Design

cc: Mr. Jason Gipson
United States Army Corps of Engineers
533 West 2600 South, Suite 150
Bountiful, Utah 84010

APPENDIX C

UPRR Letter to USACE, November 27, 2013



Pillsbury Winthrop Shaw Pittman LLP
2550 Hanover Street | Palo Alto, CA 94304-1115 | tel 650.233.4500 | fax 650.233.4545

Wayne M. Whitlock
tel 650.233.4528
wayne.whitlock@pillsburylaw.com

November 27, 2013

Via Electronic Mail

Mr. Jason A. Gipson
Branch Chief, Regulatory Division
Kathleen Anderson
Regulatory Assistant, Nevada-Utah
Regulatory Branch
U.S. Army Corps of Engineers,
Sacramento District
Nevada-Utah Regulatory Branch
533 West 2600 South, Suite 150
Bountiful, Utah 84010

Mr. Michael S. Jewell
Chief, Regulatory Division
Mr. Michael G. Nepstad
Deputy Chief, Regulatory Division
U.S. Army Corps of Engineers,
Sacramento District
1325 J Street
Sacramento, CA 95814

Re: Union Pacific Railroad – Great Salt Lake Causeway – East Culvert
Closure - Response to U.S. Army Corps of Engineers Questions
Regarding Emergency Determination

Dear Messrs. Jewell, Nepstad and Gipson and Ms. Anderson:

This letter transmits the responses of Union Pacific Railroad (“Union Pacific”) to questions regarding the Army Corps of Engineers (the “Corps”) emergency determination that Kathleen Anderson sent by email to Union Pacific yesterday, November 26, 2013, on behalf of the Corps’ Nevada-Utah Regulatory Branch. Union Pacific believes that some of the questions are not pertinent to the Corps’ emergency determination under the Corps’ regulations and that we have already responded adequately to others. Nevertheless, Union Pacific is providing a response to all questions in an effort to facilitate timely completion of the Corps’ review.

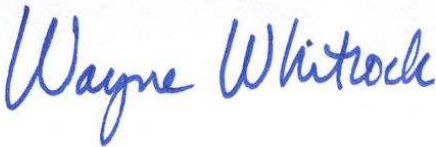
On November 21, Union Pacific submitted its Request for Reconsideration of Regulatory Branch Chief Gipson’s initial determination that the imminent failure of the East culvert is not an “Emergency Situation” under 33 CFR 325.2(e)(4). The November 21 submission documents the loss of property and immediate, unforeseen and significant economic hardship that would result if corrective action requiring a permit is not undertaken immediately. It supplements the record and provides over a

dozen pages of information regarding the hardship the public, Union Pacific, its customers and interstate commerce will suffer if the culvert is not closed. In these circumstances, the potential loss of property and economic hardship are the sole criteria upon which an "Emergency Situation" determination rests under 33 CFR 325.2(e)(4).

Union Pacific has worked diligently to provide requested information to the Nevada-Utah Regulatory Branch since first notifying the Corps of the East culvert's imminent failure on October 21, 2013. We have continued our cooperative efforts through significant, unexpected changes of the Corps' position regarding permit processing. However, Union Pacific remains very concerned about the imminent failure of the East culvert and the safety of rail operations. Union Pacific is also very concerned about the economic hardship that will result if the Great Salt Lake Causeway and the interstate rail line it supports are forced to be shut down and rail traffic rerouted through Salt Lake City. Therefore, we ask that the Corps focus with us on reviewing the information necessary to make the emergency determination and issue the East culvert closure authorization as soon as possible.

We will check again with you on Monday regarding the status of your review. Please feel free to call me over the holiday weekend with any questions. I will be monitoring my voicemail and have provided you with my cell phone number.

Sincerely,



Wayne M. Whitlock
Counsel for Union Pacific Railroad

Enclosure

cc: Mr. Mark L. McCune
Ms. Debra L. Schafer
Mr. Stephen L. Cheney
Robert C. Bylsma, Esq.

UNION PACIFIC RAILROAD RESPONSE TO ARMY CORPS OF ENGINEERS UTAH-
NEVADA REGULATORY BRANCH QUESTIONS RELATING TO EMERGENCY
DETERMINATION

UNION PACIFIC RAILROAD – GREAT SALT LAKE CAUSEWAY
PROPOSED EMERGENCY CLOSURE OF EAST CULVERT

November 27, 2013

This document sets out the questions raised by Kathleen Anderson’s email of November 26, 2013, followed by Union Pacific Railroad’s (“Union Pacific” or “UPRR”) response. Ms. Anderson’s email included questions on five different subjects, with a number of individual questions asked in each paragraph. Where one or more questions are interrelated, they are grouped and answered together. Questions are answered individually where appropriate.

Please note that UPRR has responded to many of these questions already and UPRR requests that the Army Corps review those responses—particularly the November 21 request for reconsideration and supporting documents—together with its review of UPRR’s response below. This document references but does not repeat those responses, except where helpful for context, and supplements prior submissions where appropriate.

**I. ACOE QUESTIONS REGARDING TEMPORARY STRUCTURAL
ALTERNATIVES TO CLOSING THE CULVERT**

- A. ACOE QUESTIONS: We are still awaiting a detailed response to our question as to the potential of spanning the east culvert with a steel plate as an interim measure to help increase the life of the east culvert and maintain some flow between the N and S arms. Please provide a written response for our record that supports your decision as to whether or not this alternative would be feasible. If it is not feasible, what has changed since the 2011 PCN proposal?

UPRR RESPONSE:

Section IV of Union Pacific’s November 21 request for reconsideration outlined Union Pacific’s general concerns about the various proposals the Corps’ Regulatory Branch has advanced. As explained therein, Union Pacific believes that it is neither feasible nor safe to attempt to place a steel plate or concrete slab over the top of the existing failing culvert or in the unstable substrate.

To review the critical facts, the most recent inspection found that the culvert has severely deteriorated to the point that it is beyond repair and there is a great deal of concern about its stability. Union Pacific and its professional engineers believe there is a significant and imminent risk that the East culvert will fail completely if not closed. Divers cannot safely reenter the culvert for any purpose, and surface inspections have shown that surface material around the culvert is falling into it.

Furthermore, in light of the ongoing failure of the culvert, it is unclear just how much, if any, the remaining culvert is functioning in terms of maintaining the contribution to flow and salt transfer that was occurring when the culverts were open and flowing. Accordingly, circumstances have changed significantly since the March 2011 PCN was submitted—at a time when the culvert was

relatively stable and was functioning in terms of water flow and salt transfer. Union Pacific no longer believes that alternatives considered then are feasible or that there is any likely short term aquatic benefit of pursuing them in light of the failing condition of the culvert.

Regarding the steel plate question, UPRR has not suggested nor entertained a temporary repair alternative using a steel plate. (The 2011 PCN mentioned a "concrete slab or deck.") A steel plate of a thickness that could be reasonably handled and utilized for this purpose could span only a few feet under railroad loading without excessive stress and deflection, and even less with any fill material above it. In contrast, the potential slip surfaces from a culvert failure, i.e., the surfaces that would be displaced by failure, would extend over 100 feet longitudinally at track level. The use of a steel plate or any other similar structural alternative would simply not extend far enough to cover potential slip surfaces without excessive instability.

All of the alternatives listed in the 2011 PCN were considered for stable culverts with intact structural integrity. This is no longer the case with the East culvert. It has completely separated into two pieces, which are offset from each other. The culvert is unstable, and failure would likely undermine fill material both above it and alongside it. There is nothing stable on which to support a plate, slab or deck, a necessity for placing something like this between the tracks and the culvert. It is simply not practical to construct anything stable on this unstable substrate.

Under the circumstances as they have developed here, Union Pacific strongly believes that there is no feasible alternative to closing the culvert as soon as possible. Further, Union Pacific is increasingly concerned that further delay of culvert closure would be counterproductive and would expose railroad operations to additional undue risk.

- B. ACOE SUBQUESTIONS: Also, in removing the ballast from above the culvert, it may necessary to buttress the walls using a structure similar to a trench wall support system. Would this type of structure help stabilize the walls of the ballast above the culvert and alleviate stability concerns?

UPRR RESPONSE:

We are uncertain as to the meaning of this question. Removing the ballast above the culvert would render the causeway inoperable for railroad transportation. There is approximately 15 feet of fill and ballast between the top of the failed box culvert and the track.

Perhaps the reference is to a temporary excavation as part of one of the impractical structural alternatives referenced by the Corps. Assuming this is the case, "buttressing" the culvert walls by such a method is also impractical and of dubious benefit. Shoring systems for trenching work, such as Trench Boxes, are generally used for shallow excavations like utility installations and always use struts of some kind to brace the two opposing walls. Even if the causeway were excavated to the top of the culvert, a 25-ft deep wall would be required and would only partially relieve the culvert wall of soil pressure. And the presence of the culvert precludes the use of struts. So, walls would have to be laterally supported by some type of tie-back requiring a specialty geotechnical contractor. These activities would necessitate shutdown of rail operations for at least several weeks. The result would be a failed culvert surrounded by extensive new

infrastructure, at least partially dependent on the culvert for its support, in an unstable and highly corrosive environment.

II. ACOE QUESTIONS REGARDING OTHER INTERIM MEASURES AND SHORT TERM IMPACTS OF CULVERT CLOSURE

- A. ACOE QUESTION: Also, please provide any further information to document why you believe other interim measures are not practical - i.e., pumping or some other method to maintain some connectivity between the arms.

UPRR RESPONSE:

UPRR has responded to these questions previously in our responses of November 1 and 8 and documents referenced therein. Our prior submissions discussed other methods as well as pumping.

Union Pacific continues to believe that a pumping project would be infeasible and would provide very limited benefit.

First, as discussed in our November 21 submission, connectivity between the two parts of the Great Salt Lake will not be discontinued by closure of the culvert as implied by the question. In fact, water flow and salt transfer continues through the causeway itself and through the existing Rambo Bridge. As discussed in Response II.B below the actual contribution of the culverts to South Arm salinity is relatively small in relation to that of the causeway, particularly under current lake levels. Given the volume of salt transfer through the causeway, any contribution by pumping would be small in relation to those volumes.

Second, with regard to interim pumping of brine from North to South, it is not clear at this point in the modeling and impacts analysis being conducted pursuant to Union Pacific's September 25 letter to the Army Corps of Engineers how much brine was being transferred North to South and South to North through the East and West culverts. While USGS periodic spot estimates of these flows are available, they are inconsistent and show no apparent correlation to lake elevations or salinities. Even if the lower limits of USGS measured flows were used to set pumping targets, our calculations of pumping capacity even for a system as large as that of Great Salt Lake Minerals is that it could at best pump only about one third of the brine required to replace net North to South salt transfer through the culverts. Therefore, such a pumping station's best case annual contribution to the salinity of the South Arm would be only a few hundredths of a percent increase.

Finally, while it might be technically possible to construct a pumping station similar to the existing Great Salt Lake Mineral facility, it would be a significant project in its own right. Pumps would not be readily available and would have to be custom built. Power would have to come either from a new 3-phase electrical line or from a generator (more likely multiple generators in parallel). Estimated lead time for pumps and power equipment (procurement only) is six months minimum. Furthermore, Great Salt Lake Minerals' experience indicates that pumping during the

winter months is impractical. Therefore, any small contribution to salt transfer would be further reduced by a long delay (perhaps up to a year) before a pump station could actually go on line.

B. ACOE QUESTION: “Further, why does UP believe the loss of culvert flows for up to 2 years would not be significant?”

UPRR RESPONSE:

Union Pacific’s intent is not to minimize the importance of replacing the aquatic functions that the culverts serve; that is the basis for UP’s proposal to replace the culverts with the 180-ft bridge. However, it is important not to exaggerate the overall change in bi-directional flows and salt transfer that would occur if during the time the culverts are closed and before the compensatory mitigation bridge is constructed. Of course, the modeling and impacts analyses that are underway will help identify more specifically the contribution that the culverts made to the water and salt balance between the two parts of the Great Salt Lake before the culverts were closed. However, our analyses so far indicate the following:

UPRR has completed the first of its three-step modeling plan using the USGS Water and Salt Balance computer model. The first step was to rerun the existing model calibrated for the period from 1987 through 1998 (12 years). This step included modeling a hypothetical scenario with two unobstructed culverts as they existed in November 2012, using 1987-1998 hydrology. In fact, during that period, the culverts were plugged with rubble and ineffective for most of this time. At the end of the modeling period (1998), the simulation produced a South Arm salinity of 11.3%. The average South Arm salinity based on actual measurements was 8.9%, a difference of 2.4%. This suggests that the average effect of the two unobstructed culverts on South Arm salinity was limited to about 0.2% per year. In other words, during extended periods of high water levels, such as existed during the time period of 1987-1998, flows through the unobstructed culverts are estimated to contribute only about a 0.2% increase in South Arm salinity annually.

Water and salt balance modeling has not yet been completed for the period from 1998 to 2012 (the second step of UPRR’s plan). However, salt transfers for the period from spring 2004 to spring 2009—a period of lower but relatively stable water elevations—can be calculated and evaluated using three sets of interrelated data from that period:

- *Sampled North and South Arm salinities;*
- *Measured bidirectional flows through the culverts;*
- *Total salt load in the South Arm.*

This period (spring 2004 to spring 2009) is the only one on record that is relevant for the purpose of this evaluation because it begins when UPRR removed all rubble from the culverts and constructed protective berms and ends with the latest known computation of salt load in the North and South Arms (Kidd M. Waddell, “The Potential Effects of the Proposed Great Salt Lake Minerals Project on the Water and Salt Balance of Great Salt Lake, Utah,” 2010).

In spring 2009, total salt load in the South Arm was approximately 1.7 billion tons. Measured average South Arm salinity was 15.5%. Correlating the salinities and the bidirectional flows through the culverts, the net salt transfer through the two culverts (over a 5-year period ending

spring 2009) was about 150 million tons north to south. Had the culverts been closed during that time, the estimated salt load in the South Arm in spring 2009 would therefore be 1.55 billion tons, or a salinity of 14.2%. This suggests that the average effect of the two culverts on South Arm salinity was limited to about 0.26% per year. In other words, during low water levels, such as existed at that time, flows through the unobstructed culverts are estimated to contribute about a 0.26% increase in South Arm salinity annually (although this might be partially offset by increased salt transfers through the causeway fill due to increased salinity differential). Lake elevations during this 2004 to 2009 period were similar to the current elevation.

Therefore, using this data, which is currently the best available until the completion of modeling, the estimated impact on South Arm salinity due to closure of both culverts would be expected to be on the order of 0.2% to 0.25% per year. During the 2004-2009 time period, South Arm salinity varied 4.3% (between 11.9% and 16.2%), an order of magnitude greater than the estimated annual contribution of the culverts, confirming that other factors affect salinity much more than the culverts.

- C. ACOE QUESTION: Why would pumping not be a viable option? Why would it not be a reasonable assumption to replicate the lower limits of the USGS measured north/south flows?

UPRR RESPONSE:

See Response to Question II.A above regarding the viability of pumping and using the USGS measured flows to set pumping targets.

III. ACOE QUESTIONS REGARDING IMPACTS OF CAUSEWAY SHUTDOWN ON UPRR OPERATIONS (Grouped together for response):

If it becomes necessary to use the Shafter route, what would be the effect in terms of hours of operation to that route? Jason understood the 16 Causeway trains would become 24-26 trains due to train length limitations on the Shafter route, making 40 in total when added to the Shafter average 16 daily trains. Do the 16 normal Shafter trains operate at varying hours or mostly in the day time? Would the majority of train traffic operate during primarily daytime hours or night time - or would UPRR need to basically use the Shafter route around the clock to handle and appropriately space 40 trains on a daily basis? Are we talking a train every half hour? How long does it take the average train to clear a grade crossing?

UPRR RESPONSE:

The following discussion further supplements the information provided in Union Pacific's November 21 submission.

- As discussed in Union Pacific's November 21 letter, Section II.C., shifting an average of 16 trains per day to the Shafter route would require breaking those trains up into 22-24

trains per day to accommodate the 5700 ft. limit on train lengths for this route. For a portion of the Shafter route, from just west of the downtown Salt Lake City area out to the Magna area, this would increase the average total trains per day to 38-40, including at-grade crossings at 800 West, 900 West, and 1000 West. Significantly, some of the greatest impacts on Salt Lake City traffic would be at three other at-grade locations in downtown Salt Lake City (see footnote 16 in the November 21 submission; these at-grade crossings are located at 600 West, 300 North, and 400 North), where the current average number of trains per day is 28. The increase in train traffic at those three downtown Salt Lake City at-grade crossings (as well as all the way north to Ogden) would result in a total of 50-52 trains per day.

- *Trains on the Shafter route operate on a 24-hour/day 7 days/week schedule and that would necessarily continue if the Causeway were shut down and its traffic shifted on to the Shafter Route. As noted in Union Pacific's November 21 letter, all components of the Shafter route would be loaded above fluid capacity, removing any option other than running trains as frequently as the system will allow. The average time between trains would be 36-38 minutes on the western portion of the downtown area, and 28-29 minutes in the downtown area itself and north to Ogden.*
- *For the six at-grade crossings in the downtown Salt Lake City area, maximum allowable train speed is 40 mph due to curvature. In reality, most trains transit the area at 20 mph or less and, in congested circumstances, could end up stopped in one or more crossings. Assuming a constant 20 mph, a crossing would be blocked for about 4 minutes per train. This could easily extend to 10 minutes or more due to congestion.*

IV. ACOE QUESTIONS REGARDING DIRECT COSTS OF CAUSEWAY SHUTDOWN

Also, there was not a response to our question if the \$258,000 per day associated with moving Causeway trains to the Shafter route could/would be mitigated by passing some or all of this cost on to your customers, similar to a fuel surcharge that might be used to offset rising fuel costs? Would this amount in fact be a cost UP would incur directly? Would you have recourse to recoup some of the additional costs? (grouped together)

UPRR RESPONSE:

As described in the Corps' regulations, the test of emergency conditions is associated with "economic hardship." 33 CFR 325.2(e)(4). Union Pacific's submittal described economic hardship that would arise from a Corps refusal to utilize emergency procedures, including hardships to the public, interstate commerce, Union Pacific's customers and Union Pacific itself.

In terms of Union Pacific's estimate of \$258,000/day discussed in the November 21 submission, that estimate was only for the direct costs of shutting down the Causeway and rerouting trains and freight over the Shafter route as defined in the November 21 request for reconsideration. As to passing on costs to customers, the freight transportation business is highly competitive and prices are controlled by market conditions; raising prices to recoup the costs of rerouting trains

(as described in our request for recirculation), even if it were possible under existing contracts, would risk loss or reduction of business to competitors that do not incur these costs.

Furthermore, to the extent that Union Pacific's customer costs would increase as a result of rerouting of trains, such increased costs would still constitute an "economic hardship" under the Corps' regulations at 33 CFR 325.2(e)(4).

V. ACOE ADDITIONAL QUESTIONS REGARDING SHORT TERM IMPACTS OF CAUSEWAY SHUTDOWN

Also we want to clarify that the 0.2% average salinity change per year that Karen and Mark spoke about relates to the percentage of current salinity, i.e., if the south arm salinity were 8% this year, closure of both culverts for 2014 with precipitation similar to this year, the model would predict that south arm salinity would decrease from 8% to 7.8%?

UPRR RESPONSE:

In principle, this is a correct interpretation, but the 0.2% contribution was based on modeling at higher lake elevations. Furthermore, it is doubtful that there has ever been a time when salinity has been the same in two successive years. As noted in previous discussion, other factors account for much greater swings in salinity.

Additionally, we note that, at current lake levels, South Arm salinity is likely in the 14 to 15% range, or very near causeway-era highs. A minor (on the order of 0.5%), temporary, reduction in salinity, as estimated to result here, is clearly more tolerable under these conditions than if current South Arm salinity were lower.