



MEMORANDUM

TNC – Fisher Slough Final Design and Permitting **Subject: Temporary Bridge Crossing**

To: Internal Memo for Record

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Background on Earthwork Hauling

Construction activities proposed at Fisher Slough include topsoil stripping, channel excavation and levee setback and removal. Each of these activities requires a significant amount of earthwork and hauling of excavated and stripped material between the north and south sections of the construction site, thus requiring numerous vehicle trips. In evaluating the number of inter-site hauling trips, it became apparent that a temporary crossing of Fisher Slough would greatly reduce the potential impacts from numerous large vehicles accessing the Pioneer Hwy, 1.4 miles south of Conway WA. The intent of this memorandum is to present the case for installation of a temporary bridge crossing of Fisher Slough to reduce traffic impacts, lower traffic control costs, and decrease safety related issues from large trucks frequently entering and exiting the highway.

Amount of Soil to be Hauled

The project will have numerous vehicle trips to the site including mobilization and demobilization of heavy equipment, transport of materials and equipment to the site, everyday access from worker and project staff vehicles. The most significant number of trips for the project are those related with soils hauling across the project, termed inter-site transfers, as well as large quantities of materials being imported to and exported off the site for disposal.

Import materials and end of project exports and disposal are currently estimated on the order of 60,000CY of materials. Up to 40,000CY of import soils may be necessary for filling the new levee setback as a result of project sequencing, compaction, shrinkage, and settlement issues. In addition to the import materials, a fairly significant number of trips will be necessary to haul materials off the site. Up to 5 acres of clearing and grubbing will take place, where several thousand tons of debris materials (several hundred truckloads) will need to be hauled from the site. Import to and export from the site is unavoidable and the Pioneer Highway will need to be accessed. Using a value of 8CY per truck, it is estimated that up to 8,000+ haul trips will be necessary, and are unavoidable use of the Pioneer Highway.

These materials imports and exports will likely be ongoing throughout the project. It is assumed that there is an 8 month construction period (June through Sept 2010 and 2011), and 24 working days a month. Using these rates, there would likely be up to 42 trips per day and a truck trip every 14 minutes.

For inter-site hauling and transfers, a total of 19,000CY of material will be moved south from Big Ditch realignment for use in the new levee setback. Additionally, 16,000 CY of topsoil will be hauled north across Fisher Slough to be spread on farmland. Together this equals 35,000 CY of material that must be moved across the Slough. Assuming 8 CY truck loads, this translates into 4,375 trips. The period of inter-site transfers occurs in Phase II, June through Sept. 2010. Construction will occur June through September 2010, which allows for 4 months of hauling. Therefore, assuming 24 construction days per month, it would be necessary to run 25 hauls per day, or 3 trips per hour for inter-site transfers. This is similar in scale to the number of trips to the import work with 46 trips per day and a trip every 13 minutes. Combined, import/export trips and inter-site transfers there would be a truck trip entering/exiting the highway every 7 minutes.

One additional concern with the inter-site transfers is that these trucks need to cross traffic when entering Pioneer Highway from the Jungquist property and then heading north to south to transfer Big Ditch realignment suitable fill materials for the S. Levee Setback. This is by far the most hazardous traffic maneuver when compared with others. Other traffic maneuvers include exiting the highway to Jungquists, Smith A and Smith B. This is a turn across traffic on the highway. When leaving the site, trucks will likely turn north from the access routes onto the highway, which is not a crossing maneuver and simpler and more safe to manage.

Pioneer Highway Bridge over Fisher Slough is currently the only vehicle crossing of Fisher Slough within the vicinity of the proposed construction site. Given the number of haul trips required to construct the proposed features, Tetra Tech recommends an alternative approach to Pioneer Highway for inter-site earthwork hauling between the north and south sections.

A more cost effective, environmentally sensitive and safe approach consists of the placement of a temporary structure (spanning 80' across Fisher Slough) within the vicinity of the existing Big Ditch culvert crossing (see attached sheet C72). The proposed structure would be installed for the summer of 2010 (May through September) with an optional installation in summer 2011 if needed. The installation of the structure can use a temporary crossing provided by the contractor, or even the new Smith A or one of the Jungquist crossings.

Cost savings are derived from not running a traffic control team on Pioneer Highway, which would be necessary for trucks entering and crossing traffic lanes on the highway. Environmental benefits include keeping loose and blowing soils within the construction site and out of the roadway drainage system. Also, there would be less transfer of soils from truck tires to the highway. Finally, public safety would benefit by reducing the number of entries/exits by large construction trucks onto the Pioneer Highway. A final benefit is the improve economics and reductions in traffic pollution that occur while waiting for trucks to enter the highway.

The final section of this memo includes design and cost estimating to support recommendation of the temporary crossing alternative.

Alternative 1: Without a Temporary Bridge and With a Traffic Control Crew

Alternative 1 examines using the Pioneer Highway Bridge approach for inter-site transfers between the north and south portions of the project site. This method, in conjunction with the trips required for import fill, would require approval of a traffic control plan as well as payment of a traffic control crew over the duration of the excavation and filling operations. We project that the total cost of the traffic control crew and plan for four months of heavy earthwork will be approximately \$112,000. Shown below in **Table 1** is a breakout of the costs associated with alternative one.

Table 1. Traffic Control Costs w/o Temporary Crossing
Costs Associated with Traffic Control Alternative

Item	Quantity	Unit	Unit Cost	Subtotal
Engineered Traffic Control Plan	1	LS	\$ 10,000	\$ 10,000
TESC at entrance/exit	1	LS	\$ 5,000	\$ 5,000
Traffic Control Labor (2 workers for 80 days)	1280	HR	\$ 60	\$ 76,800
Time losses	1	LS	\$ 20,000	\$ 20,000
Total				\$ 111,800

Alternative 2: Temporary Bridge Crossing

The second alternative evaluates the installation costs of a temporary bridge. The suggested location for the bridge is on the west side of the existing culvert crossing. Once the support structures are in place, one of the proposed 80' span bridges will be lowered onto the supports and connected in such a way that deconstruction at a later date is feasible.

The bridge will cross at elevation 14' (NAVD88) which is 2' feet above the ordinary high water line. Approach ramps will be constructed on both sides of the bridge at no greater than a 10% grade. The north side of the bridge will have one approach, which will connect in with the temporary haul routes proposed in the Haul Route Plan. The south side will have two approaches, which will connect with haul routes on both sides of the existing south levee.

There will be some minor earthwork associated with the temporary crossing. Assume 500 CY will need to be cut from the levee and an equal quantity filled and compacted for the approaches. Shown below in Figure 2 is a breakout of costs associated with a temporary bridge alternative. The total cost associated with alternative 2, including installation and earthwork, would be approximately \$42,000.

Table 2. Temporary Bridge Installation Costs

Costs Associated with Bridge Alternative

Item Description	Quantity	Unit	Unit Cost	Subtotal
Bridge installation Labor	50	HR	\$ 450	\$ 22,500
Crane and bridge hauling	1	LS	\$ 10,000	\$ 10,000
Excavation for Temp. Bridge	500	CY	\$ 4	\$ 1,865
Fill and Compaction for Temp. Bridge	500	CY	\$ 5	\$ 2,585
Placement of Footing/Abutment	1	LS	\$ 5,000	\$ 5,000
Total				\$ 41,950

Recommendation – Basis for Temporary Bridge Alternative

The analysis demonstrates that the costs associated with a temporary bridge (\$42,000) compare favorably with the costs associated with executing a traffic control plan (\$112,000). These dollar costs do not demonstrate various environmental costs associated with exiting and entering a construction site, nor do they account for potential impacts to the roadway from trips of heavy equipment. Tetra Tech recommends pursuing an inter-site, temporary crossing structure at Fisher Slough to decrease overall costs, improve safety, and reduce economic, traffic and other environmental impacts to the area.

