TECHNICAL MEMORANDUM

Scour Analysis for the Hansen Creek Pedestrian Bridge Project

Prepared for

Skagit County Public Works 1800 Continental Place Mount Vernon, Washington 98273

Prepared by

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Introduction

Skagit County (the County) is preparing conceptual drawings and a bid package for the final design and construction of a new pedestrian bridge across Hansen Creek within the Northern State Recreational Area (NSRA). The new pedestrian bridge will allow pedestrian and light maintenance vehicle traffic over Hansen Creek and will replace an existing bridge that is structurally deficient and hazardous. The new bridge site is located approximately 27 feet downstream of the existing bridge location, which currently separates the upper alluvial fan (Reach 2) from the apex of the lower alluvial fan (Reach 3) of Hansen Creek, as defined in the 2002 *Hansen Creek Watershed Management Plan* (Miller Consulting and Watershed Professionals Network 2002). The proposed prefabricated railcar bridge (see Attachment A, Skagit County 2012) would have a broader clear-span width of about 75 to 85 feet, whereas the existing bridge span width is only about 19 feet. Coincident with constructing the new replacement bridge, the County proposes to remove the old bridge and grade back the channel banks at approximately a 3H:1V (horizontal to vertical) slope landward of the old abutment locations.

This technical memorandum summarizes the methods and results of a scour analysis that was performed to support the structural design of the new bridge crossing. Potential scour of the creek channel bed and banks is an important issue to analyze so that appropriate countermeasures or design alterations are included in the project to assure long-term structure protection. The new pedestrian bridge will not be exposed to direct flow from Hansen Creek immediately after construction because the abutments will be placed several feet behind the existing bank. However, without an upstream log revetment to deflect flow away from the banks, the stream banks will erode over time and the bridge abutments will likely be exposed in the future. As such, the scour analysis presented in this memorandum does not provide an absolute or discrete scour estimate, but rather a range of possible scour outcomes assuming possible channel changes over time. The new crossing and scour mitigation components should be designed to accommodate the estimated maximum probable scour that may occur during a 100-year design flood event based on this range of possible outcomes.

Methods

This section summarizes how an available hydraulic model and hydrologic inputs from a previous analysis for the Reach 3 and Reach 4 Hansen Creek Alluvial Fan and Wetland Restoration Project (Herrera 2007) were modified to evaluate scour associated with the proposed replacement bridge project.

Hydraulic Analysis

The U.S. Army Corps of Engineers' Hydrologic Engineering Center River Analysis System (HEC-RAS) software was used to analyze both existing conditions and various alternatives of proposed conditions. HEC-RAS was originally developed by the U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center (HEC) in 1995 (version 1.0) as a flood hazard mapping tool and is typically used by the Federal Emergency Management Agency (FEMA) for

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the development of Flood Insurance Rate Maps (FIRMs). The HEC-RAS program (currently using version 4.1) was the successor to the HEC-2 (river hydraulics) program originally created in 1969.

HEC-RAS is a one-dimensional, stepped, backwater-surface profile program that is used for modeling both steady and unsteady, gradually varied flow. The computational procedure of a steady-state HEC-RAS model is based on the solution of the energy equation and energy losses between adjacent channel/floodplain cross-sections. A typical HEC-RAS model includes numerous channel/floodplain cross-sections through the length of a stream reach. Energy losses at each cross-section are evaluated based on friction (Manning's equation) and contraction/expansion (coefficient multiplied by the change in velocity head).

The HEC-RAS model used for the Hansen Creek bridge project was based on a previous HEC-RAS model developed to calibrate a 2-dimensional, finite difference, dynamic flood routing FLO-2D hydraulic model for the Hansen Creek Alluvial Fan and Wetland Restoration Project. The input parameters used to establish the geometric, upstream, and downstream boundary conditions of the HEC-RAS model are described in the *Conceptual Restoration Report for the Hansen Creek Alluvial Fan and Wetland Restoration Report for the Hansen Creek Alluvial Fan and Wetland Restoration Project* (Herrera 2007).

HEC-RAS Model Geometry

The geometry files from the original HEC-RAS model for the alluvial fan restoration project (Herrera 2007) were used as the basis for defining the channel upstream, at, and between the existing and proposed bridge crossing sites. The base channel widths, hydraulic roughness coefficients (Manning's "n" values), and channel elevations were all based on this original HEC-RAS model. It should be noted that the original HEC-RAS model was based on the North American Vertical Datum of 1988 (NAVD 88), whereas the County's design drawings for the project (Attachment A) reference the National Geodetic Vertical Datum of 1929 (NGVD 29). As the maximum probable scour depths reported are independent of elevation, the datum is not important. However, care should be taken when interpreting any results relative to elevations, as model water surface elevations are referenced to NGVD 29. For the Hansen Creek bridge location in Skagit County, elevations in either datum can be converted on the basis that NAVD 88 is approximately 3.82 feet higher than NGVD 29. Any elevations specified in this memo reference the appropriate datum used.

To better represent the geometry around the existing and proposed bridge crossing locations, five new cross-sections were interpolated between the upstream-most three cross-sections in the existing model. The geometry file was then modified in order to simulate five possible scenarios for scour around the new bridge site.

The model was adjusted to account for possible combinations of proposed bridge abutment depths, widths, and channel protection options as well as for possible resultant channel changes that would affect the local scour conditions at the new bridge location. Abutments were simulated as flow blockages in the HEC-RAS model. The different scenarios evaluated in the model are summarized in Table 1.

Scenario	Description
1	Constructed condition of the new bridge where the flow is not in direct contact with the new bridge abutments
2	Scour of the banks and initial exposure of the new bridge abutments (small flow obstruction of 5 feet)
3	Additional scour and exposure of the new bridge abutments (medium flow obstruction of 10 feet)
4	Additional scour and exposure of the new bridge abutments (large flow obstruction of 15 feet)
5	Upstream log revetment to deflect flow away from the new bridge abutments to eliminate abutment scour effect

Table 1. Summary of bridge scenarios modeled.

Downstream Boundary Condition

The HEC-RAS model extends downstream to the State Route (SR) 20 bridge. The downstream boundary condition assumes uniform flow (channel bed slope equals the water surface slope) at the extents of the model. This is the most common type of downstream boundary condition used for HEC-RAS models where known water surfaces based upon actual flow or stage data are not available at the downstream boundary. It is important to note that the downstream boundary condition will have no effect on the upstream model results near the new bridge. The water surface elevation, and thus flow velocity, at the bridge site is hydraulically controlled by channel confinement for approximately 400 feet downstream of the new bridge. As such, recent channel changes in the Reach 3 restoration area (700 feet downstream of the new bridge) will have no effect on the model results.

Upstream Boundary Condition

The upstream boundary condition for the HEC-RAS model included steady state inflows (i.e., a single flow value as opposed to a continuous hydrograph) for various flood events. The peak flood flows (discharges) were derived from the Hansen Creek flow data produced for the *Hansen Creek Conceptual Restoration Report* (Herrera 2007) and are summarized in Table 2.

Return Interval (years)	Hansen Creek Discharge (cfs)
2	350
5	500
25	650
100	800

Table 2. Hydrologic inputs (steady state) used in the HEC-RAS model.

cfs – cubic feet per second

Scour Analysis

The scour analysis performed for this project was based on evaluation of several empirical equations developed primarily for the design and analysis of bridge pier scour, as outlined in the Federal Highway Administration's Hydraulic Engineering Circular No. 18 (FHWA 2001). A detailed description of all equations used and a list of all references cited for the scour analysis are provided in Attachment B. Although the empirical equations represent the best available quantitative methods for evaluating local scour at road crossings, care should be taken in applying these equations for bridge abutments or large woody debris obstructions when many of the physical features such as the size of the substrate or structure may be outside of the numeric limits from which the empirical equations must be tempered by observations of actual scour in the field and professional judgment of scour potential given the vulnerability of the channel at a specific site. For the Hansen Creek pedestrian bridge analysis, both the model inputs and the equations used to produce the scour results (Attachment B) were considered to be conservative; thus additional factors of safety were not applied.

Three main types of scour are applicable to the assessment of total scour for the bridge crossing site:

- 1. Long-term scour due to degradation of the channel bed over time
- 2. General scour caused by contraction or constriction of flow
- 3. Local scour (abutment scour or pool formation scour from meander migration)

Long-term scour includes the adjustment of the bed elevation due to overall channel scour over time. For example, the Hansen Creek channel has historically been incising through the Skagit River terrace since the last glacial uplift began, approximately 12,000 years ago. However, given a likely life-span of 50 to 100 years for the replaced bridge structure, the long-term scour resulting from this geologic time-scale incision was assumed to be negligible for the bridge site. Therefore, future scour that may occur at the new bridge crossing is much more likely to be related to general and local scour. For the proposed bridge site, general scour could be induced by contraction or constriction of flow across the entire channel width, and local scour could be induced at an abutment where the direction of flow is perpendicular to the obstruction, or where riffle-pool sequence bed undulations occur parallel along the abutment face. The empirical equations used to evaluate general and local scour require various input parameters for stream substrate characteristics, flow velocity, flow depth, and pier shape characteristics, most of which were derived from the hydraulic model results. A more detailed description of the scour analysis methods, equations, assumptions, and input variables is provided in Attachment B.

Results

This section presents the results of the scour analysis.

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Hydraulic Characteristics

The detailed water surface elevation (WSE, in NAVD 88), depth, velocity, and energy grade-line results from the HEC-RAS model are provided in Attachment C. Table 3 provides summary hydraulic model results that were used as inputs to the scour analysis calculations.

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Modeled Scenario	River Station	Water Surface Elevation (ft, NAVD 88)	Flow Velocity (ft/s)	Maximum Water Depth (ft)
Existing	26.2	91.8	6.6	5.7
	26	91.6	6.3	5.9
	25	90.7	9.1	4.2
	24.6	90.2	9.1	3.8
	24.3	89.8	8.6	4.0
1	26.2	91.7	6.2	5.6
	26	91.7	4.8	6.0
	25	91.4	6.1	4.8
	24.6	90.2	9.1	3.8
	24.3	89.8	8.6	4.0
2	26.2	91.5	6.8	5.4
	26	91.5	5.0	5.8
	25	91.0	6.8	4.5
	24.6	89.8	9.1	3.4
	24.3	89.9	5.5	4.1
3	26.2	92.1	5.5	6.0
	26	92.1	4.5	6.3
	25	91.8	5.4	5.3
	24.6	90.2	10.0	3.8
	24.3	89.9	5.5	4.1
4	26.2	92.9	4.4	6.8
	26	92.9	3.8	7.1
	25	92.7	4.4	6.2
	24.6	90.8	10.7	4.4
	24.3	89.9	5.5	4.1
5	26.2	91.1	6.2	4.4
	26	91.2	4.2	5.2
	25	90.7	6.0	3.5
	24.6	90.2	6.6	3.7
	24.3	89.9	6.0	3.7

 Table 3.
 Summary hydraulic model results for the 100-year flood event.

Scour Characteristics

The detailed model output used for scour analysis inputs is presented in Attachment C and the scour results are presented in Attachment B. Table 4 provides a summary of the scour analysis results. The maximum scour depth is a cumulative effect (additive) of the different scour types. It should be noted that the maximum probable scour results presented in Table 4 represent a maximum scour depth that could be experienced during the peak of a 100-year flood event. Following the peak of the flood event, the channel bed scour-hole formed at the bridge site will likely be partially filled in with bedload material moving downstream, resulting in a semi-permanent channel bed configuration that is due primarily to long-term scour. The permanent bed scour that remains between flood events would be much shallower than the maximum scour hole depth that could occur in the midst of a large flood.

General scour from constriction of the channel was approximated with conservative assumptions of channel bank erosion leading to the exposure of the abutment with flow striking the abutment at a 90 degree (perpendicular) angle. The estimates are conservative because they assume bank erosion and channel expansion which will likely result in general aggradation of the channel bed. General constriction scour was estimated to range from 0 to 2.5 feet.

Abutment scour is a local scour phenomenon that is a function of the confinement of flow behind an obstruction and the subsequent "squeezing" of the confined flow into the main channel. Turbulence and vortex eddies result in a vertical deformation of the channel bed. Even relatively small abutments can result in significant turbulence, vortices, and scour. The results presented in Table 4 indicate that local abutment scour is the most significant scour effect at the project site and could range from 8.6 to 11.5 feet in the 100-year flood event. Once the abutment is exposed to direct flow, even for a small flow obstruction, the scour depths can be very high. The scour depths increase with increasing obstruction lengths (exposure to flow), but the highest proportional scour is during the initial exposure of the abutment. For Scenario 5 where the abutment scour at the bridge is eliminated assuming an upstream log revetment effectively deflects the flow away from the perpendicular face of the abutment, the calculated maximum probable scour is reduced by over 5 times (2.5 feet). The predominant scour effect expected for scenario 5 is associated with bed undulations from typical riffle-pool sequences, developed during meander migration along the smooth face of the bridge abutment.

Scour that may occur at the bridge site over time depends significantly on whether an upstream revetment (made of logs or other material) is installed to deflect flow into the center of the channel and dampen local scour effects upstream of the bridge. In the short term following bridge construction, the channel will be nowhere near the new bridge abutments, but the channel bed under the bridge may generally incise by 1.3 feet during the peak flow in a 100-year flood. Over time, as the banks erode, the scour depth could be as much as 14 feet in a 100-year flood event at either of the new bridge abutments. See the Attachment D graphics that illustrate a possible route of a neck cutoff, which is a type of meander migration in which an entire meander loop is cut off at its narrowest point. A neck cutoff could isolate the meander immediately upstream of the existing bridge and result in significant erosion of the right bank. The timeframe

of this bank scour propagation is impossible to predict as it depends on the magnitude and frequency of future flood events and the Hansen Creek channel has been locked into its current alignment at the project site for many years, limiting natural lateral migration. Therefore, the sooner a flow deflection or revetment structure could be installed, the sooner the bridge abutments could be protected from a neck cutoff or lateral migration that could endanger the bridge abutments.

Any flow deflection or revetment structures would also need to be designed to resist scour; however, the location(s) and orientation(s) of such deflection or revetment structures could be optimized to shift the location of scour further away from the bank or abutment as well as to reduce the maximum probable design scour depth. Although any flow deflection or revetment structures have yet to be designed, it is assumed that they could be optimized such that the maximum probable design scour depths are in the range of 8 to 10 feet, versus the maximum of 14 feet for Scenario 4 with abutment scour associated with a large flow obstruction.

		Scour Type			
	General – 100-yr Max Local – 100-yr Max L		Local – 100-yr Max	Maximum Probable Scour	
Modeled Scenario	Constriction (ft)	Abutment (ft)	Meander Pools along		
1 (Post Const)	1.3	0	0	1.3	
2 (Small)	1.1	8.6	0	9.7	
3 (Medium)	2.0	10.4	0	12.4	
4 (Large)	2.5	11.5	0	14.0	
5 (with Revetment)	0.4	0	2.1	2.5	

Table 4.	Summary	of scour	analysis results.
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Conclusions and Recommendations

There are many types of scour effects that should be considered for the protection of bridge infrastructure such as long-term scour, general scour (constriction), and local scour (abutment protrusion into the flow). Long-term scour is expected to be negligible at the new bridge site because that process is occurring on a geologic time scale and the bridge site is located within an alluvial fan that is generally aggrading. Constriction scour is typically small but must be considered for reductions in the effective channel width. Localized abutment scour is the most prevalent scour effect and mitigation of this type of scour can reduce risk and bridge costs.

The results presented in this memorandum indicate that the new bridge should be designed to accommodate possible scour depths ranging from 2.5 to 14 feet in the 100-year flood event depending on the selected design approach. A 100-year flood event is appropriate for design of scour protection because statistical probability indicates that one or more such floods could occur within the design life of the bridge. If no upstream revetment structure is installed to deflect flow into the center of the channel, the footings of the new bridge abutments should be designed

to accommodate maximum probable scour of 14 feet (down to elevation 68 feet [NGVD 29], assuming a channel thalweg elevation of 82 feet [NGVD 29]). If an upstream revetment structure is installed in the general configuration provided in Attachment D, the footings of the bridge abutment could be designed to accommodate maximum probable scour of up to 3 feet (placed down to an elevation of 79 to 80 feet [NGVD 29]). It is important to note that the upstream revetment structure(s) will experience relatively large scour depths in dissipating the energy before the flow approaches the new bridge. This potential scour depth at the revetment can be minimized by:

- 1. Increasing the roughness of the structure by providing a hydraulically complex frontal area of the revetment. A wall of rootwads provides marginal roughness, but complex orientations of logs with varying lengths projecting into the flow provide significantly more roughness and dissipation of energy.
- 2. Placing the logs further out into the flow with the core of the structure (anchoring) set back into the bank. This induces the scour to occur further out into the channel and away from the core of the structure.

Channel restoration efforts associated with the replacement of the bridge crossing structure should include some re-grading to lay back the banks around the existing bridge site in anticipation of where a neck cutoff avulsion is otherwise likely to occur between the eroding right bank upstream of the existing bridge site and the unarmored right bank downstream of the existing bridge site. This grading should ensure that the right bank is set back enough so that the addition of any roughening along the bank does not constrict the active floodplain width to less than 40 feet. It is also recommended that the right bank floodplain upstream of the new bridge crossing be excavated to set back the bank.

Wood revetment structures should also be included in the project plans to help with sediment retention and to direct flow through the new channel crossing. Wood revetment structures should be placed along the re-graded right bank in order to provide a smoother transition along the new cutoff channel as well as to prevent channel erosion from heading toward or around the outside of the proposed right bank abutment. The wood revetment structures should not be placed too close to the center of the channel, however, so as to avoid flow concentration and debris accumulation upstream of the new bridge.

References ¹

FHWA. 2001. Hydraulic Engineering Circular 18: Evaluating Scour at Bridges, Fourth Edition. Publication No. FHWA NHI 01-001, HEC-18. Federal Highway Administration.

Herrera. 2007. Conceptual Restoration Report for the Hansen Creek Alluvial Fan and Adjacent Wetland Restoration Project. Prepared for the Upper Skagit Indian Tribe by Herrera Environmental, Inc.

Miller Consulting and Watershed Professionals Network. 2002. Hansen Creek Watershed Management Plan. Prepared for the Skagit County Public Works Department by Miller Consulting and Watershed Professionals Network.

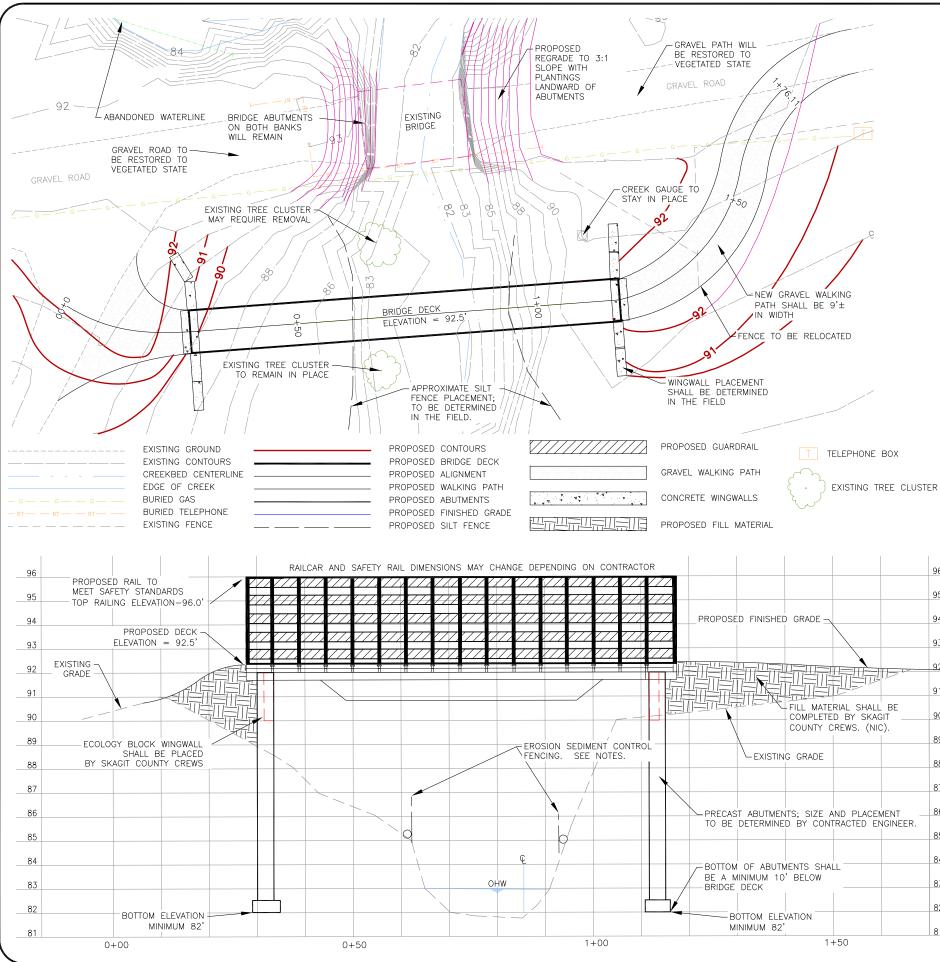
Skagit County. 2012. Draft CAD drawings of the proposed bridge plan and section. Obtained via email on April 3, 2012 from Jeff McGowan at Skagit County to Christina Avolio at Herrera.

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¹ Note: A complete list of scour references is provided in Attachment B.

ATTACHMENT A

Draft Bridge Drawings



GENERAL NOTES:

- REQUIRED BY THE COUNTY. 3. 4
- PRIOR TO CONSTRUCTION.

CONSTRUCTION SEQUENCE FOR EROSION AND SEDIMENT CONTROL 1. DELINEATE IMMEDIATE CLEARING LIMITS. INSTALL TEMPORARY EROSION AND SEDIMENTATION CONTROL FOR NATURAL DRAINAGE CONVEYANCE SYSTEMS, ADJACENT PROPERTIES, AI EXISTING DRAINAGE SYSTEMS.

- 3. CLEAR TO CLEARING LIMITS.
- EROSION AND SEDIMENT CONTROL
- CONSTRUCTED PRIOR TO ANY GRADING OR EXTENSIVE LAND CLEARING ACCORDANCE WITH THE PLANS AND AS DIRECTED BY THE ENGINEER. THESE FACILITIES MUST BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION AND LANDSCAPING ARE COMPLETED, AND POTENTIAL FC ON-SITE EROSION HAS PASSED. SEDIMENT LADEN WATERS SHALL NO ENTER THE NATURAL DRAINAGE SYSTEM. WATTLES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL, AT LEAST DAILY DURING PROLONGED RAINFALL. SEDIMENT SHALL BE REM WIND THE LEVEL OF DEFORTED INMEDIATELY APPENDENT SHALL BE REM

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- .3 HEIGHT OF THE BARRIER.
- 4
- 5 6
- DAYS.
- 7 SEDIMENT DEPOSIT. 8
- TREATED TO REMOVE SEDIMENT.
- 9. SEDIMENT POND OR OTHER APPROVED DEVICES. 10. ALL POLLUTANTS OTHER THAN SEDIMENT THAT OCCUR ON-SITE DURIN
 - CHAPTER 11-3.

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ALL WORK SHALL CONFORM TO SKAGIT COUNTY STANDARDS. PAVED SURFACES INCLUDING ROADWAYS, SIDEWALKS, AND CURBS THAT ARE DAMAGED BY NEW CONSTRUCTION SHALL BE REPAIRED AS

ALL LOCATIONS OF EXISTING UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORD AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NO NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE COUNTY TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE

IMPLEMENTATION OF THIS PLAN. THE COUNTY SHALL LOCATE AND PROTECT ALL CASTINGS AND UTILITIES DURING CONSTRUCTION AND SHALL CONTACT THE UNDERGROUND UTILITIES LOCATOR SERVICE (1-800-424-5555) AT LEAST 48 HOURS

THE COUNTY SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AN ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE COUNTY.

SKAGIT COUNTY CREWS SHALL BE RESPONSIBLE FOR PROVIDING THE EROSION CONTROL MEASURES SHOWN OR DESCRIBED IN THE CONTRAC DOCUMENTS AND ANY ADDITIONAL MEASURES THAT MAY BE REQUIRED MEANS AND METHODS OF CONSTRUCTION AS NEEDED TO CONTROL VIOLATION OF SURFACE WATER QUALITY, GROUND WATER QUALITY, OR SEDIMENT MANAGEMENT STANDARDS. EROSION CONTROL MEASURES S BE MAINTAINED THROUGHOUT THE COURSE OF CONSTRUCTION AND UN

ALL DISTURBED EARTH IS STABILIZED IN FINISH GRADE. 2. THE TEMPORARY EROSION AND SEDIMENT CONTROL FACILITY SHALL BE CONSTRUCTED PRIOR TO ANY GRADING OR EXTENSIVE LAND CLEARING

WHEN THE LEVEL OF DEPOSITION REACHES APPROXIMATELY ONE-HAL

ALL CLEARING, GRUBBING AND GRADING SHALL BE CONTAINED WITHIN LIMITS ESTABLISHED BY THE ENGINEER. ALL VEGETATION OUTSIDE

DESIGNATED LIMITS SHALL REMAIN UNDISTURBED. ALL STOCKPILES ARE TO BE LOCATED IN SAFE AREAS AND PROTECTED FROM EROSION BY MECHANICAL OR VEGETATIVE MEANS.

ALL EXPOSED AND UNWORKED SOILS BE STABILIZED BY SEEDING,

MULCHING, MATTING, OR PLASTIC COVERING, FROM OCT. 1 TO APRIL NO SOILS SHALL REMAINS UNSTABILIZED FOR MORE THAT 2 DAYS. FR MAY 1 TO SEPT. 30 NO SHALL REMAIN UNSTABLIZIED FOR MORE THAT

ALL PROPERTIES ADJACENT TO THE PROJECT SHALL BE PROTECTED F

ALL STORM DRAIN INLETS MADE OPERABLE DURING CONSTRUCTION SH BE PROTECTED SO THAT STORMWATER RUNOFF SHALL NOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE

DEWATERING DEVICES SHALL DISCHARGE INTO A SEDIMENT TRAP OR

CONSTRUCTION SHALL BE HANDLED AND DISPOSED OF IN A MANNER DOES NOT CAUSE CONTAMINATION OF STORMWATER. SEE DEPARTMEN ECOLOGY STORMWATER MANAGEMENT MANUAL FOR PUGET SOUND BASI

11. SEDIMENTS TRANSPORTED ONTO A ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH WORK DAY. SEDIMENT SHALL BE REMOVED FROM ROADS BY SHOVELING OR SWEEPING AND BE TRANSPORTED TO A CONTROLLED SEDIMENT DISPOSAL AREA. SEE SP PROVISION, DISPOSAL OF SURPLUS MATERIAL. STREET WASHING SHAL ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. 12. INSTALLATION OF ALL EROSION CONTROL METHODS SHALL FOLLOW MO CURRENT WSDOT STANDARD SPECIFICATIONS.

ATTACHMENT B

Scour Analysis Equations and Output Tables

Scour Analysis Equations

The scour analysis performed for this project was based on the evaluation of several empirical equations developed primarily for the design and analysis of bridge pier scour. Care should be taken in applying these equations for culverts or large woody debris obstructions when many of the physical features such as the size of the substrate or structure may be outside of the numeric limits from which the empirical equations were derived. These empirical equations include various input parameters for sediment characteristics, flow velocity, flow depth, and pier shape characteristics. The equations include empirical constants and factors for pier width-to-depth ratios, as well as soil characteristics based on typical bridge piers or scaled physical models that typically include sand-bedded or fine gravel systems.

Three main types of scour are applicable to the assessment of total scour for bridges or wood structures:

- 1) Long-term scour
- 1) General scour caused by contraction or constriction scour
- 2) Local scour (abutment scour or pool formation scour from meander migration)

Long-term scour includes the adjustment of the bed elevation due to overall channel scour over time. Long-term scour may be associated with the degradation of a channel bed over time due to a deficit in the upstream sediment supply (FHWA 2001).

Bed deformation around the bridge abutments will be mostly driven by general scour phenomena such as contraction scour and local scour processes associated with abutment scour or pool formation scour associated with riffle-pool sequences resulting from meander migration. Contraction scour is the scour associated with flow acceleration through a constriction and is applicable to the scour process that can be expected for the bridge. Local scour includes complex downward and lateral flow accelerations around obstructions such as the abutments for the bridge or the log revetment.

The following equations were used in the scour analysis:

- 1) Contraction Scour:
 - a) Modified Laursen Equation (FHWA 2001)
 - b) Parker Equation (FHWA 2001)
- 2) Local Scour Abutment Scour:
 - a) Froehlich Equation (FHWA 2001; WDFW 2002)
 - b) Liu Equation (Liu et al. 1961)
 - c) Ahmad Equation (1953)
- 3) Local Scour Pool Riffle Sequences (meander morphology, bed undulations):
 - a) Lofthouse and Robert (2008)

c /attachment b - scour analysis equations and results.docx

1) Contraction Scour Equations:

Modified Laursen Equation (FHWA 2001)

The modified Laursen equation (Equation 1) is recommended by the Federal Highway Administration (FHWA 2001) and the Washington Department of Fish and Wildlife (WDFW 2002) for estimation of contraction scour in live-bed conditions (a bed where active sediment transport is occurring). The modified Laursen equation accounts for contraction scour that occurs at the structure (Fischenich and Landers 2000). This equation was developed primarily for sand-bed channels, but can provide a conservative estimate of scour depth in gravel-bed channels (WDFW 2002).

$$\frac{y_2}{y_1} = \left(\frac{Q_2}{Q_1}\right)^{6/7} \left(\frac{W_1}{W_2}\right)^{k_1}; d_{cs} = y_2 - y_0$$
 (Equation 1)

Where: d_{cs} = average depth of contraction scour, in meters (m)

 y_0 = existing depth in contracted section before scour, m

 y_1 = average depth in upstream main channel, m

 y_2 = average depth in contracted section after scour, m

 Q_1 = flow in upstream main channel, cubic meters per second (cms)

 Q_2 = flow in contracted channel, cms

 W_1 = channel bottom width of upstream main channel, m

 W_2 = channel bottom width in contracted section, m

 k_1 = exponent determined using Table B-1

 u_* = shear velocity in upstream section, m/s= $\sqrt{gy_1S}$

 ω = fall velocity of bed material based on the D₅₀, m/s = $\sqrt{(G-1)gD_{50}}$

S = slope of energy grade line of main channel, m/m

Table B-1. Exponent k_1 based on u_*/ω .

U*/w	k_1	Mode of Bed Material Transport	
< 0.50	0.59	Mostly bedload	
0.50 to 2.0	0.64	Some suspended load	
>2.0	0.69	Mostly suspended load	

Parker Equation (1981) as Referenced in Melville and Coleman (2000)

The Parker equation estimates an average depth of contraction scour based on channel geometry upstream of and within the contracted section of channel, and an empirical relationship between channel dimensions and scour depth as reflected in equations 2 and 3 below.

$$d_{cs} = y_2 - y_0 \tag{Equation 2}$$

 $\frac{y_2}{y_1} = \left(\frac{W_1}{W_2}\right)^{k_4}$

 d_{cs} = average depth of contraction scour, meters (m)

- y_0 = existing depth in contracted section before scour, m
- y_1 = average depth in upstream main channel, m
- y_2 = average depth in contracted section after scour, m
- W_1 = channel bottom width of upstream main channel, m
- W_2 = channel bottom width in contracted section, m

$$K_4$$
 = exponent; range used to derive a minimum and maximum:
 $K_4 \min = 0.675$
 $K_4 \max = 0.825$

2) Abutment Scour Equations

Froehlich Equation (FHWA 2001, WDFW 2002)

The modified Froehlich (1989) equation is recommended by FHWA (2001), WDFW (2002), and Melville and Coleman (2000) for estimation of local abutment scour in live-bed conditions. This equation was developed using laboratory flume regression results.

$$\frac{d_{as}}{y} = 2.27K_1K_2 \left(\frac{L'}{y}\right)^{0.43} Fr^{0.61} + 1.0$$
(Equation 4)

Where: d_{as} = depth of scour, m

 K_1 = coefficient for abutment shape

 K_2 = coefficient for angle of embankment to flow

$$\mathbf{K}_2 = \left(\frac{\theta}{90}\right)^{0.13}$$

 θ <90° if embankment points downstream θ >90° if embankment points upstream)

 $L' = \text{length of embankment projected normal to flow, m } L' = L \cos \theta',$ if $\theta > 90$ degrees (embankment pointing upstream), then $\theta' = \theta - 90$ if $\theta < 90$ degrees (embankment pointing downstream), then $\theta' = \theta$

y =flow depth, m

Liu Equation (Liu et al. 1961)

The Liu et al. (1961) equation is recommended by Hoffmans and Verheij (1997). This equation was developed from a dimensional analysis for sand-bed channels.

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(Equation 3)

$$d_{as} = K_L y \left(\frac{L}{y}\right)^{0.4} Fr^{0.33}$$

(Equation 5)

Where: d_{as} = depth of scour, m

 K_L = coefficient for abutment shape: streamlined: K_L=1.1; blunt K_L=2.15)

y =flow depth, m

L = abutment length into flow, m

Ahmad Equation (1953)

The Ahmad (1953) equation was recommended by Hoffmans and Verheij (1997). This equation is based on field and model studies; and was developed for alluvial rivers in Pakistan. The correction factors used with this equation are listed in Table B-2.

$$d_{as} + y_1 = K_A K'_A \left[\frac{q}{1-m}\right]^{2/3}$$
(Equation 6)

Where: $K'_A = 2.14 \text{g}^{-1/3} (\approx 1.0 \text{ m}^{-1/3} \text{s}^{2/3})$ $m = L/W_1$

q =upstream discharge per unit width, m²/s

 K_A =correction factor

$$K_A = 2K_P K_S K_\alpha K_\beta$$

 K_p =correction factor for influence of channel bend (Table B-2)

 K_s =correction factor for influence of shape of structure (Table B-2)

 K_{α} =correction factor for influence of angle of attack (Table B-2)

 K_{η} =correction factor for influence of porosity (Table B-2)

Table B-2. Correction factors for Ahmad (1953) from Hoffmans and Verheij (1997).

K _p	Position of Structure in Bend	Kα	Angle of Attack
1.00	Straight channel	0.80	30°
1.10	Concave side of bend	0.90	45°
0.85	Convex side of bend	0.95	60°
1.40	Downstream part of concave side (sharp bend)	1.00	90°
1.10	Downstream part of concave side (moderate bend)	1.05	120°
		1.10	150°
Ks	Shape of Structure	K_{η}	Structure
1.00	Vertical-wall abutment	1.0	20% porosity
0.85	Spill through abutment with 45° side slopes	0.9	50% porosity (1V:2H)
		0.6	50% porosity (1V:3.5H)

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3) Local Scour – Riffle-Pool Sequences and Meander Migration Relationships The Lofthouse and Robert (2008) Relationships

Lofthouse and Robert (2008) evaluated relationships between the length, height, and curvature of riffle-pool sequences with respect to meander morphology. Statistical relationships were established between these parameters based on five alluvial, gravel bedded river reaches near Toronto, Ontario, with average reach gradients less than 1%. In this study, riffle-riffle sequence height would be equivalent to the maximum scour depth associated with local pools developed due to meander migration. If the length of a riffle-riffle sequence is known, a maximum height (or riffle-pool meander scour depth) can be derived from Figure B-1, below. For Reach 3 of Hansen Creek, downstream of the bridge site, riffle-riffle sequences were approximately 70ft long, thus using a maximum height to length ratio of about 0.03 from Figure B-1 below, results in a height (or a maximum riffle-pool meander scour depth) of about 2.1 feet.

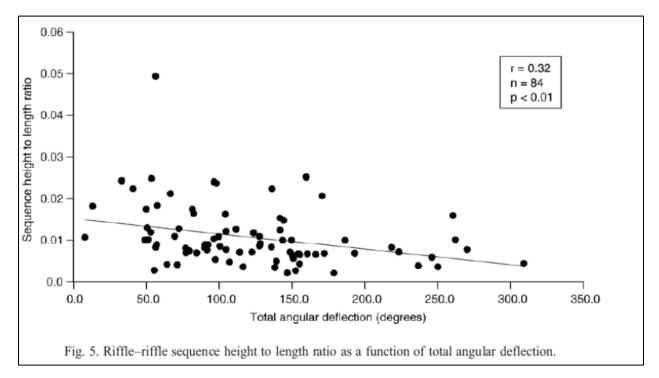


Figure B-1. Relationship between riffle-riffle sequence height to length ratios and total angular deflection for meandering, alluvial rivers.

Scour Analysis Results

Contraction Scour

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INPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 1: Bridge Removal Only

symbol	variable	unit	Mean Value
y _o	existing depth in contracted section before scour	ft	3.03
y 1	average depth in upstream main channel	ft	3.62
Q_1	flow in upstream main channel	ft ³ /s	800
Q_2	flow in contracted channel	ft ³ /s	800
W_1	channel bottom width of upstream main channel	ft	32
W_2	channel bottom width in contracted section	ft	25
D ₅₀	median diameter of bed material	mm	25
S	Slope of energy grade line of main channel	ft/ft	0.01

OUTPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 1: Bridge Removal Only

1.21	ft
1.33	ft
erage 1.27	ft
	1.33

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INPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 2: Small Obstruction

symbol	variable	unit	Mean Value
y ₀	existing depth in contracted section before scour	ft	2.82
y 1	average depth in upstream main channel	ft	3.30
Q ₁	flow in upstream main channel	ft ³ /s	800
Q ₂	flow in contracted channel	ft ³ /s	800
W_1	channel bottom width of upstream main channel	ft	32
W_2	channel bottom width in contracted section	ft	28
D ₅₀	median diameter of bed material	mm	25
S	Slope of energy grade line of main channel	ft/ft	0.0089

OUTPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 2: Small Obstruction

Output Summary Table			
Laursen Equation		0.74	ft
Parker Equation		0.82	ft
	-		
	Average	0.78	ft

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INPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 3: Medium Obstruction

symbol	variable	unit	Mean Value
У ₀	existing depth in contracted section before scour	ft	3.02
У1	average depth in upstream main channel	ft	4.05
Q ₁	flow in upstream main channel	ft ³ /s	800
Q ₂	flow in contracted channel	ft ³ /s	800
W_1	channel bottom width of upstream main channel	ft	32
W ₂	channel bottom width in contracted section	ft	23.5
D ₅₀	median diameter of bed material	mm	25
S	Slope of energy grade line of main channel	ft/ft	0.015

OUTPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 3: Medium Obstruction

tput Summary Table		
rsen Equation 1.	91	ft
ker Equation 2.	80	ft
Average 2.	00	ft
Average 2.	00	ft

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INPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 4: Large Obstruction

symbol	variable	unit	Mean Value
y 0	existing depth in contracted section before scour	ft	3.54
y 1	average depth in upstream main channel	ft	4.37
Q ₁	flow in upstream main channel	ft ³ /s	800
Q_2	flow in contracted channel	ft ³ /s	800
W_1	channel bottom width of upstream main channel	ft	32
W ₂	channel bottom width in contracted section	ft	20
D ₅₀	median diameter of bed material	mm	25
S	Slope of energy grade line of main channel	ft/ft	0.021

OUTPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 4: Large Obstruction

Output Summary Table			
Laursen Equation		2.35	ft
Parker Equation		2.67	ft
	Average	2.51	ft

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Abutment Scour

INPUT SUMMARY FOR LOCAL ABUTMENT SCOUR Hansen Creek Pedestrian Bridge - Scenario 2: Small Obstruction

INPUT VARIABLES FOR CALCULATIONS			
approach flow depth=	y=	4.45	ft
approach flow depth on floodplain=	y _a =	3.58	ft
length of embankment=	L=	5.0	ft
length of obstruction (blockage of flow tube)=	L _{ob} =	5.0	ft
velocity upstream of structure=	V=	6.76	ft/s
Calculated velocity directly upstream of structure=	V _{ob} =	6.76	ft/s
abutment shape coefficient=	$K_1 =$	1	
angle of structure to flow=	θ=	90	degrees
unobstructed channel width=	$W_1 =$	40	ft
coefficient for abutment shape (Liu et Al.)=	$K_L =$	2.15	
correction factor for influence of channel bend=	K _p =	1	
correction factor for influence of shape of structure=	K _s =	1	
correction factor for influence of angle of attack=	K _a =	1	
correction factor for influence of porosity=	K _n =	1	
upstream flow obstructed by abutment/embankment=	$Q_{ob} =$	121	ft ³ /s
upstream flow=	Q =	800	ft ³ /s
unit discharge (Q/W ₁)=	q =	20.0	ft²/s

OUTPUT SUMMARY FOR LOCAL ABUTMENT SCOUR Hansen Creek Pedestrian Bridge - Scenario 2: Small Obstruction

10.66	ft
8.61	ft
6.39	ft
Average 8.55	ft
	10.66 8.61 6.39 Average 8.55

INPUT SUMMARY FOR LOCAL ABUTMENT SCOUR Hansen Creek Pedestrian Bridge - Scenario 3: Medium Obstruction

INPUT VARIABLES FOR CALCULATIONS					
approach flow depth=	y=	5.25	ft		
approach flow depth on floodplain=	y _a =	4.31	ft		
length of embankment=	L=	10.0	ft		
length of obstruction (blockage of flow tube)=	L _{ob} =	10.0	ft		
velocity upstream of structure=	V=	5.44	ft/s		
Calculated velocity directly upstream of structure=	$V_{ob} =$	5.44	ft/s		
abutment shape coefficient=	K ₁ =	1			
angle of structure to flow=	θ=	90	degrees		
unobstructed channel width=	$W_1 =$	40	ft		
coefficient for abutment shape (Liu et Al.)=	$K_L =$	2.15			
correction factor for influence of channel bend=	K _p =	1			
correction factor for influence of shape of structure=	$K_s =$	1			
correction factor for influence of angle of attack=	K _a =	1			
correction factor for influence of porosity=	K _n =	1			
upstream flow obstructed by abutment/embankment=	$Q_{ob} =$	234	ft ³ /s		
upstream flow=	Q =	800	ft ³ /s		
unit discharge (Q/W ₁)=	q =	20.0	ft²/s		

OUTPUT SUMMARY FOR LOCAL ABUTMENT SCOUR Hansen Creek Pedestrian Bridge - Scenario 3: Medium Obstruction

	13.08	ft
	11.32	ft
	6.76	ft
Average	10.39	ft
	Average	11.32 6.76

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INPUT SUMMARY FOR LOCAL ABUTMENT SCOUR Hansen Creek Pedestrian Bridge - Scenario 4: Large Obstruction

INPUT VARIABLES FOR CALCULATIONS			
approach flow depth=	y=	6.17	ft
approach flow depth on floodplain=	y _a =	4.36	ft
length of embankment=	L=	15.0	ft
length of obstruction (blockage of flow tube)=	L _{ob} =	15.0	ft
velocity upstream of structure=	V=	4.41	ft/s
Calculated velocity directly upstream of structure=	$V_{ob} =$	4.41	ft/s
abutment shape coefficient=	$K_1 =$	1	
angle of structure to flow=	θ=	90	degrees
unobstructed channel width=	$W_1 =$	40	ft
coefficient for abutment shape (Liu et Al.)=	$K_L =$	2.15	
correction factor for influence of channel bend=	K _p =	1	
correction factor for influence of shape of structure=	$K_s =$	1	
correction factor for influence of angle of attack=	K _a =	1	
correction factor for influence of porosity=	$K_n =$	1	
upstream flow obstructed by abutment/embankment=	$Q_{ob} =$	289	ft ³ /s
upstream flow=	Q =	800	ft ³ /s
unit discharge (Q/W ₁)=	q =	20.0	ft²/s

OUTPUT SUMMARY FOR LOCAL ABUTMENT SCOUR Hansen Creek Pedestrian Bridge - Scenario 4: Large Obstruction

Output Summary Table		-	-
Froehlich Equation [FHWA 2001]		13.58	ft
Liu et. Al. Equation [Hoffmans and Verheij, 1997]		13.66	ft
Ahmed Equation [Hoffmans and Verheij, 1997]		7.39	ft
	Average	11.54	ft

INPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 5: Revetment

symbol	variable	unit	Mean Value
У ₀	existing depth in contracted section before scour	ft	2.67
У 1	average depth in upstream main channel	ft	2.77
Q ₁	flow in upstream main channel	ft ³ /s	800
Q ₂	flow in contracted channel	ft ³ /s	800
W_1	channel bottom width of upstream main channel	ft	40
W ₂	channel bottom width in contracted section	ft	35
D ₅₀	median diameter of bed material	mm	25
S	Slope of energy grade line of main channel	ft/ft	0.021

OUTPUT SUMMARY FOR CONSTRICTION SCOUR Hansen Creek Pedestrian Bridge - Scenario 5: Revetment

Output Summary Table	-	
Laursen Equation	0.35	ft
Parker Equation	0.40	ft
A	verage 0.37	ft

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ATTACHMENT C

HEC-RAS Model Output

	Leach	HIVER STA	Profile	Q Total	Min Ch El	W.S. Elev	E.G. Elev	E.G. Slope	Max Chi Dpth	Vel Chnl	Shear Chan	Ton Width	Erouido # Chi
Hansen Creek	Reach 3 and 4	27	mod flour	(cts)	(Ħ	(ft)	(Ħ)	(ft/ft)	(#)	(ft/s)	(lb/sa ft)	(#)	
Hansen Creek	Reach 2 and 4		MOIL DOT	100.00		89.43	89.50	0.001615	2.09	2.20			Ċ
Hansen Creek	Beach 3 and 4	21	1.25-yr	250.00	87	90.62	90.76	0.001806	3.28	00 0		101.02	10.0
Hansen Crock	Doot 2 and 4		OHWM	300.00	87	90.91	91.07	0.001860	3.57	2002		34.49	0.34
	reacn 3 and 4		2-yr	350.00	87.34	91.17	91.35	0.001910		02.0		41.91	0.35
	Heach 3 and 4		5-yr	500.00	87.34	91.82	92.04	0.00000		9.59		49.76	0.35
Hansen Creek	Reach 3 and 4		25-yr	650.00	87.34	, 92.32	00 55	20020000		3.81	0.42	99.10	0.36
Hansen Creek	Reach 3 and 4		100-yr	800.00	87.34	92.77	93.01	0.002200	4.98	4.06	0.50	105.75	0.37
							0	717700.0	0.40	4.21	0.55	111.68	0.37
Hansen Creek	Heach 3 and 4		mod flow	100.00	87.02	89.32	89.44	0.003001	2.30	77.0	90.0		
	Heach 3 and 4		1.25-yr	250.00	87.02	90.47	90.68	0.003330	245	11.7	0.70	24.78	0.40
mansen Creek	Reach 3 and 4		OHWM	300.00	87.02	90.75	66.06	0.000000	0.40	3.70	0.45	29.83	0.43
Hansen Creek	Reach 3 and 4	26.8*	2-yr	350.00	87.02	0016	01.07		0.10	3.95	0.53	34.80	0.45
Hansen Creek	Reach 3 and 4	26.8*	5-yr	500.00	87.02	01.67	01.67	0.003030	3.98	4.14	0.59	42.83	0.45
Hansen Creek	Reach 3 and 4	26.8*	25-yr	650.00	87.02	10.16	91.90	0.003832	4.65	4.36	0.70	88.99	0.44
Hansen Creek	Reach 3 and 4	26.8*	100-vr	800.00	87.02	32.21	92.47	0.003621	5.19	4.38	0.73	94.86	0.42
					20.10	32.00	92.93	0.003337	5.66	4.38	0.74	99.42	0.40
Hansen Creek	Reach 3 and 4		mod flow	100.00	86.71	80.11	00 00						
Hansen Creek	Reach 3 and 4		1.25-yr	250.00	86.71	an 1a	00.54	0.004907	2.40	3.64	0.40	20.53	0.56
Hansen Creek	Reach 3 and 4	26.6* C	OHWM	300.00	86 71	00.45	30.04	GG1/00.0	3.48	4.69	0.82	28.15	0.60
Hansen Creek	Reach 3 and 4		2-yr	350.00	R6 71	90.43	90.83	0.007771	3.74	4.94	0.94	30.17	0.61
Hansen Creek	Reach 3 and 4	26.6* 5	5-Vr	500.00	1 1 1 0 0 B 6 71	90.09	81.10 01.10	0.008110	3.98	5.13	1.05	34.83	0.62
Hansen Creek	Reach 3 and 4		25-Vr	650.00	90.71 86 71	91.38	91.79	0.006969	4.67	5.26	1.12	79.31	0.57
Hansen Creek	Reach 3 and 4		100-vr		00.71	91.98	92.33	0.005306	5.27	5.08	1.02	82.78	0.50
				0000	00./ 1	92.47	92.81	0.004520	5.76	5.04	0.98	85.62	0.46
Hansen Creek	Reach 3 and 4	26.4* n	mod flow	100.00	86.39	88							
Hansen Creek	Reach 3 and 4	26.4* 1	1.25-yr	250.00	86.39	00.00	00.00	0.014057	2.27	5.20	0.92	17.68	0.88
Hansen Creek	Reach 3 and 4	26.4* 0	OHWM .	300.00	86.30	01.60	30.22	0.016380	3.31	5.78	1.56	27.43	0.81
Hansen Creek	Reach 3 and 4		2-Vr	350.00	86.20	09.90	90.51	0.014741	3.57	5.94	1.59	28.23	0.78
Hansen Creek	Reach 3 and 4	26.4* 5-	5-Vr	500.00	00.00	12.06	90.78	0.013601	3.82	6.08	1.62	28.97	0.76
Hansen Creek	Reach 3 and 4	26.4* 2	25-Vr	650.00	86.00	90.08	79.19	0.011011	4.50	6.37	1.68	39.48	0.70
Hansen Creek	Reach 3 and 4	26.4* 1(100-vr	800.00	00.98	91.01	92.14	0.007592	5.22	6.01	1.44	70.15	0.59
			•	0000	00.09	92.18	92.64	0.006058	5.79	5.82	1.33	72.38	0.53
Hansen Creek	Reach 3 and 4		mod flow	100.00	86.07	88.44	88 68	010010					
Hansen Creek	Heach 3 and 4		1.25-yr	250.00	86.07	89.41	89.83	0.000782	10.2	3.88 20.1	0.72	21.89	0.63
Hansen Oreek	Heach 3 and 4		OHWM	300.00	86.07	89.67	90.14	0.009800	40.0 Ca c	0.71	1.14	24.01	0.65
Hanson Crock	Heach 3 and 4		2-yr	350.00	86.07	89.91	90.44	0.009820	0.00	0.03	1.25	24.57	0.66
	neacn 3 and 4		5-yr	500.00	86.07	90.57	91.22	0 000744		0.0	1.36	25.10	0.66
	Heach 3 and 4		25-yr	650.00	86.07	91.19	91.88	0.008872	00.4	0.47	1.62	28.75	0.67
Sell Cleek	Heach 3 and 4	26.2 10	100-yr	800.00	86.07	91.80	92.44	0.007321	3.12	0.//	1.74	58.12	0.64
Hansen Creek	Reach 3 and 4	SC SC							0.0	0.04	1.65	59.72	0.58
Hansen Creek		× -	MOII DOILI	100.00	85.75	88.51	88.57	0.000756	2.76	2.07			
Hansen Creek			1.23-yr	250.00	85.75	89.46	89.66	0.001883	3.71	3.53	05.0	PO 72	62.0
			IN ML	300.00	85.75	89.72	89.95	0.002231	3.97	3.90	0.00	24.54	00
				350.00	85.75	89.95	90.23	0.002562	4.20	4.22	0.00	54.09 00 AC	95.0
			0-yl 25	500.00	85.75	90.59	90.99	0.003461	4.84	5.05	0.71	24.30 25 82	0.41
				650.00	85.75	91.15	91.65	0.004268	5.40	5.72	900	20.02	0.45
			IUU-yr	800.00	85.75	91.64	92.26	0.004999	5.89	6.30	1.21	00.02	0.49
Hansen Creek	Reach 3 and 4	25 mo	mod flow	100 00	00 67							20.12	70.0
	The second se				i c cx	11.6 0.0							

Divor			C13()C	22					CONTRACTOR NAMES AND ADDRESS OF ADDRESS ADDRES				
IDARL	Reach	HIVER STA				(#)	(Ħ)	. (th/t)	Ð	(ft/s)	(II bs/qI)	<u></u>	
				(cts)		00.00		0.012069	2.23	6.78	1.06	24.89	0.90
Hansen Creek	Reach 3 and 4	25	1.25-yr	250.00	86.57	88.60		0.011401	2 46	7.04	1.13	25.27	0.96
Hancon Crook	Reach 3 and 4	25	OHWM	300.00	86.57	89.03		0.01010	2.68		1.20	25.63	0.93
Hansen Crook	Beach 3 and 4	25	2-Vr	350.00	86.57	89.25		766010.0	00.7 0C C			26.54	0.89
	Doch 3 and 4	25	5-vr	500.00	86.57	89.85		111110.0	0.00				06.0
Hansen Greek	Deach o and A	05 05	25-Vr	650.00	86.57	90.31		0.012040	4/.0				0.91
Hansen Creek	React 3 and 4	2 K	100-vr	800.00	86.57	90.73	92.02	0.012897	4.16		J		
Hansen Creek	Heach 3 and 4	3	·····								0.67	93 29	0.91
			mod flow	100.00	86.20	87.61	87.98	0.012567	1.41				0.86
Hansen Creek	Reach 3 and 4	24.0000		250.00		88.43	89.03	0.009990	2.23				0.80
Hansen Creek	Reach 3 and 4	24.6666	1.40-VI	00.000			89.33	0.009067	2.51	6.34			
Hansen Creek	Reach 3 and 4	24.6666*	MWHO	300.00					. 2.76	6.51			
Hanson Creek	Reach 3 and 4	24.6666*	2-yr	350.00					3.33	7.27	1.30	26.95	0.80
	Doorh 3 and 4	24.6666*	5-vr	500.00	86.20				0.00			27.66	0.85
Tansen Ureek		-14 GEEE*	DE-Mr	650.00	86.20	89.91			0.1				0.91
Hansen Creek	Heach 3 and 4	24.0000	100.44	800.00		90.22	91.51	0.011744	4.02	8.12			
Hansen Creek	Reach 3 and 4	24.0000	Incon										08.0
		and the second se				87 11	R7 47	0.011799	1.27	7 4.79			
Hansen Creek	Reach 3 and 4	24.3333*	mod flow	100.00					2.38	8 5.21	1 0.71		
Hansen Creek	Reach 3 and 4	24.3333*	1.25-yr	250.00					2.69	5.36	6 0.75		
Hanson Crook	Reach 3 and 4	24.3333*	MWHO	300.00						5.55	0.81	27.13	
Hanson Crock	Beach 3 and 4	24.3333*	2-yr	350.00							1.08	28.43	0.68
	Docoh 2 and 4	24 3333*	5-vr	500.00							1 47	29.19	0.76
Hansen Creek		24 3333*	25-Vr	650.00	85.84								0.86
Hansen Ureek	Deact o and t	01 2233*	100-vr	800.00	85.84	4 89.84	4 90.99	0.011003	4.00				
Hansen Creek	Heach 3 and 4	24:0000	·····								0.35	24.56	0.55
			mod flow	100.00	85.47	7 86.93	3 87.11						
Hansen Creek	Heach 3 and 4	64	1 25 1	250.00		7 88.09	9 88.36						
Hansen Creek	Reach 3 and 4	24	IÁ-CZ-1	00.000		7 88.40	0 88.69	0.005115					
Hansen Creek	Reach 3 and 4	24	CHWM	00.000				3 0.005337	3.19				
Hansen Creek	Reach 3 and 4	24	2-yr	00.005				0.005456	3.76				
Hansen Creek	Reach 3 and 4	24	5-yr	500.00					9 4.12		92 1.23		
Hansen Creek	Reach 3 and 4	24	25-yr	650.00							34 1.52	2 88.46	0.61
Hansen Creek	Reach 3 and 4	24	100-yr	800.00	85.47								
							00 47	0 003015	1.52	3.10	10 0.32		
Hansen Creek	Reach 3 and 4	23	mod flow	100.00						38 4.59	59 0.79		
Hansen Creek	Reach 3 and 4	23	1.25-yr	250.00			C0 20 6			2.65 4.85	85 0.91		
Hancan Creek	Reach 3 and 4	23	OHWM	300.00							5.10 0.99	99 42.00	
Hanson Creek	Reach 3 and 4	ឌ	2-yr	350.00							5.68 1.19	103.16	
Hansen Creek		23	5-yr	500.00							6.02 1.27	27 171.33	
Tailseit Oreek		23	25-Vr	650.00	0 84.81							34 172.89	9 0.58
Hansen Oreen		<u>8</u>	100-vr	800.00	0 84.81	81 88.97	97 89.47	7 0.006270					
LIGUISELI CIEGN										4 22	4.38 0.57	57 32.84	4 0.93
Jacob Contraction	Doach 3 and 4	22	mod flow	100.00	0 83.88								0.69
mansen oreen	1	20	1.25-vr	250.0	0 83.88								0.60
Hansen Creek			OHWM	300.00									0.55
Hansen Greek	aller of the second		2-vr	350.00									70 0.52
Hansen Creek		18	5-Vr	500.00									38 0.52
Hansen Creek			25-Mr	650.00	0 83.88	88 87.84							0.50
Hancon Crook	Beach 3 and 4												

ININEL	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	F G Flev	E G Slone	May Chi Dath		OL OL		
Na se februar preventa en entrente esta esta esta esta esta esta de consegura de se februar esta esta consegur				(cfs)	æ	(1)	æ	(#/#)	(±)	1#/e/			Frouge # Chi
Hansen Creek	Reach 3 and 4	27	mod flow	100.00	87.34	89.44	89.51	0.001596	2 10	0 10		Ê	
Hansen Creek	Reach 3 and 4	27	1.25-yr	250.00	87.34	90.64	90.78	0.001771	0.02	2.02 2.02	CI .0	19.62	0.31
Hansen Creek	Reach 3 and 4	27	MWHO	300.00	87.34	0000	01.00	0.001000	0.00	18.2	0.26	34.56	0.34
Hansen Creek	Reach 3 and 4	27	2-yr	350.00	87.34	91.17	91.00 01 35	0.001030	80.0	3.19	0.29	42.24	0.34
Hansen Creek	Reach 3 and 4	27	5-yr	500.00	87.34	01.70	5.10	01010000	0.83	3.40	0.33	49.66	0.35
Hansen Creek	Reach 3 and 4	27	25-yr	650.00	87.34	27.10	00 50	0.00000	4.45	3.85	0.43	98.74	0.37
Hansen Creek	Reach 3 and 4	27	100-yr	800.00	87.34	92.68	92.92	0.002000	4.00	43	0.51	105.13	0.37
						00.10	06.30	0.002430	40.0 1	4.36	0.59	110.46	0.38
Hansen Creek	Reach 3 and 4	26.8*	mod flow	100.00	87.02	89.33	89.45	0.002954	2.31	9 7 C			
Hansen Creek	Reach 3 and 4	26.8*	1.25-yr	250.00	87.02	90.49	90.70	0.003249	3.47	2.10	0.20	24.81	0.40
Hansen Creek	Reach 3 and 4	26.8*	OHWM	300.00	87.02	90.76	91.00	0.003578	14:0	10.0	0.44	29.92	0.43
Hansen Creek	Reach 3 and 4	26.8*	2-yr	350.00	87.02	91.00	91.26	0.00000	0.74	0.0 U	0.52	35.22	0.44
Hansen Creek	Reach 3 and 4	26.8*	5-yr	500.00	87.02	91.64	91 93	0.000043	0.00	4.15	0.60	42.71	0.45
Hansen Creek	Reach 3 and 4	26.8*	25-yr	650.00	87.02	92.15	92.10	0.000963	4.02	4.43	0.72	88.60	0.45
Hansen Creek	Reach 3 and 4	26.8*	100-yr	800.00	87.02	92.57	92.84	0.003745	0.0	4.50	0.77	94.22	0.43
						00	10.30	64/000.0	00.0	4.58	0.82	98.51	0.42
Hansen Creek	Reach 3 and 4	26.6*	mod flow	100.00	86.71	89.13	89.33	0 004781	01.0	2 64			
Hansen Creek	Reach 3 and 4	26.6*	1.25-yr	250.00	86.71	90.23	90.56	0.006801	2 50	0.0	0.39	20.60	0.55
Hansen Creek	Reach 3 and 4	26.6*	MWHO	300.00	86.71	90.47	90.84	0.007581	20.0 AT 0	4.01	0.79	28.41	0.59
Hansen Creek	Reach 3 and 4	26.6*	2-yr	350.00	86 71	90 G8	00100	0.000170		4.00 1	7.R.O	GE.UE	0.61
Hansen Creek	Reach 3 and 4	26.6*	5-vr	500.00	86.71	90.00	91.03	0.007000	3.97	5.15	1.05	34.60	0.62
Hansen Creek	Reach 3 and 4	26.6*	25-vr	650.00	86.71	00.10	0/.18	0.001028	4.60	5.43	1.20	78.94	0.59
Hansen Creek	Reach 3 and 4	26.6*	100-vr	800.00	00.71 BG 71	60.16 CC.CC	92.20	0.00000	5.18	5.31	1.12	82.25	0.53
				000	- / .00	36.35	34.11	0.00341	5.61	5.36	1.12	84.76	0.50
Hansen Creek	Reach 3 and 4	26.4*	mod flow	100.00	86.39	88.53	89.06	0.016034	V F C	101			
Hansen Creek	Reach 3 and 4	26.4*	1.25-yr	250.00	86.39	89.45	90.18 90.18	0.025008	+ 40 c	10.0	10.1	16.27	1.01
Hansen Creek	Reach 3 and 4	26.4*	MWHO	300.00	86.39	89.70	90.45	0.023740	0.0	0.04	CI 2	d).d2	1.01
Hansen Creek	Reach 3 and 4		2-yr	350.00	86.39	89.95	90.71	0.020400	- 0.0 9.7.6	0.00 90 9	07.7	27.42	0.98
Hansen Creek	Reach 3 and 4		5-yr	500.00	86.39	90.62	91.42	0.015624	0.00	7.16		28.20	0.92
Hansen Oreek	Reach 3 and 4		25-yr	650.00	86.39	91.26	92.01	0.011825	4 87	7.07	01.2	02.20	0.83
Hansen Creek	Reach 3 and 4	26.4*	100-yr	800.00	86.39	91.89	92.49	0.008348	5.50	6.56	2.03	71 22	0.73
									2	2	0	77.1.7	0.02
Hansen Creek	Reach 3 and 4		mod flow	100.00	86.07	88.45	88.62	0.006331	2.38	3.24	0.46	25.56	0 50
Lansen Creek	Heach 3 and 4	26.2	1.25-yr	250.00	86.07	89.39	89.70	0.006505	3.32	4.49	0.79	27.22	0.55
Lancon Crock	meach 3 and 4		OHWM	300.00	86.07	89.65	90.00	0.006571	3.58	4.79	0.87	27.67	0.56
Hansen Creek	Peach 3 and 4		2-yr	350.00	86.07	89.89	90.29	0.006600	3.82	5.04	0.95	28.10	0.56
Hansen Orech	Deeden 3 and 4		5-yr	500.00	86.07	90.55	91.05	0.006689	4.48	5.66	1.16	29.23	0.57
Hansen Oreek	Heach 3 and 4		25-yr	650.00	86.07	91.13	91.71	0.006554	5.06	6.11	1.32	57.98	0.57
Tailoell Cleek	Heach 3 and 4	20.2	100-yr	800.00	86.07	91.71	92.28	0.005881	5.64	6.21	1.35	59.48	0.54
Hansen Creek	Reach 3 and 4	26	mod flow	100.00	85.75	88.47	88 50	0.001084	040	1			
Hansen Creek	Reach 3 and 4	26	1.25-yr	250.00	85.75	80.42	80.55	0.0001004	21.2	1./4	0.12	30.37	0.22
Hansen Creek	Reach 3 and 4	26	MWHO	300.00	85.75	89.68	0.00	0.0001300	3.07	2.85	0.34	33.08	0.31
Hansen Creek	Reach 3 and 4	26	2-yr	350.00	85.75	80.03	00.00	0.000500	0.00	0.11 0.00	0.40	33.42	0.32
Hansen Creek	Reach 3 and 4		5-yr	500.00	85.75	00.60	00 84	0100000	4.18	9.94 1.04	0.46	33.74	0.33
Hansen Creek	Reach 3 and 4	26	25-yr	650.00	85.75	91.10	90.04	0.000040	4.85	3.91	0.63	34.61	0.36
Hansen Creek	Reach 3 and 4	26	100-yr	800.00	85.75	01.73	00.00	0.000401	5.44 7.00	4.38	0.80	35.38	0.38
				0	2.20	01.16	97.00	0.003/04	5.98	4.77	0.95	36.07	0.39
Hansen Creek	Reach 3 and 4	25 r	mod flow	100.00	86.57	88.24	88.45	0 000136	1 67	Г <u>с</u> с			
		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		-	-	1	2:	201020	1.0.1	3.07	0.54	28.99	0.67

HEC-RAS Plan: Post-Const Locations: User Defined

Distor	Baach	River Sta	Diver Sta Profile	Q Total		V. C. LIGV	The second se				100 N		
	INUM			(cfs)	(#)	(Ħ)	(ft)	(ft/ft)	(ft)	(ft/s)	(IL bs/ql)	(II)	
			1 25	250.00	86.57	89.10	89.44	0.008548	2.53	4.67	0.85	32.06	0.0
Hansen Creek	Reach 3 and 4	R	1.23-yr	00.002	00.00	80.35	89.72	0.008281	2.78	4.85	0.93	32.81	0.62
Hansen Creek	Reach 3 and 4	25	OHWM	300.00	10.00	00.00	00 00	0 007862	3.03	5.00	0.98	33.17	0.61
Hansen Creek	Reach 3 and 4	25	2-yr	350.00	10.08	00.00	00.00	200,0000	3 69	5.42	1.14	34.15	0.58
Hansen Creek	Reach 3 and 4	25	5-yr	200.00	90.57	90.20	21.05	2002000	70 V	5 79	1.31	35.00	0.57
Hansen Creek	Reach 3 and 4	25	25-yr	650.00	86.57	90.84	91.00 PG PG	0002000	4 80	6.11	1.45	35.78	0.56
Hansen Creek	Reach 3 and 4	25	100-yr	800.00	86.57	15.19	CP.1P	0.000	0				
							00 10	0.010667	1 41	4.85	0.67	23.29	0.91
Hansen Creek	Reach 3 and 4	24.6666*	mod flow	100.00	86.20	10.18	00.10		50 0		0.95	24.92	0.86
Hansen Creek	Reach 3 and 4	24.6666*	1.25-yr	250.00	86.20	88.43	89.03		2.1.2			25.44	0.82
Hansan Craak	Reach 3 and 4	24.6666*	MWHO	300.00	86.20	88.71	89.33		10.7			25 QU	0.8.0
Hansen Crock	Boach 3 and 4	24 6666*	2-VI	350.00	86.20	88.96	89.62		2.76			20.00	
		DA 6666*	<u>5.4</u> r	500.00	86.20	89.53	90.35	0.008889	3.33			CR.07	0.0
Hansen Creek	Heach 3 and 4	24.0000	25 1	650.00	86.20	89.91	90.96	0.010192	3.71	8.20		27.66	C8.0
Hansen Creek	Heach 3 and 4	24.0000	14-02		86.20	90.22	91.51	0.011744	4.02	9.12	2.06	28.22	0.91
Hansen Creek	Reach 3 and 4	24.0000	I/u-yi	00.000	24:00								
12					10.10	07 11	87 47	0.011799	1.27	4.79	0.65	23.07	0.89
Hansen Creek	Reach 3 and 4	24.3333*	mod flow	100.00			15.10		2.38		0.71	25.78	0.67
Hansen Creek	Reach 3 and 4	24.3333*	1.25-yr	250.00			000.04		09.0			26.51	0.65
Hansen Creek	Reach 3 and 4	24.3333*	MWHO	300.00			88.91		200			27.13	0.64
Hansen Creek	Reach 3 and 4	24.3333*	2-yr	350.00			89.27		08.2			28.43	0.68
Hansen Creek	Reach 3 and 4	24.3333*	5-yr	500.00	85.84		89.97		0.10			20.19	0.76
Hanson Crook	Reach 3 and 4	24.3333*	25-yr	650.00	85.84		90.51		3.81			20.64	0.86
Hansen Creek	Reach 3 and 4	24.3333*	100-yr	800.00	85.84	89.84	66.06	0.011003	4.00	0.0		5.51	
									1 15	3.41	0.35	24.56	0.55
Hansen Creek	Reach 3 and 4	24	mod flow	100.00			87.11						0.51
Hansen Creek		24	1.25-yr	250.00									0.50
Hansen Creek		24	MWHO	300.00									0.50
Hansen Creek		24	2-yr	350.00						4.04			0.52
Hansan Craek		24	5-vr	500.00	85.47								0.56
Hansen Creek		24	25-yr	650.00	85.47	89.59							0.61
Hansen Creek	4	24	100-yr	800.00	85.47	89.83	90.47	0.006998	4.36	0.04	7C.1		5
										0	0 30	24.06	0.47
Hansen Creek	Reach 3 and 4	33	mod flow	100.00									0.57
Hansen Creek		23	1.25-yr	250.00	84.81								0.57
Hansen Creek		33	MMHO	300.00	84.81								0.58
Hanson Creek		23	2-Vr	350.00	84.81	87.70							89.0 89.0
Hanson Crook		33	5-Vr	500.00	84.81	88.28							
Hausen Creek		23	25-Vr	650.00	84.81	88.69	89.20						
Hansen Creek		202	100-yr	800.00		88.97	89.47	0.006270	4.16	6 6.26	6 1.34	68.271	
												Ng CC	0.93
Hansen Creek	Reach 3 and 4	8	mod flow	100.00									
Hansen Creek		22	1.25-yr	250.00									
Hanson Crook		22	MWHO	300.00	83.88	86.48							
Hansen Creek		8	2-Vr	350.00	83.88								
Hansen Crook		8	5-vr	500.00	83.88	87.43	87.72						
Hansen Creek		8	25-Vr	650.00		87.84						142.38	
LIGHOGH CICCU	SULTANCES ST					0 17	00 50	0 006498	8 4.29	a 4 71	1.09		

(m) (m) <th>River</th> <th>Reach</th> <th>River Sta</th> <th>Profile</th> <th>Q Total</th> <th>Min Ch El</th> <th>W.S. Elev</th> <th>E.G. Elev</th> <th>F G Slone</th> <th>May Chi Doth</th> <th>Vol Chal</th> <th>Chanchan Chan</th> <th>The Marchall</th> <th></th>	River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	E.G. Elev	F G Slone	May Chi Doth	Vol Chal	Chanchan Chan	The Marchall	
N Memori and (17 Model Model 210 <					(cfs)	(t)	(£)	(t)	(tt/tt)	(¥)	(ft/s)	(lh/sri ft)		
N Means 3 and i (7) (36)	Hansen Creek	Reach 3 and 4	27	mod flow	100.00	87.34	89.44	89.51	0.001597			0.15	oc	15 C
N Memol and i menol and i	Hansen Creek	Reach 3 and 4	27	1.25-yr	250.00	87.34	90.64	90.77	0.001772	3.30	2.12	80 900	94.62	10.0
N Non-state(1 2)/r 3000 9/3 9/13	Hansen Creek	Reach 3 and 4	27	OHWM	300.00	87.34	90.93	91.09	0 001822	0.0	2.0	0.0	04.00	40.0
N Manch 3 mole 1 5 yr Manch	Hansen Creek	Reach 3 and 4	27	2-yr	350.00	87.34	91.18	91.36	0.001891	3.84	0.0	0.69	42.47 E0.05	0.34
N Manual Sandel 27 Bayr Bools 1 4 4 1 0 0 1 0 0 1 0 1 0 1 0 0 1 0 0 1 0 0 1 0	Hansen Creek	Reach 3 and 4	27	5-yr	500.00	87.34	91.79	92.02	0.002111	4.45	3.85	0.00	50.06 A7 90	07.0 10.0
N Membri and tart Trong tart Example and tart Examp	Hansen Creek	Reach 3 and 4	27	25-yr	650.00	87.34	92.27	92.52	0.002305	4.93	4.13	0.51	105 11	76.0
Tempon 3 and 1 Same Tempon 3 and 1 Same Tempon 3 and 1 Same Control Contro Control Control	Hansen Creek	Reach 3 and 4	27	100-yr	800.00	87.34	92.65	92.91	0.002519	5.31	4.41	0.60	110.06	0.39
No. Price Base in the second	Hansen Creek	Reach 3 and 4	26 R*	mod flour										
Reschiption	Hansen Creek	Reach 3 and 4	26.8*	1 25 45	100.00	87.02	89.33	89.44	0.002957	2.31	2.76	0.26	24.81	0.40
N Nome Derive and a line Derive and a line <thderive a="" and="" line<="" th=""> Derive and a line Derive and line</thderive>	Hansen Creek	Reach 3 and 4	26.9*	OLIMA	00.002	87.02	90.49	90.70	0.003250	3.47	3.67	0.44	29.92	0.43
neuronality and and <th< td=""><td>Hansen Creek</td><td>Reach 3 and 4</td><td>26.0</td><td></td><td>300.00</td><td>87.02</td><td>90.77</td><td>91.01</td><td>0.003543</td><td>3.75</td><td>3.91</td><td>0.52</td><td>35.52</td><td>0.44</td></th<>	Hansen Creek	Reach 3 and 4	26.0		300.00	87.02	90.77	91.01	0.003543	3.75	3.91	0.52	35.52	0.44
Neurony and year Ext	Hanson Crook	Boach 2 and 4	20.0	<u>z-yr</u>	350.00	87.02	91.01	91.27	0.003784	3.99	4.12	0.59	43.21	0.45
memory and failed act of comparison	Hansen Creek	Deach 2 and 4	20.8	5-yr or	200.00	87.02	91.64	91.93	0.003978	4.62	4.43	0.72	88.62	0.45
N Membranet Alse 100-yr 80.00 87.04 82.64 0.00086 5.22 4.66 0.64 86.71 Remerbialed 2.68° 1.00-yr 80.00 86.71 80.70 86.71 80.70 86.71 80.70 86.71 80.70 86.71 90.70 50.00 56.71 91.71 0.007486 2.72 91.91 0.007486 56.74 56.91 10.70 36.43 11.72 26.43 11.72 76.43 26.43 11.72 76.44 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 10.76 26.44 26.44 26.44 26.44 26.44 26.44	Hansen Order		20.0	25-yr	650.00	87.02	92.15	92.43	0.003856	5.13	4.50	0.77	94.20	0.43
A Teach Tea	Hansen Ureek	Heach 3 and 4	26.8*	100-yr	800.00	87.02	92.54	92.82	0.003895	5.52	4.65	0.84	98.21	0.43
(1) (2) <td>Hansen Creek</td> <td>Reach 3 and 4</td> <td>26.6*</td> <td>mod flow</td> <td>100.00</td> <td>86.71</td> <td>89.13</td> <td>80.33</td> <td>0 004788</td> <td>07.0</td> <td>70 0</td> <td></td> <td></td> <td></td>	Hansen Creek	Reach 3 and 4	26.6*	mod flow	100.00	86.71	89.13	80.33	0 004788	07.0	70 0			
C Teach 3 and 4 Sec ONW 3000 66 7 911 0.0788 373 479 0.079 3241 Reenth 3 and 4 Eff Fy 5000 66 7 9111 0.0788 312 470 111 22.4 Reenth 3 and 4 Eff 57 9000 66 71 9113 92.27 0.0788 517 511 524 112 22.4 22.4 Reenth 3 and 4 Eff 756 5300 66 71 9113 92.27 0.0589 549 111 22.4 23.4 Reenth 3 and 4 Eff 756 2.4 0.0789 5.6 0.0169 5.4 111 2.2 2.4 Reenth 3 and 4 Eff 756 2.4 0.0169 3.2 7.16 2.4 2.4 Reenth 3 and 4 Eff 756 0.01686 9.13 0.01686 3.2 1.12 2.4 2.4 2.4 2.4 2.4 2.4 2.4 2.4	Hansen Creek	Reach 3 and 4	26.6*	1.25-yr	250.00	86.71	90.23	00.56	0.0041.00	2.4C	0.0	0.39	20.59	0.55
(1) Resent 3 and 4 26° 27° 350.00 66.71 91.75 0.00034 4.76 6.40 1.20 55.40 1.11 0.00034 4.78 6.40 1.11 35.44 Resent 3 and 4 26° 5-yr 6500 96.71 91.37 91.76 0.000365 5.40 1.10 35.44 Resent 3 and 4 26° 100yy 86.00 96.71 92.37 90.46 0.00686 5.40 1.10 84.44 Resent 3 and 4 26° 100yy 86.39 96.46 90.45 0.005866 3.47 7.83 2.44 Resent 3 and 4 26° 100y 86.39 96.46 90.45 0.005866 3.47 7.83 2.44 Resent 3 and 4 26° 100y 86.39 96.46 97.30 0.05866 3.47 7.83 2.44 Resent 3 and 4 26° 100y 86.39 91.46 97.37 7.85 2.46 7.76 2.41 9.44	Hansen Creek	Reach 3 and 4	26.6*	OHWM	300.00	86 71	07.00 00.10	90.00	0.00080	3.52	4.61	0.79	28.41	0.59
Image: Decision and a local period and and a local period and a lo	Hansen Creek	Reach 3 and 4	26.6*	2-vr	350.00	86.71	21.00	11.10	0.00/404	3./8	4.85	0.91	30.47	0.60
Ameni and A 26-yr 66000 66.71 71-91 91.70	Hansen Creek	Reach 3 and 4	26.6*	5-vr	500.00	86.71	90.71	91.11	0.00/938	4.00	5.09	1.03	35.43	0.61
Ameth 3 and 4 265 100-yr 8000 671 92.27 92.04 711 92.24 711 92.24 Reach 3 and 4 26.4* 100-yr 86.39 89.46 90.16 0.006639 5.6 5.4 111 84.24 Reach 3 and 4 26.4* 100-yr 86.39 89.46 90.16 0.026600 3.77 7.35 2.46 27.30 Reach 3 and 4 26.4* 2-yr 30000 86.39 90.46 91.36 0.026600 3.77 7.35 2.46 27.30 Reach 3 and 4 26.4* 2-yr 80000 86.39 90.46 91.36 0.026600 3.77 7.35 2.49 2.49 2.49 Reach 3 and 4 26.4* 10000 86.39 90.46 91.36 0.00630 5.77 7.25 2.49 7.43 Reach 3 and 4 26.4* 100.40 86.37 90.46 92.45 0.01630 5.77 7.25 2.49 7.46 7.56	Hansen Creek	Reach 3 and 4	26.6*	25-yr	650.00	86.71	01.00	80.00	0.006067	4.60	5.43	1.20	78.94	0.59
Reach 3 and 4 Edit Model	Hansen Creek	Reach 3 and 4	26.6*	100-yr	800.00	86.71	00.10	92.20	0.000900	0.17	5.31	1.12	82.24	0.53
Reach 3 and 4 6.4 mod flow 1000 6.53 89.46 0.016656 2.14 5.85 1.07 16.30 Reach 3 and 4 26.4* 125.yr 25000 66.39 89.46 90.16 0.024954 3.06 6.83 2.15 2.57 Reach 3 and 4 26.4* 2.yr 3600 86.39 90.46 91.38 0.019871 4.06 7.13 2.33 2.46 2.73 Reach 3 and 4 26.4* 2.yr 6500 86.39 90.46 91.38 0.019871 4.06 7.76 2.47 2.56 2.46 2.73 Reach 3 and 4 26.4* 100.yr 86.07 90.48 91.48 0.019870 2.46 2.47 2.49 2.49 2.49 2.49 2.46 2.71 7.53 Reach 3 and 4 26.2 1000 86.07 89.49 0.007450 2.32 4.65 7.76 2.49 2.46 2.71 Reach 3 and 4 26.2 1000 86.07							<u>, , , , , , , , , , , , , , , , , , , </u>	001	000000	00.0	0.4 <u>0</u>	1.18	84.44	0.52
Reach 3 and 4 264* 1.35*yr 2500 86.39 89.46 90.18 0.024650 3.17 7.13 2.39 7.13 2.39 7.30 Reach 3 and 4 264* 547 547 5500 86.39 99.66 90.46 0.025650 3.17 7.13 2.39 7.30 Reach 3 and 4 264* 547 5000 86.39 91.66 91.39 0.016302 5.27 7.55 2.49 29.79 Reach 3 and 4 264* 557 0.000 86.39 91.66 0.016302 5.27 7.55 2.49 29.76 Reach 3 and 4 262 155*yr 86.07 98.47 98.97 0.016302 3.27 7.55 2.10 7.63 2.712 Reach 3 and 4 262 15*yr 89.60 99.54 89.86 0.007360 3.27 4.65 7.76 2.47 2.69 2.712 Reach 3 and 4 262 5*yr 80.60 99.54 80.97 0.007360	Hansen Creek	Reach 3 and 4	26.4*	mod flow	100.00	86.39	88.53	89.06	0.016858	2.14	5 85	1 07	16.90	Č
0 Reach 3 and 4 264* OHVM 30000 86.39 99.66 90.45 0.022565 3.27 7.13 2.36 2.73 7.33 Reach 3 and 4 264* 547 7 30000 86.39 99.66 90.70 0.023956 3.47 7.55 2.46 27.91 Reach 3 and 4 264* 547 55000 86.39 91.66 92.42 0.00590 5.77 7.55 2.49 </td <td>Hansen Creek</td> <td>Reach 3 and 4</td> <td>26.4*</td> <td>1.25-yr</td> <td>250.00</td> <td>86.39</td> <td>89.45</td> <td>90.18</td> <td>0.024934</td> <td>a O e</td> <td>0.0</td> <td>10 UT C</td> <td>10.30</td> <td>10.1</td>	Hansen Creek	Reach 3 and 4	26.4*	1.25-yr	250.00	86.39	89.45	90.18	0.024934	a O e	0.0	10 UT C	10.30	10.1
Reach 3 and 4 26.4* 2 yr 36.00 66.39 96.07 0.013971 7.63 2.46 2.73 2.49 2.73 Reach 3 and 4 26.4* 5 yr 65.000 66.39 91.60 91.97 0.013971 7.63 2.46 27.91 Reach 3 and 4 26.4* 100yr 80.000 86.39 91.60 91.97 0.015392 2.46 2.77 2.28 2.49 2.973 Reach 3 and 4 26.4 100yr 86.07 88.40 0.016570 2.36 3.31 0.49 7.63 2.49 2.98 Reach 3 and 4 26.2 1.25yr 2500 86.07 90.22 0.007260 3.56 0.49 7.63 2.46 2.71 Reach 3 and 4 26.2 0.44 26.7 7.25 2.47 10.6 2.754 Reach 3 and 4 26.2 0.44 26.7 7.25 2.49 2.76 2.754 Reach 3 and 4 26.2 10007260 3.76 0.0072	Hansen Creek	Reach 3 and 4		MWHO	300.00	86.39	89.66	90.45	0.025620	3.97	0.00		11.02	10.1
Reach 3 and 4 26.4* 5yr 50.00 86.39 91.48 91.36 0.016371 7.03 7.63 2.49 2.07 Reach 3 and 4 26.4* 100yr 86.30 91.04 91.37 0.016397 7.63 2.49 2.97 Reach 3 and 4 26.4* 250yr 86.00 86.39 91.04 91.37 0.016372 7.65 2.49 2.97 Reach 3 and 4 26.2 mod 10w 100.00 86.07 88.45 0.016370 2.35 2.49 2.37 Reach 3 and 4 26.2 DHW 300.00 86.07 88.45 0.007656 3.37 2.45 2.49 2.55 Reach 3 and 4 26.2 DHW 300.00 86.07 98.77 90.22 0.007433 3.77 2.46 2.85 Reach 3 and 4 26.2 DYM 80.07 98.77 90.23 3.71 2.43 2.75 Reach 3 and 4 26.2 DYM 80.77 90.23 90.37 3	Hansen Creek	Reach 3 and 4	26.4*	2-yr	350.00	86.39	89.86	90.70	0.023956	3.47	7 35	0.7 04 C	05.12	1.01
Reach 3 and 4 26.4* 25.yr 66:00 86.33 91.04 91.57 0.015392 4.65 7.76 2.47 4.88 Reach 3 and 4 26.4* 100-yr 80.00 86.39 91.66 92.42 0.016990 5.27 7.75 2.10 7.03 Reach 3 and 4 26.2 mod flow 100.00 86.07 88.43 88.60 0.005780 2.37 4.65 7.76 2.47 4.9.89 Reach 3 and 4 26.2 1,28-yr 23000 86.07 90.34 90.34 0.007430 3.27 4.65 0.33 27.14 Reach 3 and 4 26.2 2,yr 59.00 86.07 90.34 0.007433 3.72 4.85 0.33 27.14 Reach 3 and 4 26.2 5,yr 50.00 86.07 90.34 0.007433 3.72 5.89 1.04 27.14 Reach 3 and 4 26.2 5,yr 50.00 86.07 90.34 0.00733 5.32 5.91 7.16	Hansen Creek	Reach 3 and 4		5-yr .	500.00	86.39	90.48	91.38	0.018971	4.09	7.63	2.40	18.12	66.0
Reach 3 and 4 264* 100-yr 86.00 86.39 91.66 92.42 0.010690 5.27 7.25 2.10 7.33 Reach 3 and 4 26.2 145/yr 250.00 86.07 88.60 0.006780 2.36 331 0.43 2551 Reach 3 and 4 26.2 1.55/yr 250.00 86.07 89.34 89.65 0.007050 3.27 4.32 0.33 27.12 Reach 3 and 4 26.2 1.55/yr 350.00 86.07 89.37 89.35 0.007433 3.72 5.24 1.04 27.83 Reach 3 and 4 26.2 5.yr 360.00 86.07 90.39 90.043 3.72 5.24 1.04 27.84 Reach 3 and 4 26.2 5.yr 86.00 86.07 90.39 90.34 4.32 5.36 4.0.76 90.76 Reach 3 and 4 26.2 100.9 86.07 90.31 91.46 0.012 2.30 1.04 27.64 Reach 3 and 4	Hansen Creek	Reach 3 and 4		25-yr	650.00	86.39	91.04	91.97	0.015392	4.65	7 76	2.43	10.00	0.91
Heach 3 and 4 26.2 modellow 100.00 86.07 88.43 88.66 0.006780 2.36 3.31 0.49 25.51 Reach 3 and 4 26.2 1.25-yr 250.00 86.07 89.34 89.67 0.006780 2.36 3.31 0.49 25.51 Reach 3 and 4 26.2 1.25-yr 250.00 86.07 89.37 89.35 0.007260 3.27 4.62 0.33 7.712 Reach 3 and 4 26.2 2-yr 350.00 86.07 99.35 0.007243 3.72 5.24 1.04 27.15 Reach 3 and 4 26.2 2-yr 550.00 86.07 90.39 90.041 4.82 5.86 1.30 26.96 1.61 27.15 Reach 3 and 4 26.2 100-yr 80.00 86.07 91.46 92.14 0.00738 5.36 6.76 1.61 27.12 Reach 3 and 4 26.2 100-yr 80.00 86.77 91.46 92.14 0.04 27.3	Hansen Creek	Reach 3 and 4		100-yr	800.00	86.39	91.66	92.42	0.010890	5.27	7.25	2.10	70.33	0.83
matrix and 4 zez modilow 100.00 86.07 88.43 88.66 0.006780 2.36 3.31 0.49 25.51 Reach 3 and 4 26.2 OHWM 300.00 86.07 89.97 90.0756 3.27 4.82 0.89 27.12 Reach 3 and 4 26.2 OHWM 300.00 86.07 89.97 90.0736 3.57 0.49 25.54 Reach 3 and 4 26.2 5.47 5.00 86.07 90.39 90.94 0.007433 3.72 5.84 1.04 27.54 Reach 3 and 4 26.2 5.47 5.00 86.07 90.39 90.94 0.007383 3.72 5.84 1.04 27.54 Reach 3 and 4 26.2 5.54 650.00 86.07 91.45 92.14 0.007383 5.38 1.53 40.76 92.81 Reach 3 and 4 26 1.254 26.00 86.07 90.34 60.01 1.61 28.81 1.53 40.76 1.53 40.76	Hanson Crook	Baach O and A												-
Reach 3 and 4 26.2 1.32-yr 250.00 86.07 89.34 89.67 0.007056 3.27 4.62 0.83 2.712 Reach 3 and 4 26.2 D+WM 300.00 86.07 89.37 89.35 0.007550 3.50 0.83 27.54 1.04 27.54 Reach 3 and 4 26.2 5-yr 500.00 86.07 90.39 90.34 0.007333 3.72 5.24 1.04 27.93 Reach 3 and 4 26.2 5-yr 650.00 86.07 91.45 90.39 90.34 0.007333 4.32 5.89 1.53 40.76 Reach 3 and 4 26.2 100-yr 800.00 86.07 91.45 91.74 0.007333 5.38 6.76 1.61 58.81 Reach 3 and 4 26 100-yr 800.00 85.75 88.49 0.007233 3.43 0.76 0.12 30.29 Reach 3 and 4 26 10-yr 80.00 85.75 89.49 0.002230 3.86	Jansen Creek	Deach 3 and 4		mod flow	100.00	86.07	88.43	88.60	0.006780	2.36	3.31	0.49	25.51	0.54
Treaction and 4 -6 OTHWM 300.00 86.07 89.57 89.95 0.007350 3.50 4.95 0.94 27.54 Reach 3 and 4 26.2 2.yr 550.00 86.07 90.39 90.22 0.007433 3.72 5.24 1.04 27.93 Reach 3 and 4 26.2 5.yr 650.00 86.07 90.39 91.58 0.00843 4.32 5.39 1.04 27.93 Reach 3 and 4 26.2 100-yr 80.00 86.07 91.45 92.14 0.00738 5.38 1.53 40.76 28.91 Reach 3 and 4 26.2 100-yr 80.00 86.07 91.45 92.14 0.00738 5.38 6.76 1.61 27.93 Reach 3 and 4 26 1.25-yr 80.00 85.75 88.45 88.45 93.62 0.0124 2.76 1.76 0.76 36.76 Reach 3 and 4 26 0.46 26 0.291 0.002328 3.62 2.91 <td< td=""><td>Hanson Crook</td><td>Doch 2 and 4</td><td></td><td>1.25-yr</td><td>250.00</td><td>86.07</td><td>89.34</td><td>89.67</td><td>0.007056</td><td>3.27</td><td>4.62</td><td>0.83</td><td>27.12</td><td>0.58</td></td<>	Hanson Crook	Doch 2 and 4		1.25-yr	250.00	86.07	89.34	89.67	0.007056	3.27	4.62	0.83	27.12	0.58
Interaction and the solution of the sol	Hanson Crook	Doroh 2 and 4		CHWM	300.00	86.07	89.57	89.95	0.007250	3.50	4.95	0.94	27.54	0.59
Heaten 3 and 4 26 9-yr 500.00 86.07 90.39 90.34 0.007843 4.32 5.98 1.30 28.95 Reach 3 and 4 26.2 25-yr 650.00 86.07 90.31 91.56 0.53 1.53 40.76 Reach 3 and 4 26.2 100-yr 800.00 86.07 91.45 92.14 0.007388 5.38 6.76 1.61 58.81 Reach 3 and 4 26 1.25-yr 250.00 86.75 88.45 90.01124 2.70 1.76 0.12 30.29 Reach 3 and 4 26 1.25-yr 250.00 85.75 89.81 89.61 0.002328 3.67 0.12 30.29 Reach 3 and 4 26 1.25-yr 300.00 85.75 89.81 80.71 0.002328 3.43 0.43 33.33 Reach 3 and 4 26 2-yr 50.00 85.75 90.45 90.71 0.003328 3.43 0.43 Reach 3 and 4 26 2-yr	Hansen Creek	Beach 2 and 4		z-yr 5	350.00	86.07	89.79	90.22	0.007433	3.72	5.24	1.04	27.93	0.60
	Hansen Creek	Reach 3 and 4			500.00	86.07	90.39	90.94	0.007843	4.32	5.98	1.30	28.95	0.62
Montane and the second of the second secon	Hansen Creek	Reach 3 and 4		100.1	00.000	86.07	90.91	91.58	0.008011	4.84	6.55	1.53	40.76	0.63
Reach 3 and 4 26 mod flow 100.00 85.75 88.45 88.49 0.001124 2.70 1.76 0.12 30.29 Reach 3 and 4 26 1.25-yr 250.00 85.75 89.37 89.50 0.002328 3.62 2.91 0.35 33.01 Reach 3 and 4 26 0.HWM 300.00 85.75 89.61 89.77 0.002328 3.62 2.91 0.35 33.01 Reach 3 and 4 26 0.HWM 300.00 85.75 89.61 89.77 0.002329 3.62 3.3.01 23.3.3 Reach 3 and 4 26 0.HWM 300.00 85.75 89.84 90.02 0.002329 3.49 0.42 3.43 Reach 3 and 4 26 5-yr 50.00 85.75 90.45 90.71 0.003423 4.70 0.49 3.41 Reach 3 and 4 26 25-yr 50.00 85.75 91.50 91.32 0.003423 4.70 0.69 34.41 R		H 2010 0 100001		IA-001	800.00	86.07	91.45	92.14	0.007388	5.38	6.76	1.61	58.81	0.61
Reach 3 and 4 26 1.25-yr 250.00 85.75 89.37 89.50 0.002228 3.62 2.91 0.12 30.29 Reach 3 and 4 26 OHWM 300.00 85.75 89.61 0.002328 3.62 2.91 0.35 33.01 Reach 3 and 4 26 2-yr 350.00 85.75 89.61 89.77 0.002329 3.62 2.91 0.35 33.01 Reach 3 and 4 26 2-yr 50.00 85.75 90.45 90.071 0.002329 3.49 0.49 33.62 33.62 Reach 3 and 4 26 5-yr 50.00 85.75 90.45 90.71 0.003423 4.70 4.08 0.69 34.41 Reach 3 and 4 26 100-yr 86.75 91.50 91.32 0.003423 5.75 5.02 1.04 35.12 35.12 Reach 3 and 4 26 100-yr 86.57 91.50 91.89 0.004243 5.75 5.02 1.04 35.78<	lansen Creek	Reach 3 and 4		mod flow	100.00	85.75	88.45	88.40	0.001104	C C	1			
Reach 3 and 4 26 OHWM 300.00 85.75 8961 89.77 0.002590 3.36 3.19 0.35 33.01 Reach 3 and 4 26 2-yr 350.00 85.75 89.81 89.77 0.002590 3.38 3.19 0.35 33.33 Reach 3 and 4 26 5-yr 500.00 85.75 90.45 90.07 0.002829 4.70 4.09 3.44 0.49 33.62 Reach 3 and 4 26 5-yr 650.00 85.75 90.99 91.32 0.003822 4.70 4.08 0.69 34.41 Reach 3 and 4 26 100-yr 800.00 85.75 91.50 91.32 0.003822 5.24 4.60 0.89 35.12 Reach 3 and 4 26 100-yr 800.00 85.75 91.50 91.89 0.00243 5.75 5.02 1.04 35.78 Reach 3 and 4 26 100-yr 80.00 85.75 91.89 0.00423 5.75 5.02 <td>Hansen Creek</td> <td>Reach 3 and 4</td> <td></td> <td>1.25-yr</td> <td>250.00</td> <td>85.75</td> <td>89.37</td> <td>80.50</td> <td>0.0000</td> <td>2.10</td> <td>0/</td> <td>0.12</td> <td>30.29</td> <td>0.23</td>	Hansen Creek	Reach 3 and 4		1.25-yr	250.00	85.75	89.37	80.50	0.0000	2.10	0/	0.12	30.29	0.23
Reach 3 and 4 26 2-yr 350.00 85.75 89.84 90.02 0.002829 0.18 0.12 0.42 33.53 Reach 3 and 4 26 5-yr 500.00 85.75 90.45 90.71 0.002829 4.09 3.44 0.49 33.62 Reach 3 and 4 26 5-yr 650.00 85.75 90.45 91.32 0.003822 4.70 4.08 0.69 34.41 Reach 3 and 4 26 25-yr 650.00 85.75 91.50 91.32 0.003832 5.74 4.60 0.88 35.12 Reach 3 and 4 26 100-yr 800.00 85.75 91.50 91.89 0.004243 5.75 5.02 1.04 35.78 Reach 3 and 4 25 mod flow 100.00 85.75 91.50 91.89 0.004243 5.75 1.04 35.78 Reach 3 and 4 25 mod flow 100.00 85.57 88.18 88.42 0.011501 1.61 3.62 <t< td=""><td>Hansen Creek</td><td>Reach 3 and 4</td><td></td><td>OHWM</td><td>300.00</td><td>85.75</td><td>89.61</td><td>89.77</td><td>0.002520</td><td>3.02</td><td>10.1</td><td>0.35</td><td>33.01</td><td>0.32</td></t<>	Hansen Creek	Reach 3 and 4		OHWM	300.00	85.75	89.61	89.77	0.002520	3.02	10.1	0.35	33.01	0.32
Reach 3 and 4 26 5-yr 500.00 85.75 90.45 90.71 0.003423 4.70 0.44 0.49 33.62 Reach 3 and 4 26 25-yr 650.00 85.75 90.45 90.12 0.003423 4.70 4.08 0.69 34.41 Reach 3 and 4 26 100-yr 800.00 85.75 91.50 91.82 0.003892 5.24 4.60 0.88 35.12 Reach 3 and 4 26 100-yr 800.00 85.75 91.50 91.89 0.004243 5.75 5.02 1.04 35.78 Reach 3 and 4 25 mod flow 100.00 86.57 88.18 88.42 0.011501 1.61 3.92 0.62 28	Hansen Creek	Reach 3 and 4		2-yr	350.00	85.75	89.84	00.09	0.002820		0.0	0.42	33.33	0.33
Reach 3 and 4 26 25-yr 650.00 85.75 90.99 91.32 0.003892 5.24 4.60 0.08 35.12 Reach 3 and 4 26 100-yr 800.00 85.75 91.50 91.89 0.004243 5.75 5.02 1.04 35.78 Reach 3 and 4 26 100-yr 800.00 85.75 91.50 91.89 0.004243 5.75 5.02 1.04 35.78 Reach 3 and 4 25 mod flow 100.00 86.57 88.18 88.42 0.011501 1.61 3.92 0.62 28.77	lansen Creek	Reach 3 and 4		5-yr	500.00	85.75	90.45	90.71	0.003423	4 70	0.44 A OR	0.49	33.62	0.35
Reach 3 and 4 26 100-yr 800.00 85.75 91.50 91.89 0.004243 5.75 5.02 1.04 35.78 Reach 3 and 4 25 mod flow 100.00 86.57 88.18 88.42 0.011501 1.61 3.92 0.62 28.77	Hansen Creek	Reach 3 and 4		25-yr	650.00	85.75	90.99	91.32	0.003892	5 24	7 60	0000	-+:+0	0.00
Reach 3 and 4 25 mod flow 100.00 86.57 88.18 88.42 0.011501 1.61 3.92 0.62 28.77	Hansen Creek	Reach 3 and 4		100-yr	800.00	85.75	91.50	91.89	0.004243	5.75	4.00	0.0	30.12	0.40
Reach 3 and 4 25 mod flow 100.00 86.57 88.18 88.42 0.011501 1.61 3.92 0.62 28.77										5	20.0	04	30./8	0.42
	Tansen Creek	Reach 3 and 4		mod flow	100.00	86.57	88.18	88.42	0.011501	1.61	3.92	0.62	28.77	0 73

HEC-RAS Plan: Post - Small(S2) Locations: User Defined

	Reach	River Sta	Bivar Reach River Sta Profile	Q Total	Min Ch El	W.S. Elev	E.G. Elev	E.G. Slope	Max Chi Dpth	Vel Chri	Offeat Clian		
and the				(cfs)	£	(Ħ)	(H)	(ft/ft)	(Ħ)	(ft/s)	(lb/sq ft)	(II)	
		<u>1</u> C	1 25.11	250.00	86.57	88.99	89.38	0.010304	2.42	5.00	0.98	31.67	0./0
Hansen Creek	Reach 3 and 4	<u>8</u>	iy-c2.1	00.002	5.00	10.00	80 64	0.010351	2.64	5.25	1.09	32.45	0.70
Hansen Creek	Reach 3 and 4	25	OHWM	300.00	10.08	09.40	0000	0.010.00	2.85			32.91	0.69
Hansen Creek	Reach 3 and 4	25	2-yr	350.00	86.57	89.42	00.00		0.10		141	33.75	0.68
Hansen Creek	Reach 3 and 4	25	5-yr	500.00	86.57	89.99	00.08		74.0	6.02 6.45		34.52	0.66
Hansen Creek	Reach 3 and 4	25	25-yr	650.00	86.57	90.51	91.19	00060000	10.0 L			35.26	0.65
Hansen Creek	Reach 3 and 4	25	100-yr	800.00	86.57	91.02	91.73	0.009248	64.45	0./0		0.00	
						04 66	87 85	0.015048	1.27	4.35	0.85	25.69	0.81
Hansen Creek	Reach 3 and 4	24.6666*	mod flow	100.00	80.29	00.00	CO. 10					28.49	0.81
Hansen Creek	Reach 3 and 4	24.6666*	1.25-yr	250.00	80.29	00.00	00.04					28.77	0.79
Hansen Creek	Reach 3 and 4	24.6666*	OHWM	300.00	86.29	00.88	00.11		6			29.03	0.78
Hansen Creek	Reach 3 and 4	24.6666*	2-yr	350.00	86.29	88.77	89.37					20.05	0.79
Hansen Creek	Reach 3 and 4	24.6666*	5-yr	500.00	86.29	89.29	90.04					20.02	0.85
Hansen Creek	Reach 3 and 4	24.6666*	25-yr	650.00	86.29	89.62	90.60					0.00	0.04
Hansen Creek	Reach 3 and 4	24.6666*	100-yr	800.00	86.29	89.82	91.11	0.020717	3.54	9.11	3.28	20.00	,
										C		36 10	0.54
Hansen Creek	Reach 3 and 4	24.3333*	mod flow	100.00	85.84	87.17	87.31					00.19 20.75	94.0
Hansen Creek	Reach 3 and 4	24.3333*	1.25-yr	250.00	85.84	88.16	88.35						0.45
Hansen Creek	Reach 3 and 4	24.3333*	MWHO	300.00	85.84	88.43	88.64						
Hanson Crook	Boach 3 and 4	24 3333*	2-vr	350.00	85.84	88.68	88.90	0.005374					č o
Hansen Crook	Reach 3 and 4	24.3333*	5-Vr	500.00	85.84	89.27	89.55						0.40
Hansen Crock	Deach 3 and 4	24 3333*	25-Vr	650.00	85.84	89.65	90.02	0.006055	3.81				0.49
Hansen Creek	Reach 3 and 4	24.3333*	100-yr	800.00	85.84	89.92	90.39	0.007128	4.08	5.50	1.38	44.84	0.04
												00 00	0.37
Hancan Craak	Reach 3 and 4	24	mod flow	100.00	85.47	86.96							
Hancon Crook	Reach 3 and 4	24	1.25-Vr	250.00	85.47	87.99	88.13						
Hanson Crook	Reach 3 and 4	24	OHWM	300.00	85.47	88.27	88.43						
Hanson Crook	Beach 3 and 4		2-vr	350.00	85.47	88.52	88.69	0.004154					
Harren Crock	Doroh 2 and 4	100	5-Vr	500.00	85.47	89.12	89.33	0.004177	3.65				
nansen oreen	Dooch 2 and 4	5	25-M	650.00			89.78	0.004468	4.04	4.18			
Hansen Creek	Reach 3 and 4	24	100-yr	800.00		89.78	90.10	0.005001	4.31	4.65	1.09	107.35	0.43
											10.0	30.58	0.38
Hansen Creek	Reach 3 and 4	8	mod flow	100.00									
Hansen Creek		8	1.25-yr	250.00									
Hancon Crook	Reach 3 and 4	23	MWHO	300.00	84.81	87.48	87.72						
Hansen Creek		33	2-Vr	350.00	84.81	87.71							
Hansan Crook		23	5-vr	500.00	84.81	88.31	88.62						
Hansen Crock		3 8	25-V	650.00		88.72	89.06	0.005385	3.91				
Harisen Crock		3 8	100-vr	800.00			89.35	0.005313	3 4.20	5.11	1 1.16	173.09	0.47
dilogi cigar		}											
Hancon Crook	Beach 3 and 4	33	mod flow	100.00	83.88	85.21	85.51						
Hanson Crock		1 6	1 25-Vr	250.00	83.88	86.09	86.43	3 0.008759					
Hansen Creek		3 6	CHIMM	300.00			86.76	0.007556	6 2.60	0 4.29			
Hansen Orock		3	0-vr	350.00			87.06	0.006975	5 2.91	1 4.16			
Hansen Creek		18	5.4	500.00			87.72	2 0.006874	4 3.55				
lansen Creek		3 6	0.91 25-Vr	650.00				6 0.007175	5 3.96				
Hansen Crock		18	100-vr	800.00			88.50	0 0.006498	8 4.29	9 4.71	1.09	9 153.28	0.50

HIVE	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	E.G. Elev	E.G. Slope	Max Chi Dpth	Vel Chul	Shear Chan	Top Width	Fronda # Chl
Hancon Crook	Doct of Lond	51		(cfs)	Ð	(ŧ)	(¥)	(ft/ft)	(#)	(ft/s)	(Ib/sa ft)	(#)	
Hansell Creek	Heach 3 and 4	2/	mod flow	100.00	87.34	89.44	89.51	0.001595	2.10	2.19	0.15	29.51	0.31
Tarisen Creek	Heach 3 and 4	27	1.25-yr	250.00	87.34	90.62	90.76	0.001803	3.28	2.99	0.26	34 49	10.0
Hansen Creek	Heach 3 and 4	27	MWHO	300.00	87.34	90.91	91.07		3.57	3.21	0.30	A1 BA	10.0
Hansen Creek	Heach 3 and 4	27	2-yr	350.00	87.34	91.17	91.35		3 83	3 40	00.0		20.0
Hansen Creek	Reach 3 and 4	27	5-yr	500.00	87.34	91.82	92.03		4.48	3.81	0.00	49.00	0.35 90.0
Hansen Creek	Reach 3 and 4		25-yr	650.00	87.34	92.31	92.55		4.97	4.07	0.10	99.00 105 60	0.0
Hansen Creek	Reach 3 and 4	27	100-yr	800.00	87.34	92.79	93.02		5.45	4.18	0.55	111.91	0.37
Hansen Creek	Reach 3 and 4	76 O*											2
Hanson Crook	Doroh 2 and 4		Moli Dom	100.00	87.02	89.33	89.45	0.002953	2.31	2.76	0.26	24.81	0.40
Hanson Crock	Deceb 2 and 4	t ant All Mithead an	1.25-yr	250.00	87.02	90.47	90.69	0.003323	3.45	3.70	0.45	29.84	0.43
Hancon Crock	Deet o and 4		OHWM	300.00	87.02	90.74	90.99	0.003636	3.72	3.95	0.53	34.70	0.45
ansen Creek	Heach 3 and 4		2-yr	350.00	87.02	90.99	91.26	0.003851	3.97	4.15	0.60	42.66	24.0
nansen creek	Heach 3 and 4		5-yr	500.00	87.02	91.67	91.95	0.003840	4.65	4.36	07.0	88 07	64-0 74-0
Hansen Creek	Reach 3 and 4		25-yr	650.00	87.02	92.20	92.46	0.003664	5.18	4 40	0.70	00.90	0.44
Hansen Creek	Reach 3 and 4	26.8*	100-yr	800.00	87.02	92.70	92.94	0.003268	5.68	4.35	0.73	99.58	0.40
Hansen Creek	Reach 3 and 4	26.6*	mod flow	100.00	86.71	00 10							
Hansen Creek	Reach 3 and 4	26.6*	1.25-vr	250.00	86 71	00.00	00.00	0.004779	2.42	3.61	0.39	20.60	0.55
Hansen Creek	Reach 3 and 4		OHWM	300.00	00.00 06 71	00.00	90.04	0.00/133	3.49	4.68	0.81	28.17	09.0
Hansen Creek	Reach 3 and 4		2-vr	350.00	00./1 BG 71	90.44 00 60	90.82	0.007814	3.73	4.95	0.95	30.13	0.62
Hansen Creek	Reach 3 and 4		5-Vr	200.00	00.71	90.00	81.08	0.008184	3.97	5.15	1.05	34.58	0.62
Hansen Creek	Reach 3 and 4	Hart - The	25-vr	650.00	00.71 BG 71	90.10 20.10	91./9	0.00/028	4.66	5.27	1.13	79.27	0.57
Hansen Creek	Reach 3 and 4		100-vir		00.11	91.90	92.32	0.005419	5.25	5.12	1.04	82.68	0:50
			6 00	00.000	00./1	92.26	92.82	0.004395	5.79	4.98	0.96	85.77	0.46
Hansen Creek	Reach 3 and 4		mod flow	100.00	86.39	88.53	89.06	0.016952	014	£ 07	- CO		
Hansen Creek	Reach 3 and 4		1.25-yr	250.00	86.39	89.62	90.20	0.019181	3 23	00.9) 14	07.01	10.1
Hansen Creek	Reach 3 and 4		OHWM	300.00	86.39	89.90	90.49	0.016347	3.51	6.14	12/1	21.13	0.87
Hansen Creek	Heach 3 and 4		2-yr	350.00	86.39	90.16	90.76	0.014607	3.77	6.23	1 71	40.04	70.0
Hansen Creek	Heach 3 and 4		5-yr	500.00	86.39	90.87	91.51	0.011269	4.48	6.42	1 71	00.02	0.74
Hariseri Oreek	Heach 3 and 4		25-yr	650.00	86.39	91.57	92.12	0.007963	5.18	6.12	1 50	00.00	0.9.0
nansen Creek	Heach 3 and 4	26.4*	100-yr	800.00	86.39	92.22	92.67	0.005808	5.83	5.72	1.28	72.53	0.52
Hansen Creek	Reach 3 and 4	26.2	mod flow	100.00	86.07	00 40	1			-			
Hansen Creek	Reach 3 and 4		1.25-yr	250.00	86.07	89.59	80.85	0.004875	2.49	2.98	0.39	25.74	0.46
Hansen Creek	Reach 3 and 4		MWHO	300.00	86.07	80.86	00.00	0.004920	3.02	4.09	0.64	27.57	0.48
Hansen Creek	Reach 3 and 4		2-yr	350.00	86.07	90.12	90.10 90.45	0.003020	3.79	4.37	0.72	28.05	0.49
Hansen Creek	Reach 3 and 4	26.2 5	5-yr	500.00	86.07	90.81	50.10 50.10	0.000100	4.05	4.61	0.79	28.49	0.50
Hansen Creek	Reach 3 and 4	26.2	25-yr	650.00	86.07	91.46	01.00	061600.0	4./4	9.20	0.97	35.10	0.51
Hansen Creek	Reach 3 and 4	26.2	100-yr	800.00	86.07	92.08	20.10	0.004307	0.00	0.4/ 0.1	1.05	58.84	0.49
1									5.5	00.0	1.07	60.44	0.46
Hansen Crock			mod flow	100.00	85.75	88.57	88.61	0.000942	2.82	1.65	0.11	30.67	10.0
Hansen Creek	Boach 2 and 4		1.25-yr	250.00	85.75	89.62	89.73	0.001791	3.87	2.65	0.29	33.33	0.28
Hansen Creek		2 20	CHWM	300.00	85.75	89.89	90.02	0.001976	4.14	2.90	0.35	33.69	62.0
Hansen Creek			2-yr -	350.00	85.75	90.15	90.30	0.002137	4.40	3.12	0.40	34.03	0.30
Hansen Creek			5-yr	500.00	85.75	90.86	91.07	0.002523	5.11	3.66	0.55	34.95	0.33
Hansen Creek			400 Jun	650.00	85.75	91.49	91.75	0.002817	5.74	4.09	0.69	35.77	0.34
			in-bo	800.00	85.75	92.07	92.38	0.003057	6.32	4.45	0.82	36.51	0.35
Hansen Creek	Reach 3 and 4	25 m	mod flow	100.00	86.57	88.41	88.56	0 ONFRED	70 T	000			
					-			****	<u>t</u> .	3.09	0.37	29.62	0.52

			Construction of the owner							141	
Reach 3 and 4 Reach 3 and 4 <td< th=""><th></th><th>(cfs)</th><th>(#)</th><th>(#)</th><th>(£)</th><th>(ft/ft)</th><th>(#)</th><th>(fVs)</th><th>(Ib/sq ft</th><th>(II)</th><th>L C</th></td<>		(cfs)	(#)	(#)	(£)	(ft/ft)	(#)	(fVs)	(Ib/sq ft	(II)	L C
Reach 3 and 4	1 25-Mr	250.00	86.57	89.41	89.65	0.005308	2.84			32.89	nc.n
Heach 3 and 4 Heach 3 and 4 Reach 3 and 4 <td< td=""><td></td><td>00.005</td><td>86.57</td><td>89.67</td><td>89.94</td><td>0.005234</td><td>3.10</td><td>4.14</td><td>0.67</td><td>33.28</td><td>0.50</td></td<>		00.005	86.57	89.67	89.94	0.005234	3.10	4.14	0.67	33.28	0.50
Reach 3 and 4 Reach 3 and 4 <td< td=""><td></td><td>200.000</td><td>00.00 06.67</td><td>80.03</td><td>00 06</td><td>0.005184</td><td>3.36</td><td>4.33</td><td>0.73</td><td>33.65</td><td>0.49</td></td<>		200.000	00.00 06.67	80.03	00 06	0.005184	3.36	4.33	0.73	33.65	0.49
Reach 3 and 4 Reach 3 and 4 <td< td=""><td>Z-yr -</td><td>00.000</td><td>00.00</td><td>00.60</td><td>90 08</td><td>0 005105</td><td>4.05</td><td>4.78</td><td>0.89</td><td>34.68</td><td>0.49</td></td<>	Z-yr -	00.000	00.00	00.60	90 08	0 005105	4.05	4.78	0.89	34.68	0.49
Reach 3 and 4 Reach 3 and 4 <td< td=""><td>5-yr</td><td>200.00</td><td>73.00</td><td>20.05</td><td>01.65 01.65</td><td>0.005091</td><td>4.67</td><td>5.14</td><td>1.03</td><td>35.60</td><td>0.48</td></td<>	5-yr	200.00	73.00	20.05	01.65 01.65	0.005091	4.67	5.14	1.03	35.60	0.48
Reach 3 and 4 Reach 3 and 4 <td< td=""><td>25-yr</td><td>00.000</td><td>73.90</td><td>01 82</td><td>00.10</td><td>0.005110</td><td>5.25</td><td>5.44</td><td>1.16</td><td>36.44</td><td>0.48</td></td<>	25-yr	00.000	73.90	01 82	00.10	0.005110	5.25	5.44	1.16	36.44	0.48
Reach 3 and 4Reach 3 and 4 </td <td>100-yr</td> <td>800.00</td> <td>10.08</td> <td>20.18</td> <td>36.61</td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td>	100-yr	800.00	10.08	20.18	36.61	0					
Heach 3 and 4 Reach 3 and 4 <td< td=""><td></td><td></td><td>86.42</td><td>87.63</td><td>88.08</td><td>0.027639</td><td>1.21</td><td>5.39</td><td>1.44</td><td>20.90</td><td>1.01</td></td<>			86.42	87.63	88.08	0.027639	1.21	5.39	1.44	20.90	1.01
Heach 3 and 4 Reach 3 and 4 <td< td=""><td></td><td>260.00</td><td></td><td>88.40</td><td>89.16</td><td></td><td>1.98</td><td>7.01</td><td>2.42</td><td>23.57</td><td>1.01</td></td<>		260.00		88.40	89.16		1.98	7.01	2.42	23.57	1.01
Reach 3 and 4 Reach 3 and 4 <td< td=""><td></td><td>00.062</td><td></td><td>04.00</td><td>80.05</td><td></td><td></td><td></td><td>2.65</td><td>23.82</td><td>1.00</td></td<>		00.062		04.00	80.05				2.65	23.82	1.00
Reach 3 and 4Reach 3 and 4 </td <td></td> <td>300.00</td> <td></td> <td>88.00</td> <td>09.40</td> <td></td> <td></td> <td></td> <td></td> <td>24.05</td> <td>1.00</td>		300.00		88.00	09.40					24.05	1.00
Reach 3 and 4Reach 3 and 4 </td <td>36* 2-yr</td> <td>350.00</td> <td>86.42</td> <td>88.79</td> <td>89./3</td> <td></td> <td></td> <td></td> <td></td> <td>24.68</td> <td>1.00</td>	36* 2-yr	350.00	86.42	88.79	89./3					24.68	1.00
Reach 3 and 4Reach 3 and 4 </td <td>36* 5-yr</td> <td>500.00</td> <td></td> <td></td> <td>90.48</td> <td></td> <td></td> <td></td> <td></td> <td>25.24</td> <td>1.01</td>	36* 5-yr	500.00			90.48					25.24	1.01
Reach 3 and 4Reach 3 and 4		650.00	86.42		91.14					20.24	10 10
Reach 3 and 4Reach 3 and 4 </td <td></td> <td>800.00</td> <td>86.42</td> <td>90.19</td> <td>91.75</td> <td>0.026759</td> <td>3.77</td> <td>10.04</td> <td></td> <td>01.67</td> <td>-</td>		800.00	86.42	90.19	91.75	0.026759	3.77	10.04		01.67	-
Reach 3 and 4Reach 3 and 4 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>36.10</td> <td>0.54</td>										36.10	0.54
Reach 3 and 4Reach 3 and 4	33* mod flow	100.00	85.84		87.31						0.46
Reach 3 and 4Reach 3 and 4 </td <td>33* 1.25-yr</td> <td>250.00</td> <td>85.84</td> <td>88.16</td> <td>88.35</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0.45</td>	33* 1.25-yr	250.00	85.84	88.16	88.35						0.45
Reach 3 and 4Reach 3 and 4		300.00	85.84		88.64						0.45
Reach 3 and 4 Reach 3 and 4		350.00	85.84		88.90						
Reach 3 and 4 Reach 3 and 4		500.00	85.84	89.27	89.55						ö
Reach 3 and 4 Reach 3 and 4		650.00		89.65	90.02	0.006055					0.49
Reach 3 and 4 Reach 3 and 4		800.00			90.39	0.007128	4.08	5.50	0 1.38	44.84	0.54
Reach 3 and 4Reach 3 and 4											c
Reach 3 and 4 Reach 3 and 4 Re	mod flow	100.00	85.47	86.96	87.04	0.004310					
Heach 3 and 4 Reach 3 and 4 Re	1 25.1%	250.00		87.99	88.13	0.004116	3 2.52	2 2.98			
Heach 3 and 4 Reach 3 and 4 Re		00.005				0.004104	1 2.80	0 3.13			
Heach 3 and 4 Reach 3 and 4	CLIWIN	350.00				0.004154	3.05	5 3.28			
Heach 3 and 4 Heach 3 and 4 Reach 3 and 4	<u> </u>	500.00					7 3.65	5 3.72			
Reach 3 and 4 Reach 3 and 4	7 <u>7-6</u>	00.000						4 4.18	8 0.90	93.85	0.40
Reach 3 and 4 Reach 3 and 4	20-VI							4.65	1.09	107.35	0.43
Reach 3 and 4 Reach 3 and 4	100-yr	800.00									
Reach 3 and 4 Reach 3 and 4		100.00	84.81	86.36	86.46	0.003802	1.55				
Heach 3 and 4 Reach 3 and 4		250.00			87.43	0.005586	5 2.42	3.65	0.67		
Heach 3 and 4 Reach 3 and 4		300.00					5 2.67	3.88	88 0.76		
Reach 3 and 4 Reach 3 and 4		250.00				0.005836	2.90	90 4.09	0.84		
Reach 3 and 4 Reach 3 and 4	z-yr							60 4.59	1.00		
Reach 3 and 4 Reach 3 and 4	0-yr							91 4.88	1.08	171.49	0.47
Reach 3 and 4 Reach 3 and 4 Reach 3 and 4 Reach 3 and 4 Reach 3 and 4	25-yr	00.000						5.11	1.16	173.09	0.47
Reach 3 and 4 Reach 3 and 4 Reach 3 and 4 Reach 3 and 4	100-yr	800.00	84.81	0.80							
Reach 3 and 4 Reach 3 and 4 Reach 3 and 4 Reach 3 and 4				05 01	אה ה1 1	0 013152	2 1.33	33 4.38	38 0.57	32.84	
Reach 3 and 4 Reach 3 and 4 Reach 3 and 4	Molt Dom	100.00	00.00					21 4.62	52 0.74	t 39.32	
Reach 3 and 4 Reach 3 and 4	1.25-yr	00.062							29 0.74	t 43.70	0.60
Reach 3 and 4	OHWM	300.00							4.16 0.76	5 47.28	0.55
	2-yr	350.00							0.90	54.70	0.52
	5-yr	500.00									0.52
Hansen Creek Reach 3 and 4 22	25-yr	650.00									0.50
Reach 3 and 4	100-yr	800.00	83.88	88.1/							

	Heach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	E.G. Elev	E.G. Slope	Max Chi Dpth	Vel Chnl	Shear Chan	Ton Width	Emildo # Oti
Hansen Creek	Reach 3 and 4	33		(cfs)	£	(¥)	(ft)	(ft/ft)	(£)	(ft/s)	(lb/sn ft)		
Hansen Creek	Reach 2 and 4	2	Moli Dom	100.00	87.34	89.43	89.51	0.001604	2.09	2.20	0.15		
Hansen Creek	Beach 3 and 4	27	1.25-yr	250.00	87.34	90.67	90.80	0.001717	3.33	2.94		24.67	10.0
Hansen Creek	Reach 3 and 4	17	CHWM	300.00	87.34	90.98	91.13			3.12			0.0
Hansen Creek	Reach 3 and 4	27	<u>z-yr</u> 5.vr	350.00	87.34	91.27	91.44	0.001720		3.27			0.33
Hansen Creek	Reach 3 and 4	27	25.14	500.00	87.34	91.99	92.17	0.001770	4.65	3.56		101.30	0.0
Hansen Creek	Reach 3 and 4	27	100-14	00.000	87.34	92.64	92.81	0.001677	5.30	3.59		109.93	
			ić	800.00	87.34	93.28	93.44	0.001495	5.94	3.50	0.40	118.52	0.29
Hansen Creek	Reach 3 and 4	26.8*	mod flow	100.00	87.00								
Hansen Creek	Reach 3 and 4	26.8*	1.25-vr	250.00	20.10	09.02	89.44	0.002973	2.30	2.76	0.26	24.80	0.40
Hansen Creek	Reach 3 and 4		OHWM	300.00	07.02	90.52	90.73	0.003135	3.50	3.62	0.43	30.10	0.42
Hansen Creek	Reach 3 and 4		2-vr	350.00	20.75	90.83	91.06	0.003323	3.81	3.81	0.49	37.55	0.43
Hansen Creek	Reach 3 and 4	26.8*	5-Vr	500.00	07.02	91.13	91.36	0.003368	4.11	3.92	0.54	47.36	0.42
Hansen Creek	Reach 3 and 4		25-vr	650.00	07.02	91.88	92.10	0.003039	4.86	3.93	0.58	91.28	0.39
Hansen Creek	Reach 3 and 4		100-vr		8/.02	92.57	92.75	0.002467	5.55	3.72	0.54	98.53	0.34
				0000	20.10	93.24	93.39	0.001913	6.22	3.53	0.48	104.14	0.30
Hansen Creek	Reach 3 and 4		mod flow	100.00	86.71	89.12	80.33		3				
Hansen Creek	Reach 3 and 4		1.25-yr	250.00	86.71	90.28	00.00 00.50	0.004632	2.41	3.62	0.39	20.57	0.55
Hansen Creek	Reach 3 and 4		OHWM	300.00	86.71	90.58		11000000	10.5	4.49	0.76	28.81	0.57
Hansen Creek	Reach 3 and 4		2-yr	350.00	86.71	80.00	20.32	0.00097	3.87	4.62	0.84	31.59	0.56
Hansen Creek	Reach 3 and 4	Here and the second	5-yr	500.00	86.71	91 71	01.00	0.00048	4.17	4.68	0.89	40.98	0.55
Hansen Creek	Reach 3 and 4	26.6*	25-yr	650.00	86.71	02 44	91.33	0.004434	2.00	4.45	0.79	81.22	0.45
Hansen Creek	Reach 3 and 4	26.6*	100-yr	800.00	86 71	03 13	10.26	6/02000	5.73	4.14	0.67	85.46	0.38
						2	00.00	0.002332	6.42	3.91	• 0.59	89.43	0.33
Hansen Creek	Heach 3 and 4		mod flow	100.00	86.39	88.74	89.10	0.012436	0 25	20.2			
Hanson Crook	Peace 3 and 4		1.25-yr	250.00	86.39	89.98	90.35	0.009886	2 20	4.04	0.84	18.56	0.81
Hansen Creek	Reach 3 and 4		OHWM	300.00	86.39	90.31	90.69	0.008568	3.92	4 05	10.1	28.29	0.64
Hansen Creek	Reach 2 and 4		Z-yr	350.00	86.39	90.62	91.01	0.007639	4 23	504 104	90.1	59.29	0.61
Hansen Creek	Beach 3 and 4	20.4 2 2 2 2 2 2 2	2	500.00	86.39	91.50	91.85	0.005163	5.11	4.87	0.1	32.69	0.58
Hansen Creek	Beach 2 and 4		JV-CZ	650.00	86.39	92.29	92.57	0.003563	5.90	4 52		09.70	0.48
			100-yr	800.00	86.39	93.01	93.25	0.002739	6.62	4.30	0.00	75.64	0.41
Hansen Creek	Reach 3 and 4	26.2	mod flow									50.00	05.0
Hansen Creek			1.25-vr	250.00	80.07	88.76	88.86	0.003112	2.69	2.58	0.28	26.10	0.37
Hansen Creek			OHWM	300.00	00.07	89.96	90.15	0.003096	3.89	3.50	0.46	28.22	0.39
Hansen Creek	10112	26.2 2	2-Vr	350.00	96.07	90.29	90.50	0.003115	4.22	3.71	0.50	28.78	0.39
Hansen Creek		26.2 5	5-yr	500.00	86.07	90.00	90.83	0.003129	4.53	3.90	0.55	29.31	0.39
Hansen Creek			25-yr	650.00	86.07	91.44	91.00	0.002913	5.37	4.24	0.63	58.78	0.38
Hansen Creek	Reach 3 and 4	26.2	100-yr	800.00	86.07	32.61	92.48	0.002554	6.14	4.32	0.65	60.78	0.36
					0.00	96.31	9 . .18	0.002295	6.84	4.36	0.66	62.60	0.34
Hansen Creek			mod flow	100.00	85.75	88.77	88.80	0 000730	50 6	C L T			
			1.25-yr	250.00	85.75	89.98	90.07	0.001266	20.0	00	0.09	31.27	0.18
			MWHO	300.00	85.75	90.31	90.41	0.001375	4.50	00.7 77 C	0.23	33.81	0.23
	Decen 3 and 4	and the second se	2-yr	350.00	85.75	90.62	90.74	0.001471	4.87	00.7 0	0.27	34.23	0.24
		20 20	5-yr	500.00	85.75	91.46	91.62	0.001700	5.71	212	0.31	34.64	0.25
			Z2-Yr	650.00	85.75	92.20	92.39	0.001880	6 45	3 53	71.0	27.05	0.27
			100-yr	800.00	85.75	92.88	93.10	0.002029	7.13	3.81	70.0	36.68	0.28
Hansen Creek	Reach 3 and 4	25	mod flour							5	0.0	0C./E	0.28
1			MOL DO.					The same second se					

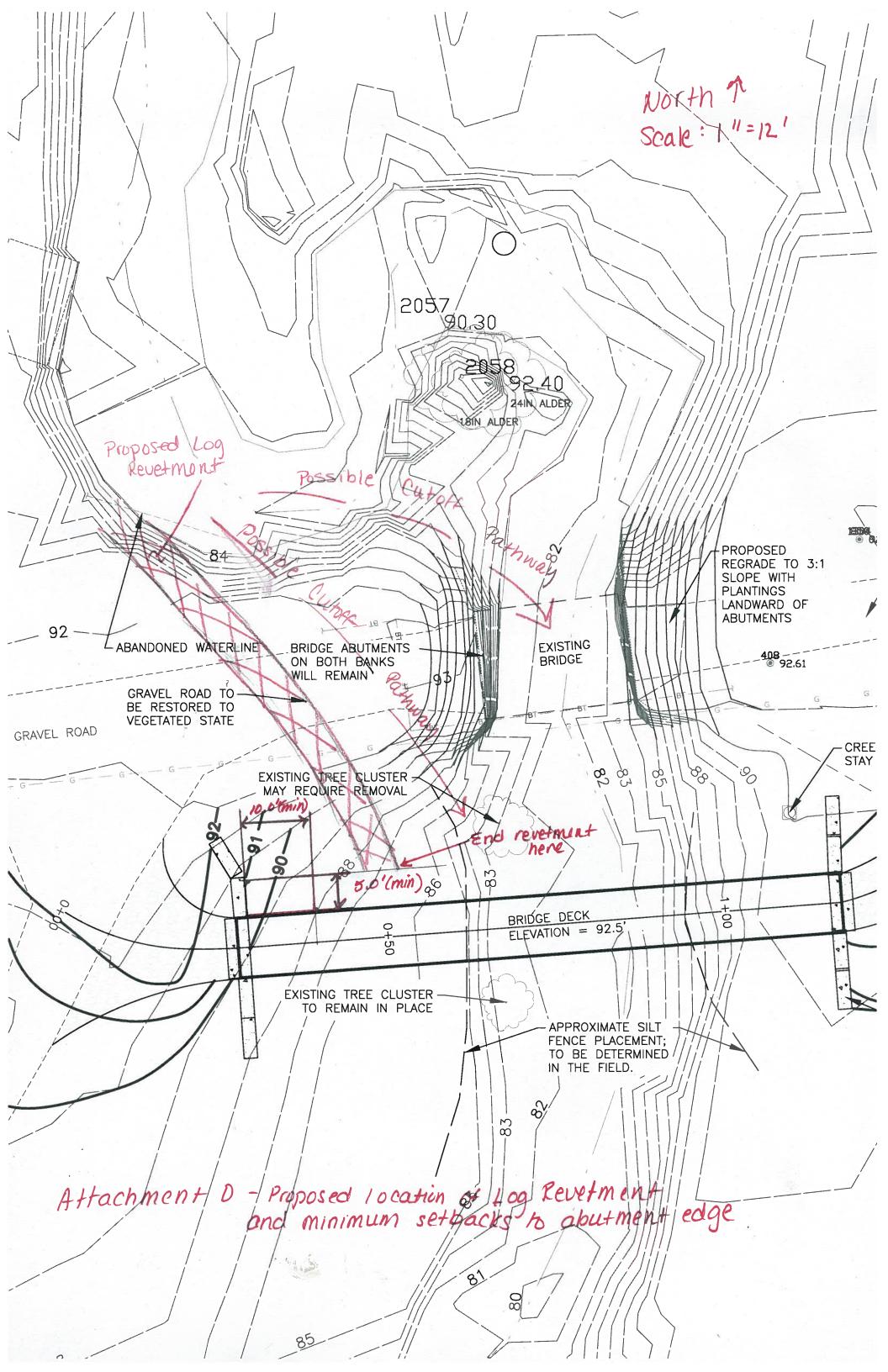
	Profile	Bivar Sta	Profile	Q Total	Min Ch El	W.S. Elev	E.G. Elev	E.G. Slope		10.00	(Ib/en ft)	(#)	
River	Headli		2002	(cfs)	£	(Ħ)	(Ħ)	(t/tt)	(H)	(su)		33 56	0.37
Samaga se ar a se a desente de se a de				250.00	86.57	89.86	90.02	0.002859	3.29	3.18	0.38	0.00	92.0
Hansen Creek	Reach 3 and 4	25	1.22-yr	00,000	0.00 06.67	90.19		0.002831	3.62	3.34	0.44	34.04	
Hansen Creek	Reach 3 and 4	25	MWHO	300.00	10.00			0.002818	3.93	3.49	0.47	34.49	00
Hansen Creek	Reach 3 and 4	25	2-yr	350.00	10.08	90.90		0.002825	4.76	3.86	0.58	35.72	0.36
Hansen Creek	Reach 3 and 4	25	5-yr	500.00	86.57	55.19		0.002863	5.50	4.16	0.68	36.81	0.36
Hansen Creek	Reach 3 and 4	25	25-yr	650.00	86.57	92.07	92.33	0.002000	6.17	4.41	0.77	37.80	0.36
Hansen Creek	Reach 3 and 4	25	100-yr	800.00	86.57	92.74		0.000.0					
							CV 00	0.032506	1.36	5.81	1.92	16.65	1.01
Hancan Crack	Reach 3 and 4	24.6666*	mod flow	100.00	86.55	87.90		0.00000	2.23	7.55	3.14	19.03	1.01
Lancon Crack	Reach 3 and 4	24.6666*	1.25-yr	250.00	86.55	88.78		0.002020	2.16	7.98	3.43	19.32	1.01
Usell Cleev	Dopoh 2 and 4	24 6666*	MWHO	300.00	86.55	89.01		0.032490	2:40	90.9	3 70	19.59	1.01
Hansen Ureek		C LEGER*	2-VIT	350.00	86.55	89.23			2.00		A A1	20.32	1.01
Hansen Creek	Heach 3 and 4	24.0000	e y.	500.00	86.55	89.83	91.17	0.031957	3.28			20.02	1.01
Hansen Creek	Reach 3 and 4	24.0000		650 00	86.55	90.36	91.92	0.031830	3.81		10.0	20.31	101
Hansen Creek	Reach 3 and 4	24.6666	IV-02	00.000	86.55			0.031895	4.30	10.66	5.55	10.12	-
Hansen Creek	Reach 3 and 4	24.6666	100-yr	00.000	200								N L C
				0000		87.17	87.31	0.009074	1.33	2.97	0.53		5
Hansen Creek	Reach 3 and 4	24.3333*	mod flow	100.00	85.84				2.32	3.52	0.66		0.46
Hansen Creek	Reach 3 and 4	24.3333*	1.25-yr	250.00	85.84				2.59	3.66	0.69	40.53	0.45
Hansen Creek	Reach 3 and 4	24.3333*	MWHO	300.00	85.84						0.72	41.24	0.45
Hansen Creek	Reach 3 and 4	24.3333*	2-yr	350.00	85.84						0.87	42.95	0.46
Lancon Crook	Reach 3 and 4	24.3333*	5-yr	500.00	85.84							44.07	0.49
Hanson Crock	Reach 3 and 4	24.3333*	25-yr	650.00	85.84							44.84	0.54
Hansen Creek	Reach 3 and 4	24.3333*	100-yr	800.00	85.84	89.92	2 90.39	0.007128					
									1 10	230	0.31	36.63	0.37
Hanna Curak	Beach 3 and 4	24	mod flow	100.00	85.47							41.66	0.37
allisen Crock	Beach 3 and 4	24	1.25-Vr	250.00	85.47							43.03	0.37
Tariser Creek	Deceb 2 and 4	PA	MWHO	300.00	85.47								0.37
Hansen Creek	meacri o allu 4	<u>t</u>	2.41	350.00	85.47	88.52							
Hansen Creek	Heach 3 and 4	24 24	F y	500.00	85.47	89.12	2 89.33	0.004177					
Hansen Creek	Reach 3 and 4	24	0-yi	650.00	85.47	89.51	1 89.78	0.004468	4.04				
Hansen Creek	Reach 3 and 4	24	IA-62		85.47			0.005001	4.31	4.65	1.09		
Hansen Creek	Reach 3 and 4	24	ik-201										0.38
					84.81	86.36	86.46	6 0.003802	1.55			20.00	
Hansen Creek	Reach 3 and 4	8		250.00	84.81	1 87.23		3 0.005586	3 2.42				
Hansen Creek	Reach 3 and 4	53	1.25-yr	00.002	84.81			2 0.005795	5 2.67				
Hansen Creek	Reach 3 and 4	33	OTWR		10 10			7 0.005836	2.90				
Hansen Creek	Reach 3 and 4	ន	2-yr	350.00					7 3.50	0 4.59	9 1.00		
Hansen Creek	Reach 3 and 4	23	5-yr	500.00					3.91	1 4.88	1.08	171.49	
Hansen Creek	Reach 3 and 4	23	25-yr	650.00						0 5.11	1 1.16	6 173.09	9 0.47
Hansen Creek			100-yr	800.00	84.81	1 89.01							
						05.04	24 85.51	0.013152	2 1.33	4.38			
Hansen Creek	Reach 3 and 4		mod flow	100.00					9 2.21	1 4.62			N
Hansen Creek	Reach 3 and 4		1.25-yr	250.00						30 4.29	9 0.74		0
Hansen Creek			OHWM	300.00							6 0.76	6 47.28	8
Hansen Creek	Reach 3 and 4		2-yr	350.00					3.55	55 4.27	7 0.90	90 54.70	0
Hansen Creek		22	5-yr	500.00							7 1.06	142.38	8
Hansen Creek			25-yr	650.00							1.09	153.28	8
		The second			83 88	38 88.17	17 88.50	0.000430					

0.0 7.3 0.00 <th></th> <th>110001</th> <th>00</th> <th>rotile</th> <th>Q Total</th> <th>Min Ch El</th> <th>W.S. Elev</th> <th>E.G. Elev</th> <th>E.G. Slope</th> <th>Max Chi Dpth</th> <th>Vel Chnl</th> <th>Shear Chan</th> <th>Ton Width</th> <th>Eroudo # Ott</th>		110001	00	rotile	Q Total	Min Ch El	W.S. Elev	E.G. Elev	E.G. Slope	Max Chi Dpth	Vel Chnl	Shear Chan	Ton Width	Eroudo # Ott
(b) (b) <th>Hansen Creek</th> <th>Reach 3 and 4</th> <th>27</th> <th>mod flow</th> <th>(CIS)</th> <th>(#)</th> <th>(tt)</th> <th>Ð</th> <th>(ft/ft)</th> <th>(#)</th> <th>(ft/s)</th> <th>(lb/sa ft)</th> <th>(#)</th> <th></th>	Hansen Creek	Reach 3 and 4	27	mod flow	(CIS)	(#)	(tt)	Ð	(ft/ft)	(#)	(ft/s)	(lb/sa ft)	(#)	
(a) (b) (b) <td>Hansen Creek</td> <td>Reach 3 and 4</td> <td>23</td> <td>MOII DOIL</td> <td>100.00</td> <td>87.34</td> <td>89.08</td> <td></td> <td></td> <td>1.74</td> <td></td> <td>0.26</td> <td></td> <td></td>	Hansen Creek	Reach 3 and 4	23	MOII DOIL	100.00	87.34	89.08			1.74		0.26		
(mode) (mod) (mod) (mod) <td>Hansen Creek</td> <td>Reach 3 and 4</td> <td>3 6</td> <td>1.20-yr</td> <td>250.00</td> <td>87.34</td> <td>89.96</td> <td></td> <td></td> <td>2.62</td> <td>4.06</td> <td>0.40</td> <td>24.00</td> <td>0.44</td>	Hansen Creek	Reach 3 and 4	3 6	1.20-yr	250.00	87.34	89.96			2.62	4.06	0.40	24.00	0.44
(b) (b) <td>Hansen Creek</td> <td>Reach 3 and 4</td> <td>27</td> <td>CHWM</td> <td>300.00</td> <td>87.34</td> <td>90.19</td> <td>90.48</td> <td></td> <td>2.85</td> <td>4.35</td> <td>950</td> <td>01.09 27.66</td> <td>0.51</td>	Hansen Creek	Reach 3 and 4	27	CHWM	300.00	87.34	90.19	90.48		2.85	4.35	950	01.09 27.66	0.51
(monon status) (monon	Hansen Creek	Reach 2 and 4	3	<u>z-yr</u>	350.00	87.34	90.40	90.73		3.06	4 61	0.60	00.00	
(match) match) match in the match in the match) matc	Hansen Creek	Basch 2 and 4	2/	5-Yr	500.00	87.34	90.96	91.39		3.62	5.24	0.02	00.00	0.5
momentation ut Utcl	Hanson Crock	Deach o and 4	<u> </u>	25-yr	650.00	87.34	91.46	91.95	0.004917	4 12	5.60	0.00	43.40	0.56
(b) (b) <td></td> <td>reacn 3 and 4</td> <td>27</td> <td>100-yr</td> <td>800.00</td> <td>87.34</td> <td>91.92</td> <td>92.43</td> <td>0.004793</td> <td>4.58</td> <td>5.84</td> <td>0.92</td> <td>100.40</td> <td>0.56</td>		reacn 3 and 4	27	100-yr	800.00	87.34	91.92	92.43	0.004793	4.58	5.84	0.92	100.40	0.56
(a) (b) (c) (c) <td>Hansen Creek</td> <td>Reach 3 and 4</td> <td>26.R*</td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2</td> <td>100.</td> <td>6.0</td>	Hansen Creek	Reach 3 and 4	26.R*	1								2	100.	6.0
(matrix) and based based based based based based based based and based	lansen Creek	Reach 3 and 4	*0.02	4 OL	100.00	87.39	88.94	89.08	0.005622	1.55	3.01	0.35	02 02	
memor natural alter Offwort SCOID 67:39 90.00 97:30 0000174 2.90 4.00 0000 97:30 0000174 2.90 4.00 0000 97:30 0000174 2.90 0000 97:30 0000174 2.90 0000 97:30 0000174 2.90 0.000 97:30 0000174 2.90 0.000 97:30 0000175 2.90 0.000 97:30 0000175 2.90 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.000 97:30 0000175 0.0000175 0.0000175 0.0000175 0.0000175 0.0000175 0.0000175 0.0000175 0.0000175 0.0000175 0.0000175	Jansen Creek	Beach 3 and 4	20 0*	JA-07-1	250.00	87.39	89.84	90.07	0.005274	2.45	3 83	0.00	27.20	
memory nerve were headed bard Cyr 5000 67:39 90,30 91,35 000013 2.81 4.20 0.30 4.30 0.30 4.30 0.30 4.30 0.30 4.30 0.30	lansan Crook	Pooch 2 and 4	20.0	CHWM	300.00	87.39	90.08	90.33	0.005174	2 69	4 00		22.00	0.5
m memory and solution 54% 5900 97.39 9.06 9.12 0.00000 4.06 0.070 4.06 0.070 4.06 0.070 6.026 m Memory and t 26.6° 100/17 6.000 97.39 9.16 9.16 0.006 4.0 4.00 0.070 6.279 m Memory and t 26.6° 100/07 25.000 97.31 26.00 97.31 26.00 97.31 26.00 97.31 26.00 97.31 26.00 97.31 26.00 97.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 27.31 26.00 26.01 26.01 26.01 26.01 26.01 26.01 26.01 26.01 26.01 26.01 26.01 26.01 26.01 <th< td=""><td>lancen Crock</td><td>Door of and 4</td><td>20.87</td><td>2-yr</td><td>350.00</td><td>87.39</td><td>90.30</td><td>90.57</td><td>0.005123</td><td>2.01</td><td>40.4 00.4</td><td>0.00</td><td>39.29</td><td>. 0.51</td></th<>	lancen Crock	Door of and 4	20.87	2-yr	350.00	87.39	90.30	90.57	0.005123	2.01	40.4 00.4	0.00	39.29	. 0.51
m memory and 4 28-7 56-00 97-30 97-40 <	aliseli Creek	Heach 3 and 4	26.8*	5-yr	500.00	87.39	90.88	91.22	0 005038	07.0	4.20	0.65	40.28	0.52
memori and 4 28-7 100-yr 9000 97.30 91.87 20.97 50.97	Iditacii Creek	Heach 3 and 4	26.8*	25-yr	650.00	87.39	91.40	91.78	0.004819	0+:0 V	4.00	0.//	42.91	0.52
Meaner) and A 26° Model (b) 1000 97.12 88.74 68.91 0.006643 2.71 4.82 0.000 97.12 88.74 0.006643 2.71 4.82 0.006 37.12 88.76 0.006643 2.71 4.82 0.006 37.12 98.76 0.006643 2.71 4.82 0.006 37.12 99.10 0.006643 2.71 4.82 0.03 37.12 99.10 97.12 99.10 0.006643 2.44 4.35 0.03 99.10 97.12 99.10 97.12 99.10 99.11 99.10 99.11 99.10 99.11 99.10 99.11 99.10 99.11 99.10 99.11 <td>arisen Ureek</td> <td>Heach 3 and 4</td> <td>26.8*</td> <td>100-yr</td> <td>800.00</td> <td>87.39</td> <td>91.87</td> <td>92.26</td> <td>0.004400</td> <td>4.01</td> <td>4.97</td> <td>0.86</td> <td>82.97</td> <td>0.51</td>	arisen Ureek	Heach 3 and 4	26.8*	100-yr	800.00	87.39	91.87	92.26	0.004400	4.01	4.97	0.86	82.97	0.51
means and a 26% Table (15%) 7000 97.12 98.97 0.006043 1.2 3.37 2.30 3.30 2.30 3.3	ancon Crook	Date of the								D t	80.C	0.90	92.37	0.49
m Relent 3 and 4 Ref 125 yr 2500 9712 9800 9819 0.006640 2.11 4.50 0.03 8710 R Relent 3 and 4 Ref 2.9r 3500 9712 9800 9712 9801 0.006650 2.11 4.50 0.03 9810 R Relent 3 and 4 Ref 2.9r 9800 9712 910 9100 0.006650 2.44 4.55 0.17 9300 R Relent 3 and 4 Ref 2.6r 0.000 9712 910 9100 0.006550 2.44 4.55 0.71 9300 R Relent 3 and 4 Ref 2.6r 0.000 9712 910 9100 <td>ansen Crook</td> <td>Dooch 2 and 4</td> <td></td> <td>mod flow</td> <td>100.00</td> <td>87.12</td> <td>88.74</td> <td>88.91</td> <td>0.006014</td> <td>162</td> <td>3 20</td> <td></td> <td></td> <td></td>	ansen Crook	Dooch 2 and 4		mod flow	100.00	87.12	88.74	88.91	0.006014	162	3 20			
m means 3 and 4 acr DHMM 30000 97/12 98.05 91/15 0.006690 271 430 775 436 775 436 775 436 775 436 775 436 775 436 737 436 530 110 3300 3310 436 530 110 3301 <td>ansan Crook</td> <td>Doch 2 and 4</td> <td></td> <td>1.25-yr</td> <td>250.00</td> <td>87.12</td> <td>89.60</td> <td>89.89</td> <td>0.006543</td> <td>2 48</td> <td>0.20 A 35</td> <td>0.00</td> <td>29.03</td> <td>0.57</td>	ansan Crook	Doch 2 and 4		1.25-yr	250.00	87.12	89.60	89.89	0.006543	2 48	0.20 A 35	0.00	29.03	0.57
m mean sec 2-yr 5000 67/12 9000 97/12 9000 97/12 9000 97/12 9000 97/12 9000 97/12 9000 97/12 9000 97/12 9000 97/12	ancan Crock	Deck 0 - 4 4		MWHO	300.00	87.12	89.83	90.15	0.006658	2.12		0.00	33.79	0.59
mean Ser Syr Solo 9712 9160 91.04 0.000690 3.46 5.47 0.001 97.12 91.00 91.01 0.000690 3.46 5.40 1.12 90.01 90.01 97.12 91.10 0.000690 3.46 5.40 1.12 90.01 90.01 91.01 0.000690 3.46 5.40 1.12 90.01<	ancon Coold	reacn 3 and 4		2-yr	350.00	87.12	90.03	90.39	0.006791	0.01	4.03	0.76	34.98	0.59
M Metern 3 and 4 26.9 (5.9)/(5.1) (600)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.1)/(5.1) (7.2)/(5.1) (7.1)/(5.1) (7.2)/(ansen Creek	Heach 3 and 4		5-yr	500.00	87.12	90.60	91.04	0 006999	07.0	4.02	0.84	36.07	0.60
Methol 3 and 4 26f 100yr 6000 712 91.56 91.51 00.0000 71.17 93.32 K Reach 3 and 4 26f* 100yr 90.00 86.82 98.95 0.005269 2.84 3.85 1.17 9.34 K Reach 3 and 4 26f* 1.28/yr 550.00 66.82 98.96 99.71 0.005269 2.84 3.86 0.71 38.44 K Reach 3 and 4 26f* 5.7 0.005269 2.84 3.80 0.82 3.84 1.17 3.344 K Reach 3 and 4 26f* 5.7 0.005242 1.84 3.80 0.82 3.84 0.71 3.344 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 6.17 1.14 <td>ansen Greek</td> <td>Heach 3 and 4</td> <td></td> <td>25-yr</td> <td>650.00</td> <td>87.12</td> <td>91.10</td> <td>91.60</td> <td>0 DOBODE</td> <td>0.40</td> <td>0.33</td> <td>1.03</td> <td>39.02</td> <td>0.61</td>	ansen Greek	Heach 3 and 4		25-yr	650.00	87.12	91.10	91.60	0 DOBODE	0.40	0.33	1.03	39.02	0.61
K Mean 3 mid Bit Model	arisen Creek	Heach 3 and 4		100-yr	800.00	87.12	91.58	00 10	0.000000	0.00	60.C	1.17	53.21	0.60
memory media 1000 66.82 88.66 88.76 0.003272 134 261 0.77 28.34 K Reach 3 and 4 26.4 0100 66.82 98.46 89.71 0.003555 264 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.7 28.64 28.7 28.64 28.7 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.64 28.7 28.7 28.64 28.7 28.64 28.7 28.7 28.7 28.7 28.7 28.7 28.7 28.7 28.7 28.7 28.64 28.7 28.7 28.7 28.64 28.7 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>2</td><td>7610000</td><td>4.40</td><td>5.85</td><td>1.21</td><td>80.49</td><td>0.57</td></t<>								2	7610000	4.40	5.85	1.21	80.49	0.57
N Mentern sand 1 Set 4 1/35 yr 2500 66.2 89.46 89.71 0.005556 2.66 3.26 0.27 3.273 K Mentern sand 4 26.4° 1/35 yr 5000 66.82 99.86 0.005556 2.66 4.28 0.027 3.347 K Reach 3 and 4 26.4° 5.77 60.00 66.82 90.82 90.84 0.005556 2.66 4.28 0.027 3.347 K Reach 3 and 4 26.7 50.00 66.82 90.83 91.41 0.006573 3.67 1.19 3.347 K Reach 3 and 4 26.2 1.25 yr 80.00 86.77 90.35 91.41 0.006732 2.86 0.77 93.47 K Reach 3 and 4 26.2 1.25 yr 89.86 0.004256 2.86 0.77 93.47 K Reach 3 and 4 26.2 1.34 0.006732 2.86 0.77 93.47 K Reach 3 and 4 26.2	meen Crock	Heach 3 and 4		mod flow	100.00	86.82	88.66	88.76	0.003272	1 84	19.0			
N Teach 3 and 4 26.4 OHWM 300.00 66.82 99.89 0.0055559 2.66 -0.70 32.57 K Reach 3 and 4 26.4' 5.7' 500.00 66.82 99.39 91.41 0.005559 2.66 0.00 33.45 K Reach 3 and 4 26.4' 5.7' 500.00 86.82 90.39 91.41 0.006473 4.6' 0.70 33.45 K Reach 3 and 4 26.4' 100.yr 86.00 86.82 91.3 91.31 0.006471 4.5' 11.9 33.4' K Reach 3 and 4 28.2 0.000 86.7' 89.56 0.004720 4.5' 11.9 33.4' K Reach 3 and 4 28.2 0.100 86.7' 90.3 0.001750 2.5' 11.9' 33.4' 13.6' 13.4' 13.6' 13.4' 13.6' 13.4' 13.6' 13.4' 13.6' 13.4' 13.6' 13.4' 13.6' 13.6' 13.6' 13.6'	meen Crock	Heach 3 and 4		1.25-yr	250.00	86.82	89.46	89.71	0.005255	10.1	10.7	0.27	28.29	0.39
m matrix act 2yr 3500 66.82 89.89 90.20 0.006073 4.6 0.01 33.4 K Reach 3 and 4 264* 5-yr 65000 66.82 90.34 0.00473 3.60 5.24 1.19 39.47 K Reach 3 and 4 264* 29-yr 65000 66.82 91.33 91.91 0.006473 3.60 5.24 1.19 39.47 K Reach 3 and 4 262* 1.25-yr 86.00 66.87 90.81 0.004750 2.26 0.21 3.07 91.41 0.004750 2.78 0.91 3.07 91.41 3.07 91.41 3.07 91.41 3.07 91.41 91.61 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.4 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7 91.7	ansen Creek	Doch 2 and 4		MWHO	300.00	86.82	89.68	89.96	0.005598	2.01	0.0 ac r	29.0	32.57	0.50
Match and bard Set Syr 5000 66.82 90.41 0.006473 3.00 5.24 1.01 33.84 Reach 3 and 4 26.4* 100y 66500 66.82 91.41 0.006473 3.60 5.24 1.01 35.43 Reach 3 and 4 26.4* 100y 86.00 66.82 91.41 0.006473 3.60 5.24 1.01 35.43 Reach 3 and 4 26.2 1.55 yr 80.00 86.77 89.36 89.36 0.002342 1.89 3.67 0.54 32.51 Reach 3 and 4 26.2 2.yr 50.00 86.77 99.36 0.005202 2.96 3.67 0.54 32.51 Reach 3 and 4 26.2 2.yr 50.00 86.77 99.36 0.005202 2.97 0.76 32.44 0.76 32.51 1.01 32.51 1.01 32.51 1.02 32.51 1.01 32.51 1.15 32.44 1.01 1.02 32.51 1.01 32.51	ancon Crook	Deet o and 4		2-yr	350.00	86.82	89.88	90.20	0.005809	3 O.S.	1.40	1.1.0	33.44	0.52
Noment and a location and location and a location and a location and a location and and location and location and and location and locatio location and location and location and location and lo	ansen Creek	Doop 2 and 4		5-yr	500.00	86.82	90.42	90.84	0.006234	3.60	4.30	0.80	33.98	0.53
Matrix Total 26.4 100-yr 86.00 86.82 91.31 0.06471 4.13 6.17 1.13 6.902 R Ratch 3 and 4 26.2 mod tlow 100.00 86.77 88.66 0.002432 1.83 2.26 0.21 30.47 R Ratch 3 and 4 26.2 125-yr 260.00 86.77 89.36 0.002432 1.83 2.26 0.21 30.70 R Ratch 3 and 4 26.2 2 yr 36.00 86.77 89.36 0.004265 2.39 36.7 0.24 32.51 R Ratch 3 and 4 26.2 2 yr 39.6 0.00472 2.39 36.7 33.49 R Reach 3 and 4 26.2 2 yr 30.00 86.77 91.71 0.00472 2.39 36.7 33.49 R Reach 3 and 4 26.2 10.9r 91.21 0.00472 2.35 0.75 33.49 R Reach 3 and 4 26 10.50 86.7 </td <td>mean Crock</td> <td>Deater 3 and 4</td> <td></td> <td>25-yr</td> <td>650.00</td> <td>86.82</td> <td>90.89</td> <td>91.41</td> <td>0.006473</td> <td>0.00</td> <td>0.74</td> <td>10.1</td> <td>35.43</td> <td>0.56</td>	mean Crock	Deater 3 and 4		25-yr	650.00	86.82	90.89	91.41	0.006473	0.00	0.74	10.1	35.43	0.56
No. Match 3 and 4 262 mod flow 1000 66.77 88.66 90.02342 1183 2.26 0.21 30.70 No. Reach 3 and 4 262 1.5Fyr 25000 66.77 88.66 99.66 0.004265 2.58 3.67 0.54 32.59 No. Reach 3 and 4 262 1.5Fyr 350.00 86.77 99.56 89.81 0.004760 2.58 3.67 0.54 32.59 No. Reach 3 and 4 262 2.5yr 50.00 86.77 99.71 91.12 0.004760 2.36 0.56 0.25 3.47 3.27 0.54 3.2.59 No. Reach 3 and 4 262 2.5yr 65.00 86.77 91.12 91.17 0.007426 3.49 5.68 0.73 3.4.58 3.5.9 3.5.9 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95 5.7.95		neacri 3 and 4		100-yr	800.00	86.82	91.33	91.91	0.006471	4.51	617	61.1 7 7	39.47	0.58
Name And Each Mode intow 100.00 66.71 88.60 88.66 0.002342 1.83 2.26 0.21 30.71 Name Tack Reach 3 and 4 Rea Tack Tack 0.024 2.56 0.004265 2.58 3.67 0.54 3.261 Name Sec 24 mat 300.00 86.77 89.36 0.004250 2.59 4.01 0.64 3.299 Name Reach 3 and 4 28.2 24 mat 300.00 86.77 99.35 99.66 0.004750 2.59 4.01 0.64 3.299 Name 282.0 86.77 90.71 91.21 0.07105 3.44 3.568 1.155 3.344 Reach 3 and 4 282 100 yr 86.01 86.07 91.12 91.17 0.007482 4.35 6.18 1.55 57.95 Reach 3 and 4 285 100 yr 88.62 0.002207 3.34 1.35 57.95 57.95 57.95 <t< td=""><td>Insen Creek</td><td>Reach 3 and 4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>20</td><td>40°-</td><td>69.02</td><td>0.58</td></t<>	Insen Creek	Reach 3 and 4									20	40°-	69.02	0.58
(*) Ratch 3 and 4 26.2 OHW 30.00 86.77 89.36 89.56 0.00456 2.58 36.7 0.54 32.51 (*) Ratch 3 and 4 26.2 OHW 30000 86.77 89.36 99.36 99.36 90.03 0.004750 2.79 4.01 0.64 32.59 (*) Ratch 3 and 4 26.2 5yr 5000 86.77 90.26 90.66 0.005192 2.99 4.01 0.64 32.59 (*) Reach 3 and 4 260 100yr 86.77 91.12 91.71 0.007192 3.34 5.68 1.05 33.44 (*) Reach 3 and 4 26 100yr 86.01 88.56 0.0007005 3.34 5.68 1.05 33.44 (*) Reach 3 and 4 26 10.00 86.01 88.56 0.0007005 3.34 5.68 1.35 5.756 (*) Reach 3 and 4 26 1.25yr 2.93 6.18 1.35 0.1	nsen Creek	Reach 3 and 4		1 OF UT	100.00	86.77	88.60	88.68	0.002342	1.83	2.26	0.21	30.70	00 U
Rach 3 and 4 2::::::::::::::::::::::::::::::::::::	nsen Creek	Reach 3 and 4		IN NAME	00.002	86.77	89.35	89.56	0.004265	2.58	3.67	0.54	32 51	20.00
No. Beach 3 and 4 262 5 yr 5000 86.17 90.03 0.005192 2.97 4.32 0.75 33.44 No. Beach 3 and 4 262 25 yr 6500 86.17 90.26 90.66 0.006520 3.49 5.68 1.05 34.45 No. Beach 3 and 4 262 25 yr 65000 86.17 91.12 91.11 0.00705 3.34 5.68 1.05 34.45 No. Beach 3 and 4 262 100-yr 86.01 86.01 91.12 91.11 0.007482 3.34 5.68 1.32 35.59 Reach 3 and 4 26 125 yr 250.00 86.01 88.51 89.43 0.001990 3.35 2.32 0.10 40.81 Reach 3 and 4 26 5-yr 36.00 86.01 89.35 0.002247 3.35 0.35 3.345 Reach 3 and 4 26 5-yr 250.00 86.01 89.35 0.002247 3.35 0.35	nsen Creek	Reach 3 and 4		2-VIF	300.00	86.77	89.56	89.81	0.004750	2.79	4.01	0.64	32.99	CH-0
(*) Reach 3 and 4 26.2 5.7 yr 5000 86.77 90.66 0.006220 3.49 5.08 1.05 3.458 (*) Reach 3 and 4 26.2 100-yr 80.00 86.77 90.71 91.21 0.007005 3.34 5.68 1.32 35.59 (*) Reach 3 and 4 26.2 100-yr 80.00 86.01 88.59 88.62 0.000590 2.56 1.32 35.59 (*) Reach 3 and 4 26 mod flow 100.00 86.01 88.59 88.62 0.000590 2.56 0.132 0.15 57.95 (*) Reach 3 and 4 26 0.125-yr 256.00 86.01 89.57 88.64 0.002247 3.56 0.36 43.45 (*) Reach 3 and 4 26 5-yr 80.01 89.57 88.85 0.002476 3.56 0.36 43.45 (*) Reach 3 and 4 26 5-yr 50.00 86.01 90.29 0.00247 3.56<	nsen Creek	Reach 3 and 4		r	00.002	86.77	89.74	90.03	0.005192	2.97	4.32	0.75	33.44	0.40
k Reach 3 and 4 26.2 100-yr 80.00 86.77 91.12 91.21 0.007005 3.94 5.68 1.32 35.59 Reach 3 and 4 26 mod flow 100.00 86.77 91.12 91.71 0.007482 4.35 6.18 1.55 57.95 Reach 3 and 4 26 1.25-yr 250.00 86.01 88.59 88.62 0.000899 2.56 1.32 0.30 43.15 Reach 3 and 4 26 1.25-yr 250.00 86.01 89.57 89.44 0.001990 3.35 2.32 0.30 43.15 Reach 3 and 4 26 2-yr 350.00 86.01 89.57 89.67 0.00247 3.56 2.37 0.36 43.15 Reach 3 and 4 26 5-yr 50.00 86.01 89.57 89.86 0.002476 3.75 2.79 0.36 43.45 Reach 3 and 4 26 5-yr 50.00 86.01 90.27 0.03 2.77 0.36 <td>nsen Creek</td> <td>Reach 3 and 4</td> <td></td> <td>25-vr</td> <td>650.00</td> <td>80.//</td> <td>90.26</td> <td>90.66</td> <td>0.006220</td> <td>3.49</td> <td>5.08</td> <td>1.05</td> <td>34.58</td> <td>0.53</td>	nsen Creek	Reach 3 and 4		25-vr	650.00	80.//	90.26	90.66	0.006220	3.49	5.08	1.05	34.58	0.53
No. No. <td>nsen Creek</td> <td>Reach 3 and 4</td> <td></td> <td>'00-vr</td> <td>BOD OD</td> <td>00.17</td> <td>90.70</td> <td>91.21</td> <td>0.007005</td> <td>3.94</td> <td>5.68</td> <td>1.32</td> <td>35.59</td> <td>0.56</td>	nsen Creek	Reach 3 and 4		'00-vr	BOD OD	00.17	90.70	91.21	0.007005	3.94	5.68	1.32	35.59	0.56
Reach 3 and 4 26 mod flow 100.00 86.01 88.59 88.62 0.00899 2.58 1.32 0.10 40.81 Reach 3 and 4 26 1.25-yr 250.00 86.01 89.35 89.44 0.001990 3.35 2.32 0.10 40.81 Reach 3 and 4 26 0HWM 300.00 86.01 89.57 89.67 0.002247 3.56 2.57 0.30 43.15 Reach 3 and 4 26 2-yr 50.00 86.01 89.75 89.87 0.002476 3.75 2.77 0.36 43.45 Reach 3 and 4 26 5-yr 650.00 86.01 90.27 90.37 2.779 0.36 43.45 Reach 3 and 4 26 5-yr 650.00 86.01 90.77 90.99 0.003476 3.75 2.779 0.36 43.47 Reach 3 and 4 26 100-yr 86.01 91.17 0.003309 5.18 4.776 43.72 4.776 4.776 45.					0000	00.11	al.12	91.71	0.007482	4.35	6.18	1.55	57.95	0.58
Reach 3 and 4 26 1.25-yr 250.00 86.01 89.35 89.44 0.001990 3.35 2.38 1.32 0.10 40.81 Reach 3 and 4 26 0HWM 300.00 86.01 89.57 89.67 0.001990 3.35 2.32 0.30 43.15 Reach 3 and 4 26 2-yr 350.00 86.01 89.57 89.67 0.002247 3.35 2.32 0.30 43.15 Reach 3 and 4 26 5-yr 500.00 86.01 89.57 90.47 0.002476 3.75 2.79 0.36 43.45 Reach 3 and 4 26 5-yr 650.00 86.01 90.77 90.39 0.003027 4.28 3.36 0.60 44.47 Reach 3 and 4 26 100-yr 86.01 91.19 91.47 0.003027 4.28 3.36 0.66 45.13 Reach 3 and 4 26 100-yr 86.01 91.19 91.47 0.003809 5.18 4.5.73 45.7	nsen Creek	Reach 3 and 4		nod flow	100.00	86.01	88 50	88 67						
Reach 3 and 4 26 OHWM 300.00 86.01 89.57 89.67 0.001340 3.35 2.32 0.30 43.15 Reach 3 and 4 26 2.yr 350.00 86.01 89.57 89.67 0.00247 3.56 2.57 0.36 43.45 Reach 3 and 4 26 5.yr 500.00 86.01 99.77 90.39 0.002476 3.75 2.79 0.36 43.45 Reach 3 and 4 26 100-yr 650.00 86.01 90.77 90.348 0.003476 3.75 2.79 0.42 43.75 Reach 3 and 4 26 100-yr 86.01 91.19 91.47 0.003369 5.18 0.56 2.77 0.36 45.73 Reach 3 and 4 26 100-yr 86.01 91.17 0.003369 5.18 0.76 45.73 Reach 3 and 4 26 100-yr 86.01 91.19 91.47 0.003809 5.18 0.76 45.73 Reach 3 and 4 2	nsen Creek	Reach 3 and 4		.25-yr	250.00	86.01	89.36	20.00	0.001000	2.58	1.32	0.10	40.81	0.17
Heach 3 and 4 26 2.yr 350.00 86.01 89.76 89.88 0.002476 2.57 0.36 43.45 Reach 3 and 4 26 5.yr 500.00 86.01 90.29 90.47 0.002476 3.75 2.79 0.42 43.72 Reach 3 and 4 26 5.yr 650.00 86.01 90.29 90.47 0.003027 4.28 3.36 0.60 44.47 Reach 3 and 4 26 100-yr 86.01 91.19 91.47 0.003029 4.76 3.83 0.76 45.13 Reach 3 and 4 26 100-yr 80.01 91.19 91.47 0.003809 5.18 4.23 0.76 45.13 Reach 3 and 4 25 mod flow 100.00 87.20 88.35 0.018602 5.18 4.76 45.73 45.73	Isen Creek	Reach 3 and 4		MWHC	300.00	86.01	89.57	89.67	0.0000777	3.35	2.32	0.30	43.15	0.26
Heach 3 and 4 26 5-yr 500.00 86.01 90.29 90.47 0.003027 4.29 0.42 43.72 Reach 3 and 4 26 5-yr 650.00 86.01 90.29 90.47 0.003027 4.28 3.36 0.60 44.47 Reach 3 and 4 26 100-yr 80.01 91.19 91.47 0.0030309 5.18 3.33 0.76 45.13 Reach 3 and 4 26 100-yr 80.01 91.19 91.47 0.003809 5.18 4.23 0.92 45.13 Reach 3 and 4 25 mod flow 100.00 87.20 88.35 0.018602 1.15 4.23 0.92 45.73	Isen Creek	Heach 3 and 4		·yr	350.00	86.01	89.76	89.88	0.00076	0.00	79.2	0.36	43.45	0.28
Heach 3 and 4 26 25-yr 650.00 86.01 90.77 90.99 0.003448 4.76 3.36 0.60 44.47 Reach 3 and 4 26 100-yr 80.00 86.01 91.19 91.47 0.003448 4.76 3.83 0.76 45.13 Reach 3 and 4 26 100-yr 80.01 91.19 91.47 0.003809 5.18 4.23 0.76 45.13 Reach 3 and 4 25 mod flow 100.00 87.20 88.35 88.55 0.018602 1.15 3.57 0.84 26 25.7 0.84 26 25.7 0.84 26 25.7 0.84 26 25.7 0.84 26 26.7	Insen Ureek	Heach 3 and 4		·yr	500.00	86.01	90.29	90.47	0.002000	C/.C	2.79	0.42	43.72	0.29
Heach 3 and 4 26 100-yr 800.00 86.01 91.19 91.47 0.003809 5.18 4.23 0.76 45.13 Heach 3 and 4 25 mod flow 100.00 87.20 88.35 88.55 0.018602 1.15 3.57 0.84 26	nsen Creek	Heach 3 and 4		5-yr	650.00	86.01	90.77		0.000440	4.28	3.36	0.60	44.47	0.32
Reach 3 and 4 25 mod flow 100.00 87.20 88.35 0.018602 1.15 3.57 0.84 28.20	Isen Creek	Reach 3 and 4		00-yr	800.00	86.01	91.19	91.47	0.0004440	4./0	3.83	0.76	45.13	0.35
Heach 3 and 4 25 mod flow 100.00 87.20 88.35 88.55 0.018602 1.15 3.57 0.84 28 20 20 20 20 20 20 20 20 20 20 20 20 20								1.10	6000000	5.18	4.23	0.92	45.73	0.37
		Heach 3 and 4		nod flow	100.00	87.20	88.35	88.55	0.018602	1.15	3.57	000	0000	

			-19- C	O Total	Min Ch Fl	W.S. Elev	דיני בופע		INIAN OIL CPUI			141	
River	Reach	HIVEL OLA	AIIOL		ŧ	(Ħ)	(#)	(ft/ft)	Ð	(ft/s)	(11 bs/al)		0.74
				(CIS)	00 20	00 07	89.32	0.017792	1.77	4.72	1.38	42.32	
Hansen Creek	Reach 3 and 4	25	1.25-yr	250.00	87.20	00.91		0.017061	1.96	4.91	1.48	43.52	0.73
Lancon Crock	Reach 3 and 4	25	OHWM	300.00	87.20	89.16		1001010	140	5 06	1.55	44.41	0.72
Hansen Crock	Beach 3 and 4	25	2-yr	350.00	87.20	89.34		0.010139	1.2	5.42	1.67	45.33	0.67
	Dooch 3 and 4	25	5-Vr	500.00	87.20	89.86		0.013439	00.7	5 10 E 70	1 79	46.15	0.64
Hansen Creek	Deach 3 and 4	25	25-Vr	650.00	87.20	90.32		0.012045	0.12	5.02 6.02	1.93	46.89	0.63
Hansen Creek	Reach 3 and 4	25	100-yr	800.00	87.20	90.74	91.30	865110.0	0.0	10.0			
Usell Clean								0 010140	1 20	3 70	0.65	34.84	0.74
Hancon Crook	Reach 3 and 4	24.6666*	mod flow	100.00	86.48	87.68		0.01100		4.82	0.97	36.54	
Hallsen Crock	Beach 3 and 4	24.6666*	1.25-Vr	250.00	86.48	88.37		0.011182	00	F 00	1.04	37.05	0.70
Insell Creek	Deach 3 and 4	24 6666*	MWHO	300.00	86.48	88.59		0.01005			1 10		0.68
Hansen Ureek		01 6666*	0.01	350.00	86.48	88.80	. 89.21	0.010054	2:32				0.66
Hansen Creek	Reach 3 and 4	24.0000	2-yi 5-	200.00	86.48	89.35	89.84	0.009378	2.87				
Hansen Creek	Reach 3 and 4	24.0000	0-yi	00.000	86 48	89.80	90.38	0.009505	3.32	9			
Hansen Creek	Reach 3 and 4	24.6666			86.48	90.18		0.009947	3.70	6.57	1.75	41.00	
Hansen Creek	Reach 3 and 4	24.6666	IQ-VI	0000				-					
and the second se					86 12	87.17	87.36	0.011553	1.05				0.0
Hansen Creek	Reach 3 and 4	24.3333*	Mod flow	0.00	00.17			0.008181	1.91	4.21			
Hansen Creek	Reach 3 and 4	24.3333*	1.25-yr	00.002	00.12				2.15	4.40			
Hansen Creek	Reach 3 and 4	24.3333*	OHWM	300.00	00.14				2.37	4.55	0.93		
Hansen Creek	Reach 3 and 4	24.3333*	2-yr	350.00	80.12				2.95	5.00	1.14		
Hansen Creek	Reach 3 and 4	24.3333*	5-yr	200.00	80.12				3.39	5.48	1.38	43.19	
Hansen Creek	Reach 3 and 4	24.3333*	25-yr	650.00	86.12						1.64	4 44.60	0.61
Hansen Creek	Reach 3 and 4	24.3333*	100-yr	800.00	86.12	89.80							
							07 01	0 005569	1.45	2.46	0.37		
Hansen Creek	Reach 3 and 4	24	mod flow	100.00	85.47	00.92				, 3.25	0.60	0 40.71	
Hansen Creek	Reach 3 and 4	24	1.25-yr	250.00	85.47					3.46	0.68	41.58	
Hansen Creek	Reach 3 and 4	24	MWHO	300.00	85.47					3.64	1 0.74	4 42.42	
Hansen Creek	Reach 3 and 4	24	2-yr	350.00	85.47					4.13	0.93	3 45.14	
Hansen Creek	Reach 3 and 4	24	5-yr	200.00	85.47						1.11	1 64.28	
Hansen Creek	Reach 3 and 4	24	25-yr	650.00	85.47						1.28	81.08	8 0.47
Hansen Creek	Reach 3 and 4	24	100-yr	800.00	85.47	89.67	an.ne						
								0.00013	1 43	2.28	0.30	34.98	8 0.36
Hansen Creek	Reach 3 and 4	23	mod flow	100.00	84.82		00.00				7 0.78	38.54	
Hansen Creek	Reach 3 and 4	23	1.25-yr	250.00	84.82						5 0.94	39.37	
Hansen Creek		8	OHWM	300.00							6 1.09	9 40.20	
Hansen Creek		33	2-yr	350.00				- 0.00000				18 53.95	6 0.59
Hansen Creek		8	5-yr	500.00							5 1.77	77 68.16	6 0.61
Hanson Creek		ន	25-yr	650.00								97 106.06	90
Hansen Creek		23	100-yr	800.00	84.82	2 88.35	35 88.90	0 0.010980					
								0.0110.38	0.95	3.56		0.39 49.18	8
Hansen Creek	Reach 3 and 4	8	mod flow	100.00								0.45 55.07	70
Hansen Creek			1.25-yr	250.00			90 80.14					0.44 56.91	91
Hansen Creek			OHWM	300.00								0.44 58.62	52
Hansen Creek			2-yr	350.00								0.46 63.03	03
Hansen Creek		8	5-yr	500.00								0.49 66.61	51
Hanson Creek			25-yr	650.00		8 87.32	32 87.61					0.54 98.67	57
ומוזמנו הואו			And a state of the second se										5

ATTACHMENT D

Proposed Location of Log Revetment



Scour Hole Dimensions estimator (Fael et al. 2006)Project:Hansen Reach 2/3 bridge scour analysisEngineer:Ian Mostrenko, Christina AvolioDate:5-14-12 and 5-18-12

Goal: Need e and f

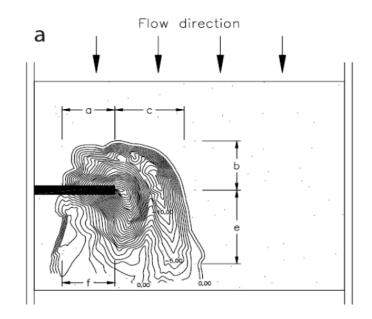
	Abutment	Approach flow	Abutment Scour					
Scenario	Length (L)	depth (d)	Depth (ds)	L/d	e/d	e	f/d	f
2	5	4.45	8.6	1.1	0.204	0.909	0.976	4.344
4	15	6.17	11.5	2.4	0.562	3.470	1.447	8.928

Coefficients:

	m	n	р
e/d	0.859	1.312	3.111
f/d	2.939	0.51	2.274

Table 6. Coefficients of Equation (17) for Sand

Dimension of Scour Hole	m	n	р	R^2
a/d	1.837	0.779	2.016	0.929
d/d	3.177	0.523	2.316	0.929
c/d	2.347	0.675	2.057	0.892
e/d	0.859	1.312	3.111	0.925
fld	2.939	0.510	2.274	0.822
A_{s}/d^{2}	30.387	1.204	4.151	0.912
V_s/d^3	12.782	1.734	6.653	0.952



 $\frac{X}{d^j} = m \left(\frac{L}{d}\right)^n \left(\frac{U}{U_c}\right)^p.$

Reference: Fael, C. M. S., G. Simarro-Grande, J.-P. Martin-Vide, and A.H. Cardoso. 2006. Local scour at vertical-wall abutments under clear-water flow conditions. Water Resources Research 42 (W10408): doi:10.1029/2005WR0004443.

Assumption

U/Uc = 0.6

Applicable Range: 8.9 < L/d < 21.4; under clear-water flow conditions, for vertical-wall abutments normal to flow, in wide rectangular open channels

Definitions

- ds scour depth
- d depth of the approach flow
- L abutment length

Angles of repose

- angle (deg) Soil 30 smooth gravel
 - 40 sharp gravel
 - 25-30 dry sand
 - 30-45 moist sand
 - 20-40 wet sand
 - 37 cement