

RAILROAD RESTORATION WARREN SLOUGH DRAFT FINAL DESIGN

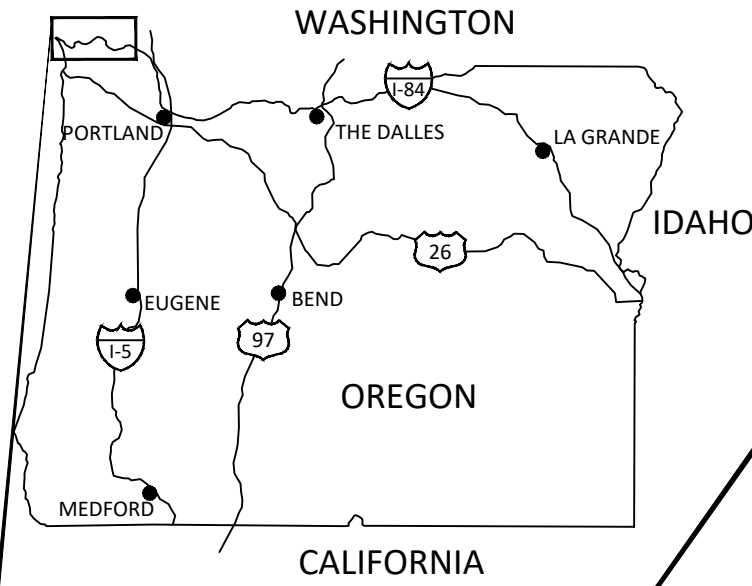
Clatsop County, Oregon
February 2024

COORDINATES:

WARREN SLOUGH

LATITUDE : 46°11'42" N
LONGITUDE 123°34'21" W

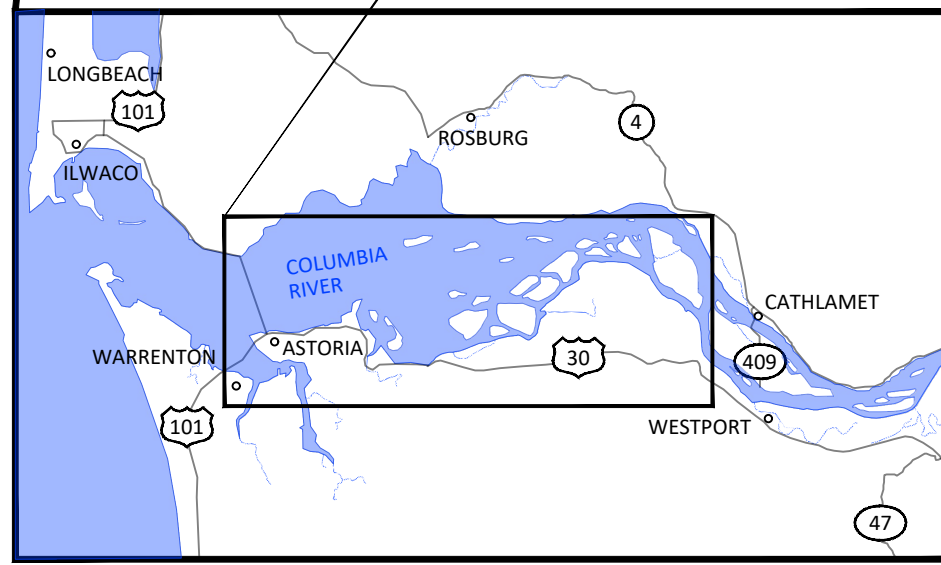
TOWNSHIP 8N, RANGE 7W,
SECTION 8



**LOCATION MAP
STATE OF OREGON**
NOT TO SCALE



SITE MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

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THIS PROJECT WAS DESIGNED IN ACCORDANCE WITH THE BPA HABITAT IMPROVEMENT PROGRAM, PROGRAMMATIC BIOLOGICAL OPINION (HIP).

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COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN




501 Portway Avenue, Suite 101
Hood River, OR 97031
541.386.9003
www.interfluve.com

COVER, VICINITY MAP, &
SHEET INDEX

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THE CONTRACTOR SHALL ATTEND A MANDATORY PRE-BID SITE MEETING.

THE CONTRACTOR SHALL ATTEND A PRE-CONSTRUCTION MEETING WITH COLUMBIA RIVER ESTUARY STUDY TASKFORCE (CREST, OWNER) PRIOR TO BEGINNING CONSTRUCTION.

ALL WORK SHALL BE GOVERNED BY THE GENESEE AND WYOMING STANDARD SPECIFICATIONS AND PUBLIC PROJECT MANUAL.

ADDITIONALLY, WORK ON THIS PROJECT SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THE 2021 OREGON DEPARTMENT OF TRANSPORTATION (ODOT) STANDARD SPECIFICATIONS.

IF ANY PORTION OF THESE REFERENCE CONDITIONS ARE IN CONFLICT WITH EACH OTHER, THE DOCUMENTS THAT GOVERN SHALL ADHERE TO THE FOLLOWING ORDER OF PRECEDENCE:

1. GENESEE AND WYOMING STANDARD CONSTRUCTION SPECIFICATIONS
2. AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION MANUAL FOR RAILWAY ENGINEERING (AREMA MANUAL)
3. ODOT (2021) STANDARD SPECIFICATION AND SPECIAL CONDITIONS MODIFYING THE STANDARD SPECIFICATIONS.

EXISTING DATA

TOPOGRAPHIC AND BATHYMETRIC SURVEY DATA WERE COLLECTED BY INTER-FLUVE, INC & CREST STAFF USING TOTAL STATION, RTK GPS AND ECOSOUNDER SONAR EQUIPMENT ON JUNE 18 & 19, 2019, AND APRIL 29, 2021. THESE DATA ARE REFERENCED TO:
 HORIZONTAL DATUM: NAD83 OREGON STATE PLAN, NORTH ZONE
 VERTICAL DATUM: NAVD88
 UNITS: INTERNATIONAL FEET

LIDAR DATA OBTAINED FROM THE LOWER COLUMBIA ESTUARY PARTNERSHIP, COMMISSIONED BY THE US ARMY CORPS OF ENGINEERS, FLOWN BETWEEN DECEMBER 2, 2009 AND FEBRUARY 22, 2010 WAS USED TO SUPPLEMENT TOPOGRAPHIC SURVEY DATA TO DEVELOP DIGITAL ELEVATION MODELS.

PROPERTY BOUNDARIES SHOWN ARE FROM THE CLATSOP COUNTY TAXLOT GIS LAYER.

TIDAL DATUMS AND WATERS BOUNDARIES

TIDAL DATUMS DISPLAYED IN THIS PLANSET ARE REFERENCED TO NAVD88.

HIGHEST MEASURED TIDE (HMT) = 12.56' - RECORDED AT THE TONGUE POINT STATION (#9439040).

THE DATUMS BELOW ARE CALCULATED BY INTERPOLATION BETWEEN THE TONGUE POINT STATION (#9439040) & THE WAUNA STATION (#9439009) BASED ON LOCATION OF PROJECT SITE AS REFERENCED BY NAUTICAL RIVER MILE (NM) ALONG THE COLUMBIA RIVER.

WARREN SLOUGH

ORDINARY HIGH WATER (OHW) = 10.24'

MEAN HIGHER HIGH WATER (MHHW)/ HIGH TIDE LINE = 8.89'

MEAN HIGH WATER (MHW) = 8.24'

MEAN LOWER LOW WATER (MLLW) = 0.86'

THESE DO NOT NECESSARILY REPRESENT JURISDICTIONAL BOUNDARIES. WITHIN THE STATE OF OREGON, THE ARMY CORPS OF ENGINEERS AND THE DEPARTMENT OF STATE LANDS HAVE THE FINAL AUTHORITY IN DETERMINING WATERS AND WETLANDS BOUNDARIES AND REGULATIONS.

SOILS

SOILS WITHIN THE PROJECT SITE CONSIST MAINLY OF COQUILLE-CLATSOP COMPLEX, 0 TO 1 PERCENT SLOPES. SOME HUMITROPEPTS, 25 TO 60 PERCENT SLOPES ARE ALSO PRESENT ALONG THE RAILROAD PRISM AS MAPPED BY NRCS.

BPA HIP

THIS PROJECT WAS DESIGNED IN ACCORDANCE WITH THE BPA HABITAT IMPROVEMENT PROGRAM, PROGRAMMATIC BIOLOGICAL OPINION (HIP). HIP GENERAL CONSERVATION MEASURES (CMs) ARE INCLUDED ON SHEETS 3 4 AND 5. SITE SPECIFIC DIRECTION IS INCLUDED IN THE FOLLOWING GENERAL NOTES. IN CASE OF A CONFLICT BETWEEN THE REGULATORY STANDARDS OR SPECIFICATIONS, THE MORE STRINGENT WILL PREVAIL, UNLESS SPECIFIED IN WRITING BY THE OWNER.

CONSTRUCTION TIMING

ALL CONSTRUCTION WORK SHALL OCCUR WITHIN THE DESIGNATED IN WATER WORK WINDOW, ANTICIPATED TO OCCUR JULY 15TH THROUGH SEPTEMBER 30TH, 2023.

EROSION CONTROL

CONTRACTOR SHALL BE SOLELY RESPONSIBLE AT OWN EXPENSE FOR PROVIDING AND MAINTAINING ALL NECESSARY EROSION CONTROL FACILITIES TO COMPLY WITH APPLICABLE EROSION CONTROL PERMITS, REGULATIONS, AND TO MAINTAIN CLEAN ACCESS ROUTES.

FISH SALVAGE

PRIOR TO BEGINNING WORK THE SITE SHALL BE ISOLATED AND DE-FISHED. FISH RESCUE TO BE COMPLETED BY EXPERIENCED FISH BIOLOGIST AND COORDINATED WITH OWNER. ADDITIONAL FISH SALVAGE MAY BE REQUIRED IF OVERLAND FLOW ENTERS THE PROJECT AREA DURING A HIGH TIDE.

CULTURAL RESOURCES

IF YOUR WORK BRINGS YOU INTO CONTACT WITH ANY OF THE FOLLOWING CULTURAL RESOURCES:

-NATIVE AMERICAN CULTURAL ARTIFACTS (EXAMPLE: FLAKES, ARROWHEADS, STONE TOOLS, BONE TOOLS, POTTERY, ETC.)

-HISTORIC ERA ARTIFACTS (EXAMPLE: BUILDING FOUNDATIONS, HOMESTEADS, SHIPWRECKS, MINING CAMPS, ETC.)

-HUMAN SKELETAL REMAINS AND BONE FRAGMENTS

YOU MUST IMMEDIATELY DISCONTINUE ALL GROUND-DISTURBING ACTIVITY. DO NOT TOUCH OR MOVE THE OBJECTS AND MAINTAIN THE CONFIDENTIALITY OF THE SITE. FOLLOW THE PROCEDURES LISTED IN THE BPA INADVERTENT DISCOVERY PROCEDURE AND AWAIT FURTHER DIRECTION FROM BPA'S CULTURAL RESOURCES STAFF.

NAME	OFFICE #	CELL #
JENNA PETERSON	(503) 230-3018	N/A
KURT PERKINS	(503) 230-4454	(503) 459-0436
SUNSHINE SCHMIDT	(503) 230-5015	(503) 804-1815

ENVIRONMENTAL PROTECTION

ALL TEMPORARY STAGING AREAS SHALL BE LOCATED AT ELEVATION 12FT (NAVD88) OR HIGHER. ADD FILL TO DESIGNATED STAGING AREAS AS NECESSARY PRIOR TO USE.

THE FOOTPRINT OF FUEL STORAGE AND EQUIPMENT PARKING WITHIN DESIGNATED STAGING AREAS SHALL BE COVERED WITH AN ABRASION RESISTANT OIL ABSORBENT MAT MATERIAL. THE MAT MATERIAL SHALL BE 3-PLY POLYPROPYLENE/POLYETHYLENE OR APPROVED EQUAL.

EQUIPMENT SHALL REMAIN IN DESIGNATED STAGING AREAS AT ANY TIME THE CONTRACTOR IS NOT ON SITE, AND SHALL HAVE A SECOND OIL ABSORBENT MAT INSTALLED UNDER THE CARRIAGE AS A "DIAPER".

ALL REFUELING SHALL TAKE PLACE IN DESIGNATED STAGING AREAS, WITH BOTH GROUND AND "DIAPER" CONTAINMENT IN PLACE.

UTILITIES

THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR HAVING UTILITIES LOCATED PRIOR TO CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL CALL (800-424-5555) FOR UTILITY LOCATE PRIOR TO CONSTRUCTION.

THE CONTRACTOR SHALL IMMEDIATELY CONTACT THE AFFECTED UTILITY SERVICE TO REPORT ANY DAMAGED OR DESTROYED UTILITIES. THE CONTRACTOR SHALL PROVIDE EQUIPMENT AND LABOR TO AID THE AFFECTED UTILITY SERVICE IN REPAIRING DAMAGED OR DESTROYED UTILITIES AT NO ADDITIONAL COST.

CONSTRUCTION STAKING

STAKING OF PROJECT LIMITS, GRADE STAKES, AND ELEVATION CONTROL POINTS BY OTHERS. SOME FIELD ADJUSTMENTS TO THE LINES AND GRADES ARE TO BE EXPECTED.

CONTRACTOR SHALL MEET WITH THE OWNER TO DEFINE AND MARK ACCESS ROUTES AND LIMITS OF DISTURBANCE PRIOR TO MOBILIZATION OF EQUIPMENT OR MATERIALS ONTO THE SITE.

THE CONTRACTOR SHALL REPLACE DAMAGED OR DESTROYED CONSTRUCTION STAKES AT NO ADDITIONAL COST.

EQUIPMENT

EXCAVATORS SHALL BE FITTED WITH NON-TOXIC HYDRAULIC FLUIDS AT NO ADDITIONAL COST.

CONTRACTORS SHALL UTILIZE CONSTRUCTION EQUIPMENT WHICH MINIMIZES IMPACTS TO TIDAL MARSHES - MATS, LOGS, LOW PRESSURE EQUIPMENT OR APPROVED EQUAL.

CONSTRUCTION ACCESS

CONTRACTOR TO NOTIFY G&W PUBLIC PROJECTS DEPARTMENT 30 DAYS PRIOR TO STARTING CONSTRUCTION. G&W FLAGGING SERVICES WILL BE REQUIRED FOR ALL WORK WITHIN G&W RIGHT OF WAY OR ANY WORK THAT HAS A "POTENTIAL TO FOUL".

PRIOR TO REVIEW OF ANY SITE ACCESS ON OR ADJACENT TO THE TRACK, PROVIDE EQUIPMENT SPECIFICATIONS TO UTILIZE EQUIPMENT ACCESS ROUTES.

CONTRACTOR SHALL SUBMIT AN ACCESS, STAGING, AND STOCKPILE PLAN TO THE OWNER FOR APPROVAL.

THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING ANY REQUIRED TRAFFIC CONTROL INCLUDING, BUT NOT LIMITED TO, SIGNAGE AND FLAGGERS, AND FOR OBTAINING ANY REQUIRED ACCESS PERMITS.

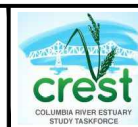
FOR DURATION OF PROJECT, CONTRACTOR SHALL KEEP ALL PRIVATE AND PUBLIC ROADS USED FOR ACCESS FREE OF DEBRIS AND MUD.

ACCESS WILL INCLUDE TRAVERSING EXISTING UN-UTILIZED RAILROAD GRADE. CONTRACTOR SHALL RETURN THE RAIL LINE AND RAIL CORRIDOR (50FT ON EITHER SIDE OF THE RAILROAD CENTERLINE) TO EXISTING OR BETTER CONDITION, AS APPROVED BY RAIL LINE OWNER.

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RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**



GENERAL NOTES

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ABBREVIATIONS

APPROX	APPROXIMATE
AVE	AVERAGE
CMP C	CORRUGATED METAL PIPE
CREST	COLUMBIA RIVER ESTUARY STUDY TASKFORCE
CY	CUBIC YARDS
°	DEGREES
DEPT	DEPARTMENT
DIA	DIAMETER
ELEV	ELEVATION
EXIST	EXISTING
FT or '	FT
HORIZ	HORIZONTAL
HWY	HIGHWAY
IN or "	INCHES
INV	INVERT
MAX	MAXIMUM
MHHW	MEAN HIGHER HIGH WATER
MHW	MEAN HIGH WATER
MIN	MINIMUM
MLLW	MEAN LOWER LOW WATER
NOAA	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
ODOT	OREGON DEPARTMENT OF TRANSPORTATION
%	PERCENT
RD	ROAD
RMx	RIVER MILE x
STA	STATION
TBD	TO BE DETERMINED
TBM	TEMPORARY BENCHMARK
TYP	TYPICAL
VERT	VERTICAL
WSE	WATER SURFACE ELEVATION
YR	YEAR

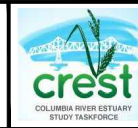
QUANTITIES

	CUT (CY)	FILL (CY)
RAILROAD PRISM BREACH	800	800
IMPORTED RIPRAP		150
Total	800	950

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ABBREVIATIONS & QUANTITIES

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HIP GENERAL CONSERVATION MEASURES APPLICABLE TO ALL ACTIONS

THE ACTIVITIES COVERED UNDER THE HIP ARE INTENDED TO PROTECT AND RESTORE FISH AND WILDLIFE HABITAT WITH LONG-TERM BENEFITS TO ESA-LISTED SPECIES. THE FOLLOWING GENERAL CONSERVATION MEASURES (DEVELOPED IN COORDINATION WITH USFWS AND NMFS) WILL BE APPLIED TO ALL ACTIONS OF THIS PROJECT.

PROJECT DESIGN AND SITE PREPARATION.

1. STATE AND FEDERAL PERMITS.

- A. ALL APPLICABLE REGULATORY PERMITS AND OFFICIAL PROJECT AUTHORIZATIONS WILL BE OBTAINED BEFORE PROJECT IMPLEMENTATION.
- B. THESE PERMITS AND AUTHORIZATIONS INCLUDE, BUT ARE NOT LIMITED TO, NATIONAL ENVIRONMENTAL POLICY ACT, NATIONAL HISTORIC PRESERVATION ACT, THE APPROPRIATE STATE AGENCY REMOVAL AND FILL PERMIT, USACE CLEAN WATER ACT (CWA) 404 PERMITS, CWA SECTION 401 WATER QUALITY CERTIFICATIONS, AND FEMA NO-RISE ANALYSES.

2. TIMING OF IN-WATER WORK.

- A. APPROPRIATE STATE (OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW), WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW), IDAHO DEPARTMENT OF FISH AND GAME (IDFG), AND MONTANA FISH WILDLIFE AND PARKS (MFWP)) GUIDELINES FOR TIMING OF IN-WATER WORK WINDOWS (IWW) WILL BE FOLLOWED.
- B. CHANGES TO ESTABLISHED WORK WINDOWS WILL BE APPROVED BY REGIONAL STATE BIOLOGISTS AND BPA'S EC LEAD.
- C. BULL TROUT. FOR AREAS WITH DESIGNATED IN-WATER WORK WINDOWS FOR BULL TROUT OR AREAS KNOWN TO HAVE BULL TROUT, PROJECT PROPONENTS WILL CONTACT THE APPROPRIATE USFWS FIELD OFFICE TO INSURE THAT ALL REASONABLE IMPLEMENTATION MEASURES ARE CONSIDERED AND AN APPROPRIATE IN-WATER WORK WINDOW IS BEING USED TO MINIMIZE PROJECT EFFECTS.
- D. LAMPREY. WORKING IN STREAM OR RIVER CHANNELS THAT CONTAIN PACIFIC LAMPREY WILL BE AVOIDED FROM MARCH 1 TO JULY 1 FOR REACHES <5,000 FEET IN ELEVATION AND FROM MARCH 1 TO AUGUST 1 FOR REACHES >5,000 FEET. IF EITHER TIMEFRAME IS INCOMPATIBLE WITH OTHER OBJECTIVES, THE AREA WILL BE SURVEYED FOR NESTS AND LAMPREY PRESENCE, AND AVOIDED IF POSSIBLE. IF LAMPREYS ARE KNOWN TO EXIST, THE PROJECT SPONSOR WILL UTILIZE DEWATERING AND SALVAGE PROCEDURES (SEE FISH SALVAGE AND ELECTROFISHING SECTIONS) TO MINIMIZE ADVERSE EFFECTS.
- E. THE IN-WATER WORK WINDOW WILL BE PROVIDED IN THE CONSTRUCTION PLANS.

3. CONTAMINANTS.

- A. EXCAVATION OF MORE THAN 20 CUBIC YARDS WILL REQUIRE A SITE VISIT AND DOCUMENTED ASSESSMENT FOR POTENTIAL CONTAMINANT SOURCES. THE SITE ASSESSMENT WILL BE STORED WITH PROJECT FILES OR AS AN APPENDIX TO THE BASIS OF DESIGN REPORT.
- B. THE SITE ASSESSMENT WILL SUMMARIZE:
 - 1. THE SITE VISIT, CONDITION OF THE PROPERTY, AND IDENTIFICATION OF ANY AREAS USED FOR VARIOUS INDUSTRIAL PROCESSES;
 - 2. AVAILABLE RECORDS, SUCH AS FORMER SITE USE, BUILDING PLANS, AND RECORDS OF ANY PRIOR CONTAMINATION EVENTS;
 - 3. INTERVIEWS WITH KNOWLEDGEABLE PEOPLE, SUCH AS SITE OWNERS, OPERATORS, OCCUPANTS, NEIGHBORS, OR LOCAL GOVERNMENT OFFICIALS; AND
 - 4. THE TYPE, QUANTITY, AND EXTENT OF ANY POTENTIAL CONTAMINATION SOURCES.

4. SITE LAYOUT AND FLAGGING.

- A. CONSTRUCTION AREAS TO BE CLEARLY FLAGGED PRIOR TO CONSTRUCTION.
- B. AREAS TO BE FLAGGED WILL INCLUDE:
 - 1. SENSITIVE RESOURCE AREAS, SUCH AS AREAS BELOW ORDINARY HIGH WATER, SPAWNING AREAS, SPRINGS, AND WETLANDS;
 - 2. EQUIPMENT ENTRY AND EXIT POINTS;
 - 3. ROAD AND STREAM CROSSING ALIGNMENTS;
 - 4. STAGING, STORAGE, AND STOCKPILE AREAS; AND
 - 5. NO-SPRAY AREAS AND BUFFERS.

5. TEMPORARY ACCESS ROADS AND PATHS.

- A. EXISTING ACCESS ROADS AND PATHS WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER AND LENGTH OF TEMPORARY ACCESS ROADS AND PATHS THROUGH RIPARIAN AREAS AND FLOODPLAINS WILL BE MINIMIZED.
- B. VEHICLE USE AND HUMAN ACTIVITIES, INCLUDING WALKING, IN AREAS OCCUPIED BY TERRESTRIAL ESA-LISTED SPECIES WILL BE MINIMIZED.
- C. TEMPORARY ACCESS ROADS AND PATHS WILL NOT BE BUILT ON SLOPES WHERE GRADE, SOIL, OR OTHER FEATURES SUGGEST A LIKELIHOOD OF EXCESSIVE EROSION OR FAILURE. IF SLOPES ARE STEEPER THAN 30%, THEN THE ROAD WILL BE DESIGNED BY A CIVIL ENGINEER WITH EXPERIENCE IN STEEP ROAD DESIGN.
- D. THE REMOVAL OF RIPARIAN VEGETATION DURING CONSTRUCTION OF TEMPORARY ACCESS ROADS WILL BE MINIMIZED. WHEN TEMPORARY VEGETATION REMOVAL IS REQUIRED, VEGETATION WILL BE CUT AT GROUND LEVEL (NOT GRUBBED).
- E. AT PROJECT COMPLETION, ALL TEMPORARY ACCESS ROADS AND PATHS WILL BE OBLITERATED, AND THE SOIL WILL BE STABILIZED AND REVEGETATED. ROAD AND PATH OBLITERATION REFERS TO THE MOST COMPREHENSIVE DEGREE OF DECOMMISSIONING AND INVOLVES DECOMPACTING THE SURFACE AND DITCH, PULLING THE FILL MATERIAL ONTO THE RUNNING SURFACE, AND RESHAPING TO MATCH THE ORIGINAL CONTOUR.

6. TEMPORARY STREAM CROSSINGS.

- A. EXISTING STREAM CROSSINGS OR BEDROCK WILL BE PREFERENTIALLY USED WHENEVER REASONABLE, AND THE NUMBER OF TEMPORARY STREAM CROSSINGS WILL BE MINIMIZED.
- B. TEMPORARY BRIDGES AND CULVERTS WILL BE INSTALLED TO ALLOW FOR EQUIPMENT AND VEHICLE CROSSING OVER PERENNIAL STREAMS DURING CONSTRUCTION. TREATED WOOD SHALL NOT BE USED ON TEMPORARY BRIDGE CROSSINGS OR IN LOCATIONS IN CONTACT WITH OR DIRECTLY OVER WATER.
- C. FOR PROJECTS THAT REQUIRE EQUIPMENT AND VEHICLES TO CROSS IN THE WET:
 - 1. THE LOCATION AND NUMBER OF ALL WET CROSSINGS SHALL BE APPROVED BY THE BPA EC LEAD AND DOCUMENTED IN THE CONSTRUCTION PLANS;
 - 2. VEHICLES AND MACHINERY SHALL CROSS STREAMS AT RIGHT ANGLES TO THE MAIN CHANNEL WHENEVER POSSIBLE;
 - 3. NO STREAM CROSSINGS WILL OCCUR 300 FEET UPSTREAM OR 100 FEET DOWNSTREAM OF AN EXISTING REDD OR SPAWNING FISH; AND
 - 4. AFTER PROJECT COMPLETION, TEMPORARY STREAM CROSSINGS WILL BE OBLITERATED AND BANKS RESTORED.

7. STAGING, STORAGE, AND STOCKPILE AREAS.

- A. STAGING AREAS (USED FOR CONSTRUCTION EQUIPMENT STORAGE, VEHICLE STORAGE, FUELING, SERVICING, AND HAZARDOUS MATERIAL STORAGE) ~~WILL BE 150 FEET OR MORE FROM ANY NATURAL WATER BODY OR WETLAND. STAGING AREAS CLOSER THAN 150 FEET WILL BE APPROVED BY THE EC LEAD.~~
- B. NATURAL MATERIALS USED FOR IMPLEMENTATION OF AQUATIC RESTORATION, SUCH AS LARGE WOOD, GRAVEL, AND BOULDERS, MAY BE STAGED WITHIN 150 FEET IF CLEARLY INDICATED IN THE PLANS THAT AREA IS FOR NATURAL MATERIALS ONLY.
- C. ANY LARGE WOOD, TOPSOIL, AND NATIVE CHANNEL MATERIAL DISPLACED BY CONSTRUCTION WILL BE STOCKPILED FOR USE DURING SITE RESTORATION AT A SPECIFICALLY IDENTIFIED AND FLAGGED AREA.
- D. ANY MATERIAL NOT USED IN RESTORATION, AND NOT NATIVE TO THE FLOODPLAIN, WILL BE DISPOSED OF OUTSIDE THE 100-YEAR FLOODPLAIN.

8. EQUIPMENT.

- A. MECHANIZED EQUIPMENT AND VEHICLES WILL BE SELECTED, OPERATED, AND MAINTAINED IN A MANNER THAT MINIMIZES ADVERSE EFFECTS ON THE ENVIRONMENT (E.G., MINIMALLY-SIZED, LOW PRESSURE TIRES; MINIMAL HARD-TURN PATHS FOR TRACKED VEHICLES; TEMPORARY MATS OR PLATES WITHIN WET AREAS OR ON SENSITIVE SOILS).
- B. EQUIPMENT WILL BE STORED, FUELED, AND MAINTAINED IN AN CLEARLY IDENTIFIED STAGING AREA THAT MEETS STAGING AREA CONSERVATION MEASURES.

- C. EQUIPMENT WILL BE REFUELED IN A VEHICLE STAGING AREA OR IN AN ISOLATED HARD ZONE, SUCH AS A PAVED PARKING LOT OR ADJACENT, ESTABLISHED ROAD (THIS MEASURE APPLIES ONLY TO GAS-POWERED EQUIPMENT WITH TANKS LARGER THAN 5 GALLONS).
- D. BIODEGRADABLE LUBRICANTS AND FLUIDS WILL BE USED ON EQUIPMENT OPERATING IN AND ADJACENT TO THE STREAM CHANNEL AND LIVE WATER.
- E. EQUIPMENT WILL BE INSPECTED DAILY FOR FLUID LEAKS BEFORE LEAVING THE VEHICLE STAGING AREA FOR OPERATION WITHIN 150 FEET OF ANY NATURAL WATER BODY OR WETLAND.
- F. EQUIPMENT WILL BE THOROUGHLY CLEANED BEFORE OPERATION BELOW ORDINARY HIGH WATER, AND AS OFTEN AS NECESSARY DURING OPERATION, TO REMAIN GREASE FREE.

9. EROSION CONTROL.

- A. TEMPORARY EROSION CONTROL MEASURES INCLUDE:
 - 1. TEMPORARY EROSION CONTROLS WILL BE IN PLACE BEFORE ANY SIGNIFICANT ALTERATION OF THE ACTION SITE AND APPROPRIATELY INSTALLED DOWNSLOPE OF PROJECT ACTIVITY WITHIN THE RIPARIAN BUFFER AREA UNTIL SITE REHABILITATION IS COMPLETE;
 - 2. IF THERE IS A POTENTIAL FOR ERODED SEDIMENT TO ENTER THE STREAM, SEDIMENT BARRIERS WILL BE INSTALLED AND MAINTAINED FOR THE DURATION OF PROJECT IMPLEMENTATION;
 - 3. TEMPORARY EROSION CONTROL MEASURES MAY INCLUDE SEDGE MATS, FIBER WATTLES, SILT FENCES, JUTE MATTING, WOOD FIBER MULCH AND SOIL BINDER, OR GEOTEXTILES AND GEOSYNTHETIC FABRIC;
 - 4. SOIL STABILIZATION UTILIZING WOOD FIBER MULCH AND TACKIFIER (HYDRO-APPLIED) MAY BE USED TO REDUCE EROSION OF BARE SOIL IF THE MATERIALS ARE NOXIOUS WEED FREE AND NONTOXIC TO AQUATIC AND TERRESTRIAL ANIMALS, SOIL MICROORGANISMS, AND VEGETATION;
 - 5. SEDIMENT WILL BE REMOVED FROM EROSION CONTROLS ONCE IT HAS REACHED 1/3 OF THE EXPOSED HEIGHT OF THE CONTROL; AND
 - 6. ONCE THE SITE IS STABILIZED AFTER CONSTRUCTION, TEMPORARY EROSION CONTROL MEASURES WILL BE REMOVED.
- B. EMERGENCY EROSION CONTROLS. THE FOLLOWING MATERIALS FOR EMERGENCY EROSION CONTROL WILL BE AVAILABLE AT THE WORK SITE:
 - 1. A SUPPLY OF SEDIMENT CONTROL MATERIALS; AND
 - 2. AN OIL-ABSORBING FLOATING BOOM WHENEVER SURFACE WATER IS PRESENT.

10. DUST ABATEMENT.

- A. THE PROJECT SPONSOR WILL DETERMINE THE APPROPRIATE DUST CONTROL MEASURES BY CONSIDERING SOIL TYPE, EQUIPMENT USAGE, PREVAILING WIND DIRECTION, AND THE EFFECTS CAUSED BY OTHER EROSION AND SEDIMENT CONTROL MEASURES.
- B. WORK WILL BE SEQUENCED AND SCHEDULED TO REDUCE EXPOSED BARE SOIL SUBJECT TO WIND EROSION.
- C. DUST-ABATEMENT ADDITIVES AND STABILIZATION CHEMICALS (TYPICALLY MAGNESIUM CHLORIDE, CALCIUM CHLORIDE SALTS, OR LIGNINSULFONATE) WILL NOT BE APPLIED WITHIN 25 FEET OF WATER OR A STREAM CHANNEL AND WILL BE APPLIED SO AS TO MINIMIZE THE LIKELIHOOD THAT THEY WILL ENTER STREAMS. APPLICATIONS OF LIGNINSULFONATE WILL BE LIMITED TO A MAXIMUM RATE OF 0.5 GALLONS PER SQUARE YARD OF ROAD SURFACE, ASSUMING MIXED 50:50 WITH WATER.
- D. APPLICATION OF DUST ABATEMENT CHEMICALS WILL BE AVOIDED DURING OR JUST BEFORE WET WEATHER, AND AT STREAM CROSSINGS OR OTHER AREAS THAT COULD RESULT IN UNFILTERED DELIVERY OF THE DUST ABATEMENT MATERIALS TO A WATERBODY (TYPICALLY THESE WOULD BE AREAS WITHIN 25 FEET OF A WATERBODY OR STREAM CHANNEL; DISTANCES MAY BE GREATER WHERE VEGETATION IS SPARSE OR SLOPES ARE STEEP).
- E. SPILL CONTAINMENT EQUIPMENT WILL BE AVAILABLE DURING APPLICATION OF DUST ABATEMENT CHEMICALS.
- F. PETROLEUM-BASED PRODUCTS WILL NOT BE USED FOR DUST ABATEMENT.

NO.	BY	DATE	REVISION DESCRIPTION

GS DRAWN	MC, CA, MB DESIGNED	MB CHECKED
MC APPROVED	02/2024 DATE	190220 PROJECT

**COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**




501 Portway Avenue, Suite 101
Hood River, OR 97031
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**HIP GENERAL CONSERVATION
MEASURES (1 OF 3)**

PROJECT DESIGN AND SITE PREPARATION (CONTINUED).

11. SPILL PREVENTION, CONTROL, AND COUNTER MEASURES.

- A. A DESCRIPTION OF HAZARDOUS MATERIALS THAT WILL BE USED, INCLUDING INVENTORY, STORAGE, AND HANDLING PROCEDURES WILL BE AVAILABLE ON-SITE.
- B. WRITTEN PROCEDURES FOR NOTIFYING ENVIRONMENTAL RESPONSE AGENCIES WILL BE POSTED AT THE WORK SITE.
- C. SPILL CONTAINMENT KITS (INCLUDING INSTRUCTIONS FOR CLEANUP AND DISPOSAL) ADEQUATE FOR THE TYPES AND QUANTITY OF HAZARDOUS MATERIALS USED AT THE SITE WILL BE AVAILABLE AT THE WORK SITE.
- D. WORKERS WILL BE TRAINED IN SPILL CONTAINMENT PROCEDURES AND WILL BE INFORMED OF THE LOCATION OF SPILL CONTAINMENT KITS.
- E. ANY WASTE LIQUIDS GENERATED AT THE STAGING AREAS WILL BE TEMPORARILY STORED UNDER AN IMPERVIOUS COVER, SUCH AS A TARPULIN, UNTIL THEY CAN BE PROPERLY TRANSPORTED TO AND DISPOSED OF AT A FACILITY THAT IS APPROVED FOR RECEIPT OF HAZARDOUS MATERIALS.
- F. PUMPS USED ADJACENT TO WATER SHALL USE SPILL CONTAINMENT SYSTEMS.

12. INVASIVE SPECIES CONTROL.

- A. PRIOR TO ENTERING THE SITE, ALL VEHICLES AND EQUIPMENT WILL BE POWER WASHED, ALLOWED TO FULLY DRY, AND INSPECTED TO MAKE SURE NO PLANTS, SOIL, OR OTHER ORGANIC MATERIAL ADHERES TO THE SURFACE.
- B. WATERCRAFT, WADERS, BOOTS, AND ANY OTHER GEAR TO BE USED IN OR NEAR WATER WILL BE INSPECTED FOR AQUATIC INVASIVE SPECIES.
- C. WADING BOOTS WITH FELT SOLES ARE NOT TO BE USED DUE TO THEIR PROPENSITY FOR AIDING IN THE TRANSFER OF INVASIVE SPECIES UNLESS DECONTAMINATION PROCEDURES HAVE BEEN APPROVED BY THE EC LEAD.

WORK AREA ISOLATION AND FISH SALVAGE.

1. WORK AREA ISOLATION.

- A. ANY WORK AREA WITHIN THE WETTED CHANNEL WILL BE ISOLATED FROM THE ACTIVE STREAM WHENEVER ESA-LISTED FISH ARE REASONABLY CERTAIN TO BE PRESENT, OR IF THE WORK AREA IS LESS THAN 300-FEET UPSTREAM FROM KNOWN SPAWNING HABITATS.
- B. WORK AREA ISOLATION AND FISH SALVAGE ACTIVITIES WILL COMPLY WITH THE IN-WATER WORK WINDOW.
- C. DESIGN PLANS WILL INCLUDE ALL ISOLATION ELEMENTS AND AREAS (COFFER DAMS, PUMPS, DISCHARGE AREAS, FISH SCREENS, FISH RELEASE AREAS, ETC.).
- D. WORK AREA ISOLATION AND FISH CAPTURE ACTIVITIES WILL OCCUR DURING PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES POSSIBLE, NORMALLY EARLY IN THE MORNING VERSUS LATE IN THE DAY, AND DURING CONDITIONS APPROPRIATE TO MINIMIZE STRESS AND DEATH OF SPECIES PRESENT.

2. FISH SALVAGE.

- A. MONITORING AND RECORDING WILL TAKE PLACE FOR DURATION OF SALVAGE. THE SALVAGE REPORT WILL BE COMMUNICATED TO AGENCIES VIA THE PROJECT COMPLETION FORM (PCF).
- B. SALVAGE ACTIVITIES SHOULD TAKE PLACE DURING CONDITIONS TO MINIMIZE STRESS TO FISH SPECIES, TYPICALLY PERIODS OF THE COOLEST AIR AND WATER TEMPERATURES WHICH OCCUR IN THE MORNING VERSUS LATE IN THE DAY.
- C. SALVAGE OPERATIONS WILL FOLLOW THE ORDERING, METHODS, AND CONSERVATION MEASURES SPECIFIED BELOW:
 - 1. SLOWLY REDUCE WATER FROM THE WORK AREA TO ALLOW SOME FISH TO LEAVE VOLITIONALLY.
 - 2. BLOCK NETS WILL BE INSTALLED AT UPSTREAM AND DOWNSTREAM LOCATIONS AND MAINTAINED IN A SECURED POSITION TO EXCLUDE FISH FROM ENTERING THE PROJECT AREA.
 - 3. BLOCK NETS WILL BE SECURED TO THE STREAM CHANNEL BED AND BANKS UNTIL FISH CAPTURE AND TRANSPORT ACTIVITIES ARE COMPLETE. BLOCK NETS MAY BE LEFT IN PLACE FOR THE DURATION OF THE PROJECT TO EXCLUDE FISH AS LONG AS PASSAGE REQUIREMENTS ARE MET.
 - 4. NETS WILL BE MONITORED HOURLY DURING IN-STREAM DISTURBANCE.

- 5. IF BLOCK NETS REMAIN IN PLACE MORE THAN ONE DAY, THE NETS WILL BE MONITORED AT LEAST DAILY TO ENSURE THEY ARE SECURED AND FREE OF ORGANIC ACCUMULATION. IF BULL TROUT ARE PRESENT, NETS ARE TO BE CHECKED EVERY 4 HOURS FOR FISH IMPINGEMENT.
- 6. CAPTURE FISH THROUGH SEINING AND RELOCATE TO STREAMS.
- 7. WHILE DEWATERING, ANY REMAINING FISH WILL BE COLLECTED BY HAND OR DIP NETS.
- 8. SEINES WITH A MESH SIZE TO ENSURE CAPTURE OF THE RESIDING ESA-LISTED FISH WILL BE USED.
- 9. MINNOW TRAPS WILL BE LEFT IN PLACE OVERNIGHT AND USED IN CONJUNCTION WITH SEINING.
- 10. ELECTROFISH TO CAPTURE AND RELOCATED FISH NOT CAUGHT DURING SEINING PER ELECTROFISH CONSERVATION MEASURES.
- 11. CONTINUE TO SLOWLY DEWATER STREAM REACH.
- 12. COLLECT ANY REMAINING FISH IN COLD-WATER BUCKETS AND RELOCATED TO THE STREAM.
- 13. LIMIT THE TIME FISH ARE IN A TRANSPORT BUCKET.
- 14. MINIMIZE PREDATION BY TRANSPORTING COMPARABLE SIZES IN BUCKETS.
- 15. BUCKET WATER TO BE CHANGED EVERY 15 MINUTES OR AERATED.
- 16. BUCKETS WILL BE KEPT IN SHADED AREAS OR COVERED.
- 17. DEAD FISH WILL NOT BE STORED IN TRANSPORT BUCKETS, BUT WILL BE LEFT ON THE STREAM BANK TO AVOID MORTALITY COUNTING ERRORS.

D. SALVAGE GUIDELINES FOR BULL TROUT, LAMPREY, MUSSELS, AND NATIVE FISH.

- 1. CONDUCT SITE SURVEY TO ESTIMATE SALVAGE NUMBERS.
- 2. PRE-SELECT SITE(S) FOR RELEASE AND/OR MUSSEL BED RELOCATION.
- 3. SALVAGE OF BULL TROUT WILL NOT TAKE PLACE WHEN WATER TEMPERATURES EXCEED 15 DEGREES CELSIUS.
- 4. IF DRAWDOWN LESS THAN 48 HOURS, SALVAGE OF LAMPREY AND MUSSELS MAY NOT BE NECESSARY IF TEMPERATURES SUPPORT SURVIVAL IN SEDIMENTS.
- 5. SALVAGE MUSSELS BY HAND, LOCATING BY SNORKELING OR WADING.
- 6. SALVAGE LAMPREY BY ELECTROFISHING (SEE ELECTROFISHING FOR LARVAL LAMPREY SETTINGS AND LARVAL LAMPREY DRY SHOCKING SETTINGS).
- 7. SALVAGE BONY FISH AFTER LAMPREY WITH NETS OR ELECTROFISHING (SEE ELECTROFISHING FOR APPROPRIATE SETTINGS).
- 8. REGULARLY INSPECT DEWATERED SITE SINCE LAMPREY LIKELY TO EMERGE AFTER DEWATERING AND MUSSELS MAY BECOME VISIBLE.
- 9. MUSSELS MAY BE TRANSFERRED IN COOLERS.
- 10. MUSSELS WILL BE PLACED INDIVIDUALLY TO ENSURE ABILITY TO BURROW INTO NEW HABITAT.

3. ELECTROFISHING.

- A. INITIAL SITE SURVEY AND INITIAL SETTINGS.
 - 1. IDENTIFY SPAWNING ADULTS AND ACTIVE REDDS TO AVOID.
 - 2. RECORD WATER TEMPERATURE. ELECTROFISHING WILL NOT OCCUR WHEN WATER TEMPERATURES ARE ABOVE 18 DEGREES CELSIUS.
 - 3. IF POSSIBLE, A BLOCK NET WILL BE PLACED DOWNSTREAM AND CHECKED REGULARLY TO CAPTURE STUNNED FISH THAT DRIFT DOWNSTREAM.
 - 4. INITIAL SETTINGS WILL BE 100 VOLTS, PULSE WIDTH OF 500 MICRO SECONDS, AND PULSE RATE OF 30 HERTZ.
 - 5. RECORDS FOR CONDUCTIVITY, WATER TEMPERATURE, AIR TEMPERATURE, ELECTROFISHING SETTINGS, ELECTROFISHER MODEL, ELECTROFISHER CALIBRATION, FISH CONDITIONS, FISH MORTALITIES, AND TOTAL CAPTURE RATES WILL BE INCLUDED IN THE SALVAGE LOG BOOK.

B. ELECTROFISHING TECHNIQUE.

- 1. SAMPLING WILL BEGIN USING STRAIGHT DC. POWER WILL REMAIN ON UNTIL THE FISH IS NETTED WHEN USING STRAIGHT DC. GRADUALLY INCREASE VOLTAGE WHILE REMAINING BELOW MAXIMUM LEVELS.
- 2. MAXIMUM VOLTAGE WILL BE 1100 VOLTS WHEN CONDUCTIVITY IS <100 MILLISECONDS, 800 VOLTS WHEN CONDUCTIVITY IS BETWEEN 100 AND 300 MILLISECONDS, AND 400 VOLTS WHEN CONDUCTIVITY IS >300 MILLISECONDS.
- 3. IF FISH CAPTURE IS NOT SUCCESSFUL USING STRAIGHT DC, THE ELECTROFISHER WILL BE SET TO INITIAL VOLTAGE FOR PDC. VOLTAGE, PULSE WIDTH, AND PULSE FREQUENCY WILL BE GRADUALLY INCREASED WITHIN MAXIMUM VALUES UNTIL CAPTURE IS SUCCESSFUL.
- 4. MAXIMUM PULSE WIDTH IS 5 MILLISECONDS. MAXIMUM PULSE RATE IS 70 HERTZ
- 5. ELECTROFISHING WILL NOT OCCUR IN ONE AREA FOR AN EXTENDED PERIOD.
- 6. THE ANODE WILL NOT INTENTIONALLY COME INTO CONTACT WITH FISH. THE ZONE FOR POTENTIAL INJURY OF 0.5 M FROM THE ANODE WILL BE AVOIDED.
- 7. SETTINGS WILL BE LOWERED IN SHALLOWER WATER SINCE VOLTAGE GRADIENTS LIKELY TO INCREASE.
- 8. ELECTROFISHING WILL NOT OCCUR IN TURBID WATER WHERE VISIBILITY IS POOR (I.E. UNABLE TO SEE THE BED OF THE STREAM).
- 9. OPERATIONS WILL IMMEDIATELY STOP IF MORTALITY OR OBVIOUS FISH INJURY IS OBSERVED. ELECTROFISHING SETTINGS WILL BE REEVALUATED.

C. SAMPLE PROCESSING.

- 1. FISH SHALL BE SORTED BY SIZE TO AVOID PREDATION DURING CONTAINMENT.
- 2. SAMPLERS WILL REGULARLY CHECK CONDITIONS OF FISH HOLDING CONTAINERS, AIR PUMPS, WATER TRANSFERS, ETC.
- 3. FISH WILL BE OBSERVED FOR GENERAL CONDITIONS AND INJURIES
- 4. EACH FISH WILL BE COMPLETELY REVIVED BEFORE RELEASE. ESA-LISTED SPECIES WILL BE PRIORITIZED FOR SUCCESSFUL RELEASE.

D. BULL TROUT ELECTROFISHING.

- 1. ELECTROFISHING FOR BULL TROUT WILL ONLY OCCUR FROM MAY 1 TO JULY 31. NO ELECTROFISHING WILL OCCUR IN ANY BULL TROUT OCCUPIED HABITAT AFTER AUGUST 15. IN FMO HABITATS ELECTROFISHING MAY OCCUR ANY TIME.
- 2. ELECTROFISHING OF BULL TROUT WILL NOT OCCUR WHEN WATER TEMPERATURES EXCEED 15 DEGREES CELSIUS.

E. LARVAL LAMPREY ELECTROFISHING.

- 1. PERMISSION FROM EC LEAD WILL BE OBTAINED IF LARVAL LAMPREY ELECTROFISHER IS NOT ONE OF FOLLOWING PRE-APPROVED MODELS: ABP-2 "WISCONSIN", SMITH-ROOT LR-24, OR SMITH-ROOT APEX BACKPACK.
- 2. LARVAL LAMPREY SAMPLING WILL INCORPORATE 2-STAGE METHOD: "TICKLE" AND "STUN".
- 3. FIRST STAGE: USE 125 VOLT DC WITH A 25 PERCENT DUTY CYCLE APPLIED AT A SLOW RATE OF 3 PULSES PER SECOND. IF TEMPERATURES ARE BELOW 10 DEGREES CELSIUS, VOLTAGE MAY BE INCREASED GRADUALLY (NOT TO EXCEED 200 VOLTS). BURSTED PULSES (THREE SLOW AND ONE SKIPPED) RECOMMENDED TO INCREASE EMERGENCE.
- 4. SECOND STAGE (OPTIONAL FOR EXPERIENCED NETTERS): IMMEDIATELY AFTER LAMPREY EMERGE, USE A FAST PULSE SETTING OF 30 PULSES PER SECOND.
- 5. USE DIP NETS FOR VISIBLE LAMPREY. SIENES AND FINE MESH NET SWEEPS MAY BE USED IN POOR VISIBILITY.
- 6. SAMPLING WILL OCCUR SLOWLY (>60 SECONDS PER METER) STARTING AT UPSTREAM AND WORKING DOWNSTREAM.
- 7. MULTIPLE SWEEPS TO OCCUR WITH 15 MINUTES BETWEEN SWEEPS.
- 8. POST-DRAWDOWN "DRY-SHOCKING" WILL BE APPLIED IF LARVAL LAMPREY CONTINUE TO EMERGE. ANODES TO BE PLACED ONE METER APART TO SAMPLE ONE SQUARE METER AT A TIME FOR AT LEAST 60 SECONDS. FOR TEMPERATURES LESS THAN 10 DEGREES CELSIUS, MAXIMUM VOLTAGE MAY BE GRADUALLY INCREASED TO 400 VOLTS (DRY-SHOCKING ONLY).

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GS	MC, CA, MB	MB
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MC	02/2024	190220
APPROVED	DATE	PROJECT

**COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**



**HIP GENERAL CONSERVATION
MEASURES (2 OF 3)**

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WORK AREA ISOLATION AND FISH SALVAGE (CONTINUED).

4. DEWATERING.

- A. DEWATERING WILL OCCUR AT A RATE SLOW ENOUGH TO ALLOW SPECIES TO NATURALLY MIGRATE OUT OF THE WORK AREA.
- B. WHERE A GRAVITY FEED DIVERSION IS NOT POSSIBLE, A PUMP MAY BE USED. PUMPS WILL BE INSTALLED TO AVOID REPETITIVE DEWATERING AND REWATERING.
- C. WHEN FISH ARE PRESENT, PUMPS WILL BE SCREENED IN ACCORDANCE WITH NMFS FISH SCREEN CRITERIA. NMFS ENGINEERING REVIEW AND APPROVAL WILL BE OBTAINED FOR PUMPS EXCEEDING 3 CUBIC FEET PER SECOND.
- D. DISSIPATION OF FLOW ENERGY AT THE BYPASS OUTFLOW WILL BE PROVIDED TO PREVENT DAMAGE TO THE STREAM CHANNEL AND RIPARIAN VEGETATION.
- E. SEEPAGE WATER WILL BE PUMPED TO A TEMPORARY STORAGE AND TREATMENT SITE OF INTO UPLAND AREAS TO ALLOW WATER TO PERCOLATE THROUGH SOIL AND VEGETATION PRIOR TO REENTERING THE STREAM CHANNEL.

CONSTRUCTION AND POST CONSTRUCTION CONSERVATION MEASURES.

1. FISH PASSAGE.

- A. FISH PASSAGE WILL BE PROVIDED FOR ADULT AND JUVENILE FISH LIKELY TO BE PRESENT DURING CONSTRUCTION UNLESS PASSAGE DID NOT EXIST BEFORE CONSTRUCTION, THE STREAM IS NATURALLY IMPASSABLE, OR PASSAGE WILL NEGATIVELY IMPACT ESA-LISTED SPECIES OR THEIR HABITAT.
- B. FISH PASSAGE ALTERNATIVES WILL BE APPROVED BY THE BPA EC LEAD UNDER ADVISEMENT BY THE NMFS HABITAT BIOLOGIST.

2. CONSTRUCTION AND DISCHARGE WATER.

- A. SURFACE WATER MAY BE DIVERTED TO MEET CONSTRUCTION NEEDS ONLY IF DEVELOPED SOURCES ARE UNAVAILABLE OR INADEQUATE.
- B. DIVERSIONS WILL NOT EXCEED 10% OF THE AVAILABLE FLOW.
- C. CONSTRUCTION DISCHARGE WATER WILL BE COLLECTED AND TREATED TO REMOVE DEBRIS, NUTRIENTS, SEDIMENT, PETROLEUM HYDROCARBONS, METALS, AND OTHER POLLUTANTS.

3. TIME AND EXTENT OF DISTURBANCE.

- A. EARTHWORK REQUIRING IN-STREAM MECHANIZED EQUIPMENT (INCLUDING DRILLING, EXCAVATION, DREDGING, FILLING, AND COMPACTING) WILL BE COMPLETED AS QUICKLY AS POSSIBLE.
- B. MECHANIZED EQUIPMENT WILL WORK FROM TOP OF BANK UNLESS WORK FROM ANOTHER LOCATION WILL RESULT IN LESS HABITAT DISTURBANCE (TURBIDITY, VEGETATION DISTURBANCE, ETC.).

4. CESSATION OF WORK.

- A. PROJECT OPERATIONS WILL CEASE WHEN HIGH FLOW CONDITIONS MAY RESULT IN INUNDATION OF THE PROJECT AREA (FLOOD EFFORTS TO DECREASE DAMAGES TO NATURAL RESOURCES PERMITTED).
- B. WATER QUALITY LEVELS EXCEEDED. SEE CWA SECTION 401 WATER QUALITY CERTIFICATION AND TURBIDITY MEASURES.

5. SITE RESTORATION.

- A. DISTURBED AREAS, STREAM BANKS, SOILS, AND VEGETATION WILL BE CLEANED UP AND RESTORED TO IMPROVED OR PRE-PROJECT CONDITIONS.
- B. PROJECT-RELATED WASTE WILL BE REMOVED.
- C. TEMPORARY ACCESS ROADS AND STAGING WILL BE DECOMPACTED AND RESTORED. SOILS WILL BE LOOSENEED IF NEEDED FOR REVEGETATION OR WATER INFILTRATION.
- D. THE PROJECT SPONSOR WILL RETAIN THE RIGHT OF REASONABLE ACCESS TO THE SITE TO MONITOR AND MAINTAIN THE SITE OVER THE LIFE OF THE PROJECT.

6. REVEGETATION.

- A. PLANTING AND SEEDING WILL OCCUR PRIOR TO OR AT THE BEGINNING OF THE FIRST GROWING SEASON AFTER CONSTRUCTION.

- B. A MIX OF NATIVE SPECIES (INVASIVE SPECIES NOT ALLOWED) APPROPRIATE TO THE SITE WILL BE USED TO REESTABLISH VEGETATION, PROVIDE SHADE, AND REDUCE EROSION. REESTABLISHED VEGETATION SHOULD BE AT LEAST 70% OF PRE-PROJECT CONDITIONS WITHIN THREE YEARS.
- C. VEGETATION SUCH AS WILLOWS, SEDGES, OR RUSH MATS WILL BE SALVAGED FROM DISTURBED OR ABANDONED AREAS TO BE REPLANTED.
- D. SHORT-TERM STABILIZATION MEASURE MAY INCLUDE THE USE OF NON-NATIVE STERILE SEED MIX (WHEN NATIVE NOT AVAILABLE), WEED-FREE CERTIFIED STRAW, OR OTHER SIMILAR TECHNIQUES.
- E. SURFACE FERTILIZER WILL NOT BE APPLIED WITHIN 50 FEET OF ANY STREAM, WATE BODY, OR WETLAND.
- F. FENCING WILL BE INSTALLED AS NECESSARY TO PREVENT ACCESS TO REVEGETATED SITES BY LIVESTOCK OR UNAUTHORIZED PERSONS.
- G. INVASIVE PLANTS WILL BE REMOVED OR CONTROLLED UNTIL NATIVE PLANT SPECIES ARE WELL ESTABLISHED (TYPICALLY THREE YEARS POST-CONSTRUCTION).

7. SITE ACCESS AND IMPLEMENTATION MONITORING.

- A. THE PROJECT SPONSOR WILL PROVIDE CONSTRUCTION MONITORING DURING IMPLEMENTATION TO ENSURE ALL CONSERVATION MEASURES ARE ADEQUATELY FOLLOWED, EFFECTS TO LISTED SPECIES ARE NOT GREATER THAN PREDICTED, AND INCIDENTAL TAKE LIMITATIONS ARE NOT EXCEEDED.
- B. THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL SUBMIT THE PROJECT COMPLETION FORM (PCF) WITHIN 30 DAYS OF PROJECT COMPLETION.

8. CWA SECTION 401 WATER QUALITY CERTIFICATION.

- A. THE PROJECT SPONSOR OR DESIGNATED REPRESENTATIVE WILL COMPLETE AND RECORD WATER QUALITY OBSERVATIONS (SEE TURBIDITY MONITORING) TO ENSURE IN-WATER WORK IS NOT DEGRADING WATER QUALITY.
- B. DURING CONSTRUCTION, WATER QUALITY PROVISIONS PROVIDED BY THE OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY, WASHINGTON DEPARTMENT OF ECOLOGY, IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY WILL BE FOLLOWED.

STAGED REWATERING PLAN.

- A. WHEN REINTRODUCING WATER TO DEWATERED AREAS AND NEWLY CONSTRUCTED CHANNELS, A STAGED REWATERING PLAN WILL BE APPLIED.
- B. THE FOLLOWING WILL BE APPLIED TO ALL REWATERING EFFORTS. COMPLEX REWATERING EFFORTS MAY REQUIRE ADDITIONAL NOTES OR A DEDICATED SHEET IN THE CONSTRUCTION DETAILS.
 - 1. TURBIDITY MONITORING PROTOCOL WILL BE APPLIED TO REWATERING EFFORTS.
 - 2. PRE-WASH THE AREA BEFORE REWATERING. TURBID WASH WATER WILL BE DETAINED AND PUMPED TO THE FLOODPLAIN OR SEDIMENT CAPTURE AREAS RATHER THAN DISCHARGING TO FISH-BEARING STREAMS.
 - 3. INSTALL SEINE NETS AT UPSTREAM END TO PREVENT FISH FROM MOVING DOWNSTREAM UNTIL 2/3 OF TOTAL FLOW IS RESTORED TO THE CHANNEL.
 - 4. STARTING IN EARLY MORNING INTRODUCE 1/3 OF NEW CHANNEL FLOW OVER PERIOD OF 1-2 HOURS.
 - 5. INTRODUCE SECOND THIRD OF FLOW OVER NEXT 1 TO 2 HOURS AND BEGIN FISH SALVAGE OF BYPASS CHANNEL IF FISH ARE PRESENT.
 - 6. REMOVE UPSTREAM SEINE NETS ONCE 2/3 FLOW IN REWATERED CHANNEL AND DOWNSTREAM TURBIDITY IS WITHIN ACCEPTABLE RANGE (LESS THAN 40 NTU OR LESS THAN 10% BACKGROUND).
 - 7. INTRODUCE FINAL THIRD OF FLOW ONCE FISH SALVAGE EFFORTS ARE COMPLETE AND DOWNSTREAM TURBIDITY VERIFIED TO BE WITHIN ACCEPTABLE RANGE.
 - 8. INSTALL PLUG TO BLOCK FLOW INTO OLD CHANNEL OR BYPASS. REMOVE ANY REMAINING SEINE NETS.
 - 9. IN LAMPREY SYSTEMS, LAMPREY SALVAGE AND DRY SHOCKING MAY BE NECESSARY.

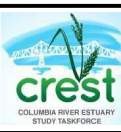
TURBIDITY MONITORING.

- A. RECORD THE READING, LOCATION, AND TIME FOR THE BACKGROUND READING APPROXIMATELY 100 FEET UPSTREAM OF THE PROJECT AREA USING A RECENTLY CALIBRATED TURBIDIMETER OR VIA VISUAL OBSERVATION (SEE THE HIP HANDBOOK TURBIDITY MONITORING SECTION FOR A VISUAL OBSERVATION KEY).
- B. RECORD THE TURBIDITY READING, LOCATION, AND TIME AT THE MEASUREMENT COMPLIANCE LOCATION POINT.
 - 1. 50 FEET DOWNSTREAM FOR STREAMS LESS THAN 30 FEET WIDE.
 - 2. 100 FEET DOWNSTREAM FOR STREAMS BETWEEN 30 AND 100 FEET WIDE.
 - 3. 200 FEET DOWNSTREAM FOR STREAMS GREATER THAN 100 FEET WIDE.
 - 4. 300 FEET FROM THE DISCHARGE POINT OR NONPOINT SOURCE FOR LOCATIONS SUBJECT TO TIDAL OR COASTAL SCOUR.
- C. TURBIDITY SHALL BE MEASURED (BACKGROUND LOCATION AND COMPLIANCE POINTS) EVERY 4 HOURS WHILE WORK IS BEING IMPLEMENTED.
- D. IF THERE IS A VISIBLE DIFFERENCE BETWEEN A COMPLIANCE POINT AND THE BACKGROUND, THE EXCEEDANCE WILL BE NOTED IN THE PROJECT COMPLETION FORM (PCF). ADJUSTMENTS OR CORRECTIVE MEASURES WILL BE TAKEN IN ORDER TO REDUCE TURBIDITY.
- E. IF EXCEEDANCES OCCUR FOR MORE THAN TWO CONSECUTIVE MONITORING INTERVALS (AFTER 8 HOURS), THE ACTIVITY WILL STOP UNTIL THE TURBIDITY LEVEL RETURNS TO BACKGROUND. THE BPA EC LEAD WILL BE NOTIFIED OF ALL EXCEEDANCES AND CORRECTIVE ACTIONS AT PROJECT COMPLETION.
- F. IF TURBIDITY CONTROLS (COFFER DAMS, WADDLES, FENCING, ETC.) ARE DETERMINED INEFFECTIVE, CREWS WILL BE MOBILIZED TO MODIFY AS NECESSARY. OCCURRENCES WILL BE DOCUMENTED IN THE PROJECT COMPLETION FORM (PCF).
- G. FINAL TURBIDITY READINGS, EXCEEDANCES, AND CONTROL FAILURES WILL BE SUBMITTED TO THE BPA EC LEAD USING THE PROJECT COMPLETION FORM (PCF).

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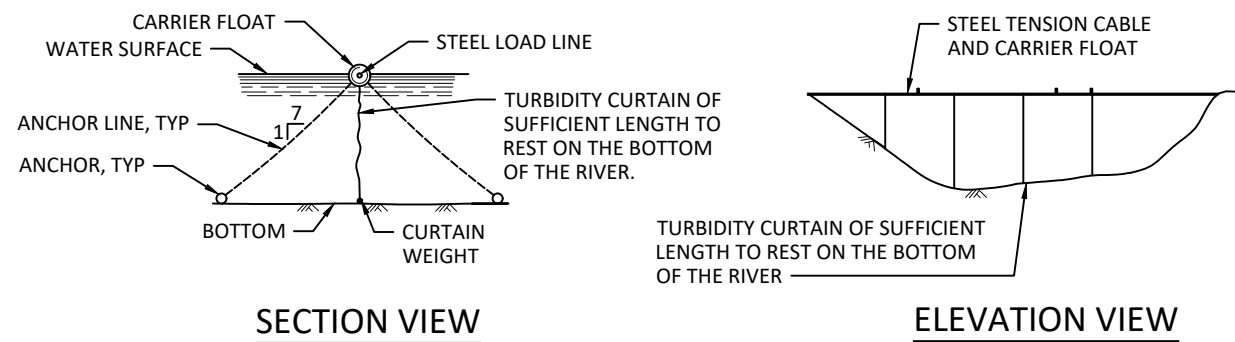
GS DRAWN	MC, CA, MB DESIGNED	MB CHECKED
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**COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**



**HIP GENERAL CONSERVATION
MEASURES (3 OF 3)**

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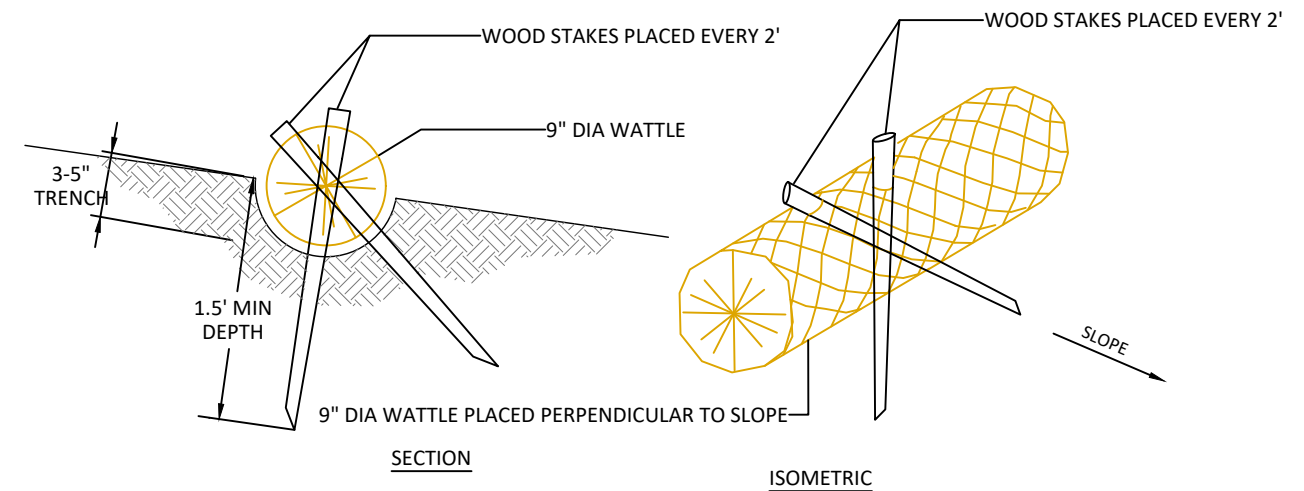


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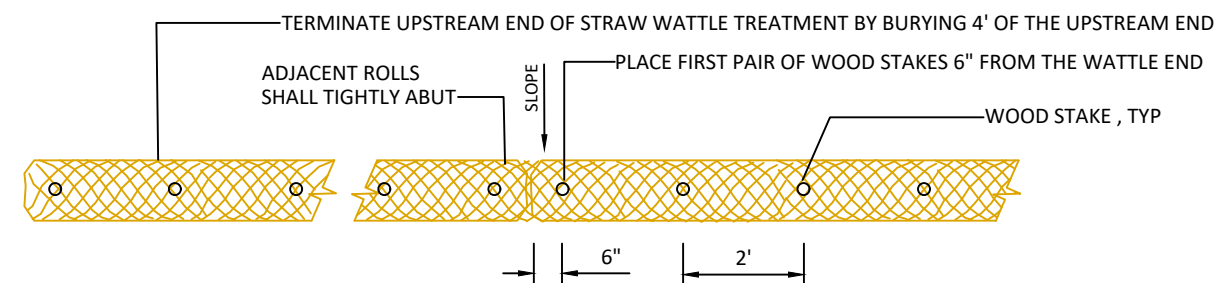
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7 TYPICAL DETAIL - TURBIDITY CURTAIN
NOT TO SCALE

- ONLY TURBIDITY CURTAINS OF TYPE II OR GREATER STRENGTH SHALL BE ACCEPTED. THE TURBIDITY CURTAIN IS TO BE INSTALLED AT LOCATIONS SHOWN ON THE PLANS.
- THE TURBIDITY CURTAIN SHALL BE OF SUFFICIENT LENGTH TO REST ON THE BOTTOM OF THE RIVER.
- THE TURBIDITY CURTAIN SHALL BE A CONTINUOUS ROLL OF CURTAIN MATERIAL SUFFICIENT TO ENCLOSE THE ENTIRE WORK AREA AND PREVENT A VISUALLY DETECTABLE DIFFERENCE IN TURBIDITY BETWEEN THE BACKGROUND AND COMPLIANCE TURBIDITY MONITORING SITES. IF ADDITIONAL FABRIC IS NEEDED TO ENCLOSE WORK AREA, SEE "PANEL CONNECTORS".
- CURTAIN MATERIAL - WITHIN NAVIGABLE WATERS, THE CURTAIN MATERIAL SHALL BE A BRIGHT COLOR (YELLOW OR ORANGE) TO ATTRACT THE ATTENTION OF ANY BOATERS OR SWIMMERS. THE CURTAIN MATERIAL SELECTION SHALL TAKE INTO ACCOUNT THE EXPECTED POLLUTANT PARTICLE SIZE BASED ON THE PRIMARY SEDIMENT IDENTIFIED.
- PANEL CONNECTORS - IF ADDITIONAL FABRIC PANELS ARE NEEDED THE SEAMS OF THE FABRIC SHALL BE GLUED, WELDED, OR SEWN AND SHALL HAVE 90% OF THE STRENGTH CHARACTERISTICS OF THE FABRIC. IF ADJACENT PANELS ARE NECESSARY, THEY SHALL BE CONNECTED USING ONE OF THE FOLLOWING METHODS: A) SEW THE PANELS TOGETHER USING TWO STITCH LINES PER SEAM AND A STITCH DENSITY OF SIX TO TEN STITCHES PER INCH, B) JOIN THE PANELS OF FABRIC USING GROMMETED HOLES AND ROPE LACING. THE HOLES SHALL BE ONLY SLIGHTLY LARGER THAN THE ROPE TO MINIMIZE LEAKAGE. C) USE COMMERCIALY AVAILABLE ALUMINUM SLIDE-CONNECTORS.
- FLOTATION - FLOTATION SEGMENTS SHALL BE RETAINED INTO A SEWN OR HEAT WELDED SEAM ALONG THE ENTIRE TOP OF THE TURBIDITY CURTAIN TO FORM A CONTINUOUS FLOAT. POSSIBLE FLOTATION MATERIAL INCLUDES EXPANDED POLYSTYRENE FLOATS OR CLOSED CELL SOLID PLASTIC FOAM FLOATS.
- LOAD LINE - TURBIDITY CURTAINS SHALL REQUIRE A LOAD LINE. THE LOAD LINE SHALL BE A MINIMUM 5/16" STEEL CABLE INSTALLED IN THE SLEEVE WITH THE FLOTATION SEGMENTS OR JUST BELOW THE FLOATS IF IN ITS OWN SLEEVE.
- CURTAIN WEIGHT - TURBIDITY CURTAINS SHALL REQUIRE A CURTAIN WEIGHT. THE CURTAIN WEIGHT SHALL BE A MINIMUM 5/16 CHAIN BALLAST INSTALLED IN THE BOTTOM SLEEVE.
- MOORING - THE TURBIDITY CURTAIN SHALL BE PROPERLY ANCHORED BOTH ONSHORE AND IN THE WATER. THE TURBIDITY CURTAIN SHALL EXTEND ONTO SHORE AND BE TIED TO A POST OR STABLE, LARGE DIAMETER TREE (8" DBH OR GREATER). THE ANCHORING SYSTEM SHALL BE DESIGNED BASED ON THE ANTICIPATED CONDITIONS. THE IN-WATER ANCHOR SYSTEM SHALL CONSIST OF AN ANCHOR, ANCHOR LINE, BUOY, CROWN BUOY, AND MOORING CABLE, AS NEEDED. THE TURBIDITY CURTAIN SHALL BE ANCHORED EVERY 100 FEET AT A MINIMUM. FOR HIGHER FLOW SITUATIONS, WHERE THE CURRENT APPROACHES 5 FPS AND/OR WAVES OVER 1 FT ARE ANTICIPATED, THE TURBIDITY CURTAIN SHALL BE ANCHORED EVERY 50 FT. TURBIDITY CURTAINS SUBJECT TO REVERSING CURRENTS, WAVES, OR FLOW FROM BOTH SIDES SHALL BE ANCHORED ON BOTH SIDES. THE ANCHORS SHALL BE PLACED SUCH THAT THE SLOPE OF THE ANCHOR LINE IS 7H:1V. THIS WILL MINIMIZE THE STRESS ON THE TURBIDITY CURTAIN AND INCREASE THE HOLDING POWER OF THE ANCHOR. A MINIMUM 1/2" DIA ROPE OR 1/4" DIA CABLE SHALL BE USED FOR THE ANCHOR LINE.
- REMOVAL - THE TURBIDITY CURTAIN SHALL ONLY BE REMOVED WHEN THERE IS NO VISUALLY DETECTABLE DIFFERENCE IN TURBIDITY BETWEEN THE BACKGROUND AND COMPLIANCE TURBIDITY MONITORING SITES.



SECTION

ISOMETRIC



PLAN VIEW

2
7 TYPICAL DETAIL - STRAW WATTLE
NOT TO SCALE

GENERAL NOTES ON INSTALLING STRAW WATTLES

- INSTALL WATTLES WITHIN TRENCH, SO THAT NO GAPS EXIST BETWEEN THE SOIL AND THE BOTTOM OF THE WATTLE. THE ENDS OF ADJACENT WATTLES SHALL BE TIGHTLY ABUTTED SO THAT NO OPENING EXISTS FOR WATER OR SEDIMENT TO PASS THROUGH.
- WOOD STAKES SHALL BE USED TO FASTEN THE WATTLES TO THE SOIL. WHEN CONDITIONS WARRANT, A STRAIGHT METAL BAR CAN BE USED TO DRIVE A "PILOT HOLE" THROUGH THE WATTLE AND INTO THE SOIL.
- PAIRS OF WOOD STAKES SHALL BE PLACED 6" FROM THE WATTLE END, ANGLED SUCH THAT ONE STAKE IS PERPENDICULAR TO GRADE AND ONE IS AT A 45° ANGLE TO GRADE. WOOD STAKE PAIRS SHALL BE SPACED AT 2-FOOT CENTERS LEAVING LESS THAN 1-2 INCHES OF STAKE EXPOSED ABOVE THE WATTLE.
- AT TERMINAL ENDS OF WATTLES, EXCAVATE MIN 2' DEEP KEY TRENCH AND BURY A MIN 4' OF WATTLE END.
- CARE SHALL BE TAKEN DURING INSTALLATION SO AS TO AVOID DAMAGE OCCURRING TO THE WATTLE AS A RESULT OF THE INSTALLATION PROCESS. SHOULD THE WATTLE BE DAMAGED DURING INSTALLATION, A WOODEN STAKE SHALL BE PLACED EITHER SIDE OF THE DAMAGED AREA TERMINATING THE WATTLE SEGMENT.
- ANY WATTLE DAMAGED DURING PLACEMENT SHALL BE REPLACED AS DIRECTED BY AGENCY STAFF, AT THE CONTRACTOR'S EXPENSE.
- INSTALL WATTLES IN FILL LOCATIONS ACCORDING TO THE FOLLOWING GUIDELINES:

STRAW WATTLE: VERTICAL SPACING	
SLOPE	SPACING
2:1	10'
2:1 - 5:1	25'
< 5:1	50'

NO.	BY	DATE	REVISION DESCRIPTION

GS DRAWN	MC, CA, MB DESIGNED	MB CHECKED
MC APPROVED	02/2024 DATE	190220 PROJECT

COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN



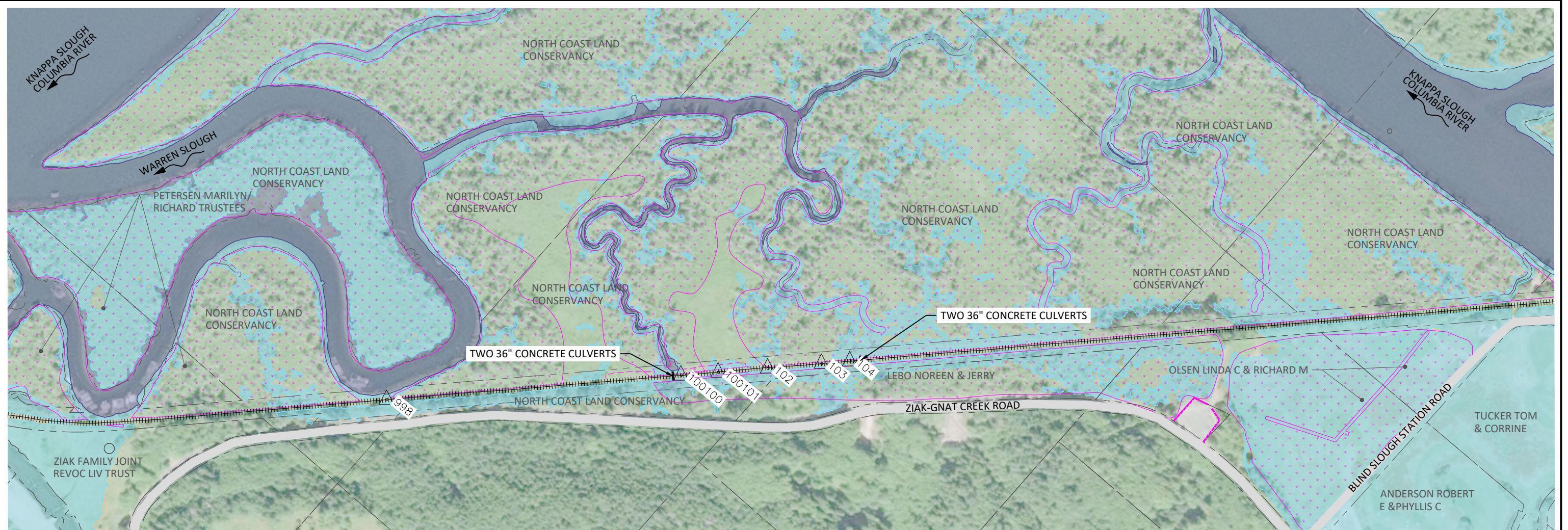
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EROSION CONTROL DETAILS

SHEET

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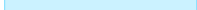


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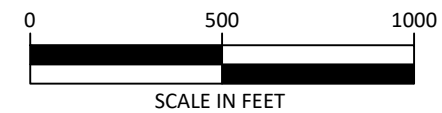


NOTE:

INUNDATION EXTENTS ARE BASED ON EXISTING TOPOGRAPHIC CONTOURS. ACTUAL SITE INUNDATION MAY VARY DUE TO IMPAIRED CONNECTIVITY.

LEGEND

-  EXISTING CONTOURS (5FT)
-  EXISTING RAILROAD TRACKS
-  TAXLOTS (FROM CLATSOP COUNTY GIS)
-  NWI WETLANDS
-  MEAN HIGHER HIGH WATER (8.89FT)
-  MEAN LOWER LOW WATER (0.86FT)
-  102 SURVEY CONTROL POINT



SURVEY CONTROL

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
100100	935880.72	7423377.81	12.59	NAIL
100101	936011.41	7423516.52	12.57	NAIL
102	936186.05	7423700.78	12.66	NAIL
103	936376.61	7423900.24	12.63	NAIL
104	936476.87	7424005.19	12.76	NAIL
998	934842.41	7422282.83	13.49	NAIL

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EXISTING CONDITIONS
& SURVEY CONTROL

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LEGEND

-  EXISTING CONTOURS (5FT)
-  PROPOSED CONTOUR (1 FT)
-  EXISTING RAILROAD TRACKS
-  TAXLOTS (FROM CLATSOP COUNTY GIS)
-  TEMPORARY ACCESS ROUTE
-  STRAW WATTLES
-  MEAN HIGHER HIGH WATER (8.89FT)
-  MEAN LOWER LOW WATER (0.86FT)
-  TEMPORARY STAGING / NATURAL MATERIAL STOCKPILE AREA



NOTE:

SPOILS PLACEMENT AND TEMPORARY ACCESS TO MINIMIZE DISTURBANCE TO NATIVE VEGETATION.

SEE SHEET 11 FOR PROPOSED CHANNEL PROFILE.

INUNDATION EXTENTS ARE BASED ON EXISTING TOPOGRAPHIC CONTOURS. ACTUAL SITE INUNDATION MAY VARY DUE TO IMPAIRED CONNECTIVITY.

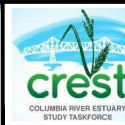
CONTRACTOR SHALL HAVE STRAW WATTLES AVAILABLE ON SITE FOR PLACEMENT IN ADDITIONAL LOCATIONS WHERE RUNOFF FROM DISTURBED GROUND MAY CONTACT SURFACE WATERS IN COORDINATION WITH PROJECT OWNER.

SEE DETAIL 1, SHEET 15 FOR RAILROAD OVERLAND ACCESS ALTERNATIVES.

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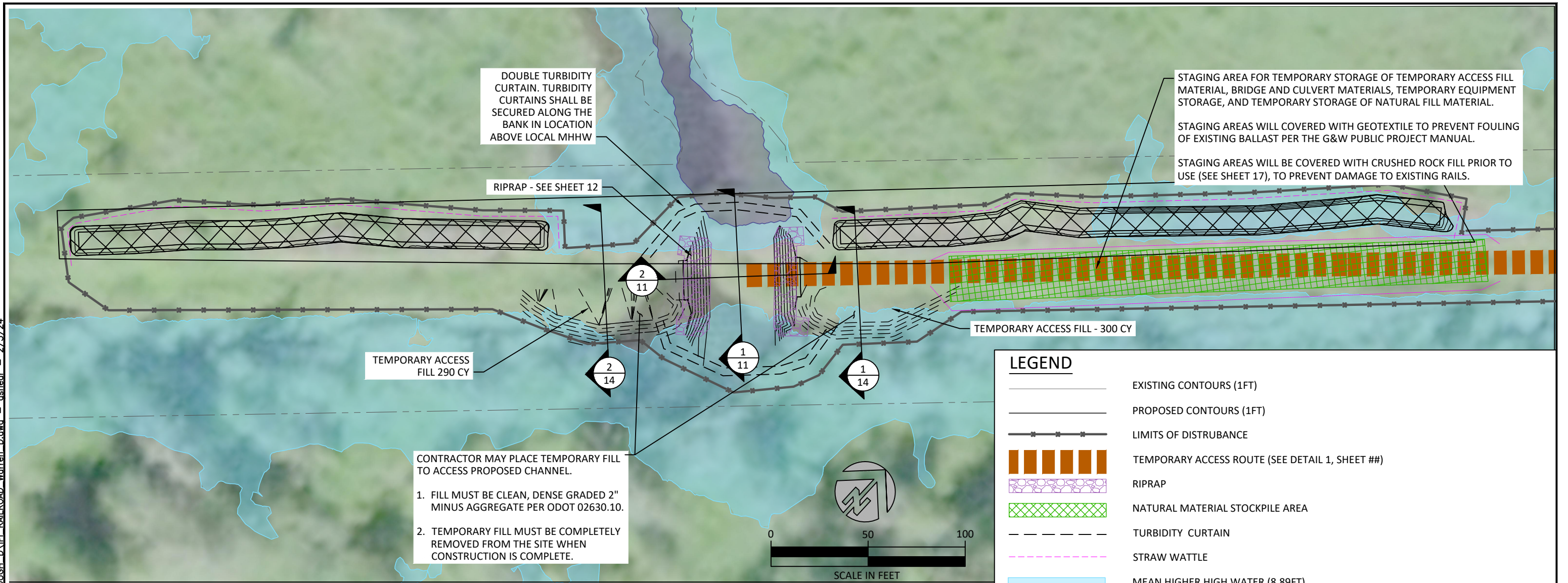
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**TEMPORARY ACCESS &
PROPOSED
CONDITIONS**

SHEET

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DOUBLE TURBIDITY CURTAIN. TURBIDITY CURTAINS SHALL BE SECURED ALONG THE BANK IN LOCATION ABOVE LOCAL MHHW

STAGING AREA FOR TEMPORARY STORAGE OF TEMPORARY ACCESS FILL MATERIAL, BRIDGE AND CULVERT MATERIALS, TEMPORARY EQUIPMENT STORAGE, AND TEMPORARY STORAGE OF NATURAL FILL MATERIAL.
STAGING AREAS WILL COVERED WITH GEOTEXTILE TO PREVENT FOULING OF EXISTING BALLAST PER THE G&W PUBLIC PROJECT MANUAL.
STAGING AREAS WILL BE COVERED WITH CRUSHED ROCK FILL PRIOR TO USE (SEE SHEET 17), TO PREVENT DAMAGE TO EXISTING RAILS.

RIPRAP - SEE SHEET 12

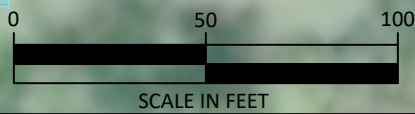
TEMPORARY ACCESS FILL 290 CY

TEMPORARY ACCESS FILL - 300 CY

CONTRACTOR MAY PLACE TEMPORARY FILL TO ACCESS PROPOSED CHANNEL.
1. FILL MUST BE CLEAN, DENSE GRADED 2" MINUS AGGREGATE PER ODOT 02630.10.
2. TEMPORARY FILL MUST BE COMPLETELY REMOVED FROM THE SITE WHEN CONSTRUCTION IS COMPLETE.

LEGEND

- EXISTING CONTOURS (1FT)
- PROPOSED CONTOURS (1FT)
- LIMITS OF DISTURBANCE
- TEMPORARY ACCESS ROUTE (SEE DETAIL 1, SHEET ##)
- RIPRAP
- NATURAL MATERIAL STOCKPILE AREA
- TURBIDITY CURTAIN
- STRAW WATTLE
- MEAN HIGHER HIGH WATER (8.89FT)
- MEAN LOWER LOW WATER (0.86FT)
- PROPOSED LEVEE SHOULDER VEGETATION COMPLEXITY ZONE (SEE DETAIL 1, SHEET 17)



PROPOSED SEQUENCING PLAN

1. ACCESS SITE ALONG RAILROAD, STAGE MATERIAL IN APPROVED SITE.
2. REMOVE RAILS IN ZONE OF EXCAVATION.
3. INSTALL TURBIDITY CURTAINS ON INTERIOR AND EXTERIOR OF THE BREACH LOCATION.
4. PREPARE GROUND AS NECESSARY TO ALLOW FOR INSTALLATION OF H-PILES AND PILE CAPS.
5. INSTALL H-PILES.
6. INSTALL PILE CAPS.
7. INSTALL TEMPORARY ACCESS FILL, IF NECESSARY.
8. EXCAVATE REMAINDER OF CHANNEL AND APPLY BANK ARMOR.
9. INSTALL BRIDGE DECK (MAY BE INSTALLED CONCURRENTLY IN STEP 7, DEPENDING ON PREFERENCE OF CONTRACTOR).
10. REMOVE TEMPORARY ACCESS FILL.
11. REPLACE RAILS.
12. DEMOBILIZE.

NOTES:

TIE-IN SLOPES TO VARY TO MATCH VARIATION IN EXISTING BANKS TO THE EAST AND WEST.
CONTRACTOR SHALL HAVE STRAW WATTLES AVAILABLE ON SITE FOR PLACEMENT IN ADDITIONAL LOCATIONS WHERE RUNOFF FROM DISTURBED GROUND MAY CONTACT SURFACE WATERS, IN COORDINATION WITH PROJECT OWNER.
SEE SHEET 9 FOR SITE ACCESS DETAILS.
MATERIAL EXCAVATED FROM WITHIN THE G & W ROW SHALL BE PLACED WITHIN THE ROW. NO EXPORT OF MATERIAL FROM THE ROW TO ADJACENT PROPERTY SHALL BE ALLOWED.

NO.	BY	DATE	REVISION DESCRIPTION

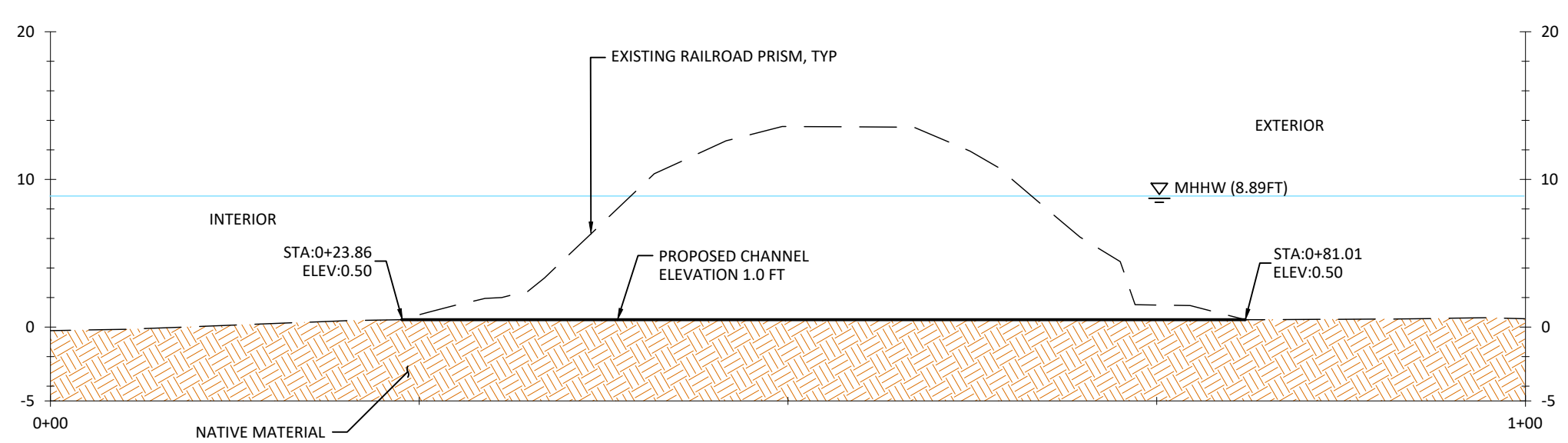
GS	MC, CA, MB	MB
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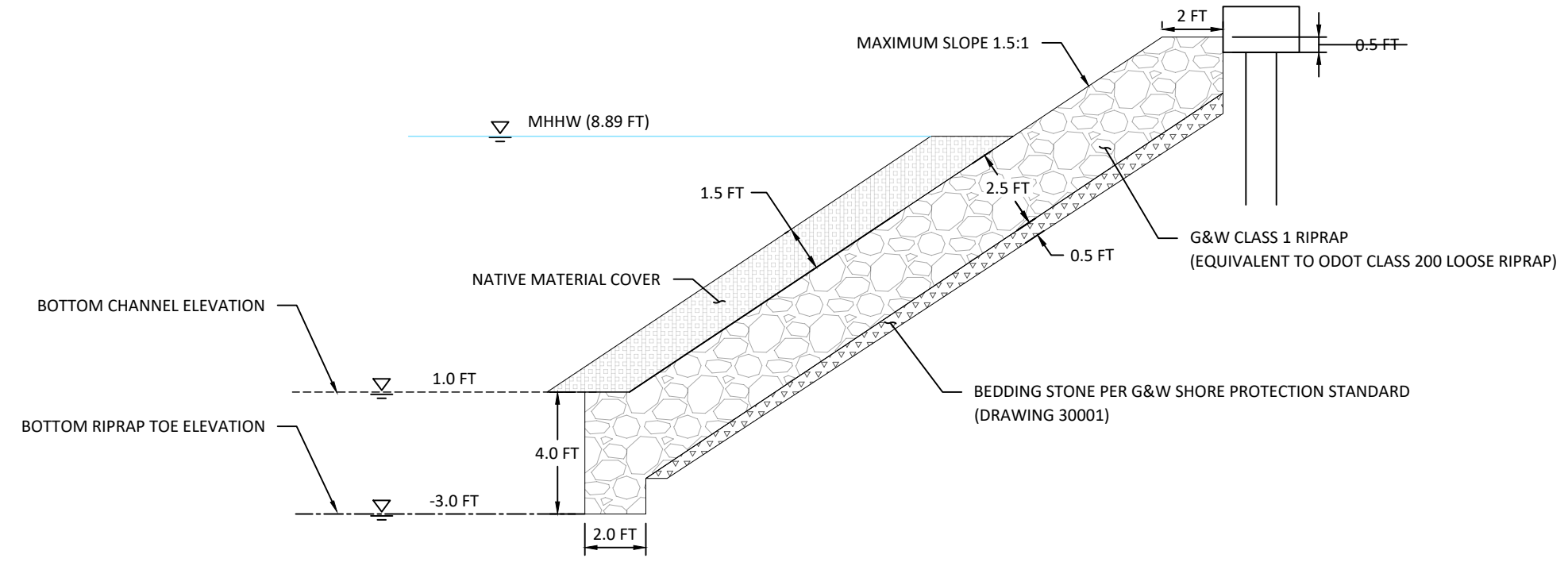
PROPOSED OPENING - PLAN,
SEQUENCE & EROSION
CONTROL

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LEGEND
 MEAN HIGHER HIGH WATER (8.89FT)

1
11 BRIDGE SPAN PROFILE



NOTES:
 CONTRACTOR SHALL HAVE STRAW WATTLES AVAILABLE ON SITE FOR PLACEMENT IN ADDITIONAL LOCATIONS WHERE RUNOFF FROM DISTURBED GROUND MAY CONTACT SURFACE WATERS, IN COORDINATION WITH PROJECT OWNER.
 SEE SHEET 15 FOR SITE ACCESS DETAILS.
 BRIDGE DECK AND PILES NOT SHOWN FOR CLARITY.

SCALE: 1" = 20'
 1X VERTICAL EXAGGERATION
 SCALE: 1" = 20'

2
11 BANK PROTECTION CROSS SECTION - OPENING

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BRIDGE SPAN PROFILE AND
 BANK PROTECTION SECTION

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LIST OF DRAWINGS - WARREN SLOUGH BRIDGE	
PLAN NO.	TITLE
001	GENERAL PLAN & ELEVATION

TABLE OF EST. LIFTING WEIGHTS		
ITEM	MARK NO.	ESTIMATED WEIGHT (LBS.)
PRECAST P/S CONC. DBL. CELL BOX BEAM	B30-2910-SL	50,120
PRECAST CONC. ABUTMENT CAP	A30-1SB	25,910
PRECAST CONC. WINGWALL	W30-S	5,120
PRECAST CONCRETE PIER CAP	C00-1	20,060

TABLE OF ELEVATION				
LOCATION	TOP/TIE	TOP/CAP	PILE CUTOFF	T/T TO PILE CUTOFF
ABUT. 1	13.00	9.19	7.19	5'-9 ³ / ₄ "
BENT 2	13.00	9.19	6.52	6'-5 ³ / ₄ "
ABUT. 3	13.00	9.19	7.19	5'-9 ³ / ₄ "

BENCH MARK:
SEE CIVIL PLANS

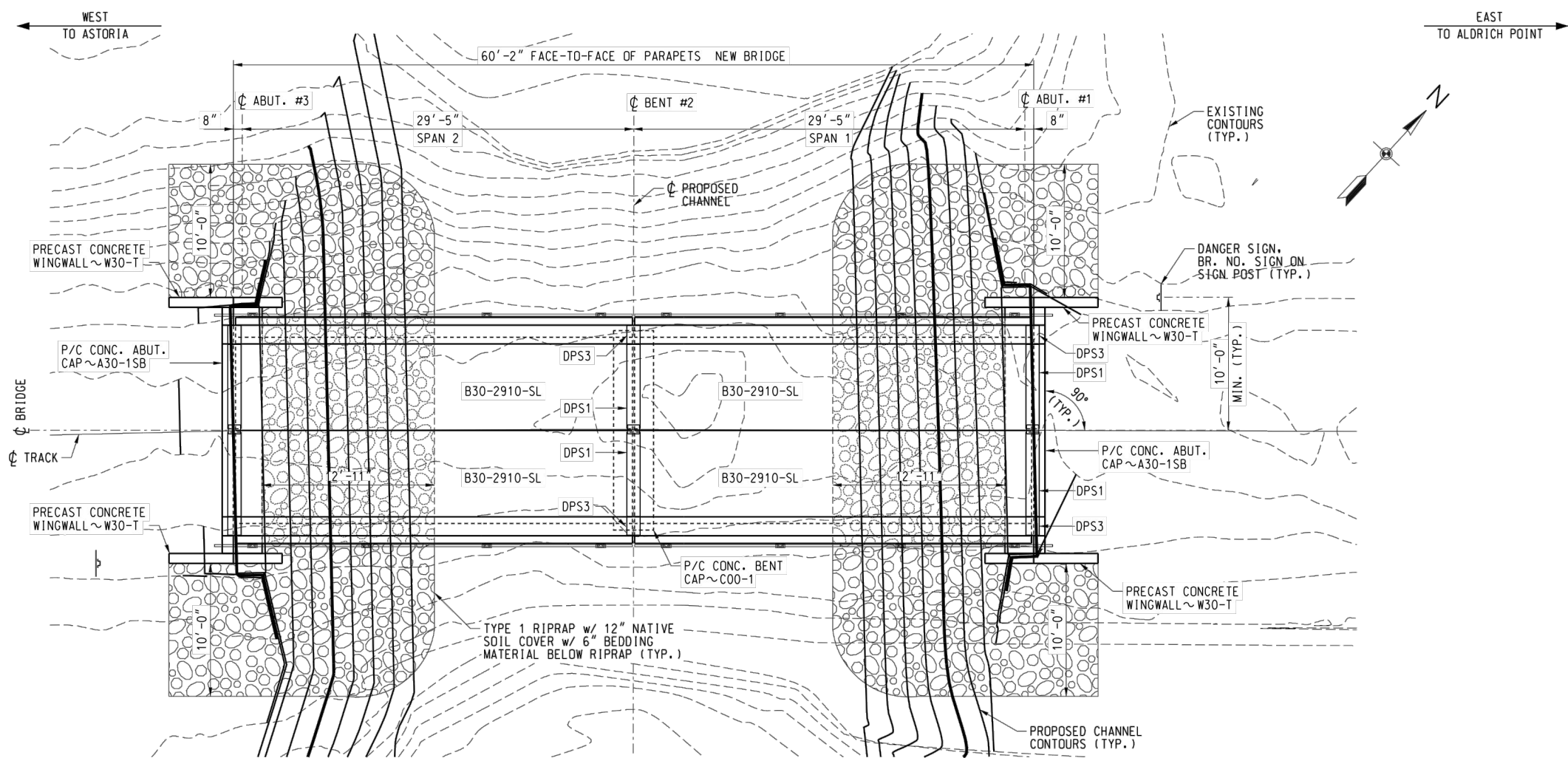
LEGEND:
T/T = TOP OF TIE
RY = RAILWAY
B.S. = BOTH SIDES
W = WITH WALK

GENERAL NOTES:

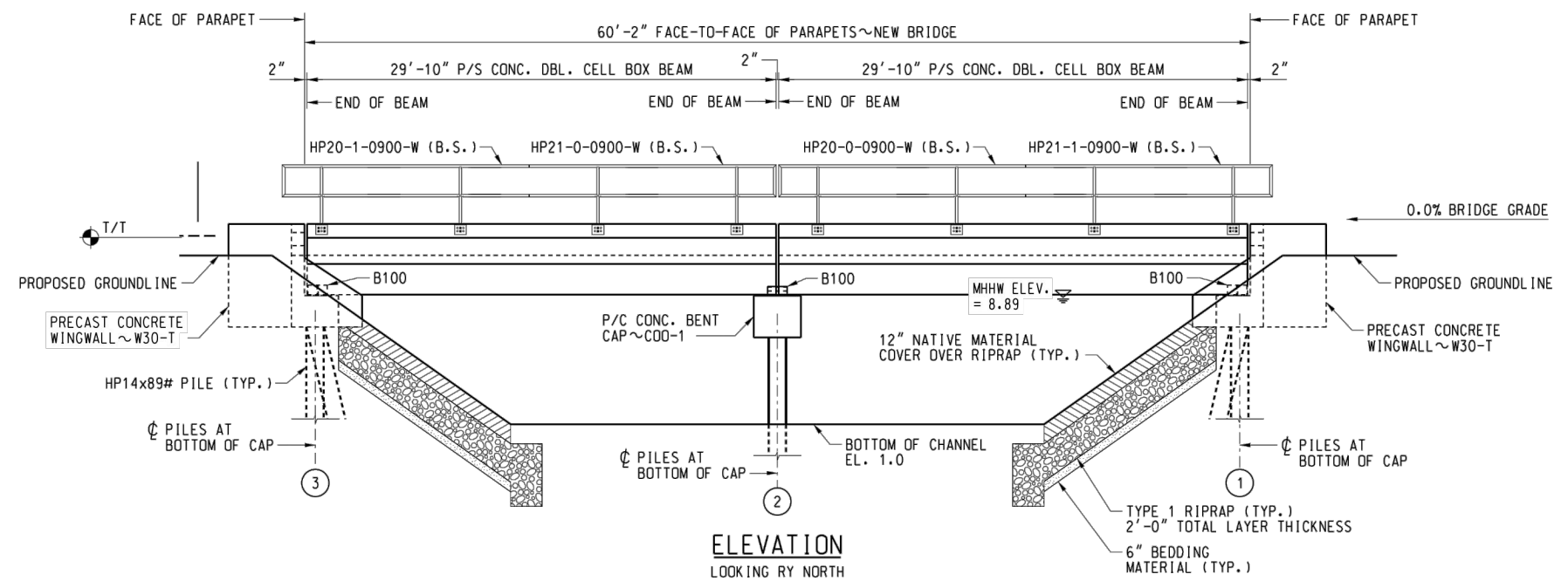
RIPRAP SHALL BE PLACED IN SUCH A MANNER AS TO AVOID SEGREGATION OF VARIOUS SIZES OF ROCK AND DISTRIBUTED SO THAT THERE WILL BE NO LARGE ACCUMULATION OF EITHER THE LARGER OR SMALLER SIZES OF STONE. INDIVIDUAL ROCKS SHALL BE PLACED IN TIGHT CONTACT WITH ONE ANOTHER IN SUCH A WAY TO PRODUCE THE LEAST AMOUNT OF VOID SPACES. RIPRAP SHALL BE SOLID, UNFRACTURED ROCK, BULKY IN SHAPE WITH SHARP ANGULAR EDGES. THE ENTIRE MASS OF RIPRAP SHALL BE WELL DISTRIBUTED WITHIN THE LIMITS SPECIFIED.

DESIGN DATA:
2020 A.R.E.M.A. DESIGN SPECIFICATIONS
LOADING: COOPER E 80 W/ DIESEL IMPACT

Preliminary
Not for Construction



PLAN



ELEVATION
LOOKING BY NORTH

GS	MC, CA, MB	MB
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MC	02/2024	190220
APPROVED	DATE	PROJECT

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RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN

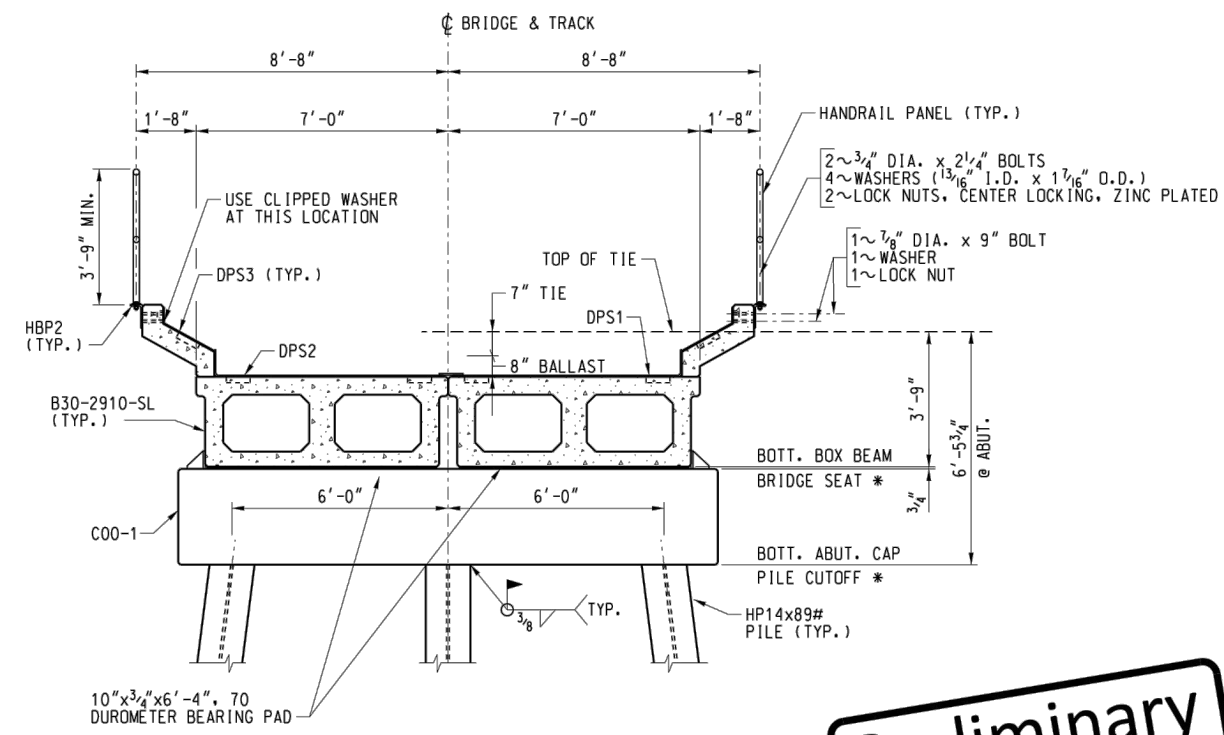
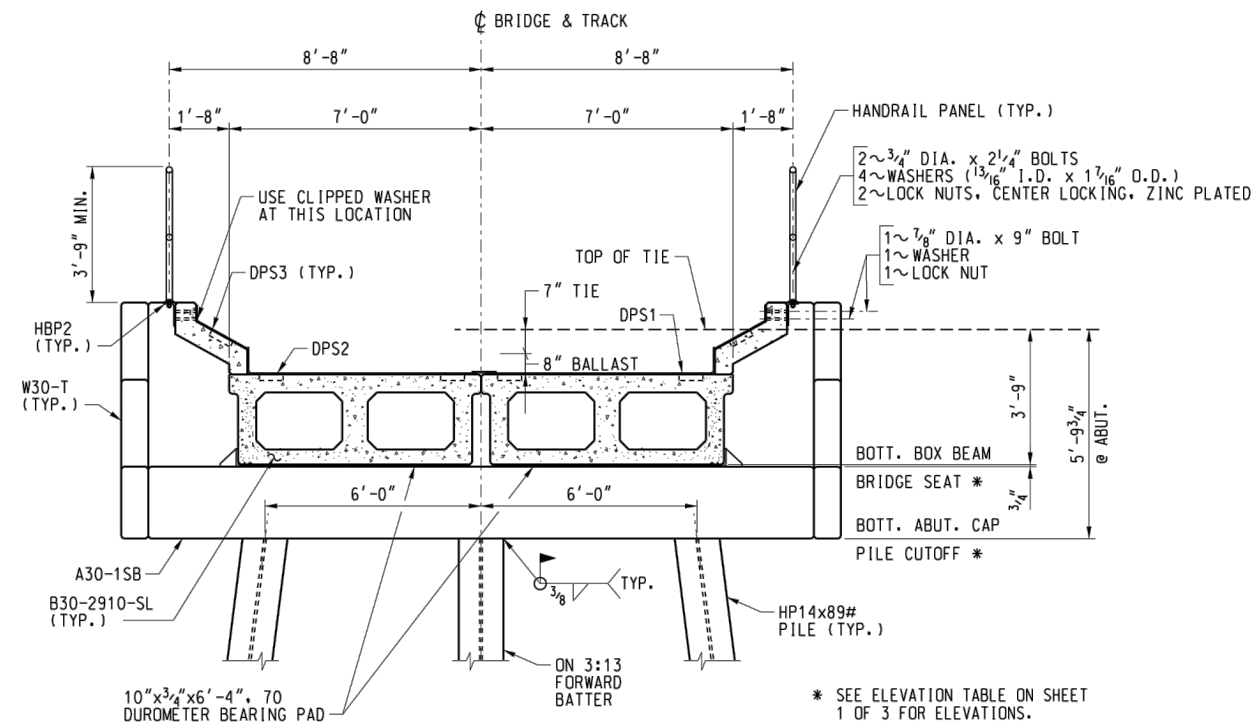
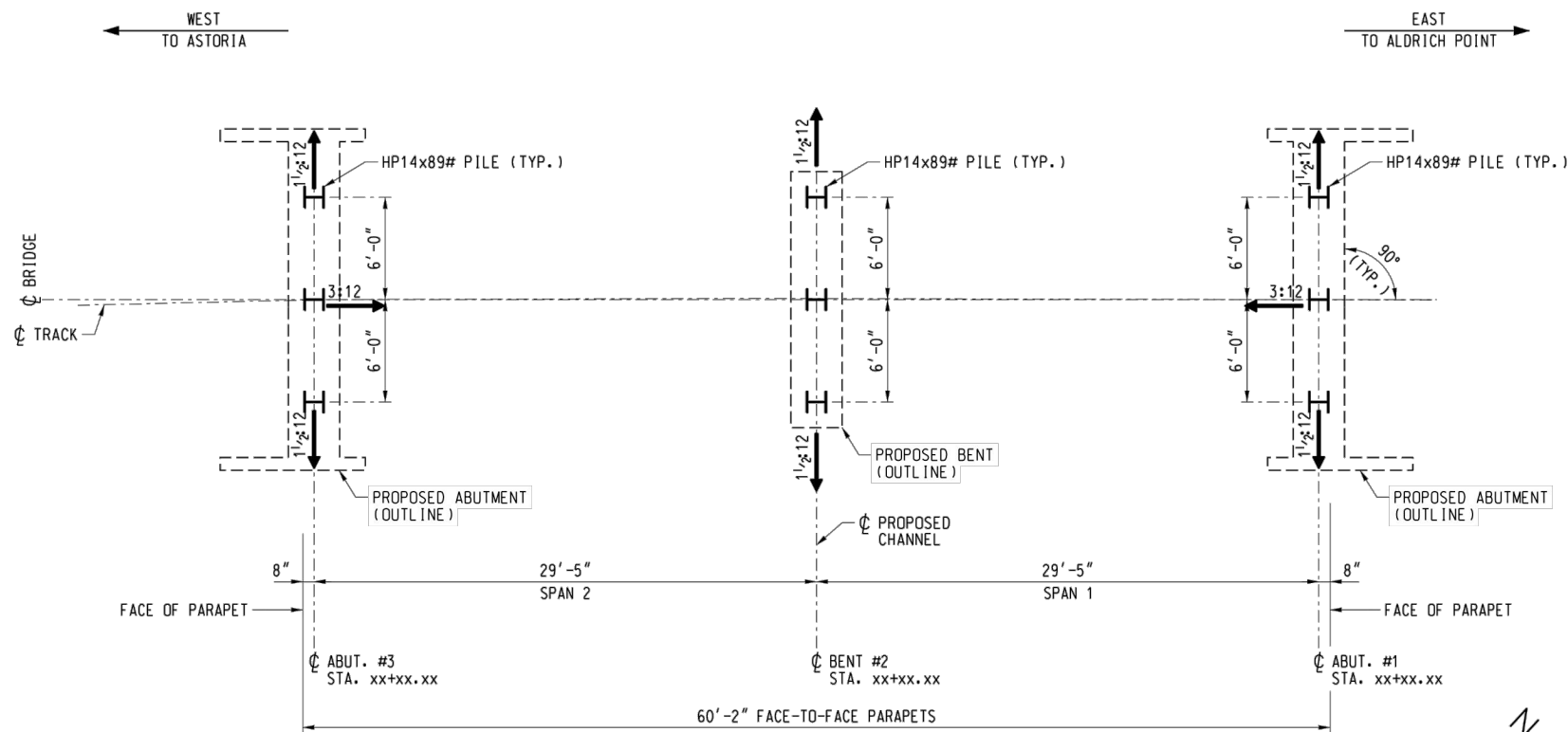


BRIDGE GENERAL PLAN & ELEVATION

SHEET
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PILE LAYOUT PLAN

TYPICAL CROSS SECTION (ABUTMENT)
(LOOKING BY WEST)

TYPICAL CROSS SECTION (BENT)
(LOOKING BY WEST)



Know what's below.
Call before you dig.

ATTENTION !

INFORMATION SHOWN ON THESE PLANS CONCERNING TYPE AND LOCATION OF UNDERGROUND OR ABOVE GROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE.

THE SUPERVISOR OF STRUCTURES OR THE FOREMAN IN CHARGE WILL VERIFY THE LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES BEFORE BEGINNING CONSTRUCTION.

PILE NOTES:

- PILES SHALL BE DRIVEN TO REFUSAL, IF POSSIBLE OR TO A MINIMUM ULTIMATE RESISTANCE OF 250 TONS.
- ALL PILES ARE TO BE DRIVEN WITH REINFORCED TIPS (PILE POINTS).
- ESTIMATED PILE LENGTH BELOW CUTOFF = XX'.
- PILE SPACING SHOWN ARE AT PILE CUTOFF ELEVATIONS.
- SYMBOL X:12 DENOTES DIRECTION AND AMOUNT OF PILE BATTER.

Preliminary
Not for Construction

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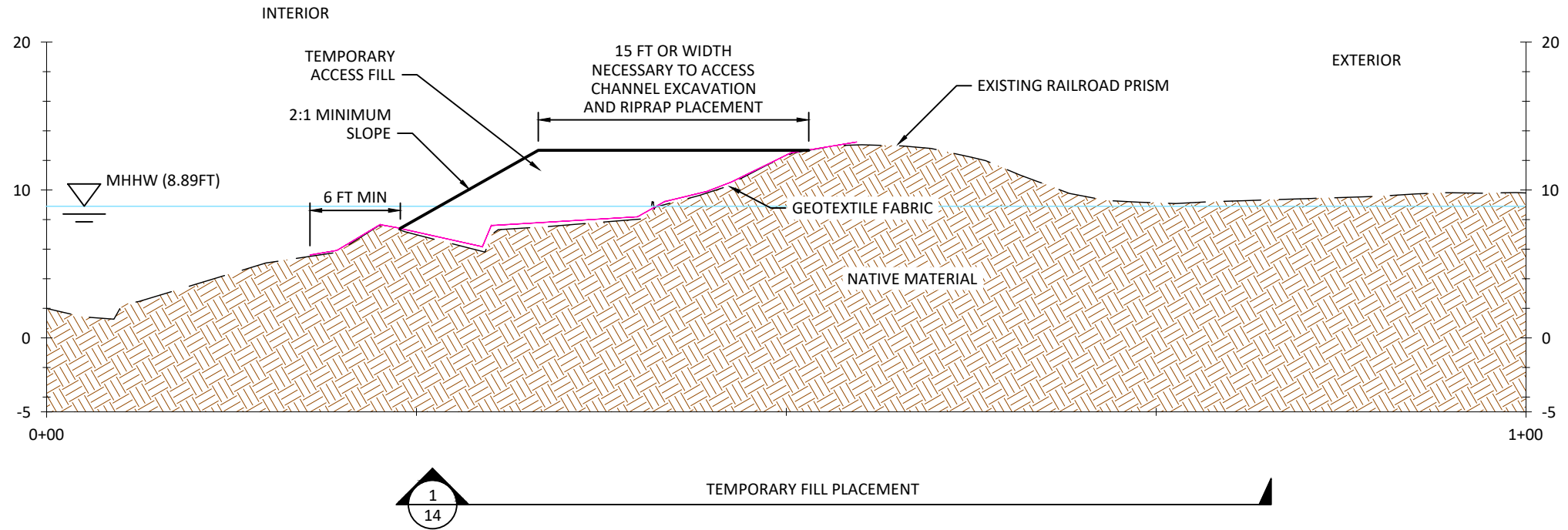
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BRIDGE PILE LAYOUT PLAN &
TYPICAL SECTION

LEGEND

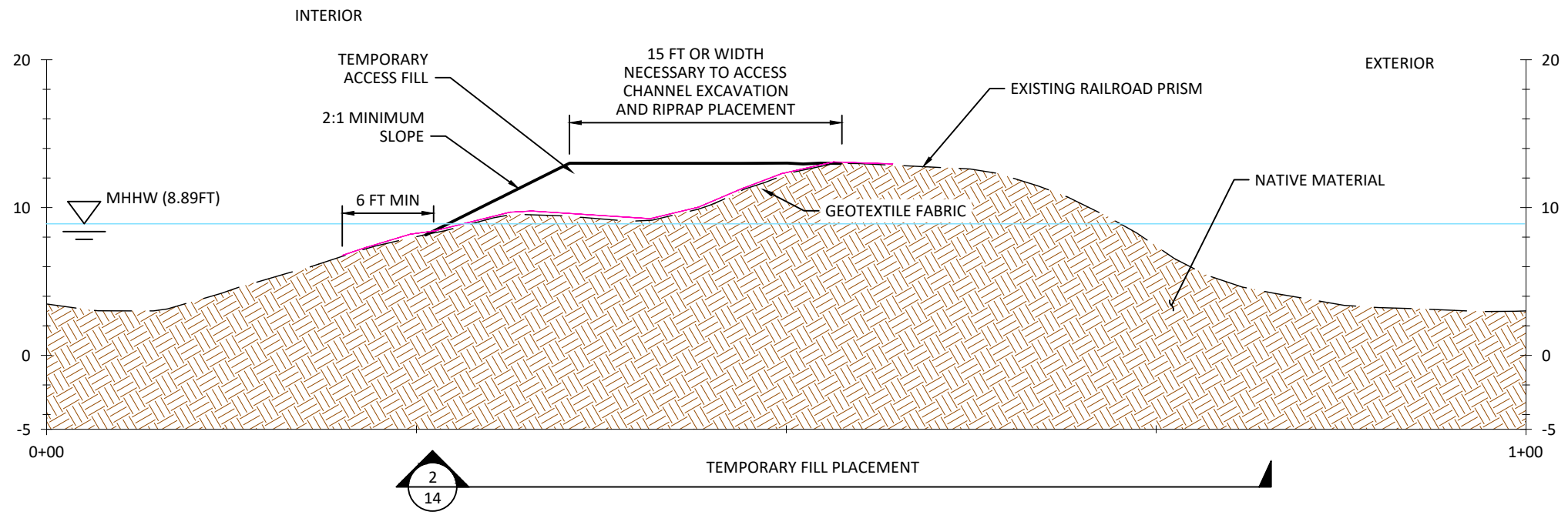
MEAN HIGHER HIGH WATER (8.89FT)

1x VERTICAL EXAGGERATION
SCALE: 1" = 20'



NOTE:

ALL TEMPORARY ACCESS FILL MUST BE REMOVED AFTER USE AND HAULED TO A LEGAL OFF-SITE DISPOSAL LOCATION



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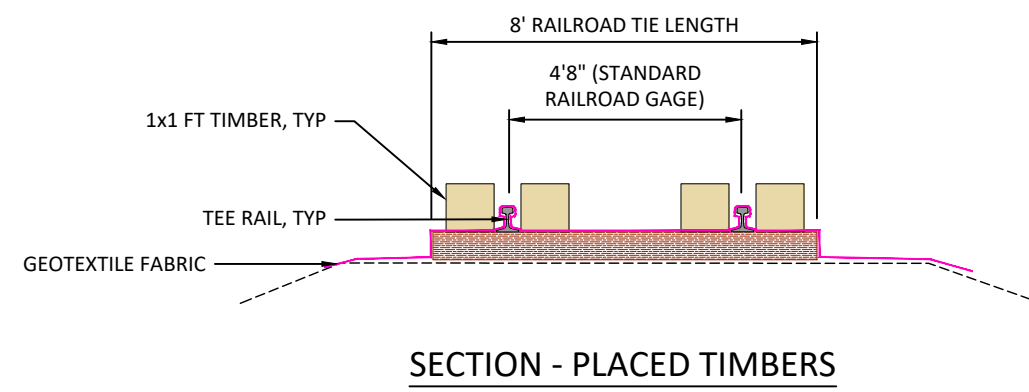
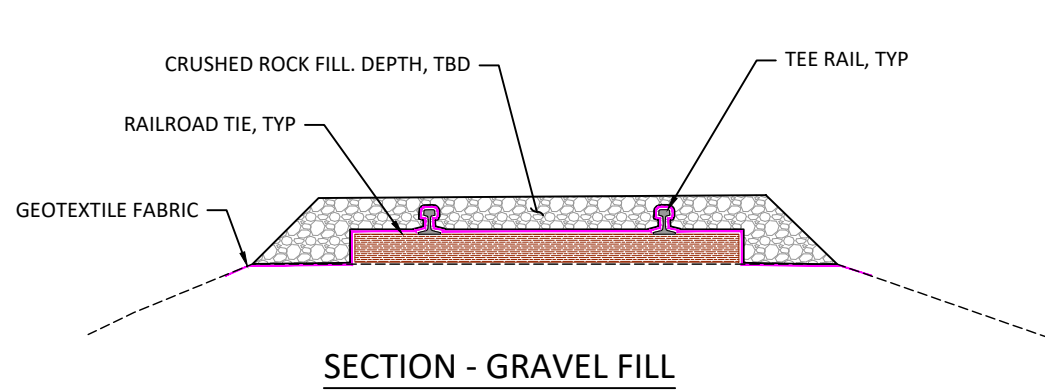
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TEMPORARY FILL ACCESS
DETAILS



- NOTE:**
1. GEOTEXTILE TO PROTECT BALLAST FROM FOULING IN ACCESS AREAS IS REQUIRED PER G&W PUBLIC PROJECT MANUAL
 2. ACCESS ACROSS RAIL MAY BE REQUIRED. RAILS MUST BE LEFT IN A SIMILAR OR BETTER CONDITION POST-CONSTRUCTION. PLACED TIMBERS OR GRAVEL FILL MAY BE USED TO PROTECT RAIL, AND ALLOW ACCESS BY EQUIPMENT. ACCESS METHODS TO BE APPROVED BY CREST AND GENESEE AND WYOMING PRIOR TO CONSTRUCTION.

SECTION - GRAVEL FILL

SECTION - PLACED TIMBERS

1
15 TYPICAL DETAIL - RAILROAD OVERLAND ACCESS OPTIONS
NOT TO SCALE

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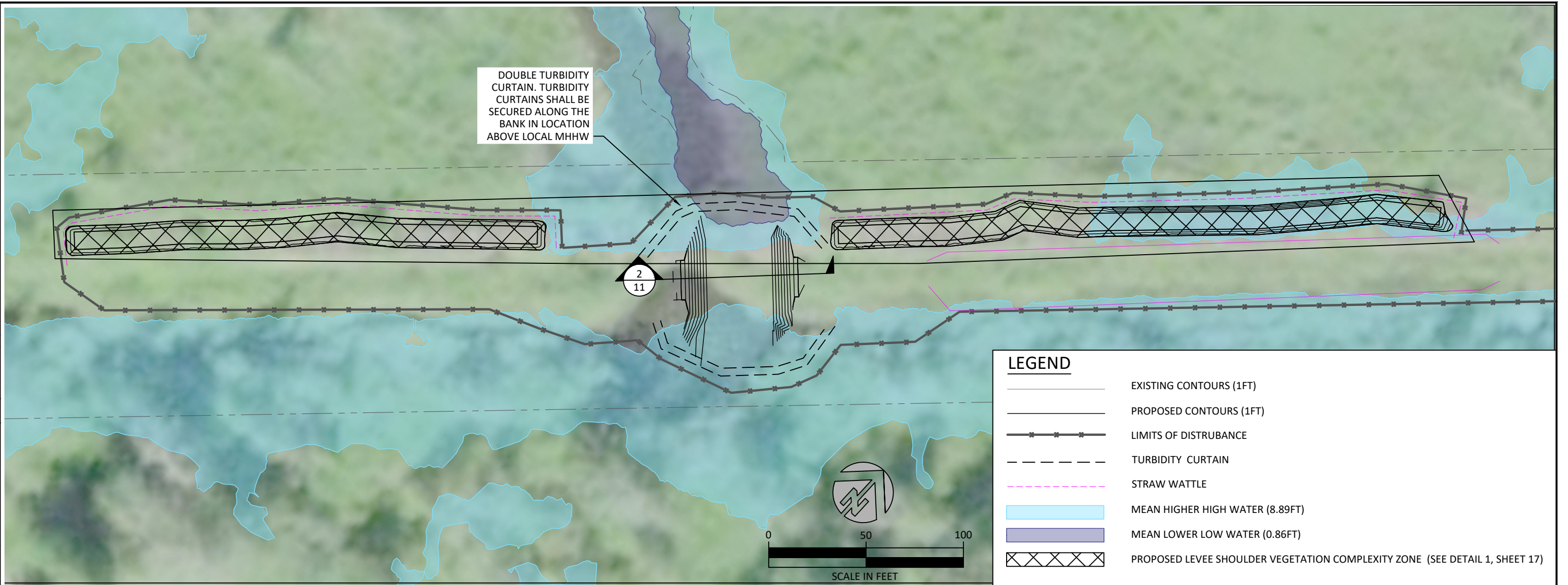
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NOTE:

- SITKA SPRUCE (*PICEA SITCHENSIS*) SHALL BE PLANTED AT TOP ELEVATIONS OF TOPOGRAPHIC COMPLEXITY MOUNDS.
- MOUND CONFIGURATION WILL VARY DEPENDING ON EXISTING VEGETATION AND ACCESS CONSIDERATIONS. MAINTAIN EXISTING MATURE WOODY VEGETATION.
- TOPOGRAPHIC MOUNDS ARE INTENDED TO MIMIC NATURAL MARSHPLAIN MICROTOPOGRAPHY. MOUNDS SHALL BE SHAPED TO MIMIC MARSHPLAIN HUMMOCKS CREATED BY NATIVE SHRUBS, HERBACEOUS PLANTS, AND CONIFER NURSE LOGS.
- TYPICAL MOUND DIMENSIONS ARE APPROXIMATELY 15' TO 40' ACROSS.
- TOPOGRAPHIC MOUNDS SHALL NOT EXCEED ELEVATION 11.0 FT (NAVD88)

GS	MC, CA, MB	MB
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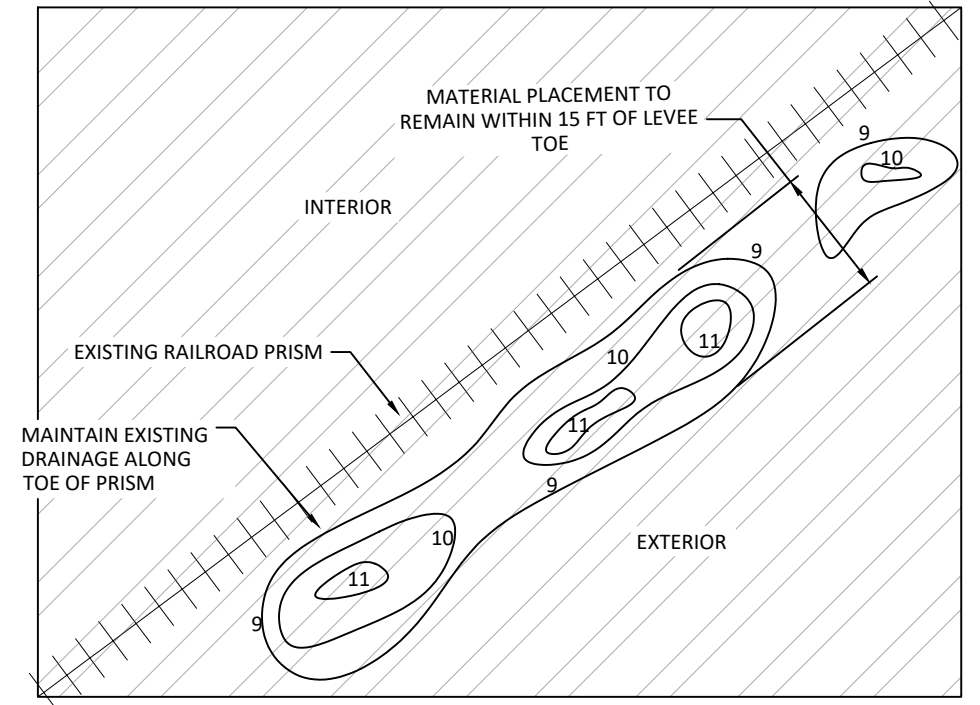
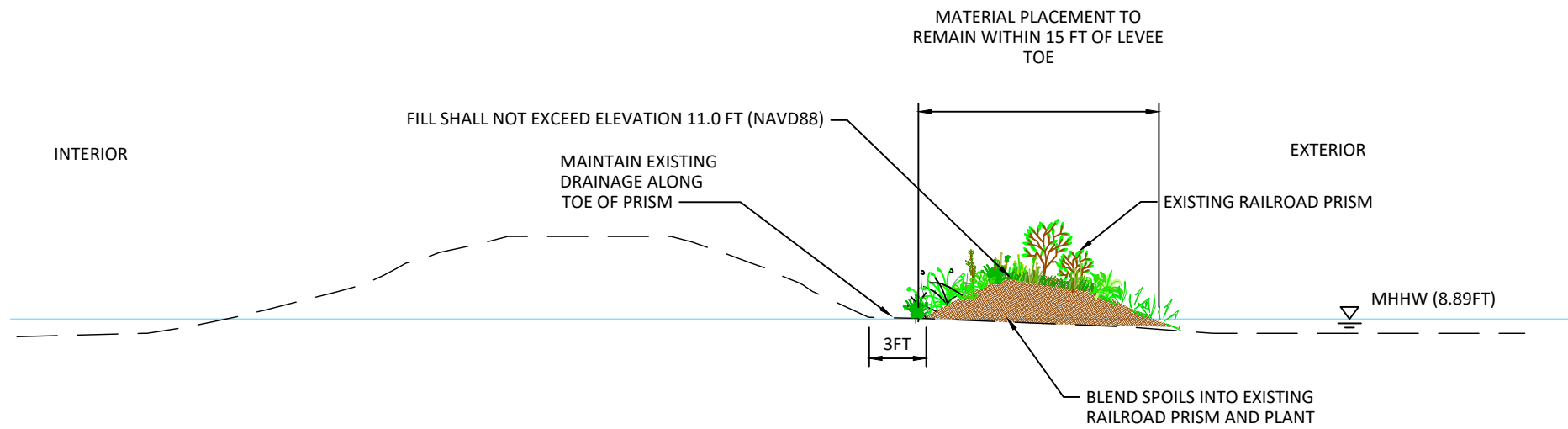
**COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**



REVEGETATION PLANS

NO.	BY	DATE	REVISION DESCRIPTION

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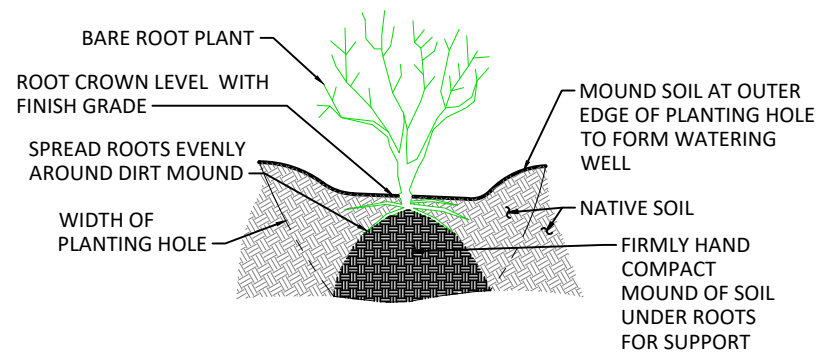
1
17 TYPICAL DETAIL - PROPOSED LEVEE SHOULDER VEGETATION COMPLEXITY ZONE
NOT TO SCALE

SEED MIX APPLY AT A RATE OF 20 LBS/ACRE

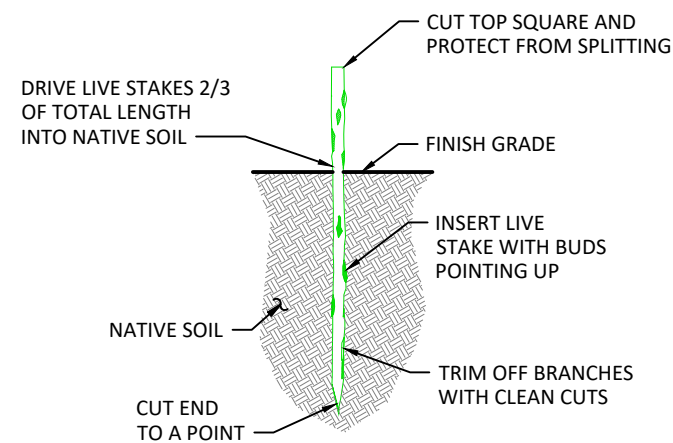
Botanical Name	Common Name	Percent Composition
<i>Sercale cereale</i>	Cereal Rye (Cover Crop)	30%
<i>Glyceria occidentalis</i>	Western Mannagrass	25%
<i>Hordeum brachyantherum</i>	Meadow Barley	20%
<i>Beckmannia syzigachne</i>	American Sloughgrass	15%
<i>Deschampsia caespitosa</i>	Tufted Hairgrass	10%

TOPOGRAPHIC COMPLEXITY PLANTING (above 8 feet elevation, NAVD88)

Botanical Name	Common Name	Stock Type	Stock Size	Average Spacing (on center)	Total Plants
<i>Cornus sericea</i>	Red osier dogwood	plug	16 cu. in.	4'	380
<i>Spiraea douglasii</i>	Douglas spirea	plug	16 cu. in.	4'	380
<i>Physocarpus capitatus</i>	Pacific ninebark	plug	16 cu. in.	4'	380
<i>Lonicera involucrata</i>	Twinberry	plug	16 cu. in.	4'	380
<i>Salix lasiandra</i>	Pacific willow	live cutting	5', 1-1.5" dia	4'	750
<i>Salix sitchensis</i>	Sitka willow	live cutting	5', 1-1.5" dia	4'	750
<i>Picea sitchensis</i>	Sitka spruce	potted plant	24"	See Note	100



2
17 TYPICAL DETAIL - BARE ROOT PLANT
NOT TO SCALE



3
17 TYPICAL DETAIL - LIVE CUTTING
NOT TO SCALE

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REVEGETATION DETAILS &
TABLES

SHEET

17 OF 35

AGENCY CREEK AND WARREN SLOUGH STANDARD PLANS DECEMBER 7, 2022

80% SUBMITTAL
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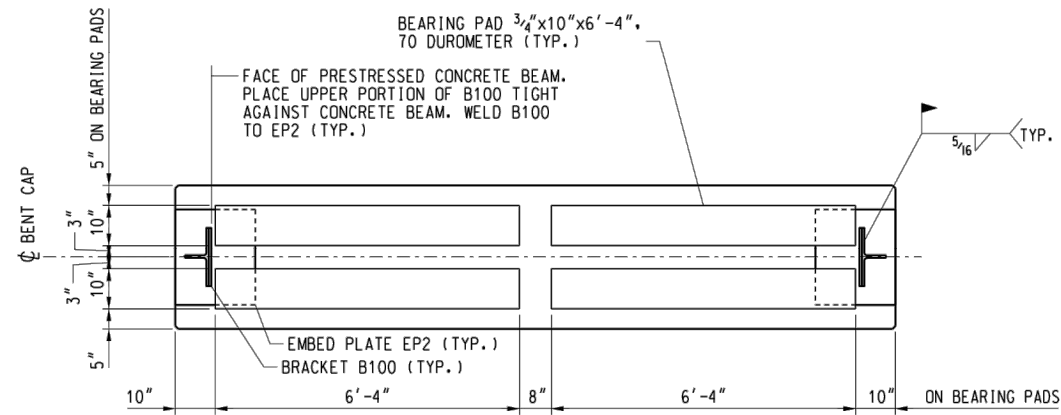
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BRIDGE STANDARDS - TITLE
PAGE

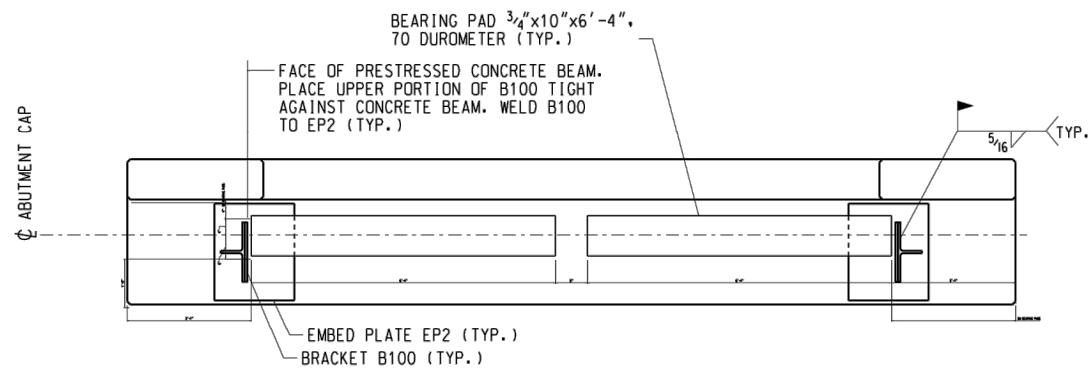
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18 OF 35

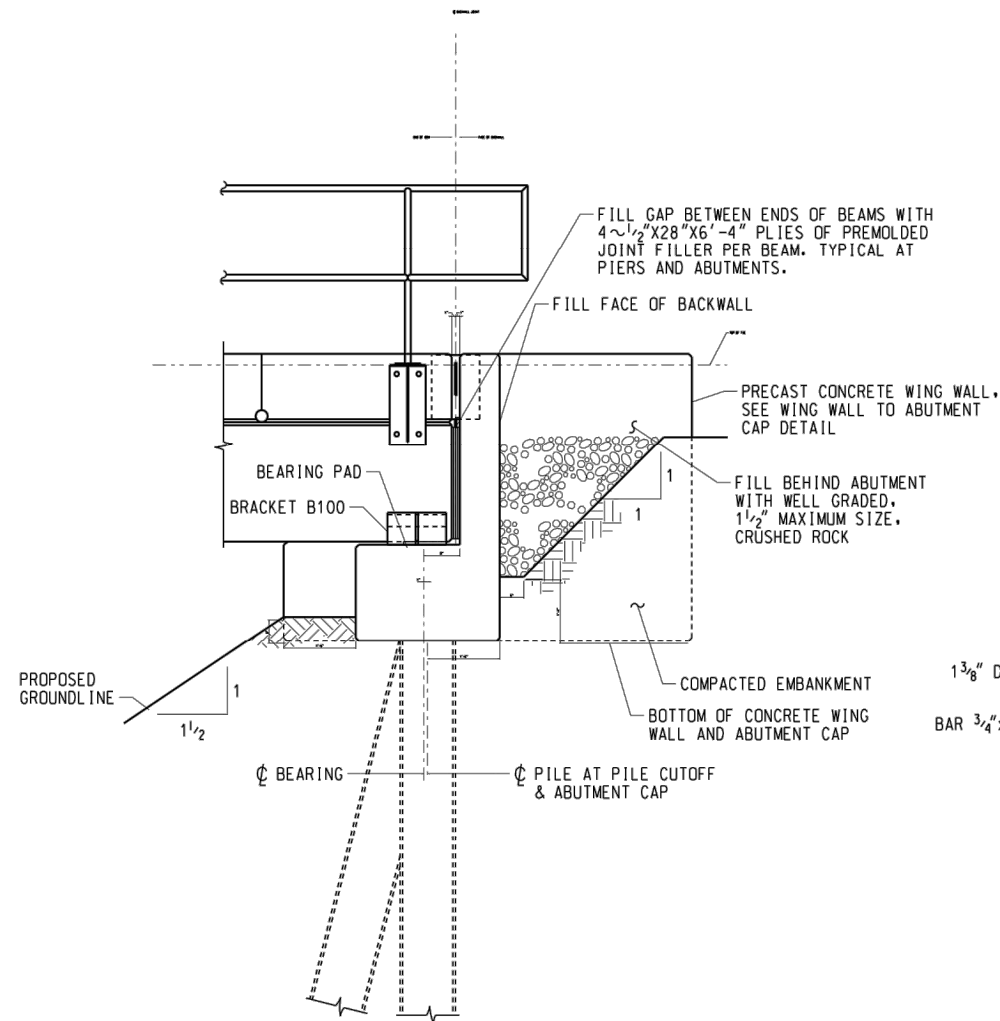
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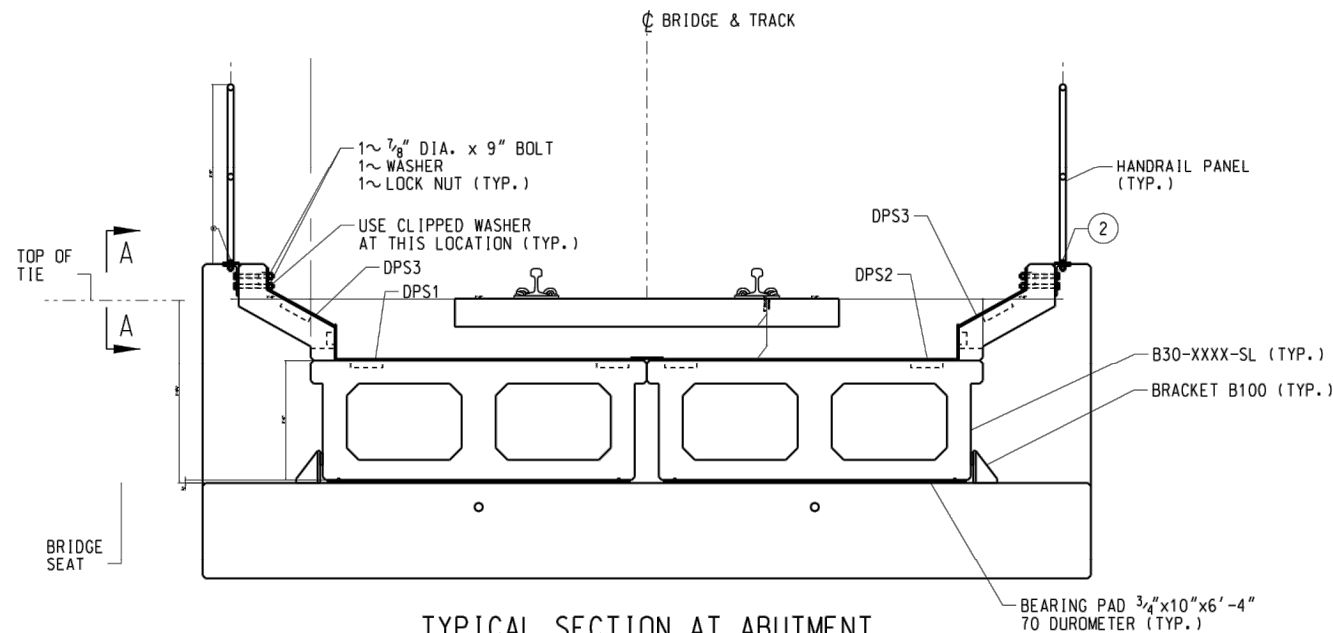
TYPE 1 - BENT



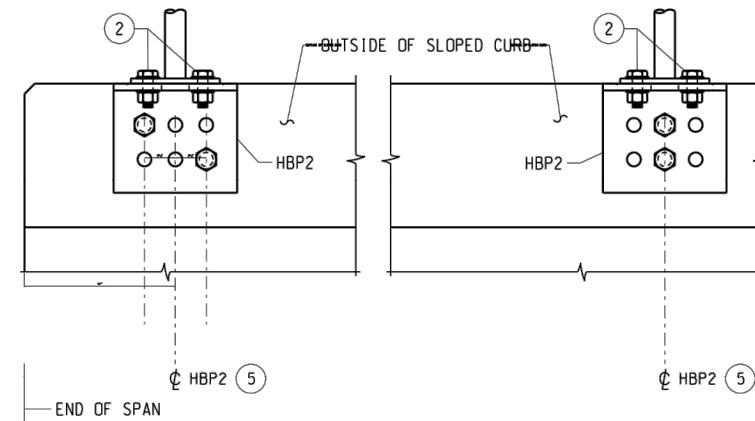
TYPE 1 - ABUTMENT



WING WALL TO ABUTMENT CAP DETAIL



TYPICAL SECTION AT ABUTMENT
30" DOUBLE CELL BOX BEAM w/ SLOPED CURB SHOWN.



VIEW A-A

- ② FASTEN HANDRAIL PANEL TO BRACKET WITH:
2~ 3/4" DIA. x 2 1/4" BOLTS
4~ WASHERS (1 3/16" I.D. x 1 1/16" O.D.)
2~ LOCK NUTS, CENTER LOCKING, ZINC PLATES
- ⑤ FASTEN HBP2 BRACKET TO CURB WITH:
2~ 1/2" DIA. x 9" BOLT
2~ WASHERS (1 3/16" I.D. x 1 3/4" O.D.)
2~ LOCK NUT, CENTER LOCKING, ZINC PLATED

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BRIDGE STANDARDS -
GENERAL NOTES

SHEET

19 OF 35

GENERAL NOTES:

LOADING:

- 1. LIVE LOAD: COOPER E80
2. IMPACT: DIESEL IMPACT

CONCRETE:

- 1. CONCRETE MATERIAL, PLACING AND CURING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN THE PROJECT SPECIFICATIONS.
2. MINIMUM COMPRESSIVE STRENGTH OF THE PRECAST PRE-STRESSED CONCRETE IS SHOWN ON BEAM SHEETS.
3. MINIMUM COMPRESSIVE STRENGTH OF PRECAST NON-PRESTRESSED CONCRETE (EXCEPT CONCRETE CURBS) SHALL BE 4,500 psi.
4. MINIMUM COMPRESSIVE STRENGTH OF CURB CONCRETE SHALL BE 4,000 psi AT 28 DAYS.
5. ESTIMATED WEIGHT OF PRECAST COMPONENTS PROVIDED THROUGHOUT ARE BASED ON NOMINAL DIMENSIONS AND A CONCRETE UNIT WEIGHT OF 156 POUNDS PER CUBIC FOOT. WEIGHTS SHOWN INCLUDE ESTIMATED WEIGHTS OF EMBED PLATES.

REINFORCING STEEL:

- 1. REINFORCING STEEL MATERIAL FABRICATION AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROJECT SPECIFICATIONS. BARS CROSSING CURB JOINT SHALL CONFORM TO A.S.T.M. A1035 ARE NOTED IN THE BENDING DIAGRAM.
2. TACK WELDING OF REINFORCING IS PROHIBITED.

PRESTRESSING STRANDS:

- 1. STRAND SHALL BE TESTED IN ACCORDANCE WITH P.C.I. RECOMMENDATIONS (MOUSTAFA METHOD) AND CERTIFIED BY THE FABRICATOR AS HAVING ADEQUATE BOND CHARACTERISTICS TO SATISFY THE PREDICTION EQUATIONS FOR TRANSFER AND DEVELOPMENT LENGTH GIVEN IN THE A.R.E.M.A. MANUAL FOR RAILWAY ENGINEERING.
2. AN ALTERNATIVE STRAND PATTERN WHICH HAS THE SAME ECCENTRICITY AS THE PATTERN SHOWN AND IS BETTER SUITED TO THE MANUFACTURER'S FACILITIES WILL BE CONSIDERED. MANUFACTURER MUST SUBMIT PLANS AND COMPUTATIONS FOR RAILROAD APPROVAL PRIOR TO CASTING.
3. PRESTRESSING STRAND MATERIAL, FABRICATION, INSTALLATION AND STRESSING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROJECT SPECIFICATIONS.

CONCRETE CURB:

- 1. CURB SHALL BE CAST ON PRESTRESSED BEAM AFTER STRANDS ARE DETENSIONED. BOND NEW CONCRETE TO PRESTRESSED BEAM USING APPROVED CONCRETE BONDING AGENT ACCORDING TO MANUFACTURER'S INSTRUCTIONS.
2. PREFORMED 1/2" x 6" ASPHALT EXPANSION BOARD SHALL BE PLACED TO DIVIDE CURB INTO EQUAL SEGMENTS. SEE TABLE ON THIS SHEET FOR NUMBER OF SEGMENTS. SEAL TOP AND SIDES OF CURB AT ASPHALT EXPANSION BOARD WITH APPROVED JOINT SEALANT. A 3" DIAMETER DRAIN OPENING SHALL BE FORMED AT THE CENTER OF EACH CURB JOINT AT THE BASE.
3. IF LENGTH OF CURB CANNOT BE EQUALLY SPACED, ADJUST CURB LENGTH SO THAT JOINT BETWEEN CURBS IS AT LEAST 12" FROM HANDRAIL POST HOLES. LENGTH OF STRAIGHT REINFORCING STEEL IN CURBS SHALL THEN BE RECALCULATED TO ACCOMMODATE A 2 1/2" CLEAR AT ENDS OF CURBS.

CEMENTITIOUS GROUT:

- 1. UNLESS OTHERWISE SPECIFIED, GROUT SHALL BE NON-SHRINK GROUT CONFORMING TO A.S.T.M. C1107, WITH A MINIMUM COMPRESSIVE STRENGTH OF 5,000 p.s.i.
2. GROUT SHALL BE MIXED PER MANUFACTURER'S INSTRUCTIONS TO ACHIEVE A PLASTIC CONSISTENCY. LIQUID, OR FLOWABLE, MIX SHALL NOT BE USED UNLESS IT IS PLACED IN A FORM AND PROPERLY CONSOLIDATED.
3. WHEN GROUT IS USED AS A LEVELING PAD, WEDGES MAY BE PLACED IN THE CORNERS OF THE GROUT AREA TO MAINTAIN PROPER ELEVATION OF THE SUPPORTED MEMBER. WHEN USING THIS PROCEDURE, THE WEDGES ARE PLACED AND ELEVATIONS CHECKED PRIOR TO MIXING AND PLACING GROUT. GROUT SHALL BE PLACED SO THAT WHEN THE MEMBER IS SET IN PLACE, GROUT IS DISPLACED ENSURING CONSISTENT CONTACT BETWEEN THE GROUT AND THE SURFACE OF THE ADJOINING MEMBERS. REMOVE THE WEDGES AFTER INITIAL SET OF GROUT AND PATCH HOLES WITH GROUT.
4. WHEN USING GROUT TO ANCHOR BARS IN CONCRETE, GROUT SHALL BE MIXED TO A FLOWABLE CONSISTENCY PER MANUFACTURER'S INSTRUCTIONS. WHEN NOT CALLED OUT ON PLANS OR IN MANUFACTURER'S INSTRUCTIONS, DRILLED HOLES SHALL BE A MINIMUM OF 1/4" GREATER IN DIAMETER THAN THE ANCHORED BAR.
5. ALL SURFACES SHALL BE DRY, CLEANED AND FREE OF DUST, DIRT, OR OTHER DEBRIS.

EPOXY:

- 1. EPOXY RESINS USED FOR ANCHORING DOWEL BARS OR ANCHOR BOLTS SHALL CONFORM TO A.S.T.M. C881 TYPE IV. ANCHORAGE DEVICES SHALL BE DEFORMED REINFORCING BARS, SWEGGED ANCHOR BOLTS, OR THREADED RODS. SMOOTH BARS SHALL NOT BE USED WITH EPOXY ANCHORAGE.
2. EPOXY RESINS USED FOR BONDING HARDENED CONCRETE TO HARDENED CONCRETE SHALL CONFORM TO A.S.T.M. C881 TYPE IV. APPROPRIATE MEASURES SHALL BE TAKEN TO ENSURE FIRM CONTACT BETWEEN THE EPOXY AND BONDED SURFACES.
3. EPOXY RESINS USED FOR BONDING FRESH CONCRETE TO HARDENED CONCRETE SHALL CONFORM TO A.S.T.M. C881 TYPE V.
4. MIXING AND PLACEMENT OF EPOXY RESIN MATERIALS SHALL BE PERFORMED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. ALL SURFACES SHALL BE DRY, CLEAN AND FREE OF DUST, DIRT, OR OTHER DEBRIS.

STEEL NOTES:

- 1. MATERIAL: STRUCTURAL STEEL CHANNELS, BARS, PLATES AND ANGLES SHALL CONFORM TO A.S.T.M. A36.
2. STANDARD BLACK PIPE SHALL CONFORM TO A.S.T.M. A53. UNCOATED PIPE SHALL BE USED.
3. FABRICATION AND ARC WELDING OF STRUCTURAL STEEL AND HANDRAIL PANELS SHALL BE IN ACCORDANCE WITH CHAPTER 15, PART 3 OF THE CURRENT A.R.E.M.A. MANUAL FOR RAILWAY ENGINEERING. MIG WELDING SHALL BE USED ON HANDRAIL PANELS.
4. GALVANIZING SHALL CONFORM TO A.S.T.M. A123. PIECES REQUIRING GALVANIZING ARE NOTED IN THESE STANDARD PLANS.
5. AFTER GALVANIZING, ALL ELEMENTS SHALL BE FREE OF FINES, ABRASIONS, ROUGH OR SHARP EDGES AND OTHER SURFACE DEFECTS.
6. HANDRAIL PANELS ON WALKWAYS SHALL BE ERECTED PLUMB AND IN LINE.
7. D-RINGS SHALL BE 3" I.D., MADE OF STEEL FOR HEAVY-DUTY USE, PROVIDED WITH WELD-ON BRACKET, AND HAVE A MINIMUM SAFE WORKING LOAD OF 1,000 LBS. COMPONENTS REQUIRING D-RINGS ARE SHOWN IN THESE STANDARD PLANS.
8. SHEAR CONNECTOR STUDS SHALL CONFORM TO A.S.T.M. A108 GRADE 1020.
9. SHEAR CONNECTOR STUDS SHALL BE AUTOMATICALLY END WELDED WITH COMPLETE FUSION IN ACCORDANCE WITH SECTION 7 OF THE CURRENT A.W.S. STRUCTURAL WELDING CODE D1.1.

PILES:

- 1. STEEL PILE MATERIAL SHALL CONFORM TO A.S.T.M. A572 GRADE 50.
2. PILES SHALL BE DRIVEN IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS. STEEL BEARING PILES SHALL BE DRIVEN TO REFUSAL IF POSSIBLE OR TO A MINIMUM ULTIMATE RESISTANCE OF 265 KIPS AS DETERMINED BY G&W SPECIFICATION 520.
3. HAMMERS MUST BE APPROVED BY ENGINEER PRIOR TO USE. PILE DRIVING CRITERIA SHALL BE SUPPLIED BY THE SYSTEM STRUCTURES OFFICE.
4. ESTIMATED PILE LENGTHS ARE NOT TO BE USED AS BEARING OR DESIGN CRITERIA. ACTUAL PILE DEPTHS REQUIRED TO MEET DESIGN ARE DEPENDENT ON SITE SOIL CONDITIONS ACCORDING TO THE BORING LOG AND PILE DRIVING EQUIPMENT.
5. AFTER PILES ARE DRIVEN, THEY SHALL BE PULLED, IF NECESSARY, AND HELD IN THE PROPER LOCATION AND CUT OFF AT THE PROPER ELEVATION. THEY SHALL CONTINUE BEING HELD UNTIL THE PRECAST CAPS HAVE BEEN SET AND WELDED TO STEEL BEARING PILES.

PAINTING:

- 1. EXPOSED PORTIONS OF PILE PLATES, EXPOSED PORTIONS OF PILING BETWEEN BOTTOM OF CAP AND ONE FOOT BELOW GROUND LINE, CHANNEL BRACING, ANGLE HANDRAIL AND ABRASIONS OR CUTS ON PAINTED STEEL SHALL BE PAINTED WITH ONE (1) FIELD COAT OF SELF-PRIMING, ALUMINUM PIGMENTED, LOW STRESS, HIGH SOLIDS MASTIC. PAINT APPLICATION SHALL BE TO A MINIMUM DRY FILM THICKNESS OF 8 MILS. ALL AREAS TO BE PAINTED SHALL BE CLEANED IN ACCORDANCE WITH THE STEEL STRUCTURES PAINTING COUNCIL SURFACE PREPARATION SPECIFICATION SSPC-SP6. PAINT SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

MANUFACTURER'S NOTES:

- 1. PRODUCTION PROCEDURES AND DIMENSIONAL TOLERANCES FOR THE MANUFACTURE OF PRECAST, PRESTRESSED BEAMS SHALL BE IN ACCORDANCE WITH THE A.R.E.M.A. MANUAL FOR RAILWAY ENGINEERING THE PRESTRESSED CONCRETE INSTITUTE'S CURRENT MANUAL MNL-116 FOR QUALITY CONTROL, AND PROJECT SPECIFICATIONS.
2. SURFACES SHALL BE FORMED IN A MANNER WHICH WILL PRODUCE A SMOOTH AND UNIFORM APPEARANCE WITHOUT RUBBING OR PLASTERING. UNLESS OTHERWISE NOTED, EXPOSED EDGES OF 90-DEGREES OR LESS ARE TO BE CHAMFERED 3/4" x 3/4". UNFORMED SURFACES SHALL HAVE A SMOOTH FINISH FREE OF ALL FLOAT AND TROWEL MARKS.
3. THE AREA AROUND LIFTING LOOPS SHALL NOT BE RECESSED. LIFTING LOOPS TO BE REMOVED IN FILED FLUSH WITH CONCRETE SURFACE.
4. IF LIFTED WITH SLINGS, INSTEAD OF LIFTING LOOPS, SLINGS MUST NOT BE PLACED MORE THAN 3'-0" FROM ENDS OF BEAMS.
5. FABRICATOR IS RESPONSIBLE FOR DEVELOPING LIFTING LOOP ANCHORAGE DETAIL TO PROVIDE SAFETY FACTOR OF 4 ON WORKING LOAD. DETAIL SHALL BE PROOF-TESTED WITH TEST RESULTS KEPT ON FILE BY FABRICATOR AND AVAILABLE FOR INSPECTION BY THE RAILROAD.
6. COIL LOOP INSERTS ARE TO BE DOUBLE FLARED, 1 1/4" x 12" AND HAVE A SAFE WORKING LOAD OF 13,500 LBS. WITH A 4 TO 1 SAFETY FACTOR. THE INSERTS ARE TO BE COMPLETELY RECESSED WITH 1 1/4" DIA. x 13" SPIRAL BOLTS ATTACHED TO CAP FOR SHIPMENT.
7. BENT CAPS AND ABUTMENT CAPS SHALL BE PROVIDED WITH SUFFICIENT ELECTRICAL GROUND CONNECTION BETWEEN EMBED PLATES, TO AID IN FIELD WELD PROCEDURES.

Z ANGLE
C CENTERLINE
B.S. BOTH SIDES
BOT. BOTTOM
CONC. CONCRETE
C.Y. CUBIC YARD
DIA. DIAMETER
E.F. EACH FACE
EST. ESTIMATED
FT. FOOT
H BENT HEIGHT
I.D. INSIDE DIAMETER
IN. INCHES
ksi KIPS PER SQUARE INCH
L BEAM LENGTH (L = S - 2")
LBS. POUNDS
MIN. MINIMUM
MAX. MAXIMUM
N/A NOT APPLICABLE
NO. NUMBER
O.D. OUTSIDE DIAMETER
PL PLATE
PLF POUNDS PER LINEAR FOOT
psi POUND PER SQUARE INCH
S SPAN LENGTH
SPA. SPACE
STD. STANDARD
STR. STRAIGHT
SYM. SYMMETRIC
(TYP.) TYPICAL
VERT. VERTICAL
WT. WEIGHT

SPACING TABLE
USE TO LAYOUT HANDRAIL PANEL, WALKWAY BRACKET SPACING AND CURB JOINT
Table with 5 columns: SPAN LENGTH 'S', HANDRAIL LAYOUT, 'C', 'D', NO. OF CURB SEGMENTS. Rows range from 14'-0" to 36'-0" span lengths.

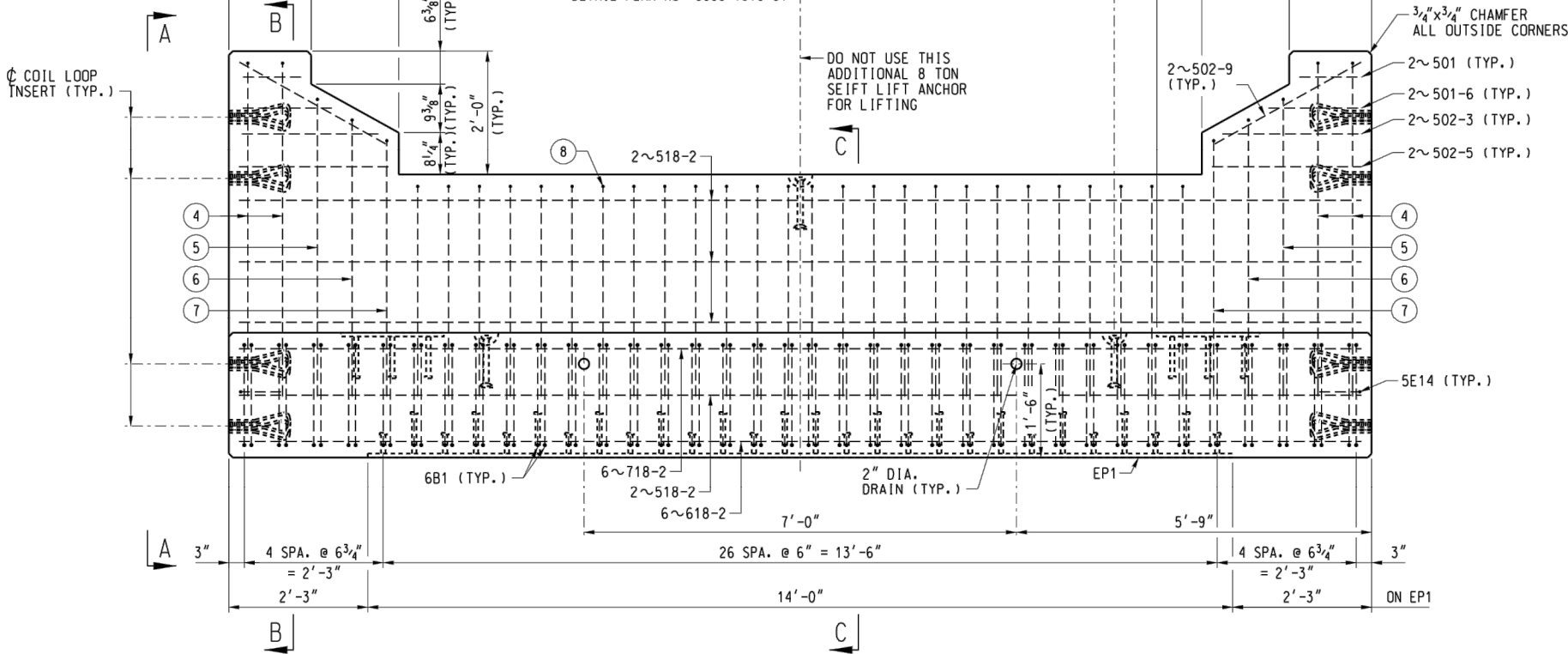
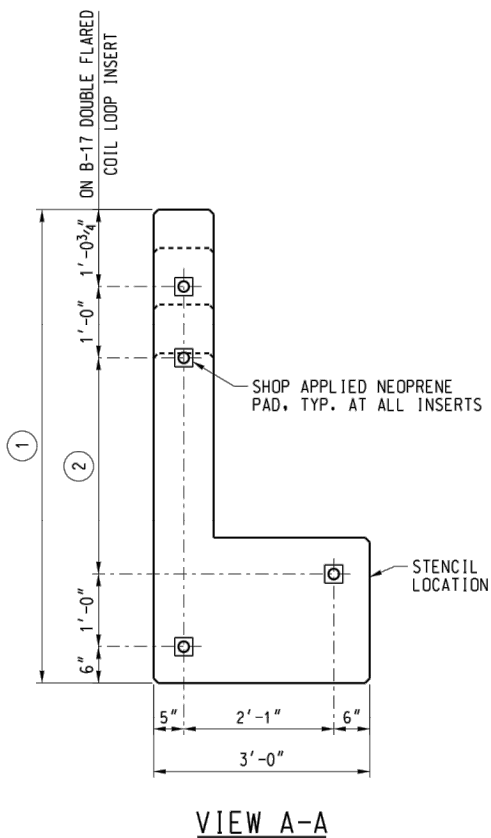
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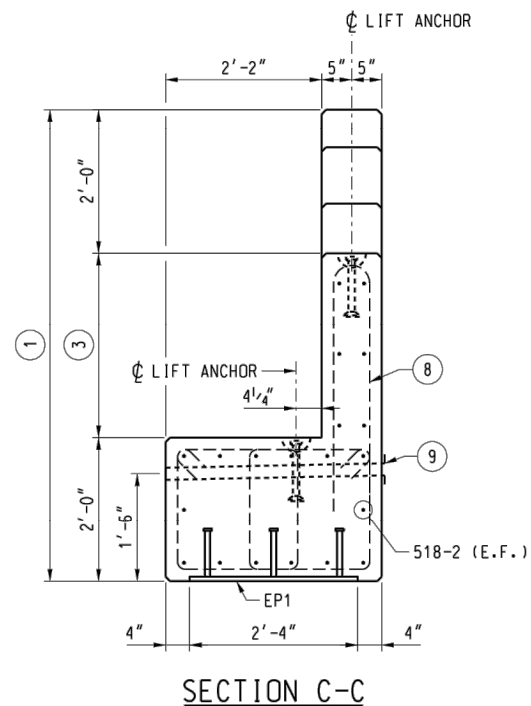
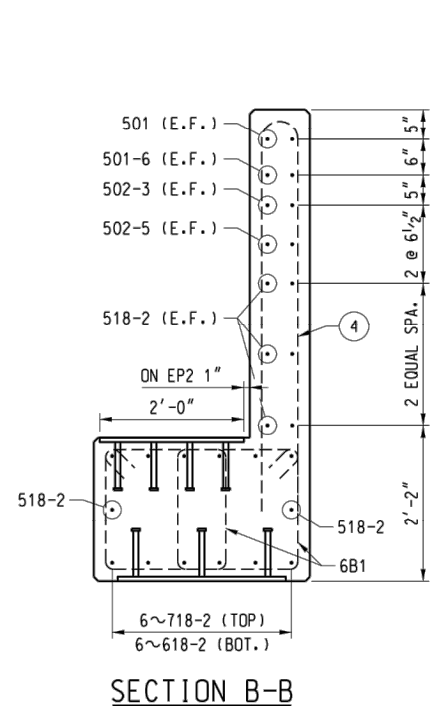


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PRECAST ABUTMENT CAP TYPE 1 - SLOPED CURB



LIST OF REINFORCING BARS

MARK	SIZE	TYPE	A	B	LENGTH
5C1	#5	C	6"	2'-3"	5'-11"
5C2	#5	C	6"	2'-7"	6'-3"
5C3	#5	C	6"	2'-11"	6'-7"
5C4	#5	C	6"	3'-5"	7'-1"
5C13	#5	C	6"	4'-3"	9'-11"
5C14	#5	C	6"	4'-7"	10'-3"
5C15	#5	C	6"	4'-11"	10'-7"
5C16	#5	C	6"	5'-5"	11'-1"
5C17	#5	C	6"	3'-8"	8'-9"
5C18	#5	C	6"	4'-0"	9'-1"
5C19	#5	C	6"	4'-4"	9'-5"
5C20	#5	C	6"	4'-10"	9'-11"
5C21	#5	C	6"	3'-4"	8'-1"
5C22	#5	C	6"	3'-8"	8'-5"
5C23	#5	C	6"	4'-0"	8'-9"
5C24	#5	C	6"	4'-6"	9'-3"
5C25	#5	C	6"	3'-0"	7'-5"
5C26	#5	C	6"	3'-4"	7'-9"
5C27	#5	C	6"	3'-8"	8'-1"
5C28	#5	C	6"	4'-2"	8'-7"
5E14	#5	E	2'-6 1/2"	9"	4'-1"
6B1	#6	B	1'-8"	1'-8"	8'-0"
501	#5	STR.	-	-	1'-0"
501-6	#5	STR.	-	-	1'-6"
502-3	#5	STR.	-	-	2'-3"
502-5	#5	STR.	-	-	2'-5"
518-2	#5	STR.	-	-	18'-2"
618-2	#6	STR.	-	-	18'-2"
718-2	#7	STR.	-	-	18'-2"

1. SEE PLAN NO. 0000-1910-07 FOR BENDING DIAGRAM.

BILL OF MATERIAL

QTY.	UNIT	DESCRIPTION
1	EA.	EP1 (SEE DETAIL, PLAN NO. 0000-1910-03)
2	EA.	EP2 (SEE DETAIL, PLAN NO. 0000-1910-03)
3	EA.	8 TON SWIFT LIFT ANCHOR
8	EA.	COIL LOOP INSERT w/ BOLT

TABLE OF DIMENSIONS

BEAM DEPTH	(1)	(2)	(3)
20"	5'-8 3/4"	2'-2"	1'-8 3/4"
30"	6'-6 3/4"	3'-0"	2'-6 3/4"

TABLE OF WEIGHT

COMPONENT NAME	BEAM DEPTH	WEIGHT (LBS.)
A20-1SB	20"	23.910
A30-1SB	30"	25.918

- (4) BAR 5C14 FOR 20" BEAM. BAR 5C16 FOR 30" BEAM.
- (5) BAR 5C18 FOR 20" BEAM. BAR 5C20 FOR 30" BEAM.
- (6) BAR 5C22 FOR 20" BEAM. BAR 5C24 FOR 30" BEAM.
- (7) BAR 5C26 FOR 20" BEAM. BAR 5C28 FOR 30" BEAM.
- (8) BAR 5C2 FOR 20" BEAM. BAR 5C4 FOR 30" BEAM.
- (9) 2" DIA. DRAIN. SLOPE 2% 4" SQUARE ALUMINUM WIRE #4 MESH HARDWARE CLOTH ANCHORED FIRMLY TO CONCRETE AT EACH DRAIN.

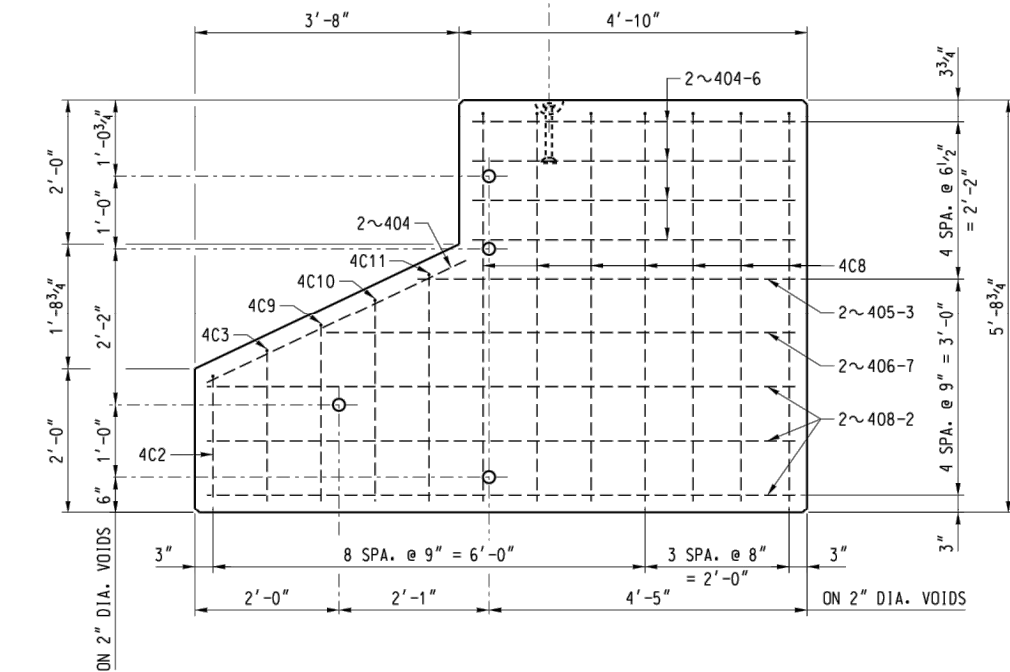
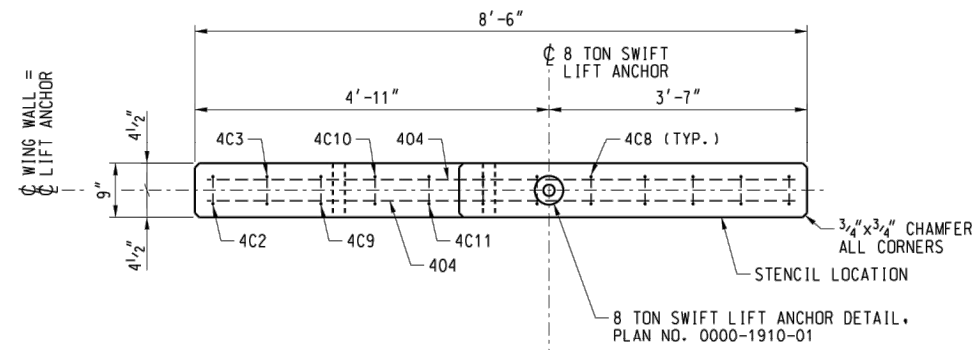
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RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN



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PRECAST WING WALL W20-T
EST. WEIGHT = 4,470 LBS.

LIST OF REINFORCING BARS

MARK	SIZE	TYPE	A	B	LENGTH
4C2	#4	C	5"	1'-9"	3'-9"
4C3	#4	C	5"	2'-1 1/4"	4'-3"
4C8	#4	C	5"	5'-4 3/4"	11'-1"
4C9	#4	C	5"	2'-5 1/2"	5'-0"
4C10	#4	C	5"	2'-9 3/4"	5'-7"
4C11	#4	C	5"	3'-2"	6'-3"
4C12	#4	C	5"	4'-9 3/4"	9'-11"
404	#4	STR.	-	-	4'-0"
404-6	#4	STR.	-	-	4'-6"
404-10	#4	STR.	-	-	4'-10"
405-3	#4	STR.	-	-	5'-3"
406-7	#4	STR.	-	-	6'-7"
408-2	#4	STR.	-	-	8'-2"

1. SEE PLAN NO. 0000-1910-07 FOR BENDING DIAGRAM.

BILL OF MATERIAL

W20-T	UNIT	DESCRIPTION
1	EA.	8 TON SWIFT LIFT ANCHOR

80% SUBMITTAL
NOT FOR CONSTRUCTION

GS	MC, CA, MB	MB
DRAWN	DESIGNED	CHECKED
MC	02/2024	190220
APPROVED	DATE	PROJECT

**COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**



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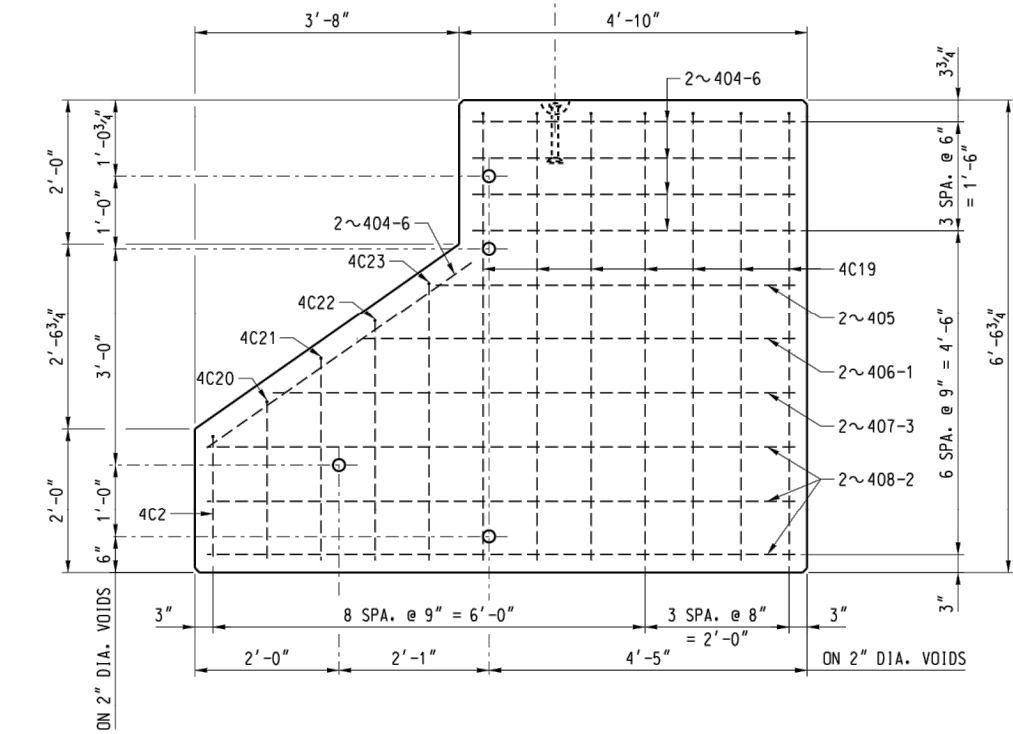
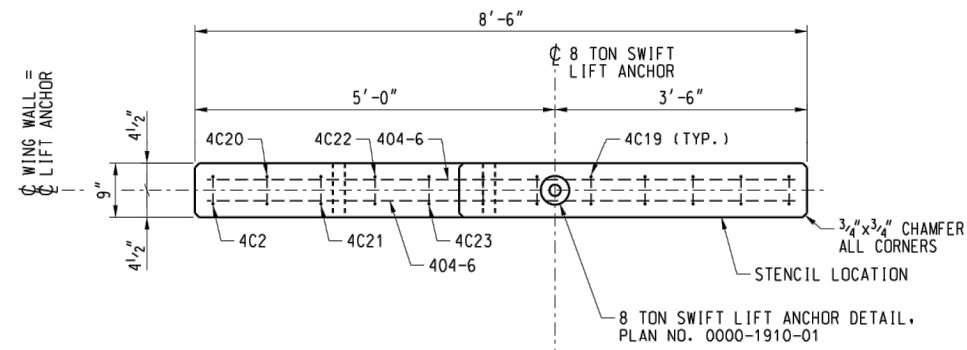
**BRIDGE STANDARD -
ABUTMENT CAP**

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NO.	BY	DATE	REVISION DESCRIPTION

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PRECAST WING WALL W30-S
EST. WEIGHT = 5,120 LBS.

LIST OF REINFORCING BARS

MARK	SIZE	TYPE	A	B	LENGTH
4C2	#4	C	5"	1'-9"	3'-9"
4C19	#4	C	5"	6'-2 3/4"	13'-4"
4C20	#4	C	5"	2'-2 3/4"	4'-8"
4C21	#4	C	5"	2'-10"	5'-8"
4C22	#4	C	5"	3'-4 1/4"	6'-8"
4C23	#4	C	5"	3'-10 1/2"	7'-8"
4C24	#4	C	5"	5'-7 3/4"	12'-9"
404-6	#4	STR.	-	-	4'-6"
405	#4	STR.	-	-	5'-0"
405-7	#4	STR.	-	-	5'-7"
406-1	#4	STR.	-	-	6'-1"
406-10	#4	STR.	-	-	6'-10"
407-3	#4	STR.	-	-	7'-3"
408-2	#4	STR.	-	-	8'-2"

1. SEE PLAN NO. 0000-1910-07 FOR BENDING DIAGRAM.

BILL OF MATERIAL

W30-S	W30-T	W30-V	UNIT	DESCRIPTION
1	1	1	EA.	8 TON SWIFT LIFT ANCHOR

80% SUBMITTAL
NOT FOR CONSTRUCTION

GS	MC, CA, MB	MB
DRAWN	DESIGNED	CHECKED
MC	02/2024	190220
APPROVED	DATE	PROJECT

**COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**



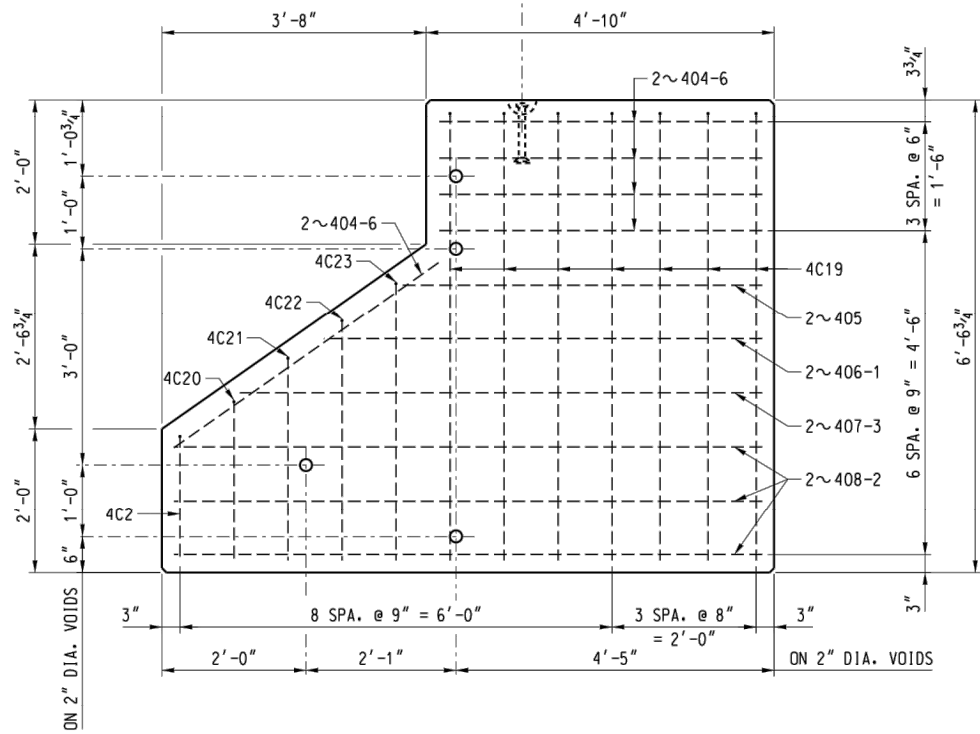
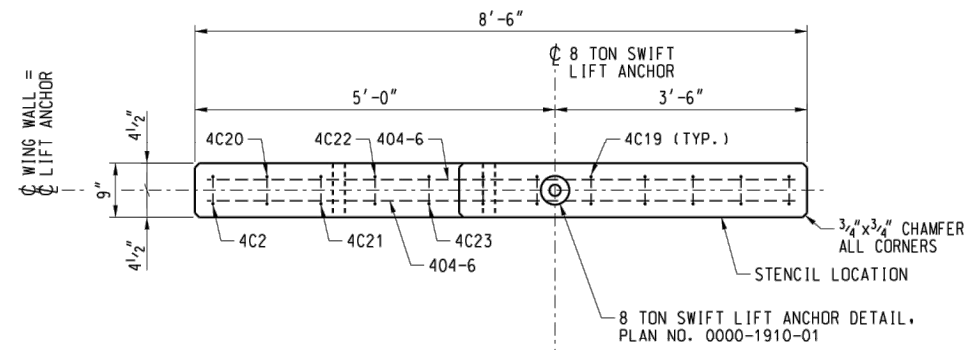
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**BRIDGE STANDARD - 20 INCH
WING WALL**

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PRECAST WING WALL W30-S
EST. WEIGHT = 5,120 LBS.

LIST OF REINFORCING BARS

MARK	SIZE	TYPE	A	B	LENGTH
4C2	#4	C	5"	1'-9"	3'-9"
4C19	#4	C	5"	6'-2 3/4"	13'-4"
4C20	#4	C	5"	2'-2 3/4"	4'-8"
4C21	#4	C	5"	2'-10"	5'-8"
4C22	#4	C	5"	3'-4 1/4"	6'-8"
4C23	#4	C	5"	3'-10 1/2"	7'-8"
4C24	#4	C	5"	5'-7 3/4"	12'-9"
404-6	#4	STR.	-	-	4'-6"
405	#4	STR.	-	-	5'-0"
405-7	#4	STR.	-	-	5'-7"
406-1	#4	STR.	-	-	6'-1"
406-10	#4	STR.	-	-	6'-10"
407-3	#4	STR.	-	-	7'-3"
408-2	#4	STR.	-	-	8'-2"

1. SEE PLAN NO. 0000-1910-07 FOR BENDING DIAGRAM.

BILL OF MATERIAL

W30-S	W30-T	W30-V	UNIT	DESCRIPTION
1	1	1	EA.	8 TON SWIFT LIFT ANCHOR

80% SUBMITTAL
NOT FOR CONSTRUCTION

GS	MC, CA, MB	MB
DRAWN	DESIGNED	CHECKED
MC	02/2024	190220
APPROVED	DATE	PROJECT

**COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**



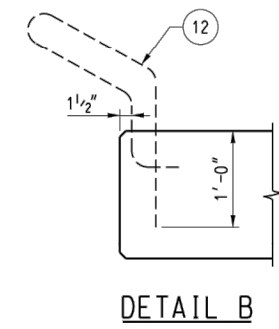
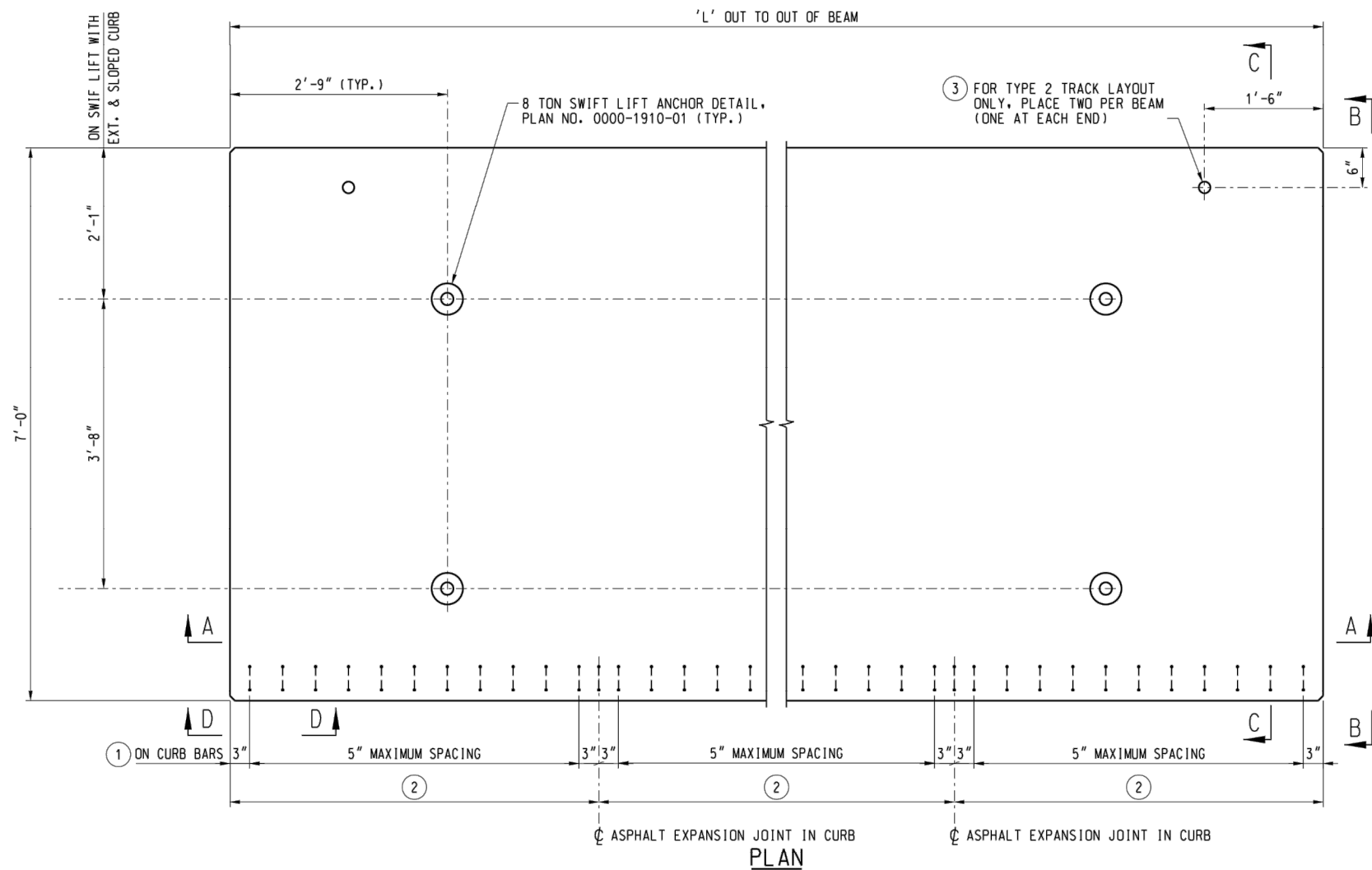
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**BRIDGE STANDARD -
WINGWALL**

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24 OF 35

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AVAILABLE SPAN LENGTHS

20" BEAM: 16'-0" TO 22'-0"

DESIGN LOADS

DEAD:

TRACK, FASTENERS, ETC.	200
BALLAST	4,065
CURB, WALK & HANDRAIL	560
BEAMS	3,500
TOTAL (LBS./FT. OF TRACK)	8,325

LIVE: SEE GENERAL NOTES, PLAN NO. 0000-1000-02.

IMPACT: SEE GENERAL NOTES, PLAN NO. 0000-1000-02.

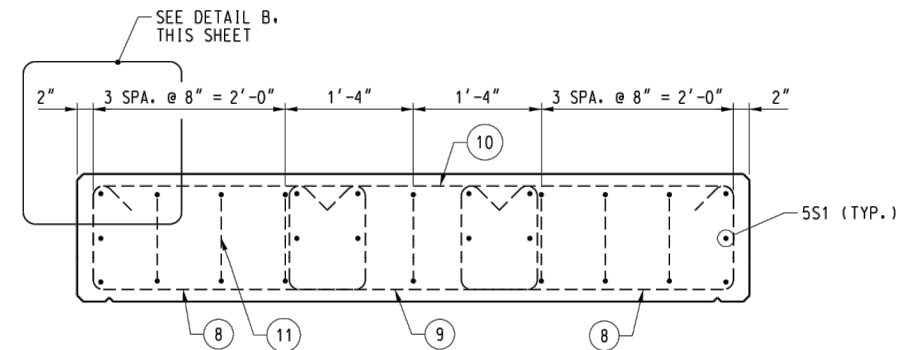
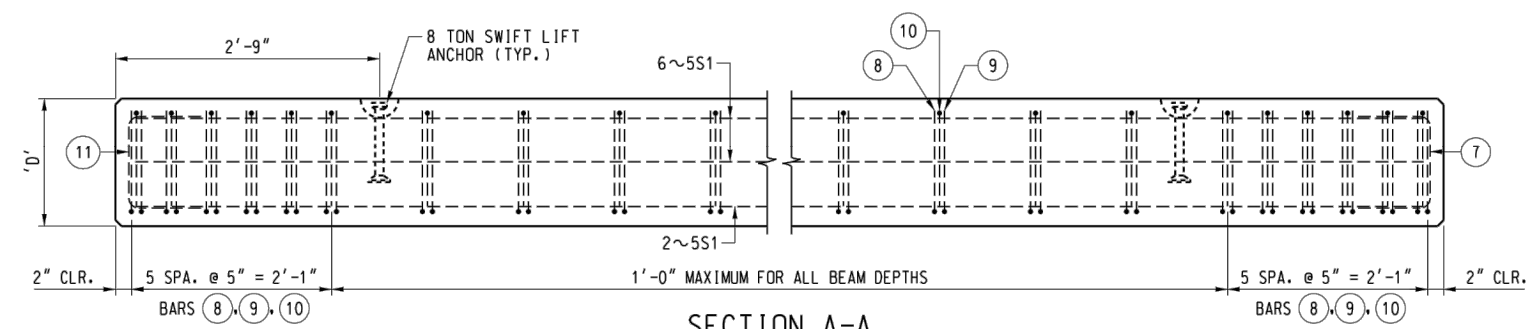
EST. LIFTING WEIGHT

20" BEAM DEPTH: 1,820 PLF (NO CURB)

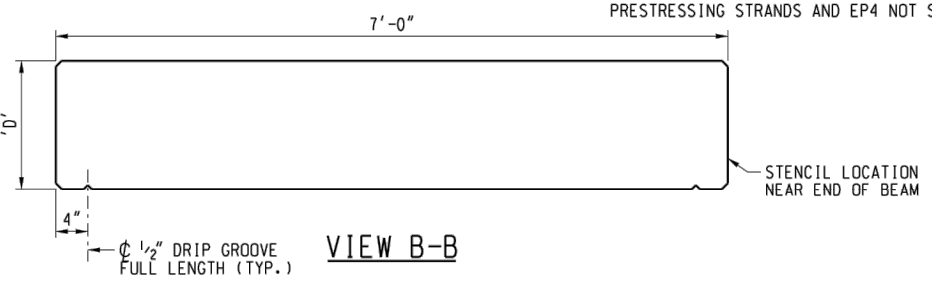
MINIMUM CONCRETE BEAM COMPRESSIVE STRENGTHS

SPAN LENGTH (ft)	BEAM DEPTH (in)	AT TRANSFER (psi)	AT 28 DAYS (psi)
16 - 22	20	4,500	7,000

- ① ADJUST AS REQUIRED TO MISS OTHER REINFORCEMENT AND FERRULE INSERTS.
- ② SPACING OF ASPHALT EXPANSION JOINT IN CURB. DIMENSION TO EQUAL 'L' DIVIDED BY NUMBER OF CURB SEGMENTS EXCEPT WHERE ADJUSTMENT IS REQUIRED TO MISS REINFORCEMENT AND FERRULE INSERTS. SEE PLAN NO. 0000-1000-05 FOR NUMBER OF CURB SEGMENTS.
- ⑧ BAR SA2 FOR 20" BEAM DEPTH
- ⑨ BAR SA4 FOR 20" BEAM DEPTH
- ⑩ BAR 5E4 FOR 20" BEAM DEPTH
- ⑪ BAR 5E2 FOR 20" BEAM DEPTH
- ⑫ SEE CURB & WALK STANDARD FOR CURB DETAIL. BAR 4L1 FOR SLOPED CURB.



SECTION C-C
ALL STEEL IS TO HAVE AT LEAST 1 1/2" COVER UNLESS OTHERWISE NOTED. SEE PLAN NO. 0000-1210-02 FOR LOCATION OF PRESTRESSING STRANDS.



80% SUBMITTAL
NOT FOR CONSTRUCTION

GS	MC, CA, MB	MB
DRAWN	DESIGNED	CHECKED
MC	02/2024	190220
APPROVED	DATE	PROJECT

**COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN**

**BRIDGE STANDARD - 20 IN
SLAB BEAM**

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LIST OF REINFORCING BARS

MARK	SIZE	TYPE	A	B	LENGTH
4C26	#4	C	4"	2'-5 1/2"	5'-1"
4C27	#4	C	4"	3'-0 1/2"	6'-3"
4L1	#4	L	-	-	5'-10"
5A1	#5	A	2'-10"	1'-1"	5'-9"
5A2	#5	A	2'-10"	1'-4"	6'-5"
5A3	#5	A	2'-7"	1'-1"	5'-7"
5A4	#5	A	2'-7"	1'-5"	6'-3"
5E1	#5	E	11 1/2"	9"	2'-6"
5E2	#5	E	1'-3 1/2"	9"	2'-10"
5E3	#5	E	6'-8"	1'-0"	8'-8"
5E4	#5	E	6'-8"	1'-4"	9'-4"
5S1	#5	STR.	-	-	(L-5")

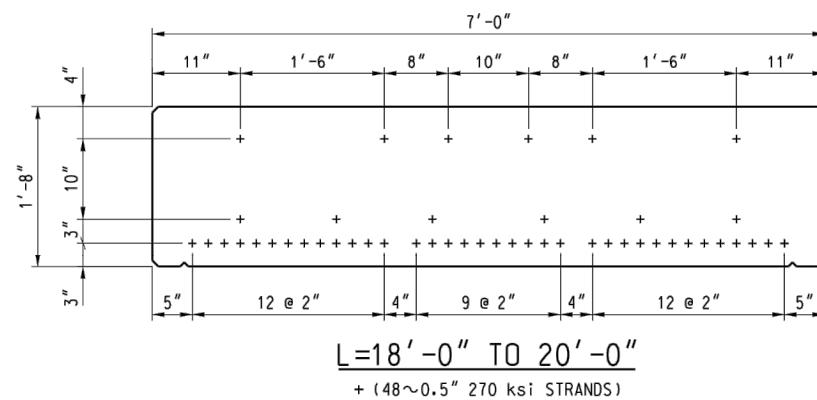
- 'L' IS THE LENGTH OF THE PRESTRESSED CONCRETE BEAM. LENGTH OF BENT BARS ARE NORMAL.
- SEE PLAN NO. 0000-1910-07 FOR BENDING DIAGRAM.

PRESTRESSING STRANDS

SPAN LENGTH (ft.)	BEAM DEPTH (in.)	NO. STRANDS	INITIAL PULL (k)	PS CENTROID FROM BOT. (in.)
14 - 16	16	42	1,302	4,380
16 - 18	20	38	1,178	4,840
18 - 20	20	48	1,488	5,000
20 - 22	20	58	1,798	5,070

NOTES:

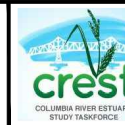
- PRESTRESSING STRANDS SHALL BE 0.5 INCH DIAMETER, SEVEN WIRE, UNCOATED, LOW RELAXATION STRAND WHICH IS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN ASTM A416. THE STRAND SHALL HAVE AN ULTIMATE TENSILE STRENGTH OF 270 ksi. THE INITIAL PRESTRESS SHALL BE 31,000 LBS. PER STRAND UNLESS NOTED OTHERWISE.



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GS	MC, CA, MB	MB
DRAWN	DESIGNED	CHECKED
MC	02/2024	190220
APPROVED	DATE	PROJECT

COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN



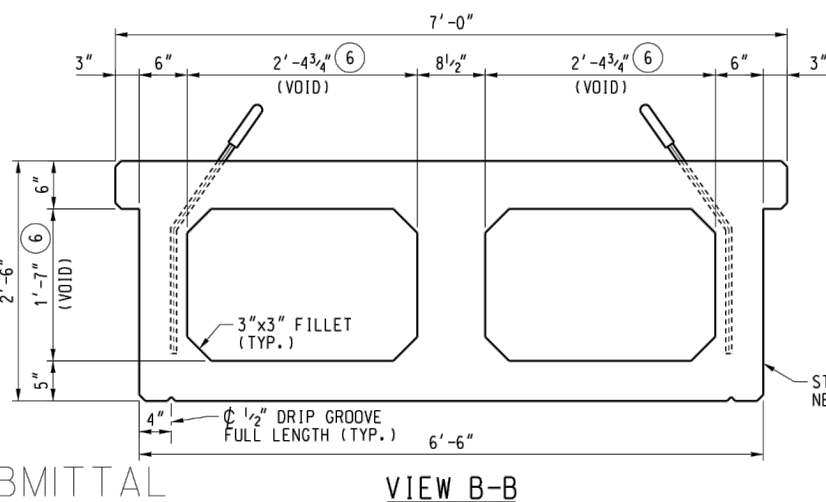
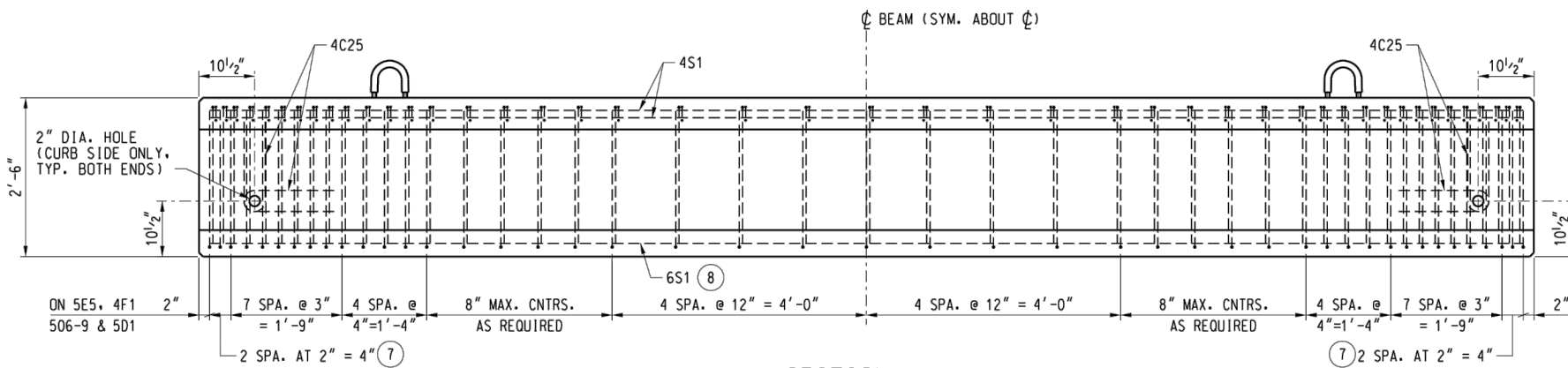
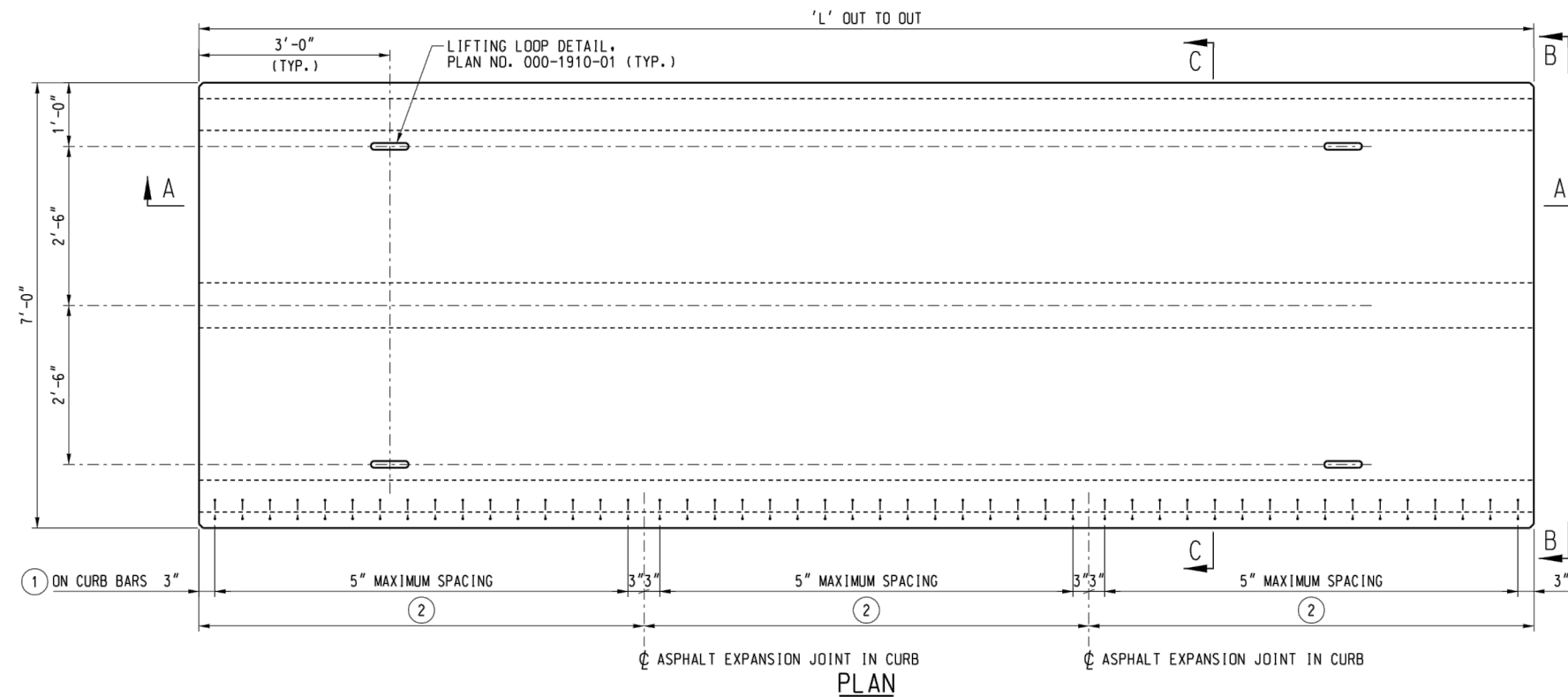
BRIDGE STANDARD - 20 INCH
SLAB BEAM

SHEET

26 OF 35

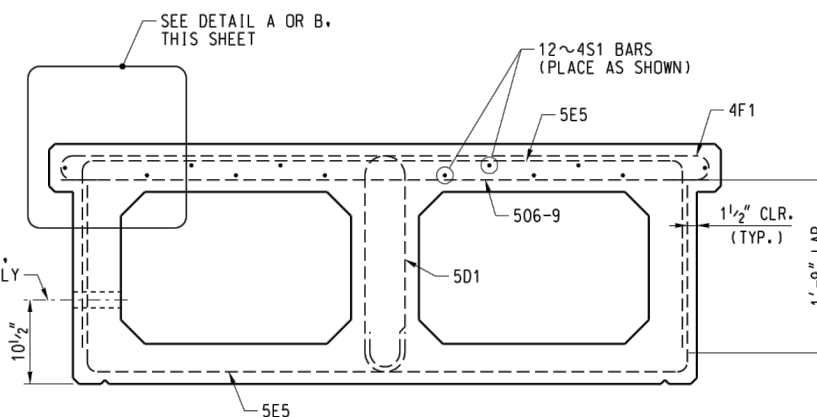
NO.	BY	DATE	REVISION DESCRIPTION

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SECTION A-A

PRESTRESSING STRANDS AND EP4 NOT SHOWN



AVAILABLE SPAN LENGTHS

20'-0" TO 36'-0"

DESIGN LOADS

DEAD:	TRACK, FASTENERS, ETC.	200
	BALLAST	4,065
	CURB, WALK & HANDRAIL	560
	BEAMS	2,825
	TOTAL (LBS./FT. OF TRACK)	7,650

LIVE: SEE GENERAL NOTES, PLAN NO. 0000-1000-02.

IMPACT: SEE GENERAL NOTES, PLAN NO. 0000-1000-02.

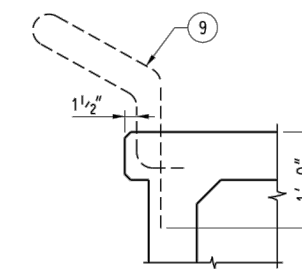
EST. LIFTING WEIGHT

30" BEAM DEPTH: 1,430 PLF (NO CURB)

MINIMUM CONCRETE BEAM COMPRESSIVE STRENGTHS

SPAN LENGTH (ft)	BEAM DEPTH (in)	BEAM TYPE	AT TRANSFER (psi)	AT 28 DAYS (psi)
20 - 30	30	I	4,500	6,000
34 - 36	30	I	5,500	7,000

- ADJUST AS REQUIRED TO MISS OTHER REINFORCEMENT AND FERRULE INSERTS.
- SPACING OF ASPHALT EXPANSION JOINT IN CURB. DIMENSION TO EQUAL 'L' DIVIDED BY NUMBER OF CURB SEGMENTS EXCEPT WHERE ADJUSTMENT IS REQUIRED TO MISS REINFORCEMENT AND FERRULE INSERTS. SEE PLAN NO. 0000-1000-02 FOR NUMBER OF CURB SEGMENTS.
- CAST-IN-PLACE FERRULE INSERTS. FOR 7/8" DIA. BOLT MINIMUM SHEAR = 3,000 LBS. FACTOR OF SAFETY 3 TO 1 AND A MINIMUM TENSION = 3,660 LBS. 4 INSERTS PER WALK BRACKET LOCATION. FURNISH WITH 7/8" DIA. BOLTS AND WASHERS. ALL ITEMS SHALL BE GALVANIZED.
- FERRULE INSERTS. LOCATION AND SPACING PER CURB AND WALK STANDARD.
- VOID DIMENSIONS SHOWN ARE MAXIMUM AND MUST NOT BE EXCEEDED AT ANY POINT INCLUDING SPLICES OF VOID FORM.
- INCREASE END STIRRUP GROUP TO 6 SPACES AT 2" = 1'-0" FOR L > 34'-0". ALL OTHER SPACINGS REMAIN THE SAME.
- SEE PRESTRESSING STRAND PATTERN SHEETS FOR LOCATION OF 6S1 BARS.
- SEE CURB & WALK STANDARD FOR CURB DETAIL. BAR 4L1 FOR SLOPED CURB.



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GS	MC, CA, MB	MB
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RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN



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BRIDGE STANDARD - 30 INCH
DOUBLE CELL BOX BEAMS

SHEET

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LIST OF REINFORCING BARS

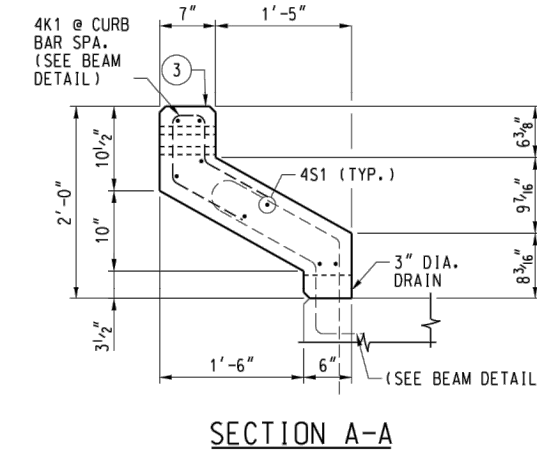
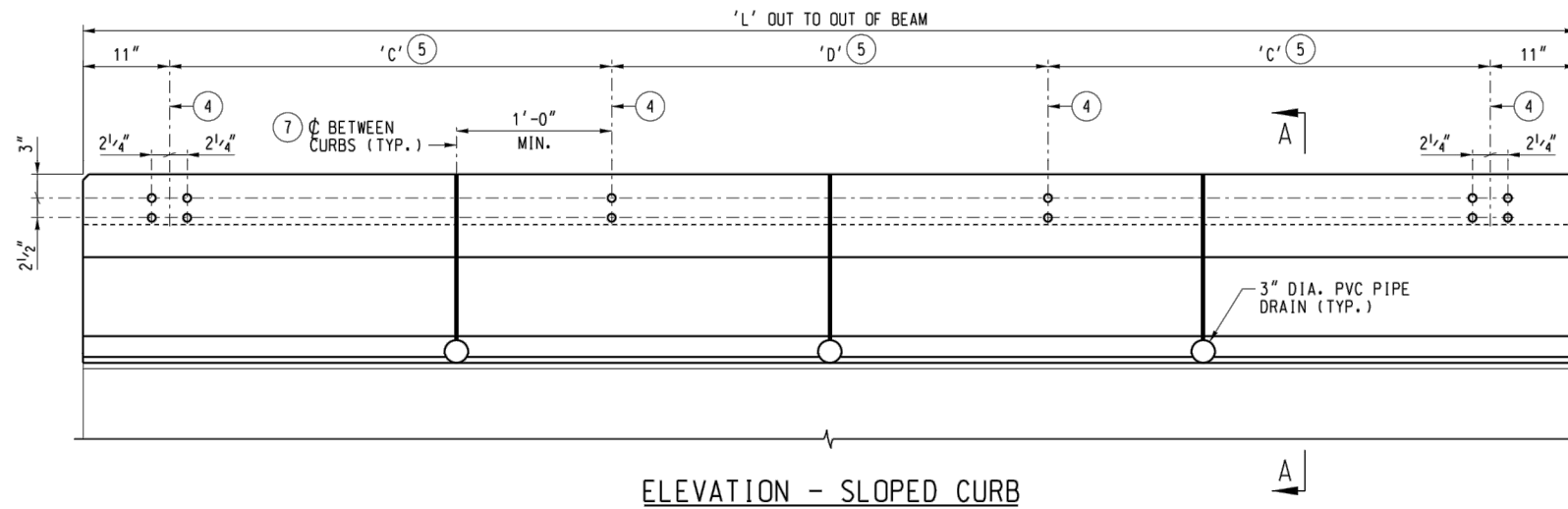
MARK	SIZE	TYPE	A	B	LENGTH
4K1	#4	K	-	-	4'-7"
4S1	#4	STR.	-	-	(6)
5J1	#5	J	2'-9"	1'-3"	4'-0"

- 'L' IS THE LENGTH OF THE PRESTRESSED CONCRETE BEAM.
- SEE PLAN NO. XXXX-1910-07 FOR BENDING DIAGRAM.

EST. WEIGHT (PLF)

CURB TYPE	WEIGHT PER LINEAR FOOT OF ONE CURB
24" SLOPED	250

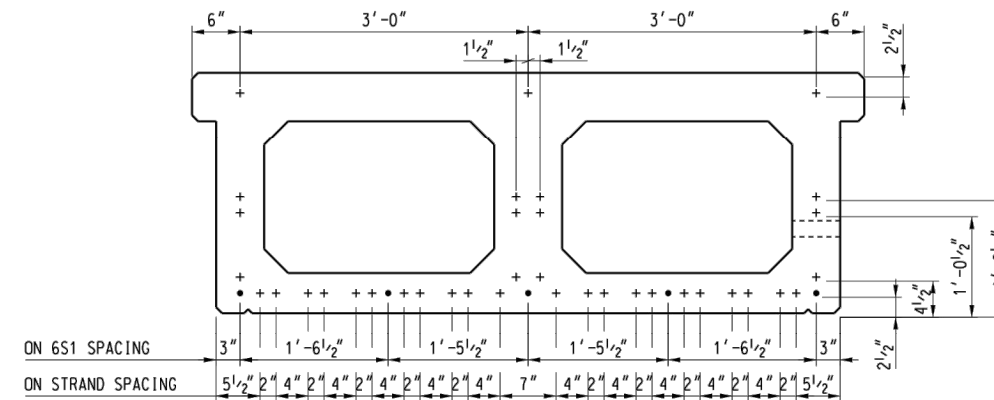
- CAST-IN-PLACE FERRULE INSERTS, FOR 7/8" DIA. BOLT MINIMUM SHEAR = 3,000 LBS. FACTOR OF SAFETY 3 TO 1 AND A MINIMUM TENSION = 3,660 LBS. 4 INSERTS PER WALK BRACKET LOCATION, FURNISH WITH 7/8" DIA. BOLTS AND WASHERS. ALL ITEMS SHALL BE GALVANIZED.
- COIL LOOP INSERTS ARE TO BE SINGLE FLARED TYPE B-18, 1" DIA. x 12" AND HAVE A SAFE WORKING LOAD 4,750 LBS. WITH A FACTOR OF SAFETY OF 4 TO 1. THE INSERTS ARE TO BE COMPLETELY RECESSED WITH SPIRAL BOLTS FURNISHED IN THE INSERT.
- 3"x6" I.D. PLATE IS TO BE EMBEDDED FLUSH IN TOP OF CURB AND CENTERED 6" FROM END OF CURB. PLATE SHALL CONTAIN THE FOLLOWING INFORMATION IN 1/2" LETTERING: ITEM NAME, LENGTH, WEIGHT, DATE MANUFACTURED AND NAME OF MANUFACTURER.
- 1" DIAMETER HOLES FOR HANDRAIL POST.
- SEE TABLE ON PLAN NO. 0000-1000-02 FOR SPACING.
- LENGTH OF BAR EQUAL TO LENGTH OF CURB SEGMENT MINUS 4".
- SEE NOTES AND TABLE ON PLAN NO. 0000-1000-02 FOR NUMBER OF EQUAL LENGTH CURBS PER BEAM LENGTH.



ELEVATION - SLOPED CURB

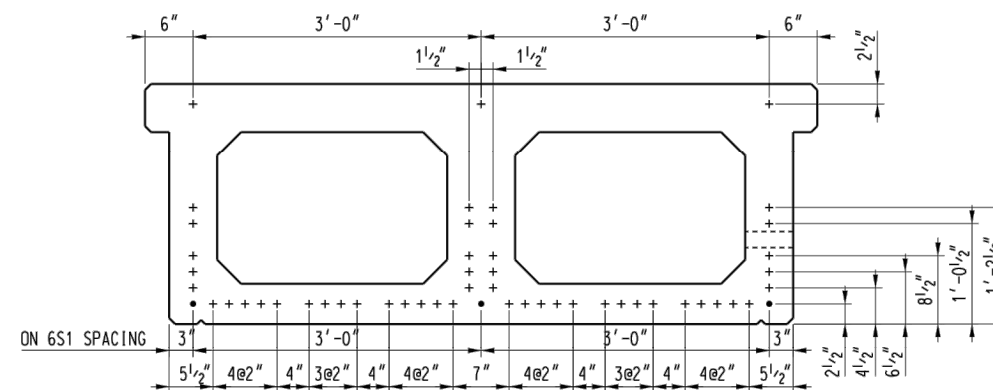
SECTION A-A

24" CURB



30" DOUBLE CELL BOX BEAM 30' PRESTRESSING STRAND PATTERN - TYPE I

+ (37~0.6" 270 KSI STRANDS)
• (5~#6 REINFORCING BARS)



30" DOUBLE CELL BOX BEAM 36' PRESTRESSING STRAND PATTERN - TYPE I

+ (51~0.6" 270 KSI STRANDS)
• (3~#6 REINFORCING BARS)

PRESTRESSING STRANDS					LIST OF REINFORCING BARS					
SPAN LENGTH (ft.)	BEAM DEPTH (in.)	NO. STRANDS	INITIAL PULL (k)	PS CENTROID FROM BOT. (in.)	MARK	SIZE	TYPE	A	B	LENGTH
28 - 30	30	37	1,605.8	7.120	4C25	#4	C	4"	1'-5"	3'-2"
34 - 36	30	51	2,213.4	6.640	4F1*	#4	F	6'-9"	3"	7'-7"
					4H1	#4	H	4"	2'-5 1/2"	5'-1"
					4H2	#4	H	4"	3'-0 1/2"	6'-3"
					4L1	#4	L	-	-	5'-10"
					4S1	#4	STR.	-	-	L-4"
					5D1	#5	D	5"	2'-3"	6'-1"
					5E5	#5	E	6'-3"	2'-0"	10'-3"
					5O6-9	#5	STR.	-	-	6'-9"
					6S1	#6	STR.	-	-	L-4"

1. 'L' IS THE LENGTH OF THE PRESTRESSED CONCRETE BEAM. LENGTH OF BENT BARS ARE NORMAL.

2. SEE PLAN NO. 0000-1910-07 FOR BENDING DIAGRAM.

* NON-STANDARD HOOK.

NOTES:

- PRESTRESSING STRANDS SHALL BE 0.6 INCH DIAMETER, SEVEN WIRE, UNCOATED, LOW RELAXATION STRAND WHICH IS IN ACCORDANCE WITH THE REQUIREMENTS SPECIFIED IN ASTM A416. THE STRAND SHALL HAVE AN ULTIMATE TENSILE STRENGTH OF 270 ksi. THE INITIAL PRESTRESS SHALL BE 43,400 LBS. PER STRAND UNLESS NOTED OTHERWISE.
- TYPE I BEAMS HAVE BEEN DESIGNED TO ACCOMMODATE A MAXIMUM OFFSET BETWEEN THE CENTERLINE OF TRACK AND THE CENTER OF THE LONGITUDINAL JOINT BETWEEN BEAMS OF 6 INCHES. TYPE I BEAMS SHALL BE SUPPLIED WITH CURB.

80% SUBMITTAL
NOT FOR CONSTRUCTION

GS	MC, CA, MB	MB
DRAWN	DESIGNED	CHECKED
MC	02/2024	190220
APPROVED	DATE	PROJECT

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WARREN SLOUGH - FINAL DESIGN



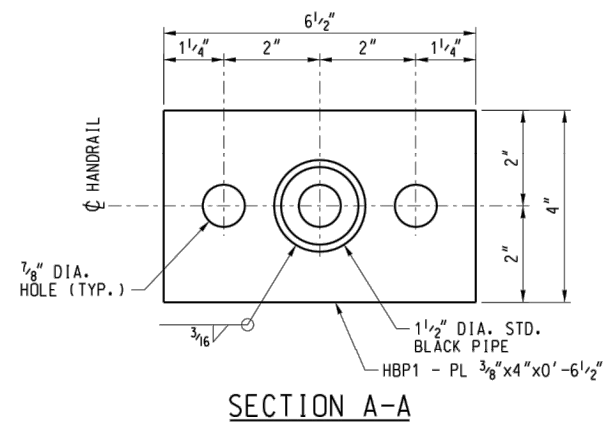
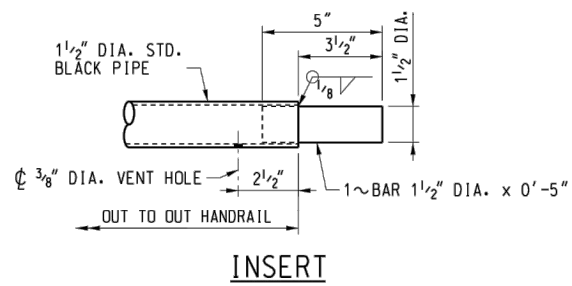
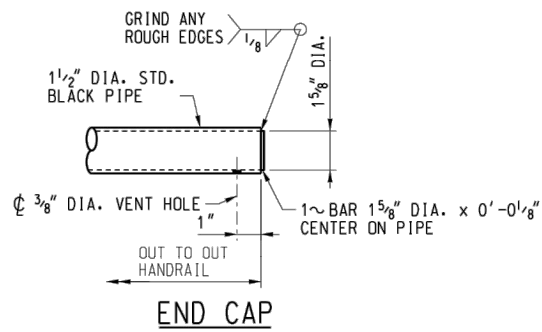
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BRIDGE STANDARD - SLOPED
CURB AND STAND PATTERN

SHEET

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NOTES:

1. V = $\frac{3}{8}$ " DIA. DRILLED VENT HOLE 1" FROM JOINT.

80% SUBMITTAL
NOT FOR CONSTRUCTION

NO.	BY	DATE	REVISION DESCRIPTION

GS	MC, CA, MB	MB
DRAWN	DESIGNED	CHECKED
MC	02/2024	190220
APPROVED	DATE	PROJECT

COLUMBIA RIVER ESTUARY STUDY TASKFORCE
RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN



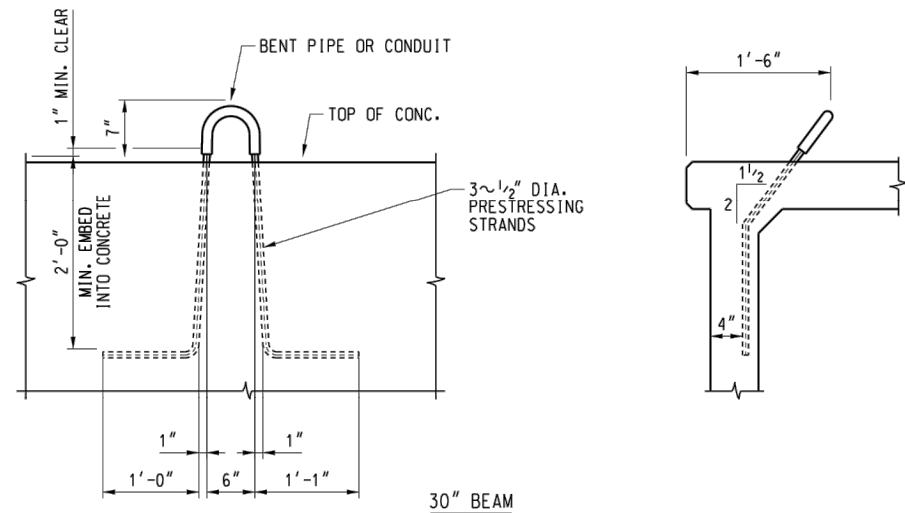
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BRIDGE STANDARD -
HANDRAIL DETAILS

SHEET

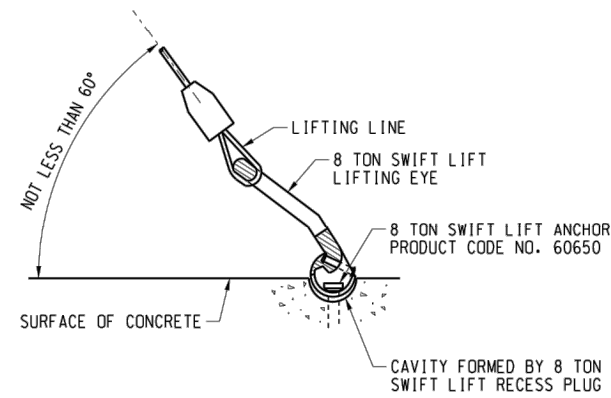
29 OF 35

Z:\ClientFiles\0-T\Railroad-Agency\WarrenSlough_CREST_190220\Drawings\1 WARREN_SLOUGH_D\1 RAILROAD_Warren_D.dwg -- 2/5/24



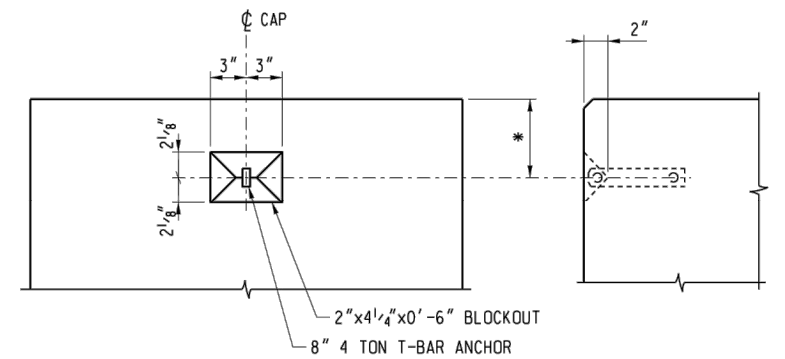
LIFTING LOOP DETAIL

FABRICATOR IS RESPONSIBLE FOR DEVELOPING LIFTING LOOP ANCHORAGE DETAIL TO PROVIDE SAFETY FACTOR OF 4 ON WORKING LOAD. DETAIL SHALL BE PROOF TESTED WITH TEST RESULTS KEPT ON FILE BY FABRICATOR AND AVAILABLE FOR INSPECTION BY THE RAILROAD.



SWIFT LIFT DETAIL

8 TON SWIFT LIFT RECESS PLUGS, ANCHORS AND LIFT. EYES ARE AVAILABLE FROM DAYTON SUPERIOR. THE MATERIAL FOR THIS LIFTING SYSTEM ARE NOT INCLUDED IN THE BILL OF MATERIAL BUT ARE TO BE ORDERED AS REQUIRED.



GUIDE LINE DETAIL

TYPICAL AT EACH END OF CAP
* SEE PRECAST CONCRETE CAP PLANS FOR LOCATION

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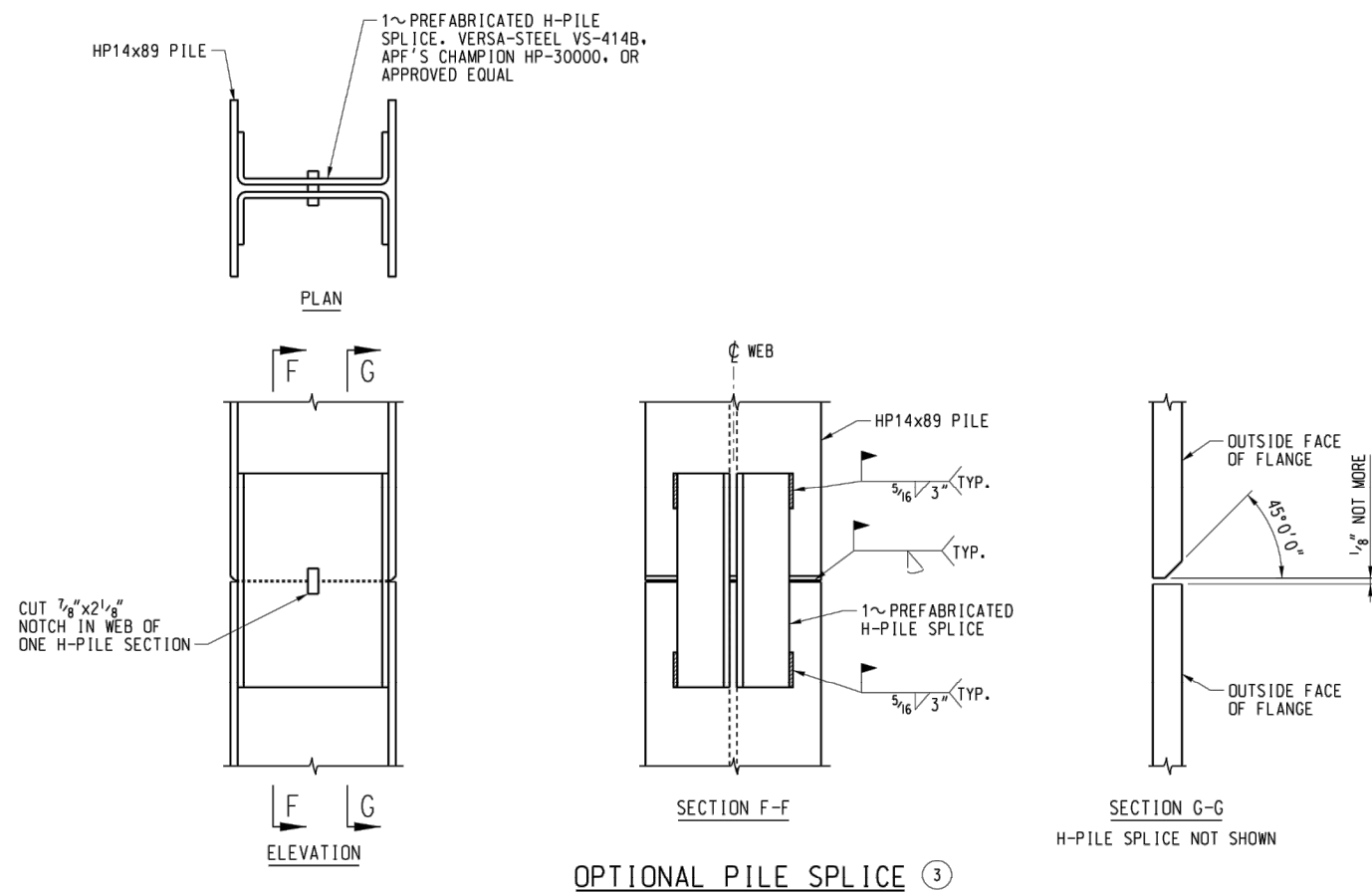
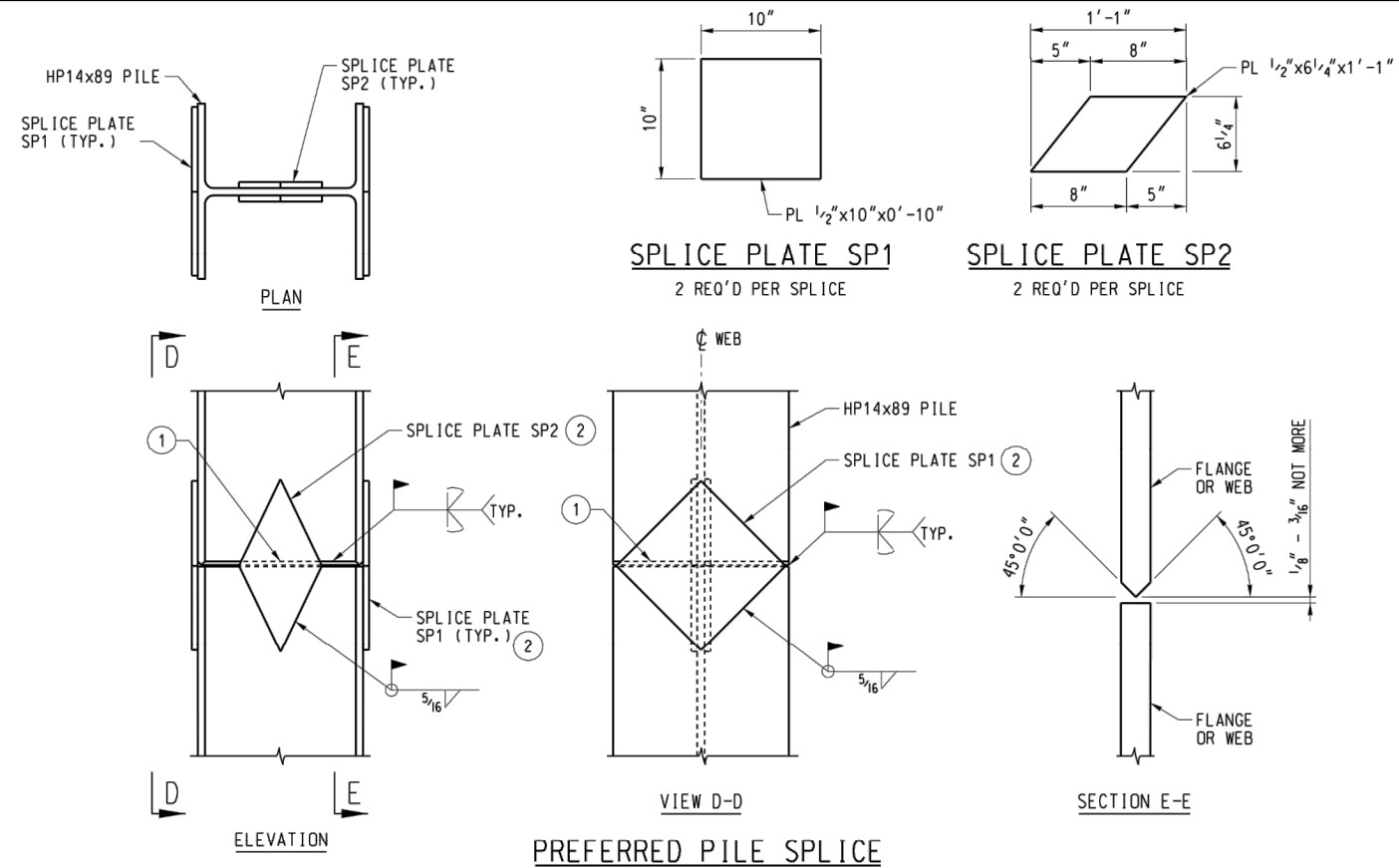
GS	MC, CA, MB	MB
DRAWN	DESIGNED	CHECKED
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APPROVED	DATE	PROJECT

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RAILROAD RESTORATION
WARREN SLOUGH - FINAL DESIGN



BRIDGE STANDARD - LIFTING
DETAILS

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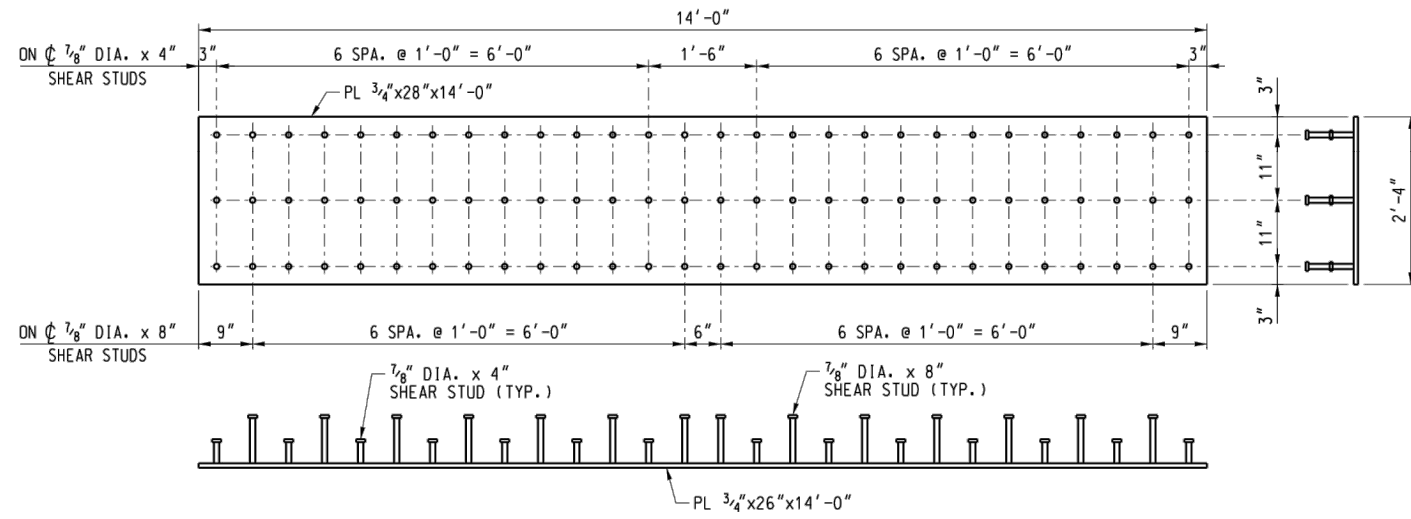
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BRIDGE STANDARD - PILE
SPLICE

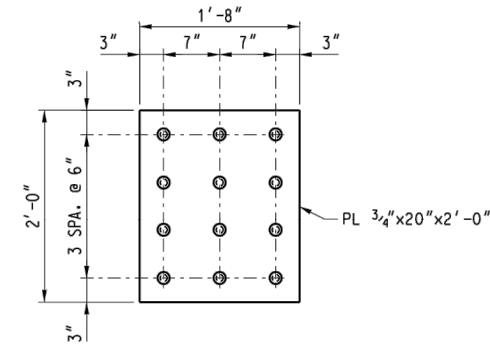
SHEET

31 OF 35

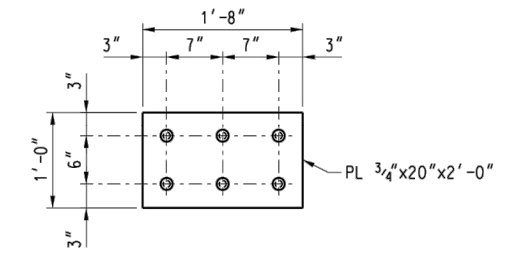
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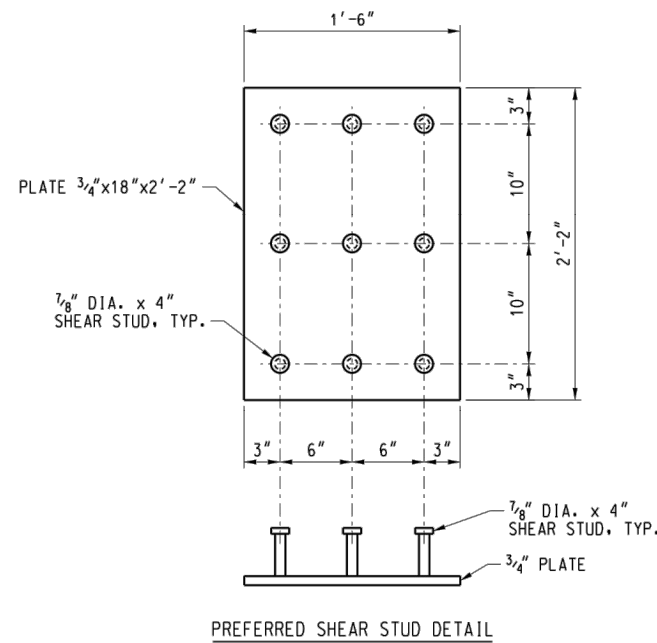
EMBED PLATE EP1
WEIGHT - 1097 LBS.



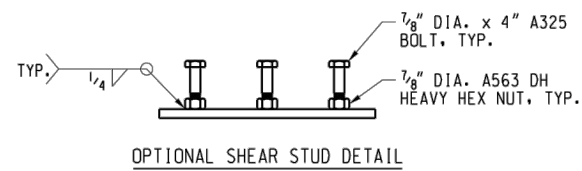
EMBED PLATE EP2
WEIGHT - 120 LBS.



EMBED PLATE EP3
WEIGHT - 60 LBS.

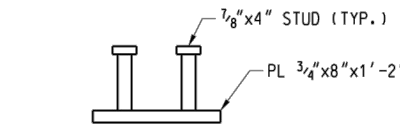
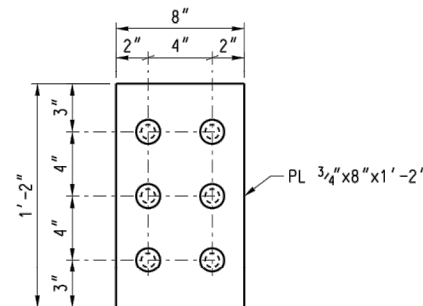


PREFERRED SHEAR STUD DETAIL



OPTIONAL SHEAR STUD DETAIL

EMBED PLATE EP4
WEIGHT - 107 LBS.



EMBED PLATE EP5
WEIGHT - 33 LBS.

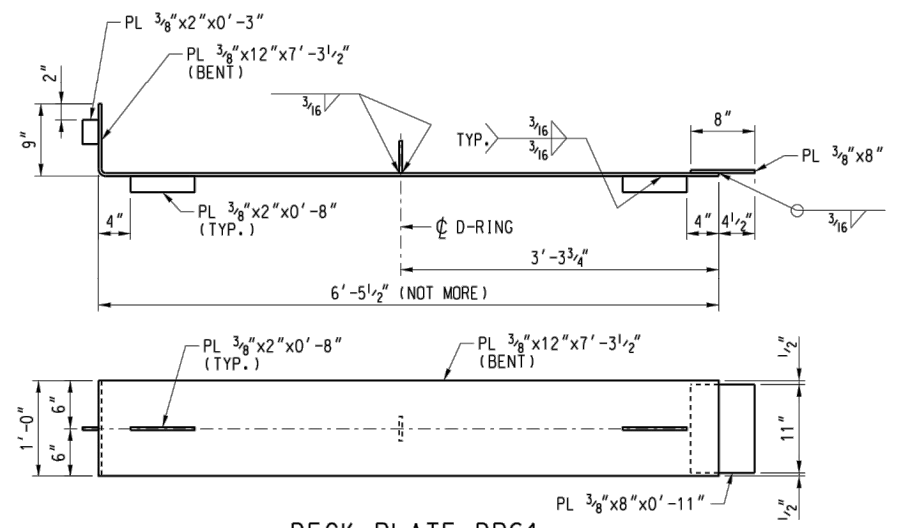
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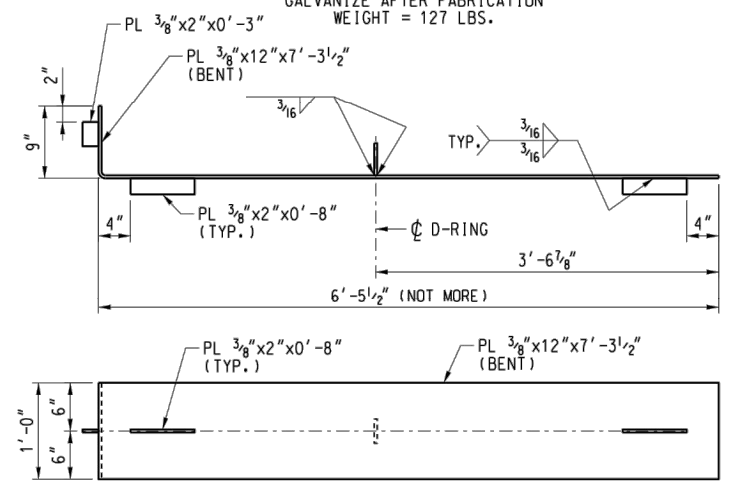
BRIDGE STANDARD - EMBED
PLATES

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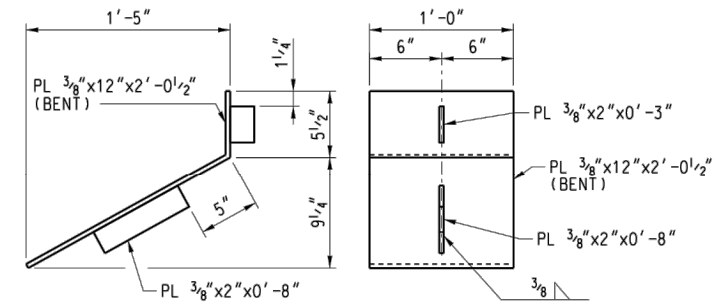
DECK PLATE DPS1

GALVANIZE AFTER FABRICATION
WEIGHT = 127 LBS.



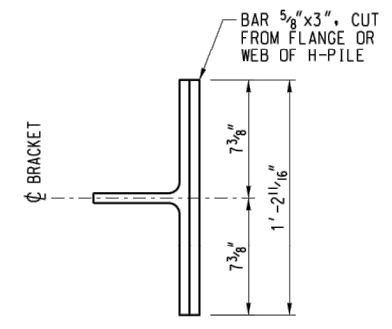
DECK PLATE DPS2

GALVANIZE AFTER FABRICATION
WEIGHT = 117 LBS.



DECK PLATE DPS3

GALVANIZE AFTER FABRICATION
WEIGHT = 35 LBS.



RETAINER BRACKET B100

WEIGHT = 30 LBS.

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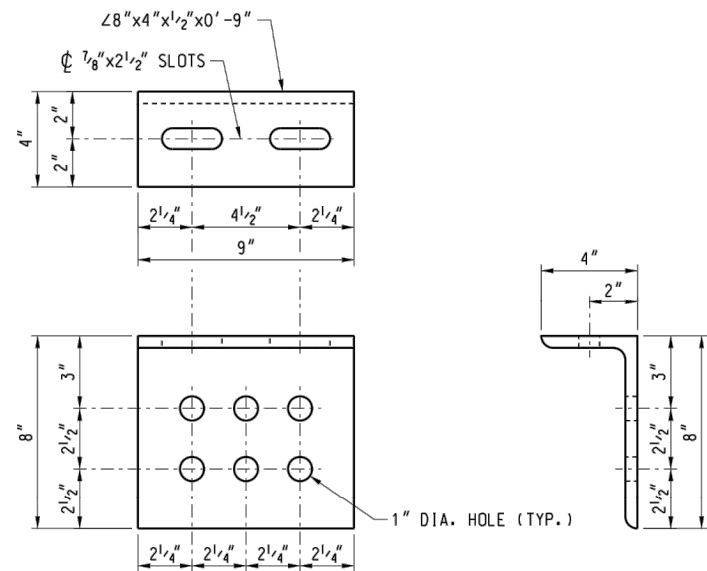
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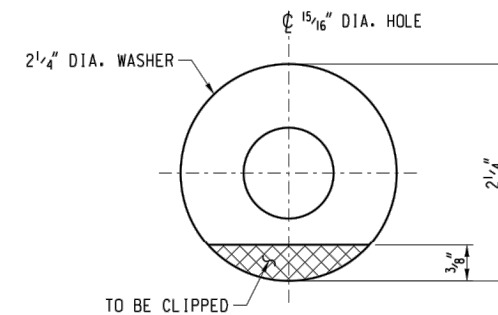
BRIDGE STANDARD - DECK
AND CURB PLATES

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HANDRAIL BASE PLATE HBP2

GALVANIZE AFTER FABRICATION
WEIGHT = 15 LBS.



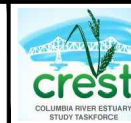
CLIPPED WASHER

1 5/16" I.D. x 2 1/4" O.D. WASHER

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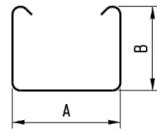
BRIDGE STANDARD - CURB
AND WALK MISC

SHEET

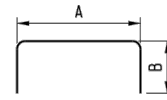
34 OF 35

NO.	BY	DATE	REVISION DESCRIPTION

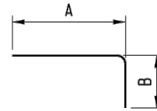
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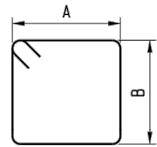
BAR A



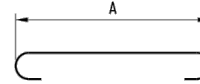
BAR E



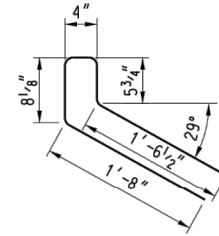
BAR J



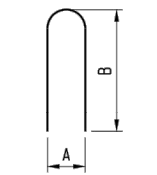
BAR B



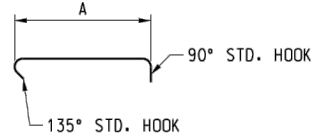
BAR F



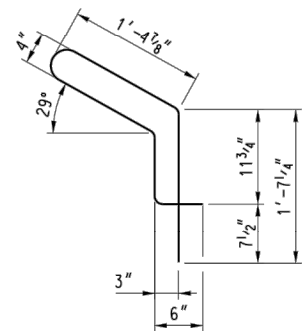
BAR K



BAR C

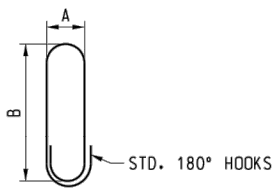


BAR G

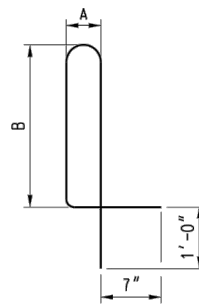


BAR L

A1035 BARS

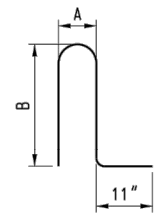


BAR D



BAR H

A1035 BARS



BAR M

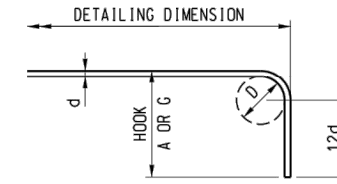
NOTES:

- REINFORCING STEEL IS TO BE IDENTIFIED PER THE FOLLOWING EXAMPLE:

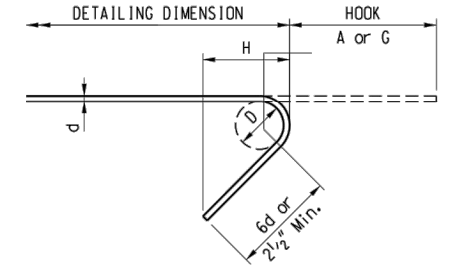
BAR NAME	BAR SIZE	DETAIL
424-4	#4	24'-4"
520	#5	20'-0"
409-11	#4	9'-11"
4C1	#4	G IS SHAPE OF BAR. 1 IS THE FIRST BENT BAR OF THIS TYPE.
- DIMENSIONS OF BENDING DETAILS ARE OUT TO OUT OF BAR.

STIRRUP & TIE HOOK DIMENSIONS

BAR SIZE	d (IN.)	D (IN.)	90° HOOK		135° HOOK	
			HOOK A OR G	HOOK A OR G	H	H
#3	3/8"	1 1/2"	4"	4"	2 1/2"	2 1/2"
#4	1/2"	2"	4 1/2"	4 1/2"	3"	3"
#5	5/8"	2 1/2"	6"	5 1/2"	3 3/4"	3 3/4"
#6	3/4"	4 1/2"	1'-0"	8"	4 1/2"	4 1/2"
#7	7/8"	5 1/4"	1'-2"	9"	5 1/4"	5 1/4"
#8	1"	6"	1'-4"	10 1/2"	6"	6"



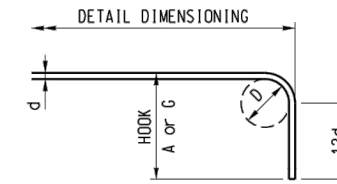
90° STIRRUP HOOK
(TIES SIMILAR)



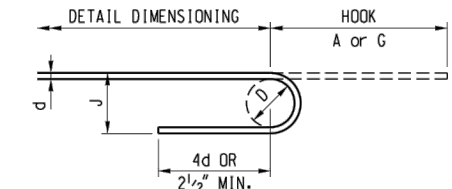
135° STIRRUP HOOK
(TIES SIMILAR)

STANDARD HOOK DIMENSIONS

BAR SIZE	d (IN.)	D (IN.)	90° HOOK		180° HOOK	
			HOOK A OR G	HOOK A OR G	J	J
#3	3/8"	2 1/4"	6"	5"	3"	3"
#4	1/2"	3"	8"	6"	4"	4"
#5	5/8"	3 3/4"	10"	7"	5"	5"
#6	3/4"	4 1/2"	1'-0"	8"	6"	6"
#7	7/8"	5 1/4"	1'-2"	10"	7"	7"
#8	1"	6"	1'-4"	11"	8"	8"
#9	1 1/8"	9 1/2"	1'-7"	1'-3"	11 3/4"	11 3/4"
#10	1 1/4"	10 3/4"	1'-10"	1'-5"	1'-1 1/4"	1'-1 1/4"
#11	1 3/8"	12"	2'-0"	1'-7"	1'-2 3/4"	1'-2 3/4"
#14	1 3/4"	18 1/4"	2'-7"	2'-2"	1'-9 3/4"	1'-9 3/4"
#18	2 1/4"	24"	3'-5"	2'-11"	2'-4 1/2"	2'-4 1/2"



90° HOOK



180° HOOK

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