

Construction Package No: 706207
IJO No: DEU00069-7J

DACA67-03-R-0208 Seed Project:

Closure of Municipal Solid Waste Landfill Cell 6 Fort Lewis, Washington

Attention: All Special Clauses and Technical
Specifications in this Package are Applicable to
This Seed Project ONLY

Department of the Army
Headquarters, I Corps and Fort Lewis
Fort Lewis, Washington 98433-9500

May 1998
Revised March 2001

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SECTION 00010
SUPPLIES OR SERVICE AND PRICES/COSTS

Item Number	Description	Quantity	Unit	Unit Price	Amount
	(See Section: PAYMENT for summary of work) Provide all plant, labor, tools, equipment and materials to Close Municipal Solid Waste Landfill Cell #6 in strict accordance with specifications and drawings.				
0001	Base Item: (IJO No. DEU00069-7J)	1	JOB	Lump Sum	\$_____

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SPECIAL CLAUSES

SC-1. COMMENCEMENT, PROSECUTION, AND COMPLETION OF WORK (APR 1984) (FAR 52.212-3).

The Contractor shall be required to (a) commence work under this Contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work ready for use not later than 180 calendar days after date of receipt by Contractor of notice to proceed. The time stated for completion shall include final cleanup of the premises.

SC-1.1 DELETED - OPTION FOR INCREASED QUANTITY

SC-2. LIQUIDATED DAMAGES - CONSTRUCTION (APR 1984) (FAR 52.212-5)

(a) If the Contractor fails to complete the work within the time specified in the Contract, or any extension, the Contractor shall pay to the Government as liquidated damages, the sum of \$765.00 for each day of delay.

(b) If the Government terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final completion of the work together with any increased costs occasioned the Government in completing the work.

(c) If the Government does not terminate the Contractor's right to proceed, the resulting damage will consist of liquidated damages until the work is completed or accepted.

SC-3. DELETED - TIME EXTENSIONS (APR 1984) (FAR 52.212-6)

Notwithstanding any other provisions of this Contract, it is mutually understood that the time extensions for changes in the work will depend upon the extent, if any, by which the changes cause delay in the completion of the various elements of construction. The change order granting the time extension may provide that the Contract completion date will be extended only for those specific elements so delayed and that the remaining Contract completion dates for all other portions of the work will not be altered and may further provide for an equitable readjustment of liquidated damages under the new completion schedule.

SC-4. DELETED - VARIATIONS IN ESTIMATED QUANTITIES - SUBDIVIDED ITEMS (1983 MAY OCE)

SC-5. INSURANCE - WORK ON A GOVERNMENT INSTALLATION (SEP 1989) (FAR 52.228-5)

(a) The Contractor shall, at its own expense, provide and maintain during the entire performance period of this Contract at least the kinds

and minimum amounts of insurance required in the Insurance Liability Schedule or elsewhere in the Contract.

(b) Before commencing work under this Contract, the Contractor shall certify to the Contracting Officer in writing that the required insurance has been obtained. The policies evidencing required insurance shall contain an endorsement to the effect that any cancellation or any material change adversely affecting the Government's interest shall not be effective:

(1) for such period as the laws of the State in which this Contract is to be performed prescribe;

or

(2) until 30 days after the insurer or the Contractor gives written notice to the Contracting Officer, whichever period is longer.

(c) The Contractor shall insert the substance of this clause, including this paragraph (c), in subcontracts under this Contract that require work on a Government installation and shall require subcontractors to provide and maintain the insurance required in the Schedule or elsewhere in the Contract. The Contractor shall maintain a copy of all subcontractors' proofs of required insurance, and shall make copies available to the Contracting Officer upon request.

(d) Insurance Liability Schedule (FAR 28.307-2)

(1) Workers' compensation and employer's liability. Contractors are required to comply with applicable Federal and State workers' compensation and occupational disease statutes. If occupational diseases are not compensable under those statutes, they shall be covered under the employer's liability section of the insurance policy, except when Contract operations are so commingled with a Contractor's commercial operation that it would not be practical to require this coverage. Employer's liability coverage of at least \$100,000 shall be required, except in states with exclusive or monopolistic funds that do not permit workers' compensation to be written by private carriers.

(2) General Liability.

(A) The Contracting Officer shall require bodily injury liability insurance coverage written on the comprehensive form of policy of at least \$500,000 per occurrence.

(B) Property damage liability insurance shall be required only in special circumstances as determined by the agency.

(3) Automobile liability. The Contracting Officer shall require automobile liability insurance written on the comprehensive form of policy. The policy shall provide for bodily injury and property damage liability covering the operation of all automobiles used in connection with performing the Contract. Policies covering automobiles operated in the United States shall provide coverage of at least \$200,000 per person and \$500,000 per occurrence for bodily injury and \$20,000 per occurrence for property damage. The amount of liability coverage on other policies shall be commensurate with any legal requirements of the locality and sufficient to meet normal and customary claims.

(4) Aircraft public and passenger liability. When aircraft are used in connection with performing the Contract, the Contracting Officer shall require aircraft public and passenger liability insurance. Coverage shall be at least \$200,000 per person and \$500,000 per occurrence for bodily injury, other than passenger liability, and \$200,000 per occurrence for property damage. Coverage for passenger liability bodily injury shall be at least \$200,000 multiplied by the number of seats or passengers, whichever is greater.

SC-6. DELETED - CONTINUING CONTRACTS (EFARS 52.232-50001):

SC-7. PERFORMANCE OF WORK BY THE CONTRACTOR (APR 1984) (FAR 52.236-1)

The Contractor shall perform on the site, and with its own organization, work equivalent to at least 20 percent of the total amount of work to be performed under the Contract. The percentage may be reduced by a supplemental agreement to this Contract if, during performing the work, the Contractor requests a reduction and the Contracting Officer determines that the reduction would be to the advantage of the Government.

SC-8. PHYSICAL DATA (APR 1984) (FAR 52.236-4)

Data and information furnished or referred to below is for the Contractor's information. The Government will not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

(a) Physical Conditions: The indications of physical conditions on the drawings and in the specifications are the result of site investigations by test holes shown on the drawings.

(b) Weather Conditions: Each bidder shall be satisfied before submitting his bid as to the hazards likely to arise from weather conditions. Complete weather records and reports may be obtained from any National Weather Service Office.

(c) Transportation Facilities: Each bidder, before submitting his bid, shall make an investigation of the conditions of existing public and private roads and of clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress at the jobsite. The unavailability of transportation facilities or limitations thereon shall not become a basis for claims for damages or extension of time for completion of the work.

(d) Right-of-Way: Not Used.

(e) Condition of Area: The condition of the area when last surveyed is shown on the drawings.

(f) Obstruction of Channel: Not Used.

(g) Datum and Bench Marks: The plane of reference is shown on the drawings.

SC-9. DELETED - QUANTITY SURVEYS (APR 1984) (FAR 52.236-16)

SC-10. LAYOUT OF WORK (APR 1984) (FAR 52.236-17)

The Contractor shall lay out its work from Government-established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, materials, and labor required to lay out any part of the work. The Contractor shall be responsible for executing the work to the lines and grades that may be established or indicated by the Contracting Officer. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the Contracting Officer until authorized to remove them. If such marks are destroyed by the Contractor or through its negligence before their removal is authorized, the Contracting Officer may replace them and deduct the expense of the replacement from any amounts due, or to become due, to the Contractor.

SC-11 CONTRACT DRAWINGS, MAPS, AND SPECIFICATIONS (DEC 91)(DOD FAR SUPP 252.236-7001)

(a) The Government--

(1) Will provide the Contractor, without charge, five sets of large-scale contract drawings and specifications except publications incorporated into the technical provisions by reference;

(2) Will furnish additional sets on request, for the cost of reproduction; and

(3) May, at its option, furnish the Contractor one set of reproducible, or 5 sets of half-size drawings, in lieu of the drawings in paragraphs (a)(1) and (a)(2) of this clause.

(b) The Contractor shall--

- (1) check all drawings furnished immediately upon receipt;
- (2) Compare all drawings and verify the figures before laying out the work;
- (3) Promptly notify the Contracting Officer of any discrepancies; and
- (4) Be responsible for any errors which might have been avoided by complying with this paragraph (b).

(c) Large scale drawings shall, in general, govern small scale drawings. Figures marked on drawings shall, in general, be followed in preference to scale measurements.

(d) Omissions from the drawings or specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of the work, but shall be performed as if fully and correctly set forth and described in the drawings and specifications.

(e) The work shall conform to the specifications and the contract drawings identified on the index of drawings at the end of this section.

SC-12. DELETED - PAYMENT FOR MOBILIZATION AND PREPARATORY WORK, PAYMENT ITEM NO. (MAR 1979) (DOD FAR SUPP 52.236-7009(A)):

SC-13. DELETED - AIRFIELD SAFETY PRECAUTIONS (DEC 1991) (DOD FAR SUPP 252.236-7005)

SC-14. IDENTIFICATION OF GOVERNMENT-FURNISHED PROPERTY (APR 1984) (FAR 52.245-3):

INDEX OF DRAWINGS

Drawing Number	Sheet Number	Plate Number	Title	Revision Number	Date
			Closure of Municipal Solid Waste Landfill Cell No. 6 Fort Lewis, Washington IJO: DEU00069-7J		
5304	1	G-1	Washington and Vicinity Maps, Legend, and Index		March 7, 2001
5304	2	C-1	Site Plan, Ground Water and Gas Monitoring Plan		March 7, 2001
5304	3	C-2	Grading and Cover Plan		March 7, 2001
5304	4	C-3	Cover Section and Details		March 7, 2001
5304	5	C-4	Geomembrane Section and Boot Detail		March 7, 2001
5304	6	C-5	Storm Drainage Sections and Road Section, and Road Profile		March 7, 2001
5304	7	C-6	Gas Collection and Flare Plan		March 7, 2001
5304	8	C-7	Gas Details		March 7, 2001
5304	9	C-8	Flare Facility Plan, Section and Details		March 7, 2001
5304	10	C-9	Flare Fabrication Details		March 7, 2001

STANDARD DETAILS BOUND IN THE SPECIFICATIONS

SECTION 01501—CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1 & 2	U.S. Army Project Construction Sign	84Jun20
1	Hard Hat Sign	10Sep90

SECTION 02685—GAS DISTRIBUTION SYSTEM AND

SECTION 02710—UNDERDRAIN SYSTEM

1	Washington State Department of Transportation, Standard Plans for Road, Bridge, and Municipal Construction, Standard Plan J-11a Junction Box Details
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* * END OF SECTION * *

GENERAL DECISION **WA020001** 03/07/2003 WA1

Date: March 7, 2003

General Decision Number **WA020001**

Superseded General Decision No. WA010001

State: Washington

Construction Type:

DREDGING

HEAVY

HIGHWAY

County(ies):

STATEWIDE

HEAVY AND HIGHWAY AND DREDGING CONSTRUCTION PROJECTS
(Excludes D.O.E. Hanford Site in Benton and Franklin Counties)

Modification Number	Publication Date
0	03/01/2002
1	03/08/2002
2	03/15/2002
3	03/29/2002
4	04/19/2002
5	05/03/2002
6	05/10/2002
7	06/07/2002
8	06/21/2002
9	07/05/2002
10	07/19/2002
11	07/26/2002
12	08/09/2002
13	09/06/2002
14	09/27/2002
15	01/03/2003
16	01/17/2003
17	01/24/2003
18	01/31/2003
19	02/07/2003
20	03/07/2003

COUNTY(ies):

STATEWIDE

CARP0001W 06/01/2002

COLUMBIA RIVER AREA - ADAMS, BENTON, COLUMBIA, DOUGLAS (EAST OF THE 120TH MERIDIAN), FERRY, FRANKLIN, GRANT, OKANOGAN (EAST OF THE 120TH MERIDIAN) AND WALLA WALLA COUNTIES

CARPENTERS:

GROUP 1:	23.58	6.25
GROUP 2:	24.69	6.25
GROUP 3:	23.85	6.25
GROUP 4:	23.58	6.25
GROUP 5:	58.43	6.25
GROUP 6:	27.72	6.25

SPOKANE AREA: ASOTIN, GARFIELD, LINCOLN, PEND OREILLE, SPOKANE, STEVENS AND WHITMAN COUNTIES

CARPENTERS:

GROUP 1:	22.91	6.25
GROUP 2:	24.01	6.25
GROUP 3:	23.17	6.25
GROUP 4:	22.91	6.25
GROUP 5:	56.77	6.25
GROUP 6:	27.00	6.25

CARPENTERS CLASSIFICATIONS

GROUP 1: Carpenter; Burner-Welder; Rigger and Signaler; Insulators (all types), Acoustical, Drywall and Metal Studs, Metal Panels and Partitions; Floor Layer, Sander, Finisher and Astro Turf; Layout Carpenters; Form Builder; Rough Framers; Outside or Inside Finisher, including doors, windows, and jams; Sawfiler; Shingler (wood, composition) Solar, Fiberglass, Aluminum or Metal; Scaffold Erecting and Dismantling; Stationary Saw-Off Bearer; Wire, Wood and Metal Lather Applicator

GROUP 2: Millwright, machine erector

GROUP 3: Piledriver - includes driving, pulling, cutting, placing collars, setting, welding, or creosote treated material, on all piling

GROUP 4: Bridge, dock and wharf carpenters

GROUP 5: Divers

GROUP 6: Divers Tender

DEPTH PAYS FOR DIVERS:

Each foot over 50-100 feet	\$1.00
Each foot over 100-175 feet	2.25
Each foot over 175-250 feet	5.50

HAZMAT PROJECTS

Anyone working on a HAZMAT job (task), where HAZMAT certification is required, shall be compensated at a premium, in addition to the classification working in as follows:

LEVEL D + \$.25 per hour - This is the lowest level of protection. No respirator is used and skin protection is minimal.

LEVEL C + \$.50 per hour - This level uses an air purifying respirator or additional protective clothing.

LEVEL B + \$.75 per hour - Uses same respirator protection as Level A. Supplied air line is provided in conjunction with a chemical "splash suit".

LEVEL A +\$1.00 per hour - This level utilizes a fully

encapsulated suit with a self-contained breathing apparatus or a supplied air line.

CARP00030 06/01/2002

Rates Fringes
SOUTHWEST WASHINGTON: CLARK, COWLITZ, KLICKITAT,
LEWIS(Piledriver only), PACIFIC (South of a straight line made by
extending the north boundary line of Wahkiakum County west to
Willapa Bay to the Pacific Ocean), SKAMANIA AND WAHAKIYAKUM
COUNTIES and INCLUDES THE ENTIRE PENINSULA WEST OF WILLAPA BAY

SEE ZONE DESCRIPTION FOR CITIES BASE POINTS

ZONE 1:

CARPENTERS; ACOUSTICAL	27.37	8.80
DRYWALL	27.37	8.80
FLOOR LAYERS & FLOOR FINISHERS (the laying of all hardwood floors nailed and mastic set, parquet and wood-type tiles, and block floors, the sanding and finishing of floors, the preparation of old and new floors when the materials mentioned above are to be installed); INSULATORS (fiberglass and similar irritating materils	27.52	8.80
MILLWRIGHTS	27.87	8.80
PILEDRIVERS	27.87	8.80
DIVERS	65.05	8.80
DIVERS TENDERS	29.91	8.80

DEPTH PAY

50 TO 100 FEET	\$1.00 PER FOOT OVER 50 FEET
100 TO 150 FEET	1.50 PER FOOT OVER 100 FEET
150 TO 200 FEET	2.00 PER FOOT OVER 150 FEET

Zone Differential (Add up Zone 1 rates):

Zone 2 - \$0.85

Zone 3 - 1.25

Zone 4 - 1.70

Zone 5 - 2.00

Zone 6 - 3.00

BASEPOINTS: ASTORIA, LONGVIEW, PORTLAND, THE DALLES,
AND VANCOUVER, (NOTE: All dispatches for Washington State
Counties: Cowlitz, Wahkiakum and Pacific shall be from Longview
Local #1707 and mileage shall be computed from that point.)

ZONE 1: Projects located within 30 miles of the respective
city hall of the above mentioned cities

ZONE 2: Projects located more than 30 miles and less than 40
miles of the respective city of the above mentioned
cities

ZONE 3: Projects located more than 40 miles and less than 50
miles of the respective city of the above mentioned

- cities
- ZONE 4: Projects located more than 50 miles and less than 60 miles of the respective city of the above mentioned cities.
- ZONE 5: Projects located more than 60 miles and less than 70 miles of the respective city of the above mentioned cities
- ZONE 6: Projects located more than 70 miles of the respected city of the above mentioned cities
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CARP0770D 06/01/2002

Rates Fringes

WESTERN WASHINGTON: CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS (excludes piledrivers only), MASON, PACIFIC (North of a straight line made by extending the north boundary line of Wahkiakum County west to the Pacific Ocean), PIERCE, SAN JUAN, SKAGIT, SNOHOMISH, THURSTON AND WHATCOM COUNTIES

CARPENTERS AND DRYWALL APPLICATORS	27.95	8.05
CARPENTERS ON CREOSOTE MATERIAL	28.05	8.05
INSULATION APPLICATORS	25.50	8.05
SAWFILERS, STATIONARY POWER SAW OPERATORS, FLOOR FINISHER, FLOOR LAYER, SHINGLER, FLOOR SANDER OPERATOR AND OPERATORS OF OTHER STATIONARY WOOD WORKING TOOLS	28.08	8.05
MILLWRIGHT AND MACHINE ERECTORS	28.95	8.05
ACOUSTICAL WOKRERS	28.11	8.05
PILEDRIVER, DRIVING, PULLING, CUTTING, PLACING COLLARS, SETTING, WELDING OR CRESOTE TREATED MATERIAL, ALL PILING	28.15	8.05
PILEDRIVER, BRIDGE, DOCK & WHARF CARPENTERS	27.95	8.05
DIVERS	68.97	8.05
DIVERS TENDER	30.68	8.05

(HOURLY ZONE PAY: WESTERN AND CENTRAL WASHINGTON - ALL

CLASSIFICATIONS EXCEPT MILLWRIGHTS AND PILEDRIVERS

Hourly Zone Pay shall be paid on jobs located outside of the free zone computed from the city center of the following listed cities:

Seattle	Olympia	Bellingham
Auburn	Bremerton	Anacortes
Renton	Shelton	Yakima
Aberdeen-Hoquiam	Tacoma	Wenatchee
Ellensburg	Everett	Port Angeles
Centralia	Mount Vernon	Sunnyside
Chelan	Pt. Townsend	

Zone Pay	
0 -25 radius miles	Free

25-35 radius miles \$1.00/hour
 35-45 radius miles \$1.15/hour
 45-55 radius miles \$1.35/hour
 Over 55 radius miles \$1.55/hour

(HOURLY ZONE PAY: WESTERN AND CENTRAL WASHINGTON - MILLWRIGHT AND PILEDRIIVER ONLY)

Hourly Zone Pay shall be computed from Seattle Union Hall, Tacoma City center, and Everett City center

Zone Pay
 0 -25 radius miles Free
 25-45 radius miles \$.70/hour
 Over 45 radius miles \$1.50/hour
 CENTRAL WASHINGTON: CHELAN, DOUGLAS (WEST OF THE 120TH MERIDIAN), KITTITAS, OKANOGAN (WEST OF THE 120TH MERIDIAN) AND YAKIMA COUNTIES

CARPENTERS AND DRYWALL APPLICATORS	20.72	7.82
CARPENTERS ON CREOSOTED MATERIAL	20.82	7.82
INSULATION APPLICATORS	20.72	7.82
SAWFILERS, STATIONARY POWER S37 OPERATORS, FLOOR FINISHER, FLOOR LAYER, SHINGLERS, FLOOR SANDER OPERATORS	20.85	7.82
MILLWRIGHT AND MACHINE ERECTORS	28.95	7.82
PILEDRIIVER, DRIVING, PULLING, CUTTING, PLACING COLLARS, SETTING, WELDING OR CRESOTE TREATED MATERIAL, ALL PILING	28.15	7.82
PILEDRIIVER, BRIDGE DOCK AND WHARF CARPENTERS	27.95	7.82
DIVERS	68.97	8.05
DIVERS TENDER	30.68	8.05

 * ELEC0046A 12/30/2002

	Rates	Fringes
CALLAM, JEFFERSON, KING AND KITSAP COUNTIES		
ELECTRICIANS	34.25	3%+9.55
CABLE SPLICERS	37.68	3%+9.55

 ELEC0048C 01/01/2003

	Rates	Fringes
CLARK, KLICKITAT AND SKAMANIA COUNTIES		
ELECTRICIANS	31.00	3%+11.83
CABLE SPLICERS	31.25	3%+11.83

 ELEC0073A 07/01/2002

	Rates	Fringes
ADAMS, FERRY, LINCOLN, PEND OREILLE, SPOKANE, STEVENS, WHITMAN COUNTIES		

ELECTRICIANS	23.82	3%+ 9.58
CABLE SPLICERS	24.22	3%+ 9.58

ELEC0076B 07/01/2002

	Rates	Fringes
GRAYS HARBOR, LEWIS, MASON, PACIFIC, PIERCE, AND THURSTON COUNTIES		

ELECTRICIANS	29.78	3%+11.01
CABLE SPLICERS	32.76	3%+11.01

ELEC0077C 02/01/2003

	Rates	Fringes
LINE CONSTRUCTION:		
CABLE SPLICERS	37.95	3.875%+7.45
LINEMEN, POLE SPRAYERS, HEAVY LINE EQUIPMENT MAN	33.88	3.875%+7.45
LINE EQUIPMENT MEN	29.14	3.875%+5.70
POWDERMEN, JACKHAMMERMEN	25.41	3.875%+5.70
GROUNDMEN	23.72	3.875%+5.70
TREE TRIMMER	23.81	3.875%+5.70

ELEC0112E 06/01/2002

	Rates	Fringes
ASOTIN, BENTON, COLUMBIA, FRANKLIN, GARFIELD, KITTITAS, WALLA WALLA, YAKIMA COUNTIES		

ELECTRICIANS	28.75	3%+9.63
CABLE SPLICERS	30.19	3%+9.63

ELEC0191C 08/31/2002

	Rates	Fringes
ISLAND, SAN JUAN, SNOHOMISH, SKAGIT AND WHATCOM COUNTIES		

ELECTRICIANS	30.66	3%+9.33
CABLE SPLICERS	33.72	3%+9.33

ELEC0191D 12/01/2002

	Rates	Fringes
CHELAN, DOUGLAS, GRANT AND OKANOGAN COUNTIES		

ELECTRICIANS	26.66	3%+9.28
CABLE SPLICERS	29.33	3%+9.28

ELEC0970A 01/01/2003

	Rates	Fringes
COWLITZ AND WAHAKIAKUM COUNTIES		

ELECTRICIANS	28.55	3%+9.25
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CABLE SPLICERS 31.41 3%+9.25

ENGI0302E 06/01/2002

Rates Fringes
CHELAN (WEST OF THE 120TH MERIDIAN), CLALLAM, DOUGLAS (WEST OF THE 120TH MERIDIAN), GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, KITTITAS, MASON, OKANOGAN (WEST OF THE 120TH MERIDIAN), SAN JUAN, SKAGIT, SNOHOMISH, WHATCOM AND YAKIMA (WEST OF THE 120TH MERIDIAN) COUNTIES

PROJECTS

CATEGORY A PROJECTS (excludes Category B projects, as show below)

POWER EQUIPMENT OPERATORS:

Zone 1 (0-25 radius miles):

GROUP 1AAA	31.14	8.40
GROUP 1AA	30.64	8.40
GROUP 1A	30.14	8.40
GROUP 1	29.64	8.40
GROUP 2	29.20	8.40
GROUP 3	28.84	8.40
GROUP 4	26.74	8.40

Zone 2 (26-45 radius miles) - Add \$.70 to Zone 1 rates

Zone 3 (Over 45 radius miles) - Add \$1.00 to Zone 1 rates

BASEPOINTS: Bellingham, Mount Vernon, Kent, Port Angeles, Port Townsend, Aberdeen, Shelton, Bremerton, Wenatchee, Yakima, Seattle, Everett

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1AAA - Cranes-over 300 tons or 300 ft. of boom (including job with attachments)

GROUP 1AA - Cranes - 200 tons to 300 tons or 250 ft. of boom (including jib and attachments); Tower crane over 175 ft. in height, base to boom

GROUP 1A - Cranes - 100 tons thru 199 tons or 150' of boom (including jib with attachments); Crane-overhead, bridge type, 100 tons and over; Tower crane up to 175 ft. in height base to boom; Loader-overhead, 8 yards and over; Shovel, excavator, backhoes-6 yards and over with attachments

GROUP 1 - Cableway; Cranes-45 tons thru 99 tons, under 150 ft. of boom (including jib with attachments); Crane-overhead, bridge type, 45 tons thru 99 tons; Shovel, excavator, backhoes over 3 yards and under 6 yards; Hard tail end dump articulating off-road equipment 45 yards and over; Loader-overhead, 6 yards to, but not including 8 yards; Mucking machine, mole, tunnel, drill and/or shield; Quad 9, HD 41, d-10; Remote control operator on rubber tired earth moving equipment; Rollagon; Scrapers-self-propelled-45 yards and over; Slipform pavers; Transporters, all track or truck type

GROUP 2 - Barrier machine (zipper); Barch Plant operator- concrete; Bump cutter; Cranes-20 tons thru 44 tons with attachments; Cranes-overheads, bridge type-20 tons through 44 tons; Chipper; Concrete pump-truck mount with boom attachment; Crusher; Deck Engineer/Deck Winches (power); Drilling machine; Excavator, shovel backhoe-3 yards and under; Finishing machine Bidwell, Gamaco and similar equipment; Guardrail punch; Horizontal/directional drill operator; Loaders, overhead under 6 yds.; Loaders-plant feed; Locomotives-all; Mechanics-all; Mixers-asphalt plant; Motor patrol graders-finishing; Pildriver (other than crane mount); Roto-mill, roto-grinder; Screedman, Spreader, Topside Operator-Blaw Knox, Cedar Rapids, Jaeger, Caterpillar, Barbar Green; Scraper-self-propelled, hard tail end dump, articulating off-road equipment-under 45 yards; Subgrader trimmer; Tractors, backhoes-over 75 hp; Transfer material service machine-shuttle buggy, blow knox, roadtec; Truck crane oiler/driver-100 tons and over; Truck mount portable conveyor; Yo Yo Pay Dozer

GROUP 3 - Conveyors; Cranes-thru 19 tons with attachments; Cranes-A-frame over 10 tons; Drill oilers-auger type, truck or crane mount; Dozers D9 and under; Forklifts-3000 lbs and over with attachments; horizontal/directional drill locator; Outside hoists-(elevators and manlifts), air tuggers, strao tower bucket elevators; Hydralifts/boom truck-over 10 tons; Loader-elevating type belt; Motor Patrol Grader-non-finishing; Plant Oiler-asphalt, crusher; Pumps-concrete; Roller, plant mix or multi-lift materials; Saws-concrete; Scrapers-concrete and carryall; Service engineers-equipment; Trenching machines; Truck crane oiler/driver-under 100 tons Tractors, backhoes-under 75 hp

GROUP 4 - Assistant Engineer; Bobcat; Brooms; Compressor; Concrete Finish Machine-laser screed; Cranes-A-frame-10 tons and under; Elevator and manlift-permanent and shaft type; Forklifts-under 3000 lbs. with attachments; Gradechecker, stakehop; Hydralifts, boom trucks-10 tons and under; Oil distributors, blower distribution and mulch seeding operator; Pavement breaker; Post Hole Digger-mechanical; Power

Plant; Pumps-water; Rigger and Bellman; Roller-other than plant mix; Wheel Tractors, farmall type; Shot crete/gunite equipment operator

CATEGORY B PROJECTS - 95% of the basic hourly rate for each group plus full fringe benefits applicable to Category A projects shall apply to the following projects. Reduced rates may be paid on the following:

1. Projects involving work on structures such as buildings and structures whose total value is less than \$1.5 million excluding mechanical, electrical, and utility portions of the contract.
2. Projects of less than \$1 million where no building is involved. Surfacing and paving included, but utilities excluded.
3. Marine projects (docks, wharfs, etc.) less than \$150,000.

WORK PERFORMED ON HYDRAULIC DREDGES:

Total Project Cost \$300,000 and over

GROUP 1	28.38	8.40
GROUP 2	28.48	8.40
GROUP 3	28.82	8.40
GROUP 4	28.87	8.40
GROUP 5	30.26	8.40
GROUP 6	28.38	8.40

- GROUP 1: Assistant Mate (Deckhand)
- GROUP 2: Oiler
- GROUP 3: Assistant Engineer (Electric, Diesel, Steam or Booster Pump); Mates and Boatmen
- GROUP 4: Craneman, Engineer Welder
- GROUP 5: Leverman, Hydraulic
- GROUP 6: Maintenance

Total Project cost under \$300,000

GROUP 1	26.96	8.40
GROUP 2	27.06	8.40
GROUP 3	27.38	8.40
GROUP 4	27.43	8.40
GROUP 5	28.75	8.40
GROUP 6	26.96	8.40

- GROUP 1: Assistant Mate (Deckhand)
- GROUP 2: Oiler
- GROUP 3: Assistant Engineer (Electric, Diesel, Steam, or Booster Pump); Mates and Boatmen
- GROUP 4: Craneman, Engineer Welder
- GROUP 5: Leverman, Hydraulic
- GROUP 6: Maintenance

HEAVY WAGE RATES (CATEGORY A) APPLIES TO CLAM SHELL DREDGE, HOE AND DIPPER, SHOVELS AND SHOVEL ATTACHMENTS, CRANES AND BULLDOZERS.

HANDLING OF HAZARDOUS WASTE MATERIALS: Personnel in all craft classifications subject to working inside a federally designated hazardous perimeter shall be eligible for compensation in

accordance with the following group schedule relative to the level of hazardous waste as outlined in the specific hazardous waste project site safety plan.

- H-1 Base wage rate when on a hazardous waste site when not outfitted with protective clothing
- H-2 Class "C" Suit - Base wage rate plus \$.25 per hour.
- H-3 Class "B" Suit - Base wage rate plus \$.50 per hour.
- H-4 Class "A" Suit - Base wage rate plus \$.75 per hour.

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	Rates	Fringes
ADAMS, ASOTIN, BENTON, CHELAN (EAST OF THE 120TH MERIDIAN), COLUMBIA, DOUGLAS (EAST OF THE 120TH MERIDIAN), FERRY, FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN (EAST OF THE 120TH MERIDIAN), PEND OREILLE, SPOKANE, STEVENS, WALLA WALLA, WHITMAN AND YAKIMA (EAST OF THE 120TH MERIDIAN) COUNTIES		

ZONE 1:

POWER EQUIPMENT OPERATORS:

GROUP 1A	20.94	6.52
GROUP 1	21.49	6.52
GROUP 2	21.81	6.52
GROUP 3	22.42	6.52
GROUP 4	22.58	6.52
GROUP 5	22.74	6.52
GROUP 6	23.02	6.52
GROUP 7	23.29	6.52
GROUP 8	24.39	6.52

ZONE DIFFERENTIAL (Add to Zone 1 rate): Zone 2 - \$2.00

Zone 1: Within 45 mile radius of Spokane, Moses Lake, Pasco, Washington; Lewiston, Idaho

Zone 2: Outside 45 mile radius of Spokane, Moses Lake, Pasco, Washington; Lewiston, Idaho

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1A: Boat Operator; Crush Feeder; Oiler; Steam Cleaner

GROUP 1: Bit Grinders; Bolt Threading Machine; Compressors (under 2000 CFM, gas, diesel, or electric power); Deck Hand; Drillers Helper (Assist driller in making drill rod connections, service drill engine and air compressor, repair drill rig and drill tools, drive drill support truck to and on the job site, remove drill cuttings from around bore hole and inspect drill rig while in operation); Fireman & Heater Tender; Grade Checker; Hydro-seeder, Mulcher, Nozzlemans; Oiler Driver, & Cable Tender, Mucking Machine; Pumpman; Rollers, all types on subgrade, including seal and chip coatings (farm type, Case, John Deere & similar, or Compacting Vibrator), except when pulled by Dozer with operable blade; Welding Machine

GROUP 2: A-frame Truck (single drum); Assistant Refrigeration Plant (under 1000 ton); Assistant Plant Operator, Fireman or Pugmixer (asphalt); Bagley or Stationary Scraper; Belt Finishing Machine; Blower Operator (cement); Cement Hog; Compressor (2000 CFM or over, 2 or more, gas diesel or electric power); Concrete Saw (multiple cut); Distributor Leverman; Ditch Witch or similar; Elevator Hoisting Materials; Dope Pots (power agitated); Fork Lift or Lumber Stacker, hydra-lift & similar; Gin Trucks (pipeline); Hoist, single drum; Loaders (bucket elevators and conveyors); Longitudinal Float; Mixer (portable-concrete); Pavement Breaker, Hydra-Hammer & similar; Power Broom; Railroad Ballast Regulation Operator (self-propelled); Railroad Power Tamper Operator (self-propelled); Railroad Tamper Jack Operator (self-propelled); Spray Curing Machine (concrete); Spreader Box (self-propelled); Straddle Buggy (Ross & similar on construction job only); Tractor (Farm type R/T with attachment, except Backhoe); Tugger Operator

GROUP 3: A-frame Truck (2 or more drums); Assistant Refrigeration Plant & Chiller Operator (over 1000 ton); Backfillers (Cleveland & similar); Batch Plant & Wet Mix Operator, single unit (concrete); Belt-Crete Conveyors with power pack or similar; Belt Loader (Kocal or similar); Bending Machine; Bob Cat; Boring Machine (earth); Boring Machine (rock under 8" bit) (Quarry Master, Joy or similar); Bump Cutter (Wayne, Saginaw or similar); Canal Lining Machine (concrete); Chipper (without crane); Cleaning & Doping Machine (pipeline); Deck Engineer; Elevating Belt-type Loader (Euclid, Barber Green & similar); Elevating Grader-type Loader (Dumort, Adams or similar); Generator Plant Engineers (diesel or electric); Gunnite Combination Mixer & Compressor; Locomotive Engineer; Mixermobile; Mucking Machine; Posthole Auger or Punch; Pump (grout or jet); Soil Stabilizer (P & H or similar); Spreader Machine; Tractor (to D-6 or equivalent) and Traxcavator; Traverse Finish Machine; Turnhead Operator

GROUP 4: Concrete Pumps (squeeze-crete, flow-crete, pump-crete, Whitman & similar); Curb Extruder (asphalt or concrete); Drills (churn, core, calyx or diamond)(operate drilling machine, drive or transport drill rig to and on job site and weld well casing); Equipment Serviceman; Greaser & Oiler; Hoist (2 or more drums or Tower Hoist); Loaders (overhead & front-end, under 4 yds. R/T); Refrigeration Plant Engineer (under 1000 ton); Rubber-tired Skidders (R/T with or without attachments); Surface Heater & Plant Machine; Trenching Machines (under 7 ft. depth capacity); Turnhead (with re-screening); Vacuum Drill (reverse circulation drill under 8" bit)

GROUP 5: Backhoe (under 45,000 gw); Backhoe & Hoe Ram (under 3/4 yd.); Carrydeck & Boom Truck (under 25 tons); Cranes (25 tons & under), all attachments including clamshell, dragline; Derricks & Stifflegs (under 65 tons); Drilling Equipment(8" bit & over) (Robbins, reverse circulation & similar)(operates drilling machine, drive or transport drill rig to and on job site and weld well casing); Hoe Ram; Piledriving Engineers; Paving (dual drum); Railroad Track Liner Operatr (self-propelled);

Refrigeration Plant Engineer (1000 tons & over); Signalman (Whirleys, Highline Hammerheads or similar)

GROUP 6: Asphalt Plant Operator; Automatic Subgrader (Ditches & Trimmers)(Autograde, ABC, R.A. Hansen & similar on grade wire); Backhoe (45,000 gw and over to 110,000 gw); Backhoes & Hoe Ram (3/4 yd. to 3 yd.); Batch Plant (over 4 units); Batch & Wet Mix Operator (multiple units, 2 & incl. 4); Blade Operator (motor patrol & attachments, Athey & Huber); Boom Cats (side); Cable Controller (dispatcher); Clamshell Operator (under 3 yds.); Compactor (self-propelled with blade); Concrete Pump Boom Truck; Concrete Slip Form Paver; Cranes (over 25 tons, to and including 45 tons), all attachments including clamshell, dragline; Crusher, Grizzle & Screening Plant Operator; Dozer, 834 R/T & similar; Draglines (under 3 yds.); Drill Doctor; H.D. Mechanic; H.D. Welder; Loader Operator (front-end & overhead, 4 yds. incl. 8 yds.); Multiple Dozer Units with single blade; Paving Machine (asphalt and concrete); Quad-Track or

similar equipment; Rollerman (finishing asphalt pavement); Roto Mill (pavement grinder); Scrapers, all, rubber-tired; Screed Operator; Shovel (under 3 yds.); Tractors (D-6 & equivalent & over); Trenching Machines (7 ft. depth & over); Tug Boat Operator Vactor guzzler, super sucker

GROUP 7: Backhoe (over 110,000 gw); Backhoes & Hoe Ram (3 yds & over); Blade (finish & bluetop) Automatic, CMI, ABC, Finish Athey & Huber & similar when used as automatic; Cableway Operators; Concrete Cleaning/Decontamination machine operator; Cranes (over 45 tons to but not including 85 tons), all attachments including clamshell and dragline; Derricks & Stiffleys (65 tons & over); Elevating Belt (Holland type); Heavy equipment robotics operator; Loader (360 degrees revolving Koehring Scooper or similar); Loaders (overhead & front-end, over 8 yds. to 10 yds.); Rubber-tired Scrapers (multiple engine with three or more scrapers); Shovels (3 yds. & over); Whirleys & Hammerheads, ALL

GROUP 8: Cranes (85 tons and over, and all climbing, overhead, rail and tower), all attachments including clamshell, dragline; Loaders (overhead and front-end, 10 yards and over); Helicopter Pilot

BOOM PAY: (All Cranes, Including Tower)
 180' to 250' \$.30 over scale
 Over 250' \$.60 over scale

NOTE: In computing the length of the boom on Tower Cranes, they shall be measured from the base of the Tower to the point of the boom.

HAZMAT: Anyone working on HAZMAT jobs, working with supplied air shall receive \$1.00 an hour above classification.

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Rates Fringes
 ADAMS, ASOTIN, BENTON, CHELAN (EAST OF THE 120TH MERIDIAN),

COLUMBIA, DOUGLAS (EAST OF THE 120TH MERIDIAN), FERRY, FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN (EAST OF THE 120TH MERIDIAN), PEND OREILLE, SPOKANE, STEVENS, WALLA WALLA, WHITMAN AND YAKIMA (EAST OF THE 120TH MERIDIAN) COUNTIES

WORK PERFORMED ON HYDRAULIC DREDGES

GROUP 1:	24.73	6.27
GROUP 2:	25.10	6.27
GROUP 3:	25.13	6.27
GROUP 4:	25.52	6.27
GROUP 5:	24.73	6.27

GROUP 1: Assistant Mate (Deckhand) and Oiler
 GROUP 2: Assistant Engineer (Electric, Diesel, Steam, or Booster Pump); Mates and Boatmen
 GROUP 3: Engineer Welder
 GROUP 4: Leverman, Hydraulic

GROUP 5: Maintenance

HEAVY WAGE RATES APPLIES TO CLAM SHELL DREDGE, HOE AND DIPPER,
SHOVELS AND SHOVEL ATTACHMENTS, CRANES AND BULLDOZERS.

ENGI0612A 06/01/2002

LEWIS, PIERCE, PACIFIC (THAT PORTION WHICH LIES NORTH OF A
PARALLEL LINE EXTENDED WEST FROM THE NORTHERN BOUNDARY OF
WAHKAIKUM COUNTY TO THE SEA IN THE STATE OF WASHINGTON) AND
THURSTON COUNTIES

PROJECTS:

CATEGORY A PROJECTS (excludes Category B projects, as shown
below)

POWER EQUIPMENT OPERATORS:

ZONE 1 (0-25 radius miles):

	Rates	Fringes
GROUP 1AAA	31.14	8.40
GROUP 1AA	30.64	8.40
GROUP 1A	30.14	8.40
GROUP 1	29.64	8.40
GROUP 2	29.20	8.40
GROUP 3	28.94	8.40
GROUP 4	26.74	8.40

ZONE 2 (26-45 radius miles) - Add \$.70 to Zone 1 rates

ZONE 3 (Over 45 radius miles) - Add \$1.00 to Zone 1 rates

BASEPOINTS: Tacoma, Olympia, and Centralia

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1AAA - Cranes-300 tons, or 300 ft of boom (including jib
with attachments)

GROUP 1AA - Cranes 200 tons to 300 tons, or 250 ft of boom
(including jib with attachments); Tower crane over 175 ft in
height, base to boom

GROUP 1A - Crane 100 tons thru 199 tons, or 150 of boom
(including jib with attachments); Crane-overhead, bridge type,
100 tons and over; Shovel, excavator, backhoes-6 yds and over
with attachments

GROUP 1 - Cableways; Cranes-45 tons thru 99 tons, under 150 ft
of boom (including jib with attachments); Crane-overhead, bridge
type - 45 tons thru 99 tons; Excavator, shovel, backhoes over 3
yards and under 6 yards; hard tail end dump articulating off-road
equipment 45 yards and over; loader-overhead 6 yards to, but not
including 8 yards; Mucking machine, mole, tunnel, drill and/or
shield; Quad 9, HD 41, D-10; Remote control operator on rubber
tired earth moving equipment; Rollagon; Scrapers-self-
propelled-45 yds and over; Slipform pavers; Transporters-all
track or truck type

GROUP 2 - Barrier machine (zipper); Batch Plant Operator-concrete; Bump cutter; Cranes-20 tons through 44 tons with attachments; Crane-overhead, bridge type-20 tons thru 44 tons; Chipper, Concrete Pump-truck mounted with boom attachment; Crushers; Deck Engineer/Deck Winches (power); Drilling machine; Excavator, shovel, backhoe-3yards and under; Finishing machine, Bidwell, Gamaco and similar equipment; Guardrail punch; Horizontal/directional drill operator; Loaders, overhead under 6 yds.; Loaders, plant feed; Locomotive-all; Mechanics-all; Mixers, asphalt plant; Motor patrol graders-finishing; Piledriver (other than crane mount); Roto-mill, roto grinder; screedman, spreader, topside operator-Blaw Knox, Cedar Rapids, Jaeger, Caterpillar, Barbar Green; Scraper-self propelled, hard tail end dump, articulating off-road equipment under 45 yds.; Subgrader trimmer; Tractors, backhoes over 75 hp.; Transfer material service machine-shuttle buggy, Blaw Knox-Roadtec; Truck Crane Oiler/driver-100 tons and over, Truck Mount Portable Conveyor; Yo Yo Pay dozer.

GROUP 3 - Conveyors; Cranes-thru 19 tons with attachments; Cranes-A-frame over 10 tons; Drill Oilers-Auger type, truck or crane mount; Dozers-D-9 and under; Forklifts-3000 lbs. and over with attachments; Horizontal/directional drill locator; Outside hoists-(elevators and manlifts), air tuggers, strato tower bucket elevators; Hydralifts/Boom Trucks-over 10 tons; Loaders-elevating type, belt; Motor patrol grader-nonfinishing; Plant Oiler-Asphalt, Crusher; Pumps, Concrete; Roller, plant mix or multi-lift materials; Saws-concrete; Scrapers-Concrete and Carry all; Trenching machines; Truck Crane Oiler/Driver-under 100 tons; Tractor, backhoe-under 75 hp

GROUP 4 - Assistant Engineer; Bobcat; Brooms; Compressor; Concrete Finish Machine-laser screed; Crane-A-Frame, 10 tons and under; Elevator and manlift-permanent and shaft type; Forklifts-under 3000 lbs. with attachments; Gradechecker, stakehop; Hydralifts, boom trucks, 10 tons and under; Oil distributors, blower distribution and mulch seeding operator; Pavement breaker; Posthole Digger-mechanical; Power plant;

Pumps-Water; Roller-other than Plant Mix; Wheel Tractors, Farmall type; Shotcrete/Gunite Equipment Operator

CATEGORY B PROJECTS - 95% of the basic hourly rate for each group plus full fringe benefits applicable to Category A projects shall apply to the following projects: Reduced rates may be paid on the following:

1. Projects involving work on structures such as buildings and structures whose total value is less than \$1.5 million excluding mechanical, electrical, and utility portions of the contract.
2. Projects of less than \$1 million where no building is involved. Surfacing and paving included, but utilities excluded.
3. Marine projects (docts, wharfs, etc.) less than \$150,000

WORK PERFORMED ON HYDRAULIC DREDGES:		
Total Project cost \$300,000 and over		
GROUP 1	28.38	8.40

GROUP 2	28.48	8.40
GROUP 3	28.82	8.40
GROUP 4	28.87	8.40
GROUP 5	30.26	8.40
GROUP 6	28.38	8.40

GROUP 1: Assistant Mate (Deckhand)
 GROUP 2: Oiler
 GROUP 3: Assistant Engineer (Electric, Diesel, Steam or Booster Pump); Mates and Boatmen
 GROUP 4: Craneman, Engineer Welder
 GROUP 5: Leverman, Hydraulic
 GROUP 6: Maintenance

Total Project Cost under \$300,000

GROUP 1	26.96	8.40
GROUP 2	27.06	8.40
GROUP 3	27.38	8.40
GROUP 4	27.43	8.40
GROUP 5	28.75	8.40
GROUP 6	26.96	8.40

GROUP 1: Assistant Mate (Deckhand)
 GROUP 2: Oiler
 GROUP 3: Assistant Engineer (Electric, Diesel, Steam or Booster Pump); Mates and Boatmen
 GROUP 4: Craneman, Engineer Welder
 GROUP 5: Leverman, Hydraulic
 GROUP 6: Maintenance

HEAVY WAGE RATES APPLIES TO CLAM SHEEL DREDGE, HOE AND DIPPER, SHOVELS AND SHOVEL ATTACHMENTS, CRANES AND BULLDOZERS

HANDLING OF HAZARDOUS WASTE MATERIALS

- H-1 - When not outfitted with protective clothing of level D equipment - Base wage rate
- H-2 - Class "C" Suit - Base wage rate + \$.25 per hour
- H-3 - Class "B" Suit - Base wage rate + \$.50 per hour
- H-4 - Class "A" Suit - Base wage rate +\$.75 per hour

 ENGI0701D 01/01/2003

Rates Fringes
 CLARK, COWLITZ, KLICKITAT, PACIFIC (SOUTH), SKAMANIA, AND WAHKIAKUM COUNTIES

POWER EQUIPMENT OPERATORS (See Footnote A)

ZONE 1:		
GROUP 1	29.30	8.95
GROUP 1A	30.77	8.95
GROUP 1B	32.23	8.95
GROUP 2	28.07	8.95
GROUP 3	27.31	8.95
GROUP 4	26.79	8.95
GROUP 5	26.19	8.95

GROUP 6

23.84

8.95

Zone Differential (add to Zone 1 rates):

Zone 2 - \$1.50

Zone 3 - 3.00

For the following metropolitan counties: MULTNOMAH; CLACKAMAS; MARION; WASHINGTON; YAMHILL; AND COLUMBIA; CLARK; AND COWLITZ COUNTY, WASHINGTON WITH MODIFICATIONS AS INDICATED:

All jobs or projects located in Multnomah, Clackamas and Marion Counties, West of the western boundary of Mt. Hood National Forest and West of Mile Post 30 on Interstate 84 and West of Mile Post 30 on State Highway 26 and West of Mile Post 30 on Highway 22 and all jobs or projects located in Yamhill County, Washington County and Columbia County and all jobs or projects located in Clark & Cowlitz County, Washington except that portion of Cowlitz County in the Mt. St. Helens "Blast Zone" shall receive Zone I pay for all classifications.

All jobs or projects located in the area outside the identified boundary above, but less than 50 miles from the Portland City Hall shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the Portland City Hall, but outside the identified border above, shall receive Zone III pay for all classifications.

For the following cities: ALBANY; BEND; COOS BAY; EUGENE; GRANTS PASS; KLAMATH FALLS; MEDFORD; ROSEBURG

All jobs or projects located within 30 miles of the respective city hall of the above mentioned cities shall receive Zone I pay for all classifications.

All jobs or projects located more than 30 miles and less than 50 miles from the respective city hall of the above mentioned cities shall receive Zone II pay for all classifications.

All jobs or projects located more than 50 miles from the respective city hall of the above mentioned cities shall receive Zone III pay for all classifications.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: CONCRETE: Batch Plant and/or Wet Mix Operator, three units or more; CRANE: Helicopter Operator, when used in erecting work; Whirley Operator, 90 ton and over; LATTICE BOOM CRANE: Operator 200 tons through 299 tons, and/or over 200 feet boom; HYDRAULIC CRANE: Hydraulic Crane Operator 90 tons through 199 tons with luffing or tower attachments; FLOATING EQUIPMENT: Floating Crane, 150 ton but less than 250 ton

GROUP 1A: HYDRAULIC CRANE: Hydraulic Operator, 200 tons and over (with luffing or tower attachment); LATTICE BOOM CRANE: Operator, 200 tons through 299 tons, with over 200 feet boom; FLOATING

EQUIPMENT: Floating Crane 250 ton and over

GROUP 1B: LATTICE BOOM CRANE: Operator, 300 tons through 399 tons with over 200 feet boom; Operator 400 tons and over; FLOATING EQUIPMENT: Floating Crane 350 ton and over

GROUP 2: ASPHALT: Asphalt Plant Operator (any type); Roto Mill, pavement profiler, operator, 6 foot lateral cut and over; BLADE: Auto Grader or "Trimmer" (Grade Checker required); Blade Operator, Robotic; BULLDOZERS: Bulldozer operator over 120,000 lbs and above; Bulldozer operator, twin engine; Bulldozer Operator,tandem, quadnine, D10, D11, and similar type; Bulldozere Robotic Equipment (any type; CONCRETE: Batch Plant and/or Wet Mix Operator, one and two drum; Automatic Concrete Slip Form Paver Operator; Concrete Canal Line Operator; Concrete Profiler, Diamond Head; CRANE: Cableway Operator, 25 tons and over; HYDRAULIC CRANE: Hydraulic crane operator 90 tons through 199 tons (with luffing or tower attachment); TOWER/WHIRLEY OPERATOR: Tower Crane Operator; Whirley Operator, under 90 tons; LATTICE BOOM CRANE: 90 through 199 tons and/or 150 to 200 feet boom; CRUSHER: Crusher Plant Operator; FLOATING EQUIPMENT: Floating Clamshell, etc.operator, 3 cu. yds. and over; Floating Crane (derrick barge) Operator, 30 tons but less than 150 tons; LOADERS: Loader operator, 120,000 lbs. and above; REMOTE CONTROL: Remote controlled earth-moving equipment; RUBBER-TIRED SCRAPERS: Rubber-tired scraper operator, with tandem scrapers, multi-engine; SHOVEL, DRAGLINE, CLAMSHELL, SKOOPER OPERATOR: Shovel, Dragline, Clamshell, operator 5 cu. yds and over; TRENCHING MACHINE: Wheel Excavator, under 750 cu. yds. per hour (Grade Oiler required); Canal Trimmer (Grade Oiler required); Wheel Excavator, over 750 cu. yds. per hour; Band Wagon (in conjunction with wheel excavator); UNDERWATER EQUIPMENT: Underwater Equipment Operator, remote or otherwise; HYDRAULIC HOES-EXCAVATOR: Excavator over 130,000 lbs.

GROUP 3: BULLDOZERS: Bulldozer operator, over 70,000 lbs. up to and including 120,000 lbs.; HYDRAULIC CRANE: Hydraulic crane operator, 50 tons through 89 tons (with luffing or tower attachment); LATTICE BOOM CRANES: Lattice Boom Crane-50 through 89 tons (and less than 150 feet boom); FORKLIFT: Rock Hound Operator; HYDRAULIC HOES-EXCAVATOR: excavator over 80,000 lbs. through 130,000 lbs.; LOADERS: Loader operator 60,000 and less than 120,000; RUBBER-TIRED SCRAPERS: Scraper Operator, with tandem scrapers; Self-loading, paddle wheel, auger type, finish and/or 2 or more units; SHOVEL, DRAGLINE, CLAMSHELL,SKOOPER OPERATOR: Shovel, Dragline, Clamshell operators 3 cu. yds. but less than 5 cu yds.

GROUP 4: ASPHALT: Screed Operator; Asphalt Paver operator (screeman required); BLADE: Blade operator; Blade operator, finish; Blade operator, externally controlled by electronic, mechanical hydraulic means; Blade operator, multi-engine; BULLDOZERS: Bulldozer Operator over 20,000 lbs and more than 100 horse up to 70,000 lbs; Drill Cat Operator; Side-boom Operator; Cable-Plow Operator (any type); CLEARING: Log Skidders;

Chippers; Incinerator; Stump Splitter (loader mounted or similar type); Stump Grinder (loader mounted or similar type; Tub Grinder; Land Clearing Machine (Track mounted forestry mowing & grinding machine); Hydro Axe (loader mounted or similar type); COMPACTORS SELF-PROPELLED: Compactor Operator, with blade; Compactor Operator, multi-engine; Compactor Operator, robotic; CONCRETE: Mixer Mobile Operator; Screed Operator; Concrete Cooling Machine Operator; Concrete Paving Road Mixer; Concrete Breaker; Reinforced Tank Banding Machine (K-17 or similar types); Laser Screed; CRANE: Chicago boom and similar types; Lift Slab Machine Operator; Boom type lifting device, 5 ton capacity or less; Hoist Operator, two (2) drum; Hoist Operator, three (3) or more drums; Derrick Operator, under 100 ton; Hoist Operator, stiff leg, guy derrick or similar type, 50 ton and over; Cableway Operator up to twenty (25) ton; Bridge Crane Operator, Locomotive, Gantry, Overhead; Cherry Picker or similar type crane; Carry Deck Operator; Hydraulic Crane Operator, under 50 tons; LATTICE BOOM CRANE OPERATOR: Lattice Boom Crane Operator, under 50 tons; CRUSHER: Generator Operator; Diesel-Electric Engineer; Grizzley Operator; Drill Doctor; Boring Machine Operator; Driller-Perussion, Diamond, Core, Cable, Rotary and similar type; Cat Drill (John Henry); Directional Drill Operator over 20,000 lbs pullback; FLOATING EQUIPMENT: Diesel-electric Engineer; Jack Operator, elevating barges, Barge Operator, self-unloading; Piledriver Operator (not crane type) (Deckhand required); Floating Clamshell, etc. Operator, under 3 cu. yds. (Fireman or Diesel-Electric Engineer required); Floating Crane (derrick barge) Operator, less than 30 tons; GENERATORS: Generator Operator; Diesel-electric Engineer; GUARDRAIL EQUIPMENT: Guardrail Punch Operator (all types); Guardrail Auger Operator (all types); Combination Guardrail machines, i.e., punch auger, etc.; HEATING PLANT: Surface Heater and Planer Operator; HYDRAULIC HOES EXCAVATOR: Robotic Hydraulic backhoe operator, track and wheel type up to and including 20,000 lbs. with any or all attachments; Excavator Operator over 20,000 lbs through 80,000 lbs.; LOADERS: Belt Loaders, Kolman and Ko Cal types; Loaders Operator, front end and overhead, 25,000 lbs and less

than 60,000 lbs; Elevating Grader Operator by Tractor operator, Sierra, Euclid or similar types; PILEDRIVERS: Hammer Operator; Piledriver Operator (not crane type); PIPELINE, SEWER WATER: Pipe Cleaning Machine Operator; Pipe Doping Machine Operator; Pipe Bending Machine Operator; Pipe Wrapping Machine Operator; Boring Machine Operator; Back Filling Machine Operator; REMOTE CONTROL: Concrete Cleaning Decontamination Machine Operator; Ultra High Pressure Water Jet Cutting Tool System Operator/Mechanic; Vacuum Blasting Machine Operator/mechanic; REPAIRMEN, HEAVY DUTY: Diesel Electric Engineer (Plant or Floating; Bolt Threading Machine operator; Drill Doctor (Bit Grinder); H.D. Mechanic; Machine Tool Operator; RUBBER-TIRED SCRAPERS: Rubber-tired Scraper Operator, single engine, single scraper; Self-loading, paddle wheel, auger type under 15 cu. yds.; Rubber-tired Scraper Operator, twin engine; Rubber-tired Scraper Operator, with push-ull attachments; Self Loading, paddle wheel, auger type 15 cu. yds. and over, single engine; Water pulls, water wagons; SHOVEL, DRAGLINE, CLAMSHELL, SKOOPER OPERATOR: Diesel Electric Engineer; Stationay Drag Scraper Operator; Shovel, Dragline, Clamshell,

Operator under 3 cy yds.; Grade-all Operator; SURFACE (BASE) MATERIAL: Blade mounted spreaders, Ulrich and similar types; TRACTOR-RUBBERED TIRED: Tractor operator, rubber-tired, over 50 hp flywheel; Tractor operator, with boom attachment; Rubber-tired dozers and pushers (Michigan, Cat, Hough type); Skip Loader, Drag Box; TRENCHING MACHINE: Trenching Machine operator, digging capacity over 3 ft depth; Back filling machine operator; TUNNEL: Mucking machine operator

GROUP 5: ASPHALT: Extrusion Machine Operator; Roller Operator (any asphalt mix); Asphalt Burner and Reconditioner Operator (any type); Roto-Mill, pavement profiler, ground man; BULLDOZERS: Bulldozer operator, 20,000 lbs. or less or 100 horse or less; COMPRESSORS: Compressor Operator (any power), over 1,250 cu. ft. total capacity; COMPACTORS: Compactor Operator, including vibratory; Wagner Pactor Operator or similar type (without blade); CONCRETE: Combination mixer and Compressor Operator, gunite work; Concrete Batch Plant Quality Control Operator; Beltcrete Operator; Pumpcrete Operator (any type); Pavement Grinder and/or Grooving Machine Operator (riding type); Cement Pump Operator, Fuller-Kenyon and similar; Concrete Pump Operator; Grouting Machine Operator; Concrete mixer operator, single drum, under (5) bag capacity; Cast in place pipe laying machine; maginnis Internal Full slab vibrator operator; Concrete finishing mahine operator, Clary, Johnson, Bidwell, Burgess Bridge deck or similar type; Curb Machine Operator, mechanical Berm, Curb and/or Curb and Gutter; Concrete Joint Machine Operator; Concrete Planer Operator; Tower Mobile Operator; Power Jumbo Operator setting slip forms in tunnels; Slip Form Pumps, power driven hydraulic lifting device for concrete forms; Concrete Paving Machine Operator; Concrete Finishing Machine Operator; Concrete Spreader Operator; CRANE: Helicopter Hoist Operator; Hoist Operator, single drum; Elevator Operator; A-frame Truck Operator, Double drum; Boom Truck Operator; HYDRAULIC CRANE OPERATOR: Hydraulic Boom Truck, Pittman; DRILLING: Churm Drill and Earth Boring Machine Operator; Vacuum Truck; Directional Drill Operator over 20,000 lbs pullback; FLOATING EQUIPMENT:

Fireman; FORKLIFT: Fork Lift, over 10 ton and/or robotic; HYDRAULIC HOES EXCAVATORS: Hydraulic Backhoe Operator, wheel type (Ford, John Deere, Case type); Hydraulic Backhoe Operator track type up to and including 20,000 lbs.; LOADERS: Loaders, rubber-tired type, less than 25,000 lbs; Elevating Grader Operator, Tractor Towed requiring Operator or Grader; Elevating loader operator, Athey and similar types; OILERS: Service oiler (Greaser); PIPELINE-SEWER WATER: Hydra hammer or simialr types; Pavement Breaker Operator; PUMPS: Pump Operator, more than 5 (any size); Pot Rammer Operator; RAILROAD EQUIPMENT: Locomotive Operator, under 40 tons; Ballast Regulator Operator; Ballast Tamper Multi-Purpose Operator; Track Liner Operator; Tie Spacer Operator; Shuttle Car Operator; Locomotive Operator, 40 tons and over; MATERIAL HAULRS: Cat wagon DJB's Volvo similar types; Conveyored material hauler; SURFACING (BASE) MATERIAL: Rock Spreaders, self-propelled; Pulva-mixer or similar types; Chiip Spreading machine operator; Lime spreading operator, construction job siter; SWEEPERS: Sweeper operator (Wayne type) self-propelled construction job site; TRACTOR-RUBBER TIRED: Tractor operator,

rubber-tired, 50 hp flywheel and under; Trenching machine operator, maximum digging capacity 3 ft depth; TUNNEL: Dinkey GROUP 6: ASPHALT: Plant Oiler; Plant Fireman; Pugmill Operator (any type); Truck mounted asphalt spreader, with screed; COMPRESSORS: Compressor Operator (any power), under 1,250 cu. ft. total capacity; CONCRETE: Plant Oiler, Assistant Conveyor Operator; Conveyor Operator; Mixer Box Operator (C.T.B., dry batch, etc.); Cement Hog Operator; Concrete Saw Operator; Concrete Curing Machine Operator (riding type); Wire Mat or Brooming Machine Operator; CRANE: Oiler; Fireman, all equipment; Truck Crane Oiler Driver; A-frame Truck Operator, single drum; Tugger or Coffin Type Hoist Operator; CRUSHER: Crusher Oiler; Crusher Feeder; CRUSHER: Crusher oiler; Crusher feeder; DRILLING: Drill Tender; Auger Oiler; FLOATING EQUIPMENT: Deckhand; Boatman; FORKLIFT: Self-propelled Scaffolding Operator, construction job site (excluding working platform); Fork Lift or Lumber Stacker Operator, construction job site; Ross Carrier Operator, construction job site; Lull Hi-Lift Operator or Similar Type; GUARDRAIL EQUIPMENT: Oiler; Auger Oiler; Oiler, combination guardrail machines; Guardrail Punch Oiler; HEATING PLANT: Temporary Heating Plant Operator; LOADERS: Bobcat, skid steer (less than 1 cu yd.); Bucket Elevator Loader Operator, BarberGreene and similar types; OILERS: Oiler; Guardrail Punch Oiler; Truck Crane Oiler-Driver; Auger Oiler; Grade Oiler, required to check grade; Grade Checker; Rigger; PIPELINE-SEWER WATER: Tar Pot Fireman; Tar Pot Fireman (power agitated); PUMPS: Pump Operator (any power); Hydrostatic Pump Operator; RAILROAD EQUIPMENT: Brakeman; Oiler; Switchman; Motorman; Ballast Jack Tamper Operator; SHOVEL, DRAGLINE, CLAMSHELL, SKOOPER, ETC. OPERATOR: Oiler, Grade Oiler (required to check grade); Grade Checker; Fireman; SWEEPER: Broom operator, self propelled, construction job site; SURFACING (BASE) MATERIAL: Roller Operator, grading of base rock (not asphalt); Tamping Machine operator, mechanical, self-propelled; Hydrographic Seeder Machine Operator; TRENCHING MACHINE: Oiler; Grade Oiler; TUNNEL: Conveyor operator; Air filtration equipment operator

ENGI0701E 06/01/2002

CLARK, COWLITZ, KLICKITAT, PACIFIC (SOUTH), SKAMANIA,
AND WAHKIAKUM COUNTIES

DREDGING:

	Rates	Fringes
ZONE A		
LEVERMAN, HYDRAULIC	32.43	8.50
LEVERMAN, DIPPER, FLOATING CLAMSHELL	30.25	8.50
ASSISTANT ENGINEER	29.25	8.50
TENDERMAN	28.44	8.50
ASSISTANT MATE	26.58	8.50
ZONE B		
LEVERMAN, HYDRAULIC	34.43	8.50
LEVERMAN, DIPPER,		

FLOATING CLAMSHELL	32.25	8.50
ASSISTANT ENGINEER	31.25	8.50
TENDERMAN	30.44	8.50
ASSISTANT MATE	28.58	8.50

ZONE C		
LEVERMAN, HYDRAULIC	35.43	8.50
LEVERMAN, DIPPER, FLOATING CLAMSHELL	33.25	8.50
ASSISTANT ENGINEER	32.25	8.50
TENDERMAN	31.44	8.50
ASSISTANT MATE	29.58	8.50

ZONE DESCRIPTION FOR DREDGING:

ZONE A - All jobs or projects located within 30 road miles of Portland City Hall.

ZONE B - Over 30-50 road miles from Portland City Hall.

ZONE C - Over 50 road miles from Portland City Hall.

*All jobs or projects shall be computed from the city hall by the shortest route to the geographical center of the project.

IRON0014F 07/01/2002

	Rates	Fringes
ADAMS, ASOTIN, BENTON, COLUMBIA, DOUGLAS, FERRY, FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN, PEND ORIELLE, SPOKANE, STEVENS, WALLA WALLA AND WHITMAN COUNTIES		

IRONWORKERS	24.52	11.80
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IRON0029I 07/01/2002

	Rates	Fringes
CLARK, COWLITZ, KLUCKITAT, PACIFIC, SKAMANIA, AND WAHKAIKUM COUNTIES		

IRONWORKERS	26.97	11.80
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IRON0086B 07/01/2002

	Rates	Fringes
YAKIMA, KITTITAS AND CHELAN COUNTIES		

IRONWORKERS	26.72	11.80
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IRON0086E 07/01/2002

	Rates	Fringes
CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS, MASON, PIERCE, SKAGIT, SNOHOMISH, THURSTON, AND WHATCOM COUNTIES		

IRONWORKERS	27.22	11.80
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LAB00001D 06/01/2002

	Rates	Fringes
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CHELAN, DOUGLAS (WEST OF THE 120TH MERIDIAN), KITTITAS AND
YAKIMA COUNTIES

LABORERS:

ZONE 1:

GROUP 1	14.79	6.20
GROUP 2	17.11	6.20
GROUP 3	18.83	6.20
GROUP 4	19.31	6.20
GROUP 5	19.67	6.20

ZONE DIFFERENTIAL (ADD TO ZONE 1 RATES):

ZONE 2 - \$.70

ZONE 3 - \$1.00

BASE POINTS: CHELAN, SUNNYSIDE, WENATCHEE,
AND YAKIMA

ZONE 1 - Projects within 25 radius miles of the respective city
hall

ZONE 2 - More than 25 but less than 45 radius miles from the
respective city hall

ZONE 3 - More than 45 radius miles from the respective city hall

CALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS,
MASON, PACIFIC (NORTH OF STRAIGHT LINE MADE BY EXTENDING THE
NORTH BOUNDARY WAHKIAKUM COUNTY WEST TO THE PACIFIC OCEAN),
PIERCE, SAN JUAN, SKAGIT, SNOHOMISH, THURSTON AND WHATCOM
COUNTIES

LABORERS:

ZONE 1:

GROUP 1	17.71	6.20
GROUP 2	20.03	6.20
GROUP 3	24.71	6.20
GROUP 4	25.19	6.20
GROUP 5	25.55	6.20

ZONE DIFFERENTIAL (ADD TO ZONE 1 RATES):

ZONE 2 - \$.70

ZONE 3 - \$1.00

BASE POINTS: BELLINGHAM, MT. VERNON, EVERETT,
SEATTLE, KENT, TACOMA, OLYMPIA,
CENTRALIA, ABERDEEN, SHELTON, PT.
TOWNSEND, PT. ANGELES, AND BREMERTON

ZONE 1 - Projects within 25 radius miles of the respective city
hall

ZONE 2 - More than 25 but less than 45 radius miles from the
respective city hall

ZONE 3 - More than 45 radius miles from the respective city hall

LABORERS CLASSIFICATIONS

GROUP 1: Landscaping and Planting; Watchman; Window

Washer/Cleaner (detail clean-up, such as but not limited to cleaning floors, ceilings, walls, windows, etc., prior to final acceptance by the owner)

GROUP 2: Batch Weighman; Crusher Feeder; Fence Laborer; Flagman; Pilot Car

GROUP 3: General Laborer; Air, Gas, or Electric Vibrating Screed; Asbestos Abatement Laborer; Ballast Regulator Machine; Brush Cutter; Brush Hog Feeder; Burner; Carpenter Tender; Cement Finisher Tender; Change House or Dry Shack; Chipping Gun (under 30 lbs.); Choker Setter; Chuck Tender; Clean-up Laborer; Concrete Form Stripper; Curing Laborer; Demolition (wrecking and moving including charred material); Ditch Digger; Dump Person; Fine Graders; Firewatch; Form Setter; Gabian Basket Builders; Grout Machine Tender; Grinders; Guardrail Erector; Hazardous Waste Worker (Level C); Maintenance Person; Material Yard Person; Pot Tender; Rip Rap Person; Riggers; Scale Person; Sloper Sprayer; Signal Person; Stock Piler; Stake Hopper; Toolroom Man (at job site); Topper-Tailer; Track Laborer; Truck Spotter; Vinyl Seamer

GROUP 4: Cement Dumper-Paving; Chipping Gun (over 30 lbs.); Clary Power Spreader; Concrete Dumper/Chute Operator; Concrete Saw Operator; Drill Operator (hydraulic, diamond, aiartrac); Faller and Bucker Chain Saw; Grade Checker and Transit Person; Groutmen (pressure) including post tension beams; Hazardous Waste Worker (Level B); High Scaler; Jackhammer; Laserbeam Operator; Manhole Builder-Mudman; Mortarman and Hodcarrier; Nozzleman (concrete pump, green cutter when using combination of high pressure air and water on concrete and rock, sandblast, gunite, shotcrete, water blaster, vacuum blaster); Pavement Breaker; Pipe Layer and Caulker; Pipe Pot Tender; Pipe Reliner (not insert type); Pipe Wrapper; Power Jacks; Railroad Spike Puller-Power; Raker-Asphalt; Rivet Buster; Rodder; Sloper (over 20'); Spreader

(concrete); Tamper and Similar electric, air and glas operated tool; Timber Person-sewer (lagger shorer and cribber); Track Liner Power; Tugger Operator; Vibrator; Well Point Laborer

GROUP 5: Caisson Worker; Miner; Powderman; Re-Timberman; Hazardous Waste Worker (Level A).

LAB00238E 06/01/2002

	Rates	Fringes
ADAMS, ASOTIN, BENTON, COLUMBIA, DOUGLAS (EAST OF THE 120TH MERIDIAN), FERRY, FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN, PEND OREILLE, STEVENS, SPOKANE, WALLA WALLA AND WHITMAN COUNTIES		

LABORERS:

ZONE 1:

GROUP 1	17.66	5.50
GROUP 2	19.76	5.50
GROUP 3	20.03	5.50
GROUP 4	20.30	5.50
GROUP 5	20.58	5.50

GROUP 6

21.95

5.50

Zone Differential (Add to Zone 1 rate): \$2.00

BASE POINTS: Spokane, Moses Lake, Pasco, Lewiston

Zone 1: 0-45 radius miles from the main post office.

Zone 2: 45 radius miles and over from the main post office.

LABORERS CLASSIFICATIONS

GROUP 1: Flagman; Landscape Laborer; Scaleman; Traffic Control Maintenance Laborer (to include erection and maintenance of barricades, signs and relief of flagperson); Window Washer/Cleaner (detail cleanup, such as, but not limited to cleaning floors, ceilings, walls, windows, etc. prior to final acceptance by the owner)

GROUP 2: Asbestos Abatement Worker; Brush Hog Feeder; Carpenter Tender; Cement Handler; Clean-up Laborer; Concrete Crewman (to include stripping of forms, hand operating jacks on slip form construction, application of concrete curing compounds, pumpcrete machine, signaling, handling the nozzle of squeezecrete or similar machine, 6 inches and smaller); Confined Space Attendant; Concrete Signalman; Crusher Feeder; Demolition (to include clean-up, burning, loading, wrecking and salvage of all material); Dumpman; Fence Erector; Firewatch; Form Cleaning Machine Feeder, Stacker; General Laborer; Grout Machine Header Tender; Guard Rail (to include guard rails, guide and reference posts, sign posts, and right-of-way markers); Hazardous Waste Worker, Level D (no respirator is used and skin protection is minimal); Miner, Class "A" (to include all bull gang, concrete crewman, dumpman and pumpcrete crewman, including distributing pipe, assembly &

dismantle, and nipper); Nipper; Riprap Man; Sandblast Tailhoseman; Scaffold Erector (wood or steel); Stake Jumper; Structural Mover (to include separating foundation, preparation, cribbing, shoring, jacking and unloading of structures); Tailhoseman (water nozzle); Timber Bucker and Faller (by hand); Track Laborer (RR); Truck Loader; Well-Point Man; All Other Work Classifications Not Specially Listed Shall Be Classified As General Laborer

GROUP 3: Asphalt Raker; Asphalt Roller, walking; Cement Finisher Tender; Concrete Saw, walking; Demolition Torch; Dope Pot Firemen, non-mechanical; Driller Tender (when required to move and position machine); Form Setter, Paving; Grade Checker using level; Hazardous Waste Worker, Level C (uses a chemical "splash suit" and air purifying respirator); Jackhammer Operator; Miner, Class "B" (to include brakeman, finisher, vibrator, form setter); Nozzlemans (to include squeeze and flo-crete nozzle); Nozzlemans, water, air or steam; Pavement Breaker (under 90 lbs.); Pipelayer, corrugated metal culvert; Pipelayer, multi-plate; Pot Tender; Power Buggy Operator; Power Tool Operator, gas, electric, pneumatic; Railroad Equipment, power driven, except dual mobile power spiker or puller; Railroad Power Spiker

or Puller, dual mobile; Rodder and Spreader; Tamper (to include operation of Barco, Essex and similar tampers); Trencher, Shawnee; Tugger Operator; Wagon Drills; Water Pipe Liner; Wheelbarrow (power driven)

GROUP 4: Air and Hydraulic Track Drill; Brush Machine (to include horizontal construction joint cleanup brush machine, power propelled); Caisson Worker, free air; Chain Saw Operator and Faller; Concrete Stack (to include laborers when laborers working on free standing concrete stacks for smoke or fume control above 40 feet high); Guniting (to include operation of machine and nozzle); Hazardous Waste Worker, Level B (uses same respirator protection as Level A. A supplied air line is provided in conjunction with a chemical "splash suit"); High Scaler; Laser Beam Operator (to include grade checker and elevation control); Miner, Class C (to include miner, nozzleman for concrete, laser beam operator and rigger on tunnels); Monitor Operator (air track or similar mounting); Mortar Mixer; Nozzleman (to include jet blasting nozzleman, over 1,200 lbs., jet blast machine power propelled, sandblast nozzle); Pavement Breaker (90 lbs. and over); Pipelayer (to include working topman, caulker, collarman, jointer, mortarman, rigger, jacker, shorer, valve or meter installer); Pipewrapper; Plasterer Tender; Vibrators (all)

GROUP 5 - Drills with Dual Masts; Hazardous Waste Worker, Level A (utilizes a fully encapsulated suit with a self-contained breathing apparatus or a supplied air line); Miner Class "D", (to include raise and shaft miner, laser beam operator on riases and shafts)

GROUP 6 - Powderman

 LAB00238G 06/01/2002

	Rates	Fringes
COUNTIES EAST OF THE 120TH MERIDIAN: ADAMS, ASOTIN, BENTON, COLUMBIA, DOUGLAS, FERRY, FRANKLIN, GARFIELD, GRANT, LINCOLN, OKANOGAN, PEND OREILLE, STEVENS, SPOKANE, WALLA WALLA, WHITMAN		
HOD CARRIERS	21.55	5.50

 LAB00335A 06/01/2002

	Rates	Fringes
CLARK, COWLITZ, KLICKITAT, PACIFIC (SOUTH OF A STRAIGHT LINE MADE BY EXTENDING THE NORTH BOUNDARY LINE OF WAHKIAKUM COUNTY WEST TO THE PACIFIC OCEAN), SKAMANIA AND WAHKIAKUM COUNTIES		

ZONE 1:

LABORERS:

GROUP 1	23.43	6.15
GROUP 2	23.94	6.15
GROUP 3	24.33	6.15
GROUP 4	24.66	6.15
GROUP 5	21.26	6.15
GROUP 6	19.16	6.15

GROUP 7

16.40

6.15

Zone Differential (Add to Zone 1 rates):

Zone 2 \$ 0.65

Zone 3 - 1.15

Zone 4 - 1.70

Zone 5 - 2.75

BASE POINTS: GOLDENDALE, LONGVIEW, AND VANCOUVER

ZONE 1: Projects within 30 miles of the respective city all.

ZONE 2: More than 30 miles but less than 40 miles from the respective city hall.

ZONE 3: More than 40 miles but less than 50 miles from the respective city hall.

ZONE 4: More than 50 miles but less than 80 miles from the respective city hall.

ZONE 5: More than 80 miles from the respective city hall.

LABORERS CLASSIFICATIONS

GROUP 1: Asphalt Plant Laborers; Asphalt Spreaders; Batch Weighman; Broomers; Brush Burners and Cutters; Car and Truck Loaders; Carpenter Tender; Change-House Man or Dry Shack Man; Choker Setter; Clean-up Laborers; Curing, Concrete; Demolition, Wrecking and Moving Laborers; Dumpers, road oiling crew; Dumpmen (for grading crew); Elevator Feeders; Guard Rail, Median Rail Reference Post, Guide Post, Right of Way Marker; Fine Graders; Fire Watch; Form Strippers (not swinging stages); General Laborers; Hazardous Waste Worker; Leverman or Aggregate Spreader (Flaherty and similar types); Loading Spotters; Material Yard Man (including electrical); Pittsburgh Chipper Operator or Similar Types; Railroad Track Laborers; Ribbon Setters (including steel forms); Rip Rap Man (hand placed); Road Pump Tender; Sewer Labor;

Signalman; Skipman; Slopers; Spraymen; Stake Chaser; Stockpiler; Tie Back Shoring; Timber Faller and Bucker (hand labor); Toolroom Man (at job site); Tunnel Bullgang (above ground); Weight-Man-Crusher (aggregate when used)

GROUP 2: Applicator (including pot power tender for same), applying protective material by hand or nozzle on utility lines or storage tanks on project; Brush Cutters (power saw); Burners; Choker Splicer; Clary Power Spreader and similar types; Clean-up Nozzlemans-Green Cutter (concrete, rock, etc.); Concrete Power Buggyman; Concrete Laborer; Crusher Feeder; Demolition and Wrecking Charred Materials; Guniting Nozzlemans Tender; Guniting or Sand Blasting Pot Tender; Handlers or Mixers of all Materials of an irritating nature (including cement and lime); Tool Operators (includes but not limited to: Dry Pack Machine; Jackhammer; Chipping Guns; Paving Breakers); Pipe Doping and Wrapping; Post Hole Digger, air, gas or electric; Vibrating Screed; Tampers; Sand Blasting (Wet); Stake-Setter; Tunnel-Muckers, Brakemen, Concrete Crew, Bullgang (underground)

GROUP 3: Asbestos Removal; Bit Grinder; Drill Doctor; Drill Operators, air tracks, cat drills, wagon drills, rubber-mounted

drills, and other similar types including at crusher plants; Gunite Nozzelman; High Scalers, Strippers and Drillers (covers work in swinging stages, chairs or belts, under extreme conditions unusual to normal drilling, blasting, barring-down, or sloping and stripping); Manhole Builder; Powdermen; Concrete Saw Operator; Powdermen; Power Saw Operators (Bucking and Falling); Pumpcrete Nozzlemen; Sand Blasting (Dry); Sewer Timberman; Track Liners, Anchor Machines, Ballast Regulators, Multiple Tampers, Power Jacks, Tugger Operator; Tunnel-Chuck Tenders, Nippers and Timbermen; Vibrator; Water Blaster

GROUP 4: Asphalt Raker; Concrete Saw Operator (walls); Concrete Nozzelman; Grade Checker; Pipelayer; Laser Beam (pipelaying)-applicable when employee assigned to move, set up, align; Laser Beam; Tunnel Miners; Motorman-Dinky Locomotive-Tunnel; Powderman-Tunnel; Shield Operator-Tunnel

GROUP 5: Traffic Flaggers

GROUP 6: Fence Builders

GROUP 7: Landscaping or Planting Laborers

LAB00335L 06/01/2002

Rates Fringes
 CLARK, COWLITZ, KLICKITAT, PACIFIC (SOUTH OF A STRAIGHT LINE MADE BY EXTENDING THE NORTH BOUNDARY LINE OF WAHKIAKUM COUNTY WEST TO THE PACIFIC OCEAN), SKAMANIA AND WAHKIAKUM COUNTIES

HOD CARRIERS 25.04 6.15

PAIN0005B 06/01/2002

Rates Fringes
 STATEWIDE EXCEPT CLARK, COWLITZ, KLICKITAT, PACIFIC (SOUTH), SKAMANIA, AND WAHKIAKUM COUNTIES

STRIPERS 21.25 6.40

PAIN0005D 07/01/2002

Rates Fringes
 CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS, MASON, PIERCE, SAN JUAN, SKAGIT, SNOHOMISH, THURSTON AND WHATCOM COUNTIES

PAINTERS 23.27 5.36

* PAIN0005G 07/01/2002

Rates Fringes
 ADAMS, ASOTIN; BENTON AND FRANKLIN (EXCEPT HANFORD SITE); CHELAN, COLUMBIA, DOUGLAS, FERRY, GARFIELD, GRANT, KITTITAS, LINCOLN, OKANOGAN, PEND OREILLE, SPOKANE, STEVENS, WALLA WALLA, WHITMAN AND YAKIMA COUNTIES

PAINTERS*:

Brush, Roller, Striping, Steam-cleaning and Spray Application of Cold Tar Products, Epoxies, Polyure thanes, Acids, Radiation Resistant Material, Water and Sandblasting, Bridges, Towers, Tanks, Stacks, Steeples	18.97	5.32
TV Radio, Electrical Transmission Towers	19.97	5.32
Lead Abatement, Asbestos Abatement	20.72	5.32
	19.97	5.32

*\$.70 shall be paid over and above the basic wage rates listed for work on swing stages and high work of over 30 feet.

PAIN0055C 07/01/2002

CLARK, COWLITZ, KLICKITAT, PACIFIC, SKAMANIA, AND WAHKIAKUM
COUNTIES

PAINTERS:

	Rates	Fringes
Brush & Roller	17.35	5.08
Spray and Sandblasting	17.95	5.08
High work - All work 60 ft. or higher	18.10	5.08

PAIN0055L 06/01/2002

CLARK, COWLITZ, KLICKITAT, SKAMANIA and WAHKIAKUM COUNTIES

PAINTERS:

HIGHWAY AND PARKING LOT STRIPER	23.36	5.75
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PLAS0072E 06/01/2002

ADAMS, ASOTIN, BENTON, CHELAN, COLUMBIA, DOUGLAS, FERRY,
FRANKLIN, GARFIELD, GRANT, KITTITAS, LINCOLN, OKANOGAN, PEND
OREILLE, SPOKANE, STEVENS, WALLA WALLA, WHITMAN, AND
YAKIMA COUNTIES

ZONE 1:

CEMENT MASONS	22.33	5.98
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Zone Differential (Add to Zone 1
rate): Zone 2 - \$2.00

BASE POINTS: Spokane, Pasco, Moses Lake, Lewiston

Zone 1: 0 - 45 radius miles from the main post office

Zone 2: Over 45 radius miles from the main post office

PLAS0528A 12/01/2002

	Rates	Fringes
CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS, MASON, PACIFIC (NORTH), PIERCE, SAN JUAN, SKAGIT, SNOHOMISH, THURSTON, AND WHATCOM COUNTIES		
CEMENT MASON	28.05	9.84
COMPOSITION, COLOR MASTIC, TROWEL MACHINE, GRINDER, POWER TOOLS, GUNNITE NOZZLE	28.30	9.84

PLAS0555B 06/01/2002

	Rates	Fringes
CLARK, COWLITZ, KLICKITAT, PACIFIC (SOUTH), SKAMANIA, AND WAHKIAKUM COUNTIES		
ZONE 1:		
CEMENT MASONS	24.24	9.70
COMPOSITION WORKERS AND POWER MACHINERY OPERATORS	24.68	9.70
CEMENT MASONS ON SUSPENDED, SWINGING AND/OR HANGING SCAFFOLD	24.68	9.70
CEMENT MASONS DOING BOTH COMPOSITION/POWER MACHINERY AND SUSPENDED/HANGING SCAFFOLD	25.13	9.70

Zone Differential (Add To Zone 1 Rates):

Zone 2 - \$0.65

Zone 3 - 1.15

Zone 4 - 1.70

Zone 5 - 2.75

BASE POINTS: BEND, CORVALLIS, EUGENE, LONGVIEW, MEDFORD,
PORTLAND, SALEM, THE DALLES, VANCOUVER

ZONE 1: Projects within 30 miles of the respective city hall

ZONE 2: More than 30 miles but less than 40 miles from the
respective city hall.

ZONE 3: More than 40 miles but less than 50 miles from the
respective city hall.

ZONE 4: More than 50 miles but less than 80 miles from the
respective city hall.

ZONE 5: More than 80 miles from the respective city hall

PLUM0032B 01/01/2003

	Rates	Fringes
CLALLAM, KING AND JEFFERSON COUNTIES		
PLUMBERS AND PIPEFITTERS	34.18	12.68

PLUM0032D 06/01/2002
Rates Fringes
CHELAN, KITTITAS (NORTHERN TIP), DOUGLAS (NORTH), AND OKANOGAN
(NORTH) COUNTIES

PLUMBERS AND PIPEFITTERS 26.13 10.23

PLUM0044C 06/01/2002
Rates Fringes
ADAMS (NORTHERN PART), ASOTIN (CLARKSTON ONLY), FERRY (EASTERN
PART), LINCOLN (EASTERN PART), PEND ORIELLE, STEVENS, SPOKANE,
AND WHITMAN COUNTIES

PLUMBERS AND PIPEFITTERS 26.16 9.89

PLUM0082A 08/01/2002
Rates Fringes
CLARK (NORTHERN TIP INCLUDING WOODLAND), COWLITZ, GRAYS HARBOR,
LEWIS, MASON (EXCLUDING NE SECTION), PACIFIC, PIERCE
SKAMANIA, THURSTON AND WAHKIAKUM COUNTIES

PLUMBERS AND PIPEFITTERS 29.60 11.62

PLUM0265C 08/01/2002
Rates Fringes
ISLAND, SKAGIT, SNOHOMISH, SAN JUAN AND WHATCOM COUNTIES

PLUMBERS AND PIPEFITTERS 29.00 11.62

PLUM0290K 10/01/2002
Rates Fringes
CLARK (ALL EXCLUDING NORTHERN TIP INCLUDING CITY OF WOODLAND)

PLUMBERS AND PIPEFITTERS 31.73 12.93

PLUM0598E 06/01/2002
Rates Fringes
ADAMS (SOUTHERN PART), ASOTIN (EXCLUDING THE CITY OF CLARKSTON),
BENTON, COLUMBIA, DOUGLAS (EASTERN HALF), FERRY (WESTERN PART),
FRANKLIN, GARFIELD, GRANT, KITTITAS (ALL BUT NORTHERN TIP),
KLICKITAT, LINCOLN (WESTERN PART), OKANOGAN (EASTERN), WALLA
WALLA AND YAKIMA COUNTIES

PLUMBERS 29.85 12.59

PLUM0631A 08/01/2002
Rates Fringes
MASON (NE SECTION),

AND KITSAP COUNTIES

PLUMBERS/PIPEFITTERS:

All new construction, additions, and remodeling of commercial building projects such as: cocktail lounges and taverns, professional buildings, medical clinics, retail stores, hotels and motels, restaurants and fast food types, gasoline service stations, and car washes where the plumbing and mechanical cost of the project is less than \$100,000

	19.20	4.58
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All other work where the plumbing and mechanical cost of the project is \$100,000 and over

	27.84	11.62
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* TEAM0037C 06/01/2002

	Rates	Fringes
CLARK, COWLITZ, KLUCKITAT, PACIFIC (South of a straight line made by extending the north boundary line of Wahkiakum County west to the Pacific Ocean), SKAMANIA, AND WAHAKIAKUM COUNTIES		

TRUCK DRIVERS

ZONE 1:

GROUP 1	23.65	8.45
GROUP 2	23.77	8.45
GROUP 3	23.90	8.45
GROUP 4	24.16	8.45
GROUP 5	24.38	8.45
GROUP 6	24.54	8.45
GROUP 7	24.74	8.45

Zone Differential (Add to Zone 1 Rates):

Zone 2 - \$0.65
 Zone 3 - 1.15
 Zone 4 - 1.70
 Zone 5 - 2.75

BASE POINTS: ASTORIA, THE DALLES, LONGVIEW AND VANCOUVER

ZONE 1: Projects within 30 miles of the respective city hall.
 ZONE 2: More than 30 miles but less than 40 miles from the respective city hall.
 ZONE 3: More than 40 miles but less than 50 miles from the respective city hall.
 ZONE 4: More than 50 miles but less than 80 miles from the respective city hall.
 ZONE 5: More than 80 miles from the respective city hall.

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: A Frame or Hydra lift truck w/load bearing surface; Articulated dump truck; Battery Rebuilders; Bus or Manhaul Driver; Concrete Buggies (power operated); Concrete pump truck; Dump Trucks, side, end and bottom dumps, including Semi Trucks and Trains or combinations there of: up to and including 10 cu. yds.; Lift Jitneys, Fork Lifts (all sizes in loading, unloading and transporting material on job site); Loader and/or Leverman on Concrete Dry Batch Plant (manually operated); Pilot Car; Pickup truck; Solo Flat Bed and misc. Body Trucks, 0-10 tons; Truck Tender; Truck Mechanic Tender; Water Wagons (rated capacity) up to 3,000 gallons; Transit Mix and Wet or Dry Mix - 5 cu. yds. and under; Lubrication Man, Fuel Truck Driver, Tireman, Wash Rack, Steam Cleaner or combinations; Team Driver; Slurry Truck Driver or Leverman; Tireman

GROUP 2: Boom truck/hydra lift or retracting crane; Challenger; Dumpsters or similar equipment all sizes; Dump Trucks/articulated dumps 6 cu to 10 cu.; Flaherty Spreader Driver or Leverman; Lowbed Equipment, Flat Bed Semi-trailer or doubles transporting equipment or wet or dry materials; Lumber Carrier, Driver-Straddle Carrier (used in loading, unloading and transporting of materials on job site); Oil Distributor Driver or Leverman; Transit mix and wet or dry mix trucks: over 5 cu. yds. and including 7 cu. yds.; Vacuum trucks; Water truck/Wagons (rated capacity) over 3,000 to 5,000 gallons

GROUP 3: Ammonia nitrate distributor driver; Dump trucks, side, end and bottom dumps, including Semi Trucks and Trains or combinations thereof: over 10 cu. yds. and including 30 cu. yds. includes Articulated dump trucks; Selfpropelled street sweeper; Transit mix and wet or dry mix truck: over 7 cu yds. and including 11 cu yds.; Truck Mechanic-Welder-Body Repairman; Utility and cleanup truck; Water Wagons (rated capacity) over 5,000 to 10,000 gallons

GROUP 4: Asphalt burner; Dump Trucks, side, end and bottom cumps, including Semi-Trucks and Trains or combinations thereof: over 30 cu. yds. and including 50 cu. yds. includes articulated dump trucks; Fire guard; Transit Mix and Wet or Dry Mix Trucks, over 11 cu. yds. and including 15 cu. yds.; Water Wagon (rated capacity) over 10,000 gallons to 15,000 gallons

GROUP 5: Dump Trucks, side, end and bottom dumps, including Semi Trucks and Trains or combinations thereof: over 50 cu. yds. and including 60 cu. yds. includes articulated dump trucks

GROUP 6: Bulk cement spreader w/o auger; Dry prebatch concrete mix trucks; Dump trucks, side, end and bottom dumps, including Semi Trucks and Trains of combinations thereof: over 60 cu. yds. and including 80 cu. yds., and includes articulated dump trucks; Skid truck

GROUP 7: Dump Trucks, side, end and bottom dumps, including Semi Trucks and Trains or combinations thereof: over 80 cu. yds. and including 100 cu. yds., includes articulated dump trucks; Industrial lift truck (mechanical tailgate)

TEAM0174A 06/01/2002

Rates Fringes
CLALLAM, GRAYS HARBOR, ISLAND, JEFFERSON, KING, KITSAP, LEWIS,
MASON, PACIFIC (North of a straight line made by extending the
north boundary line of Wahkiakum County west to the Pacific
Ocean), PIERCE, SAN JUAN, SKAGIT, SNOHOMISH, THURSTON AND
WHATCOM COUNTIES

TRUCK DRIVERS;

ZONE A:

GROUP 1:	25.79	9.68
GROUP 2:	25.21	9.68
GROUP 3:	22.81	9.68
GROUP 4:	18.56	9.68
GROUP 5:	25.55	9.68

ZONE B (25-45 miles from center of listed cities*):

Add \$.70 per hour to Zone A rates.

ZONE C (over 45 miles from centr of listed cities*):

Add \$1.00 per hour to Zone A rates.

*Zone pay will be calculated from the city center of the
following listed cities:

BELLINGHAM	CENTRALIA	RAYMOND	OLYMPIA
EVERETT	SHELTON	ANACORTES	BELLEVUE
SEATTLE	PORT ANGELES	MT. VERNON	KENT
TACOMA	PORT TOWNSEND	ABERDEEN	BREMERTON

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1 - "A-frame or Hydralift" trucks and Boom trucks or
similar equipment when "A" frame or "Hydralift" and Boom truck or

similar equipment is used; Buggymobile; Bulk Cement Tanker;
Dumpsters and similar equipment, Tournorockers, Tournowagon,
Turnotrailer, Cat DW series, Terra Cobra, Le Tourneau,
Westinghouse, Athye Wagon, Euclid Two and Four-Wheeled power
tractor with trailer and similar top-loaded equipment
transporting material: Dump Trucks, side, end and bottom dump,
including semi-trucks and trains or combinations thereof with 16
yards to 30 yards capacity: Over 30 yards \$.15 per hour
additional for each 10 yard increment; Explosive Truck (field
mix) and similar equipment; Hyster Operators (handling bulk loose
aggregates); Lowbed and Heavy Duty Trailer; Road Oil Distributor
Driver; Spreader, Flaherty Transit mix used exclusively in heavy
construction; Water Wagon and Tank Truck-3,000 gallons and
over capacity

GROUP 2 - Bulllifts, or similar equipment used in loading or
unloading trucks, transporting materials on job site; Dumpsters,
and similar equipment, Tournorockers, Tournowagon, Turnotrailer,
Cat. D.W. Series, Terra Cobra, Le Tourneau, Westinghouse, Athye
wagon, Euclid two and four-wheeled power tractor with trailer and
similar top-loaded equipment transporting material: Dump trucks,
side, end and bottom dump, including semi-trucks and trains or

BASE POINTS: Spokane, Moses Lake, Pasco, Lewiston

Zone 1: 0-45 radius miles from the main post office.

Zone 2: 45 radius miles and over from the main post office

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Escort Driver or Pilot Car; Employee Haul; Power Boat Hauling Employees or Material

GROUP 2: Fish Truck; Flat Bed Truck; Fork Lift (3000 lbs. and under); Leverperson (loading trucks at bunkers); Trailer Mounted Hydro Seeder and Mulcher; Seeder & Mulcher; Stationary Fuel Operator; Tractor (small, rubber-tired, pulling trailer or similar equipment)

GROUP 3: Auto Crane (2000 lbs. capacity); Buggy Mobile & Similar; Bulk Cement Tanks & Spreader; Dumptor (6 yds. & under); Flat Bed Truck with Hydraulic System; Fork Lift (3001-16,000 lbs.); Fuel Truck Driver, Steamcleaner & Washer; Power Operated Sweeper; Rubber-tired Tunnel Jumbo; Scissors Truck; Slurry Truck Driver; Straddle Carrier (Ross, Hyster, & similar); Tireperson; Transit Mixers & Truck Hauling Concrete (3 yd. to & including 6 yds.); Trucks, side, end, bottom & articulated end dump (3 yards to and including 6 yds.); Warehouseperson (to include shipping & receiving); Wrecker & Tow Truck

GROUP 4: A-Frame; Burner, Cutter, & Welder; Service Greaser; Trucks, side, end, bottom & articulated end dump (over 6 yards to and including 12 yds.); Truck Mounted Hydro Seeder; Warehouseperson; Water Tank truck (0-8,000 gallons)

GROUP 5: Dumptor (over 6 yds.); Lowboy (50 tons & under); Self-loading Roll Off; Semi-Truck & Trailer; Tractor with Steer Trailer; Transit Mixers and Trucks Hauling Concrete (over 6 yds.

to and including 10 yds.); Trucks, side, end, bottom and end dump (over 12 yds. to & including 20 yds.); Truck-Mounted Crane (with load bearing surface either mounted or pulled, up to 14 ton); Vacuum Truck (super sucker, guzzler, etc.)

GROUP 6: Flaherty Spreader Box Driver; Flowboys; Fork Lift (over 16,000 lbs.); Dumps (Semi-end); Mechanic (Field); Semi-end Dumps; Transfer Truck & Trailer; Transit Mixers & Trucks Hauling Concrete (over 10 yds. to & including 20 yds.); Trucks, side, end, bottom and articulated end dump (over 20 yds. to & including 40 yds.); Truck and Pup; Tournarocker, DW's & similar with 2 or more 4 wheel-power tractor with trailer, gallonage or yardage scale, whichever is greater Water Tank Truck (8,001-14,000 gallons)

GROUP 7: Oil Distributor Driver; Stringer Truck (cable operated trailer); Transit Mixers & Trucks Hauling Concrete (over 20 yds.); Truck, side, end, bottom end dump (over 40 yds. to & including 100 yds.); Truck Mounted Crane (with load bearing surface either mounted or pulled (16 through 25 tons);

GROUP 8: Prime Movers and Stinger Truck; Trucks, side, end, bottom and articulated end dump (over 100 yds.); Helicopter Pilot

Hauling Employees or Materials

Footnote A - Anyone working on a HAZMAT job, where HAZMAT certification is required, shall be compensated as a premium, in addition to the classification working in as follows:

LEVEL C-D: - \$.50 PER HOUR (This is the lowest level of protection. This level may use an air purifying respirator or additional protective clothing.

LEVEL A-B: - \$1.00 PER HOUR (Uses supplied air in conjunction with a chemical splash suit or fully encapsulated suit with a self-contained breathing apparatus.

NOTE: Trucks Pulling Equipment Trailers: shall receive \$.15/hour over applicable truck rate

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5(a)(1)(ii)).

In the listing above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal

process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U. S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N. W.
Washington, D. C. 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U. S. Department of Labor

200 Constitution Avenue, N. W.
Washington, D. C. 20210

4.) All decisions by the Administrative Review Board are final.
END OF GENERAL DECISION

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**SECTION 01001
SUPPLEMENTARY REQUIREMENTS**

PART 1—GENERAL

1.1 DEFINITIONS

The references listed below are to be defined as indicated wherever they may be used in the TECHNICAL SPECIFICATIONS.

"SUPPLEMENTARY REQUIREMENTS " shall be read to pertain to any of the sections of the DIVISION 1 as required by the content of the section or paragraph containing the reference.

1.2 CONSTRUCTION SCHEDULING

1.2.1 Construction Progress Charts and Status Reports:

The instructions and information herein supplement the requirements of Paragraph SCHEDULE FOR CONSTRUCTION CONTRACTS IN THE CONTRACT CLAUSES. The proposed Construction Progress Chart shall be prepared on ENG Form 2454. Additional instructions are obtained in INSTRUCTIONS AND INFORMATION FOR CONTRACTORS, a manual furnished to the Contractor by the Contracting Officer. This manual is available for inspection in the Office of the Seattle District, Corps of Engineers 4735 East Marginal Way South, Seattle, Washington.

1.2.2 The minimum principal contract features (activities) to be included on ENG Form 2454 shall represent the work in each of the following divisions:

- (a) Site work
 - grading
 - geomembrane barrier
 - geonet composite
 - gas collection system
 - wells and probes
 - storm drainage
 - top soil / seeding
- (b) Concrete
- (c) Special Construction
 - gas flare

1.2.3 The Construction Progress Chart shall show the total bid amount distributed among the features shown on the chart. The schedule shall show the percentage of completion at the close of each weekly period. This percentage shall be based on percentage of physical completion of the work. (NOTE: Mobilization and demobilization shall not be listed as a separate payment item unless so noted in the schedule.)

1.2.4 The Construction Progress Chart shall be submitted within 10 calendar days after the date of receipt of notice to proceed.

1.2.5 The Contractor shall prepare and submit a monthly project status report. The report shall tell whether the project as a whole is on, ahead of, or behind schedule. If the project is behind schedule, the Contractor shall explain what actions he will take to regain his schedule. The report shall include a description of problem areas, delaying factors and their impact, and an explanation of corrective actions taken or proposed. Any delays caused by the Government shall be identified. Any significant items or events that occurred during the report month shall also be detailed.

1.3 CORRESPONDENCE

1.3.1 All correspondence shall be addressed to the Administrative Contracting Officer, shall be serially numbered commencing with Number 1, with no numbers missing or duplicated and shall be furnished with an original and one copy. Enclosures attached or transmitted with the correspondence shall also be furnished with an original and one copy. Each serial letter shall make reference to the contract name, contract number and shall have only one subject.

1.3.2 All correspondence from the Contracting Officer will be also serially numbered with no numbers missing or duplicated. Letters to the Contractor will be forwarded in duplicate.

1.3.3 In the event there is more than one project within a contract, correspondence shall contain separate and distinct submittals to identify each project by name.

1.3.4 For submission of Contractor payment requests, See Section 01025, PAYMENT.

1.4 ADVANCED NOTICE OF CONTRACTOR PERFORMED ACCEPTANCE TESTING

The Contractor shall notify the Contracting Officer a minimum of 20 days prior to performing any acceptance or "buy off" testing of the gas flare. Advance notification is not required for testing performed as part of fabrication or installation.

1.5 CONTRACTOR'S FILES

Contractor shall maintain "Approved (Action Code "A") and "Approved Except as Noted (Action Code "B") shop drawing files in fabrication shops and at project sites for government use.

1.6 AUDIO-VIDEO RECORDINGS

1.6.1 General

The Contractor shall provide all equipment, materials, and trained personnel to visually and audibly record (video tape) all on site operations and maintenance (O&M) training sessions for this contract. The video technician shall be employed by a video production company that has been in business for a minimum of 2 years. The Contractor shall

submit the resume of the technician and video production company. Also the Contractor shall submit for approval an agenda or an outline breakdown of the proposed presentation. Video tapes shall be produced in the VHS format. Audio shall be adjusted, filtered or otherwise controlled to insure that the trainer can be understood at all times. Each system or piece of equipment shall be covered in a single tape or set of tapes which shall be correlated with the O&M manuals provided. Video tapes and their individual storage cases shall be identified with a typewritten label showing the project, equipment or system, and contract number; this same information shall be provided as an introduction on each video tape. When two or more tapes are provided, they shall be submitted as a set in an appropriate storage container.

1.6.2 Submittals

Prior to conducting the training sessions the following shall be submitted for approval:

- 1) A training plan consisting of the agenda or an outline breakdown of the proposed presentation and
- 2) The qualifications of the trainer and the video recording technician

Two copies of the video taped material shall be submitted to the Contracting Officer within 10 days after completion of video taping the training sessions.

1.7 MECHANICAL AND ELECTRICAL LAYOUT DRAWINGS - NOT USED

1.8 PROJECT PHOTOGRAPHS

1.8.1 General

The Contractor shall furnish photographs (35 mm color slides) depicting construction as specified herein. Each slide shall be individually labeled showing date taken, project location, contract title and number, and a brief description of what each slide depicts. Two copies of each slide shall be furnished to the Contracting Officer by the time specified. Slides shall be submitted in 8 1/2 X 11 inch clear plastic slide holders. Duplicate slides shall be collated into separate folders.

1.8.2 Progress Photographs

Construction progress photographs (35 mm color slides) shall be taken between the 1st and 15th of each month and delivered to the Contracting Officer with the payment request for the month taken. Slides shall be taken from 8 positions. Location of positions shall be coordinated with or may be selected by the Contracting Officer. They shall show, inasmuch as practicable, work accomplished during the previous month. Photographic quality and composition of slides shall be such that they can be used for briefings and/or to illustrate articles on the construction progress of the project.

1.9 COLOR BOARDS - NOT USED

1.10 IDENTIFICATION OF EMPLOYEES AND MILITARY REGULATIONS:

(a) The Contractor shall be responsible for compliance with all regulations and orders of the Commanding Officer of the Military Installation, respecting identification of employees, movements on installation, parking, truck entry, and all other military regulations which may affect the work.

(b) The work under this Contract is to be performed at an operating Military Installation with consequent restrictions on entry and movement of nonmilitary personnel and equipment.

(c) Army and Fort Lewis regulations require anyone operating a motorcycle on an Army installation to have passed an Army-approved motorcycle safety course. At Fort Lewis, a Contractor employee may meet this requirement by successfully completing either the Motorcycle Rider's Course (MRC), or the Experienced Rider's Course (ERC), as taught by instructors certified by the Motorcycle Safety Foundation. This training is available in the local area and must be completed before Contractor personnel will be permitted to register or operate motorcycles on post.

(d) The Commanding Officer of Fort Lewis, Washington, has initiated the following specific requirement regarding vehicle registration for this contract.

Contractors performing work on Fort Lewis shall, after award, register all vehicles to be used on the installation with the Vehicle Registration Section of the Law Enforcement Command. Contractor employees entering the installation in privately owned vehicles (POVs) shall also register their vehicles. A copy of contract award, proof of liability insurance, current driver's license and state vehicle registration shall be required to register Contractor, subcontractor, and employee vehicles.

Upon completion of the contract, it shall be the prime contractor's responsibility to collect all vehicle decals issued under the contract including those issued to employees and subcontractors. Decals are to be carefully removed from the vehicle, placed in an envelope and attached to the original documentation (i.e., post vehicle registration document) received with the decal. Decals, with documentation, must be returned to Vehicle Registration, Building 2140. Proof of decal clearance for all vehicles registered under this contract will be issued to the prime contractor and shall be returned to the Contracting Officer prior to final payment.

In the event of contract extension, it shall be the prime contractor's responsibility to report time extension to Vehicle Registration, with evidence of same. For further information, contact Vehicle Registration, Building 2140 (Telephone: (206) 967-7668), Fort Lewis, Washington 98433-5000.

1.11 PERMITS OBTAINED BY GOVERNMENT AND CONTRACTOR RESPONSIBILITIES

It will be the responsibility of the Contractor to obtain all other permits/licenses required for this project. See the Contract Clause paragraph entitled PERMITS AND RESPONSIBILITIES.

1.12 PRESERVATION OF HISTORICAL, ARCHEOLOGICAL AND CULTURAL RESOURCES (1985 JAN OCE): - NOT USED

1.13 PERFORMANCE EVALUATION OF CONTRACTOR (1985 JAN OCE):

As a minimum, the Contractor's performance will be evaluated upon final acceptance of the work. However, interim evaluation may be prepared at any time during contract performance when determined to be in the best interest of the Government.

The format for the evaluation will be SF 1420, and the contractor will be rated either outstanding, satisfactory, or unsatisfactory in the areas of Contract Quality Control, Timely Performance, Effectiveness of Management, Compliance with Labor Standards, and Compliance with Safety Standards. The Contractor will be advised of any unsatisfactory rating, either in an individual element or in the overall rating, prior to completing the evaluation, and all Contractor comments will be made as part of the official record. Performance Evaluation Reports will be available to all DOD Contracting Officers for their future use in determining Contractor responsibility, in compliance with DFARS 36.201(c)(1).

1.14 SPECIAL SAFETY REQUIREMENTS:

1.14.1 Standards

The Contractor shall comply with applicable sections of the following standards:

- a) CFR 1926, Construction Standards
- b) CFR 1919, General Industry Standards
- c) CFR, Energy
- d) AR 385-9, Requirements for Military Lasers
- e) AR 385-10, The Army Safety Program
- f) AR 385-40, Accident Reporting and Records
- g) AR 385-55, Prevention of Motor Vehicle Accidents
- h) EM 385-1-1, Safety and Health Requirements Manual
- i) FORSCOM Reg 385-1, Forces Command Safety Program
- j) FL Reg 385-5, Fort Lewis Hazard Communication Program
- k) FL Cir 385-5, Motorcycle Safety

1.14.2 Contractor Compliance with Standards

In resolving any conflicts in compliance standards, the most stringent standard shall apply. The Contractor shall comply with all sections of EM 385-1-1, including Section 1, entitled "Program Management". The Contractor shall comply with the following additions to EM 385-1-1 listed below:

- (a) Paragraph 01.A.12: Add new paragraph: Safety Personnel. The Contractor shall designate a person on his staff to manage the Contractor's safety and accident prevention program. This person will provide a point of contact for the Contracting Officer on matters of job safety, and shall be responsible for ensuring the health and safety of on site personnel.
- (b) Paragraph 01.D.02, revise as follows:
 - (1) Replace paragraph 01.D.02c with the following:
"c. Property damage in excess of \$2,000.00
 - (2) Add new paragraph d as follows:
"An injury resulting in a lost workday."

1.14.3 Compliance Oversight

The U.S. Department of Labor - OSHA has the regulatory and statutory authority to enforce Contractor compliance with OSHA standards. The Installation Safety Officer, through the Contracting Officer or his representative, shall have the authority to enforce compliance with all referenced standards as they affect either Contractor personnel, or Army-accountable personnel and property.

1.14.4 Radiation Safety

All aspects of the job relating to radiation safety, including transportation, use, storage or handling must be addressed by the Contractor through the Contracting Officer to the Radiation Safety Officer, Mr. Ralph Weddle, Installation Safety Office, Building 6069, Fort Lewis, Ph: 967-3079/6764.

1.15 TIME EXTENSIONS FOR UNUSUALLY SEVERE WEATHER (ER 415-1-15 31 OCT 89)

This Paragraph specifies the procedure for the determination of time extensions for unusually severe weather in accordance with the CONTRACT CLAUSE entitled "Default (Fixed Price Construction)". In order for the Contracting Officer to award a time extension under this clause, the following conditions must be satisfied:

1.15.1 The weather experienced at the project site during the contract period must be found to be unusually severe, that is, more severe than the adverse weather anticipated for the project location during any given month.

1.15.2 The unusually severe weather must actually cause a delay to the completion of the project. The delay must be beyond the control and without the fault or negligence of the contractor.

1.15.3 The following schedule of monthly anticipated adverse weather delays is based on National Oceanic and Atmospheric Administration (NOAA) or similar data for the project location and will constitute the base line for monthly weather time evaluations. The contractor's progress schedule must reflect these anticipated adverse weather delays in all weather dependent activities.

**Monthly Anticipated Adverse Weather Delay
Work Days Based on (5) Day Work Week**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
9	8	8	4	2	3	1	2	4	7	10	10	Ft Lewis/McChord AFB

1.15.4 Upon acknowledgment of the notice to proceed (NTP) and continuing throughout the contract, the contractor will record on the daily QCQ report, the occurrence of adverse weather and resultant impact to normally scheduled work. Actual adverse weather delays must prevent work on critical activities for 50 percent or more of the contractor's scheduled work day.

1.15.5 The number of actual adverse weather delay days shall include days impacted by actual adverse weather (even if adverse weather occurred in previous month), be calculated chronologically from the first to the last day of each month, and be recorded as full days. If the number of actual adverse weather delay days exceeds the number of days anticipated in paragraph 1.15.3, above, the Contracting Officer will convert any qualifying delays to calendar days, giving full consideration for equivalent fair weather work days, and issue a modification in accordance with the contract clause entitled " Default (Fixed Price Construction)".

**1.16 SALVAGE MATERIALS AND EQUIPMENT FOR THE
GOVERNMENT - NOT USED**

PART 2—NOT USED

PART 3—NOT USED

* * END OF SECTION * *

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**SECTION 01005
SITE SPECIFIC
SUPPLEMENTARY REQUIREMENTS**

PART 1—CONDUCT OF WORK

1.1 COORDINATION AND ACCESS TO SITE

1.1.1 Coordination with using agencies shall be made through the Contracting Officer to assist the Contractor in completing the work with a minimum of interference and inconvenience.

1.1.2 All Contractor-owned and privately-owned vehicles require an access pass/vehicle decal. This pass is obtained from the Fort Lewis Vehicle Registrar, Building 2140 by showing proof of insurance; the vehicle registration; Washington State driver's license; and a letter with original signature of prime Contractor or his superintendent stating the contract name and number, the contract period for which the pass is required, and the employee's name. See Paragraph IDENTIFICATION OF EMPLOYEES AND MILITARY REGULATIONS in SECTION 01001 for specific requirements.

1.1.3 When keys are required for access to facilities on this contract, they shall be obtained through the Contracting Officer.

1.1.3.1 The Contractor shall be responsible for Government-owned keys issued for access to facilities or areas pertinent to this contract.

1.1.3.2 Upon completion of the work in an area, or upon request of the Contracting Officer, the key or keys relevant to the completed areas shall be returned.

1.1.3.3 Should the Contractor lose a key:

- a. the Contracting Officer shall be notified, in writing, within three (3) working days after the loss is discovered and
- b. should the key not be found before final acceptance, the final contract payment shall be reduced by \$100 for each key not returned.

1.1.4 Work hours in the construction area will be restricted to 7:30 a.m. to 4 p.m. daily, Monday through Friday, excluding federal holidays. Work hours other than as specified above shall be coordinated with and approved by the Contracting Officer.

1.1.5 Contractor's workmen shall have on either a uniform with the firm name and the workman's last name or shall have a badge pinned on with both the firm name and the workman's photograph and full name.

1.2 UTILITY OUTAGES

Contractor shall coordinate utility outages with the Contracting Officer at least 7 days in advance. Outages shall be kept to a minimum and any one outage shall not last more than 2 hours.

1.3 PROTECTION OF GOVERNMENT PROPERTY

In addition to requirements of the CONTRACT CLAUSES, Contractor shall protect all Government property within the buildings in which he is working, except for such property as is required to be demolished. Property which is to be demolished shall be protected until its scheduled demolition time. Protection shall include, but not be limited to, protection from construction generated dust, debris, water, and vibration.

*** * END OF SECTION * ***

**SECTION 01025
MEASUREMENT AND PAYMENT**

PART 1—GENERAL

1.1 GENERAL

The contract price shall constitute full compensation for furnishing all plant, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete the item in accordance with these specifications and the applicable drawings, including surveying performed by the Contractor. Payment shall be considered as full compensation, notwithstanding that minor features may not be mentioned herein. No separate payment will be made for the work, services, or operations required by the Contractor, as specified in DIVISION 1, GENERAL REQUIREMENTS, to complete the project in accordance with these specifications; all costs thereof shall be considered as incidental to the work.

1.2 PAYMENT

1.2.1 Item 0001 (Base Item)

Payment will be made at the contract lump sum price for Item No. 0001, Close Municipal Solid Waste Landfill Cell #6, payment of which shall constitute full compensation for Item No. 0001, complete.

1.3 PAYMENT FOR MATERIALS DELIVERED OFFSITE (1985 JAN HQ USACE):

Pursuant to the Contract Clause in this contract entitled "Payments Under Fixed-Price Construction Contracts", materials delivered to the Contractor at locations other than the site of the work may be taken into consideration in making payments if included in payment estimates and if all the conditions of the contract clauses are fulfilled. Payment for items delivered to locations other than the work site will be limited to those materials which have been approved, if required by the technical provisions; those materials which have been fabricated to the point where they are identifiable to an item of work required under this contract. Such payment will be made only after receipt of paid or receipted invoices or invoices with canceled check showing title to the items in the prime Contractor and including the value of materials and labor incorporated into the item. In addition to petroleum products, this clause will be limited to the following items: Any construction material stored offsite may be considered in determining the amount of a progress payment.

1.4 PROGRESS PAYMENT INVOICE

Requests for payment shall be submitted in accordance with Federal Acquisition Regulations (FAR) Subpart 32.9, entitled "PROMPT PAYMENT", and Paragraphs 52.232-5 and 52.232-27, entitled "Payments Under Fixed-Price Construction Contracts", and "Prompt Payment for Construction Contracts", respectively. In addition each request shall be submitted in the number of copies and to the designated billing office as shown in the Contract.

1.4.1 When submitting payment requests, the Contractor shall complete Blocks 1 through 12 of the "PROGRESS PAYMENT INVOICE" Form as directed by the Contracting Officer. (A sample form is attached at the end of this Technical Specification Section.) The completed form shall then become the cover document to which all other support data shall be attached.

1.4.2 One additional copy of the entire request for payment, to include the "PROGRESS PAYMENT INVOICE" cover document, shall be forwarded to a separate address as designated by the Contracting Officer.

1.4.3 The Contractor shall submit with each pay request, a list of subcontractors that have worked during that pay period. The listing shall be broken down into weeks, identifying each subcontractor that has worked during a particular week, and indicate the total number of employees that have worked on site for each subcontractor for each week. The prime Contractor shall also indicate the total number of employees for its on site staff for each week.

**1.5 EQUIPMENT OWNERSHIP AND OPERATING EXPENSE
SCHEDULE: (1985 JAN HQ USACE):**

(a) Allowable cost for construction and marine plant and equipment in sound workable condition owned or controlled and furnished by a contractor or subcontractor at any tier shall be based upon actual cost data when the Government can determine both ownership and operating costs for each piece of equipment or equipment groups of similar serial and series from the contractor's accounting records. When both ownership and operating costs cannot be determined from the contractor's accounting records, equipment costs shall be based upon the applicable provisions of EP 1110-1-8, "Construction Equipment Ownership and Operating Expense Schedule," Region VIII. Working conditions shall be considered to be average for determining equipment rates using the schedule unless specified otherwise by the Contracting Officer. For equipment not included in the schedule, rates for comparable pieces of equipment may be used or a rate may be developed using the formula provided in the schedule. For forward pricing, the schedule in effect at the time of negotiation shall apply. For retrospective pricing, the schedule in effect at the time the work was performed shall apply.

(b) Equipment rental costs are allowable, subject to the provisions of FAR 31.105(d)(ii) and FAR 31.205-36 substantiated by certified copies of paid invoices. Rates for equipment rented from an organization under common control, lease-purchase or sale-leaseback arrangements will be determined using the schedule except that rental costs leased from an organization under common control that has an established practice of leasing the same or similar equipment to unaffiliated lessees are allowable. Cost for major repairs and overhaul are unallowable.

(c) When actual equipment costs are proposed and the total amount of the pricing action is over \$25,000, cost or pricing data shall be submitted on Standard Form 1411, "Contract Pricing Proposal Cover Sheet." By submitting cost or pricing data, the contractor grants to the contracting officer or an authorized representative the right to examine those books, records, documents and other supporting data that will permit evaluation of the proposed equipment costs. After price agreement the contractor shall certify that the equipment costs or pricing data submitted are accurate, complete and current.

PART 2—NOT USED

PART 3—NOT USED

PROGRESS PAYMENT INVOICE

See Federal Acquisition Regulations (FAR) 32.900, 52.232-5, & 52.232-27

1. PROJECT AND LOCATION	2. DATE
3. CONTRACTOR NAME AND ADDRESS (Must be the same as in the Contract)	4. CONTRACT NO. 5. INVOICE NO. _____
6. DESCRIPTION OF WORK	7. PERIOD OF PERFORMANCE From: To:
8. DISCOUNT TERMS	
9. OFFICIAL TO WHOM PAYMENT IS TO BE FORWARDED Name: Title: Phone: () -	10. OFFICIAL TO BE NOTIFIED OF DEFECTIVE INVOICE Name: Title: Phone ()
11. CERTIFICATION: I hereby certify, to the best of my knowledge and belief, that (1) The amounts requested are only for the performance in accordance with the specifications, terms, and conditions of this contract; (2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements and the requirements of Chapter 39 of Title 31, United States Code; and (3) This request for progress payment does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.	
_____ (Signature)	_____ (Title)
_____ (Date)	
12. OTHER INFORMATION OR DOCUMENTATION required by Contract. Provide two (2) copies of each (check and attach if applicable): <input type="checkbox"/> Updated Progress Chart/Schedule <input type="checkbox"/> Progress Narrative <input type="checkbox"/> Certified Payrolls (submitted weekly) <input type="checkbox"/> Safety Exposure Report <input type="checkbox"/> Updated Submittal register <input type="checkbox"/> Progress Photos <input type="checkbox"/> Subcontractor/Employee Listings	(FOR GOVERNMENT USE ONLY) Retainage: _____ % Amt: \$ _____ Withholdings: \$ _____ Reason: _____ _____ Following items are current: As-Builts <input type="checkbox"/> Yes <input type="checkbox"/> No O & M Manuals <input type="checkbox"/> Yes <input type="checkbox"/> No 1354 Data <input type="checkbox"/> Yes <input type="checkbox"/> No Submittal Register <input type="checkbox"/> Yes <input type="checkbox"/> No

* * END OF SECTION * *

**SECTION 01035
MODIFICATION PROCEDURES**

PART 1—GENERAL

1.1 PROPOSED PROJECT MODIFICATIONS:

Price proposals for proposed modifications shall be submitted in accordance with the requirements of the CONTRACT CLAUSE MODIFICATIONS OF PROPOSALS - PRICE BREAKDOWN. If change order work impacts or delays other unchanged contract work, the costs of such impacts or delays shall be included in the proposals and separately identified. Additionally, for all change orders estimated to exceed \$500,000, or when the Contracting Officer determines that an audit is required, price proposals shall be submitted in accordance with the applicable requirements of Section III, Appendix 1, NPDR 715-1-1, a copy of which will be furnished upon request.

PART 2—PRODUCTS (NOT USED)

PART 3—EXECUTION (NOT USED)

* * END OF SECTION * *

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SECTION 01300 SUBMITTALS

PART 1—GENERAL

1.1 GENERAL

Within 30 days after receipt of notice to proceed, the Contractor shall complete and submit to the Contracting Officer, 5 copies of submittal register ENG Form 4288 listing all submittal items (see form at end of this section). In addition to those items listed on ENG Form 4288, the Contractor shall furnish submittals for all deviations from the plans or specifications. The scheduled need dates shall be recorded on the document for each item for control purposes. In preparing the document, adequate time (minimum of 30 days) shall be allowed for review and approval and possible resubmittal. Scheduling shall be coordinated with the approved progress schedule. The Contractor's Quality Control representative shall review the listing at least every 30 days and take appropriate action to maintain an effective system. Copies of updated or corrected listings shall be submitted to the Contracting Officer at least every 30 days in the quantity specified. Payment will not be made for any material or equipment which does not comply with Contract requirements.

The submittals described below are those required and further described in other sections of the specifications. Submittals required by the CONTRACT CLAUSES and other non-technical parts of the contract are not included in this section.

Throughout these specifications submittals may be identified without the prefix "SD" followed by a number. This number and prefix are for book keeping and record sorting in the system. The SD stands for submittal data and the number is a category, i.e. data, drawings, reports, etc. The submittal register shows either the title of the item being submitted or the number and title of the item being submitted.

SD-01 Data

Submittals which provide calculations, descriptions, or documentation regarding the work.

SD-04 Drawings

Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, details of fabrication, layouts of particular elements, connections, and other relational aspects of the work.

SD-06 Instructions

Preprinted material describing installation of a product, system or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.

SD-07 Schedules

Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work.

SD-08 Statements

A document, required of the Contractor, or through the Contractor, from a supplier, installer, manufacturer, or other lower tier Contractor, the purpose of which is to confirm the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verifications of quality.

SD-09 Reports

Reports of inspections or tests, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used shall be identified and test results shall be recorded.

SD-13 Certificates

Statement signed by an official authorized to certify on behalf of the manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements. The statement must be dated after the award of this contract, must state the Contractor's name and address, must name the project and location, and must list the specific requirements which are being certified.

SD-14 Samples

Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work.

SD-18 Records

Documentation to record compliance with technical or administrative requirements.

SD-19 Operation and Maintenance Manuals

Data which forms a part of an operation and maintenance manual.

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows for: review purposes

1.2.1 Government Approved (GA)

Government (Contracting Officer) approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be

checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.2.2 Information Only (FIO)

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

The approval of submittals by the Contracting Officer shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract, is responsible for the dimensions and design of adequate connections, details and satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be given consideration unless accompanied by an explanation as to why a substitution is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies as specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, notice as required under the Contract Clause entitled "Changes" shall be given promptly to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

1.6 PAYMENT

Separate payment will not be made for submittals, and all costs associated therein shall be included in the applicable unit prices or lump sum prices contained in the schedule.

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION

3.1 GENERAL

The Contractor shall submit all items listed on the Submittal Register (ENG Form 4288) or specified in the other sections of these specifications. The Contracting Officer may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same used in the contract drawings. Submittals shall be made in the respective number of copies and to the respective addresses set forth below.

Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item of the submittal shall be stamped, signed, and dated and each respective transmittal form (ENG Form 4025) shall be signed, and dated by the CQC representative certifying that the accompanying submittal complies with the contract requirements. This procedure applies to all transmittals regardless of classification (Information Only or Government Approved). Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals including parts list; certifications; warranties and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Forms 4288 listing each item of equipment and material for which submittals are required by Special Clauses (SC) and the Technical Specifications Divisions 1 through 16. Columns "Specification Paragraph Number" through "Government Approved" have been completed by the Government. The Contractor shall complete columns "Item No." and all data under "Contractor Schedule Dates" and "Contractor Action" and return 5 completed copies to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. Contractor shall review the list to ensure its completeness and may expand general category listings to show individual entries for each item. The item numbers in column "Item No." are to be assigned sequentially starting with "1" for each specification section.

When a conflict exists between the SUBMITTAL REGISTER and a submittal requirement in the technical sections, other than those submittals referenced in Paragraph 3.9: Field Test Reports, the SUBMITTAL REGISTER shall govern.

The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. This register, Contractors schedule and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed on the register for review and approval. No delays damages or time extensions will be allowed for time lost in late submittals.

3.4 TRANSMITTAL FORM (ENG Form 4025)

The transmittal form (ENG Form 4025), sample attached at end of this section, shall be used for submitting both Government Approved and Information Only submittals in

accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care will be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 CROSS-REFERENCE (ENG FORM 4288/ENG FORM 4025)

To provide a cross-reference between the submittals of ENG FORM 4288 and the transmittal form ENG FORM 4025 the Contractor shall record the "transmittal numbers" assigned when submitting materials in column "Item No." of the ENG FORM 4288. DO NOT preassign transmittal numbers when preparing the submittal register. Transmittal numbers shall be assigned sequentially in accordance with the instructions on the reverse side of the transmittal form (ENG FORM 4025). The item numbers in column "Item No." of Form 4288 shall correspond to the item numbers of Form 4025.

3.6 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

3.6.1 General

Shop drawings and ENG Form 4025 (sample attached at end of this section) shall be submitted in the number of copies specified in subparagraphs "Government Approved Submittals" and "Information Only Submittals." ENG Form 4025 is the transmittal document and shall be initiated by the Contractor in accordance with the instructions herein and as on the reverse side of ENG Form 4025. Blank ENG Form 4025's will be furnished by the Contracting Officer upon request. Each submittal item shall be listed separately on the form, naming subcontractor, supplier, or manufacturer, applicable specification paragraph number(s), drawing/sheet number, pay item number, and any other information needed to identify the item, define its use, and locate it in the work. One or more ENG Forms 4025 shall be used per specification SECTION, however, never include more than one specification SECTION per form. Each submittal shall be complete, containing all information needed to determine contract compliance.

3.6.2 Approval of Submittals

All submittals shall be Contractor approved; however, certain specified submittals will also require Government approval. Government approval is required when submittals:

- a. are specially identified in the Submittal Register (ENG FORM 4288) for Government approval, or
- b. are extensions of design, or
- c. represent critical materials, or
- d. involve equipment that must be checked for compatibility with an entire system, or

- e. depict deviation from the contract (such as an "or equal" decision).

All other submittals are for information only.

Before submission, Contractor shall review and correct shop drawings prepared by subcontractors, suppliers, and itself, for completeness and compliance with plans and specifications. Contractor shall not use red markings for correcting material to be submitted. Red markings are reserved for Contracting Officer use. Contractor shall not use action codes A, B, C, or E to indicate his review action; these codes are reserved for Contracting Officer use. Approval by Contractor shall be indicated on each shop drawing by an "Approval" stamp containing information as shown on stamp outline in paragraph CONTRACTOR APPROVAL STAMP. Names and titles of individuals authorized by Contractor to approve shop drawings shall be submitted to Contracting Officer with submittal of ENG Form 4288, as specified. Suppliers' or subcontractors' certifications are not acceptable as meeting this requirement. Submittals not conforming to the requirements of this Section will be returned to the Contractor for correction and resubmittal.

3.6.3 Variations

For submittals which include proposed variations requested by the Contractor, the column "h" variation" of ENG Form 4025 shall be checked AND FIVE COPIES SUBMITTED for Government Approval. The Contractor shall set forth in writing the justification for any variations and annotate such variations on the submittal in the REMARKS BLOCK. Normally, variances are not approved unless there is an advantage to the Government. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6.4 Drawings

Each drawing shall be not more than 28 inches high by 40 inches wide, with a title block in lower right hand corner and a 3- by 4-inch clear area adjacent. Title block shall contain subcontractor's or fabricator's name, Contract number, description of item(s), bid item number, and a revision block. Contractor shall submit the required number of prints of any type, except blueprints. Provide a blank margin of 3/4 inch at bottom, 2 inches at left, and 1/2 inch at top and right. Where drawings are submitted for assemblies of more than one piece of equipment or systems of components dependent on each other for compatible characteristics, complete information shall be submitted on all such related components at the same time. Contractor shall insure that information is complete and that sequence of drawing submittal is such that all information is available for reviewing each drawing. Drawings for all items and equipment, of special manufacture or fabrication, shall consist of complete assembly and detail drawings. All revisions after initial submittal shall be shown by number, date, and subject in revision block.

3.6.5 Printed Material

All requirements for shop drawings shall apply to catalog cuts, illustrations, printed specifications, or other data submitted, except 3- by 4-inch clear area adjacent to the title

block is not mandatory. Inapplicable portions shall be marked out and applicable items such as model numbers, sizes, and accessories shall be indicated.

3.7 SAMPLES REQUIRING LABORATORY ANALYSIS

See SECTION: 01400 CONTRACTOR QUALITY CONTROL for procedures and address for samples requiring Government testing. If testing is to be accomplished by the Contractor the requirements of the same section shall apply.

3.8 SAMPLES REQUIRING VISUAL INSPECTION

Samples requiring only physical inspection for appearance and suitability shall be handled in accordance with PARAGRAPH: SUBMITTAL PROCEDURE above.

3.9 FIELD TEST REPORTS

Routine daily tests such as soil density, concrete deliveries, routine pressure testing shall be delivered to the Contracting Officer with the daily Quality Control reports. See SECTION: 01400 CONTRACTOR QUALITY CONTROL for daily Quality Control Reports.

3.10 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.11 GOVERNMENT APPROVED SUBMITTALS (SUBMIT 5 COPIES)

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and date. Three copies of the submittal will be retained by the Contracting Officer and 2 (two) copies of the submittal will be returned to the Contractor.

3.11.1 Processing of Government Approved Submittals

Five copies of all submittals requiring Government approval shall be submitted. Each copy submitted shall be identified by having a completed copy of ENG Form 4025 attached to it. Submittals will be reviewed and processed as follows:

- a. Approved as Submitted (Action Code "A"): Shop drawings which can be approved without correction will be stamped "Approved" and two prints, or two copies of catalog and other printed data, will be returned to the Contractor.
- b. Approved Except as Noted (Action Code "B"): Shop drawings which have only minor discrepancies will be annotated in red to indicate necessary corrections. Marked material will be stamped "Approved Except as Noted" and returned to the Contractor for correction. Distribution will be the same as for "Approved as Submitted (Action Code "A") submittals.

- c. Approved Except as Noted (Action Code "C"): Shop drawings which are incomplete or require more than minor corrections will be annotated in red to indicate necessary corrections. Marked material will be stamped "Approved Except as Noted - Resubmission Required" and returned to the Contractor for correction. Two prints, or two copies of catalog and other printed data, will be returned to the Contractor. The Contractor need only resubmit the items of the submittal needing the corrections.
- d. Disapproved (Action Code "E"): Shop drawings which are fundamentally in error, cover wrong equipment or construction, or require extensive corrections, will be returned to the Contractor stamped "Disapproved." an explanation will be furnished on the submitted material or on ENG Form 4025 indicating reason for disapproval. Distribution will be the same as for "Approved Except as Noted (Action Code "C") submittals.
- e. Resubmittal will not be required for shop drawings stamped "Approved as Submitted (Action Code "A") or "Approved Except as Noted (Action Code "B")" unless subsequent changes are made by Contractor or a contract modification. For shop drawings stamped "Approved Except as Noted (Action Code "C") or "Disapproved (Action Code "E")," Contractor shall make corrections required, note any changes by dating the revisions to correspond with the change request date, and promptly resubmit the corrected material. Government costs incurred after the first resubmittal will be charged to the Contractor.

3.12 INFORMATION ONLY SUBMITTALS (SUBMIT 3 COPIES OF DATA AND 4 COPIES OF ENG FORM 4025)

Normally submittals for information only will not be returned. Approval of the Government is not required on information only submittals. These submittals will be used for information purposes. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. The resubmittal shall be reclassified as Government approved submittal. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications and will not prevent the Contracting Office from requiring removal and replacement if nonconforming material is incorporated in the work. This does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or check testing by the Government in those instances where the technical specifications so prescribe.

3.12.1 Processing of Information Only Submittals

Three copies of all shop drawings submitted for information only shall be submitted prior to delivery of the material or equipment to the jobsite. Each copy submitted shall be identified by having a completed copy of ENG Form 4025 attached to it. ENG Form 4025 shall be marked as follows to identify the Contractor approved submittals. The

words "Contractor approved - information copy only" shall be placed in the remarks block of the form. Submittals will be monitored and spot checks will be made. When such checks indicate noncompliance, Contractor will be notified by the same method used for Government approvals. An additional completed ENG form 4025 shall be submitted (without attachments) which will be returned to the Contractor to signify that the submittal has been received.

3.13 CONTRACTOR APPROVAL STAMP

The stamp used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR: _____ CONTRACT NO. _____ TRANSMITTAL NO. _____ ITEM NO _____ SPECIFICATION SECTION _____ PARAGRAPH NO. _____ APPROVED: YES _____ NO _____ APPROVED WITH CORRECTIONS AS NOTED ON SUBMITTAL DATA _____ ON ATTACHED COMMENT SHEET _____ SIGNATURE: _____ TITLE: _____ DATE _____
--

“CONTRACTORS REVIEW STAMP
 MAXIMUM SIZE
 3 INCHES x 3 INCHES”

3.14 TRANSMITTAL CHECK LIST

The following check list is intended to aid in the preparation of form 4025 and related transmittals and is intended only as a partial summary of requirements stated elsewhere within this specification.

- a. Use originals of the ENG FORM 4025. DO NOT use photocopies.
- b. DO NOT submit multiple 5 digit specification sections on one ENG FORM 4025.
- c. Transmittal # 1 shall be the Submittal Register (ENG FORM 4288). Subsequent submittals shall be numbered sequentially as submitted except for resubmittals. Resubmittals must be related to the parent (original) transmittal, i.e. transmittal no. 2 resubmittal would be number 2A, etc.
- d. Government Approval; Submit 5 copies of enclosures, each with ENG FORM 4025's attached. Information only; Submit 3 copies of enclosures, each with ENG FORM 4025's attached and 1 additional copy of the ENG FORM 4025.

- e. Break the submittal into items which can be reviewed independently. For a transmittal with more than 9 items use multiple sets of ENG FORM 4025's.
- f. Item numbers must be written on the enclosures and the ENG FORM 4025 (column A)
- g. There shall be a reviewers set with one copy of all items (not the originals) with the remainder of the submittal having each item and associated copies in separate bundles.
- h. Each item of an enclosure shall be "approval stamped" by the Contractor.
- i. Enter the specification technical paragraph for each Item in column "e" on the ENG FORM 4025.
- j. Identify the contract drawing number that applies, if applicable in column "f" on ENG FORM 4025.
- k. Variations shall be identified in column "g" on ENG FORM 4025 and justified in the Remarks Block and 5 copies submitted for Government Approval.
- l. Cross out inapplicable portions of submitted data or point to exact equipment being used on the project.
- m. Allow a minimum 30 days for submittals requiring Government Approval. Justify exceptions for shorter periods.
- n. SIGN the ENG FORM 4025.

* * END OF SECTION * *

**SECTION 01400
CONTRACTOR QUALITY CONTROL**

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740 (1988) Evaluation of Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (1990) Use in the Evaluation of Testing and Inspection Agencies as Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Clause entitled "Inspection of Construction", in SECTION 00700 of this document.

The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both on-site and off-site, and shall be keyed to the proposed construction sequence.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than 30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause entitled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 30 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started.

Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC plan shall include, as a minimum, the following to cover all construction operations, both on-site and off-site, including work by subcontractors, fabricators, suppliers and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC system manager who shall report to the project manager or someone higher in the Contractor's organization. Project manager in this context shall mean the individual with responsibility for the overall management of the project including quality and production.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a QC function.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities and responsibilities. Copies of these letters will also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, off-site fabricators, suppliers and purchasing agents. These procedures shall be in accordance with Section 01300 SUBMITTALS.
- e. Control, verification and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test. (Laboratory facilities will be approved by the Contracting Officer.)
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.

- h. Reporting procedures, including proposed reporting formats. This shall include a copy of the Daily CQC report form.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks and has separate control requirements. It could be identified by different trades or disciplines, or it could be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the QC plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven calendar days prior to any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the Quality Control Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both on-site and off-site work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 CQC System Manager

The Contractor shall identify an individual within his organization at the site of the work who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. This CQC System Manager shall be on the site at all times during construction and will be employed by the Contractor, except as noted in the following. An alternate for the CQC System Manager will be identified in the plan to

serve in the event of the system manager's absence. Period of absence may not exceed 2 weeks at any one time. The requirements for the alternate will be the same as for the designated CQC manager.

3.4.2 CQC Organizational Staffing

The Contractor shall provide a CQC staff which shall be at the site of work at all times during progress, with complete authority to take any action necessary to ensure compliance with the contract.

3.4.2.1 CQC Staff

Following are the minimum requirements for the CQC staff. These minimum requirements will not necessarily assure an adequate staff to meet the CQC requirements at all times during construction. The actual strength of the CQC staff may vary during any specific work period to cover the needs of the work period. When necessary for a proper CQC organization, the Contractor will add additional staff at no cost to the Government. This listing of minimum staff in no way relieves the Contractor of meeting the basic requirements of quality construction in accordance with contract requirements. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2.2 CQC System Manager

The CQC system manager shall be a graduate engineer, graduate architect, or a graduate of construction management, with a minimum of five years construction experience on similar type construction to this contract. The CQC system manager shall be assigned no other duties.

In addition to the above experience and education requirements the CQC System Manager shall have completed the course entitled "Construction Quality Management for Contractors". This course is periodically offered in Spokane, Boise, Portland, and Seattle. For further information contact the Construction Division Office in your area.

3.4.2.3 Supplemental Personnel

A staff shall be maintained under the direction of the CQC system manager to perform all QC activities. The staff must be of sufficient size to ensure adequate QC coverage of all work phases, work shifts, and work crews involved in the construction. These personnel may perform other duties, but must be fully qualified by experience and technical training to perform their assigned QC responsibilities and must be allowed sufficient time to carry out these responsibilities. The QC plan will clearly state the duties and responsibilities of each staff member.

3.4.3 Organizational Changes

The Contractor shall obtain Contracting Officer's acceptance before replacing any member of the CQC staff. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement.

3.5 SUBMITTALS

Submittals shall be as specified in Section 01300 SUBMITTALS. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements. The Government will furnish copies of test report forms (See Table 2) upon request by the Contractor. The Contractor may use other forms as approved.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The controls shall be adequate to cover all construction operations, including both on-site and off-site fabrication, and will be keyed to the proposed construction sequence. The controls shall include at least three phases of control to be conducted by the CQC system manager for all definable features of work, as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work and shall include:

- a. A review of each paragraph of applicable specifications.
- b. A review of the contract plans.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. A check to assure that provisions have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawing or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for constructing the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that phase of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.

- j. The Government shall be notified at least 48 hours in advance of beginning any of the required action of the preparatory phase. This phase shall include a meeting conducted by the CQC system manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC system manager and attached to the daily QC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

- a. A check of preliminary work to ensure that it is in compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verification of full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with sample panels is appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 48 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC system manager and attached to the daily QC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work on-site, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure continuing compliance with contract requirements, including control testing, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation and shall document specific results of inspections for all features of work for the day or shift. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of

additional features of work which may be affected by the deficient work. The Contractor shall not build upon or conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases may be conducted on the same definable features of work as determined by the Government if the quality of on-going work is unacceptable; or if there are changes in the applicable QC staff or in the on-site production supervision or work crew; or if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform tests specified or required to verify that control measures are adequate to provide a product which conforms to contract requirements, see Table 1- Minimum Testing. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. A list of tests to be performed shall be furnished as a part of the CQC plan. The list shall give the test name, frequency, specification paragraph containing the test requirements, the personnel and laboratory responsible for each type of test, and an estimate of the number of tests required. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, will be recorded on the Quality Control report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test will be given. Actual test reports may be submitted later, if approved by the Contracting Officer, with a reference to the test number and date taken. An information copy of tests performed by an off-site or commercial test facility will be provided directly to the Contracting Officer. Failure to submit timely test reports, as stated, may result in nonpayment for related work performed and disapproval of the test facility for this contract. Test results shall be signed by an Engineer Registered in the state where the tests are performed.

3.7.2 Testing Laboratories

3.7.2.1 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Costs of testing the Contractor Laboratory facilities for Government acceptance shall be borne by the Contractor. Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. All personnel performing concrete testing shall be certified by the American Concrete Institute (ACI). The contractor shall submit documentation showing the AALA, or other approved testing facility, certification, personnel ACI certifications, and the name and work experience of the Registered Professional Engineer on the staff.

3.7.2.2 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge of \$500.00 plus travel costs to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 On-Site Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials will be borne by the Contractor.

Coordination for each specific test, exact delivery location and dates will be made through the Area Office.

3.8 COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC system manager shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC system manager or staff shall make a second inspection to ascertain that all deficiencies have

been corrected and so notify the Government. These inspections and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.9 DOCUMENTATION

The Contractor shall maintain current records of quality control operations, activities, and tests performed, including the work of subcontractors and suppliers. These records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed today, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- e. Material received with statement as to its acceptability and storage.
- f. Identify submittals reviewed, with contract reference, by whom, and action taken.
- g. Off-site surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. List instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.
- k. These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date(s) covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every seven days of no work

and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC system manager. The report from the CQC system manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 SAMPLE FORMS

Sample Contractor Quality Control Report forms are enclosed at the end of this section.

3.11 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor at the site of the work, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

Table 1		
Minimum Sampling And Testing Frequency		
Materials	Test	Minimum Sampling and Testing Frequency
Fills, Embankments, Backfills, Subgrade, Subbase, and Base Course Material		
Fill and Embankment	Field Density ^{2/12/}	Two tests per lift for each increment or fraction of 4000 sy and any time material type changes.
	Lab Density ^{3/}	One test initially per each type of materials or blended material and any time material type changes, and one every 10 field density tests.
	Gradation ^{1/}	One test every 2000 cubic yards of fill for each type of materials or blended material and any time material type changes.
Aggregate Base Course	Field Density ^{(2)/(12)}	One per lift per 200 cubic yards
	Gradation ⁽¹⁾	One test every 1000 ton placed, minimum of 3 samples for each day's run
	Thickness	One test every 540 square yards
Backfill for Culverts, Trenches, Pavements	Field Density ^{2/12/}	Culverts: One test per each lift.
		Trenches: One test per lift for each increment or fraction of 500 linear feet for backfill. Under pavements, one test every lift and at every crossing.
Compacted Base Soil	In-Place Denisty ⁽¹²⁾	One Sample very 8,500 square feet/lift.
	Gradation ⁽¹⁾	One every five in-place density tests
	Moisture-Density Relationship	One every ten density tests.
	Moisture ⁽²⁾	One every density test.
	Permeability ⁽²⁾	Three test initially per each type of material and three test any time material type changes.
	Thickness	One test every 540 square yards
Cover Soil	Gradation ⁽¹⁾	One sample for every 1000 cubic yards.
	Thickness	One test every 540 square yards
Drain Rock	Gradation ⁽¹⁾	One sample every 10 tons.
Geosynthetics		
Geomembrane	Seam Peel	One every 500 linear feet of field seam or one per panel/sheet, whichever is more often. One test per panel/sheet of factory seam, if applicable.
	Seam Shear Strength	One every seam peel test.
	Thickness	One every seam peel test.
	Non-Destructive Seam Test.	100 percent of seams.
	Weld Crew Test Seams	One every 4 hrs/crew.
	Interface Friction	One test.
	Multi-Axial Tension	One test every 100,000 square feet.
Geonet	Transmissivity	One test.

Notes:

1/ All acceptance tests shall be conducted from in-place samples.

2/ Additional tests shall be conducted when variations occur due to the contractors operations, weather conditions, site conditions, etc.

3/ Classification (ASTM D-2487), moisture contents, Atterberg limits and specific gravity tests shall be conducted for each compaction test if applicable.

4/ through 11/ not used.

12/ The nuclear densimeter, if properly calibrated, may be used, but only to supplement the required testing frequency and procedures. The densimeter shall be calibrated and is recommended for use when the time for complete results becomes critical.

Table 2
Standard Report Forms and Use

Form Number	Form Title	Form Use
NPD 300	Transmittal of Material Samples	Form to accompany any samples sent to NPD Laboratory
NPD 326	Compaction Test Data Sheet	Soil compaction tests.
DD 1206	Sieve Analysis Data	Sieve analysis data sheet for soils.
NPD 320	Mechanical Analysis Test Data	Sieve analysis data sheet and hydrometer data sheet for soils.
ENG 2087	Gradation Curves	Gradation graph for soils and aggregates. (To include specification limits).
DD 1205	Soil Moisture Content	Moisture content sheet for soils and/or aggregates.
NPD 322	Specific Gravity and Absorption Test Data Sheet	Specific gravity and absorption test for soil and aggregates.
DD 1209	Atterberg Limits Determinations	Test and graph for Atterburg limits tests.
DD 1217	Bituminous Mix Design -Aggregate Blending	Aggregate blending sheet for asphaltic concrete.
NPD 346	Asphaltic Concrete Mix Design Report	Asphaltic mix design and aggregate grinding.
DD 1218	Marshall Method - Computation of Properties of Asphalt Mixtures	Marshall Test form.
NPD 88	Screen Analysis of Concrete Aggregates	Gradation test form for aggregates (self carboning).
NPD 357	Mortar Strength of Fine Aggregate Data Sheet	Flexural and compressive strength test form for mortar.
NPD 355	Data Sheet - Compressive and Flexural Strengths of Concrete	Compressive and/or flexural strength testing (include averages per specification).
NPD 359	Report of Concrete Mixture Design	Mix design sheet for Contractor mix submittal.
NPS 57	Statistical Evaluation of Concrete Compression Tests	Summary sheet of concrete tests. Form can be used for flexural strengths if revised to conform with proper days specified. A separate sheet is to be used for each mix design.
NPS Form 41	Test Data on Absorption and Moisture Condition of Masonry Blocks	Absorption and moisture condition tests for masonry units.

3. QUALITY CONTROL INSPECTIONS AND RESULTS: (Include a description of preparatory, initial, and/or follow up inspections or meetings; check of subcontractors work and materials delivered to the site compared to submittals and/or specifications; comments on the proper storage of materials; include comments on corrective actions to be taken):

4. QUALITY CONTROL TESTING AND RESULTS (comment on tests and attach test reports):

5. DAILY SAFETY INSPECTIONS (Include comments on new hazards to be added to the Hazard Analysis and corrective action of any safety issues):

6. REMARKS (Include conversations with or instructions from the Government representatives; delays of any kind that are impacting the job; conflicts in the contract documents; comments on change orders; environmental considerations; etc.):

CONTRACTOR'S VERIFICATION: The above report is complete and correct. All material, equipment used, and work performed during this reporting period are in compliance with the contract documents except as noted above.

CONTRACTOR QC REPRESENTATIVE

(Sample of Typical Contractor's Test Report)

TEST REPORT

STRUCTURE OR BUILDING _____

CONTRACT NO _____

DESCRIPTION OF ITEM, SYSTEM, OR PART OF SYSTEM TESTED:

DESCRIPTION OF TEST: _____

NAME AND TITLE OF PERSON IN CHARGE OF PERFORMING TESTS FOR THE CONTRACTOR:

NAME _____

TITLE _____

SIGNATURE _____

I HEREBY CERTIFY THAT THE ABOVE DESCRIBED ITEM, SYSTEM, OR PART OF SYSTEM HAS BEEN TESTED AS INDICATED ABOVE AND FOUND TO BE ENTIRELY SATISFACTORY AS REQUIRED IN THE CONTRACT SPECIFICATIONS.

SIGNATURE OF CONTRACTOR
QUALITY CONTROL INSPECTOR _____

DATE _____

REMARKS

* * END OF SECTION * *

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**SECTION 01410
ENVIRONMENTAL PROTECTION**

PART 1 - GENERAL REQUIREMENTS

1.1 The contractor shall perform the work minimizing environmental pollution and damage as the result of construction operations under this contract. For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade the utility of the environment for aesthetic, cultural, and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual esthetics, noise, solid waste, and erosion from stormwater, as well as pollutants.

1.2 ABBREVIATIONS AND ACRONYMS

BACT	Best Available Control Technology
BMP	Best Management Practice
CFR	Code of Federal Regulations
CO	Contracting Officer
COR	Contracting Officer's Representative
DOT	Department of Transportation
ECMD	Engineering & Contract Management Division
ECO	Environmental Compliance Officer
ENRD	Environmental and Natural Resources Division
EPA	Environmental Protection Agency
HM	Hazardous Material
HMTA	Hazardous Materials Transportation Act
HW	Hazardous Waste
HWT	Hazardous Waste Technician
HWMS	Hazardous Waste Management Section
ISCP	Installation Spill Contingency Plan
MSDS	Material Safety Data Sheets
NFPA	National Fire Protection Association
NPDES	National Pollutant Discharge Elimination System
NOI	Notice of Intent
OSHA	Occupational Safety and Health Act
PCB	Polychlorinated Biphenyls
PCS	Petroleum Contaminated Soil
PPE	Personnel Protective Equipment
PW	Public Works
PSAPCA	Puget Sound Air Pollution Control Agency
RUL	Restricted Use List
SPCCP	Spill Prevention, Control and Countermeasures Plan
TPCHD	Tacoma Pierce County Health Department
WAC	Washington Administrative Code

WHPA Well Head Protection Area
WISHA Washington Industrial Safety and Health Act
YTC Yakima Training Center

1.3 PROTECTION OF ENVIRONMENTAL RESOURCES

The environmental resources within the project boundaries and those affected outside the limits of work under this contract shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the drawings and specifications.

1.4 SUBCONTRACTORS

The contractor shall ensure compliance with this section by all subcontractors.

1.5 LAWS AND REGULATIONS

The Contractor shall comply with all applicable Federal, State, and Local environmental, natural and cultural resources, and historic preservation laws and regulations. Specific attention is directed to Fort Lewis Regulation No. 200-1 “Environmental Protection and Enhancement”. These specifications supplement these laws and regulations.

1.6 COORDINATION

The Environmental and Natural Resources Division (ENRD) of PW coordinates most environmental concerns at Fort Lewis and its subinstallations. Coordination of solid waste, drinking water, and stormwater permit matters shall be done with the Production Division, Roads and Sanitation Branch of PW. The Contractor shall make contact with them through PW, Engineering & Contract Management Division.

1.7 PERMITS

The Contractor shall obtain all needed permits or licenses. The Government will not obtain any permits. The Contractor shall be responsible for implementing the terms and requirements of the appropriate permits as needed and for payment of all fees.

1.8 SUBMITTALS

The following is a summary of required submittals. Complete details and schedules are described in the rest of the section.

1.8.1 Environmental Protection Plan

The Contractor shall submit an environmental protection plan within 15 days after receipt of the notice to proceed. Approval of the Contractor’s plan will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures. The environmental protection plan shall include, but not be limited to, the following:

- (a) A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control and abatement that

are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.

- (b) Methods for protection of features to be preserved within authorized work areas like trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archaeological, and cultural resources.
- (c) Procedures to be implemented to provide the required environmental protection, to comply with the applicable laws and regulations, and to correct pollution due to accident, natural causes, or failure to follow the procedures of the environmental protection plan.
- (d) Location of the permitted solid waste disposal facility to be used.
- (e) Drawings showing locations of any proposed temporary excavations or embankments for haul roads, stream crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.
- (f) Environmental monitoring plans for the job site, including land, water, air, and noise monitoring.
- (g) Traffic control plan including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather, and the amount of mud transported onto paved roads by vehicles or runoff.
- (h) Erosion control plan including methods of protecting surface and ground water during construction activities.
- (i) Plan showing the proposed activity in each portion of the work area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas.
- (j) Drawings of borrow area location. Protection measures required at the work site shall apply to the borrow areas including final restoration for subsequent beneficial use of the land. A borrow pit permit is required and can be obtained from the PW Production Division, Roads and Sanitation Branch. A copy of the permit shall be included in this plan.
- (k) A recycling and waste prevention plan with a list of measures to reduce consumption of energy and natural resources; for example: the possibility to shred fallen trees and use them as mulch shall be considered as an alternative to burning or burial.
- (l) Applicable environmental training (both formal and on the job) the Contractor's personnel have received prior to the construction period.

1.8.2 Hazardous Materials and Hazardous Wastes

Hazardous Materials Inventory Form (Initial and ongoing)
Material Safety Data Sheets (MSDS)

1.8.3 Air Resources

Notice of Construction Permit
Burning Permit

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 WORK AREA LIMITS

The Contractor shall confine all activities to areas defined by the design drawings and specifications. Prior to any construction, the Contractor shall mark the areas that will not be disturbed under this contract. Isolated areas within the general work area, which are to be saved and protected, shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor's personnel shall be knowledgeable of the purpose for marking and/or protecting particular objects.

3.1.1 Contractor Facilities and Work Areas

The Contractor's field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer or their representative. Temporary movement or relocation of Contractor facilities shall be made only when approved by the Contracting Officer or their representative. Borrow areas shall be managed to minimize erosion and to prevent sediment from entering nearby waters. Spoil areas shall be managed and controlled to limit spoil intrusion into areas designated on the drawings and to prevent erosion of soil or sediment from entering nearby waters. Spoil areas shall be developed in accordance with the grading plan indicated on the drawings. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

3.2 MANAGEMENT OF HAZARDOUS MATERIALS AND HAZARDOUS WASTE

3.2.1 General

3.2.1.1 Definitions

- (a) Hazardous material (HM): A useful product that requires special management because it has hazardous characteristics (ignitability, corrosivity, reactivity, or toxicity) that could pose dangers to human health or the environment. A HM becomes a Hazardous Waste when it can no longer be used for its intended purpose.
- (b) Hazardous waste (HW): A discarded material with properties that could pose dangers to human health or the environment. A HW either exhibits a hazardous characteristic (ignitability, corrosivity, reactivity, or toxicity) or is specifically listed as a HW by the EPA or by the State.

- (c) Material Safety Data Sheet (MSDS): A document containing information that manufacturers are required by law to provide on all products they manufacture and sell. The MSDS is useful in evaluating the product to determine if it has hazardous constituents and the type of medical treatment in case of an accident.

3.2.1.2 Hazardous Waste Management Section (HWMS)

The Contractor shall contact the HWMS at (253) 967-4786 with any questions pertaining to the storage, use, and disposal of Hazardous Materials and/or Hazardous Waste during the execution of this contract.

3.2.1.3 Restricted Use Materials

Certain chemicals are restricted from use on Fort Lewis. These chemicals are listed on the Restricted Use List (RUL). The RUL is maintained by the PW Environmental and Natural Resources Division (ENRD) and is updated semi-annually. A print out and/or an electronic copy of the entire RUL is available from ENRD, Building 1210. The Contractor shall receive authorization from the Contracting Officer or their representative prior to using any product that contains chemicals listed on the RUL. Only materials necessary for and associated with the execution of this Contract will be allowed on Government property.

3.2.1.4 Contingency Planning and Spill Response

The Contractor shall comply with the provisions of the Fort Lewis Spill Prevention, Control and Countermeasures Plan (SPCCP) and the Installation Spill Contingency Plan (ISCP). The PW ENRD maintains these plans. The Contractor shall also maintain on site a written contingency plan for HW accumulation and HM storage areas if the work associated with this contract generates HW or require storage of HM.

3.2.1.5 Transportation of HM and HW

The Contractor shall comply with all Department of Transportation (DOT) requirements associated with HM/HW, including proper container marking/labeling and vehicle placarding when transporting HM/HW on or off the installation. The Contractor shall obtain Government approval prior to removal of any HW from the installation. Removal shall only be done by an authorized HW transporter having an EPA Identification Number and with the HW recorded on a Uniform Hazardous Waste Manifest (EPA Form 8700-22).

3.2.1.6 HM/HW Personnel and Training Requirements

The Contractor shall appoint an Environmental Compliance Officer (ECO) and a Hazardous Waste Technician (HWT) in writing, if the work associated with this contract causes the Contractor to generate, store, or handle HM/HW. The ECO/HWT shall be responsible for insuring the requirements of this specification are met.

The Contractor shall insure that all personnel are trained in accordance with Washington Department of Ecology regulations before being assigned to any position handling HW/HM. This training shall include, but not be limited to:

- (a) Hazardous Materials Use, Storage and Disposal Training Course for ECOs/HWTs. The 8 hour course is available weekly from the Fort Lewis ENRD Hazardous Waste Management Section (HWMS) and shall be taken prior to the Contractor generating, storing, or handling HM or HW on the installation. The Contractor shall contact the HWMS to schedule attendance.
- (b) First Responder Awareness Level as specified in the ISCP.
- (c) Quarterly contingency plan review and rehearsal.
- (d) Hazard Communication training as stated in paragraph 3.2.2.5.

The Contractor shall maintain a record of all required training, and the date conducted, for each individual requiring training and shall make this record available to the Government at all times during the execution of this contract.

3.2.2 Hazardous Materials

3.2.2.1 Notification

The Contractor shall provide an initial inventory and MSDS copies for all HM to be used during the execution of this contract, to the PW, Engineering & Contract Management Division. The inventory shall include the type of HM, proposed storage location and quantity to be stored and shall be provided before bringing any HM onto the installation. The Contractor shall use the Hazardous Material Inventory form (HFL Form 953-Enclosure No. 1) or a contractor-generated form providing the same information. An electronic version of the Hazardous Material Inventory form is available from the PW ENRD in Building 1210.

3.2.2.2 Storage Facilities

Facilities shall meet all fire code requirements and provide adequate ventilation, containment, and protection from the elements. Provide warning signs, limit access to the facility, and lock it when it is unattended. Only HM shall be stored in the facility. Contractor vehicles are not considered a proper storage facility. No HM shall be stored in vehicles overnight or for any length of time.

3.2.2.3 Storage and Use

The Contractor shall store HM according to product labels and MSDS requirements. Non-compatible materials shall not be stored together. All containers shall be properly labeled as to contents and kept in good condition with tight fitting lids. Unopened containers shall be segregated from opened containers. Personal protective equipment (PPE) required by the MSDS or product label shall be available and worn by all personnel who handle the product.

3.2.2.4 Inspections, Record Keeping, and Reporting

The Contractor shall perform weekly inspections of their HM storage facilities utilizing the HM Inspection Checklist (HFL Form 951-Enclosure No. 2). A current inventory of the HM storage facility shall be maintained on site and a copy forwarded to PW,

Engineering & Contract Management Division quarterly using the Hazardous Material Inventory form. Additionally, a current MSDS for each product used or stored shall be present and on file at the site where the product is used or stored.

3.2.2.5 Hazard Communication Program

The Contractor shall have a written Hazard Communication program, which explains how personnel are informed and trained concerning HM in the workplace as required by Federal, state and Fort Lewis regulations. The written program shall be located at a hazard communication station that is accessible to all Contractor personnel and shall contain the following sections:

- (a) A current inventory of HM, who is responsible for classifying a product as a HM, and how the inventory is updated.
- (b) Labels and other forms of warning: This section shall describe the procedure for insuring that each HM container is clearly labeled and has the appropriate warnings. The section also states who is responsible for labeling requirements and how label information is updated.
- (c) MSDS file: The location of the MSDS file, who maintains the file, and how personnel may access the file, shall be described. This section shall also describe what is done when a product is received without the MSDS and how the MSDS file is updated.
- (d) Personnel training and information: This section shall describe initial and refresher training provided to personnel concerning the hazards of the HM in the workplace, the training provided, and who conducts the training.
- (e) Information to non-Contractor personnel: This section shall describe how non-Contractor personnel are informed about possible hazards, where MSDS copies can be obtained, and what PPE is required in the workplace.

3.2.3 Hazardous Waste

3.2.3.1 Identification

The Contractor shall identify all HW generated during the execution of this contract. The Contractor shall completely characterize the waste stream to identify the waste constituents. Each waste stream identity shall be recorded on a Hazardous Waste Profile Sheet (HWPS) and submitted to PW, Engineering & Contract Management Division for approval prior to waste generation. Profile sheets are available from the HWMS or Contractor generated equivalent sheets may be used. The Contractor is responsible for any costs associated with laboratory analysis to verify the waste stream identity if it is not obviously evident.

3.2.3.2 Accumulation

HW shall be accumulated in waste-compatible, sturdy, leak-proof, closed containers that are Department of Transportation (DOT) approved. If the waste is to be disposed of on Fort Lewis, YTC and Vancouver Barracks, the Contractor shall accumulate wastes only

in Government issued HW containers. The Contractor shall contact the HWMS, phone (253) 967-4786 for drums at Fort Lewis.

Each HW container shall be clearly labeled with the words HAZARDOUS WASTE, a description of the waste, and the hazard associated description or label. Any container issued by the HWMS at Fort Lewis or the Directorate of Environment & Natural Resources at YTC shall have a Bar-coded label that contains all necessary labeling information. This label can be obtained by contacting the HWMS.

3.2.3.3 Container Management

HW shall be handled in a manner that prevents leaks, spills, fires, and explosions. Container tops and/or bungs shall be serviceable and tightly installed (wrench tight) at all times except when adding material to the container (material should not spill if the container tips over). Containers shall be properly grounded when transferring flammable materials. Containers holding flammable liquids (flash point less than 140 degrees F) shall be grounded. Reactive and ignitable waste containers shall be stored in a manner compatible with NFPA Fire Code requirements. Incompatible wastes shall not be accumulated in the same container or in the same area.

The container accumulation area shall be 50 feet from any other occupied building, shall have overhead cover, and shall be capable of being secured. Access to the area shall be restricted to trained personnel who need to be in and use the area. The site shall be locked when not in use. The container accumulation area shall have a secondary containment system capable of collecting and holding spills and leaks. It shall be sized to hold 110% of the volume of the largest container. A minimum of thirty inches of aisle space shall be maintained between container rows. Container markings and labels shall be clearly visible.

3.2.3.4 Inspection, Record Keeping, and Reporting

The Contractor shall inspect each accumulation point weekly, utilizing the attached Hazardous Waste Accumulation Areas checklist, (HFL Form 950-Enclosure No. 3) to verify compliance with the above requirements. The checklist shall be available on site for inspection.

3.2.3.5 Transportation and Disposal

The Contractor shall be responsible for the transportation and disposal off site of all HW generated from the execution of this contract, unless stated otherwise in this specification.

The Contractor or his representative, who provides services that generate, prepare for shipment or transports hazardous waste or provides hazardous waste clean-up/disposal services, shall be responsible for preparing EPA Form 8700-22, Uniform Hazardous Waste Manifest, for the state to which the material is being transported. The Contractor shall comply with all manifest and record keeping and reporting requirements. Specific manifesting procedures include:

- (a) The Uniform Hazardous Waste Manifest will only be signed by personnel in the HWMS at Building 1210 on Fort Lewis.
- (b) The Contractor shall provide a copy of the Uniform Hazardous Waste Manifest and supporting documentation (i.e., waste profile and land ban as appropriate) no less than 72 hours in advance of the proposed transporter pick up date.
- (c) The Contractor shall coordinate and schedule transportation pick up dates and times by contacting the HWMS at (253) 967-4786 or 3268. This will ensure qualified individuals are available for the certification/signature of the manifest and other related documentation. A waste profile (land ban when required) must accompany the manifest to verify description of material being transported.

The Contractor shall be responsible for verifying that the shipment is properly identified (profiled), packaged, marked, labeled, and not leaking. The Contractor shall apply appropriate placards to his vehicle while transporting hazardous materials/waste.

The Contractor shall insure that the transporter and disposal facility have a valid Environmental Protection Agency identification number for the applicable hazardous waste services, i.e., transportation, treatment, storage, or disposal.

The Contractor shall ensure that the transporter drivers have current DOT combination licenses. The Contractor shall ensure that the carrier has instructed and trained personnel concerning the applicable Hazardous Materials Transportation Act (HMTA) regulations relevant to their job functions.

The Contractor or his representatives shall take appropriate action (including cleanup) in the event of a release/spill. If a release/spill occurs on Fort Lewis the Contractor shall immediately notify the Fort Lewis Fire Department (Dial 911). Secondary notification shall be made to (253) 967-4786 or 3268.

The Contractor shall ensure the transporter and disposal facility has liability insurance in effect for claims arising out of death or bodily injury and property damage from hazardous material/waste transport, treatment, storage, and disposal, including vehicle liability and legal defense costs in the amount of \$1,000,000.00, as evidenced by a certificate of insurance for General, Automobile, and Environmental Liability Coverage.

3.2.3.6 Not Used

3.3 NOT USED

3.4 NOT USED

3.5 NOT USED

3.6 NOT USED

3.7 NOT USED

3.8 DISPOSAL OF SOLID WASTE

3.8.1 General

The Contractor shall be responsible for the disposal off site of all refuse generated in the course of performance of this contract, to include containers, transport, handling, and dumping fees. All solid wastes shall be placed in containers that are emptied on a regular schedule. The Contractor will not be permitted to deposit refuse in existing garbage cans or refuse dumpsters. No burning of refuse is allowed. All vehicle loads of waste being transported shall be adequately secured to prevent spillage.

3.8.2 Disposal on Fort Lewis

No material shall be disposed of at the Fort Lewis Landfill.

3.8.3 Not Used

3.8.4 Not Used

3.8.5 Not Used

3.8.6 Not Used

3.8.7 Not Used

3.9 PROTECTION OF LAND RESOURCES

Prior to the beginning of any construction, the Contractor shall identify the land resources to be preserved within the work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without special permission from the Contracting Officer or their representative. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized.

3.9.1 Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques.

3.9.2 Unprotected Erodible Soils

Earthwork brought to final grade shall be finished as indicated on the design drawings and specifications. Side slopes and back slopes shall be protected as soon as practicable upon completion of rough grading. All earthwork shall be planned and conducted to minimize the duration of exposure of unprotected soils. Except in cases where the constructed feature obscures borrow areas, quarries, and waste material areas, these areas shall not initially be totally cleared. Clearing of such areas shall progress in reasonably sized increments as needed to use the developed areas as approved by the Contracting Officer or their representative.

3.9.3 Disturbed Areas

The Contractor shall effectively prevent erosion and control sedimentation through approved methods including, but not limited to, the following:

- (a) Retardation and control of runoff. Runoff from the construction site or from storms shall be controlled, retarded, and diverted to protected drainage courses by means of diversion ditches, benches, berms, and by any measures required by area wide plans under the Clean Water Act.
- (b) Erosion and sedimentation control devices. The Contractor shall construct or install temporary and permanent erosion and sedimentation control features as indicated on the drawings. Berms, dikes, drains, sedimentation basins, grassing, and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative.
- (c) Sediment basins. Sediment from construction areas shall be trapped in temporary or permanent sediment basins in accordance with the drawings.

The basins shall accommodate the runoff of a local 5 year, 24 hour storm. After each storm, the basins shall be pumped dry and accumulated sediment shall be removed to maintain basin effectiveness. Overflow shall be controlled by paved weirs or by vertical overflow pipes. The collected topsoil sediment shall be reused for fill on the construction site, and/or stockpiled for use at another site. The Contractor shall institute effluent quality monitoring programs as required by State and local environmental agencies.

3.9.4 Tree Protection

The Contractor shall exercise care when excavating trenches in the vicinity of trees. Where roots are two inches in diameter or greater, the trench shall be excavated by hand or tunneled. When large roots are exposed, they shall be wrapped with heavy burlap for protection and to prevent drying. Trenches dug by machines adjacent to trees having roots less than two inches in diameter shall have the sides hand trimmed, making a clean cut of the roots. Trenches having exposed tree roots shall be backfilled within 24 hours unless adequately protected by moist burlap or canvas.

3.9.5 Trees Removed During Construction

Logs from trees removed during construction shall be decked for subsequent disposal by the Government. Decks shall be located so as not to interfere with the construction work

and shall be located as directed by PW, Engineering & Contract Management Division. Logs shall be sorted by size and placed in separate decks for sawlogs and fuelwood. Trees shall be cut from the stump and limbed to the top before decking. Whenever possible logs shall be left in tree length. If trees are too large to be handled tree length, cut 40-foot logs plus 12 inches trim allowance from the butt. The minimum size for a sawlog is 6 diameter inches on the small end and 16 foot in length. All logs not suitable for sawlogs shall be placed in a fuelwood deck. The minimum size for a fuelwood log is 5 inches diameter on the large end and 8 feet in length.

3.9.6 Restoration of Landscape Damage

All landscape features (vegetation - such as trees, plants, and grass) damaged or destroyed during Contractor operations outside and within the work areas shall be restored by the Contractor to a condition similar to that which existed prior to construction activities unless otherwise indicated on the drawings or in the specifications. All vegetation that was removed or damaged consisting of native species shall be replaced with native species. If the area had been previously landscaped with non-native species then similar plants shall be used for replacement. Landscaping shall be maintained for a minimum of 60 days after planting, to include irrigation. The Contractor shall coordinate with ENRD prior to planting any non-native species.

Trees shall be replaced in kind with a minimum 4-inch caliper nursery stock. Shrubs, vines, and ground cover shall be replaced in kind; the Contracting Officer or their representative shall approve size. All plant material shall meet specifications outlined in ANSI Z60.1 - current publication, "American Standard for Nursery Stock."

Grass areas shall be replaced in kind by seeding.

3.10 PROTECTION OF WATER RESOURCES

3.10.1 General

The Contractor shall keep construction activities under surveillance, management, and control to avoid pollution of surface and ground waters. Toxic or hazardous chemicals shall not be applied to soil or vegetation when such application may cause contamination of the fresh water reserve. Monitoring of water areas affected by construction shall be the Contractor's responsibility. The Contractor shall monitor all water areas affected by construction activities. The Contractor shall observe all prescribed setbacks from streams and wetlands as specified in FL REG 200-1.

3.10.2 Washing and Curing Water

Stormwaters from sites less than 5 acres, directly derived from construction activities shall not be allowed to enter water areas. Stormwaters shall be collected and placed in retention ponds where suspended material can be settled out or the water evaporates to separate pollutants from the water. Analysis shall be performed and results reviewed and approved before water in retention ponds is discharged.

3.10.3 Not Used

3.10.4 Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating water pollution control standards of the Federal, State or local government.

3.10.5 Fish and Wildlife

The Contractor shall minimize interference with, disturbance to, and damage of fish and wildlife. The Contractor prior to beginning of construction operations shall list species that require specific attention along with measures for their protection.

3.10.6 Wellhead Protection Areas

Particular care shall be taken to prevent the introduction of any contaminant to the surface in a designated Wellhead Protection Area (WPA). Certain activities that may pose a danger to groundwater resources are prohibited within WPAs.

3.10.7 Construction Stormwater Permit

The National Pollutant Discharge Elimination System (NPDES), requires general permits, a notice of intent, and a notice of discontinuation for construction sites greater than 5 acres discharging stormwater to any waters of the United States. The Contractor shall file a Notice of Intent with the EPA for coverage under the EPA's general permit for storm water discharges from construction activities. A copy of the NOI shall be submitted to PW, Engineering & Contract Management Division. The Contractor shall be responsible for compliance with the terms of the permit, including the development of a storm water pollution prevention plan.

3.11 PROTECTION OF AIR RESOURCES

3.11.1 General

Dust particles, aerosols, and gaseous byproducts from construction activities, processing, and preparation of materials shall be controlled at all times, including weekends, holidays, and hours when work is not in progress. Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and state allowable limits at all times. The Contractor shall not conceal or mask the emission of an air pollutant which violates air pollution regulations or causes a detriment to the health, safety, or welfare of any person.

An air pollution source shall not emit air pollutants in such quantities and of such characteristics and duration which are likely to be injurious to human health, plant or animal life, property, or which unreasonably interfere with enjoyment of life and property.

3.11.2 Fugitive Dust

Fugitive dust created as a result of construction activities shall be controlled with the BACT such as spraying with water. Contractor vehicles shall not enter public roadways with deposits of mud, dirt, or other debris or unsecured loads. Fugitive dust shall not be emitted from air pollution generating equipment such as boilers and incinerators.

3.11.3 Not Used

3.11.4 Burning Natural Vegetation

All cantonment areas, housing areas and all of North Fort are designated as no burn areas. A burning permit is required for burning natural vegetation in all other areas on Fort Lewis. Burning permits may be obtained from the PW Forestry Section. A copy of the permit shall be submitted to PW, Engineering & Contract Management Division.

3.11.5 Notice of Construction Permits

The Contractor shall be responsible for obtaining any necessary Puget Sound Air Pollution Control Agency "Notice of Construction" permits for the construction/ installation of new air emission sources (landfill gas system and flare) under this project. The Contractor is responsible for the associated fees.

The following process shall be followed when filing a Notice of Construction and Application for Approval. The Contractor shall complete the application including the Environmental Checklist (the proper forms can be obtained from the Puget Sound Air Pollution Control Agency (PSAPCA)). The Contractor shall then submit the application and a cashier's check addressed to PSAPCA for the associated plan examination fee to PW, Contract & Engineering Management Division. The application and check are to be submitted in a sealed envelope clearly marked with PSAPCA Notice of Construction Application and Associated Fee. The Government will review the application. If it is complete and accurate, the Application will be submitted by the Government to PSAPCA's with check. If it is not complete or accurate, the Contractor will be requested to submit a revised Application. The Contractor shall allow 30 days for review and submission by the Government. After submission, the Contractor shall allow 75 days for review, negotiation, and approval by PSAPCA. This process time line applies to standard projects. If the project is a major air pollution source, which requires other environmental documentation and public comment, the process time should be adjusted accordingly. The contractor shall provide an operations and maintenance manual that satisfies PSA PCA's Regulation I, Article 7, Section 7.09.

The Contractor is responsible for assuring all the standards/limits included in the Order of Approval to the Notice of Construction and Application for Approval are implemented or met. This includes developing an Operations and Maintenance plan to assure compliance with all environmental requirements and any testing of the air pollution source, the control equipment, or the monitoring equipment required by the Order of Approval or other regulatory requirement (this may be a supplement to any O&M manuals required elsewhere in the technical specifications).

The address on the Notice of Construction and Application for Approval for the property owner as well as the applicant should be PUBLIC WORKS, ATTN: AFZH-PWE, MS 17E, BOX 339500, FORT LEWIS, WA, 98433-9500.

3.11.6 Best Available Control Technology (BACT)

The Contractor shall utilize the BACT as determined by the regulatory authority on all air pollution sources. The Contracting Officer or their representative shall be notified for resolution if this requires a change in the design.

3.12 NOT USED

3.13 PROTECTION OF FISH AND WILDLIFE

The Contractor shall conduct their operations in a manner that will minimize impacts on surrounding fish and wildlife. If, during construction activities, the Contractor observes any Federal or State protected species, the Contractor shall immediately contact the Contracting Officer or their representative and cease all activities at the site.

END OF SECTION

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**SECTION 01501
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

PART 1—GENERAL

1.1—AVAILABILITY OF UTILITY SERVICES

1.1.1 Water

The Government will make available to Contractor, from existing outlets and supplies, reasonable amounts of potable water without charge. Contractor shall reasonably conserve potable water furnished. Contractor, at its own expense, shall install and maintain necessary temporary connections and distribution lines and shall remove the connections and lines prior to final acceptance of construction.

1.1.2 Electricity

Subject to available supply, reasonable amounts of electric current will be made available by the Government, without charge, to the Contractor for performing work at the work area. The Contractor shall carefully conserve electricity furnished. The Contractor, at its own expense and in a workmanlike manner satisfactory to the Contracting Officer, shall extend the existing electrical distribution system (overhead and underground) for temporary electrical service to the worksite, shall install and maintain necessary temporary connections, and shall remove the same prior to final acceptance of the construction.

1.2 SANITARY PROVISIONS

Contractor shall provide sanitary accommodations for the use of employees as may be necessary and shall maintain accommodations approved by the Contracting Officer and shall comply with the requirements and regulations of the State Health Department, County Sanitarian, or other authorities having jurisdiction.

1.3 TEMPORARY ELECTRIC WIRING

1.3.1 Temporary Power and Lighting

The Contractor shall provide construction power facilities in accordance with the safety requirements of the National Electric Code NFPA No. 70 and the SAFETY AND HEALTH REQUIREMENTS MANUAL EM 385-1-1. The Contractor, or its delegated subcontractor, shall enforce the safety requirements of electrical extensions for the work of subcontractors. Work shall be accomplished by skilled electrical tradesmen.

1.3.2 Construction Equipment

In addition to the requirements of SAFETY AND HEALTH REQUIREMENTS MANUAL,

EM 385-1-1, temporary wiring conductors installed for operation of construction tools and equipment shall be either Type TW or THW contained in metal raceways, or shall be hard usage or extra hard usage multiconductor cord. Temporary wiring shall be secured above the ground or floor in a workmanlike manner and shall not present an obstacle to

persons or equipment. Open wiring may only be used outside of buildings, and then only in accordance with the provisions of the National Electric Code.

1.3.3 Submittals

Submit detailed drawings of temporary power connections. Drawings shall include, but not be limited to, main disconnect, grounding, service drops, service entrance conductors, feeders, GFCI'S, and all site trailer connections.

1.4 FIRE PROTECTION

During the construction period, the Contractor shall provide fire extinguishers in accordance with the safety requirements of the SAFETY AND HEALTH REQUIREMENTS MANUAL, EM 385-1-1, OCT 92. The Contractor shall remove the fire extinguishers at the completion of construction.

1.5 STAGING AREA

Contractor will be provided adequate open staging area as directed by the Contracting Officer. Area is unsecured, and Contractor shall make provisions for its own security.

Contractor shall be responsible for keeping staging area, and office area clean and free of weeds and uncontrolled vegetation growth. Weeds shall be removed by pulling or cutting to within 1-inch of ground level. Lawn areas shall be mown to keep growth to less than 2-inches. All loose debris and material subject to being moved by prevailing winds in the area shall be picked up or secured at all times.

If the area is not maintained in a safe and clean condition as defined above the Contracting Officer may have the area cleaned by others with the costs being deducted from the contractor's payment.

1.6 HOUSEKEEPING AND CLEANUP

Pursuant to the requirements of Clause CLEANING UP and Clause ACCIDENT PREVENTION, of the CONTRACT CLAUSES, the Contractor shall assign sufficient personnel to insure compliance. The Contractor shall submit a detailed written plan for implementation of this requirement. The plan will be presented as part of the preconstruction safety plan and will provide for keeping the total construction site, structures, and accessways free of debris and obstructions at all times. Work will not be allowed in those areas that, in the opinion of the Contracting Officer, have unsatisfactory cleanup and housekeeping at the end of the preceding day's normal work shift. At least once each day all areas shall be checked by the Quality Control person of the Contractor and the findings recorded on the Quality Control Daily Report. In addition, the Quality Control person shall take immediate action to insure compliance with this requirement. Housekeeping and cleanup shall be assigned by the Contractor to specific personnel. The name(s) of the personnel shall be available at the project site.

1.7 DIGGING PERMIT

Before performing any onsite excavation, Contractor shall obtain a digging permit. The digging permit can be obtained at Building 4301, room 13, on weekdays between 8 a.m. and 3:30 p.m. Typically it will take a Contractor 3-5 working days to collect all signatures necessary for clearances prior to the permit being issued.

1.8 CONSTRUCTION NEAR COMMUNICATIONS CABLES - NOT USED

1.9 PROJECT SIGN

Contractor shall furnish and install one project sign in accordance with conditions hereinafter specified and layout shown on drawing No. 49s-40-05-15, Sheets 1 and 2, except Corps of Engineers' castle and Department of Army seal will be Government furnished. All letters shall be block type, upper case. Letters shall be painted as indicated using exterior-type paint. Sign shall be maintained in excellent condition throughout the life of job. Project sign shall be located as directed. Upon completion of project, sign shall be removed and shall remain the property of Contractor.

1.10 ELEVATED WORK AREAS - NOT USED

1.11 CONSTRUCTION PLANNING MEETINGS - NOT USED

1.12 TRAFFIC CONTROL

The Contractor shall provide for movement of traffic through and around the construction zone in a manner that is conducive to the safety of motorists, pedestrians, and workers. This shall include placement and maintenance of traffic control devices in accordance with the U.S. Department of Transportation, Federal Highway Administration publication, Manual on Uniform Traffic Control Devices. Streets (except dead end) may be closed to traffic temporarily by approved written request to the Contracting Officer at least 10 working days prior to street closure. Street closures shall at all times allow street access to a building from one direction. Excavations shall not remain open for more than 1 working day without approval.

1.13 UTILITIES NOT SHOWN

The Contractor can expect to encounter, within the construction limits of the entire project, utilities not shown on the drawings and not visible as to the date of this contract. If such utilities will interfere with construction operations, he shall immediately notify the Contracting Officer verbally and then in writing to enable a determination by the Contracting Officer as to the necessity for removal or relocation. If such utilities are removed or relocated as directed, the Contractor shall be entitled to equitable adjustment for any additional work or delay. The types of utilities the Contractor may encounter are waterlines, sewerlines (storm and sanitary), gaslines, fueling lines, steamlines, buried fuel tanks, septic tanks, other buried tanks, communication lines, and powerlines. These utilities may be active or abandoned utilities.

1.14 GOVERNMENT WITNESSING AND SCHEDULING OF TESTING

The Contractor shall notify the Contracting Officer, by serial letter, of dates and agenda of all performance testing of the following systems: mechanical (including fire protection and EMCS, electrical (including fire protection) medical and food service systems not later than 10 calendar days prior to start of such testing. In this notification, the Contractor shall certify that all equipment, materials, and personnel necessary to conduct such testing will be available on the scheduled date and that the systems have been prechecked by him and are ready for performance and/or acceptance testing. Contractor shall also confirm that all operations and maintenance manuals have been submitted and approved. **NO PERFORMANCE AND/OR ACCEPTANCE TESTING WILL BE PERMITTED UNTIL THE OPERATIONS AND MAINTENANCE MANUALS HAVE BEEN APPROVED.**

Government personnel, at the option of the Government, will travel to the site to witness testing. If the testing must be postponed or canceled for whatever reason not the fault of the government, the Contractor shall provide the Government not less than 3 working days advance notice (notice may be faxed) of this postponement or cancellation. Should this 3 working day notice not be given, the Contractor shall reimburse the Government for any and all out of pocket expenses incurred for making arrangements to witness such testing including, but not limited to airline, rental car, meal, and lodging expenses. Should testing be conducted, but fail and have to be rescheduled for any reason not the fault of the Government, the Contractor shall similarly reimburse the Government for all expenses incurred.

1.15 HARD HAT SIGNS

The Contractor shall provide 24 x 24 inch square Hard Hat Area signs at each entry to the project or work area as directed by the Contracting Officer. A minimum of two signs will be required. Signs shall be in accordance with the sketch at the end of this section.

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION (NOT APPLICABLE)

*** * END OF SECTION * ***

**SECTION 01701
OPERATIONS AND MAINTENANCE MANUALS**

PART 1—GENERAL

1.1 SUBMITTALS

Submittals shall be in accordance with SECTION 01300: SUBMITTALS .

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION

3.1 GENERAL

The Contractor shall provide Operation and Maintenance (O&M) manuals for the collection and flare system, ultrasonic level sensor, and data acquisition unit. Included herein are requirements for compiling and submitting the O&M data. Additional O&M data requirements are specified in the individual sections of the technical specifications. O & M Manual requirements shall be coordinated with the requirements as stated in the other technical specification sections and shall include listings for spare parts, framed instructions, etc.

3.1.1 Preparation

Manual preparation shall be under the direction of an individual or organization that has demonstrated expertise and a minimum of 3 years experience in the preparation of comprehensive and complete O&M manuals. Qualifications shall be submitted for Contracting Officer approval.

3.1.2 Format

O&M data shall be separated into distinct systems. O&M manuals for any particular system shall include narrative and technical descriptions of the interrelations with other systems. This narrative shall include a description on how the system works with notable features of the system, including normal and abnormal operating conditions. The explanation of the system is to be short and concise with reference to specific manufacturer's equipment manuals for details (see paragraph CONTENT, subparagraph b). If the quantity of material is such that it will not fit within one binder then it shall be divided into volumes, as required (see paragraph Binders).

3.1.3 Six copies of the complete set of manuals shall be provided.

3.1.4 The requirement for six copies of the O&M manual shall supersede and replace any requirements for a lesser amount of manuals which may be indicated in some specifications. Each set of manuals shall be tailored for its respective building or facility.

3.2 PRELIMINARY O&M MANUAL AND DATA SUBMITTAL

To establish and assure uniform O&M manual format, the Contractor shall submit and receive Contracting Officer approval on one (1) complete set of O&M data without the

binders prior to submission of the final bound manuals. Initial O & M Manual data submittal shall be a minimum of 30 days prior to 90 percent project completion.

The Contractor shall also provide two typewritten pages representing the proposed binder marking format as required under Paragraph: Marking and Binding. One page will represent the front cover/spine and the other page will represent the inside of the front cover.

3.2.1 Data submitted for the manual are to be for the specific equipment furnished, and are in addition to that furnished as shop drawings.

3.2.2 The Contracting Officer will require thirty (30) days for review of submitted O&M manual(s) or data. The Contracting Officer will retain one copy of unacceptable O&M manual submittal and return remainder of copies to the Contractor marked "Returned for Correction." If "Returned for Correction." the Contractor shall resubmit the required number of copies of the manual(s) incorporating all comments, prior to substantial completion and/or use and possession. The Contractor may, at his option, update the copy retained by the Government in lieu of providing the added copy.

3.2.3 For equipment or systems requiring personnel training and/or acceptance testing, the final O&M data shall be approved by the Contracting Officer prior to the scheduling of the training and/or testing. O&M data on equipment or systems not requiring training or testing shall be submitted so all data will be approved and bound in the O&M manuals in the required quantity by the time the project reaches 90 percent completion. Failure to furnish approved, bound manuals in the required quantity by the time the project is 90 percent complete, will be cause for the Contracting Officer to hold or adjust the retained percentage in accordance with CONTRACT CLAUSE, PAYMENTS UNDER FIXED PRICE CONSTRUCTION CONTRACTS.

3.2.4 Three of the six completed copies of the final O&M manuals (for each building) shall contain original manufacturer's data. Data in the remaining manuals may be duplicated copies of original data. All data furnished must be of such quality to reproduce clear, legible copies.

3.3 BINDERS

3.3.1 Construction and Assembly

Manuals shall be sliding posts or screw-type aluminum binding posts (three screws) with spine, but only one type shall be used for all manuals. The manuals shall be hardback plastic-covered, cleanable, not over three (3) inches thick and designed for 8-1/2 x 11 inch paper. The hard cover shall be of minimum stiffness equal to 0.080 inch display board or double weight illustration board.

3.3.2 Marking and Binding

As appropriate, systems shall be grouped into four separate categories and bound into volumes as follows: Mechanical, Electrical, Fire Protection/Security, and Architectural/General.

Each binder shall have the following information, as a minimum, inscribed on both the spine and cover using an offset or silk screen printing process; "EQUIPMENT OPERATING, MAINTENANCE, AND REPAIR MANUAL;" BUILDING NAME, IDENTIFICATION NUMBER (Building No.), LOCATION, AND DISCIPLINE (MECHANICAL, ELECTRICAL, FIRE PROTECTION/SECURITY, ARCHITECTURAL/GENERAL). Contractor's name and address as well as the contract title and contract number shall be printed on the inside of the front cover.

3.3.3 Color

Color of binder and printing shall be the option of the Contractor except that; (a) printing color shall contrast with binder color, and (b) colors shall be the same for all manuals.

3.3.4 Content

The O&M manuals shall be structured to address each of the following topics in order for each system. When the topic does not apply to a particular system the topic name will be included in the manual with the words "DOES NOT APPLY."

- a. Warning Page: A warning page shall be provided to warn of potential dangers (if they exist), such as high voltage, toxic chemicals, flammable liquids, explosive materials, carcinogens, or high pressures. The warning page shall be placed inside the front cover, in front of the title page.
- b. Index: Each manual shall have a master index at the front identifying all manuals and volumes and subject matter by system name for each. Following the master index, each manual shall have an index of its enclosures listing each volume, tab numbers, etc., as necessary to readily refer to a particular operating or maintenance instruction. Rigid tabbed fly leaf sheets shall be provided for each separate product and/or piece of equipment under each system in the manual. For example, if a system includes Air Handling Units 1 through 5, there shall be tab sheets AHU-1, AHU-2, AHU-3, AHU-4 and AHU-5. When a manual is divided into volumes, each volume shall have a master index at its front, followed by an index for the specific volume listing in detail all enclosed instructions for materials, individual pieces of equipment, and systems. All pages shall be numbered with the referenced number included in the index.
- c. Description: Narrative and technical descriptions of the system and of the interrelations with other systems.
- d. Check List Prior to Start Up: Precautions and prechecks prior to start up of equipment and/or system, including safety devices, monitoring devices and control sequence shall be provided.
- e. Start Up and Operation: Step-by-step sequential procedures for start up and normal operation checks for satisfactory operation shall be provided.

Safety precautions and instructions that should be followed during these procedures shall be incorporated into the operating instructions and flagged for the attention of the operator. Procedures shall include test, manual or normal, and automatic modes.

- f. Shutdown: Procedures for normal and emergency shutdown of equipment and/or systems shall be provided. The instructions shall include any procedures necessary for placing the equipment and/or system on standby or preparing the equipment and/or system for start up at a later time. Procedures shall include test, manual or normal, and automatic modes.
- g. Operator Preventive Maintenance, Major Maintenance, and Adjustments: The instructions shall include recommended operator preventive maintenance which would normally be performed by operating personnel and adjustment procedures necessary for normal operation. Schedules shall be provided indicating time frames or operating hours for initiating operator maintenance and adjustments, and including manufacturer's recommended major maintenance requirements. Emergency adjustments shall be included and flagged for operator's attention; the instructions shall also include procedures for emergency repairs that could be performed by operating personnel. These emergency repairs or "trouble-shooting guides" shall be outlined in three columns with the following headings:

- Column 1 - Trouble
- Column 2 - Probable Cause(s)
- Column 3 - Correction

- h. Operator Data: The instructions shall include equipment and/or system layouts showing all piping, wiring, breakers, valves, dampers, controls, etc., complete with diagrams, schematics, isometrics, and data to explain the detailed operation and control of each individual piece of equipment and/or system, including system components. Layouts shall show the location within the facility of controls, valves, switches, dampers, etc., by reference to site location, wing designation, floor, room number, or other clear and concise directions for locating the item. Operator data may be identical to posted data and framed instructions but shall be prepared as part of the O&M manuals. All control systems operations data shall include the following:
 - (1) A fully labeled control schematic which details all set points, throttling ranges, actions, spans, proportional bands, and any other adjustment.
 - (2) A fully labeled elementary diagram (ladder diagram).
 - (3) A sequence of control on the diagrams cross-referenced to the control schematic and elementary diagram.

- (4) A generic, functional description of each control component shown on the drawings.
 - (5) Catalog data of every control device.
- i. Electrical Layout Drawings: The Electrical O&M's shall include complete layout drawings and one-line diagrams of exterior and interior electrical with reference to the buildings and site layout. Drawings shall include layout of interior lighting, interior power, intrusion detection systems, communication systems and fire protection systems. Exterior layout drawings shall show where fed from, pad-mount transformer, metering, main distribution panel and communication lines. Layout drawings shall show the location within the facility or reference to the building and the site plan. Layout drawings shall be half size contract as-built drawings and shall be inserted into plastic pockets and installed at the back of the O&M's that pertain to that particular drawing.
 - j. Maintenance Procedures: Recommended procedures shall indicate preventive maintenance, lubrication, and good housekeeping practices which should be performed by operating personnel as well as more complex maintenance procedures which would normally be performed by trained maintenance personnel only. The procedures shall be presented with a schedule indicating time frames or operating hours for specific maintenance to be accomplished. Safety precautions and instructions that should be followed during these procedures shall be incorporated into the maintenance procedures and flagged for the attention of personnel. The procedures shall include necessary operating instructions for taking equipment off line, putting equipment on line, or putting equipment on standby. The instructions shall include all necessary material, equipment, and system data to perform maintenance work and shall include, but not be limited to, manufacturers/bulletins, catalogs, and descriptive data; certified performance curves, copies of approved test plans, including logs and records of performance acceptance test results, and actual adjustments made during final acceptance and inspection; system layouts, including block diagrams, wiring, control, and isometric diagrams: schematic items within the facility; and interrelationships with other items of system.
 - k. Repairs: Repair procedures shall be presented with a step-by-step procedure for locating and correcting the trouble. A "shop manual" may be used for this purpose. Repair procedures shall be keyed to a troubleshooting guide outlined in three columns with the following headings:

- Column 1 - Trouble
- Column 2 - Probable Cause(s)
- Column 3 - Correction

The procedures shall clearly indicate a major repair activity which should only be performed in a shop or factory versus normal repair work that may be performed onsite or with equipment online. The procedures shall also clearly indicate the limit of repair work that may be performed by Government personnel during the warranty period without voiding warranty provisions. Safety precautions and instructions that should be followed during these procedures shall be incorporated into the repair procedures and flagged for the attention of personnel.

- l. Tools: The Contractor shall provide one of each nonstandard tool, test instrument, and gauge necessary for performing maintenance and repair work. A nonstandard tool, test instrument, or gauge is defined as an item normally supplied by the manufacturer for the equipment operation or maintenance. The Contractor shall prepare a master list of such items for all equipment and systems and shall key maintenance and repair procedures to this list. The above referenced items for performing maintenance and repair work shall be provided for each individual facility of multifacility projects.
- m. Parts and Supplies: A complete list of parts and supplies shall be provided with the maintenance instructions. The list shall include all parts and components of individual pieces of equipment, and all parts and components of each system and shall identify such items as description of part, model number, circuit or component identification, etc. Parts and supplies lists shall be included within each volume of maintenance instructions. Further, a master list of spare parts and supplies recommended from each manufacturer for 1 year of operation, including source of supply, shall be sublisted with each instruction.
 - (1) Availability: The Contractor shall list the sources of supply for all parts and supplies, including name of supplier/manufacturer, address, and telephone number. If the parts and supplies are not normally stocked locally, (within 6 hours travel time, round trip by surface transportation) necessary procurement time shall also be a part of the listing.
 - (2) Spare Parts: The Contractor shall provide those spare parts and supplies that are specified in the TECHNICAL SPECIFICATIONS and those which are normally provided with the equipment or material item. A separate master list shall be provided for these items upon turnover to the Government of the parts and supplies.
- n. Maintenance Schedule: A separate schedule of all required periodic maintenance shall be included. This schedule shall list by frequency of occurrence all lubricants and special adjustments required. The types and amounts of lubrication must be specified. The Contractor shall

verify that the furnished maintenance schedule agrees with the published manufacturer's data.

3.3.4.1 Architectural/General O&M: - NOT USED

3.3.4.2 Warranties

In addition to the general warranty required by the contract, the O&M manuals shall include any specific warranties required by other sections of the TECHNICAL SPECIFICATIONS and other warranties normally provided with the particular piece of equipment or system. Extended warranties normally provided by manufacturers that are beyond the warranty of construction shall be specifically noted. The O&M manuals shall also include a specific warranty section itemizing all standard and extended warranty items. The warranty list shall be as indicated below. Warranties will not begin until the facility is accepted by the Contracting Officer. Copy of warranty shall be included in the manual.

WARRANTY INFORMATION

Project Title
Contract Number
General Contractors Name, Phone Number

Item Description Start Date End Date O & M Reference Location
(in alphabetical order)

Descriptive Name,
Manufactures/
Warrantors Name
Address & Phone No.

3.3.4.3 Installed Equipment Lists

A copy of the completed Equipment in Place forms required in SECTION 01705: EQUIPMENT-IN-PLACE shall be included in the manual. The completed forms shall be located at the front of the catalog and O&M data for the equipment listed on the form.

3.3.4.4 Data Layout

- a. Data Identification: Catalog data shall be marked to clearly identify pertinent data by highlighting the data with pointers or crossing out all nonpertinent data.
- b. Drawings: All drawings bound in the manuals shall be of such size that will require only one fold made right to left. All larger size drawings shall be inserted into a separate pocket in the required location in the manual. All drawings shall be of microfilm quality.

- c. **Posted Data:** The Contractor shall provide posted data for equipment or systems, in addition to O&M manuals, and as required by other Technical Specifications sections. The data shall consist of as-built schematics of all wiring, controls, piping, etc., as necessary for the operation of the equipment or system, and a condensed typewritten description of the system. The posted data may include approved shop drawings, layout drawings, riser, and block diagrams and shall indicate all necessary interrelation with other equipment and systems. The data may be presented in one or several frames, under glass or sheet acrylic glazing, for clarity and convenience of location. The framed data presentation and outline shall be acceptable to and posted at locations designated by the Contracting Officer. The data shall be posted before personnel training or performance testing acceptance for the related items of equipment or system.

- d. **Framed Instructions:** Typewritten instructions, framed under glass or sheet acrylic glazing, explaining equipment or system prestart checkout, startup, operations and shutdown procedures, safety precautions, preventive maintenance procedures, and normal operation checks for satisfactory performance of the equipment of systems shall be posted in conjunction with the posted data. The framed instructions may be presented in one or several frames for clarity and convenience of location. The instruction presentation and outline shall be acceptable to the Contracting Officer prior to posting, and shall be posted at locations designated by the Contracting Officer. All framed instructions shall be posted before personnel training or performance testing acceptance commences for the related item of equipment or system.

3.3.5 Payment

No separate payment will be made for the preparation and submittal of O&M manuals. All costs incurred by the Contractor in the preparation and submittal of O&M manuals shall be considered as part of the price for the equipment and included in the contract price. Approval and acceptance of the final O&M manuals shall be accomplished before final payment is made to the Contractor.

3.3.6 Checklist

Contractor shall complete and initial a copy of the O&M Manual Check List which is provided at the end of this section, and forwarded along with ENG form 4025 as part of the O&M Manual submittal to the Contracting Officer for approval.

O&M MANUAL - REVIEW CHECKLIST

_____ Does the manual cover all equipment furnished under the contract? (Review against equipment schedules on the drawings and/or equipment submittals.)

_____ Does the manual clearly highlight all relevant portions or cross out all irrelevant

- _____ portions of catalog data?
- _____ Does the manual contain operations data for the equipment? (Step-by-step operating instructions, start up procedures, sequences of operation, precautions.)
- _____ Does the manual contain maintenance and repair data for the equipment? (Lubrication, dismantling, assembly, adjustment, troubleshooting.)
- _____ Does the manual contain a separate maintenance schedule listed by frequency of occurrence?
- _____ Does the manual contain parts lists or parts catalogs for the equipment? Parts catalog or list shall contain identification, part numbers, recommended parts to be stocked, and local source of parts.
- _____ Does the manual contain electrical connection diagrams?
- _____ Does the manual contain control and interlock system diagrams where applicable?
- _____ Is every page in the manual numbered and an index provided for ready reference to the data?
- _____ Is the cover hard (nonflexible) with the facility name, identification number, location, and system embossed on both the spine and cover?
- _____ Is the Contractor's name and address, and the contract title and contract number embossed on the inside of the manual cover?
- _____ Is the binding screw posts or sliding post?
- _____ Is any of the data in the manual under the binding where it cannot be seen?
- _____ Do three sets of manuals contain all original data sheets and are others clearly legible?
- _____ Are system layout drawings provided? (Simplified diagrams for the system as installed.)
- _____ Are all drawings in the manual of such a size that requires one fold right to left, or if a larger size drawing, then inserted into a pocket in the manual?

Note that the above are common requirements to all contracts. Check the specific contract for additional information.

* * END OF SECTION * *

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**SECTION 01702
AS BUILT RECORDS AND DRAWINGS**

PART 1—GENERAL

1.1 SUBMITTALS

Data listed in PART 3 of this section shall be submitted in accordance with section 01300 SUBMITTALS. Due dates shall be as indicated in applicable paragraphs and all submittals shall be completed before final payment will be made.

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION

3.1 AS-BUILT FIELD DATA

3.1.1 General

The Contractor shall keep at the construction site a complete set of full size blueline prints of the contract drawings, reproduced at Contractor expense. During construction, these prints shall be marked to show all deviations in actual construction from the contract drawings. The color red shall be used to indicate all additions and green to indicate all deletions. The drawings shall show the following information but not be limited thereto:

- a. The locations and description of any utility lines and other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.
- b. The locations and dimension of any changes within the building or structure, and the accurate location and dimension of all underground utilities and facilities.
- c. Correct grade or alignment of roads, structures, and utilities if any changes were made from contract plans.
- d. Correct elevations if changes were made in site grading from the contract plans.
- e. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor including, but not limited to, fabrication erection, installation, and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
- f. The topography and grades of all drainage installed or affected as part of the project construction.

- g. All changes or modifications from the original design and from the final inspection.
- h. Where contract drawings or specifications allow options, only the option actually used in the construction shall be shown on the as-built drawings. The option not used shall be deleted.

These deviations shall be shown in the same general detail utilized in the contract drawings. Marking of the prints shall be pursued continuously during construction to keep them up to date. In addition, the Contractor shall maintain full size marked-up drawings, survey notes, sketches, nameplate data, pricing information, description, and serial numbers of all installed equipment. This information shall be maintained in a current condition at all times until the completion of the work. The resulting field-marked prints and data shall be referred to and marked as "As-Built Field Data," and shall be used for no other purpose. They shall be made available for inspection by the Contracting Officer's representative whenever requested during construction and shall be jointly inspected for accuracy and completeness by the Contracting Officer's representative and a responsible representative of the Contractor prior to submission of each monthly pay estimate. Failure to keep the As-Built Field Data (including Equipment-in-Place lists) current shall be sufficient justification to withhold a retained percentage from the monthly pay estimate.

3.1.2 Submittal of the As-Built Field Data

The As-Built Field Data shall be submitted to the Contracting Officer for review and approval a minimum of 20 calendar days prior to the date of final inspection. If review of the preliminary as-built drawings reveals errors and/or omissions, the drawings will be returned to the Contractor for corrections. The Contractor shall make all corrections and return the drawings to the Contracting Officer within 10 calendar days of receipt.

3.2 AS-BUILT ELECTRONIC FILE DRAWINGS

3.2.1 Upon Contractor's request the Government will provide the Contractor one set of AutoCAD electronic file format contract drawings, to be used for as-built drawings. The electronic file drawings will be available on either 3-1/2 inch or 5-1/4 inch high density magnetic disks (Contractor's choice).

3.2.2 No later than 30 days after final acceptance a complete set of as-built drawings shall be submitted in AutoCAD electronic file format. . The electronic file format, layering standards and submittal requirements are specified in paragraphs below. The as-built drawings shall be done in a quality equal to that of the originals. Line work, line weights, and lettering, and use of symbols shall be the same as the original line work, line weights, and lettering, and symbols. If additional drawings are required they shall be prepared in electronic file format under the same guidance. When final revisions have been completed, each drawings shall be identified with the words "AS-BUILT" in block letters at least 3/8-inch high placed above the title block if space permits, or if not, below the title block between the border and the trim line. The date of completion and the

words "REVISED AS-BUILT" shall be placed in the revision block above the latest revision notation.

3.2.3 Electronic File Submittal Requirements

3.2.3.1 The AutoCAD electronic file(s) deliverable shall be in AutoCAD release 12 'DWG' binary format. All support files required to display or plot the file(s) in the same manner as they were developed shall be delivered along with the files. These files include but are not limited to Font files, Menu files, Plotter Setup, and Referenced files.

3.2.3.2 Layering shall conform to the guidelines defined by the American Institute of Architects (AIA) standard document, "CAD Layer Guidelines", Copyright 1990. An explanatory list of which layer is used at which drawing and an explanatory list of all layers which do not conform to the standard AIA CAD Layer Guidelines including any user definable fields permitted by the guidelines shall be provided with each submittal.

3.2.3.3 Electronic File Deliverable Media: All electronic files shall be submitted on MS-DOS FAT or extended FAT format 3 ½ inch 1.44 MB micro-floppy disks. Two complete sets of disks shall be submitted along with one complete set of prints taken from the disks. Each disk shall be clearly marked with typewritten self-adhesive disk labels which shall contain the following information: Contractor's firm name, project name and location, submittal type (AS-BUILT), the name of each file contained within the disk or archive file, the format and version/release number of each file, a disk number indicating the numeric sequence of the disk in the submittal along with the total number of disks in the submittal, and date the disk was made. [In lieu of floppy disks the electronic files may be delivered on ISO 9660 format CD-ROM media. Due to the limited ability to mark on CD-ROM media, only the Contractor's firm name, project name and location, submittal type (AS-BUILT) and date will be required.] Each submittal shall be accompanied by a hard copy transmittal sheet that contains the above information along with a description of each file provided in the submittal.

3.2.4 Submittal of the Final As-Built Drawings

The final as-built record drawings shall be completed and returned together with the approved preliminary as-built drawings to the Contracting Officer within 30 calendar days of final acceptance. The Contracting Officer will review all final as-built record drawings for accuracy and conformance to the drafting standards and other requirements contained in DIVISION 1 GENERAL REQUIREMENTS. The drawings shall be returned to the Contractor if corrections are necessary. The Contractor shall make all corrections and shall return the drawings to the Contracting Officer within 7 calendar days of receipt.

3.3 All costs incurred by the Contractor in the preparation and furnishing of as-built drawings in AutoCAD electronic file format shall be included in the contract price and no separate payment will be made for this work. Approval and acceptance of the final as-built record drawings shall be accomplished before final payment is made to the Contractor.

3.4 One set of marked-up as-built blueline prints shall be furnished at the time of system acceptance testing. These as-built blueline prints shall be in addition to the requirements stated for the submission of the Operations and Maintenance Manuals - Paragraph, SUBMITTALS OF SHOP DRAWINGS AND OPERATIONS AND MAINTENANCE DATA.

* * END OF SECTION

**SECTION 01703
WARRANTY OF CONSTRUCTION**

PART 1—GENERAL

1.1 SUBMITTALS

Submittals shall be made in accordance with SECTION 01300: SUBMITTALS. Submittal dates shall be as defined in PART 3 of this section.

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION

3.1 WARRANTY OF CONSTRUCTION (APR 1984) (FAR52.246-21):

3.1.1 In addition to any other warranties in this contract, the Contractor warrants, except as provided in paragraph 3.1.9 of this Clause, that work performed under this contract conforms to the contract requirements and is free of any defect in equipment, material, or design furnished, or workmanship performed by the Contractor or any subcontractor or supplier at any tier.

3.1.2 This warranty shall continue for a period of 1 year from the date of final acceptance of the work. If the Government takes possession of any part of the work before final acceptance, this warranty shall continue for a period of 1 year from the date the Government takes possession.

3.1.3 The Contractor shall remedy at the Contractor's expense, any failure to conform, or any defect. In addition, the Contractor shall remedy, at the Contractor's expense, any damage to Government-owned or controlled real or personal property, when that damage is the result of:

- a. the Contractor's failure to conform to contract requirements or
- b. any defect of equipment, material, workmanship, or design furnished.

3.1.4 The Contractor shall restore any work damaged in fulfilling the terms and conditions of this clause. The Contractor's warranty with respect to work repaired or replaced will run for 1 year from the date of repair or replacement.

3.1.5 The Government will notify the Contractor, in writing or by telephone, after the discovery of any failure, defect, or damage and the Contractor shall respond and be on-site to correct the problem within 1 working day after notification. The Contractor shall furnish, and maintain, a 24 hour emergency telephone number as the point of contact. For failures, defects, or damage causing loss of power or heat, the Contractor shall respond within 4 hours.

3.1.6 If the Contractor fails to remedy any failure, defect, or damage within a reasonable time as determined by the Government, after receipt of notice, the

Government will have the right to replace, repair, or otherwise remedy the failure, defect, or damage at the Contractor's expense.

3.1.7 With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this contract, the Contractor shall:

- a. obtain all warranties that would be given in normal commercial practice;
- b. require all warranties to be executed, in writing, for the benefit of the Government, if directed by the Contracting Officer; and
- c. enforce all warranties for the benefit of the Government, if directed by the Contracting Officer.

3.1.8 In the event the Contractor's warranty under paragraph 3.1.2 of this clause has expired, the Government may bring suit at its expense to enforce a subcontractor's, manufacturer's, or supplier's warranty.

3.1.9 Unless a defect is caused by the negligence of the Contractor or subcontractor or supplier at any tier, the Contractor shall not be liable for the repair of any defects of material or design furnished by the Government nor for the repair of any damage that results from any defect in Government-furnished material or design.

3.1.10 This warranty shall not limit the Government's rights under the Inspection and Acceptance clause of this contract with respect to latent defects, gross mistakes, or fraud.

3.1.11 After final acceptance of the work, the Contractor shall furnish and install an Equipment Warranty Sticker on Contractor-installed equipment. Lettering shall be block-type upper case and easily readable. Sticker shall be of a durable type material and of a type that can be written on. Sticker shall state the following:

- a. The title "Equipment Warranty."
- b. Contractor's name and Contract Number.
- c. Date warranty expires.
- d. Point of contact, including name and telephone number.
- e. Manufacturer.

* * END OF SECTION * *

SECTION 01704
FORM 1354 CHECKLIST

PART 1—GENERAL

1.1 Procedures

The form which is a part of this specification section shall be completed for any project having revisions to real property. The following page contains the basic instructions applicable to the form.

1.2 Submittal

This form shall be submitted for approval, and be approved a minimum of 30 days before final inspection of the project. Failure to have this form completed and approved in time for the final inspection will result in delay of the inspection until the checklist is completed.

PART 2—NOT USED

PART 3—NOT USED

INSTRUCTIONS FOR DD FORM 1354 CHECKLIST

The following checklist is only a guide to describe various parts of new and modified construction. Alter this form as necessary or create your own document to give complete accounting of the real property added or deleted for this contract. All items added, deleted, replaced, or relocated within the building 5 foot line, or on site 5 feet beyond the building perimeter must be accounted for completely. Only a few of the most common items beyond the 5 foot line are included on the checklist under UTILITIES/SURFACE CONSTRUCTION, add additional items as required by the construction accomplished. Attach a continuation sheet and use the checklist format to describe other work related to this particular project. Listed on the last page are additional items with units of measure and descriptive terms.

Costs for each item must include material, tax, installation, overhead and profit, bond and insurance costs. This form should be filled out as each item is installed or each phase of work is completed.

TOTAL FOR ALL ITEMS INCLUDING CONTRACT MODIFICATION COSTS
ADDED TOGETHER SHOULD EQUAL THE TOTAL CONTRACT PRICE.

KEY TO ABBREVIATIONS

AC - Acres
BL - Barrels, Capacity
BTU - British Thermal Unit
CY - Cubic Yards
EA - Each
GA - Gallons, Capacity
HD - Head
KV - Kilovolt-Amperes, Capacity (KVA)
KW - Kilowatts, Capacity
SE - Seats
SF - Square Feet
SY - Square Yard
MB - Million British Thermal Units
MI - Miles
LF - Linear Feet
KG - Thousand Gallons Per Day, Capacity
TN - Ton
- Number; How Many

4. **NEW CONSTRUCTION OVERVIEW: BUILDING(S)/ADDITION(S) TO A BUILDING - NOT USED**

5. **BUILDING SYSTEMS (INTERIOR). - NOT USED**

SITE WORK

6. **UTILITIES/SURFACE CONSTRUCTION:**

(1) (812 41/812-223) PRIM DISTR LINE OH-LF-(# LF of wire; size & type of wire; # of poles; voltage)

DESCRIPTION:

COST: _____

(2) (812/81360) TRANSFORMERS-KVA POWER POLES-LF
(# poles; # transformers - pad or pole mounted; KVA of wire; # LF of wire)

DESCRIPTION:

COST: _____

(3) (812 40/812-224) SEC DISTR LINE OH-LF-(voltage; size & type of wire; # transformers; KVA; # LF of wire; # of service drops; # poles)

DESCRIPTION:

COST: _____

- (4) (812 42/812-225) PRIM DISTR LINE UG-LF-(KVA; voltage; type of conduit & size(encased or direct burial); size & kind of wire inside conduit; LF of wire& conduit)

DESCRIPTION:

COST: _____

- (5) (812 42/812-226) SEC DISTR LINE UG-LF-(type of conduit & size; type & size of wires in conduit; LF of conduit & wire inside conduit; voltage)

DESCRIPTION:

COST: _____

- (6) (812 30/812-926) EXTERIOR LIGHTING-EA-(streets or parking area lights) (# & type of lights; whether pole mounted or not; # LF of connecting wire if pole mounted)

DESCRIPTION:

COST: _____

- (7) (824 10/824-464) GAS MAINS-LF(size, type, & # of LF of pipe)

DESCRIPTION:

COST: _____

- (8) (831 90/831-169) SEWAGE SEPTIC TANK - KG - NOT USED

- (9) (832 10/832-266) SANITARY SEWER-LF-(sizes & types of pipes - # of LF of each; # of cleanouts; # & size of manholes)

DESCRIPTION:

COST: _____

- (10) (842 10/842-245) WATER DISTR MAINS (POTABLE)-LF-(# LF & size, type of pipe)

DESCRIPTION:

COST: _____

- (11) (843 11/843-315) FIRE HYDRANTS-EA-NOT USED

- (12) (851 90/851-143) CURBS & GUTTERS-LF-NOT USED

COST: _____

- (13) (851 90/851-145) DRIVEWAY-SY-(SY; material used; thickness)

DESCRIPTION:

COST: _____

- (14) (851 10/12/851-147) ROAD-SY & LF-(SY; material used; thickness; LF)

COST: _____

(14) (85210/11 /852-262) VEHICLE PARKING-SY-NOT USED

COST: _____

(15) (852 20/852-289) SIDEWALKS-SY & LF-(# SF & LF; dimensions of each section & location; thickness; material used)

DESCRIPTION:

COST: _____

(16) (871 10/871-183) STORM DRAIN DISPOSAL-LF-(# LF of pipe; sizes & types pipe; # of catch basins & manholes & sizes of each)of

DESCRIPTION:

COST: _____

(17) (872 15/872-247) FENCE, SECURITY (ARMS)-LF-(# of LF; fence material; # & type of gate(s); # strands of barbed wire on top)

DESCRIPTION:

COST: _____

- (18) (87210/12/872-248) FENCE, INTERIOR-LF-(# of LF; fence material; # & kind of gate(s))

DESCRIPTION:

COST: _____

- (19) (890 70/890-187) UTILITY VAULT(4 or more transformers)- SF(# SF; dimensions of vault; # of xfmers)

DESCRIPTION:

COST: _____

- (20) (135 10/135-583) TEL DUCT FACILITY-LF-(# of LF; size & type of conduit; type of wire)

DESCRIPTION:

COST: _____

- (21) (135 10/135-586) TEL POLE FACILITY-LF-(# LF & type of wire; # of poles)

DESCRIPTION:

COST: _____

7. **INSTALLED EQUIPMENT:** Furnish an Equipment-In-Place List. Any price related to equipment should already be included in this checklist.

8. **SYSTEMS NOT PREVIOUSLY LISTED:** Attach a separate sheet and use the same format to describe the system(s). Example: CATV system, intercom system, or other utilities and surface construction not described on this checklist.

9. **ASBESTOS REMOVAL:** Furnish a description by building of the number of LF of asbestos removed, number of LF of re-insulation, number of SF of soil encapsulation, and number and size of tanks, etc., where asbestos was removed. Also, identify buildings by their numbers and use.

10. **MAINTENANCE/RENOVATIONS:** List by building number and describe all additions and deletions by quantity and the correct unit of measure. Furnish a cost per building.

UTILITIES/SURFACE CONSTRUCTION - Listed below are some additional items which may or may not apply to your contract. EACH item installed on site should be listed and priced separately even if not included on this checklist.

- (1) IRRIGATION SYSTEM-(LF of pipe; size & type of pipe; number and type of heads)
- (2) UNDERGROUND/ABOVEGROUND STORAGE TANKS-(GA, type of tank; material stored)
- (3) (833-354) DUMPSTER ENCLOSURE-(SF & dimensions)
- (4) (890-152) UNLOADING PAD-(SY; material)
- (5) SIGNAGE-(Dimensions; material)
- (6) (12580) CATHODIC PROTECTION-(MI; LF)
- (7) (87270) LIGHTNING PROTECTION-(LF)
- (8) (81290) POLE DUCT RISER-(LF, type of material)
- (9) RAMPS-(SF, material; CY if concrete-use code for sidewalk if concrete)
- (10) (89080/890-158) LOAD AND UNLOAD PLATFORM-(SF)
- (11) (83240/832-255) INDUSTRIAL WASTE MAIN-(LF)
- (12) WHEEL STOPS-(EA; size & material)
- (13) (81350) OUTDOOR INTEGRAL DISTR CTR-(KVA)
- (14) (45110) OUTDOOR STORAGE AREA-(SF)
- (15) (73055/730-275) BUS/WAIT SHELTER-(SF)
- (16) (690-432) FLAGPOLE-(EA; dimensions)
- (17) (93210) SITE IMPROVEMENT-(JOB)
- (18) (93220) LANDSCAPE PLANTING (Acre; EA; SF)
- (19) (93230) LANDSCAPE BERMS/MOUNDS-(SY)
- (20) (93410) CUT AND FILL-(CY)
- (21) (843-315) FIRE HYDRANTS-(EA; Type)
- (22) (14970) LOADING AND UNLOADING DOCKS AND RAMPS (not connected to a Bldg)-(SF) (23) BICYCLE RACK-(EA)
- (24) (85140/812-928) TRAFFIC SIGNALS-(EA)
- (25) (87210) FENCING OR WALLS-(LF)
- (26) (15432) RIPRAP-(LF & SY)
- (27) (75061) GRANDSTAND OR BLEACHERS-(EA; SE)
- (28) 87150/871-187) RETAINING WALLS-(LF; SY; material)

NOTE: 5 Digit Codes-Army; 6 Digit Codes-Air Force

* * END OF SECTION * *

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**SECTION 01705
EQUIPMENT-IN-PLACE LIST**

PART 1—GENERAL

1.1 SUBMITTALS

Data listed in PART 3 of this section shall be submitted in accordance with section 01300 SUBMITTALS. Due dates shall be as indicated in applicable paragraphs and all submittals shall be completed before final payment will be made.

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION

3.1 SUBMITTAL

The final equipment-in-place list shall be completed and returned to the Contracting Officer within 30 calendar days of the final inspection. The Contracting Officer will review all final Equipment-In-Place Lists for accuracy and conformance to the requirements contained in DIVISION 1 GENERAL REQUIREMENTS. The lists shall be returned to the Contractor if corrections are necessary. The Contractor shall make all corrections and shall return the lists to the Contracting Officer within 7 calendar days of receipt.

3.2 EQUIPMENT-IN-PLACE LIST

Contractor shall submit for approval, at the completion of construction, a list of equipment-in-place. This list shall be updated and kept current throughout construction, and shall be jointly inspected for accuracy and completeness by the Contracting Officer's representative and a responsible representative of the Contractor prior to submission of each monthly pay estimate. A sample form showing minimum data required is provided at the end of this section. The EQUIPMENT-IN-PLACE LIST shall be comprised of all equipment falling under one or more of the following classifications:

- a. Each piece of equipment listed on the mechanical equipment schedules.
- b. Each electrical panel, switchboard, and MCC panel.
- c. Each transformer.
- d. Each piece of equipment or furniture designed to be movable.
- e. Each piece of equipment that contains a manufacturer's serial number on the name plate.

3.3 PAYMENT

All costs incurred by the Contractor in the preparation and furnishing of Equipment-In-Place Lists shall be included in the contract price and no separate payment will be made

for this work. Approval and acceptance of the final Equipment-In Place Lists shall be accomplished before final payment is made to the Contractor.

EQUIPMENT-IN-PLACE LIST

CONTRACT NO.: _____

Specification Section: _____ Paragraph No. _____

ITEM DESCRIPTION:

Item Name: _____

Serial Number: _____

Model Number: _____

Capacity: _____ Replacement Cost _____

ITEM LOCATION:

Building Number: _____ Room Number: _____

or Column Location: _____

MANUFACTURER INFORMATION:

Manufacturer Name: _____

Trade Name (if different from item name): _____

Manufacturer's Address: _____

Telephone Number: _____

WARRANTY PERIOD: _____

CHECKED BY: _____

**** END OF SECTION ****

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SECTION 02210 GRADING

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 698	(1991) Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D 2487	(1992) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.2 UNIT PRICE (Not Used)

1.3 DEFINITIONS

1.3.1 Satisfactory Materials

Materials imported from off-site free from roots and other organic matter, trash, debris, and frozen materials and stones larger than 6 inches in any dimension are satisfactory for embankment. Satisfactory material shall consist of any material classified by ASTM D 2487 as GW, GP, SP, and SW. See Paragraph 2.2.3, Embankment, for embankment product specification.

1.3.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Materials classified in ASTM D 2487 as Pt, OH, and OL are unsatisfactory.

1.3.3 Cohesionless and Cohesive Materials

Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines have a plasticity index of zero.

1.3.4 Degree of Compaction

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in ASTM D 698 abbreviated below as a percent of laboratory maximum density.

1.3.5 Topsoil

Material obtained from off-site areas suitable for topsoils, is defined as suitable. See Paragraph 2.2.4, Topsoil, for topsoil product specification.

1.3.6 Low Ground Pressure Equipment

Low ground pressure equipment is equipment that exerts less than five pounds per square inch.

1.4 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data

Plant, Equipment, Machines, and Tools; FIO

List of proposed equipment to be used in performance of construction work, including descriptive data.

SD-08 Statements

Field Testing Control; FIO.

Qualifications of the commercial testing laboratory who will be performing all testing in accordance with paragraph FIELD TESTING CONTROL.

SD-09 Reports

Field Testing Control; FIO. Satisfactory Materials; FIO.

Borrow pit operations and disposal of overburden and unsuitable materials; GA.

Certified test reports and analysis certifying that the satisfactory materials proposed for use at the project site conform to the specified requirements, and for all tests conducted in accordance with paragraph FIELD TESTING CONTROL.

Sampling and Testing; FIO. Field Density; FIO.

Calibration curves and related test results prior to using the device or equipment being calibrated. Copies of field test results within 24 hours after the tests are performed. Certified copies of test results for approval not less than 14 days before material is required for the work.

1.5 SUBSURFACE DATA

There has been no subsurface exploration at cell 6..

1.6 CONSTRUCTION QUALITY ASSURANCE

Quality Assurance Plan is not part of specification.

PART 2—PRODUCTS

2.1 QUARRY SPALLS FOR SLOPE PROTECTION

Quarry spalls shall be supplied from off-site contractor provided source.

The stone shall be hard, sound, and durable. It shall be free from segregation, seams, cracks, and other defects tending to destroy its resistance to weather. Quarry spalls shall meet the following requirements for grading:

Sieve Size	Percent Passing
8"	100
3"	40 max.
3/4"	10 max.

2.2 BORROW MATERIAL

Borrow material shall be selected to meet requirements and conditions of the particular fill for which it is to be used. Necessary clearing, grubbing, disposal of debris, and satisfactory drainage of borrow pits shall be performed by the Contractor as incidental operations to the borrow excavation.

2.2.1 Selection

Borrow materials shall be obtained from sources outside the limits of Government-controlled land. Borrow materials shall be subject to approval. Unless specifically provided, no borrow shall be obtained within the limits of the project site without prior written approval. The source of borrow material shall be the Contractor's responsibility. Unless otherwise provided in the contract, the Contractor shall obtain from the owners the right to procure material, shall pay all royalties and other charges involved, and shall bear all the expense of developing the sources, including rights-of-way for hauling.

The Contractor shall determine whether or not soils from off-site sources can meet the requirements of these specifications.

2.2.2 Borrow Pits

Except as otherwise permitted, borrow pits shall be excavated to afford adequate drainage. Overburden and other spoil material shall be stockpiled at the borrow pit as approved by the Contracting Officer. Borrow pits shall be neatly trimmed after the excavation is completed.

2.2.3 Embankment

Embankment material shall be from a Contractor selected source. The material shall be well graded. The maximum stone size shall be six inches. The material shall contain no more than two percent organic material.

2.2.4 Topsoil

Topsoil shall be native topsoil from Contractor selected sources. Material for topsoil shall not be taken from a depth greater than one foot from the existing ground unless otherwise designated by the Contracting Officer.

In the production of topsoil, all vegetative matter, except large brush and trees over four feet in height, shall become part of the topsoil. Noxious weeds and blackberries, as designated by government officials, shall not be incorporated into the topsoil.

The topsoil shall have a pH range of 5.0 to 7.6. Topsoil that does not meet the pH range shall be amended by the addition of pH adjusters, at the rate recommended by the County Extension Service based on soil tests.

The topsoil shall have a maximum of 600 parts per million of soluble salts.

2.2.5 Cover Soil

Cover soil shall consist of gravel and sand approved materials processed and blended or naturally combined. Material shall be durable and sound free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. Material shall be uniform in density and quality shall be in accordance with any and all requirements specified by the manufacturer of the underlying geotextile, and shall meet the following requirements:

Sieve Size	Percent Passing
1-1/2"	100
3/8"	50-100
No. 10	20-100
No. 40	0-80
No. 200	0-5

The material shall be uniform or well graded with a uniformity coefficient of three or greater. Gradation curves will exhibit no abrupt changes in slope denoting skip or gap grading. The soil shall be manufactured from a Contractor selected source.

PART 3—EXECUTION

3.1 CONSERVATION OF TOPSOIL (Not Applicable)

3.2 EXCAVATION

Excavation of every description, regardless of material encountered, within the grading limits of the project shall be performed to the lines and grades indicated. Satisfactory

excavation material shall be transported to and placed in fill areas within the limits of the work. All unsatisfactory excavated material including debris shall be placed within the refuse layer of cell 6. All cut and fill areas within the limits of final cover system shall be covered with at least 12 inches of embankment, graded to a smooth slope no steeper than 3H:1V or no less than 5 percent in general accordance with the lines and grades indicated on the Drawings, and compacted to provide a suitable base for the overlying final cover system. Excavations carried below the depths indicated, without specific directions, shall, except as otherwise specified, be refilled to the proper grade with satisfactory material as directed. All additional work of this nature shall be at the Contractor's expense. Excavation and filling shall be performed in a manner and sequence that will provide drainage at all times. Excavations shall be kept free from water while construction therein is in progress. Embankment required for fills in excess of that produced by excavation within the grading limits and overfill areas shall be obtained from borrow areas.

3.3 DITCHES AND CHANNEL CHANGES

Ditches and channel changes shall be cut accurately to the cross sections and grades indicated. All roots, stumps, rock, and foreign matter in the sides and bottom of ditches and channel changes shall be trimmed and dressed or removed to conform to the slope, grade, and shape of the section indicated. Care shall be taken not to excavate ditches below the grades indicated. Excessive ditch excavation shall be backfilled to grade either with satisfactory, thoroughly compacted material or with suitable stone or cobble. All ditches excavated under this section shall be maintained until final acceptance of the work. Satisfactory material excavated from ditches and channel changes shall be placed in fill areas. Unsatisfactory and excess excavated material shall be disposed of in accordance with directions in paragraph EXCAVATION. No excavated material shall be deposited closer to the edges of the ditches than indicated and in no case less than 3 feet.

3.4 BACKFILL ADJACENT TO STRUCTURES

Backfill adjacent to structures shall be placed and compacted uniformly in such manner as to prevent wedging action or eccentric loading upon or against the structures. Slopes bounding or within areas to be backfilled shall be stepped or serrated to prevent sliding of the fill. During backfilling operations and in the formation of embankments, equipment that will overload the structure in passing over and compacting these fills shall not be used. Backfill for storm drains and subdrains, including the bedding and backfill for structures other than culverts and drains, shall conform to the additional requirements in other applicable sections.

3.5 PREPARATION OF GROUND SURFACE FOR FILL

Outside of the limits of the final cover system, all vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish, and other unsatisfactory material within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. In no case will unsatisfactory material remain in or under the fill area. Sloped ground surfaces steeper than one vertical to four horizontal on which fill is to be placed shall be plowed, stepped, or broken up, as directed, in such manner that the fill material will bond with the existing surface.

Prepared surfaces on which compacted fill is to be placed shall be wetted or dried as may be required to obtain the specified moisture content and density.

3.6 FILLS AND EMBANKMENTS

The entire surface of the cell 6 area shall be covered with a sufficient quantity of embankment, so that no debris is apparent on the ground surface after compaction. Fills and embankments shall be constructed at the locations and to lines and grades indicated. The completed fill shall conform to the shape of the typical sections indicated or shall meet the requirements of the particular case. Satisfactory material obtained during excavation may be used in forming required fill. Fill shall be satisfactory material and shall be reasonably free from roots, other organic material, and trash and from stones having a maximum diameter greater than 6 inches. No frozen material will be permitted in the fill. Stones having a dimension greater than 4 inches shall not be permitted in the upper 6 inches of fill or embankment. The material shall be placed in successive horizontal layers of 12 inches in loose depth for the full width of the cross section and shall be compacted as specified. Each layer shall be compacted before the overlaying lift is placed.

3.7 COMPACTION

Each layer of the fill or embankment shall be compacted to at least 85 percent of laboratory maximum density using ASTM D 698. Each layer shall be compacted to provide a firm, unyielding surface for placement of succeeding soil layers.

3.8 FINISHED EXCAVATION, FILLS, AND EMBANKMENTS

All areas covered by the project, including the subgrade for the final cover system; existing, excavated, and filled sections; and adjacent transition areas, shall be uniformly smooth-graded. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes and voids. Ditches shall be finished to permit adequate drainage. The surface of areas to be turfed shall be finished to a smoothness suitable for the application of turfing materials. For the subgrade for the final cover system, the following shall be accomplished as required: (a) soft or otherwise unsatisfactory material shall be replaced with satisfactory excavated material or other approved materials; (b) rock encountered in the cut sections shall be excavated to a depth of 6 inches below finished grade for the subgrade; (c) low areas resulting from removal of unsatisfactory material or from excavation of rock shall be brought up to required grade with satisfactory materials, and the entire subgrade shall be shaped to line, grade, and cross section and shall be compacted as specified. The surface of embankments or excavated areas for road construction or other areas on which a base course or pavement is to be placed shall vary not more than 0.05 foot from the established grade and approved cross section.

Surfaces other than those that are to be paved shall be finished not more than 0.15 foot below the established grade or approved cross section. Average job thickness shall be the average of all thickness measurements taken from the job, but shall be no less than 1/2 inch less than the dimensioned layer thickness indicated on the Plans.

3.9 PLACING TOPSOIL

On areas to receive topsoil, the compacted subgrade soil shall be scarified to a 2-inch depth for bonding of topsoil with subsoil. Topsoil then shall be spread by pushing the material up or across the slope evenly to a thickness of 6 inches and graded to the elevations and slopes shown. Topsoil shall not be spread when frozen or excessively wet or dry.

The topsoil shall be placed by only low ground pressure equipment above the geomembrane. Equipment that is not low ground pressure shall be operated on at least three feet of soil above the geomembrane.

3.10 PLACING COVER SOIL

On areas with a soil subgrade to receive cover soil, the compacted subgrade soil shall be scarified to a depth of 2 inches depth for bonding of cover soil with subsoil. Cover soil placed over geonet composite shall be placed in one lift beginning at the bottom of a slope and pushing the cover soil up or across the slope. The cover soil shall not be crowded but tumbled to prevent damage to the underlying geonet composite.

Cover soil shall be spread evenly to a thickness of 18 inches and graded to elevations and slopes shown. Cover soil shall not be spread when frozen or excessively wet or dry.

Only low ground pressure equipment can place and spread cover soil above the geomembrane. Equipment that is not low ground pressure, shall be operated on at least three feet of soil above the geomembrane.

3.11 FIELD TESTING CONTROL

Testing shall be the responsibility of the Contractor and shall be performed by an approved commercial testing laboratory or by the Contractor subject to approval. Field density and moisture content tests shall be performed at one test per lift per acre of embankment placed. Field in-place density shall be determined in accordance with ASTM D 2922. When ASTM D 2922 is used, the calibration curves shall be checked, and adjusted if necessary, using the sand cone method as described in paragraph Calibration of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. The calibration checks of both the density and moisture gauges shall be made at the beginning of a job on each different type of material encountered and at intervals as directed.

3.12 PROTECTION

Newly graded areas shall be protected from traffic and from erosion, and any settlement or washing away that may occur from any cause, prior to acceptance, shall be repaired and grades reestablished to the required elevations and slopes. All work shall be conducted in accordance with the environmental protection requirements of the contract.

**** END OF SECTION ****

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SECTION 02222
EXCAVATION, TRENCHING, AND BACKFILLING
FOR UTILITIES SYSTEMS

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS MANUAL

EM 385-1-1 Safety and Health Requirements

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422 Particle Size Analysis of Soils (R 1972)

ASTM D 4318 Liquid Limit, Plastic Limit and Plasticity Index of Soils

ASTM D 1556 Density of Soils In-Place by the Sand-Cone Method

ASTM D 1557 Moisture Density Relations of Soils Using a 10-lb (4.54 kg)
Rammer and 18-inch (457 mm) Drop

ASTM D 216 Density of Soil In-Place by the Rubber Balloon Method (R
1977)

ASTM D 2217 Wet Preparation of Soil Samples for Particle-Size Analysis and
Determination of Soil Contents

ASTM D 2487 Classification of Soils for Engineering Purposes

ASTM D 3740 Evaluation of Agencies Engaged in the Testing and/or Inspection
of Soil and Rock as Used in Engineering Design and
Construction

1.2 DEFINITIONS

1.2.1 Satisfactory Materials

Satisfactory materials shall consist of any material classified by ASTM D 2487 as, GW, GP, SP, and SW. Materials classified as SP-SM, GP-GM, or GM are also satisfactory provided that they contain moisture content suitable for the intended use.

1.2.2 Unsatisfactory Materials

Unsatisfactory materials shall be materials that do not comply with the requirements for satisfactory materials. Unsatisfactory materials include but are not limited to those materials containing roots and other organic matter, trash, debris, frozen materials and stones larger than 3 inches, and materials classified in ASTM D 2487, as GM, PT, OH, and OL. Unsatisfactory materials also include man-made fills and refuse.

1.2.3 Cohesionless and Cohesive Materials

Cohesionless materials shall include materials classified in ASTM D 2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Liquid limit and plasticity index shall be determined in accordance with ASTM D 4318 using ASTM D 2217, Procedure B.

1.2.4 Unyielding Material

Unyielding material shall consist of gravelly soils with stones greater than 3 inches in any dimension or as defined by the pipe manufacturer, whichever is smaller.

1.2.5 Unstable material

Unstable material shall consist of materials too wet to properly support the utility pipe, conduit, or appurtenance structure.

1.2.6 Select granular material

Select granular material shall consist of well-graded sand, gravel, crushed gravel, or crushed stone composed of hard, tough and durable particles, and shall contain not more than 10 percent by weight of material passing a No. 200 mesh sieve and not less than 95 percent by weight passing the 1-inch sieve. The maximum allowable aggregate size shall be 1-1/2 inches, or the maximum size recommended by the pipe manufacturer, whichever is smaller.

1.2.7 Degree of Compaction

Degree of compaction shall be expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 1557, Method D.

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION

3.1 EXCAVATION

Excavation of every description and of whatever substances encountered shall be performed to the lines and grades indicated. During excavation, material satisfactory for backfilling shall be stockpiled in an orderly manner at a distance from the banks of the trench equal to 1/2 the depth of the excavation, but in no instance closer than 2 feet. Adequate drainage shall be provided for the stockpiles and surrounding areas by means of ditches, dikes, or other approved methods. The stockpiles shall also be protected from contamination with unsatisfactory excavated material or other material that may destroy the quality and fitness of the suitable stockpiled material. If the Contractor fails to protect the stockpiles and any material becomes unsatisfactory as a result, such material, if directed, shall be removed and replaced with satisfactory on-site or imported material from approved sources at no additional cost to the Government. Excavated material not required or not satisfactory for backfill shall be removed from the site and shall be disposed of in designated areas approved for surplus material storage or in designated waste areas as directed. Any excess satisfactory excavated materials shall not be mixed

with unsatisfactory materials. Unsatisfactory materials shall not cover available suitable materials. Grading shall be done as may be necessary to prevent surface water from flowing into the excavation, and any water accumulating therein shall be removed so that the stability of the bottom and sides of the excavation is maintained. Unauthorized overexcavation shall be backfilled in accordance with Paragraph BACKFILLING at no additional cost to the Government.

3.1 TRENCH EXCAVATION

The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below and above the top of the pipe shall be sloped, or made vertical, as recommended in the manufacturer's installation manual. The trench width below the top of the pipe shall not exceed that recommended in the installation manual. Where no manufacturer's installation manuals are available, trench walls shall be excavated to a stable angle of repose as required to properly complete the work. Trench excavations shall adhere to requirements prescribed in EM 385-1-1, Safety and Health Requirements Manual. Trench width below the top of the pipe shall not exceed 24 inches. Where recommended trench widths are exceeded, redesign shall be performed by the Contractor using stronger pipe or special installation procedures. The cost of this redesign and the increased cost of pipe or installation procedures shall be borne by the Contractor without additional cost to the Government.

3.1.1 Bottom Preparation

The bottoms of trenches shall be accurately graded to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Stones of 3 inches or greater if any dimension, or as recommended by the pipe manufacturer, whichever is smaller, shall be removed to avoid point bearing.

3.1.2 Removal of Unyielding Material

Where overdepth is not indicated and unyielding material is encountered in the bottom of the trench, such material shall be removed 6 inches below the required grade and replaced with suitable materials as provided in Paragraph BACKFILLING.

3.1.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, such material shall be removed to the depth directed and replaced to the proper grade with select granular material as provided in Paragraph BACKFILLING. When removal of unstable material is required due to the fault or neglect of the Contractor in his performance of the work, the resulting material shall be excavated and replaced by the Contractor without additional cost to the Government.

3.1.4 Excavation for Appurtenances

Excavation for junction boxes, hand holes, or similar structures shall be sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members. Removal of unstable material shall be as specified above. When concrete or masonry is to be placed in an excavated area, special care shall

be taken not to disturb the bottom of the excavation. Excavation to the final grade level shall not be made until just before the concrete or masonry is to be placed.

3.1.5 Stockpiles

Stockpiles of satisfactory, unsatisfactory, and wasted materials shall be placed and graded as specified. Stockpiles shall be kept in a neat and well drained condition, giving due consideration to drainage at all times. The ground surface at stockpile locations shall be cleared, grubbed, and sealed by rubber-tired equipment; excavated satisfactory; and unsatisfactory materials shall be separately stockpiled. Stockpiles of satisfactory materials shall be protected from contamination which may destroy the quality and fitness of the stockpiled material. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, such material shall be removed and replaced with satisfactory material from approved sources at no additional cost to the Government. Locations of stockpiles of satisfactory materials shall be subject to prior approval of the Contracting Officer.

3.2 BACKFILLING

Backfill material shall consist of satisfactory material. Backfill shall be placed in layers not exceeding 6 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density for cohesionless soils and 90 percent maximum density for cohesive soils, unless otherwise specified.

3.2.1 Trench Backfill

Trenches shall be backfilled to the finished grades shown or as required to match the surrounding grades. The trench shall be backfilled to at least 2 feet above the top of pipe prior to performing the required pressure tests. The joints and couplings shall be left uncovered during the pressure test.

3.2.2 Replacement of Unyielding Material

Unyielding material removed from the bottom of the trench shall be replaced with select granular material or initial backfill material.

3.2.3 Replacement of Unstable Material

Unstable material removed from the bottom of the trench or excavation shall be replaced with select granular material placed in layers not exceeding 6 inches loose thickness.

3.2.4 Bedding and Initial Backfill

Bedding shall be of the type and thickness shown. Bedding shall be clean, sand-gravel mixture free from organic matter and conforming to the following gradation when tested in accordance with ASTM D 422.

<u>U.S. Standard</u>	<u>Percent Passing Sieve Size</u>
1-inch	100

No. 4
No. 200

25-80
0-10

Initial backfill material shall be placed in layers of a maximum of 6 inches less thickness and compacted with approved tampers to the density of the adjacent soil and to a height of at least 1 foot above the utility pipe or conduit. The first 6 inches of backfill material directly above PVC or copper pipes shall not be compacted. The backfill shall be brought up evenly on both sides of pipe for the full length of the pipe. Care shall be taken to ensure thorough compaction of the fill under the haunches of the pipe. Backfill material in this portion of the trench shall consist of satisfactory material at a moisture content that will facilitate compaction, free from stones of such size as recommended by the pipe manufacturer, or larger than 1-1/2 inches in any dimension, whichever is smaller. Pipe bedding shall be obtained from a government-controlled source indicated on the Drawings.

3.2.5 Final Backfill

The remainder of the trench, except for special materials for roadways, shall be backfilled with satisfactory material. Backfill material shall be deposited and compacted as follows:

3.2.5.1 Roadways

Backfill shall be placed up to the elevation four inches below final grade. Finish backfilling with four inches of base course per Section AGGREGATE BASE COURSE. Water flooding or jetting methods of compaction will not be permitted.

3.2.5.2 Turfed or Seeded Areas and Miscellaneous Areas

Backfill shall be deposited in layers of a maximum of 12-inch loose thickness, and compacted to 85 percent maximum density for cohesive soils and 90 percent maximum density for cohesionless soils. Compaction by water flooding or jetting will not be permitted. This requirement shall also apply to all other areas not specifically designated above.

3.2.6 Backfill for Appurtenances

After the manhole, catchbasin, inlet, or similar structure has been constructed, backfill shall be placed in such a manner that the structure will not be damaged by the shock of falling earth. The backfill material shall be deposited and compacted as specified for final backfill, and shall be placed in such a manner as to prevent eccentric loading and excessive stress on the structure.

3.3 SPECIAL REQUIREMENTS

Special requirements for both excavation and backfill relating to the specific utilities are as follows:

3.3.1 Plastic Marking Tape

Warning tapes shall be installed directly above the pipe, at a depth of 18 inches below finished grade unless otherwise shown. The tape shall have a foil backing. The tape shall be acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise. Tape color shall be green, signifying sewer/leachate transmission, and shall bear a continuous printed inscription describing the specific utility.

3.4 TESTING

Testing shall be the responsibility of the Contractor and shall be performed at no additional cost to the Government. Number of tests shall be in accordance with Section CONTRACTOR QUALITY CONTROL.

3.4.1 Testing Facilities

Tests shall be performed by an approved commercial testing laboratory. Approval of testing facilities and personnel shall be based on compliance with requirements specified in Section CONTRACTOR QUALITY CONTROL, and no work requiring testing will be permitted until the facilities have been inspected and approved by the Contracting Officer.

3.4.2 Laboratory Tests for Moisture-Density Relations

Laboratory tests for moisture-density relations shall be determined in accordance with ASTM D 1557, Method D. A mechanical tamper may be used, provided the results are correlated with those obtained by the referenced hand tamper or ASTM D 1557, Method D. Field in-place density shall be determined in accordance with ASTM D 1556 or D 2167. Trenches improperly compacted shall be reopened to the depth directed, then refilled and compacted to the density specified at no additional cost to the Government.

* * END OF SECTION * *

**SECTION 02230
CLEARING AND GRUBBING**

PART 1—GENERAL

1.1 REFERENCES (Not Applicable)

1.2 DEFINITIONS

1.2.1 Clearing

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including down timber, snags, brush, and rubbish occurring in the areas to be cleared.

1.2.2 Grubbing

Grubbing shall consist of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas.

1.3 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-18 Records

Materials Other Than Salable Timber; FIO.

Written permission to dispose of such products on private property shall be filed with the Contracting Officer.

PART 2—PRODUCTS (NOT APPLICABLE)

PART 3—EXECUTION

3.1 CLEARING

Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Trees and vegetation to be left standing shall be protected from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require. Clearing shall also include the removal and disposal of structures that obtrude, encroach upon, or otherwise obstruct the work.

3.2 GRUBBING

Material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, shall be removed to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Depressions made by grubbing shall be filled with suitable material and compacted to make the surface conform with the original adjacent surface of the ground.

3.3 TREE REMOVAL

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.4 DISPOSAL OF MATERIALS

3.4.1 Salable Timber

All felled timber from which saw logs, pulpwood, posts, poles, ties, mine props, or cordwood can be produced shall be considered as salable timber. Salable timber is the property of the Government.

3.4.2 Materials Other Than Salable Timber

Logs, stumps, roots, brush, rotten wood, and other refuse (material) from the clearing and grubbing operations, except for salable timber, shall be disposed of in the cell 6 area designated on the Plans, except when otherwise approved in writing. Such permission will state the conditions covering the disposal of such products and will also state the areas in which they may be placed.

Material shall be placed in the cell 6 area shall be covered with at least 12 inches of embankment. Materials shall be placed such that embankment is placed and compacted under and around the material. No voids shall be allowed under or around any material.

* * END OF SECTION * *

SECTION 02233
AGGREGATE BASE COURSE

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 127	(1988) Specific Gravity and Absorption of Course Aggregate
ASTM C 128	(1988) Specific Gravity and Absorption of Fine Aggregate
ASTM C 131	(1989) Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C 136	Sieve Analysis of Fine and Coarse Aggregates
ASTM D 75	(1987; R 1992) Sampling Aggregates
ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/cu. ft. (600 kN-m/cu. m.))
ASTM D 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 1556	(1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM E 11	(1987) Wire-Cloth Sieves for Testing Purposes

1.2 UNIT PRICE (Not Used)

1.3 DEFINITIONS

1.3.1 Aggregate Base

Aggregate base as used herein is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.3.2 Degree of Compaction

Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D 698 abbreviated hereinafter as percent laboratory maximum density.

1.3.3 Low Ground Pressure Equipment

Low ground pressure equipment is equipment that exerts less than five pounds per square inch.

1.4 GENERAL

The work specified herein consists of the construction of an aggregate base course. The work shall be performed in accordance with this specification and shall conform to the lines, grades, notes and typical sections shown in the plans. Sources of all materials shall be selected well in advance of the time that materials will be required in the work.

1.5 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data

Low Ground Pressure Equipment; FIO

Manufacturer's data sheets.

Plant, Equipment, Machines, and Tools; FIO

List of proposed equipment to be used in performance of construction work including descriptive data.

SD-09 Reports

Sampling and Testing; FIO. Field Density; FIO.

Calibration curves and related test results prior to using the device or equipment being calibrated. Copies of field test results within 24 hours after the tests are performed. Certified copies of test results for approval not less than 14 days before material is required for the work.

1.6 WAYBILLS AND DELIVERY TICKETS (Not Applicable)

1.7 WEATHER LIMITATIONS

Base shall not be constructed when the atmospheric temperature is less than 35°F. Base shall not be constructed on subgrades that are frozen or contain frost. If the temperature falls below 35°F, completed areas shall be protected against any detrimental effects of freezing.

1.8 PLANT, EQUIPMENT, MACHINES, AND TOOLS

1.8.1 General Requirements

Plant, equipment, machines, and tools used in the work shall be subject to approval and shall be maintained in satisfactory working condition at all times. Other compacting equipment may be used in lieu of that specified, where it can be demonstrated that the

results are equivalent. The equipment shall be adequate and have the capability of producing the results specified.

1.8.2 Steel-Wheeled Rollers

Steel-wheeled rollers shall be the self-propelled type weighing not less than 10 tons, with a minimum weight of 300 pounds per inch width of rear wheel. Wheels of the rollers shall be equipped with adjustable scrapers. The use of vibratory rollers is optional.

1.8.3 Sprinkling Equipment

Sprinkling equipment shall consist of tank trucks, pressure distributors, or other approved equipment designed to apply controlled quantities of water uniformly over variable widths of surface.

1.8.4 Tampers

Tampers shall be of an approved mechanical type, operated by either pneumatic pressure or internal combustion, and shall have sufficient weight and striking power to produce the compaction required.

1.9 STOCKPILING MATERIALS

Materials, including approved material available from excavation and grading, shall be stockpiled in the manner and at locations designated. Before stockpiling of material, storage sites shall be cleared, and sloped to drain. Materials obtained from different sources shall be stockpiled separately.

1.10 SAMPLING AND TESTING

1.10.1 General Requirements

Sampling and testing shall be performed by an approved commercial testing laboratory or by facilities furnished by the Contractor. No work requiring testing shall be permitted until the facilities have been inspected and approved. Costs of testing the Contractor Laboratory facilities for Government acceptance shall be borne by the Contractor. Tests shall be performed in sufficient numbers and at the locations and times directed to insure that materials and compaction meet specified requirements. Copies of test results shall be furnished to the Contracting Officer within 24 hours of completion of tests.

1.10.2 Test Results

Results shall verify that materials comply with this specification. When a material source is changed, the new material will be tested for compliance. When deficiencies are found, the initial analysis shall be repeated and the material already placed shall be retested to determine the extent of unacceptable material. All in-place unacceptable material shall be replaced or modified as directed by the Contracting Officer.

1.10.3 Sampling

Aggregate samples for laboratory tests shall be taken in accordance with ASTM D 75.

1.10.4 Sieve Analysis

Before starting work, at least one sample of material shall be tested in accordance with ASTM C 136 and ASTM D 422 on sieves conforming to ASTM E 11. After the initial test, a minimum of one analysis shall be performed for each 1000 tons of material placed, with a minimum of three analyses for each day's run until the course is completed.

1.10.5 Laboratory Density

Tests shall provide a moisture-density relationship for the aggregate. Tests shall be conducted in accordance with ASTM D 698.

PART 2—PRODUCTS

2.1 MATERIALS

2.1.1 Aggregates

Aggregates shall consist of crushed stone or slag, crushed gravel, angular sand, or other approved material. Aggregates shall be durable and sound, free from lumps of clay, organic matter, objectionable coatings, and other foreign material. Material retained on a No. 4 sieve shall be known as coarse aggregate and that passing the No. 4 sieve shall be known as binder material. Aggregates shall be manufactured from a Contractor selected source.

2.1.1.1 Coarse Aggregate

Only one type of coarse aggregate shall be used on the project. Coarse aggregates, consisting of angular fragments of uniform density and quality, shall have a percentage of wear not to exceed 50 percent after 500 revolutions when tested in accordance with ASTM C 131. The amount of flat and elongated particles shall not exceed 30 percent. A flat particle is one having a ratio of width to thickness greater than 3, and an elongated particle is one having a ratio of length to width greater than 3.

- a. **Crushed Gravel:** Crushed gravel shall be manufactured from gravel particles 50 percent of which by weight are retained on the maximum size gradation sieve specified.
- b. **Crushed Stone:** Crushed stone retained on each sieve specified shall contain at least 50 percent by weight of crushed pieces having two or more freshly fractured faces with the area of each face being at least equal to 75 percent of the smallest mid-sectional area of the piece. When two fractures are adjacent, the angle between the planes of the fractures must be at least 30 degrees to count as two fractured faces.

2.1.2 Binder Material

Binder material shall consist of screenings, angular sand, or other finely divided mineral matter processed or naturally combined with the coarse aggregate. Liquid-limit and plasticity-index requirements shall apply to any component that is blended to meet the required gradation and shall also apply to the completed course. The portion of any

component or of the completed course passing the No. 40 sieve shall be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 5.

2.1.3 Gradation

Requirements for gradation specified shall apply to the completed base course. The aggregates shall have a 2-inch maximum size and shall be continuously graded within the following limits:

Sieve Designation	Percentage by Weight Passing Square-Mesh Sieve ^{(a)(b)}
2"	100
1-1/2"	70-100
1"	45-80
1/2"	30-60
No. 4	20-50
No. 10	15-40
No. 40	5-25
No. 200	0-10

(a) Particles having diameters less than 0.02 millimeter shall not be in excess of 3 percent by weight of the total sample tested.

(b) The values are based on aggregates of uniform specific gravity, and the percentages passing the various sieves are subject to appropriate correction in accordance with ASTM C 127 and ASTM C 128 when aggregates of varying specific gravities are used.

PART 3—EXECUTION

3.1 GENERAL REQUIREMENTS

Adequate drainage shall be provided during the entire period of construction to prevent water from collecting or standing on the working area. Line and grade stakes shall be provided as necessary for control. Grade stakes shall be in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

3.2 OPERATION OF AGGREGATE SOURCES

Aggregates shall be obtained from offsite sources

3.3 PREPARATION OF UNDERLYING COURSE

3.3.1 General Requirements

Before constructing aggregate base course, the previously constructed underlying course shall be cleaned of foreign substances. Surface of underlying course shall meet the specified compaction and surface tolerances. Subgrade shall conform to Section 02210, GRADING. Ruts or soft, yielding spots that may appear in the underlying course, areas having inadequate compaction, and deviations of the surface from requirements specified shall be corrected. For cohesionless underlying materials containing sands, sand gravels, or any other cohesionless material in harmful quantities, the surface shall be mechanically stabilized with aggregate prior to placement of the aggregate course.

Stabilization may be accomplished by mixing base course material into the underlying course and compacting by approved methods. Properly compacted material will be considered as part of the underlying course and shall meet all requirements for the underlying course. Finished underlying course shall not be disturbed by traffic or other operations and shall be maintained in a satisfactory condition until base course is placed.

3.3.2 Grade Control

Underlying material shall be excavated to sufficient depth for the required base course thickness so that the finished base course with the subsequent surface course will meet the fixed grade. Finished and completed area shall conform to the lines, grades, cross section, and dimensions indicated.

3.4 INSTALLATION

3.4.1 Mixing and Placing

Materials shall be mixed and placed in such a manner as to obtain uniformity of the aggregate base course material and at a uniform optimum water content for compaction. The Contractor shall make such adjustments in mixing or placing procedures or in equipment to obtain the true grades, to minimize segregation and degradation, to reduce or accelerate loss or increase of water, and to ensure a satisfactory base course.

3.4.2 Compaction

Each layer of aggregate base course shall be compacted. Water content shall be maintained at optimum. Density of compacted mixture shall be at least 90 percent of laboratory maximum density. Rolling shall begin at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Alternate trips of the roller shall be slightly different lengths. Speed of the roller shall be such that displacement of the aggregate does not occur. Areas inaccessible to the rollers shall be compacted with mechanical tampers, and shall be shaped and finished by hand methods.

3.4.3 Layer Thickness

Compacted thickness of the aggregate course shall be as indicated. No layer shall be in excess of 8 inches nor less than 3 inches in compacted thickness.

3.4.4 Finishing

The surface of the top layer shall be finished to grade and cross section shown. Finished surface shall be of uniform texture. Light blading during compaction may be necessary for the finished surface to conform to the lines, grades, and cross sections. Should the surface for any reason become rough, corrugated, uneven in texture, or traffic marked prior to completion, such unsatisfactory portion shall be scarified, reworked, recompacted, or replaced as directed.

3.4.4.1 Thickness Control

Compacted thickness of the base course shall be within 1/2 inch of the thickness indicated. Where the measured thickness is more than 1/2 inch deficient, such areas shall

be corrected by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course shall be considered as conforming to the specified thickness requirements.

3.5 FIELD QUALITY CONTROL

3.5.1 Field Density

Field in-place density shall be determined in accordance with ASTM D 698. When ASTM D 2922 is used, the calibration curves shall be checked, and adjusted if necessary, using the sand cone method as described in paragraph Calibration of the ASTM publication. ASTM D 2922 results in a wet unit weight of soil, and when using this method, ASTM D 3017 shall be used to determine the moisture content of the soil. The calibration curves furnished with the moisture gauges shall be checked along with density calibration checks as described in ASTM D 3017. If ASTM D 2922 is used, in-place densities shall be checked by ASTM D 1556 at least once per lift of base material. Calibration curves and calibration test results shall be furnished within 24 hours of the conclusion of the tests. At least one field density test shall be performed for each layer of base material.

3.5.2 Thickness

Thickness of the base course shall be measured at intervals in such a manner as to ensure one measurement for each 540 square yards of base course. Measurements shall be made in 3-inch diameter test holes penetrating the base course.

3.6 MAINTENANCE

The aggregate base course shall be maintained in a satisfactory condition until accepted. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact.

3.7 DISPOSAL OF UNSATISFACTORY MATERIALS

Removed in-place materials that are unsuitable for the base course material that is removed for the required correction of defective areas, and waste material and debris shall be disposed of as directed in waste disposal area.

* * END OF SECTION * *

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**SECTION 02271
WASTE CONTAINMENT GEOMEMBRANE**

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of the specification to the extent referenced. The publications are referenced in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 638	(1991) Tensile Properties of Plastics
ASTM D 746	(1979; R 1987) Brittleness Temperature of Plastics and Elastomers by Impact
ASTM D 1004	(1990) Initial Tear Resistance of Plastic Film and Sheeting
ASTM D 1505	(1998) Density (Resin, Maximum)
ASTM D 4437	(1984; R 1988) Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes
ASTM D 5397	(1999) Environmental Stress Crack
ASTM D 5994	(1998) Thickness, Nominal, plus or minus 10%
ASTM D 5321	(1992) Determining the Coefficient of Soil and Geosynthetic or Geosynthetic and Geosynthetic Friction by the Direct Shear Method

FEDERAL TEST METHOD STANDARDS (FTMS)

FTSM 101C, Puncture Resistance
Method 2065

NATIONAL SANITATION FOUNDATION (NSF)

NSF Std 54 (1993) Flexible Membrane Liners

GEOSYNTHETIC RESEARCH INSTITUTE (GRI)

GRI GM4 (1991) Three Dimensional Geomembrane Tension Test

1.2 MEASUREMENT (Not Used)

1.3 PAYMENT (Not Used)

1.4 DEFINITIONS

Boot: Watertight collar fabricated from geomembrane sheet for sealing geomembrane to pipes and other objects that penetrate geomembrane.

Film Tearing Bond: Failure by tearing under tension without separation at seams.

Panel: Piece of geomembrane composed of two or more sheets factory seamed together.

Sheet: Seamless piece of geomembrane.

Watertight: Geomembrane installation free of flaws and defects that will allow passage of water and gases, liquids, and solids to be contained under anticipated service conditions.

Geomembrane: LLDPE geomembrane used for final cover.

1.5 QUALIFICATIONS

1.5.1 Manufacturer

Manufacturer shall have produced the proposed geomembrane sheets for at least five completed projects having a total minimum area of 5 million square feet.

1.5.2 Fabricator

The fabricator is responsible for seaming geomembrane sheets into panels. Fabricator shall have fabricated the proposed geomembrane panels for at least five completed projects having a total minimum area of 5 million square feet.

1.5.3 Installer

The installer is responsible for field handling, deploying, seaming, anchoring, and field quality control testing of the geomembrane. The installer shall have installed the proposed geomembrane material for at least five completed projects having a total minimum area of 2 million square feet. At least one seamer shall have experience seaming a minimum of 2 million square feet of the proposed geomembrane using the same type of seaming equipment and geomembrane mil thickness specified for this project.

1.6 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with SECTION 01300 SUBMITTALS:

Government approval is required for submittals with a “GA” designation, submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with SECTION 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data

Materials; GA

Manufacturer’s certified raw material and sheet material data sheets along with a copy of quality control certificates.

SD-04 Drawings

Layout and Detail Drawings; GA

Geomembrane panel layout and penetration detail drawings a minimum of 30 days prior to delivery of geomembrane to the site.

As-built Drawings; GA

Final as-built drawings of geomembrane installation showing panel/sheet numbers, seam numbers, and location of patches, destructive seam samples, and penetrations, and horizontal and vertical location of the edge of the geomembrane and all penetrations.

SD-06 Instructions

Tests, Inspections, and Verifications; GA

Manufacturer's quality control manual. Fabricator's quality control manual.

Field Seaming; GA

Installer's quality control manual.

SD-08 Statements

Qualifications; GA

Manufacturer's, fabricator's, installer's, inspector's, and independent laboratory's qualification statements including resumes of key personnel involved in the project.

Warranty; GA

Written warranties for geomembrane material and installation workmanship.

Surface Preparation; GA

Written acceptance of the geomembrane and subgrade.

SD-09 Reports

Tests, Inspections, and Verifications; GA

Certified laboratory interface friction test results including description of equipment and test method. Manufacturer's certified quality control test results. Fabricator's certified quality control test results.

Field Seaming; GA

Installer's certified quality control test results.

SD-14 Samples

Tests, Inspections, and Verifications; GA

One 12 by 30 inch minimum size geomembrane sample.

Exceptions:

Listing of all exceptions to the requirements specified herein.

1.7 DELIVERY, STORAGE AND HANDLING

Individually package each sheet of geomembrane and protect from damage during shipment. Mark each package with identification of material type, size and weight. Keep roll stack height to that which will not deform or damage rolls in accordance with manufacturer's recommendations.

Each package shall have sufficient marking to clearly correlate each roll to test results and certifications.

Geomembrane shall not be off-loaded unless the Inspector is present. The geomembrane shall be protected from puncture, abrasion, excessive heat or cold, material degradation, adhesion of individual layers or other damaging circumstances. Damaged geomembrane shall be removed from the site.

1.8 WEATHER LIMITATIONS

Geomembrane shall be deployed and field-seamed only when the geomembrane is dry and winds are low. In marginal conditions, seaming shall cease unless tests confirm that satisfactory seam strengths are being obtained. The Contractor shall protect the geomembrane from weather and replace any geomembrane damaged by the weather.

Do not install geomembrane or perform seaming, unless installation procedures approved by the Engineer are in place to address the following environmental conditions, when:

1. Air temperature is less than 35 degrees F and decreasing or more than 90 degrees F.
2. Relative humidity is more than 90 percent.
3. Raining or snowing, or frost is on the ground, or wind is excessive.

Do not place granular materials on geomembrane when ambient temperature is less than 35 degrees F or more than 104 degrees F.

1.9 WARRANTY

The Installer of the geomembrane shall warrant his workmanship to be free of defects on a non-prorata basis for one year after final acceptance of the work by the Contracting Officer. This warranty shall include all seams. The Installer shall provide all warranty work and associated costs required by the Contracting Officer at the Contractor's sole expense.

The Installer shall also obtain and furnish the Contracting Officer a warranty from the geomembrane, manufacturers, and fabricators for the materials used. The material warranty shall be for defects or failure of the material for 20 years after completion of the work on a prorata basis. All defects or failure of the material shall be repaired at the Contractor's sole expense.

1.10 EQUIPMENT

Equipment used in performance of the work shall be in accordance with the geomembrane manufacturer's recommendations and shall be maintained in satisfactory working condition.

PART 2—PRODUCTS

2.1 MATERIALS

Linear Low Density Polyethylene (LLDPE) Geomembrane

2.1.1 Raw Materials

Resin used in manufacturing polyethylene geomembranes shall have a broad molecular weight distribution, a density of less than 0.935 g/cc and no more than 6% of a higher density resin added as carrier for the approximately 2% by weight of carbon black for ultraviolet resistance. Textured materials shall contain no more than 7% by weight of carbon black and additives. In addition, resins shall not contain plasticizers, fillers, extenders, reclaimed polymers, fatty acid residues, epoxy or other chemical additives. Materials which have been used previously will not be allowed. The materials used to manufacture geomembrane sheets shall contain no more than 2 percent regrind ingredients that originate from the same formulation and the same production lot and which are clean and free of any foreign contaminants. Antioxidants and heat stabilizers, not to exceed 1.5 percent total BY WEIGHT, may be added as required for manufacturing.

2.1.2 Sheet Materials

A sheet is defined as a manufactured seamless geomembrane unit. Geomembrane sheets shall be non-reinforced and uniform in color, thickness, and surface texture. For textured sheets, the textured surface features shall consist of polymers identical to that of the base material. The sheets shall also be free of and resistant to fungal or bacterial attack and they shall be free of cuts, abrasions, holes, blisters, contaminants and other imperfections.

2.1.3 Geomembrane Physical Properties

Sheets and factory seams shall conform to the minimum physical requirements listed in NSF Std 54 and Tables 1. Test values shown in Tables 1, except when specified as minimum or maximum, are typical test values. If materials are not included in NSF Std 54, manufacturer's property specifications shall be substituted. Manufacturer's property specifications shall be submitted a minimum of 30 days prior to delivery of geomembrane to the site.

Furnish in rolled single-ply continuous sheets with no factory seams. Material shall be textured-surface on both sides.

Sheet Thickness: Minimum Values determined in accordance with ASTM 5994.

Sheet Width: Minimum 22 feet.

Roll Length: Longest that will be manageable and reduce field seams.

Table 1 LLDPE Physical Properties		
Property	Required Value	Test Method
Density (Resin, maximum)	0.935 g/cc (Note: Compounded sheet density to be not more than 1.5% greater than resin density)	ASTM D1505
Double-Sided Textured Surface. Minimum Properties, Each Direction (see Note 1)		
Thickness, Nominal, plus or minus 10%	60 mil	ASTM D5994, Modified, Note 1
Tensile Stress at Break	1.8 lb/in/mil thickness	ASTM D638, Type IV
Tensile Elongation at Break	200%	
Puncture Resistance	1.2 lb/mil thickness	FTMS 101C, Method 2065
Tear Resistance	0.55 lb/mil thickness	ASTM D1004, Die C
Brittleness Temperature	Minus 70°F, no cracks	ASTM D746 (Proc. B)
Environmental Stress Crack	200 hours	ASTM D5397
Bonded Seam Strength in Shear	1.3 lb/in/mil thickness and film tear bond	ASTM D4437/D816, Method B
Bonded Seam Strength in Peel	1.1 lb/in/mil thickness and film tear bond	ASTM D4437/D413, Method A
Note: 1. Thickness of 60 mils shall be used in calculating required strength properties.		

2.1.4 Extrudate

Extrudate for Fusion Welding of HDPE and LLDPE Geomembranes: Formulated from same HDPE or LLDPE resin as geomembrane and shall meet applicable physical property requirements.

2.1.5 Field-Fabricated Boots

Pipes and other structures penetrating the cover system shall be sealed to the geomembrane with fabricated boots made of the same material and workmanship as the cover system geomembrane. The flange portion of each boot shall match the angle of the slope or bottom, be sealed to the geomembrane, and fit smoothly without folds or stretching of the material.

2.1.6 Sealant Caulking

Where shown on the Drawings, the caulking used shall be a one-component sealant formulated of butyl rubber and other selected ingredients, equivalent to Biddle Co., St. Louis, MO, Butylgrip Sealant, or as recommended by the manufacturer of the geomembrane materials.

2.1.7 Stainless Steel Clamps

As indicated on the Drawings, clamps shall be used to secure the HDPE geomembrane to pipes, poles, or risers that are intended to protrude through the cover. One-half-inch wide clamps shall meet or exceed specifications for "Make-a-Clamp" as manufactured by Breeze Clamp Products Division, Federal Laboratory, Inc., Saltsburg, PA.

2.1.8 Butyl Mastic Tape

Shall be as manufactured by Tremco, Cleveland, OH; or of a type recommended by HDPE geomembrane manufacturer.

2.1.9 Neoprene Rubber Pad

As indicated on the Drawings, neoprene rubber shall be used as compression strip beneath the stainless steel clamps (ASTM D2240). One-half-inch thick neoprene rubber shall be 35 to 40 durometer hardness, as supplied by Aero Rubber Co., Inc., Bridgeview, IL, or approved equal. Cut to a continuous 2-inch wide piece of neoprene to form the gasket. Neoprene rubber contact cement recommended by the supplier shall be used to bond butt ends of joined strips and to bond neoprene rubber in position on surface. Butt joints in neoprene shall be offset from adjacent joints by at least 6 inches.

2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

2.2.1 Interface Friction Testing

Laboratory interface friction tests shall be conducted on all cover system interfaces using ASTM D 5321 and the geosynthetics and soils to be used in the actual construction. Normal stresses of 1.5, 4.0, and 6.0 psi along with a displacement rate of 0.04 inches per minute shall be used. Cover system soil components shall be compacted to the same moisture-density requirements specified for full-scale field placement and saturated prior to shear. Geosynthetics shall be oriented such that the shear force is parallel to the downslope orientation of these components in the field. A minimum interface friction angle of 27 degrees is required between all cover system components. Results shall be submitted and approved prior to delivery of cover system geosynthetics.

The Contractor shall select materials (geosynthetics and soils) that are capable of meeting the minimum required friction angle. The Contractor can test the entire cover system in one test or test each layer interface individually.

2.2.2 Manufacturing, Sampling, and Testing

2.2.2.1 Resin Materials

Resin shall be tested in accordance with the approved geomembrane manufacturer's quality control manual. Any resin that fails to meet the geomembrane manufacturer's

specified physical properties shall not be accepted for manufacturing the sheet. Polyethylene seaming rod and pellets shall be manufactured of resin that is essentially identical to that used in the geomembrane sheet. Seaming rods and pellets shall be tested for density, melt index and carbon black content in accordance with the approved geomembrane manufacturer's quality control manual. Seaming rods and pellets that fail to meet the corresponding property values required for the sheet material shall be rejected.

2.2.2.2 Geomembrane Sample

One 12 by 12-inch minimum size geomembrane sample, along with appropriate identification, shall be provided for quality assurance testing and permanent record of actual furnished material. Samples not meeting the minimum requirements specified shall result in the rejection of the applicable sheets.

2.2.2.3 Multi-Axial Tensile Test

As a minimum, one multi-axial tensile test shall be run per 100,000 square feet of geomembrane used. Testing shall be conducted prior to installation in accordance with GRI GM4.

2.2.3 Fabrication, Sampling, and Testing

2.2.3.1 General

Prior to or during factory seaming, roll goods shall be visually inspected on both sides for defects and impurities. Defects and impurities shall be removed and repaired prior to completion of the fabrication process. Thickness measurements shall be made at the center and each edge of the beginning and end of each roll of material in accordance with ASTM D 5994. Rolls having a thickness less than the value specified herein shall be rejected.

2.2.3.2 Non-Destructive Factory Seam Testing

Non-destructive seam testing shall be conducted in accordance with the fabricator's approved quality control manual. Continuous visual inspection shall be performed on the seams during fabrication. Defective seams shall be repaired, retested and approved prior to continuation of the seaming process.

2.2.4 Geomembrane Testing Equipment

2.2.4.1 Field Tensiometer

The geomembrane installer shall provide and maintain throughout the installation and repair work a tensiometer for onsite shear and peel testing of geomembrane seams. The tensiometer shall be in good working order, built to ASTM specifications, and accompanied by evidence of recent calibration. The tensiometer shall be motor-driven and have jaws capable of traveling at a measured rate of 2 inches per minute. It shall be equipped with a gauge that measures the force in unit pounds exerted between the jaws and have a digital readout. Field tensiometer shall be Force Tech 5002 DPR portable tensile tester as furnished by Columbine International, Ltd., Placerville, CA, or approved equal.

2.2.4.2 Punch Press

The geomembrane installer shall provide and maintain throughout the installation and repair work a punch press for the onsite preparation of specimens for testing. The press shall be capable of cutting specimens in accordance with ASTM D4437.

2.2.4.3 Vacuum Box

The geomembrane installer shall provide and maintain throughout the installation and repair work a vacuum box for onsite testing of geomembrane seams. The vacuum box shall have a transparent viewing window on top and a soft, close-cell neoprene gasket attached to the bottom. The housing shall be rigid and equipped with a bleed valve and vacuum gauge. A separate vacuum source shall be connected to the vacuum box. The equipment shall be capable of inducing and holding a vacuum of 10 inches of mercury (Hg). The Contractor shall provide other testing equipment as needed, such as an air compressor for the air pressure test.

2.2.4.4 Copper Wire for Spark Test

Not less than gauge 30 and not more than gauge 24 copper wire.

PART 3—EXECUTION

3.1 GENERAL

1. Each miscellaneous product required for completion of geomembrane installation shall be of types, sizes, and installed in strict accordance with geomembrane manufacturer's recommendations.
2. Reduce field seaming to minimum. Horizontal seams on slopes will not be acceptable. Seams parallel to toe shall be at least 2 feet from toe. Align rough-sided sheets in manner that maximizes their frictional capabilities along slope.
3. Prevent wrinkles, folds, or other distress that can result in damage or prevent satisfactory alignment or seaming. Provide for factors such as expansion, contraction, overlap at seams, anchorage requirements, seaming progress, and drainage.
4. Temporarily weight sheets with sandbags as necessary to anchor or hold them in position during installation. Use continuous holddowns along edges to reduce wind flow under sheet.
 - a. Sandbag fabric shall be sufficiently close knit to preclude fines from working through bags.
 - b. Do not use tires or paper bags, whether or not lined with plastic. Burlap bags, if used, shall be lined with plastic.
 - c. Immediately remove damaged or improperly sealed bags from work area, and immediately clean up spills.

During unwrapping visually inspect; mark each imperfection for repair.

During installation protect liner from damage including:

1. Do not use geomembrane surfaces as work area for preparing patches, storing tools and supplies, or other uses. Use protective cover as work surface, if necessary.
2. Instruct workers about requirements for protection of geomembrane such as handling geomembrane material in high winds, handling of equipment, and walking on geomembrane surfaces. Shoes of personnel walking on geomembrane shall be smooth bonded sole or be covered with smooth type of overboot. Prohibit smoking, eating, or drinking in vicinity of geomembrane, placing heated equipment directly on geomembrane, or other activities that may damage geomembrane.
3. Do not operate equipment without spark arrestors in vicinity of geomembrane material nor place generators or containers of flammable liquid on geomembranes.
4. Protect from vehicle traffic and other hazards.
5. Keep clean and free of debris during placement.
6. Prevent uplift, displacement, and damage by wind.

3.2 PREPARATION

3.2.1 Surface Preparation

Surface preparation shall be performed in accordance with Section 02443, LOW PERMEABILITY CLAY LAYER. Material larger than 3/8 inch in diameter and any other debris that could damage the geomembrane shall be removed from the surfaces to be covered with the geomembrane. The subgrade surface shall be observed daily by the Inspector and Installer to evaluate the surface conditions. Any damage to the subgrade caused by the Contractor's operations shall be repaired at no additional cost to the Government. Immediately prior to geomembrane placement, the Inspector and Installer shall certify in writing, on the form located at the end of this section, that the surface on which the geomembrane is to be placed is acceptable.

Do not place geomembrane until condition of previously installed geosynthetics is acceptable to the engineer and installer. Prior to the start of fabrication make necessary field measurements to provided proper fit of the geomembrane.

3.2.2 Anchor/Drainage Trenches

Only the amount of trench required for the geomembrane to be anchored in one day shall be excavated. Trench corners shall be slightly rounded to avoid sharp bends in the geomembrane. Loose soil, rock larger than 3/8 inch in diameter, and any other debris that could damage the geomembrane shall be removed from the surfaces of the trench.

Backfilling and compaction shall be in accordance with Section 02443, LOW PERMEABILITY CLAY LAYER.

3.3 PANEL/SHEET DEPLOYMENT

The geomembrane shall be placed with minimum handling. The procedures and equipment used shall not damage the geomembrane. Geomembrane damaged during installation shall be removed or repaired, at the Inspector's discretion and as specified in paragraph Defects and Repairs, at no additional cost to the government. Only those panels/sheets that can be anchored and seamed together the same day shall be deployed. Adequate ballast (e.g., sandbags) shall be placed on the geomembrane to prevent uplift by wind without damaging the geomembrane. No vehicular traffic will be allowed directly on the geomembrane. The method used to unroll the panels/sheets shall not scratch, crimp or excessively elongate the geomembrane and shall not detrimentally rut the subgrade soil as determined by the Inspector. Seams shall be oriented parallel to the line of maximum slope. Where seams can only be oriented across the slope, the upper panel shall be lapped over the lower panel.

3.3.1 Wrinkles

The method used to place the panels/sheets shall minimize wrinkles; however, the geomembrane manufacturer and installer shall coordinate efforts to provide the proper amount of slack in the deployed geomembrane so as to compensate for contraction due to local temperature extremes.

3.3.2 Thickness Measurement

For textured material, a minimum of one sample per 100,000 square feet shall be sent to the independent laboratory for thickness measurements in accordance with ASTM D 5994. Panels/sheets whose mil thickness falls below the specified minimum value shall be rejected and replaced at no additional cost to the Government.

3.4 FIELD SEAMING

1.4.1 TRIAL SEAMS

Trial seams shall be made on fragment pieces of geomembrane to verify that seaming conditions are adequate. Trial seams include field fabricated startup seam samples and random field fabricated samples. Such trial seams shall be made at the beginning of each seaming period, and at least once each 5 hours, for each seaming apparatus used that day. Also, each seamer shall make at least one trial seam each day. Trial seams shall be made under the same conditions as actual seams. Engineer reserves the right to require more frequent trial seam testing if the visual quality of seams or number of failing tests suggests poor seaming techniques or poor equipment operations.

1. Sample Size: 12 inches wide plus seam width, and 30 inches long with seam centered lengthwise.
2. Two adjoining specimens 1 inch wide shall be cut with a die by the installer. The specimens shall be tested in shear and peel using a field

tensiometer, and shall fail in the film tearing bond. If a specimen fails, the entire operation shall be repeated. If the additional specimen fails, the welding apparatus or welder shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful trial welds are achieved.

3. The remaining portion of the trial seam sample will be subjected to destructive testing by the Engineer's independent testing laboratory as specified in Section 2.1.3 in the Special Provisions. A minimum one trial seam sample per day shall be subjected to destructive testing. The Engineer may reduce the frequency of trial seam destructive testing if the field tensiometer appears adequate for assuring trial seam quality.
4. If a trial seam sample fails a test conducted by the independent testing laboratory, then a destructive test seam sample shall be taken from the seams completed by the welder during the shift related to the considered trial seam. These samples shall be forwarded to the laboratory, and, if they fail the tests, the procedure indicated in Section 3.4.3.2 shall apply.
5. The conditions of this paragraph shall be considered as met for a given seam if a destructive seam test sample has already been taken from the considered seam(s).

3.4.2 Field Seams

3.4.2.1 General Requirements

The Contractor shall use lap joints to seal geomembrane sheets together in the field. Field seams shall be made on a supporting smooth surface. The Contractor shall form the seams by lapping the edges of sheets a minimum of 4 inches. The Contractor shall wipe contact surfaces of the sheets clean to remove dirt, dust, moisture, and other foreign materials and prepare in accordance with the installer's seaming method approved by the Engineer. The Contractor shall extend the seams to the ends of the geomembrane sheets through the anchor trench, boots, and mechanical attachments.

The Contractor shall seam the geomembrane sheets together, using the extrusion and/or fusion (hot-wedge) welding system, equipment, and techniques.

For seams where extrusion welds are used and where it will be impracticable to perform a vacuum test, the Contractor shall insert copper wire for spark test, prior to welding. The location of the copper wire shall be in the extrudate of the weld and at the edge of the top sheet.

When capping of a field seam is required, the Contractor shall use a cover strip cap of the same thickness as the geomembrane (and from the same roll, if available) and of 8-inch minimum width. The Contractor shall position the cap strip over the center of the field seam and weld to the geomembrane using an extrusion weld each side, and vacuum test.

3.4.3 Field Sampling and Testing

3.4.3.1 Non-Destructive Field Seam Testing

Field seams shall be non-destructively tested over their full length in accordance with the Installer's approved quality control manual. Seam testing shall be performed as the seaming work progresses, not at the completion of field seaming. Any seams which fail shall be documented and repaired in accordance with paragraph Defects and Repairs.

Visually inspect geomembrane sheets, seams, anchors, seals, and repairs for defects as installation progresses and again on completion. Clearly mark defective and questionable areas, and repair them to Engineer's satisfaction. Each area showing damage due to scuffing, penetration by foreign objects, or distress from rough subsurface shall be replaced or covered with an additional layer of geomembrane material. Depending on seam welding equipment used, test each seam and repair using vacuum testing device, and/or air channel pressure test for double wedge welded seams. Perform testing in presence of Engineer.

- 1 Vacuum Box Testing: Vacuum box test each of these types of welds: Fillet, extrusion lap, and single hot-wedge fusion lap.
 - a. Testing Procedures: Conforming to ASTM D4437.
2. Air Channel Pressure Testing of Double Hot-Wedge Fusion Seam:
 - a. Insert needle with gauge in air space between welds. Pump air into space to 30 psi and hold for 5 minutes.
 - b. At end of 5 minutes, depressurize seam by placing needle hole in air space between welds at opposite end of seam and observe gauge.
 - c. If seam maintains at least 27 psi during 5-minute hold and pressure drops to zero within 30 seconds of depressurization, seam is acceptable.
 - d. If pressure drops below 27 psi during test period, or does not drop during 30-second depressurization period, repair needle holes and retest seam by same procedure or vacuum box test along entire length of seam. If seam maintains a minimum of 27 psi, seam is acceptable.
 - e. If second air pressure test fails, vacuum box test entire length of seam.
 - 1) If no bubbles appear in vacuum box, bottom or second seam will be considered defective, and upper seam is acceptable.

- 2) If bubbles appear in vacuum box, repair each defective area by extrusion welding and test again by vacuum box.
- f. As alternative to vacuum box testing, apply soap solution to exposed seam edge while maintaining required air channel test pressure.
- 1) If bubbles appear, mark, trim unbonded edge, and extrusion weld defective areas.
 - 2) If no bubbles appear and test pressure cannot be maintained, leak is judged to be in bottom or second seam and the upper seam is acceptable.
- g. Mark and repair needle holes.

3.4.3.2 Destructive Field Seam Testing

A minimum of one destructive test sample per 500 feet of field seam shall be obtained at locations specified by the Inspector. A minimum of one destructive test sample shall be taken from each factory fabricated panel, if applicable. Sample locations shall not be identified prior to seaming. Each sample shall be cut into two equal pieces with one piece retained by the Installer and the remaining piece given to the Contracting Officer for quality assurance testing and permanent record. Each sample shall be numbered and cross referenced to a field log which identifies: (1) panel/sheet number; (2) seam number; (3) top sheet; (4) date and time cut; (5) ambient temperature; (6) seaming unit designation; (7) name of seamer; and (8) seaming apparatus temperature and pressures (where applicable). A minimum of ten 1-inch-wide replicate specimens shall be cut from the Installer's sample. A minimum of five specimens shall be tested for shear strength and five for peel adhesion using an approved field quantitative tensiometer. Field testing shall be in accordance with ASTM D 4437. Jaw separation speed shall be as given in NSF 54. To be acceptable, all replicate test specimens must meet the specified seam strength requirements. If the field or laboratory tests fail, the seam shall be repaired in accordance with paragraph Repair Procedures. In addition, destructive seam sample holes shall be repaired the same day as cut. Test results on field seams shall be submitted to and approved by the Contracting Officer prior to acceptance of the seam.

1. Destructive seam samples shall be obtained from actual fabricated field seams as the work progresses, not at the completion of field seaming. Seams will be tested by the Engineer's independent laboratory as specified in Section 2.3.1.
2. Sample Size: 12 inches wide plus seam width and 30 inches long
3. Frequency: Minimum one sample per 500 feet of field seam. The Engineer reserves the right to waive this testing requirement if other seam tests appear adequate for assuring seam quality.

4. The Contractor shall remove Samples from field seams at locations selected by Engineer. Repair field seams in accordance with repair procedures specified in these Specifications.
5. Destructive Sample Failure: Rerun field seam test using new sample coupon from same Sample. If that test passes, Engineer may assume an error was made in first test and accept field seam. If second test fails, either cap field seam between any two previous passed seam test locations that include failed seam or take another Sample on each side of failed seam location (10-foot minimum), and test both. If both pass, cap field seam between two locations. If either fails, repeat process of taking Samples for test. Each field seam shall be bounded by two passed test locations prior to acceptance.

3.4.4 Defects and Repairs

3.4.4.1 Identification

Immediately prior to covering the geomembrane, seams and non-seam areas shall be visually inspected by the Inspector and Contracting Officer for defects, holes, or damage due to weather conditions or construction activities. At the Contracting Officer's discretion, the surface of the geomembrane shall be brushed, blown, or washed by the Installer if the amount of dust, mud, or foreign material inhibits inspection or functioning of the overlying material.

3.4.4.2 Evaluation

Each suspect location shall be non-destructively tested. Each location that fails non-destructive testing shall be repaired and re-tested by the Installer until it passes.

3.4.4.3 Repair Procedures

Defective seam areas may be overlaid with a strip of new material and seamed (cap stripped). Alternatively, the seaming path shall be retraced to an intermediate location a minimum of 10 feet on each side of the failed seam location. At each location a 12 by 12-inch minimum size seam sample shall be taken for 2 additional shear strength and 2 additional peel adhesion tests using an approved quantitative field tensiometer. If these tests pass, then the remaining seam sample portion shall be sent to the Independent Laboratory for 2 shear strength and 2 peel adhesion tests in accordance with ASTM D 4437. If these laboratory tests pass, then the seam shall be cap stripped between that location and the original failed location. Prepare contact surfaces and seam patch in accordance with Section 3.4.2 Field Seams. If field or laboratory tests fail, then the process is repeated. After cap stripping, the entire cap stripped seam shall be non-destructively tested. Certified test results on all repaired seams shall be submitted and approved by the Contracting Officer prior to covering the seamed areas.

3.4.4.4 Patches

Tears, holes, blisters and areas with undispersed raw materials or foreign material contamination shall be repaired with patches. Patches shall have rounded corners, be

made of the same geomembrane, and extend a minimum of 6 inches beyond the edge of defects. Patch shall be neat in appearance. Round corners of each patch to minimum 1-inch radius. Prepare contact surfaces and patch in accordance with Section 3.4.2. Field Seams. Minor localized flaws shall be repaired by spot welding or seaming as determined by the Inspector. Repairs shall be non-destructively tested. The Inspector may also elect to perform a destructive seam test on a suspect area.

3.5 PENETRATIONS

Geomembrane penetration details shall be as shown on the drawings. Factory fabricated boots shall be used wherever possible. All tailored area field seams shall be non-destructively tested.

3.6 CAP SYSTEM COMPLETION

The geomembrane shall be covered with the required materials within 5 days of acceptance. Folding over of geomembrane wrinkles will not be allowed prior to or during placement of cover materials.

**** END OF SECTION ****

**GEOMEMBRANE INSTALLER'S CERTIFICATION
OF
SUBSURFACE ACCEPTABILITY**

Geomembrane installer,

_____ for Fort Lewis
Landfill Number 5, Cell 6 Closure, hereby certify that supporting surfaces are acceptable for
installation of geomembrane, undersigned having personally inspected condition of prepared
surfaces. This certification is for areas shown on Attachment or defined as follows:

Condition of supporting surfaces in defined area meets or exceeds minimum requirements
for installation of geomembrane.

Signed: _____
(Representative of Geomembrane Installer)

(Position)

Date: _____

Witness: _____

* END OF SECTION * *

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SECTION 02272 GEOTEXTILE

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) PUBLICATIONS

ASTM D 123	(1984) Definitions of Terms Relating to Textiles
ASTM D 751	(1979) Methods of Testing Coated Fabrics
ASTM D 3776	Weight of Knitted Goods and Nonwoven Fabrics
ASTM D 4491	(1985) Test Methods for Water Permeability of Geotextiles by Permissivity
ASTM D 4632	(1986) Breaking Load Elongation of Textile Fabrics (Grab Method)

1.2 MEASUREMENT AND PAYMENT (Not Used)

1.3 EQUIPMENT

Equipment, plants, and tools used in the work shall be subject to approval and shall be maintained in satisfactory working condition.

1.4 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FI0” designation are for information only. The following shall be submitted in according with Section 01300, SUBMITTAL DESCRIPTIONS.

SD-01 Data

Geotextile; FI0

Manufacturer’s certified raw and roll material test results. Test results not meeting the requirements in Table 1 will result in rejection of the applicable rolls. Certified test results shall be provided 7 days prior to delivery to the site.

Sewing; FI0

Manufacturer’s recommended sewing method.

SD-06 Instructions

Sampling and Testing; F10

Manufacturer’s quality control (QC) manual.

SD-14 Samples

Geotextile; F10

One properly identified 24- by 24-inch minimum size geotextile sample.

One properly identified 24- by 24-inch minimum size geotextile sample using the proposed sewing method.

1.5 DELIVERY, STORAGE, AND HANDLING OF GEOTEXTILE

1.5.1 Delivery and Storage

Geotextile delivered to site shall be inspected for damage, unloaded, and stored with the minimum of handling. Geotextile shall not be stored directly on the ground. During shipment and storage, geotextile shall be wrapped in a protective covering. The storage area shall be such that the geotextile is protected from mud, soil, dust, and debris. Geotextile materials that are not to be installed immediately shall not be stored in the direct sunlight. Geotextile shall be delivered only after the required submittals have been received by the Contracting Officer.

PART 2—PRODUCTS

2.1 GEOTEXTILE

Geotextile shall be a nonwoven pervious sheet of polymeric yarn as defined by ASTM D 123. The geotextile fiber shall consist of long-chain polymers composed of at least 85 percent by weight or polypropylene, polyester, polyethylene, nylon, or polyvinylidene-chloride. Stabilizers and/or inhibitors shall be added to the base polymer if necessary to make the filaments resistant to deterioration by ultra-violet and heat exposure. The geotextile shall be constructed so that the filaments will retain their relative position with respect to each other. The edges of the geotextile shall be sealed or otherwise finished to prevent the outer material from pulling away from the geotextile or raveling. During all periods of shipment and storage, the geotextile shall be protected from direct sunlight, ultraviolet rays, temperatures greater than 140 degrees Fahrenheit, mud, dirt, dust, and debris. To the extent possible, the geotextile shall be maintained wrapped in a heavy duty protective covering. The geotextile shall be guaranteed needle free. The geotextile shall meet the physical requirement listed in Table 1 below.

Table 1 Geotextile Physical Requirements			
Physical Property	Test Method	Test Values	
		Type 1	Type 2
Weight, oz./sq. yd., min.	ASTM D 3776	5.9	4.0
Tensile Strength, lbs., in any principal direction	ASTM D 4632	155	100
Breaking Elongation, %, in any principal direction	ASTM D 4632	50%	50%
Puncture Strength, lbs., min.	ASTM D 751 except polished steel ball replaced with a 5/16-inch diameter solid steel cylinder with a hemispherical tip centered within the ring clamp	75	50
Water Permeability, cm/sec, min.	ASTM D 4491	0.20	—
Permissivity, 1/sec	ASTM D 4491	110	—
Apparent Opening Size (AOS), U.S. Standard Sieve	ASTM D 4751	70-100	—

PART 3—EXECUTION

3.1 INSTALLATION

3.1.1 Requirements

The area to be covered by the geotextile shall be graded to a smooth, uniform condition free from ruts, potholes and protruding objects such as rocks and sticks. The geotextile shall be spread immediately ahead of the covering operation. The geotextile shall be laid smooth without excessive wrinkles. Under no circumstances shall the geotextile be dragged through mud or over sharp objects which could damage the geotextile. Construction vehicles shall be limited in size and weight such that rutting in the lift above the geotextile is not greater than 3 inches deep, to prevent overstressing the geotextile. Turning of vehicles on the lift above the geotextile will not be permitted. End-dumping the cover material directly on the geotextile will not be permitted.

3.1.2 Geotextile Protection

The geotextile shall be protected from exposure to ultraviolet light. During installation, geotextile shall be covered with soil cover within 14 days after it is laid.

The manufacturer's recommended method shall be used as needed to hold the geotextile in place until the specified cover material is placed. Should the geotextile be torn or punctured or the overlaps or sewn joints be disturbed, as evidenced by visible geotextile damage, subgrade pumping, intrusion, or bottom liner distortion, the backfill around the damaged or displaced area shall be removed and the damaged area repaired or replaced by the Contractor at no additional cost. The repair shall consist of a patch of the same type of geotextile placed over the damaged area. The patch shall overlap the existing geotextile a minimum of 2 feet from the edge of any part of the damaged area.

3.1.3 Geotextile Seaming

The geotextile shall be either overlapped to the manufacturers recommendations, but not less than two feet, or sewn at all seams.

3.1.4 Geotextile Sewing

The seam, stitch type, and the equipment used to perform the stitching shall be as recommended by the manufacturer of the geotextile and as approved by the Contracting Officer. The seams shall be sewn in such a manner that the seam can be inspected readily by the Contracting Officer or his representative. The stitching shall be a lock-type stitch. The minimum distance from the geotextile edge to the stitch line nearest to that edge shall be 1.5 inches.

* END OF SECTION * *

**SECTION 02273
GEONET**

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of the specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 413	(1982; R 1988) Test Method for Rubber Property-Adhesion to Flexible Substrate
ASTM D 1238	(1990b) Flow Rates of Thermoplastics by Extrusion Plastometer
ASTM D 1505	(1985; R 1990) Density of Plastics by the Density-Gradient Technique
ASTM D 4218	(1991) Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
ASTM D 4716	(1987) Constant Head Hydraulic Transmissivity (In-Plane Flow) of Geotextiles and Geotextile Related Products

1.2 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data

Geonet; GA

Manufacturer’s certified raw and roll material test results. Test results not meeting the requirements in Tables 1 and 2 will result in rejection of the applicable rolls. Certified test results shall be provided 7 days prior to delivery to the site.

Bond Properties; GA

Manufacturer’s certified data sheets for bond adhesion.

SD-06 Instructions

Sampling and Testing; FIO. Geotextile Sewing; FIO

Manufacturer’s and installers quality control (QC) manual. Geotextile sewing recommendations.

SD-09 Reports

Interface Friction Testing; GA

Certified laboratory interface friction test results including description of equipment and test method.

SD-14 Samples

Geonet; F10

One properly identified 24 by 24 inch minimum size geonet sample with attached geotextiles.

1.3 DELIVERY, STORAGE AND HANDLING

The geonet materials shall be packaged, shipped, stored and handled ensuring that no damage is incurred. Under no circumstances shall the Contractor drag the geonet across a textured geomembrane during placement if a geotextile is attached to the geonet surface facing the geomembrane. Materials shall be delivered only after the required submittals have been received and approved by the Contracting Officer. The Contractor shall be responsible for keeping the geonet free of dirt, dust, mud, or any other foreign materials. Any geonet material found to be damaged shall be replaced with new material. Each roll shall be labeled with the Manufacturer’s name, product identification, lot number, roll number, and roll dimensions.

PART 2—PRODUCTS

2.1 GEONET

The polymer used to manufacture the geonet shall be non-thermally degraded polyethylene which is clean and free of any foreign contaminants. The manufactured geonet shall conform to the property requirements listed in Tables 1 and 2 and shall be free of defects including tears, nodules or other manufacturing defects which may affect its serviceability.

Table 1 Geonet Properties (Metric)		
Property	Test Method	Test Value
Polymer Density, minimum	ASTM D 1505	0.930 g/cc
Polymer Melt Index, maximum	ASTM D 1238	1.1 g/10 min.
Carbon Black Content	ASTM D 4218	2-3 percent
Transmissivity, minimum	ASTM D 4716	4.6x10 ⁻⁴ square meter per second

Note: Transmissivity shall be measured using water at 20°C with a maximum gradient of 0.25 under a normal pressure of 48 kPa. Geotextiles shall be attached to the geonet in the same configuration as will be used in the field for transmissivity testing. The drainage net shall be sandwiched between the Contractor selected compacted based soil and geomembrane on the bottom and cover soil on the top. A minimum seating period of 15 minutes shall be used.

Table 2 Geonet Properties (English)		
Property	Test Method	Test Value
Polymer Density, minimum	ASTM D 1505	0.930 g/cc
Polymer Melt Index, maximum	ASTM D 1238	1.1 g/10 min.
Carbon Black Content	ASTM D 4218	2-3 percent
Transmissivity, minimum	ASTM D 4716	5x10 ⁻³ sq. ft./sec

Note: Transmissivity shall be measured using water at 68°F with a maximum gradient of 0.25 under a normal pressure of 1,000 psf. Geotextiles shall be attached to the geonet in the same configuration as will be used in the field for transmissivity testing. The drainage net shall be sandwiched between the Contractor selected compacted base soil and geomembrane on the bottom and cover soil on the top. A minimum seating period of 15 minutes shall be used.

2.2 GEOTEXTILE PROPERTIES

The geonet shall be covered on both sides with a geotextile. The geotextile shall comply with requirements specified in Section 02227, Geotextiles. The installed top side shall be covered with a Type 1 geotextile and the bottom side covered with a Type 2 geotextile.

2.3 BOND PROPERTIES

A geocomposite shall be created by heat bonding geotextiles to the geonet with ply adhesion meeting the requirements of ASTM D 413. The bond between the geotextile and the geonet shall exhibit a minimum peel strength of 2 lbs/inch.

2.4 SAMPLING AND TESTING

2.4.1 General Requirements

Geonet testing shall be performed by a testing laboratory approved by the Contracting Officer. The geonet shall be randomly sampled and tested in accordance with the manufacturer's approved QC manual. One transmissivity test shall be performed in accordance with the requirements specified in Tables 1 and 2.

2.4.2 Interface Friction Testing

The Contractor shall perform laboratory interface friction tests on the cover system as described in Section 02271, WASTE CONTAINMENT GEOMEMBRANE.

PART 3—EXECUTION

3.1 INSTALLATION

3.1.1 Surface Preparation

Prior to placement of the geonet, the surface of the geomembrane shall be cleaned of all soil, rock, and other materials which could damage the geonet.

3.1.2 Placement

The Contractor shall deploy the geonet ensuring that the geonet and underlying materials are not damaged. All faulty or damaged geonet shall be replaced or repaired as specified in paragraph REPAIRS. The geonet shall be unrolled downslope keeping the net in slight tension to minimize wrinkles and folds. The geonet shall be maintained free of dirt, mud, or any other foreign materials at all times during construction. Rolls which are contaminated with these materials shall be cleaned or replaced. Adequate loading (e.g. sandbags) shall be placed to prevent uplift by wind.

3.1.2.1 Overlap and Fasteners

Adjacent rolls shall be overlapped a minimum of 6 inches. Fasteners, as recommended by the Manufacturer and approved by the Contracting Officer, shall be used to join adjacent rolls. Metallic fasteners will not be allowed. Fasteners shall be spaced a maximum of 5 feet along downslope roll overlaps and a maximum of 2 feet along cross slope roll overlaps. Fasteners shall be of contrasting color from the geonet to facilitate visual inspection. Geonets shall not be welded to geomembranes.

3.1.2.2 Stacked Geonet Layers

When more than one layer of geonet is required, joints shall be staggered. Stacked geonet layers shall always be laid in the same direction to maintain transmissivity requirements.

3.1.2.3 Corners

In the corners of side slopes, where overlaps between rolls of nets are staggered, an extra layer of geonet shall be installed from the top to the bottom of the slope.

3.1.2.4 Geotextile Seaming

The Type 1 geotextile shall be sewn continuously along its entire length. No gaps shall be left in the sewn seam.

3.2 REPAIRS

Holes or tears in the geonet shall be repaired by placing a patch of geonet extending a minimum of 2 feet beyond the edges of the hole or tear. Approved fasteners, spaced every 6 inches around the patch, shall be used to fasten the patch to the original roll.

3.3 PENETRATIONS

Geonet penetration details shall be as recommended by the geonet manufacturer and as approved by the Contracting Officer.

3.4 FINAL COVER

Upon completion and acceptance of the geonet in an area, the geonet shall be covered with the required materials within 5 days of acceptance in accordance with the drawings and specifications.

* * END OF SECTION * *

SECTION 02443
LOW PERMEABILITY CLAY LAYER

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 422	(1963; R 1990) Particle-Size Analysis of Soils
ASTM D 698	(1991) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/cu. ft. (600 kN-m/cu. m.))
ASTM D 1556	(1990) Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D 2167	(1984; R 1990) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2216	(1992) Laboratory Determination of Water (Moisture) Content of Soil and Rock
ASTM D 2487	(1992) Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D 2922	(1991) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 5084	(1990) Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter

1.2 UNIT PRICES (Not Used)

1.3 EQUIPMENT

Compaction equipment shall be as required in the Contractor's Materials Handling Plan.

1.4 SUBMITTALS

Government approval is required for submittals with a "GA" designation. Submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data

Materials Handling Plan; GA.

The Materials Handling Plan describing the following: processing and placement of soil; type, model number, weight and critical dimensions of equipment to be used for construction of the soil layer and subgrade; method of protecting processed soil from contamination and changes in moisture content prior to placement; methods of protecting the soil layer from desiccation and freezing during construction.

SD-08 Statements

Commercial Testing Laboratory; GA.

Name and qualifications of the proposed commercial testing laboratory.

SD-09 Reports

Borrow Source Assessment; GA. Borrow Tests; GA. Grain Size Distribution Testing; GA. Moisture Content and Density Tests; GA. Hydraulic Conductivity Tests; GA.

The Borrow Source Assessment Report at least 10 days prior to delivery of soil to the site. No soil placement shall begin until the Borrow Source Assessment Report is approved. The report shall include the following: location of each borrow source; plan view and estimated available quantity of soil; laboratory test results; moisture-density curves showing the “Acceptable Zone” of moisture contents and densities which achieve the required permeability for each principal type of material or combination of materials.

SD-14 Samples

Compacted Base Soil; F10. Undisturbed Samples; F10

A minimum of 100 pounds of each principal type of material or combination of materials at least 10 days prior to placement.

PART 2—PRODUCTS

2.1 LOW PERMEABILITY CLAY LAYER

Soil shall be from off-site contractor provided sources and be free of roots, debris, organic or frozen material, and shall have a maximum clod size of 2 inches at the time of compaction. Gradation analysis shall be in accordance with ASTM D 422.

2.2 BENTONITE SEALING COMPOUND

Bentonite sealing compound in powder or granular form shall be the same product used in the manufacture of the GCL materials. The sealing compounds shall be applied to seal around all penetrations and structures shown on the Drawings and under repair patches. The manufacturer shall recommend the minimum amount of sealing compound to use in

each instance in order to effect an adequate seal. The sealing compound shall be furnished by the manufacturer of the GCL product furnished for this project.

PART 3—EXECUTION

3.1 BORROW SOURCE ASSESSMENT

3.1.1 General

Borrow source assessment tests shall be performed on each principal type or combination of material proposed for use as compacted base soil to assure compliance with specified requirements and to develop compaction requirements for placement. At a minimum, one set of borrow assessment tests shall be performed for each borrow source proposed. A set of borrow source assessment tests shall consist of classification testing, moisture-density (compaction) testing, and hydraulic conductivity testing.

3.1.2 Classification Testing

The Contractor shall locate a suitable borrow source for the compacted base soil. The Contractor shall hire a qualified professional geologist or geotechnical engineer to characterize the soil, determine if adequate quantity of soil is available at the site and to test the soil for grain size distribution at a minimum frequency of 6,000 cubic yards per test.

3.1.3 Compaction Testing

A representative sample from each principal type or combination of materials shall be tested to establish a compaction curve using ASTM D 698 or other methods approved by the Contracting Officer. A minimum of one set of compaction tests shall be performed per 6,500 cubic yards of proposed borrow. A minimum of 5 points shall be used to develop each compaction curve. The compaction curves shall be plotted on a single graph of dry density versus moisture content.

3.1.4 Hydraulic Conductivity Testing

A set of hydraulic conductivity tests shall be performed on representative samples of each principal type or combination of materials. A minimum of one set of tests shall be performed per 13,000 cubic yards of proposed borrow. A set of tests shall consist of a minimum of 3 test specimens. The moisture contents and densities of the specimens shall meet the criteria outlined in paragraph Acceptable Zone Development. Hydraulic conductivity testing referenced in this section shall be conducted in accordance with ASTM D 5084.

3.1.5 Acceptable Zone Development

An “Acceptable Zone” of moisture contents and densities shall be developed and displayed on the compaction curve graphs for each principal type of material or combination of materials. The “Acceptable Zone” shall consist of moisture-density values that meet the following requirements:

- a. Maximum Allowable Permeability = 1×10^{-5} cm per second.

3.1.6 Commercial Testing Laboratory

Tests for the compacted base soil layer and subgrade shall be performed by an approved commercial testing laboratory or may be tested by facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved. Costs of testing the Contractor Laboratory facilities for Government acceptance shall be borne by the Contractor.

3.2 SUBGRADE PREPARATION

Compacted base soil shall not be placed on surfaces that are muddy, frozen, or contain frost. Unsatisfactory material shall be removed from the upper 12 inches of surfaces to receive compacted base soil and shall be replaced with satisfactory material. Satisfactory material includes materials classified in ASTM D 2487 and shall be free of contamination, trash, debris, roots or other organic matter, or stones larger than 3 inches in any dimension. Unsatisfactory material includes materials classified in ASTM D 2487 as Pt, OH, and OL and any other materials not defined as satisfactory.

3.3 INSTALLATION

3.3.1 Compacted Base Soil

Compacted base soil shall be placed to the lines and grades shown on the drawings. The soil shall be placed in loose lifts not to exceed 8 inches in thickness. In areas where hand operated tampers must be used, the loose lift thickness shall not exceed 4 inches.

3.3.2 Moisture Control

Compacted base soil shall be placed and compacted within the moisture content range approved in the Borrow Source Assessment Report. The moisture content shall be maintained uniform throughout each lift. Moisture added shall be thoroughly incorporated into the compacted base soil to ensure uniformity of moisture content prior to compaction.

3.3.3 Compaction

Compacted base soil shall be compacted to the density requirements in the approved Borrow Source Assessment Report and by at least the number of passes recommended of the approved compaction equipment over all areas of each lift. For self-propelled compactors, one pass is defined as one pass of the entire vehicle. For towed rollers, one pass of the drum constitutes a pass. Hand operated tampers shall be used in areas where standard compaction equipment cannot be operated. An approved non-penetrating type compactor shall be used to compact the first lift of compacted base soil.

3.3.4 Scarification

Scarification shall be performed on all areas of the upper surface of each compacted base soil lift prior to placement of the next lift. Scarification shall be accomplished with approved equipment. The final lift of compacted base soil shall not be scarified. It shall be rolled with at least 3 passes of the approved smooth steel wheeled roller to provide a smooth surface with no ridges or depressions. The maximum ridge or depression shall be no more than one inch with rounded edges.

3.3.5 Repair of Voids

Voids in the compacted base soil created during construction, including penetrations for test samples, grade stakes, and other penetrations necessary for construction shall be repaired immediately by removing sand or other non-base soil material, placing base soil or bentonite backfill in lifts no thicker than 3 inches and tamping each lift with a steel rod. Each lift shall be tamped a minimum of 25 times altering the location of the rod within the void. Other ruts and depressions in the surface of the lifts shall be scarified, filled, and then compacted to grade.

3.4 CONSTRUCTION TOLERANCES

The thickness of the completed compacted base soil layer shall be within plus or minus 2 inches of the neat-line thickness shown on the Plans.

3.5 TESTS

3.5.1 Grain Size Analysis

Representative samples shall be taken for grain size analysis testing once per acre per lift. Where test results indicate a previously undefined material type, additional testing shall be performed as described in paragraph BORROW SOURCE ASSESSMENT.

3.5.2 Moisture Content and Density Tests

Moisture content and density tests shall be performed in a grid pattern. The grid pattern shall be staggered for successive lifts so that sampling points are not at the same location in each lift. Moisture content and density tests shall be performed in accordance with Table 2.

Table 2 Moisture Content and Density Tests		
Property	Test Method	Frequency
Rapid Moisture Content	ASTM D 3017	8,500 square feet
Standard Moisture Content	ASTM D 2216	One for every 10 rapid tests.
Rapid Density	ASTM D 2922	8,500 square feet
Standard Density	ASTM D 1556 ASTM D 2167	One for every 20 rapid tests.

Rapid moisture and density test results shall be checked against standard test results to verify good correlation. A minimum of one moisture content and density test shall be performed each day base soil is compacted. Nuclear density gauges shall be used in the direct transmission mode. Nuclear density and moisture calibration curves shall be checked and adjusted by the procedures described in ASTM D 2922 and ASTM D 3017. The nuclear gauge calibration checks shall be made at the beginning of a job, on each different type of material to be placed, and at intervals as directed. At the start of construction, a minimum of ten measurements shall be made on representative samples of

compacted base soil using both standard methods and any rapid moisture or density testing methods to be used. Results shall be compared to verify good correlation.

The field moisture content and density test results shall be plotted on the “Acceptable Zone” plot that corresponds to the appropriate material type being tested. If test results are not within the “Acceptable Zone” for moisture content or density, 3 additional tests shall be taken at the location of the failed parameter. If all retests pass, no additional action shall be taken. If any of the retests fail, the lift of soil shall be repaired out to the limits defined by passing tests for that parameter. The area shall then be retested as directed. Documentation shall be provided concerning the corrective measures taken in response to failed test results.

3.6 PROTECTION

3.6.1 Weather Conditions

Base soil placement and compaction shall not take place during adverse weather conditions of freezing, desiccation, or excessive moisture.

3.6.2 Excess Surface Water

Excess moisture shall be removed prior to placement of additional base soil. If in place base soil is reworked and recompacted, affected areas shall be retested at the same frequency as the rest of the project. Occurrences of excess surface water shall be documented including location and volume of soil affected, corrective action taken, replacement, and retesting. Erosion that occurs in the base soil layer prior to acceptance of the work shall be repaired and grades re-established.

3.6.3 Freezing and Desiccation

Freezing and desiccation of the base soil layer shall be prevented. If freezing or desiccation occurs, the affected soil shall be removed or reconditioned as directed. Affected areas shall be retested at the same frequency as the rest of the project. Occurrences of freezing or desiccation of the base soil layer shall be documented including location and volume of soil affected, corrective action taken, replacement, and retesting.

* * END OF SECTION * *

**SECTION 02672
WELLS AND PROBES**

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	(1993) Specification for Structural Steel
ASTM A 53	(1990b) Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
ASTM A 153	(1987) Specification for Zinc Coating (Hot Dip) or Iron and Steel Hardware
ASTM D 1785	(1993) Specification for Poly(vinyl chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D 2464	(1993) Specification for Threaded Poly(vinyl chloride) (PVC) Plastic Pipe Fittings, Schedule 80

1.2 MEASUREMENT AND PAYMENT (Not Used)

1.3 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-08, Statements

Work Plan; FIO

Proposed plan for drilling and constructing wells, before beginning work. The plan shall include, but not be limited to, the proposed method of drilling and equipment to be used. No work shall be performed until the drilling plan has been approved and no deviation from the approved drilling plan will be permitted without approval of the Contracting Officer. Details of specific methods to be employed to control potential contamination or pollution arising from well installation activities, shall also be included.

SD-18 Records

Permits; FIO

A copy of all permits, licenses, or other requirements necessary for execution of the work. Before beginning work, the local United States

Geological Survey office (USGS), United States Department of Ecology, and the Tacoma-Pierce County Health Department shall be notified of the type and location of wells to be constructed, the method of construction and anticipated schedule for construction of the wells. A copy of all such correspondence shall be furnished.

Boring Log; F10

During the drilling of the wells, accurate logs shall be maintained. As a minimum, the logs shall include depths, elevations, and descriptions of all formations encountered; identification of each stratum according to the Unified Soil Classification System; or standard rock nomenclature, as necessary; and depths at which groundwater is encountered. Soil samples shall be taken each 5 feet with a split-spoon sampler. The Contractor shall prepare a graphic boring log to scale showing the required details. Five prints of the boring log drawing shall be submitted.

1.4 ENVIRONMENTAL PROTECTION

The Contractor shall take all precautions as may be required to prevent contaminated water or water having undesirable physical or chemical characteristics from entering the water supply stratum through the well bore or by seepage from the ground surface. The Contractor also shall take all precautions necessary to prevent contamination of the ground surface or of surface waters resulting from drilling of the test-hole or well.

1.5 ABANDONMENT OF WELLS

In the event that the Contractor fails to construct a well as required, or should the well be abandoned because of loss of tools or for any other cause, the Contractor shall fill the abandoned hole with sand-cement grout and remove the casing.

PART 2—PRODUCTS

2.1 STEEL PROTECTIVE CASING AND LOCKING STEEL CAPS

Steel protective casings and locking steel caps shall be fabricated from ASTM A 53 seamless or electric welded pipe and ASTM A 36 structure steel, 3/16-inch minimum material thickness. Well number shown on the Plans shall be labeled in weld on the caps or casings. Letters and numbers shall be at least 2 inches high by 1 inch wide. Casings and caps shall be hot dip galvanized per ASTM A 153 following fabrication and labeling. Locking provision shall be an eye and hasp or similar design.

2.2 PIPE AND FITTINGS

Pipe shall be Schedule 80 PVC, threaded, in accordance with ASTM D 1785. Fittings shall be Schedule 80 PVC, threaded, in accordance with ASTM D 2464.

Screen for Ground Water Monitoring Wells shall be 0.02-inch slot. Screen for gas monitoring probes shall be 0.04-inch slot.

Valves for gas monitoring probes shall be PVC body labcock valves. Valves shall be fitted with 1/4-inch barb adapters.

Joint compound for groundwater monitoring wells shall be polytetrafluoroethylene. No petroleum or soap-based products shall be allowed. Centralizers shall be stainless steel. Joints for gas monitoring probes shall be flush threaded.

2.3 CEMENT GROUT

Cement grout shall consist of portland cement conforming to ASTM C 150, Type I or II, sand and water. Cement grout shall be proportioned not to exceed 6 gallons of water per cubic foot of cement, with a mixture of such consistency that the well can be properly grouted. Not more than 5 percent by weight of bentonite powder may be added to reduce shrinkage.

2.4 BENTONITE

Bentonite shall be free-flowing sodium bentonite, pellet form.

2.5 SILICA SAND

Processed or naturally occurring silica sand, free from organic material and other deleterious material. Silica sand, 10-20, shall conform to the following gradation:

Sieve Size	Percent Passing
1/4-inch square	100
U.S. No. 10	95 minimum
U.S. No. 20	0-5

Silica sand, 100, shall conform to the following gradation:

Sieve Size	Percent Passing
U.S. No. 50	100
U.S. No. 100	90 minimum
U.S. No. 200	0-5

2.6 PEA GRAVEL

Naturally occurring, rounded gravel, free from organic material and other deleterious material, conforming to the following gradation:

Sieve Size	Percent Passing
3/8-inch square	100
1/4-inch square	95 minimum
U.S. No. 8	0-5

PART 3—EXECUTION

3.1 WELL CONSTRUCTION

3.1.1 General Requirements

The method of drill shall be air rotary as approved by the Contracting Officer and shall conform to all state and local standards for well construction. The execution of the work shall be by competent workmen and performed under the direct supervision of an experienced well driller. Contractor shall wear new, clean gloves and coveralls while handling well piping and centralizers.

3.1.2 Drilling and Sampling

No bit lubrication other than filtered air and potable water shall be allowed. Compressed air shall be filtered to eliminate contamination of the air by oil from the compressor. Water used in circulation shall be kept to a minimum. The Contractor shall prevent and is responsible for any hydrocarbon or other chemical contamination of materials used in drilling. No drilling muds or foams shall be used and petroleum or soap-based products shall not be allowed. The use of petroleum based joint compounds, which are normally used to prevent binding, shall not be allowed. Polytetrafluoroethylene joint compound or tape is allowed. The Contractor shall use only potable water that meets the State of Washington Drinking Water Quality Standards (Chapter 248.54 WAC).

3.1.3 Decontamination Procedures

All large drilling equipment (rods, bits, drill rig, etc.) will be steam cleaned with a high pressure washer prior to drilling each monitoring well borehole. The area designated for steam cleaning activities will be located at least 50 feet away from the drilling to avoid cross contamination.

Smaller equipment (hammers, samplers, water-level probes, etc.) will be decontaminated between each use with a tap-water rinse, followed by a detergent wash (Liquinox or Alconox). Rinsate and drill cuttings will be disposed of on the ground surface.

The Contractor shall wear new, clean gloves and coveralls while handling well piping, centralizers, and pack materials.

3.1.4 Test for Plumbness and Alignment

Alignment requirements during drilling are that any casing, liner, or drill tools can be run freely through the boring. At a minimum, the alignment shall conform to Chapter 173-160-215(4) WAC, *Design and Construction—Well Completion—General (Alignment)*. The alignment requirement for the completed groundwater monitoring wells is that any 1.5-inch-diameter bailer or temporary or permanent pump must install freely to the bottom of the well.

3.1.5 Development

Following installation, each well will be developed by the Contractor by bailing or pumping and the purge water will be monitored by the Contracting Officer for temperature, specific conductivity, pH, and turbidity. The wells will be developed until

the temperature, specific conductance, pH, and turbidity stabilize. Groundwater removed from the well during development will be disposed of on the ground surface.

3.2 CLEAN-UP

Upon completion of the well construction and other incidentals, all debris and surplus materials resulting from the work shall be removed from the jobsite.

* * END OF SECTION * *

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SECTION 02685
GAS DISTRIBUTION SYSTEM

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

STATE SPECIFICATIONS

Washington State Department of Transportation, Standard
Plans for Road, Bridge, and Municipal Construction

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM C 177	Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus
ASTM D 638	Test Method for Tensile Properties of Plastics
ASTM D 696	Test Method for Coefficient of Linear Thermal Expansion of Plastics
ASTM D 746	Test Method for Brittleness Temperature of Plastics and Elastomers by Impact
ASTM D 790	Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
ASTM D 1238	Test Method for Flow Rate of Thermoplastics by Extrusion Plastomer
ASTM D 1248	Specification for Polyethylene Plastics Molding and Extrusion Materials
ASTM D 1505	Test Method for Density of Plastics by the Density Gradient Technique
ASTM D 1525	Test Method for Vicat Softening Temperature of Plastics
ASTM D 1693	Test Method for Environmental Stress-Cracking of Ethylene Plastics
ASTM D 1784	Specifications for Rigid Polyvinyl Chloride (PVC) Compounds
ASTM D 1785	Specifications for Polyvinyl Chloride Pipe (PVC)
ASTM D 2466	Specifications for Polyvinyl Chloride (PVC) Plastic Pipe Fittings
ASTM D 2564	Specifications for Polyvinyl Chloride (PVC) Solvent Cement
ASTM D 2240	Test Method for Rubber Property—Durometer Hardness

ASTM D 2837	Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials
ASTM D 3035	Specification for Polyethylene (PE) Plastic Pipe (SDR-PF) Based on Controlled Outside Diameter
ASTM D 3350	Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM F 405	Specification for Corrugated Polyethylene (PE) Tubing and Fittings
ASTM F 593	Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
ASTM F 714	Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter

1.2 MEASUREMENT AND PAYMENT (Not Used) 1.3 SUBMITTALS

Government Approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with Section SUBMITTALS:

SD-01 Data

PVC and HDPE Material Certification; FIO

The manufacturer shall furnish appropriate certification, based on the manufacturer's routine quality control tests, that the pipe and pipe fittings meet the requirements of the pertinent ASTM or ANSI Specifications.

Valves; FIO

Submit valve manufacturer, make, model, dimensions, ratings, materials of construction, and any other product information.

1.4 WORKMANSHIP

When necessary to cut pipe, the pipe shall be cut using a tool or tools specifically designed to leave a smooth, even, and square end on the pipe material to be cut. Cut ends shall be reamed to the full inside diameter of the pipe.

The Contractor shall take care when handling the pipe so as to not damage it by dragging it over sharp and cutting objects. Sections of the pipe with gouges or cuts shall be cut out and the ends of the pipe rejoined.

PART 2—PRODUCTS

2.1 SOLID WALL PIPE AND FITTINGS

Landfill gas (LFG) pipe shall be High Density Polyethylene (HDPE) pipe conforming to the following specifications:

- a. Pipe sizing shall be in accordance with ASTM F 714-83 and ASTM D 3035-83.
- b. The pipe shall be made from Premium High Density Polyethylene resin qualified as Type III, Category 5, Class C, Grade P34 in ASTM D 1248-81.
- c. This material shall have a long term hydrostatic strength of 1600 psi when tested and analyzed by ASTM D 2837-76 (1981), and listed by the Plastic Pipe Institute as P.E. 3408 resin.
- d. The following minimum engineering design specifications are required:
 - ASTM D 638 Tensile Strength Yield (2 in/min), $\geq 3,200$ PSI.
 - ASTM D 638 Elongation at break, 750%.
 - ASTM D 638 Modulus of Elasticity, 120,000 PSI.
 - ASTM D 790 Flexural Modulus, 135,000 PSI.
 - ASTM D 1693 Environmental stress crack resistance (E.S.C.R.)
Condition C, $>5,000$ F, 20 Hrs.
 - ASTM D-2837 Long Term Strength (L.T.H.S.) @73.4 Fahrenheit, 1600 PSI.
- e. In addition to the above, the High Density Polyethylene Material shall have the following general characteristics:
 - ASTM D 1505 Density with carbon black, 0.955 g/cm³ (min).
 - ASTM D 1238 Melt index (E) Condition, < 0.14 g/10 min.
 - ASTM D 1238 Melt index (F) Condition, < 11.0 g/10 min.
 - ASTM D 1525 Vicat softening point, 257 Fahrenheit (min).
 - ASTM D 746 Brittleness temperature, < -180 Fahrenheit (max).
 - ASTM C 177 Thermal conductivity, 2.7 BTU, in/ft² hrs./degrees Fahrenheit.
 - ASTM D 696 Thermal expansion, 1.2×10^{-4} in/in/degrees Fahrenheit (max).
 - ASTM D 2240 Hardness shore “D,” 65.
 - ASTM D 3350 Cell Class, 345434C.
 - Resin to be N.S.F. listed.
- f. The pipe shall contain no recycled compound except that generated on the manufacturer's own plant from resin of the same specification from the same raw supplier.

- g. The HDPE pipe shall be homogenous throughout and free from visible cracks, holes, foreign inclusions, or other injurious defects. The pipe shall be uniform in color, opacity, density, and other physical properties. The following information shall be continuously marked on the pipe or spaced at intervals not exceeding 5 feet:
 - 1. Name and/or trade mark of the pipe manufacturer.
 - 2. Nominal pipe size.
 - 3. Standard Dimension Ratio (SDR)
 - 4. PE 3408
 - 5. Manufacturer's Standard Reference
 - 6. A production code from which the date and place of manufacture can be determined.
- h. Polyethylene compound shall be protected against ultra violet degradation by carbon black in concentration of not less than 2 percent. All gas riser sections and manifold pipe shall have a minimum working pressure of 160 psi at 73.4 F and a minimum SDR of 17. Cleanout penetration pipe for the leachate collector shall be SDR 11.
- i. Flanges shall consist of a polyethylene flange adapter (ribbed face) fused to each length of pipe, with stainless steel convoluted back-up rings.
- j. Flange bolts shall conform to material requirements of ASTM F 593. Flat washers shall be provided with each nut for protection of flanges.

2.2 PERFORATED, CORRUGATED PIPE AND FITTINGS

Perforated pipe and fittings shall be corrugated high-density polyethylene pipe manufactured in accordance with ASTM F 405.

2.3 VALVES

The 6-inch butterfly valve shall be a PVC wafer style body, Polypropylene (PP) or Polyvinylidene fluoride (PVDF) disk and EPDM seat. The valve shall be provided with a ratcheting hand lever for operation.

The 6-inch gate valves shall be PVC flanged body, straight-through flow passage, EPDM seats, and non-rising stem with handwheel operator.

2.4 GAS COLLECTION TRENCHES

Drain rock; per Section UNDERDRAIN SYSTEM. Type 1 geotextile; per section GEOTEXTILE. Geotextile shall be placed on top of the drain rock per Detail 2, Gas Collection Trench, on Plate C-7.

2.5 POLYVINYL CHLORIDE (PVC) CONDENSATE PIPE AND FITTINGS

2.5.1 PVC Condensate Pipe

Condensate Pipe shall be Schedule 80 in accordance with ASTM D 1785, Type 1 (normal impact), Grade 1 (high chemical resistance). It shall be free from defects in materials, workmanship, and handling.

2.5.2 PVC Condensate Fittings

PVC Condensate Fittings shall conform to the requirements of ASTM D 2466 and ASTM D 1784 and be Schedule 80, Type 1, Grade 1, or Class 12454-B.

2.5.3 PVC Solvent Cement

All PVC socket connections shall be joined with PVC solvent cement conforming to ASTM D 2564. Manufacture, chemical composition, and viscosity shall be as recommended by the pipe and fitting manufacturer to assure capability with pipe and fittings materials.

2.6 PIPE SUPPORTS

Metal framing members shall be formed from 12-gauge low-carbon strip steel and conforming to ASTM A570 GR 33. Metal fittings shall be formed from hot rolled steel plate or strip and shall conform to ASTM A575. Fasteners shall be stainless steel. All steel members, fittings, and other nonstainless steel metal fittings shall be hot-dipped galvanized after fabrication. Concrete shall be in accordance with Section 03301 CONCRETE FOR FOUNDATIONS, ANCHORS, AND SUPPORTS.

2.7 CONDENSATE ACCESS BOXES

The condensate access boxes shall conform to WSDOT Standard Plan J-11a, Junction Box Details, Type 3.

PART 3—EXECUTION

3.1 GENERAL REQUIREMENTS

All items shall be installed according to the Drawings and the manufacturer's recommendations.

3.2 SOLID WALL GAS PIPE AND FITTINGS

The individual lengths of pipe and all fittings (unless otherwise noted) shall be jointed together by thermal butt fusion. This pipe shall be fused of the same type, grade, and class of polyethylene compound and supplied by the same raw material supplier.

Butt fusion shall be made only when the pipe materials to be jointed are clean and dry, at ambient temperatures of 40 F and above, and according to the pipe manufacturer's recommendation. Welders shall be trained in proper butt-fusion techniques by the pipe manufacturer or supplier.

Where shown on the Drawings, lengths of pipe shall be joined together by the use of flanges rather than thermal fusion. Flange bolts shall be tightened by pulling down on diametrically opposite nuts until proper bolt torque values are achieved.

Bolt torques shall be the lesser of: 20 foot-pounds (ft-lb) for 3-inch flanges; 30 ft-lb for 6-inch flanges; as recommended by the valve manufacturer where connecting a valve; as recommended by the flame arrester manufacturer where connecting the flame arrester.

3.3 VALVES

Butterfly valves; installed with shaft in horizontal, lever up in closed position.

Gate valves; operator shaft in vertical, handle up.

3.4 POLYVINYL CHLORIDE (PVC) CONDENSATE PIPE AND FITTINGS

All PVC condensate pipe and fittings shall be cut, made up, and installed in accordance with the pipe manufacturer's recommendations using solvent cement. Provide adequate ventilation when working with pipe joint solvent cement.

Pipe shall not be laid when the ambient temperature is below 40 F, nor above 90 F.

3.5 AIR TESTING

After the HDPE manifold is complete, it shall be air tested for leakage. The new piping shall be isolated from the existing pipeline and gas well and extraction riser connections. The Contractor shall supply all materials necessary for isolation. The line shall be tested with butterfly valves open and the ends of condensate drain lines and the manifold temporarily closed. After all plugs are in place and securely blocked, introduce air slowly into the pipe section to be tested until the internal air pressure reaches 5.0 pounds per square inch greater than atmospheric pressure. Allow a minimum of 2 minutes for the air temperature to stabilize. Pipe and joints being air tested shall be considered acceptable when tested at an average pressure of 5.0 pounds per square inch greater than atmospheric pressure, and when the section of line does not lose air at a rate greater than 0.0030 cubic foot per minute per square foot of internal pipe surface. The Contractor shall supply all testing equipment and personnel and shall conduct the tests.

If the manifold fails the air testing, the Contractor shall be responsible for finding the leak(s) causing the failure and shall repair the leak(s). The Contractor shall then retest the manifold and repeat these procedures until the manifold passes the air testing. The Contractor shall be solely responsible for finding and repairing any leaks in the manifold and for all air testing responsibilities.

* * END OF SECTION * *

***INSERT JUNCTION BOX DETAILS PAGE HERE
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**SECTION 02710
UNDERDRAIN SYSTEM**

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 2751	(1991) Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings
ASTM D 3034	(1989) Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM D 3212	(1989) Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM F 405	(1989) Corrugated Polyethylene (PE) Tubing and Fittings
ASTM F 667	(1985) Large Diameter Corrugated Polyethylene Tubing and Fittings
ASTM F 758	(1990) Smooth-Wall Polyvinyl Chloride (PVC) Plastic Underdrain Systems for Highway, Airport, and Similar Drainage
ASTM F 949	(1991a) Polyvinyl Chloride (PVC) Corrugated Sewer Pipe With a Smooth Interior and Fittings

STATE SPECIFICATIONS

Washington State Department of Transportation, Standard Plans
For Road, Bridge, And Municipal Construction

1.2 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-13 Certificates

Geotextile; FIO. Pipe for Underdrains; FIO.

Certifications from the manufacturers attesting that materials meet specification requirements. Certificates are required for drain pipe, drain tile, fittings, and filter fabric.

SD-14 Samples

Geotextile; F10. Pipe for Underdrains; F10.

Samples of geotextile, pipe, and pipe fittings, before starting the work.

1.3 DELIVER, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with minimum handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. During shipment and storage, geotextile shall be wrapped in burlap, plastic, or similar heavy duty protective covering. The storage area shall be such that the geotextile is protected from mud, soil, dust, and debris. Geotextile materials that are not to be installed immediately shall not be stored in direct sunlight. Plastic pipe shall be installed within 6 months from the date of manufacture unless otherwise approved.

1.3.2 Handling

Materials shall be handled in such a manner as to insure delivery to the trench in sound undamaged condition. Pipe shall be carried and not dragged to the trench.

1.4 MEASUREMENT AND PAYMENT (Not Used)

PART 2—PRODUCTS

2.1 PIPE FOR UNDERDRAINS

Pipe for underdrains shall be of the types and sizes indicated.

2.1.1 Plastic Pipe

Plastic pipe shall contain ultraviolet inhibitor to provide protection from exposure to direct sunlight.

2.1.1.1 Acrylonitrile-Butadiene-Styrene (ABS) Piping

Acrylonitrile-butadiene-styrene (ABS) piping and fittings shall conform to ASTM D 2751, with maximum SDR of 35.

2.1.1.2 Polyvinyl Chloride (PVC) Pipe and Fittings

Polyvinyl chloride (PVC) pipe and fittings shall conform to ASTM F 758, Type PS 46.

2.1.1.3 Corrugated Polyethylene (PE) Pipe and Fittings

Use ASTM F 405 for pipes 3 to 6 inches in diameter, inclusive, ASTM F 667 for pipes 8 to 24 inches in diameter. Fittings shall be manufacturer's standard type and shall conform to the indicated specification.

2.1.1.4 Pipe Perforations

Water inlet area shall be a minimum of 0.5 square inch per linear foot. Manufacturer's standard perforated pipe which essentially meets these requirements may be substituted with prior approval of the Contracting Officer.

Circular Perforations in Plastic Pipe: circular holes shall be cleanly cut not more than 3/8 inch or less than 3/16 inch in diameter and arranged in rows parallel to the longitudinal axis of the pipe. Perforations shall be approximately 3 inches center-to-center along rows. The rows shall be approximately 1-1/2 inch apart and arranged in a staggered pattern so that all perforations lie at the midpoint between perforations in adjacent rows. The rows shall be spaced over not more than 155 degrees of circumference. The spigot or tongue end of the pipe shall not be perforated for a length equal to the depth of the socket, and perforations shall continue at uniform spacing over the entire length of the pipe.

Slotted Perforations in Plastic Pipe: circumferential slots shall be cleanly cut so as not to restrict the inflow of water and uniformly spaced along the length and circumference of the tubing. Width of slots shall not exceed 1/8 inch nor be less than 1/32 inch. The length of individual slots shall not exceed 1-1/4 inch on 3 inch diameter tubing, 10 percent of the tubing inside nominal circumference on 4 to 8 inch diameter tubing, and 2-1/2 inch on 10 inch diameter tubing. Rows of slots shall be symmetrically spaced so that they are fully contained in 2 quadrants of the pipe. Slots shall be centered in the valleys of the corrugations of profile wall pipe.

2.2 GEOTEXTILE

Geotextile shall be Type 1 as specified in GEOTEXTILE.

2.3 CLEANOUT ACCESS BOXES

The cleanout access boxes shall conform to WSDOT Standard Plan J-11a, Junction Box Details, Type 1.

2.4 DRAIN ROCK

Drain rock shall be washed rock of hard, tough durable particles free from adherent coatings. Drain rock shall not contain corrosive agents, organic matter, or soft, friable, thin, or elongated particles.

Table 1. Drain Rock Gradation	
Sieve Designation	Percent by Weight Passing
1 1/2"	100
3/8"	0-2

Drain rock shall be manufactured from a Contractor selected source.

PART 3—EXECUTION

3.1 EXCAVATION AND BEDDING FOR UNDERDRAINS SYSTEMS

The underdrains system is to be placed directly on the geonet composite. Excavation should not be required for installation of the underdrains system.

3.2 CLEANOUTS

3.2.1 Cleanouts

Cleanout pipes with frames and covers shall be installed at the locations indicated. Risers shall be constructed of the same material as the underdrains system. Joining of riser pipes to the underdrains system shall be as indicated on the drawings. The riser pipe shall be oriented such that flushing of the underdrains piping is down slope.

3.3 INSTALLATION OF GEOTEXTILE AND PIPE FOR UNDERDRAINS

3.3.1 Installation of Geotextile

The drain rock shall be wrapped in a geotextile as shown on the plans. The geotextile overlap shall be at least 24 inches at top of rock and ends of rolls.

3.3.2 Installation of Pipe for Underdrains

3.3.2.1 Pipelaying

Each pipe shall be carefully inspected before it is laid. Any defective or damaged pipe shall be rejected. No pipe shall be laid when the ditch conditions or weather is unsuitable for such work. The pipe shall be laid in the centerline of the ditching as indicated. The pipe shall be bedded to the established gradeline. Perforations shall be centered on the bottom of the pipe. Pipes of either the bell-and-spigot type or the tongue-and-groove type shall be laid with the bell or groove ends upstream. All pipes in place shall be approved before backfilling.

3.3.2.2 Jointings

Acrylonitrile-Butadiene-Styrene (ABS): Solvent cement or elastomeric joints for ABS pipe shall be in accordance with ASTM D 2751. Dimensions and tolerances shall be in accordance with TABLE II of ASTM D 2751.

Polyvinyl Chloride (PVC) Pipe: Joints shall be in accordance with the requirements of ASTM D 3034, ASTM D 3212, or ASTM F 949.

Perforated Corrugated Polyethylene Pipe: Perforated corrugated polyethylene drainage pipe shall be installed in accordance with the manufacturer's specifications and as specified herein. A pipe with physical imperfections shall not be installed. No stretch in a section will be permitted.

3.4 INSTALLATION OF DRAIN ROCK AND BACKFILLING FOR UNDERDRAINS

After pipe for underdrains has been laid, inspected, and approved, drain rock shall be placed around and over the pipe to the depth indicated. The drain rock shall be placed in one layer.

* END OF SECTION *

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**SECTION 02720
STORM-DRAINAGE SYSTEM**

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

**WASHINGTON STATE D.O.T. “STANDARD PLANS FOR ROAD, BRIDGE,
AND MUNICIPAL CONSTRUCTION”**

Standard Plan B-1

**AMERICAN ASSOCIATION OF STATE HIGHWAY AND
TRANSPORTATION OFFICIALS (AASHTO)**

AASHTO-01 (1990, 14th Ed) Standard Specifications for Highway Bridges

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 123	(1989a) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 444	(1989) Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process for Storm Sewer and Drainage Pipe
ASTM A 760	(1990a) Corrugated Steel Pipe, Metallic-Coated for Sewers and Drains
ASTM A 798	(1988) Installing Factory-Made Corrugated Steel Pipe for Sewers and Other Applications
ASTM C 443	(1985a; R 1990) Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
ASTM C 478	(1990b) Precast Reinforced Concrete Manhole Sections
ASTM D 1056	(1985) Flexible Cellular Materials – Sponge or Expanded Rubber
ASTM D 1171	(1986) Rubber Deterioration – Surface Ozone Cracking Outdoors or Chamber (Triangular Specimens)
ASTM D 1557	(1978; R 1990) Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb (4.54-kg) Rammer and 18-in. (457-mm) Drop
ASTM D 1751	(1983) Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	(1984) Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 1784	(1990) Rigid Poly(Vinyl Chloride) (PVC) Compounds and

Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

ASTM D 2167	(1984; R 1990) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D 2922	(1981; R 1990) Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
ASTM D 3017	(1988) Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
ASTM D 3034	(1989) Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D 3212	(1989) Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals

FEDERAL SPECIFICATIONS (FS)

FS HH-G-156	(Rev D; Int Am 1) Gasket Material, General Purpose; Rubber Sheets, Strips, and Special Shapes
FS SS-S-210	(Rev A; Am 1) Sealing Compound, Preformed Plastic, for Expansion Joints and Pipe Joints

FEDERAL TEST METHOD STANDARDS (FTM-STD)

FTM-STD 601	(Basic; Notice 7) Rubber, Sampling and Testing
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1.2 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with Section SUBMITTALS:

SD-04 Drawings

Miscellaneous Metal Items: GA

Detail drawings indicating material thickness, type, grade, and class; dimensions; and construction details. Drawings shall include catalog cuts, erection details, manufacturer's descriptive data and installation instructions, and templates. Detail drawings for the orifice/trash rack.

SD-06 Instructions

Placing Pipe; FIO

Printed copies of the manufacturer's recommendations for installation procedures of the material being placed, prior to installation.

SD-13 Certificates

Pipeline Testing; GA.

Certified copies of test reports demonstrating conformance to applicable pipe specifications, before pipe is installed.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery and Storage

Materials delivered to site shall be inspected for damage, unloaded, and stored with a minimum of handling. Materials shall not be stored directly on the ground. The inside of pipes and fittings shall be kept free of dirt and debris. Gasket materials and plastic materials shall be protected from exposure to the direct sunlight over extended periods.

1.3.2 Handling

Materials shall be handled in such a manner as to insure delivery to the trench in sound, undamaged condition. Pipe shall be carried to the trench, not dragged.

PART 2—PRODUCTS

2.1 CULVERTS

2.1.1 Pipe for Culverts

Pipe for culverts shall be of the sizes indicated and shall conform to the requirements for AASHTO Type 1 and Type 2 with helical corrugations. Sheet thickness and corrugation size shall be as indicated. Steel shall be zinc coated, ASTM A 760.

2.1.2 For Corrugated Metal Pipe

Transverse field joints shall be of such design that the successive connection of pipe sections will form a continuous line free of appreciable irregularities in the flow line. In addition, the joints shall meet the general performance requirements described in ASTM A 798. Suitable transverse field joints which satisfy the requirements for one or more of the joint performance categories can be obtained with the following types of connecting bands furnished with suitable band-end fastening devices: corrugated bands, bands with projections, flat bands, and bands of special design that engage factory preformed ends of corrugated pipe. The space between the pipe and connecting bands shall be kept free from dirt and grit so that corrugations fit snugly. The connecting band, while being tightened, shall be tapped with a soft-head mallet of wood, rubber or plastic, to take up slack and insure a tight joint.

2.1.3 Field Joints

Field joints for corrugated metal pipe shall maintain pipe alignment during construction and prevent infiltration of fill material during the life of the installations. The type, size, and sheet thickness of the band and the size of angles or lugs and bolts shall be as specified in the applicable Standards or Specifications for the pipe.

2.2 MISCELLANEOUS MATERIALS

2.2.1 Precast Reinforced Catch Basins (Not Used)

2.2.2 Frame and Grating (Not Used)

2.2.3 Trash Rack

The trash rack at the culvert inlet shall be constructed in accordance with the plans.

PART 3—EXECUTION

3.1 EXCAVATION FOR PIPE CULVERTS AND DRAINAGE STRUCTURES

Excavation of trenches and for appurtenances and backfilling for culverts and storm drains shall be in accordance with the applicable portions of Section EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS and the requirements specified below.

3.1.1 Trenching

The width of trenches at any point below the top of the pipe shall be not greater than the outside diameter of the pipe plus 24 inches to permit satisfactory jointing and thorough tamping of the bedding material under and around the pipe. Sheeting and bracing where required shall be placed within the trench width as specified. Care shall be taken not to overexcavate. Where trench widths are exceeded, redesign with a resultant increase in cost of stronger pipe or special installation procedures shall be necessary. Cost of this redesign and increased cost of pipe or installation shall be borne by the Contractor without additional cost to the Government.

3.1.2 Removal of Existing Culvert

Existing culvert to be removed shall be disposed of within the Fort Lewis Landfill boundary at the location designated by the Contracting Officer.

3.1.3 Removal of Unstable Material

Where wet or otherwise unstable soil incapable of properly supporting the pipe, as determined by the Contracting Officer, is unexpectedly encountered in the bottom of a trench, such material shall be removed to the depth required and replaced to the proper grade with select granular material, compacted as provided in Paragraph BACKFILLING. When removal of unstable material is due to the fault or neglect of the Contractor in his performance of shoring and sheeting, water removal, or other specified requirements, such removal and replacement shall be performed at no additional cost to the government.

3.2 BEDDING

The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. When necessary, the bedding shall be tamped. Bedding for corrugated metal pipe shall be in accordance with ASTM A 798. It is not required to shape the bedding to the pipe geometry.

3.3 PLACING PIPE

Each pipe shall be carefully examined before being laid, and defective or damaged pipe shall not be used. Pipelines shall be laid to the grades and alignment indicated. Proper facilities shall be provided for lowering sections of pipe into trenches. Under no circumstances shall pipe be laid in water, and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Diversion of drainage or dewatering of trenches during construction shall be provided as necessary. All pipe in place shall be inspected before backfilling, and those pipes damaged during placement shall be removed and replaced.

Laying shall be with the separate sections joined firmly together, with the outside laps of circumferential joints pointing upstream, and with longitudinal laps on the sides.

3.4 DRAINAGE STRUCTURES

3.4.1 Catch Basins (Not Used)

3.5 BACKFILLING

3.5.1 Backfilling Pipe in Trenches

After the pipe has been properly bedded, selected material from excavation or borrow, at a moisture content that will facilitate compaction, shall be placed along both sides of pipe in layers not exceeding 6 inches in compacted depth. The backfill shall be brought up evenly on both sides of pipe for the full length of pipe. Care shall be taken to insure thorough compaction of the fill under the haunches of the pipe. Each layer shall be thoroughly compacted with mechanical tampers or rammers. This method of filling and compacting shall continue until the fill has reached an elevation of at least 12 inches above the top of the pipe. The remainder of the trench shall be backfilled and compacted by spreading and rolling or compacted by mechanical rammers or tampers in layers not exceeding 6 inches. Tests for density will be made as necessary to insure conformance to the compaction requirements specified elsewhere in this paragraph. Where it is necessary in the opinion of the Contracting Officer, any sheeting or portions of bracing used shall be left in place and the contract will be adjusted accordingly. Untreated sheeting shall not be left in place beneath structures or pavements.

3.5.2 Backfilling Pipe in Fill Sections

For pipe placed in fill sections, backfill material and the placement and compaction procedures shall be as specified elsewhere in this paragraph. The fill material shall be uniformly spread in layers longitudinally on both sides of the pipe, not exceeding 6 inches in compacted depth, and shall be compacted by rolling parallel with pipe or by

mechanical tamping or ramming. Prior to commencing normal filling operations, the crown width of the fill at a height of 12 inches above the top of the pipe shall extend a distance of not less than twice the outside pipe diameter on each side of the pipe or 12 feet, whichever is less. After the backfill has reached at least 12 inches above the top of the pipe, the remainder of the fill shall be placed and thoroughly compacted in layers not exceeding 6 inches.

3.5.3 Movement of Construction Machinery

In compacting by rolling or operating heavy equipment parallel with the pipe, displacement of or injury to the pipe shall be avoided. Movement of construction machinery over a culvert at any stage of construction shall be at the Contractor's risk. Any damaged pipe shall be repaired or replaced.

3.5.4 Compaction

Compaction for culverts and storm drains shall be in accordance with applicable portions of Section EXCAVATION, TRENCHING, AND BACKFILLING FOR UTILITIES SYSTEMS.

3.5.5 Trash Rack

Trash rack shall be installed at the location shown on the Drawings.

* END OF SECTION * *

**SECTION 02935
TURF (HYDROSEEDING)**

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AGRICULTURAL MARKETING SERVICE (AMS)

AMS-01 (Amended through Aug 1988) Federal Seed Act Regulations
(Part 201-202)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 977 (1991) Emulsified Asphalt

ASTM D 2028 (1976; R 1992) Cutback Asphalt (Rapid-Curing Type)

COMMERCIAL ITEM DESCRIPTIONS (CID)

CID A-A-1909 (Basic; Notice 1) Fertilizer

1.2 MEASUREMENT AND PAYMENT (Not Used)

1.3 SUBMITTALS

Government approval is required for submittals with a “GA” designation; submittals having an “FIO” designation are for information only. The following shall be submitted in accordance with Section 01300 SUBMITTAL DESCRIPTIONS:

SD-01 Data

Manufacturer's Literature; FIO

Manufacturer's literature discussing physical characteristics, application and installation instructions for erosion control material, and for chemical treatment material.

SD-07 Schedules

Equipment List; FIO

A list of proposed pesticide application, seeding and mulching equipment to be used in performance of turfing operation, including descriptive data and calibration tests.

SD-08 Statements

Delivery; F10

Delivery schedule, at least 10 days prior to the intended date of the first delivery.

Turf Establishment Period; GA

Written calendar time period for the turf establishment period. When there is more than one turf establishment period, the boundaries of the turfed area covered for each period shall be described.

SD-13 Certificates

Certificates of compliance certifying that materials meet the requirements specified, prior to the delivery of materials. Certified copies of the reports for the following materials shall be included:

Seed; F10

For mixture, percent pure live seed, minimum percent germination and hard seed, maximum percent weed seed content, date tested and state certification.

Fertilizer; F10

For chemical analysis, composition percent.

Agricultural Limestone; F10

For calcium carbonate equivalent and sieve analysis.

Topsoil; F10

For pH, particle size, chemical analysis and mechanical analysis.

1.4 DELIVERY, INSPECTION, STORAGE, AND HANDLING

1.4.1 Delivery

1.4.1.1 Topsoil

A soil test shall be provided for topsoil delivered to the site.

1.4.1.2 Soil Amendments

Soil amendments shall be delivered to the site in the original, unopened containers bearing the manufacturer's chemical analysis. In lieu of containers, soil amendments may be furnished in bulk. A chemical analysis shall be provided for bulk deliveries.

1.4.2 Inspection

Seed shall be inspected upon arrival at the job site by the Contracting Officer for conformity to type and quality in accordance with paragraph MATERIALS. Other

material shall be inspected for meeting specified requirements and unacceptable materials shall be removed from the job site.

1.4.2 Storage

Materials shall be stored in areas designated by the Contracting Officer. Seed, lime and fertilizer shall be stored in cool, dry locations away from contaminants. Chemical treatment materials shall not be stored with other landscape materials.

1.4.3 Handling

1.4.3.1 Materials

Except for bulk deliveries, materials shall not be dropped or dumped from vehicles.

PART 2—PRODUCTS

2.1 MATERIALS

2.1.1 Seed

2.1.1.1 Seed Classification

State-approved seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS-01 and applicable state seed laws.

2.1.1.2 Seed Mixtures

Seed mixtures shall be proportioned by weight as follows:

Botanical Name	Common Name*	Mixture Percent by Weight	Percent Pure Live Seed
Lolium Perenne	Perennial Ryegrass (3 or more, cultivars, equal parts of each)	41	88
Festuca	Creeping Fescue (2 or more cultivars, equal parts of each)	27	78
Festuca	Hard Fescue (2 or more cultivars, equal parts of each)	27	78
Agrostis tenuis	Colonial Bentgrass (1 or more cultivar)	5	86

* All cultivars are to be selected from those printed in bold in the Washington State University publication, "1992 Turfgrass Field Day," pages 33 and 34.

2.1.1.3 Quality

Weed seed shall not exceed 1 percent by weight of the total mixture. Wet, moldy, or otherwise damaged seed shall be rejected.

2.1.1.4 Seed Mixing

The field mixing of seed shall be performed on site in the presence of the Contracting Officer.

2.1.2 Soil Amendments

Soil amendments shall consist of lime, fertilizer, organic soil amendments and soil conditioners meeting the following requirements.

2.1.2.1 Lime

Lime shall be agricultural limestone and shall have a minimum calcium carbonate equivalent of 90 percent and shall be ground to such a fineness that at least 90 percent will pass a 10-mesh sieve and at least 50 percent will pass a 60-mesh sieve.

2.1.2.2 Fertilizer

Fertilizer shall be commercial grade, free flowing, uniform in composition and conforming to CID A-A-1909. Granular Fertilizer: As recommended by the soil test.

2.1.2.3 Organic Soil Amendments

- a. Topsoil: Delivered topsoil shall conform to topsoil requirements specified in Section 02210 GRADING, and shall be amended as recommended by soil test.
- b. Sand: Clean, free of toxic materials; 95 percent by weight shall pass a No. 10 sieve (No. 10 sieve) and 10 percent by weight shall pass a No. 16 sieve. (No. 16 sieve.)
- c. Rotted Manure: Well rotted, horse or cattle manure containing a maximum 25 percent by volume of straw, sawdust, or other bedding materials, free of stones, sticks, soil and containing no chemicals or ingredients harmful to plants.
- d. Decomposed Wood Derivatives: Ground bark, sawdust, or other wood waste material free of stones, sticks, soil, and toxic substances harmful to plants, stabilized with nitrogen and having the following properties:

Particle Size: Minimum percent by weight passing:

Sieve Size	Percent
No. 4	95
No. 4	80

Nitrogen Content: Minimum percent based on dry weight:

Material	Percent
Redwood Sawdust	0.5
Fir Sawdust	0.7

- e. Calcined Clay: Granular particles produced from montmorillonite clay calcined to minimum temperature of 1200 degrees F to the following gradation: minimum 90 percent passing No. 8, (No. 8,) 99 percent retained on No. 60 sieve (No. 60 sieve) and maximum 2 percent passing No. 100 sieve. (No. 100 sieve.) Bulk density: maximum 640 kg per cubic m. (40 pounds per cubic foot.)

2.1.2.4 Soil Conditioner

Soil conditioner may be for single use or in combination to meet requirements for topsoil. Gypsum shall be commercially packaged, free flowing, minimum 95 percent calcium sulfate by volume.

2.1.3 Mulch

Mulch shall be free from weeds, mold, and other deleterious materials.

2.1.3.1 Straw

Straw shall be stalks from oats, wheat, rye, barley, or rice furnished in air-dry condition and with a consistency for placing with commercial mulch-blowing equipment.

2.1.3.2 Hay

Hay shall be native hay, sudan-grass hay, broomsedge hay, or other herbaceous mowings furnished in an air-dry condition suitable for placing with commercial mulch-blowing equipment.

2.1.3.3 Wood Cellulose Fiber

Wood cellulose fiber shall not contain any growth or germination-inhibiting factors and shall be dyed an appropriate color to facilitate visual metering during application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 4.5 to 6.0.

2.1.3.4 Wood Chips

Wood chips shall be chips or shredded bark with maximum particle size of 3/16 inch.

2.1.3.5 Paper Fiber Mulch

Paper fiber mulch shall be recycled news print that is shredded for the purpose of mulching seed.

2.1.4 Asphalt Adhesive

Asphalt adhesive shall conform to the following:

2.1.4.1 Emulsified Asphalt

Conforming to ASTM D 977, Grade SS-1.

2.1.4.2 Cutback Asphalt

Conforming to ASTM D 2028, designation RC-70.

2.1.5 Water

Water shall not contain elements toxic to plant life.

2.1.6 Erosion Control Material

Soil erosion control shall conform to the following:

2.1.6.1 Erosion Control Blanket

Machine produced mat of wood excelsior formed from a web of interlocking wood fibers, covered on one side with either knitted straw blanket-like mat construction, covered with biodegradable plastic mesh, or interwoven biodegradable thread, plastic netting or twisted kraft paper cord netting.

2.1.6.2 Erosion Control Fabric

Knitted construction of polypropylene yarn with uniform mesh openings 3/4 to 1 inch square with strips of biodegradable paper. Filler paper strips shall last 6 to 8 months.

2.1.6.3 Erosion Control Net

Heavy, twisted jute mesh weighing approximately 1.22 pounds per yard (1.22 pounds per linear yard) and 4 feet wide with mesh openings of approximately 1 inch square.

2.1.6.4 Erosion Control Chemicals

High-polymer synthetic resin or cold-water emulsion of selected petroleum resins.

2.1.6.5 Hydrophilic Colloids

Hydrophilic colloids shall be physiologically harmless to plant and animal life, without phytotoxic agents. Colloids shall be naturally occurring, silicate powder based, and shall form a water insoluble membrane after curing. Colloids must resist mold growth.

2.1.6.6 Anchors

Erosion control anchor material shall be as recommended by the manufacturer.

PART 3—EXECUTION

3.1 SEEDING, SODDING AND SPRIGGING TIMES AND CONDITIONS

3.1.1 Seeding Time

Seed shall be sown from March 1 to May 1 for spring planting and from September 1 to October 15 for fall planting.

3.1.2 Turfing Conditions

Turf operations shall be performed only during periods when beneficial results can be obtained. When drought, excessive moisture or other unsatisfactory conditions prevail, the work shall be stopped when directed. When special conditions warrant a variance to the turf operations, proposed times shall be submitted to and approved by the Contracting Officer.

3.2 SITE PREPARATION

3.2.1 Grading

The Contracting Officer shall verify that finished grades are as indicated on drawings, and the placing of topsoil and the smooth grading has been completed in accordance with Section 02210 GRADING.

3.2.2 Application of Soil Amendments

3.2.2.1 Soil Test

A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

3.2.2.2 Lime

Lime shall be applied at the rate recommended by the soil test. Lime shall be incorporated into the soil to a minimum depth of 4 inches or may be incorporated as part of the tillage operation.

3.2.2.3 Fertilizer

Fertilizer shall be applied at the rate recommended by the soil test. Fertilizer shall be incorporated into the soil to a minimum depth of 4 inches and may be incorporated as part of the tillage or hydroseeding operation.

3.2.2.4 Soil Conditioner

Soil Conditioner shall be spread uniformly over the soil and thoroughly incorporated by tillage into the soil to a minimum depth of 4 inches.

3.2.3 Tillage

3.2.3.1 Minimum Depth

Soil on slopes gentler than 3-horizontal-to-1-vertical shall be tilled to a minimum depth of 4 inches.

3.2.4 Finished Grading

3.2.4.1 Preparation

Turf areas shall be filled as needed or have surplus soil removed to attain the finished grade. Drainage patterns shall be maintained as indicated on drawings. Turf areas compacted by construction operations shall be completely pulverized by tillage. Soil

used for repair of erosion or grade deficiencies shall conform to topsoil requirements specified in Section 02210 GRADING. Finished grade shall be 1 inch below adjoining grade of any surfaced area. New surfaces shall be blended to existing areas.

3.2.4.2 Protection

Finished graded areas shall be protected from damage by vehicular or pedestrian traffic and erosion.

3.3 SEEDING

3.3.1 General

Prior to seeding, any previously prepared seedbed areas compacted or damaged by interim rain, traffic or other cause, shall be reworked to restore the ground condition previously specified. Seeding operations shall not take place when the wind velocity will prevent uniform seed distribution.

3.3.2 Equipment Calibration

The equipment to be used and the methods of turfing shall be subject to the inspection and approval of the Contracting Officer prior to commencement of turfing operations. Immediately prior to the commencement of turfing operations, the Contractor shall conduct turfing equipment calibration tests in the presence of the Contracting Officer.

3.3.3 Applying Seed

3.3.3.1 Broadcast Seeding

Seed shall be uniformly broadcast at the rate of 4.5 pounds per 1000 square feet using broadcast seeders. Half of seed shall be broadcast in one direction, and the remainder at right angles to the first direction. Seed shall be covered to an average depth of 1/4 inch by disk harrow, steel mat drag, cultipacker, or other approved device.

3.3.4 Hydroseeding

Seed and fertilizer shall be added to water and thoroughly mixed at the rates specified. Wood cellulose fiber mulch shall be added at the rate of 2,000 pounds per acre after the seed, fertilizer and water have been thoroughly mixed, to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.

3.3.4.1 Asphalt Adhesive Tackifier

When asphalt adhesive is applied to the in-place mulch, spraying shall be at the rate of between 10 to 13 gallons per 1000 square feet.

3.3.4.2 Non-Asphaltic Tackifier

Hydrophilic colloid shall be applied at rate recommended by manufacturer. Apply with hydraulic equipment suitable for mixing and applying uniform mixture of tackifier.

3.3.4.3 Wood Cellulose Fiber

Wood cellulose fiber mulch for use with the hydraulic application of seed and fertilizer shall be applied as part of the hydroseeding operation.

3.3.5 Water

Watering shall be started within 7 days after completing the seeded area. Water shall be applied at a rate sufficient to ensure moist soil conditions to a minimum depth of 1 inch. Runoff and puddling shall be prevented.

3.4 EROSION CONTROL

3.4.1 Erosion Control Material

Erosion control material, where indicated or required, shall be installed in accordance with manufacturer's instructions. Placement of the erosion control material shall be accomplished without damage to installed material or without deviation to finished grade. Erosion control blanket shall be placed on slopes steeper than 4 horizontal to 1 vertical. Erosion control fabric shall be placed in the cutoff and perimeter ditches.

3.5 RESTORATION AND CLEAN UP

3.5.1 Restoration

Existing turf areas, pavements and facilities that have been damaged from the turfing operation shall be restored to original condition at Contractor's expense.

3.5.2 Clean Up

Excess and waste material shall be removed from the planting operation and shall be disposed of off the site. Adjacent paved areas shall be cleaned.

3.6 PROTECTION OF TURFED AREAS

Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required, or as directed by the Contracting Officer.

3.7 TURF ESTABLISHMENT PERIOD

3.7.1 Commencement

The Turf Establishment Period for establishing a healthy stand of turf shall begin on the first day of work under this contract and shall end three (3) months after the last day of turfing operations required by this contract. Written calendar time period shall be furnished to the Contracting Officer for the Turf Establishment Period. When there is more than one turf establishment period, describe the boundaries of the turfed area covered for each period.

3.7.2 Satisfactory Stand of Turf

3.7.2.1 Seeded Area

- a. Field Area: A satisfactory stand of turf from the seeding operation for a field area is defined as a minimum of 100 (10) grass plants per square foot. The total bare spots shall not exceed 2 percent of the total seeded area.

3.7.3 Maintenance During Establishment Period

3.7.3.1 General

Maintenance of the turfed areas shall include eradicating weeds, eradicating insects and diseases, protecting embankments and ditches from erosion, maintaining erosion control materials and mulch, protecting turfed areas from traffic, mowing, watering, and post-fertilization.

3.7.3.2 Watering

Watering shall be at intervals to obtain a moist soil condition to a minimum depth of 1 inch. Frequency of watering and quantity of water shall be adjusted in accordance with the growth of the turf. Runoff, puddling and wilting shall be prevented.

3.7.3.3 Post-Fertilization

Nitrogen carrier fertilizer shall be applied at the rate recommended by a soils testing laboratory after the first month and again in 3 months prior to the final acceptance. The application shall be timed prior to the advent of winter dormancy and shall avoid excessively high nitrogen levels.

3.7.3.4 Repair

The Contractor shall re-establish as specified herein, eroded, damaged or barren areas. Mulch shall also be repaired or replaced as required.

3.7.3.5 Maintenance Report

A written record shall be furnished to the Contracting Officer of the maintenance work performed.

3.8 FINAL ACCEPTANCE

3.8.1 Preliminary Inspection

Prior to the completion of the Turf Establishment Period, a preliminary inspection shall be held by the Contracting Officer. Time for the inspection shall be established in writing. The acceptability of the turf in accordance with the Turf Establishment Period shall be determined. An unacceptable stand of turf shall be repaired as soon as turfing conditions permit.

3.8.2 Final Inspection

A final inspection shall be held by the Contracting Officer to determine that deficiencies noted in the preliminary inspection have been corrected. Time for the inspection shall be established in writing.

* * END OF SECTION * *

SECTION 03301
CONCRETE FOR FOUNDATIONS, ANCHORS, AND SUPPORTS

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 615 (1986) Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

ASTM C 94 (1986b) Ready-Mixed Concrete

1.2 SUBMITTALS

The following shall be submitted in accordance with Section SUBMITTALS:

SD-9, Reports

Mix Design; F10

At least 14 days prior to commencing concrete placing operations, the Contractor shall submit the results of trial mix along with a statement giving the maximum nominal coarse aggregate size and the proportions of all ingredients that will be used in the manufacture of each strength of concrete. Aggregate weights shall be based on the saturated surface dry condition. The statement shall be accompanied by test results from an independent commercial testing laboratory, attesting that the proportions selected will produce concrete of the qualities indicated. Concrete mixes designed for pumping shall so state on the mix design test reports. No substitutions shall be made in the materials used in the work without additional tests to show that the quality of the concrete is satisfactory.

Test Reports; F10

Certified copies of laboratory test reports, including all test data, shall be submitted for aggregate, cement and pozzolan, showing materials meet all requirements specified in PART 2—PRODUCTS.

SD-13 Certificates

Certificates of Compliance; F10

Certificate of compliance shall be submitted for concrete admixtures abrasive aggregate, perimeter insulation, and vapor barrier showing conformance to requirements specified in PART 2—PRODUCTS.

1.3 GENERAL

1.3.1 Strength Requirements

Structural concrete for all work shall have a 28-day compressive strength of 3000 pounds per square inch. Concrete made with high-early strength cement shall have a 7-day strength equal to the specified 28-day strength for concrete made with Type I or II portland cement.

1.3.2 Air Entrainment

All concrete shall contain from 5 to 7 percent total air.

1.3.3 Slump

Slump shall be within the following limits:

Structural Element	Slump in Inches	
	Minimum	Maximum
Walls, columns and beams footings, foundation walls, slabs	2	4

PART 2—PRODUCTS

2.1 CONCRETE INGREDIENTS

Air-entraining admixture shall conform to ASTM C 260. Water-reducing or retarding admixtures shall conform to ASTM C 494, Type A, B, or D. No calcium chloride or admixture containing chloride shall be used.

2.1.2 Aggregates

Aggregates for normal weight concrete shall conform to ASTM C 33.

2.1.3 Cementing Materials

Only one source and type of cement shall be used for exposed concrete surfaces of any structure. Pozzolan may be blended with Type I or II portland cement in an amount not exceeding 30 percent of the combined volume. Only one class of pozzolan, from a single source, may be used.

Portland Cement: Portland cement shall conform to ASTM C 150, Type I or II.

High Early-Strength Portland Cement: High early-strength portland cement shall conform to ASTM C 150, Type III, and shall be used only when specifically approved in writing. Concrete made with such cement shall be subject to all applicable provisions of these specifications.

Pozzolan: Pozzolan shall conform to ASTM C 618, Class F.

2.2 CURING MATERIALS

Curing materials shall be burlap, impervious sheets, or membrane-forming compounds.

2.3 EMBEDDED ITEMS

Embedded items shall be of the size and type indicated.

2.4 FORM MATERIALS

Forms for concrete surfaces shall be metal, plywood, or hardboard capable of producing the required surface without adverse effect on the concrete. Form coating shall be nonstaining form oil or form release agent that will not adversely affect the concrete surfaces or impair subsequent applications to the concrete. Form ties shall be metal, factory-fabricated, removable or snap-off type that will not leave holes less than 1/4 inch nor more than 1 inch deep and not more than 1 inch in diameter.

2.5 REINFORCEMENT

Bar reinforcement shall be deformed, Grade 40 or Grade 60 billet steel conforming to ASTM-A-615.

2.6 WATER

Water shall be potable.

PART 3—EXECUTION

3.1 PREPARATION OF SURFACES

Surfaces to receive concrete shall be clean and free from frost, ice, mud, and water. Conduit and other similar items shall be in place and clean of any deleterious substance. Surfaces shall be moist but without free water when the concrete is placed.

3.2 FORMWORK

Formwork shall be mortar-tight, properly aligned, and adequately supported to produce concrete conforming accurately to the indicated shapes, lines, dimensions, and with surfaces free of offsets, waviness, or bulges. Where surfaces are to be exposed or painted, panels shall be of uniform sizes, using smaller panels only where required by openings, joints or for closure. Unless otherwise shown, exposed external corners shall be chamfered, beveled or rounded by moldings placed in the forms. Form surfaces shall be thoroughly cleaned and coated before each use. Forms shall be removed at a time and in a manner that will not injure the concrete.

3.3 INSTALLATION OF REINFORCEMENT

Reinforcement shall be fabricated to the required shapes. Reinforcement shall be accurately positioned and secured in place.

3.4 INSTALLATION OF EMBEDDED ITEMS

Embedded items shall be free from oil, loose scale or rust, and paint. Embedded items shall be installed at the locations indicated.

3.5 BATCHING, MIXING AND TRANSPORTING CONCRETE

Ready mixed concrete shall be batched, mixed and transported in accordance with ASTM C 94.

3.6 CONCRETE PLACEMENT

Concrete shall be handled from mixer to forms in a continuous manner until the approved unit of operation is completed. Adequate scaffolding, ramps and walkways shall be provided so that personnel and equipment are not supported by in-place reinforcement. Placing will not be permitted when the sun, heat, wind, or limitations of facilities furnished by the Contractor prevent proper consolidation, finishing and curing. Concrete shall be deposited as close as possible to its final position in the forms, and there shall be no vertical drop greater than 5 feet except where suitable equipment is provided to prevent segregation and where specifically authorized. Depositing of the concrete shall be so regulated that it will be effectively consolidated in horizontal layers not more than 18 inches thick. Concrete to receive other construction shall be screeded to the proper level to avoid excessive shimming or grouting.

3.7 CONSOLIDATION

Immediately after placing, each layer of concrete shall be consolidated by internal vibrators, except for slabs 4 inches or less. The vibrators shall at all times be adequate in effectiveness and number to properly consolidate the concrete; a spare vibrator shall be kept at the jobsite during all concrete placing operations. The vibrators shall have a frequency of not less than 8000 vibrations per minute, and the head diameter and amplitude shall be appropriate for the concrete mixture being placed. Vibrators shall be inserted vertically at uniform spacing over the area of placement. The distance between insertions shall be approximately 1-1/2 times the radius of action of the vibrator so that the area being vibrated will overlap the adjacent just-vibrated area by a few inches. The vibrator shall penetrate rapidly to the bottom of the layer and at least 6 inches into the preceding layer if there is such. Vibrator shall be held stationary until the concrete is consolidated and then withdrawn slowly. The use of form vibrators must be specifically approved. Vibrators shall not be used to transport concrete within the forms. Slabs 4 inches and less in thickness shall be consolidated by properly designed vibrating screeds. Slabs greater than 4 inches shall be consolidated by internal vibration.

3.8 WEATHER LIMITATIONS AND TIME INTERVAL BETWEEN MIXING AND PLACING

Special protection measures, approved by the Contracting Officer, shall be used if freezing temperatures are anticipated before the expiration of the specified curing period. The temperature of the concrete placed during warm weather shall not exceed 85°F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. In no case shall the placing temperature exceed 90°F. Concrete shall be placed within 1 1/2 hours after introduction of cement to aggregates and 45 minutes when temperature exceeds 85°F.

3.9 FINISHING CONCRETE

3.9.1 Treatment of Formed Surfaces

Within 24 hours after forms are removed, surface defects shall be remedied as specified herein. All surfaces, fins shall be removed and holes left by removal of tie rods shall be reamed and filled by dry-packing. For all surfaces, honeycomb and other defective areas shall be cut back to sound concrete and to a depth of not less than 1 inch. The edges of the cut shall be perpendicular to the surface of the concrete. The prepared area shall be dampened and brush-coated with neat cement grout. The repair shall then be made using a stiff mortar, preshrunk by allowing the mixed mortar to stand for 45 minutes and then remixed, thoroughly tamped into place; in lieu of hand patching, a small shotcrete gun may be used. Patches shall be finished flush with adjacent surfaces. For surfaces permanently exposed to view, the cement used shall be a blend of job cement with white cement proportioned so that the final color after curing will be the same as the adjacent concrete. The temperature of concrete, mortar patching material and ambient air shall be above 50°F while making the repair and during the ensuing 72 hours moist curing period. Concrete with excessive honeycomb, or other defects which affect the strength of the member, will be rejected or the defects shall be corrected as directed by the Contracting Officer.

3.10 SLABS ON GRADE

3.10.1 Placement

Placement of concrete shall be continuous so that each unit of operation will be monolithic. Concrete shall be consolidated, screeded to grade, and prepared for the specified finish. Forms shall remain in place for at least 24 hours after concrete placement.

3.10.2 Finishing Concrete Slabs

In cold weather, the air temperature in areas where concrete is being finished shall not be less than 50°F. In hot windy weather, a covering or windbreak shall be provided as necessary to prevent premature setting and drying of the surface. The dusting of surfaces with dry materials or the addition of water during finishing will not be permitted. The surface shall be protected from rain and if any water is finished into the surface, it will be cause for rejection. Finished surfaces shall be plane, with no deviation greater than 1/4 inch when tested with a 10 foot straightedge. Surfaces shall be pitched to drains.

3.10.3 Rough Finish

Immediately after consolidation, slabs shall be screeded with straightedges to bring the surface to the required finish level with no coarse aggregate visible. The resulting rough slab finish shall be suitable to receive fill and mortar setting beds.

3.10.4 Wood-Float Finish

The screeding shall be followed immediately by darbying or bull floating before bleeding water is present, to bring the surface to a true, even plane. After the concrete has stiffened so that it will withstand a man's weight without imprint and the water sheen has disappeared, it shall be wood floated.

3.11 CURING AND PROTECTION

3.11.1 General

All concrete shall be cured by an approved method for the period of time given below:

Type III cement	3 days
Type I or Type II cement	7 days
Blended cement or cement and pozzolan	7 days

Immediately after placement, concrete shall be protected from premature drying extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. All materials and equipment needed for adequate curing and protection shall be available and at the placement prior to placing concrete. No fire or excessive heat shall be permitted near or in direct contact with the concrete at any time. Curing shall be accomplished by any of the following methods, or combination thereof, as approved.

3.12 CURING AND PROTECTION

3.12.1 General

Immediately after placement, concrete shall be protected from premature drying extremes in temperatures, rapid temperature change, mechanical injury and injury from rain and flowing water. Air and forms in contact with concrete shall be maintained at a temperature above 50°F for the first 3 days and at a temperature above 32°F for the remainder of the specified curing period.

3.12.2 Membrane Curing

Curing compound shall be applied to formed surfaces immediately after the forms are removed and prior to any patching or other surface treatment except the cleaning of loose sand, mortar, and debris from the surface. Surfaces shall be thoroughly moistened with water and the curing compound shall be applied to slab surfaces as soon as the bleeding water has disappeared. Compound shall be applied in a one-coat continuous operation by mechanical spraying equipment, at a uniform coverage in accordance with the manufacturer's printed instructions. Concrete surfaces which have been subjected to rainfall within 3 hours after curing compound has been applied shall be resprayed by the method and at the coverage specified. On surfaces permanently exposed to view, the surface shall be shaded from direct rays of the sun for the duration of the curing period. Surfaces coated with curing compound shall be kept free of foot and vehicular traffic, and from other sources of abrasion and contamination during the curing period.

3.13 SETTING BASE PLATES AND BEARING PLATES

After being properly positioned, bearing plates for structural members and machinery and equipment base plates shall be set to the proper line and elevation with damp-pack bedding mortar, except where nonshrink grout is indicated. The thickness of the mortar or grout shall be approximately 1/24 the width of the plate, but not less than 3/4 inch. Concrete and metal surfaces in contact with grout shall be clean and free of oil and

grease, and concrete surfaces in contact with grout shall be damp and free of laitance when grout is placed.

Anchor bolts shall be stainless steel J-bolts or wedge anchors sized per the Drawings. Wedge anchors shall be 304 or 316 stainless steel with all component parts of the same grade.

3.14 TESTING

The Contractor shall perform all tests required as specified in Section CONTRACTOR QUALITY CONTROL.

* * END OF SECTION * *

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**SECTION 13010
FLARE AND APPURTENANCES**

PART 1—GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A 36	Standard Specification for Structural Steel
ASTM A 53	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless

1.2 SUBMITTALS

Submit the following: detailed finish specifications including surface preparation and application instructions, complete shop drawings and wiring details; and igniter manufacturer, make, model, catalog cut and description.

PART 2—PRODUCTS

2.1 FLARE

The flare shall be fabricated according to the Drawings from mild carbon steel conforming to the following: plate, ASTM A 36; and pipe, ASTM A 53.

2.1.1 Guy Wires

The guy wires shall be 1/4-inch diameter braided stainless steel cable with all stainless steel hardware. Six guy wires are required, each one assembled as follows: shackle on one end, safety hook on the other end; 6-inch long turnbuckle located approximately 4 feet from the safety hook; length as required to span from the lifting eye to the guy wire anchor eye nut with the turnbuckle adjusted to the center of its adjustment range; and a thimble at every loop.

2.1.2 Finish

The finish shall be resistant to weather and sunlight and shall be able to withstand sustained temperatures of 1200 F without blistering, cracking, discoloring or otherwise degrading. All exterior surfaces, including the bottom of the base plate, shall be finished. Surface preparation and finish application shall conform to the written instructions of the finish manufacturer. The finish shall be Tnemec System 39-1261 or approved equal.

2.1.3 Flame Arrester

Flame arrester: horizontal, with heavy wall cast aluminum body, ANSI 125-psi flat faced flange connections, aluminum element.

2.2 IGNITER

The igniter shall include a sparking head, control panel, and installation hardware. The igniter head shall consist of the following:

- ☐ Two ½-inch, 316L stainless steel venturi electrodes 30-inches long. Venturi electrodes are hollow to provide self cooling and self cleaning.
- ☐ One air aspiration port at the base of each venturi electrode.
- ☐ Single Insulator covered with protective heat shield.
- ☐ Single 2½-inch square by 33½-inch long insulated probe.
- ☐ Twelve volt coil enclosed within a NEMA 3 weatherproof enclosure.
- ☐ Mounting bracket.
- ☐ Except for the stainless steel, painted gray enamel.

The control panel shall consist of the following:

- ☐ NEMA 3 weatherproof enclosure.
- ☐ Corrosion resistant, spring loaded Hand-Off-Auto key switch. The hand position is for testing, the Auto position is for continuous operation.
- ☐ Solid state plug in control card for adjusting the length of arc (Arc Duration) and the length between arc (Arc Sequence). Arc Duration shall be factory preset at .9 seconds, Arc Sequence at 30 seconds.
- ☐ Solar collector for charging a 12 volt battery, associated mounting hardware and wiring hardware to battery enclosure.
- ☐ One weatherproof vented battery enclosure with wiring hardware to control panel enclosure with 12 Volt/160 Amp cycle battery.
- ☐ Power requirement: 12V D.C./2 Amp supplied by the Solar Collector.
- ☐ The Control Panel Enclosure and Battery Enclosure shall be painted gray enamel.
- ☐ Ignition System shall operate 1 week on the battery power supply in the event of a solar collector failure.

The installation hardware shall consist of the following:

- ⊞ Two-inch diameter by 8'-0" long Control Panel Mounting Pole.
- ⊞ All necessary unistrut and bolting to mount the Control Panel and Battery Box Enclosures.
- ⊞ 1/4" thk x 8" x 8" Baseplate complete with four (4) Boltholes on an 8'-1/4" BCD.
- ⊞ Finish painted gray enamel.
- ⊞ Forty feet of 3C/#14 Tech Cable and two (2) Tech Connectors.

The flare fabricator shall install the stationary mounting bracket and test fit the igniter head assembly to the flare per the igniter manufacturer's instructions and the Plans.

2.2.1 Battery

Deep cycle, 12 V, 160 amp, dimensions as required to fit in the battery enclosure furnished with the igniter.

PART 3—EXECUTION

3.1 INSTALLATION

3.1.1 General

Flare; level and plumb, anchored per Section CONCRETE FOR FOUNDATIONS, ANCHORS, AND SUPPORTS, with 3/4" x 8" wedge anchors or 3/4" J-bolts, guy wires taught.

Igniter controls and mounting pole; plumb, per manufacturer's written instructions.

3.1.2 Igniter

Assemble, position, and wire per the manufacturer's instructions.

3.1.3 Flame Arrester

Install per manufacturer's instructions, bolts properly torqued so as not to crack the flanges.

* * END OF SECTION * *

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